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Applewood

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

Manorwood Homes

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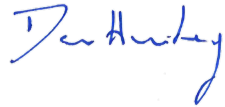
April
1, 2021

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Issue	Date	Description
1	April 1, 2021	FSR & SWM Report

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1 Introduction

Tatham Engineering Limited has been retained by Manorwood Homes to complete a Functional Servicing and Stormwater Management Report in support of a 42-unit residential development located in the Town of The Blue Mountains referred to as Applewood. This report presents background information and an overview of the proposed servicing strategy for the following:

- water supply;
- sanitary sewage collection;
- drainage and stormwater management; and
- utility distribution (electrical, telephone, cable and gas).



2 Development Site

2.1 SITE LOCATION

The subject site is located in the Thornbury neighborhood of The Town of The Blue Mountains. The legal description of the site is Parts 1, 4, 5, 6, 7, and 9 of plan 16R-8184. The site is bounded by Huron Street to the north, and Elgin Street to the east, the Thornbury Cidery and Medical Clinic to the south and a park to the west, as illustrated in Figure 1.

2.2 SITE CONDITIONS

The subject site is a vacant lot, covered in tall grass and moderate trees. The Georgian Trail runs along the north and east property lines. The topography of the site generally slopes to the north directing storm runoff flows towards Huron Street as overland flow. While due to existing grades it is expected that some of the flow will drain internally due to low areas. The overland flow from the property travels north and eventually makes it way to Georgian Bay. There is a small area of the site near the eastern limit that flows overland onto Elgin Street and is conveyed to the Bay via the Elgin Street storm sewer.

2.3 SUBSURFACE CONDITIONS

XCG Consultants completed a test pit investigation and installed monitoring wells on the site in 1995. In October 2020, DS Consultants sampled the wells and supplemented the subsurface data with several new boreholes in October 2020. A 50 mm to 300 mm layer of topsoil was observed, followed by an alluvial deposit of varied thickness depending on where you are on-site. Beneath the alluvial deposit a clayey silt was encountered to a depth of 2.3 m up to 7.5 m. The remainder of the explored depths was found to be a silty sand/sandy silt/sand with rock fragments. Groundwater was found to be at depths between 2.3 and 4.3 m.

2.4 PROPOSED DEVELOPMENT

The proposed development features 42 residential units as follows:

- two 7-unit townhouses;
- three 6-unit townhouses; and
- two 5-unit townhouses.

All proposed townhomes will be two-stories in height, including an attached garage. Site access will be provided by a private driveway access from Elgin Street, all units will front directly onto this internal road. The road will include 6 m of asphalt, a mountable curb on both sides. There



will be an access allowance provided to the King Street / Medical Centre driveway entrance to the south if needed for emergencies. A hammerhead turn around is provided at the end of the driveway to allow for emergency and refuse collection vehicles to turnaround. For pedestrian access a 1.5m sidewalk is proposed on the north side of the driveway. The sidewalk will connect to the Georgian Trail system that has been re-routed around the site adjacent to Huron Street along the north limit of the property. A block of approximately 0.1 ha in the north east of the property adjacent to Elgin and Huron Streets will remain open space.



3 Water Supply & Distribution

3.1 EXISTING WATER INFRASTRUCTURE

The site is not currently serviced with water. An existing 150 mm diameter watermain is located on Elgin Street and an existing 400 mm diameter watermain is located on King Street, which services the existing Medical Clinic and Thornbury Cidery.

3.2 PROPOSED INFRASTRUCTURE

A single 150 mm diameter watermain will be connected to the 150 mm diameter watermain on Elgin Street which will extend the length of the development, approximately 240 m. Each unit will have an individual water service and the watermain will dead end with a hydrant at the west limit of the development. At this time, it is proposed to install a shared water meter and backflow preventer at the entrance to the development. This will be reviewed with the Town and be resolved depending on the form of condominium development the site will follow (at this time it is expected to be a standard condo). The proposed water service design is displayed on Drawing 120164-SS-1 and 120164-WM-1 which are enclosed with this report.

3.2.1 Water Demands

Table 1 sets out the proposed water demands for the development; corresponding detailed water demand calculations are provided in Appendix A.

Table 1: Proposed Water Demands

CONDITION	FLOW (L/s)
Average Day Demand	0.50
Maximum Day Demand	1.38
Peak Hour Demand	2.26
Fire Flow	484.49

Water supply for firefighting purposes will be provided by three fire hydrants located strategically across the proposed development, with a maximum spacing of 90 meters. These proposed locations are in accordance with Town Standards and will provide for future maintenance.



3.2.2 Water Capacity

The proposed development will have an Average Day Demand (ADD) of 43.5 m³/day and Maximum Day Demand (MDD) of 119.2 m³/day based on a total equivalent population of 96.6 persons. As per the Town of The Blue Mountains *2019 Year End Water and Wastewater Capacity Assessment*, the Town has a total water capacity of 16,390 m³/day which equates to 15,462 units, of which, 2,670 units are available for allocation. Therefore, the Town's existing water supply is sufficient to provide potable water to the proposed development. We understand the Town will insert this development and the water demand in the overall Town model to confirm the adequacy of the servicing concept.



4 Sanitary Servicing

4.1 EXISTING INFRASTRUCTURE

There are various existing sanitary sewer systems surrounding the development. An existing 350 mm diameter outfall sewer, a 200 mm diameter gravity sewer and a 300mm diameter forcemain are located in the Elgin Street right-of-way, these sanitary sewers continue along Huron Street and then north on McAuley Street. An old sanitary service for the Thornbury Cidery bisects the Applewood development, this service includes approximately 115 m of gravity sewer along with two 1200 mm maintenance holes. This infrastructure is still in service but will be decommissioned and removed prior to development of the Applewood site.

4.2 PROPOSED INFRASTRUCTURE

A new 200 mm diameter gravity sanitary sewer outlet for the Cidery was recently installed in 2020 along the south and west boundaries of the Applewood development and discharges to an existing maintenance hole at the intersection of Huron Street and McAuley Street. As noted above, the old Cidery service that bisects the Applewood development will be decommissioned and removed.

The proposed sanitary sewer for the Applewood development will be installed along the frontage of the units under the internal access road. It will connect to the recently installed sanitary sewer installed for the Cidery at the west limit of the site. It is our understanding this sewer will come under Town ownership once the connection is made from this site. The Applewood units will discharge to this new sewer via gravity however due to some depth limitations of the new Cidery sanitary sewer, a few of the Applewood units may require sewage pumps in their basements to discharge to the gravity sewer along the internal access road. The proposed sanitary sewer routing and design is displayed on Drawing 120164-SS-1 and 120164 SAN-1 enclosed with this report.

4.2.1 Sanitary Demands

Table 2 sets out the proposed sewage flows for the development; detailed sanitary design flows are included in Appendix B.



Table 2: Proposed Sewage Demands

CONDITION	FLOW (L/s)
Average Daily Flow	0.50
Peak Sewage Flow	2.14
Peak Flow Plus Infiltration	2.45

4.2.2 Sewage Capacity

The proposed development will generate very modest flows that can be conveyed by the existing gravity sewers and pump station. Peak flows are minimal and should not adversely impact the downstream conveyance system. In total the site will have an Average Flow of 43.5 m³/day and Peak Flow of 211.7 m³/day based on a total equivalent population of 96.6 persons. As per the Town of The Blue Mountains *2019 Year End Water and Wastewater Capacity Assessment*, the Thornbury Wastewater Treatment Plant has a total capacity of 3,580 m³/day which equates to 3,436 units, of which 1,501 units are available for allocation. Therefore, the conveyance system from the site has capacity and the Thornbury Wastewater Treatment Plant has sufficient capacity for the proposed development.



5 Stormwater Management

5.1 EXISTING DRAINAGE CONDITIONS

Under existing conditions, the site drains via overland flows from the south to the north-west. The site as described in Section 2.2 of this report as an undeveloped lot, generally covered in grass and moderate trees.

Drainage from the site flows as overland flow to the north and while currently there are low areas on site that can capture and store some of these flows the overland flow outlet for the site is to the north and west. Overland flow would travel north approximately 150 metres either through private property or down the McAuley Street or Elgin Street right-of-way into Georgian Bay.

Drainage from the adjacent Cidery and Clinic is collected in existing catch basins and conveyed to the King Street storm sewer.

A pre-development drainage plan (Drawing 120164-DP-1) is enclosed and shows the existing drainage pattern of the site. Pre-development flows exiting the site at select locations are summarized below in Table 3.

Table 3: Pre-Development Peak Flows

CATCHMENT	AREA	PRE-DEVELOPMENT PEAK FLOWS (m ³ /s)				
		5 Year	10 Year	25 Year	50 Year	100 Year
Huron Street	101	0.045	0.093	0.133	0.175	0.222
Elgin Street Storm Sewer	102	0.002	0.005	0.007	0.009	0.011
Medical Clinic	103	0.095	0.125	0.155	0.182	0.211
Cidery	104	0.076	0.098	0.120	0.140	0.161
Total		0.218	0.321	0.416	0.506	0.605



5.2 PROPOSED DRAINAGE CONDITIONS

5.2.1 Minor Storm Sewer System

The drainage pattern for the proposed development is shown on the enclosed post-development drainage plan (Drawing 120164-DP-2). Units located on the north side of the internal access road will be split draining with the roof and front yard draining to the proposed minor storm sewer system within the internal access road. Only the rear yards will continue to drain to Huron Street at rates less than under existing conditions.

Units on the south side of the development, with the exception of Block 1, are rear to front draining where possible. Block 1 roof area will have split drainage, while Blocks 2 and 3 roof areas will drain north to the proposed minor storm sewer system. Only rear yards of these blocks will drain to the Cidery or Medical Clinic lot at rates less than under existing conditions.

Overall, the addition of the Applewood units will increase the imperviousness of the site and thus the total flows leaving the site, however, it is proposed to reduce the area draining overland off-site to the north west. The majority of drainage from the site will be collected and conveyed via the proposed storm sewer system within the internal access road. It is proposed to outlet this on-site sewer to the existing storm sewer on Elgin Street. Based on discussions with the Town it has been confirmed that it is nearing capacity and may not have capacity set aside for this development. As such to accommodate this site it is proposed that this Elgin Street sewer be upsized for a length of approximately 210 meters, from the development to the outlet at Georgian Bay. The new additional capacity to be provided in the Elgin street sewer will match the 1:100 year flow from the site storm sewer which is 310 L/s. This will ensure the 100 year storm flow from the development will be safely conveyed to Georgian Bay without adversely impacting the storm sewer function. Proposed flows to the outlets are summarized in Table 4. Based on preliminary sizing the upsized external sewer upgrade is expected to be to an 825mm diameter. Final design details are being resolved for this proposed upsizing storm solution and will be submitted to the Town under separate cover.



Table 4: Post-Development Peak Flows

CATCHMENT	AREA	POST-DEVELOPMENT PEAK FLOWS (m ³ /s)				
		5 Year	10 Year	25 Year	50 Year	100 Year
Huron Street	201	0.012	0.022	0.031	0.040	0.050
Elgin Street Storm Sewer	210	0.170	0.204	0.245	0.278	0.310
Medical Clinic	212	0.071	0.089	0.109	0.125	0.143
Cidery	211	0.079	0.099	0.121	0.140	0.159
Total		0.331	0.414	0.506	0.582	0.661

5.2.2 Major Storm Sewer System

As identified above the proposed storm sewer upgrade on Elgin Street will be sized to convey the 100-year storm flow from the development site. Any flows over and above this will be conveyed overland wither down Elgin street or to the north west, via Mcauley Street north through the park at flow rates less than the existing condition.

5.2.3 Water Quality Control

Enhanced, Level 1 water quality treatment in the form of 80% TSS removal is required. Flows draining to the proposed minor system will move through an OGS sized to remove 80% TSS. A detailed OGS sizing output can be found in Appendix D.

5.3 SILTATION & EROSION CONTROL

Siltation and erosion control will be implemented for all construction activities for the proposed development, including vegetation clearing, topsoil stripping, road construction and stockpiling of materials. The siltation and erosion control for the proposed development is shown on the enclosed Sediment Control and Removals Plan (Drawing 120164-SC-1).

The basic principles considered to minimize erosion and sedimentation and resultant negative environmental impacts include:

- minimize disturbance activities where possible;
- expose the smallest possible land area to erosion for the shortest possible time;
- institute erosion control measures as-required immediately;



- implement sediment control measures before the outset of construction activities; and
- carry out regular inspections of erosion/sediment control measures and repair or maintain as necessary.



6 Utilities

The Health Centre and Cidery are serviced with hydro, telephone, cable and gas service from existing infrastructure located in municipal right-of-way.

Final design for utility services has been commenced via contact with the utilities and will be finalize following site plan review by the Town.



7 Summary

As outlined in the report, the property can be appropriately serviced; key findings are summarized below.

- A new 150 mm diameter watermain will be provided off the existing 150 mm diameter watermain on Elgin Street. Each townhouse unit will have an individual service off this watermain, however, all units will share one water meter.
- Three hydrants have been included to provide fire fighting flows to the development, spaced as per the Town of The Blue Mountains Design Standards.
- A new 200 mm diameter sanitary sewer will be provided off the existing 200 mm diameter Thornbury Cidery sanitary sewer.
- Due to proximity to Georgian Bay and the upsizing of existing storm sewer is proposed to accommodate the site drainage and no on-site stormwater quantity controls are proposed.
- A new internal storm sewer will be provided to service the proposed development. As the existing storm sewer on Elgin Street is at capacity, storm infrastructure will be replaced from the proposed development north along Elgin Street to the existing outlet.
- An oil and grit separator is proposed to provide stormwater cleansing prior to discharge into the Bay.
- Utilities are located throughout the area and have the capacity to service the development including internal street lighting.



Figure 1: Site Location Map



APPLEWOOD

MANORWOOD HOMES

TOWN OF THE BLUE MOUNTAINS



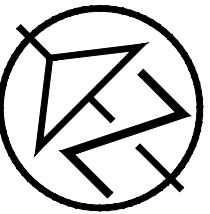
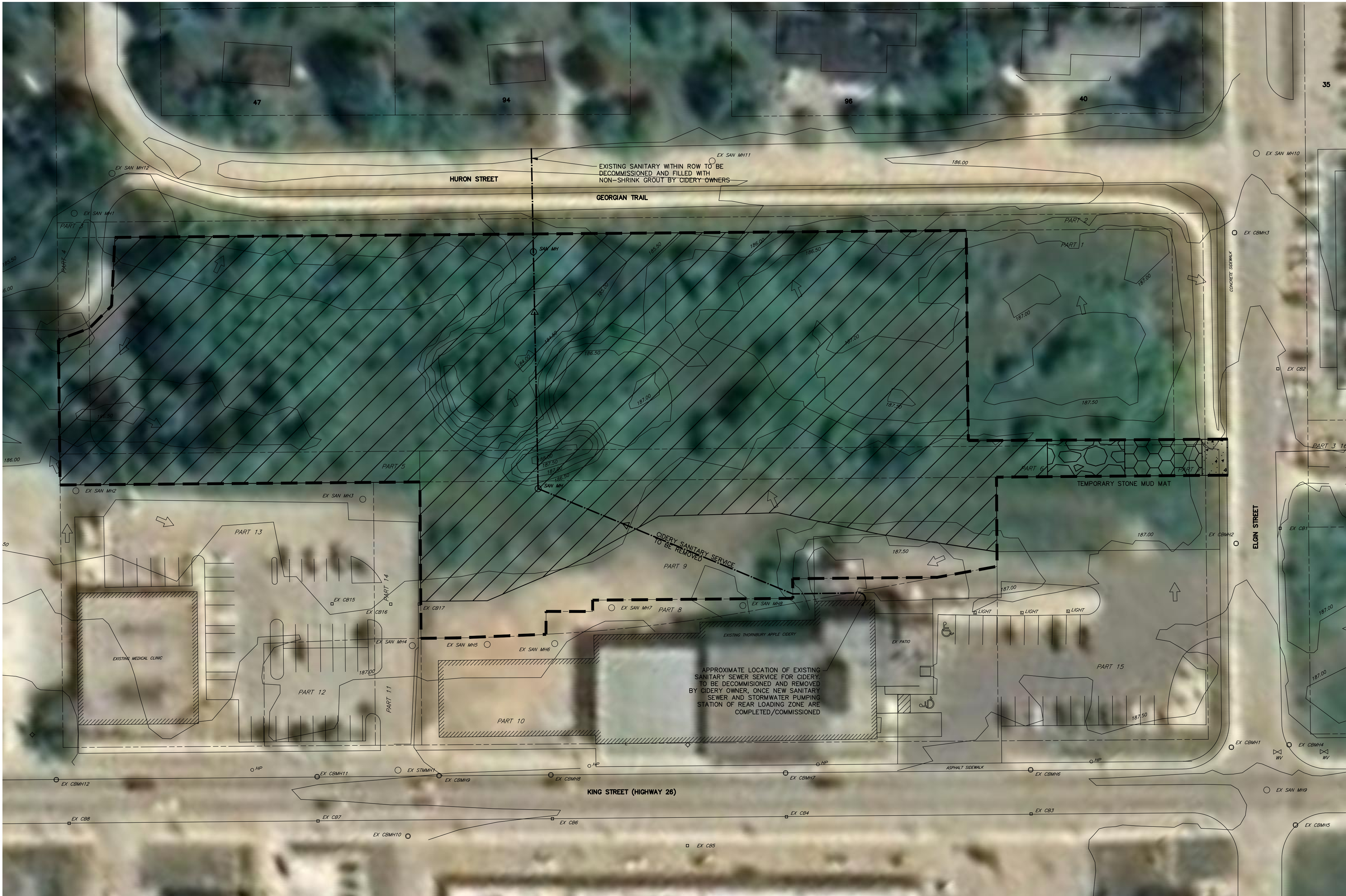
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5	120164--SG--1	SITE GRADING PLAN
6	120164--WM--1	WATER DISTRIBUTION PLAN
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8	120164--DP--1	PRE--DEVELOPMENT DRAINAGE PLAN
9	120164--DP--2	POST--DEVELOPMENT DRAINAGE PLAN
10	120164--DE--1	DETAILS AND NOTES SHEET 1

LEGEND

PROPERTY LINE	----
EXISTING CENTERLINE	----
PROPOSED CENTERLINE	----
EXISTING EDGE OF ASPHALT	----
EXISTING CURB	----
PROPOSED EDGE OF ASPHALT	----
PROPOSED CURB	----
EXISTING DITCH/DIRECTION OF FLOW	----->
PROPOSED DITCH/DIRECTION OF FLOW	----->
EXISTING SANITARY SEWER/SIZE/DIRECTION OF FLOW	-----> 200# SAN
PROPOSED SANITARY SEWER/SIZE/DIRECTION OF FLOW	-----> 200# SAN
EXISTING SANITARY SERVICE	-----
PROPOSED SANITARY SERVICE	-----
EXISTING WATERMAIN/SIZE	----- 150# W/M
PROPOSED WATERMAIN/SIZE	----- 150# W/M
EXISTING WATER SERVICE	-----
PROPOSED WATER SERVICE	-----
EXISTING STORM SEWER/SIZE/DIRECTION OF FLOW	-----> 375# STM
PROPOSED STORM SEWER/SIZE/DIRECTION OF FLOW	-----> 375# STM
EXISTING CULVERT	=====
PROPOSED CULVERT	=====
PROPOSED SWALE LOCATION	----->
EXISTING GAS MAIN	----- GAS
EXISTING GAS SERVICE	----- GAS
EXISTING FENCELINE	-----
PROPOSED FENCELINE	-----
EXISTING BUSHLINE	-----
EXISTING CONTOUR	----- 179.00
EXISTING SPOT ELEVATION	x 179.00
PROPOSED SPOT ELEVATION	x 179.00
EXISTING GRADING DIRECTION	----->
PROPOSED GRADING DIRECTION	----->
EXISTING TEMPORARY BENCHMARK	SB
EXISTING STANDARD IRON BAR	SB
EXISTING BOREHOLE	BH9
EXISTING GAS VALVE	GAS
EXISTING HYDRO TRANSFORMER	HT
EXISTING CABLE PEDESTAL	CP
EXISTING BELL PEDESTAL	BP
EXISTING BELL MAINTENANCE HOLE	BELL MH
EXISTING HYDRO POLE	HP
EXISTING HYDRO GUY WIRE	HW
EXISTING TRAFFIC SIGN	TS
PROPOSED TRAFFIC SIGN (MISCELLANEOUS)	TS
EXISTING DECIDUOUS TREE	DT
EXISTING CONIFEROUS TREE	CT
EXISTING BUSH	B
EXISTING SANITARY MAINTENANCE HOLE	SAN MH20
PROPOSED SANITARY MAINTENANCE HOLE	SAN MH17
EXISTING HYDRANT	HYD
PROPOSED HYDRANT	HYD
EXISTING WATER VALVE	WV
PROPOSED WATER VALVE	WV
PROPOSED CURB STOP VALVE	CSV
EXISTING WATERMAIN PLUG	WP
PROPOSED WATERMAIN PLUG	WP
PROPOSED WATERMAIN REDUCER	WR
EXISTING STORM MAINTENANCE HOLE	STM MH20
PROPOSED STORM MAINTENANCE HOLE	STM MH9
EXISTING CATCH BASIN	CBMH 18
PROPOSED CATCH BASIN	CB8
PROPOSED CATCH BASIN MAINTENANCE HOLE	CBMH12
PROPOSED DOUBLE CATCH BASIN MAINTENANCE HOLE	DCBMH4
PROPOSED DOUBLE CATCH BASIN	DCB12
PROPOSED DITCH INLET CATCH BASIN	DICB2
PROPOSED TACTILE WALKING SURFACE INDICATOR	TWSI
PROPOSED CURB DEPRESSION	CD

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- NOTES**
- A. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED. SEDIMENT AND EROSION CONTROL MEASURES THAT ARE DESIGNED TO CONTROL RUNOFF FROM SPECIFIC AREAS MUST BE INSTALLED PRIOR TO ANY DISTURBANCE OF THAT PART OF THE SITE. THE LOCATION OF ALL SILTATION AND EROSION CONTROL WORKS TO BE REVIEWED ON SITE AND MAY BE REVISED AS DIRECTED BY THE ENGINEER.
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 - C. THE CONTRACTOR SHALL HAVE MATERIALS AVAILABLE ON-SITE TO REPAIR SEDIMENT AND EROSION CONTROL MEASURES IN THE EVENT OF UNFORESEEN CONDITIONS: HIGH WATER, EXTREME RAINFALL EVENTS, ETC.
 - D. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSPECTED, CLEANED AND MAINTAINED BY THE CONTRACTOR AFTER EACH STORM EVENT. ALL WORKS WILL BE REVIEWED BY THE ENGINEER BI-WEEKLY AND AFTER EACH MAJOR STORM EVENT.
 - E. ALL CONSTRUCTION VEHICLES TO ACCESS SITE USING THE DESIGNED CONSTRUCTION ACCESS

LEGEND

- AREA OF TREE REMOVAL
- HEAVY DUTY SILT FENCE
- AS PER OPSD 219.130
- EXISTING OVERLAND FLOW DIRECTION

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BENCHMARKS

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RAIL ROAD SPIKE IN SOUTH FACE OF HYDRO POLE AT NORTH-WEST CORNER OF MILL STREET AND OLD PENETANGUSHIENE ROAD

TBM2 - ELEVATION 265.47
RAIL ROAD SPIKE IN SOUTH FACE OF HYDRO POLE AT INTERSECTION OF MILL STREET AND MURPHY STREET. POLE IS ON NORTH SIDE OF MILL STREET BETWEEN HOUSE 30 AND 28

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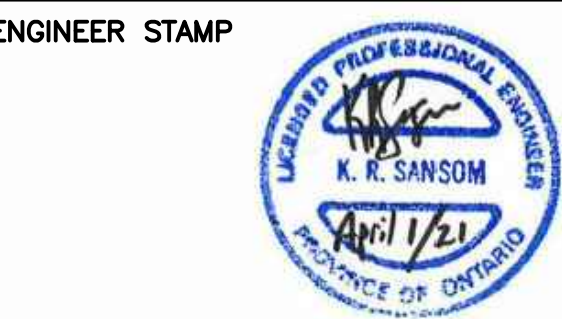
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SURVEY AS PER CROZIER AND ASSOCIATES FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT DATED JULY 2013.

SERVICING AS PER CROZIER AND ASSOCIATES FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT DATED JULY 2013.

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1.	FIRST SUBMISSION	APR 2021

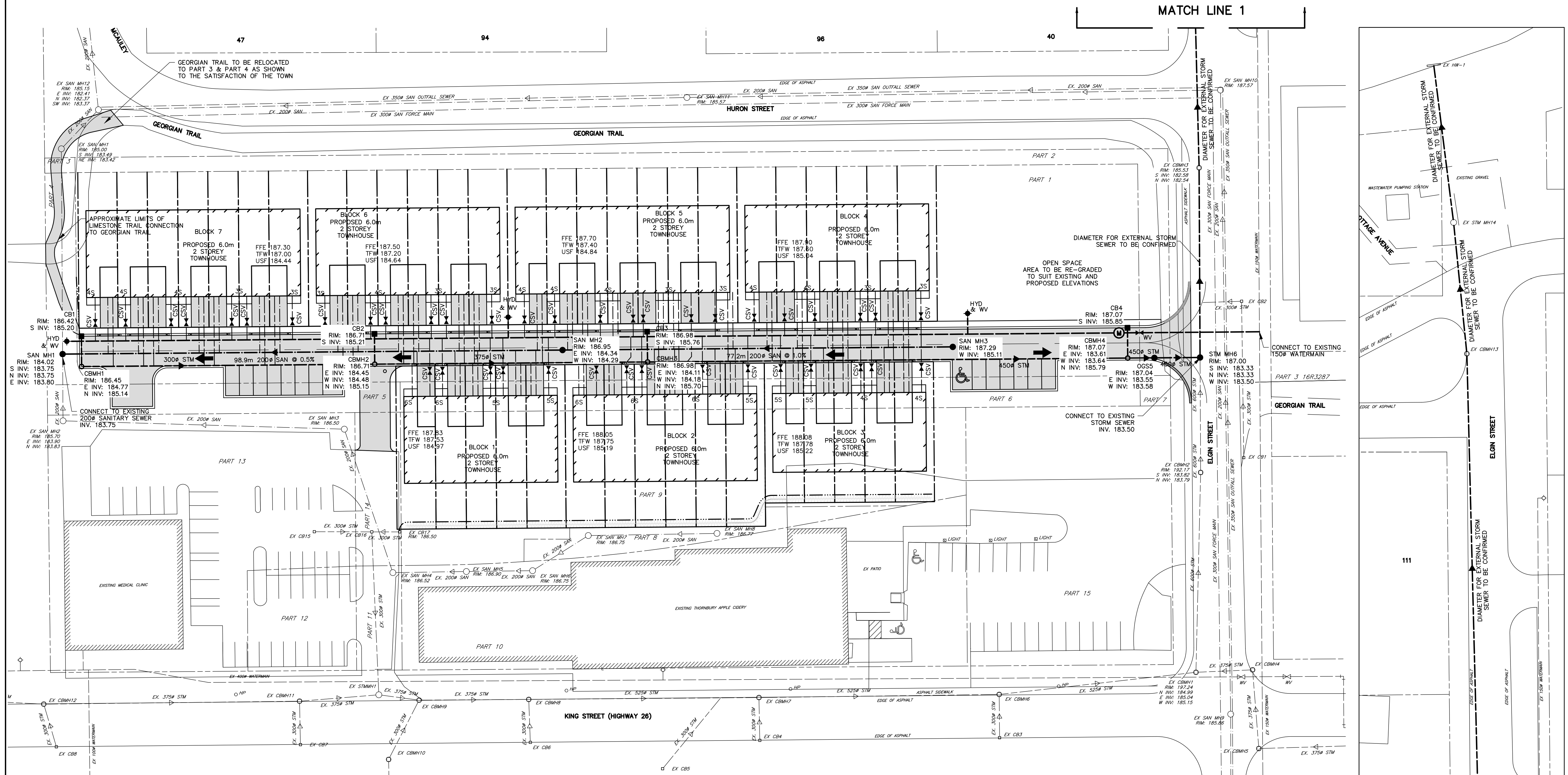
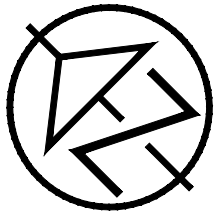


APPLEWOOD
TOWN OF THE BLUE MOUNTAINS

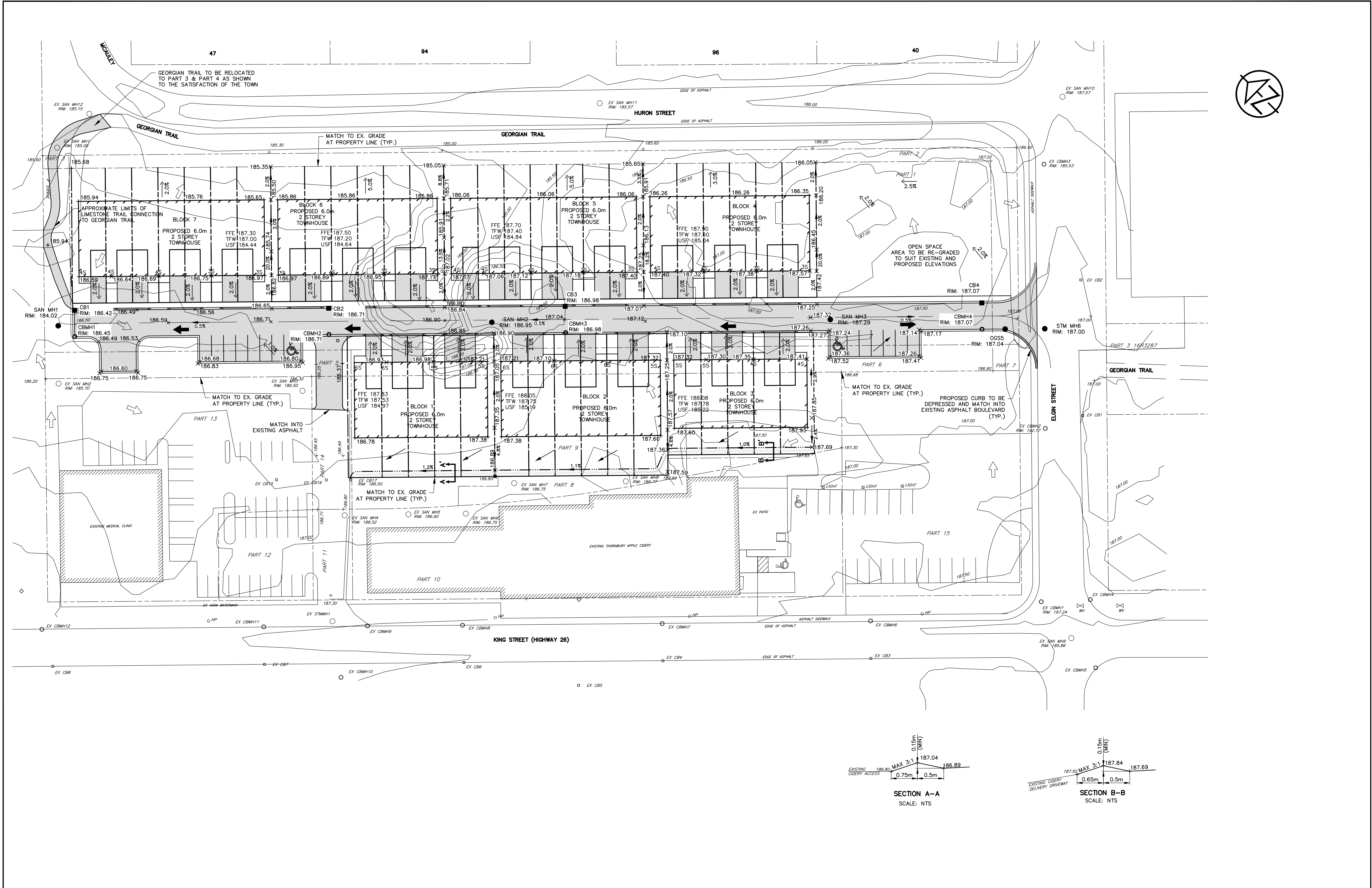
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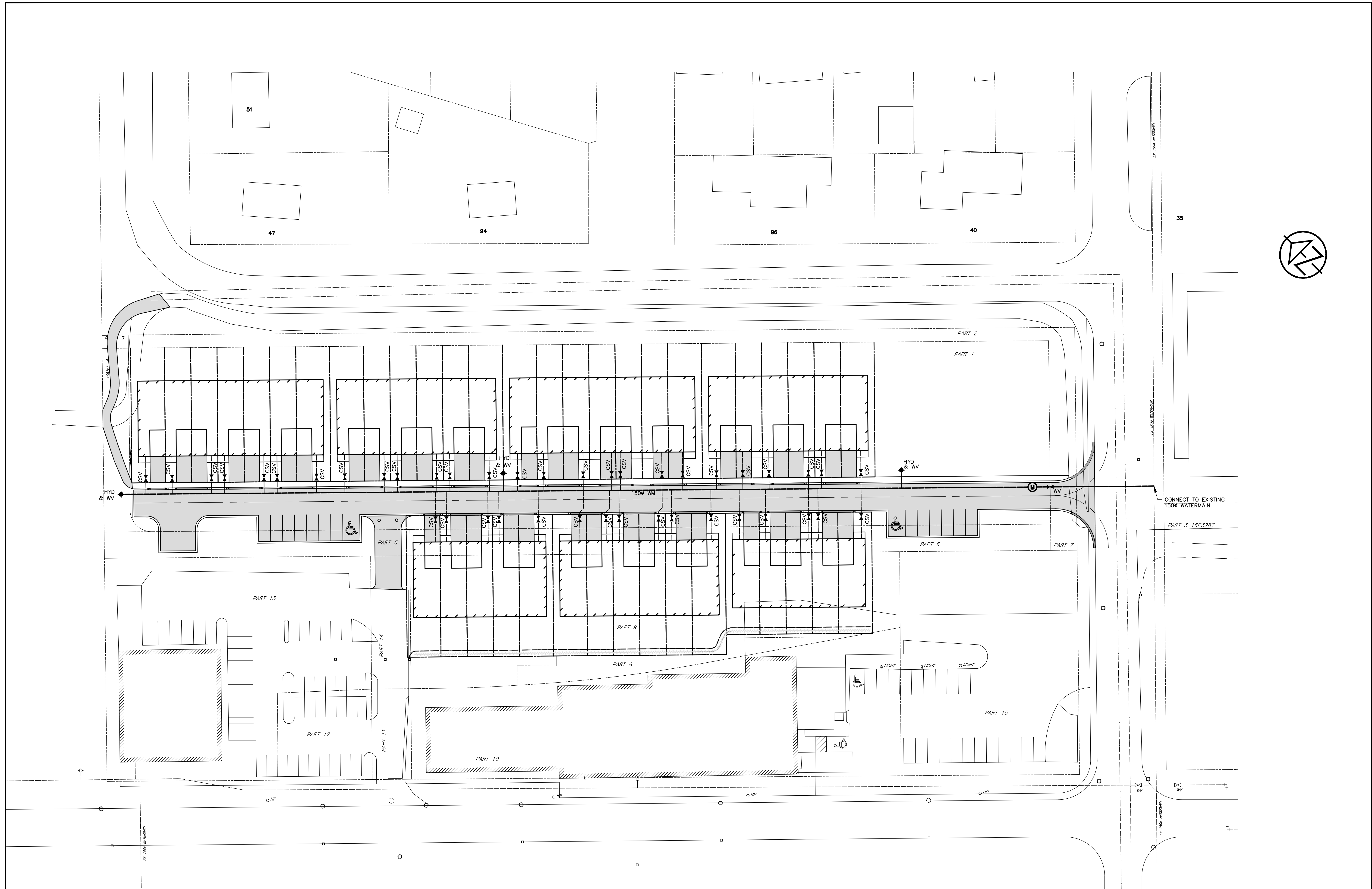
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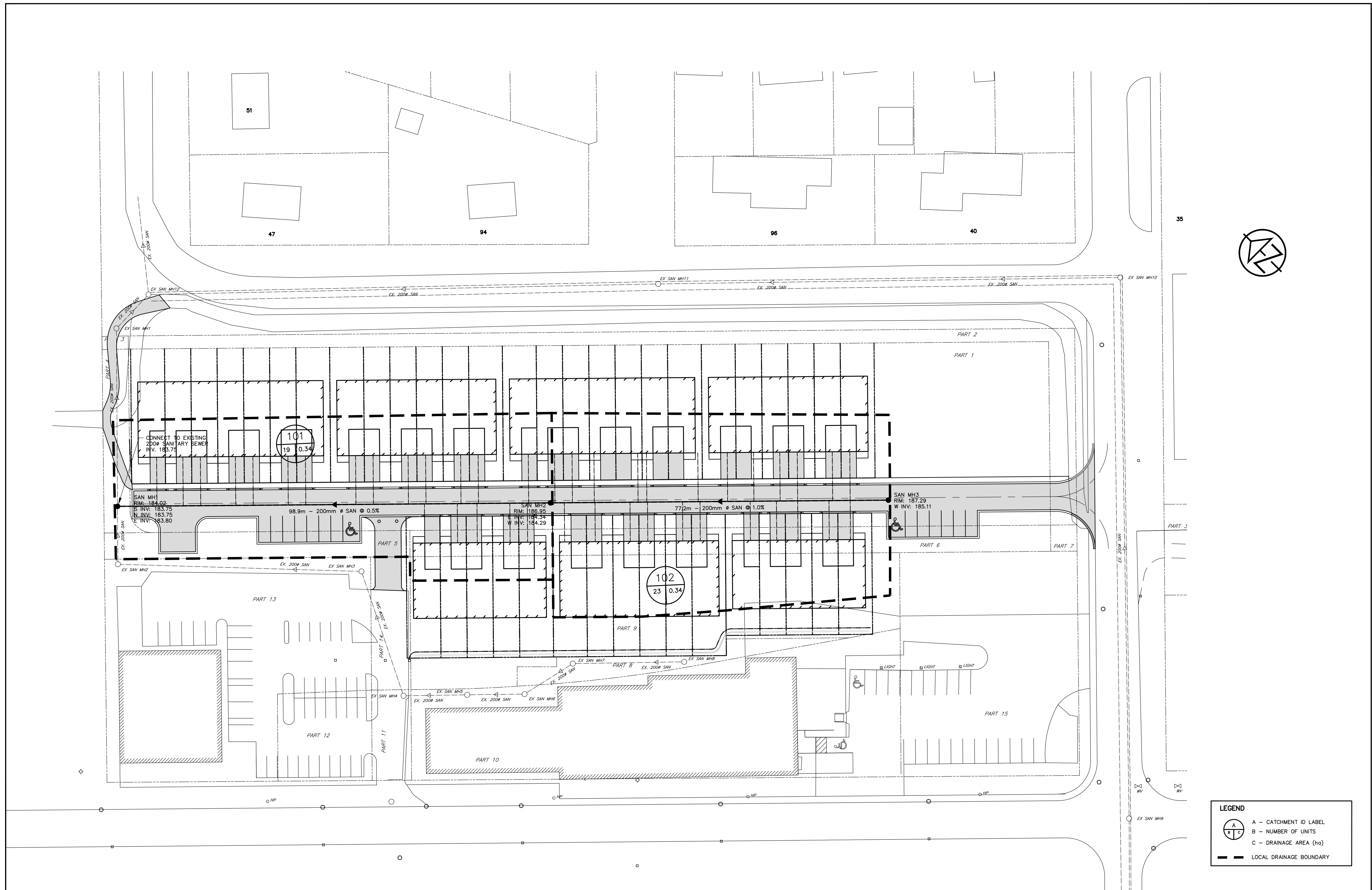
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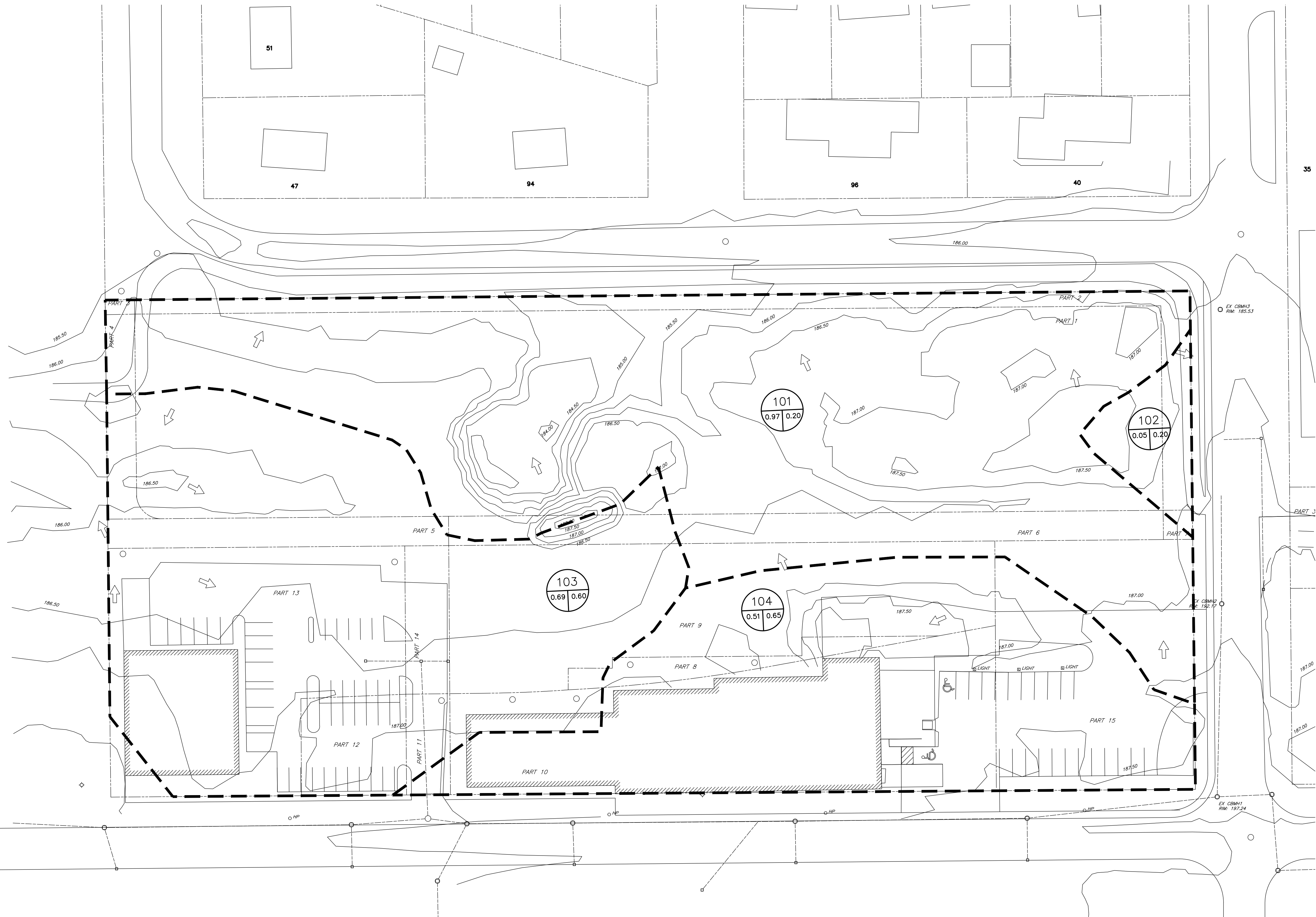
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LEGEND

➔ EXISTING OVERLAND FLOW DIRECTION

A - CATCHMENT ID LABEL
B - DRAINAGE AREA (ha)
C - RUNOFF COEFFICIENT

--- LOCAL DRAINAGE BOUNDARY

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

TATHAM ENGINEERING LIMITED CLAIMS COPYRIGHT TO THIS DRAWING WHICH MAY NOT BE USED FOR ANY PURPOSE OTHER THAN THAT PROVIDED IN THE CONTRACT BETWEEN THE OWNER/CLIENT AND THE ENGINEER WITHOUT THE EXPRESS CONSENT OF TATHAM ENGINEERING LIMITED.

BENCHMARKS

TBM1 - ELEVATION 269.81
RAIL ROAD SPIKE IN SOUTH FACE OF HYDRO POLE AT NORTH-WEST CORNER OF MILL STREET AND OLD PENETANGUSHIENE ROAD

TBM2 - ELEVATION 265.47
RAIL ROAD SPIKE IN SOUTH FACE OF HYDRO POLE AT INTERSECTION OF MILL STREET AND MURPHY STREET. POLE IS ON NORTH SIDE OF MILL STREET BETWEEN HOUSE 30 AND 28

TBM3 - ELEVATION 253.71
RAIL ROAD SPIKE AT NORTHWEST CORNER OF INTERSECTION OF MILL STREET AND COUNTY ROAD 93

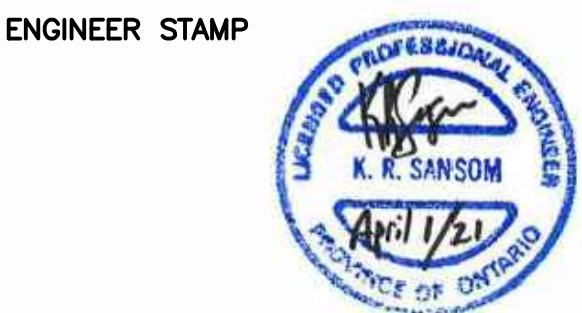
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SURVEY AS PER CROZIER AND ASSOCIATES FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT DATED JULY 2013.

SERVICING AS PER CROZIER AND ASSOCIATES FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT DATED JULY 2013.

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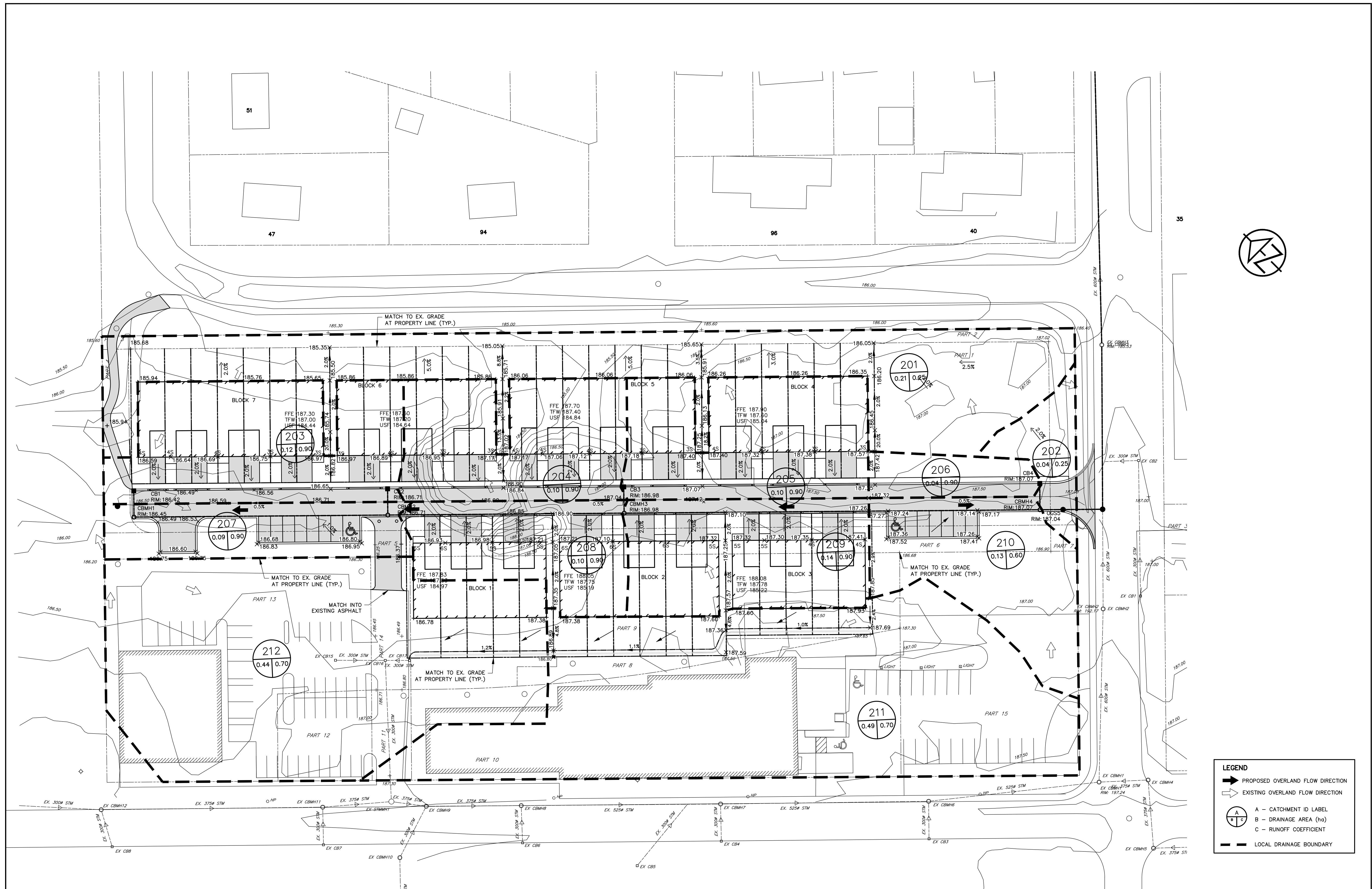


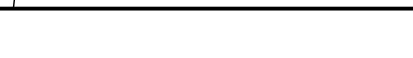
APPLEWOOD
TOWN OF THE BLUE MOUNTAINS

PRE-DEVELOPMENT DRAINAGE PLAN

TATHAM ENGINEERING

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A. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH TOWN OF THE BLUE MOUNTAINS STANDARDS AND OPS STANDARDS, WHERE CONFLICT OCCURS, TOWN STANDARDS TO GOVERN.

B. THE OWNER'S ENGINEER SHALL PROVIDE BENCHMARK ELEVATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DETAILED ELEVATION OF ALL VERTICAL WORK.

C. ALL PROPERTY BARS TO BE PRESERVED AND REPLACED BY OLS AT CONTRACTOR'S EXPENSE IF REMOVED DURING CONSTRUCTION.

D. THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR THE SUPPLY OF TEMPORARY WATER AND POWER.

E. DOWATERING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS 517 AND OPSS 518, MAINTAIN ALL TRENCHES IN A DRY CONDITION.

F. ALL TRENCHES TO BE BACKFILLED TO BE ADOPTED TO THE STANDARD SPECIFICATIONS OF THE DISTRICT.

G. GENERAL INSTALLATION AND TESTING OF SEWERS, WATERMAIN AND APPURTENANCES TO BE IN ACCORDANCE WITH OPSS 407, 408, 409, 410, 421, AND 441 AND ALL SPECIFICATIONS REFERENCED WITHIN THESE SECTIONS.

H. ALL MAINTENANCE HOLES ARE 1200 mm DIAMETER UNLESS OTHERWISE SPECIFIED.

I. ALL STRUCTURES TO BE INSTALLED WITH FROST STRAPS TO OPSS 701-100.

J. PIPE SUPPORT AT ALL STRUCTURES TO OPSS 708-020.

K. ALL MAINTENANCE HOLE AND CATCH BASIN FRAME AND GRATES TO BE SET TO BASE COURSE ASPHALT ELEVATION IN ACCORDANCE WITH OPSS 704-010. ALL STRUCTURES TO BE FINISHED TO FINISHED GRADE PRIOR TO THE PLACEMENT OF SURFACE COURSE.

L. ASPHALT USING CONCRETE ADJUSTMENT UNITS. MAXIMUM COMBINED HEIGHT OF ADJUSTMENT UNITS SHALL BE 450 mm.

M. TRENCH BACKFILL TO BE SELECT NATIVE MATERIAL OR IMPORTED SELECT SUBGRADE MATERIAL TO OPSS/MUNI 1010. BACKFILL TO BE PLACED IN MINIMUM 200 mm THICK LIFTS (OR AS OTHERWISE DIRECTED BY THE GEOTECHNICAL CONSULTANT) AND COMPACTED TO A MINIMUM DENSITY OF 95% OF THE MATERIAL'S STANDARD PROCTOR MAXIMUM DRY DENSITY (SPM).

N. PIPE EMBEDMENT TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S SPMD. BACKFILL AND EMBEDMENT TO OPSS 802-010 (FLEXIBLE PIPE), GRANULAR A EMBEDMENT OR OPSS 802-031 (RIGID PIPE) CLASS B, GRANULAR A BEDDING, GRANULAR B COVER (MAX. AGGREGATE SIZE 25 mm). MINIMUM BEDDING DEPTH 150 mm, MINIMUM COVER DEPTH 300 mm ON ALL PIPES. WHERE EXCESSIVELY WEFT OR POOR SUBGRADE IS ENCOUNTERED AT THE INVERT LEVEL, IT MAY BE NECESSARY TO INCREASE THE BEDDING THICKNESS.

O. CLEAR STONE COMPLETELY WRAPPED IN FILTER FABRIC MAY BE SUBSTITUTED FOR EMBEDMENT MATERIAL IF APPROVED BY THE ENGINEER.

P. THE CONTRACTOR IS RESPONSIBLE FOR THE PRESERVATION OF ALL EXISTING INFRASTRUCTURE/FACILITIES AS WELL AS NOTIFYING ALL UTILITY COMPANIES PRIOR TO COMMENCING WORK AND CO-ORDINATE CONSTRUCTION ACCORDINGLY.

Q. ALL ON-SITE MATERIAL SHALL BE PROPERLY STORED, SECURED, MONITORED AND COVERED AS REQUIRED. SPECIFICALLY, ALL PVC PIPE SHALL BE COVERED WHILE STORED ON-SITE.

R. ALL WORK TO COMPLY WITH THE TOWN OF THE BLUE MOUNTAINS SIGN BY-LAW.

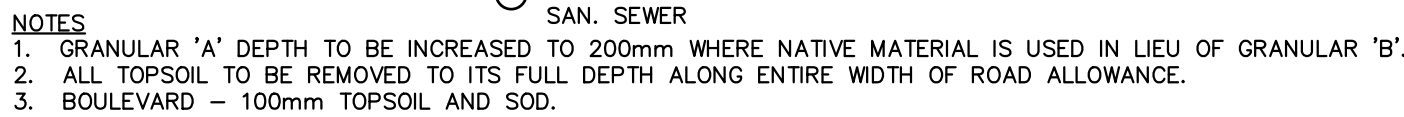
S. REFER TO LANDSCAPE PLANS FOR TREE CLEARING AND TREE PROTECTION.

A. SUBGRADE AND BOULEVARD MATERIAL TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S SPMD. B. SUBGRADE TO BE PROOF ROLLED AND CERTIFIED PRIOR TO PLACING GRANULAR B. C. GRANULAR A AND B TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 100% OF THE MATERIAL'S RESPECTIVE SPMD. D. ASPHALT TO BE COMPACTED TO 98% OF THE MARSHALL BULK DENSITY. E. ROADWAYS TO BE CONSTRUCTED IN ACCORDANCE WITH THE APPLICABLE ROAD CROSS-SECTIONS. F. TEMPORARY FIRE ROUTE TO BE CONSTRUCTED WITH MINIMUM 300 mm GRANULAR B AND 150 mm GRANULAR A. G. ALL ASPHALT AND GRANULAR MATERIAL TO BE PLACED IN ACCORDANCE WITH OPSS.MUNI 310 AND OPSS.MUNI 314. H. ASPHALT AND TACK COATS TO BE SUPPLIED PER TOWN SPECIFICATIONS. I. BASE ASPHALT TO BE CLEANED AND TACK COAT TO BE APPLIED PRIOR TO PLACEMENT OF SURFACE COURSE ASPHALT. J. CONCRETE CURB AND GUTTER TO OPSS 600.040 AND OPSS 600.110 – AS SPECIFIED, AND OPSS.MUNI 353. CURB DEPRESSIONS AT SIDEWALK CROSSINGS TO BE IN ACCORDANCE WITH OPSS 600.030. K. CONCRETE CURB TERMINATIONS TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 608.010. L. CONCRETE SIDEWALK TO OPSS 310.010, 310.033 AND OPSS 351. SUBBASE TO CONSENT TO 150 mm DEPTH GRANULAR A. M. UNPAINTED CAST IRON TACTILE WALKING SURFACE INDICATOR COMPONENTS TO BE IN ACCORDANCE WITH OPSS 310.039. N. GRANULAR A AND B TO BE PLACED IN ACCORDANCE WITH OPSS 310.010, 310.033 AND OPSS 351. BOTH SIDES OF THE ROAD IN ACCORDANCE WITH OPSS.MUNI 405 AND OPSS 216.021, UNWRAPPED TRENCH, GRANULAR A EMBEDMENT.

A. MAINTENANCE HOLES AND CATCH BASIN MAINTENANCE HOLES TO OPSD 701.010, 701.012 AND 701.013.
B. MAINTENANCE HOLES TO BE BENTCHED TO OPSD 701.021. CATCH BASIN MAINTENANCE HOLES TO HAVE A SUMP PER OPSD 701.010.
C. MAINTENANCE HOLE AND CATCH BASIN MAINTENANCE HOLE STEPS TO OPSD 405.010.
D. MAINTENANCE HOLE FRAMES AND GRATES TO OPSD 401.010 TYPE A CLOSED COVER.
E. CATCH BASINS TO OPSD 705.010 AND 705.020 COMPLETE WITH SUMP.
F. CATCH BASIN AND CATCH BASIN MAINTENANCE HOLE FRAMES AND GRATES TO OPSD 400.020.
G. CATCH BASIN LEADS ~ 300 mm DIAMETER SINGLE AND 375 mm DIAMETER DOUBLE. CATCH BASIN CONNECTIONS TO OPSD 708.010 AND 708.030.

A. ALL EXISTING SERVICES AND UTILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE TO ARRANGE FOR THE LOCATIONS OF ALL EXISTING SERVICES AND UTILITIES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO REPAIR ANY DAMAGES CAUSED BY CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR LOCATING, SUPPORTING AND PROTECTING ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THE CONTRACTORS WORK, WHETHER SHOWN ON THE PLANS OR NOT, AND FOR ALL REPAIRS TO ANY CONSTRUCTION RESULTING FROM DAMAGES TO ANY EXISTING UTILITIES.

B. ANY AREA OF POSSIBLE CONFLICTS WITH EXISTING UTILITIES SHALL BE EXCAVATED BY HAND PRIOR TO CONSTRUCTION.



Appendix A: Detailed Water Demand Calculations

	Project: Applewood	Date: April 1, 2021
	File No.: 120164	Designed: CMM
	Subject: Water Demand	Checked: KRS

Design Criteria

Person per Unit =	2.3		
Units =	42		
Per Capita Flow =	450.0	L/day	
Peaking Factors =	2.75	Maximum Day	(MECP Design Guidelines)
	4.5	Peak Hour	(TOBM Development Standards)

Design Flows

$$\begin{aligned}\text{Average Daily Flow} &= 43,470.00 \text{ L/day} \\ &= 0.503 \text{ L/s}\end{aligned}$$

$$\begin{aligned}\text{Maximum Day Demand} &= \text{Average Flow} \times \text{Peaking Factor} \\ &= 1.38 \text{ L/s}\end{aligned}$$

$$\begin{aligned}\text{Peak Hour Demand} &= \text{Average Flow} \times \text{Peaking Factor} \\ &= 2.26 \text{ L/s}\end{aligned}$$

$$\text{Fire Underwriters Survey (FUS)} = 220C\sqrt{A} \quad (\text{Fire Underwriters Survey})$$

$$C = 1.5 \quad (\text{Fire Underwriters Survey})$$

Type	A		B		C		
	mid	end	mid	end	mid	end	
A =	185	190	166	171	185	190	per unit
# =	7	4	3	2	18	8	units
Total =	1297	762	499	342	3336	1524	

$$\text{FUS} = 29069.53 \text{ L/min}$$

$$\text{Fire Flows} = 484.49 \text{ L/s}$$

$$\text{Therefore, Design Flow} = 484.49 \text{ L/s}$$

Appendix B: Detailed Sanitary Design Flows

Engineer Stamp



A circular blue ink stamp from the Province of Ontario. The outer ring contains the text "LICENSED PROFESSIONAL ENGINEER" at the top and "PROVINCE OF ONTARIO" at the bottom. In the center, the name "K. R. SANSOM" is printed. Above the name is a handwritten signature "K.R. Sansom" and below the name is the date "April 1/21".

I:\2020 Projects\120164 - Applewood Due diligence\Design\120164- Sanitary Sewer Design Sheet

	Project: Applewood	Date: April 1, 2021
	File No.: 120164	Designed: CMM
	Subject: Sanitary Flows	Checked KRS

Design Criteria

Person per Unit =	2.3		
Units =	42		
Per Capita Flow =	450.0	L/day	(TOBM Development Standards)
Harmon Peaking Factor =	4.25	Maximum Day	(TOBM Development Standards)

Sewage Flows

Average Daily Flow =	43,470.00	L/day	
=	0.503	L/s	
Peak Sewage Flow =	Avg Daily Flow x Peaking Factor		
=	2.137	L/s	

Infiltration Flows

Per Hectare Flow =	0.23	L/s	(TOBM Development Standards)
Development Area =	1.34	ha	
Infiltration Flow =	0.31	L/s	

Peak Flow =	Peak Sewage Flow	+	Infiltration Flow
=	2.45	L/s	
=	211,274	L/day	

Appendix C: Storm Sewer Design Sheet

Version Number: 1

Version Date: March 15, 2021

Project Information

Applewood	120164
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Drawing Reference

SD-2	March 15, 2021
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Prepared By

CMM	March 15, 2021
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Reviewed By

KRS	
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Municipality

Town of The Blue Mountains

Runoff Coefficient Adjustment

Year	A	B
10	0.80	0.20
25	0.70	0.30
50	0.60	0.40
100	0.50	0.50

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.009

Time of Concentration

15 mins

IDF Curve Coefficients

Year	A	B	C
2	807.44	6.75	0.83
5	1135.40	7.50	0.84
10	1387.00	7.97	0.85
25	1676.20	8.30	0.86
50	1973.10	9.00	0.87
100	2193.10	9.04	0.87

Engineer Stamp



Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m³/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
Huron Street	101			0.97	0.20	5	0.20	0.19	0.97	0.19	15.00	82.79	0.045											
Storm Sewer	102			0.05	0.20	5	0.20	0.01	0.05	0.01	15.00	82.79	0.002											
Medical Clinic	103			0.69	0.60	5	0.60	0.41	0.69	0.41	15.00	82.79	0.095											
Cidery	104			0.51	0.65	5	0.65	0.33	0.51	0.33	15.00	82.79	0.076											
TOTAL														0.218										

Version Number: 1

Version Date: March 15, 2021

Project Information

Applewood	120164
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Drawing Reference

SD-2	March 15, 2021
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Prepared By

CMM	March 15, 2021
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Reviewed By

KRS	
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Municipality

Town of The Blue Mountains

Runoff Coefficient Adjustment

Year	A	B
10	0.80	0.20
25	0.70	0.30
50	0.60	0.40
100	0.50	0.50

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.009

Time of Concentration

15 mins

IDF Curve Coefficients

Year	A	B	C
2	807.44	6.75	0.83
5	1135.40	7.50	0.84
10	1387.00	7.97	0.85
25	1676.20	8.30	0.86
50	1973.10	9.00	0.87
100	2193.10	9.04	0.87

Engineer Stamp



Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m ³ /s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
Huron Street	101			0.97	0.20	10	0.36	0.35	0.97	0.35	15.00	96.02	0.093											
Storm Sewer	102			0.05	0.20	10	0.36	0.02	0.05	0.02	15.00	96.02	0.005											
Medical Clinic	103			0.69	0.60	10	0.68	0.47	0.69	0.47	15.00	96.02	0.125											
Cidery	104			0.51	0.65	10	0.72	0.37	0.51	0.37	15.00	96.02	0.098											
TOTAL														0.321										

Project Information

Applewood

120164

Drawing Reference

SD-2

March 15, 2021

Prepared By

CMM

March 15, 2021

Reviewed By

KRS

Municipality

Town of The Blue Mountains

Runoff Coefficient Adjustment

Year	A	B
10	0.80	0.20
25	0.70	0.30
50	0.60	0.40
100	0.50	0.50

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.009

Time of Concentration

15 mins

IDF Curve Coefficients

Year	A	B	C
2	807.44	6.75	0.83
5	1135.40	7.50	0.84
10	1387.00	7.97	0.85
25	1676.20	8.30	0.86
50	1973.10	9.00	0.87
100	2193.10	9.04	0.87



Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m ³ /s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
Huron Street	101			0.97	0.20	25	0.44	0.43	0.97	0.43	15.00	112.50	0.133											
Storm Sewer	102			0.05	0.20	25	0.44	0.02	0.05	0.02	15.00	112.50	0.007											
Medical Clinic	103			0.69	0.60	25	0.72	0.50	0.69	0.50	15.00	112.50	0.155											
Cidery	104			0.51	0.65	25	0.76	0.39	0.51	0.39	15.00	112.50	0.120											
TOTAL														0.416										

Version Number: 1

Version Date: March 15, 2021

Project Information

Applewood

120164

Drawing Reference

SD-2

March 15, 2021

Prepared By

CMM

March 15, 2021

Reviewed By

KRS

Municipality

Town of The Blue Mountains

Runoff Coefficient Adjustment

Year	A	B
10	0.80	0.20
25	0.70	0.30
50	0.60	0.40
100	0.50	0.50

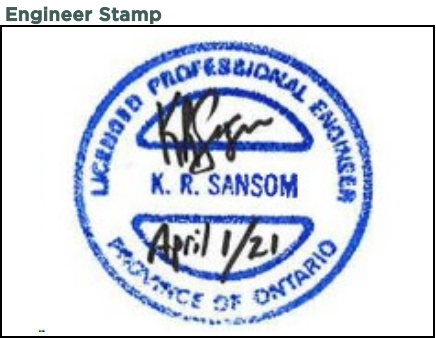
Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.009

Time of Concentration

15 mins

IDF Curve Coefficients			
Year	A	B	C
2	807.44	6.75	0.83
5	1135.40	7.50	0.84
10	1387.00	7.97	0.85
25	1676.20	8.30	0.86
50	1973.10	9.00	0.87
100	2193.10	9.04	0.87



Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m ³ /s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
Huron Street	101			0.97	0.20	50	0.52	0.50	0.97	0.50	15.00	125.06	0.175											
Storm Sewer	102			0.05	0.20	50	0.52	0.03	0.05	0.03	15.00	125.06	0.009											
Medical Clinic	103			0.69	0.60	50	0.76	0.52	0.69	0.52	15.00	125.06	0.182											
Cidery	104			0.51	0.65	50	0.79	0.40	0.51	0.40	15.00	125.06	0.140											
TOTAL														0.506										

Project Information	
Applewood	120164
Drawing Reference	
SD-2	March 15, 2021
Prepared By	
CMM	March 15, 2021
Reviewed By	
KRS	

Municipality		
Town of The Blue Mountains		
Runoff Coefficient Adjustment		
Year	A	B
10	0.80	0.20
25	0.70	0.30
50	0.60	0.40
100	0.50	0.50

Manning's Coefficient	
Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.009
Time of Concentration	
15 mins	

IDF Curve Coefficients			
Year	A	B	C
2	807.44	6.75	0.83
5	1135.40	7.50	0.84
10	1387.00	7.97	0.85
25	1676.20	8.30	0.86
50	1973.10	9.00	0.87
100	2193.10	9.04	0.87



Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m ³ /s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
Huron Street	101			0.97	0.20	100	0.60	0.58	0.97	0.58	15.00	137.49	0.222											
Storm Sewer	102			0.05	0.20	100	0.60	0.03	0.05	0.03	15.00	137.49	0.011											
Medical Clinic	103			0.69	0.60	100	0.80	0.55	0.69	0.55	15.00	137.49	0.211											
Cidery	104			0.51	0.65	100	0.83	0.42	0.51	0.42	15.00	137.49	0.161											
TOTAL														0.605										

Project Information

Applewood120164

Drawing Reference

SD-2March 15, 2021

Prepared By

CMMMarch 15, 2021

Reviewed By

KRS

Municipality

Town of The Blue Mountains

Runoff Coefficient Adjustment

Year	A	B
10	0.80	0.20
25	0.70	0.30
50	0.60	0.40
100	0.50	0.50

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.009

Time of Concentration

15 mins

IDF Curve Coefficients

Year	A	B	C
2	807.44	6.75	0.83
5	1135.40	7.50	0.84
10	1387.00	7.97	0.85
25	1676.20	8.30	0.86
50	1973.10	9.00	0.87
100	2193.10	9.04	0.87

Engineer Stamp



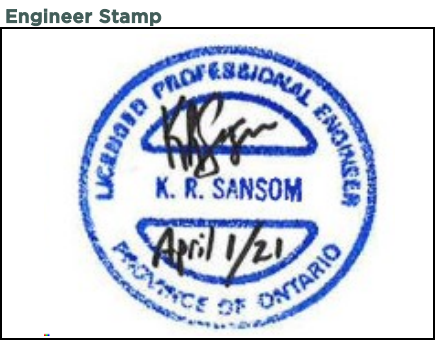
Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m³/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
Huron Street	201			0.21	0.25	5	0.25	0.05	0.21	0.05	15.00	82.79	0.012											
Storm Sewer	203	CB1	CBMH1	0.17	0.90	5	0.90	0.15	0.17	0.15	15.00	82.79	0.035	0.013	6.0	0.7%	300	1.14	0.081	1.03	0.10	219	43.5%	15.10
	207	CBMH1	CBMH2	0.09	0.90	5	0.90	0.08	0.26	0.23	15.10	82.49	0.054	0.013	58.0	0.5%	300	0.97	0.068	0.97	1.00	274	78.4%	16.10
	204	CB2	CBMH2	0.14	0.90	5	0.90	0.13	0.14	0.13	15.00	82.79	0.029	0.013	6.0	0.7%	300	1.14	0.081	0.98	0.10	204	35.8%	15.10
	208	CBMH2	CBMH3	0.10	0.90	5	0.90	0.09	0.50	0.45	16.10	79.54	0.099	0.013	54.0	0.5%	375	1.12	0.124	1.12	0.80	345	80.2%	16.90
	205	CB3	CBMH3	0.15	0.90	5	0.90	0.14	0.15	0.14	15.00	82.79	0.031	0.013	6.0	0.7%	300	1.14	0.081	1.00	0.10	209	38.4%	15.10
	209	CBMH3	CBMH4	0.14	0.90	5	0.90	0.13	0.79	0.71	16.90	77.34	0.153	0.013	95.0	0.5%	450	1.27	0.202	1.27	1.25	405	75.8%	18.15
	206	CB4	CBMH4	0.04	0.90	5	0.90	0.04	0.04	0.04	15.00	82.79	0.008	0.013	6.0	0.7%	300	1.14	0.081	0.70	0.14	128	10.2%	15.14
	210	CBMH4	OGS5	0.13	0.60	5	0.60	0.08	0.96	0.83	18.15	74.16	0.170	0.013	5.3	0.5%	450	1.27	0.202	1.27	0.07	422	84.3%	18.22
	-	OGS5	STM MH6	0.00	0.00	5	0.00	0.00	0.96	0.83	18.22	73.99	0.170	0.013	9.7	0.5%	450	1.27	0.202	1.27	0.13	422	84.1%	18.34
Medical Clinic	212			0.44	0.70	5	0.70	0.31	0.44	0.31	15.00	82.79	0.071											
Cidery	211			0.49	0.70	5	0.70	0.34	0.49	0.34	15.00	82.79	0.079											
TOTAL														0.331										

Project Information	
Applewood	120164
Drawing Reference	
SD-2	March 15, 2021
Prepared By	
CMM	March 15, 2021
Reviewed By	
KRS	

Municipality		
Town of The Blue Mountains		
Runoff Coefficient Adjustment		
Year	A	B
10	0.80	0.20
25	0.70	0.30
50	0.60	0.40
100	0.50	0.50

Manning's Coefficient	
Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.009
Time of Concentration	
15 mins	

IDF Curve Coefficients			
Year	A	B	C
2	807.44	6.75	0.83
5	1135.40	7.50	0.84
10	1387.00	7.97	0.85
25	1676.20	8.30	0.86
50	1973.10	9.00	0.87
100	2193.10	9.04	0.87



Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m³/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
Huron Street	201			0.21	0.25	10	0.40	0.08	0.21	0.08	15.00	96.02	0.022											
Storm Sewer	203	CB1	CBMH1	0.17	0.90	10	0.92	0.16	0.17	0.16	15.00	96.02	0.042	0.013	6.0	0.7%	300	1.14	0.081	1.08	0.09	234	51.6%	15.09
	207	CBMH1	CBMH2	0.09	0.90	10	0.92	0.08	0.26	0.24	15.09	95.69	0.064	0.013	58.0	0.5%	300	0.97	0.068	0.97	1.00	292	93.0%	16.09
	204	CB2	CBMH2	0.14	0.90	10	0.92	0.13	0.14	0.13	15.00	96.02	0.034	0.013	6.0	0.7%	300	1.14	0.081	1.02	0.10	217	42.5%	15.10
	208	CBMH2	CBMH3	0.10	0.90	10	0.92	0.09	0.50	0.46	16.09	92.30	0.118	0.013	54.0	0.5%	375	1.12	0.124	1.12	0.80	368	95.1%	16.89
	205	CB3	CBMH3	0.15	0.90	10	0.92	0.14	0.15	0.14	15.00	96.02	0.037	0.013	6.0	0.7%	300	1.14	0.081	1.04	0.10	223	45.5%	15.10
	209	CBMH3	CBMH4	0.14	0.90	10	0.92	0.13	0.79	0.73	16.89	89.75	0.181	0.013	95.0	0.5%	450	1.27	0.202	1.27	1.25	432	89.9%	18.14
	206	CB4	CBMH4	0.04	0.90	10	0.92	0.04	0.04	0.04	15.00	96.02	0.010	0.013	6.0	0.7%	300	1.14	0.081	0.73	0.14	136	12.1%	15.14
	210	CBMH4	OGS5	0.13	0.60	10	0.68	0.09	0.96	0.85	18.14	86.08	0.204	0.013	5.3	0.5%	525	1.40	0.304	1.40	0.06	452	67.0%	18.21
	-	OGS5	STM MH6	0.00	0.00	10	0.20	0.00	0.96	0.85	18.21	85.91	0.203	0.013	9.7	0.5%	525	1.40	0.304	1.40	0.12	451	66.9%	18.32
Medical Clinic	212			0.44	0.70	10	0.76	0.33	0.44	0.33	15.00	96.02	0.089											
Cidery	211			0.49	0.70	10	0.76	0.37	0.49	0.37	15.00	96.02	0.099											
TOTAL														0.414										

Project Information

Applewood

120164

Drawing Reference

SD-2

March 15, 2021

Prepared By

CMM

March 15, 2021

Reviewed By

KRS

Municipality

Town of The Blue Mountains

Runoff Coefficient Adjustment

Year	A	B
10	0.80	0.20
25	0.70	0.30
50	0.60	0.40
100	0.50	0.50

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.009

Time of Concentration

15 mins

IDF Curve Coefficients

Year	A	B	C
2	807.44	6.75	0.83
5	1135.40	7.50	0.84
10	1387.00	7.97	0.85
25	1676.20	8.30	0.86
50	1973.10	9.00	0.87
100	2193.10	9.04	0.87



Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m³/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)	
Huron Street	201			0.21	0.25	25	0.48	0.10	0.21	0.10	15.00	112.50	0.031												
Storm Sewer	203	CB1	CBMH1	0.17	0.90	25	0.93	0.16	0.17	0.16	15.00	112.50	0.049	0.013	6.0	0.7%	300	1.14	0.081	1.13	0.09	249	61.1%	15.09	
	207	CBMH1	CBMH2	0.09	0.90	25	0.93	0.08	0.26	0.24	15.09	112.13	0.075	0.013	58.0	0.5%	375	1.12	0.124	1.10	0.88	311	60.7%	15.96	
	204	CB2	CBMH2	0.14	0.90	25	0.93	0.13	0.14	0.13	15.00	112.50	0.041	0.013	6.0	0.7%	300	1.14	0.081	1.07	0.09	232	50.3%	15.09	
	208	CBMH2	CBMH3	0.10	0.90	25	0.93	0.09	0.50	0.47	15.96	108.65	0.140	0.013	54.0	0.5%	450	1.27	0.202	1.27	0.71	393	69.6%	16.67	
	205	CB3	CBMH3	0.15	0.90	25	0.93	0.14	0.15	0.14	15.00	112.50	0.044	0.013	6.0	0.7%	300	1.14	0.081	1.09	0.09	238	53.9%	15.09	
	209	CBMH3	CBMH4	0.14	0.90	25	0.93	0.13	0.79	0.73	16.67	105.99	0.216	0.013	95.0	0.5%	525	1.40	0.304	1.40	1.13	462	71.1%	17.80	
	206	CB4	CBMH4	0.04	0.90	25	0.93	0.04	0.04	0.04	15.00	112.50	0.012	0.013	6.0	0.7%	300	1.14	0.081	0.76	0.13	145	14.4%	15.13	
	210	CBMH4	OGS5	0.13	0.60	25	0.72	0.09	0.96	0.87	17.80	102.05	0.245	0.013	5.3	0.5%	525	1.40	0.304	1.40	0.06	484	80.7%	17.86	
	-	OGS5	STM MH6	0.00	0.00	25	0.30	0.00	0.96	0.87	17.86	101.84	0.245	0.013	9.7	0.5%	525	1.40	0.304	1.40	0.12	484	80.5%	17.98	
Medical Clinic	212			0.44	0.70	25	0.79	0.35	0.44	0.35	15.00	112.50	0.109												
Cidery	211			0.49	0.70	25	0.79	0.39	0.49	0.39	15.00	112.50	0.121												
TOTAL														0.506											

Project Information	
Applewood	120164
Drawing Reference	
SD-2	March 15, 2021
Prepared By	
CMM	March 15, 2021
Reviewed By	
KRS	

Municipality		
Town of The Blue Mountains		
Runoff Coefficient Adjustment		
Year	A	B
10	0.80	0.20
25	0.70	0.30
50	0.60	0.40
100	0.50	0.50

Manning's Coefficient	
Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.009
Time of Concentration	
15 mins	

IDF Curve Coefficients			
Year	A	B	C
2	807.44	6.75	0.83
5	1135.40	7.50	0.84
10	1387.00	7.97	0.85
25	1676.20	8.30	0.86
50	1973.10	9.00	0.87
100	2193.10	9.04	0.87



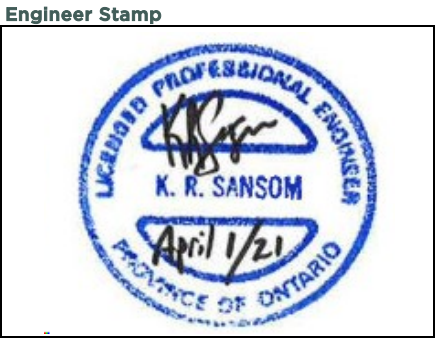
Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m ³ /s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
Huron Street	201			0.21	0.25	50	0.55	0.12	0.21	0.12	15.00	125.06	0.040											
Storm Sewer	203	CB1	CBMH1	0.17	0.90	50	0.94	0.16	0.17	0.16	15.00	125.06	0.056	0.013	6.0	0.7%	300	1.14	0.081	1.14	0.09	260	68.6%	15.09
	207	CBMH1	CBMH2	0.09	0.90	50	0.94	0.08	0.26	0.24	15.09	124.67	0.085	0.013	58.0	0.5%	375	1.12	0.124	1.12	0.86	325	68.3%	15.95
	204	CB2	CBMH2	0.14	0.90	50	0.94	0.13	0.14	0.13	15.00	125.06	0.046	0.013	6.0	0.7%	300	1.14	0.081	1.10	0.09	242	56.5%	15.09
	208	CBMH2	CBMH3	0.10	0.90	50	0.94	0.09	0.50	0.47	15.95	120.92	0.158	0.013	54.0	0.5%	450	1.27	0.202	1.27	0.71	410	78.3%	16.66
	205	CB3	CBMH3	0.15	0.90	50	0.94	0.14	0.15	0.14	15.00	125.06	0.049	0.013	6.0	0.7%	300	1.14	0.081	1.13	0.09	248	60.5%	15.09
	209	CBMH3	CBMH4	0.14	0.90	50	0.94	0.13	0.79	0.74	16.66	118.01	0.243	0.013	95.0	0.5%	525	1.40	0.304	1.40	1.13	483	80.1%	17.79
	206	CB4	CBMH4	0.04	0.90	50	0.94	0.04	0.04	0.04	15.00	125.06	0.013	0.013	6.0	0.7%	300	1.14	0.081	0.79	0.13	151	16.1%	15.13
	210	CBMH4	OGS5	0.13	0.60	50	0.76	0.10	0.96	0.88	17.79	113.69	0.278	0.013	5.3	0.5%	525	1.40	0.304	1.40	0.06	507	91.3%	17.85
	-	OGS5	STM MH6	0.00	0.00	50	0.40	0.00	0.96	0.88	17.85	113.46	0.277	0.013	9.7	0.5%	525	1.40	0.304	1.40	0.12	507	91.1%	17.96
Medical Clinic	212			0.44	0.70	50	0.82	0.36	0.44	0.36	15.00	125.06	0.125											
Cidery	211			0.49	0.70	50	0.82	0.40	0.49	0.40	15.00	125.06	0.140											
TOTAL														0.582										

Project Information	
Applewood	120164
Drawing Reference	
SD-2	March 15, 2021
Prepared By	
CMM	March 15, 2021
Reviewed By	
KRS	

Municipality		
Town of The Blue Mountains		
Runoff Coefficient Adjustment		
Year	A	B
10	0.80	0.20
25	0.70	0.30
50	0.60	0.40
100	0.50	0.50

Manning's Coefficient	
Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.009
Time of Concentration	
15 mins	

IDF Curve Coefficients			
Year	A	B	C
2	807.44	6.75	0.83
5	1135.40	7.50	0.84
10	1387.00	7.97	0.85
25	1676.20	8.30	0.86
50	1973.10	9.00	0.87
100	2193.10	9.04	0.87

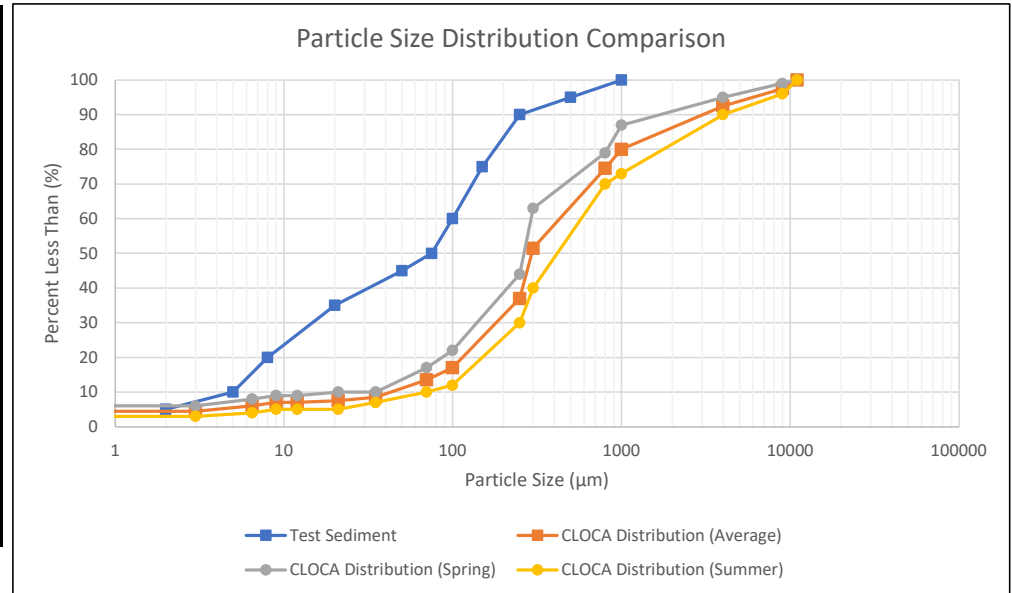


Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m³/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
Huron Street	201			0.21	0.25	100	0.63	0.13	0.21	0.13	15.00	137.49	0.050											
Storm Sewer	203	CB1	CBMH1	0.17	0.90	100	0.95	0.16	0.17	0.16	15.00	137.49	0.062	0.013	6.0	0.7%	300	1.14	0.081	1.14	0.09	271	76.2%	15.09
	207	CBMH1	CBMH2	0.09	0.90	100	0.95	0.09	0.26	0.25	15.09	137.05	0.094	0.013	58.0	0.5%	375	1.12	0.124	1.12	0.86	338	75.8%	15.95
	204	CB2	CBMH2	0.14	0.90	100	0.95	0.13	0.14	0.13	15.00	137.49	0.051	0.013	6.0	0.7%	300	1.14	0.081	1.14	0.09	252	62.8%	15.09
	208	CBMH2	CBMH3	0.10	0.90	100	0.95	0.10	0.50	0.48	15.95	132.93	0.175	0.013	54.0	0.5%	450	1.27	0.202	1.27	0.71	427	87.0%	16.66
	205	CB3	CBMH3	0.15	0.90	100	0.95	0.14	0.15	0.14	15.00	137.49	0.054	0.013	6.0	0.7%	300	1.14	0.081	1.14	0.09	258	67.3%	15.09
	209	CBMH3	CBMH4	0.14	0.90	100	0.95	0.13	0.79	0.75	16.66	129.73	0.270	0.013	95.0	0.5%	525	1.40	0.304	1.40	1.13	502	88.9%	17.79
	206	CB4	CBMH4	0.04	0.90	100	0.95	0.04	0.04	0.04	15.00	137.49	0.015	0.013	6.0	0.7%	300	1.14	0.081	0.81	0.12	157	17.9%	15.12
	210	CBMH4	OGS5	0.13	0.60	100	0.80	0.10	0.96	0.89	17.79	124.97	0.310	0.013	5.3	0.5%	600	1.54	0.434	1.54	0.06	528	71.4%	17.84
	-	OGS5	STM MH6	0.00	0.00	100	0.50	0.00	0.96	0.89	17.84	124.73	0.309	0.013	9.7	0.5%	600	1.54	0.434	1.54	0.11	528	71.2%	17.95
Medical Clinic	212			0.44	0.70	100	0.85	0.37	0.44	0.37	15.00	137.49	0.143											
Cidery	211			0.49	0.70	100	0.85	0.42	0.49	0.42	15.00	137.49	0.159											
TOTAL														0.661										

Appendix D: OGS Detailed Sizing Output

PARTICLE SIZE DISTRIBUTION COMPARISON
LABORATORY TESTING VERSUS CLOCA
 April 1, 2021

Laboratory Testing		CLOCA			
Particle Size (µm)	Percent Less Than	Particle Size (µm)	Percent Less Than		
			Average Sample	Spring Sample	Summer Sample
1000	100	11000	100	100	100
500	95	9000	97.5	99	96
250	90	4000	92.5	95	90
150	75	1000	80	87	73
100	60	800	74.5	79	70
75	50	300	51.5	63	40
50	45	250	37	44	30
20	35	100	17	22	12
8	20	70	13.5	17	10
5	10	35	8.5	10	7
2	5	21	7.5	10	5
		12	7	9	5
		9	7	9	5
		6.5	6	8	4
		3	4.5	6	3
		0.5	4.5	6	3



OIL GRIT SEPARATOR TREATMENT EFFICIENCY
HYDRO INTERNATIONAL FIRST DEFENDER
April 1, 2021

Mass Surface Loading Rate

25 mm Design Storm Peak Flow Rate = 43 L/s
 2580 L/min
 First Defender Diameter = 1.8 m
 First Defender Treatment Area = 2.5 m²
 Mass Surface Loading Rate = 1014 L/min/m²

Particle Size (µm)	Percent Less Than (CLOCA Average)	Particle Size Fraction	Treatment Efficiency - ETV 1000 (%)	Sediment Removal (%)
11000	100.0%			
500	60.7%	39.3%	86.0%	33.8%
250	37.0%	23.7%	59.0%	14.0%
150	23.7%	13.3%	100.0%	13.3%
105	17.7%	6.0%	70.0%	4.2%
75	14.1%	3.6%	100.0%	3.6%
53	11.1%	3.0%	46.0%	1.4%
20	7.4%	3.7%	0.0%	0.0%
8	6.6%	0.8%	1.0%	0.0%
5	5.0%	1.6%	4.0%	0.1%
0	0.0%	5.0%	3.0%	0.2%
Total		100.0%		70.3%

OIL GRIT SEPARATOR TREATMENT EFFICIENCY
HYDRO INTERNATIONAL FIRST DEFENDER
April 1, 2021

Mass Surface Loading Rate

25 mm Design Storm Peak Flow Rate = 43 L/s
 2580 L/min
 First Defender Diameter = 1.8 m
 First Defender Treatment Area = 2.5 m²
 Mass Surface Loading Rate = 1014 L/min/m²

Particle Size (µm)	Percent Less Than (CLOCA Spring)	Particle Size Fraction	Treatment Efficiency - ETV 600 (%)	Sediment Removal (%)
11000	100.0%			
500	69.4%	30.6%	86.0%	26.3%
250	44.0%	25.4%	59.0%	15.0%
150	29.3%	14.7%	100.0%	14.7%
105	22.7%	6.6%	70.0%	4.6%
75	17.8%	4.9%	100.0%	4.9%
53	13.0%	4.8%	46.0%	2.2%
20	9.9%	3.1%	0.0%	0.0%
8	8.6%	1.3%	1.0%	0.0%
5	6.9%	1.7%	4.0%	0.1%
0	0.0%	6.9%	3.0%	0.2%
Total		100.0%		67.8%

OIL GRIT SEPARATOR TREATMENT EFFICIENCY
HYDRO INTERNATIONAL FIRST DEFENDER
April 1, 2021

Mass Surface Loading Rate

25 mm Design Storm Peak Flow Rate = 43 L/s
 2580 L/min
 First Defender Diameter = 1.8 m
 First Defender Treatment Area = 2.5 m²
 Mass Surface Loading Rate = 1014 L/min/m²

Particle Size (µm)	Percent Less Than (CLOCA Summer)	Particle Size Fraction	Treatment Efficiency - ETV 600 (%)	Sediment Removal (%)
11000	100.0%			
500	52.0%	48.0%	86.0%	41.3%
250	30.0%	22.0%	59.0%	13.0%
150	18.0%	12.0%	100.0%	12.0%
105	12.6%	5.4%	70.0%	3.8%
75	10.3%	2.3%	100.0%	2.3%
53	8.3%	2.0%	46.0%	0.9%
20	5.0%	3.3%	0.0%	0.0%
8	4.6%	0.4%	1.0%	0.0%
5	3.4%	1.2%	4.0%	0.0%
0	0.0%	3.4%	3.0%	0.1%
Total		100.0%		73.3%