STORMWATER MANAGEMENT REPORT

YORK ROAD RESIDENTIAL INFILL

1317 York Road
Niagara-on-the-Lake, ON

Prepared by: *Quartek Group Inc.*
Engineers, Architects & Planners
89-91 St. Paul Street, Suite 100
St. Catharines, ON
905-984-8676
www.quartekgroup.com

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STORMWATER MANAGEMENT REPORT

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1317 York Road
Niagara-on-the-Lake, ON

1. Background Information

1.1. Site Conditions

Site Location:	1317 York Road, Niagara-on-the-Lake, ON	
Site Area:	±0.26 ha (SWM Site – includes some area outside the property)	
Land Use:	Existing:	R1 – Low Density Residential Zone
	Proposed:	Residential townhouse dwellings and one (1) single detached dwelling (6 units total)
Receiving Storm Sewers:	600mmØ concrete STM on the west side of Tanbark Road (west of site) 300mmØ concrete STM on the south side of York Road (east of site)	

1.2. Background

This report summarizes the stormwater management design for the proposed 6-unit residential development. An aerial view of the site is provided in Figure 1-1.

The subject site is located on the SE corner of the York Road and Tanbark Road intersection in Niagara-on-the-Lake. There are low density residential dwellings, parkland and a school in close proximity to the property.

There is an existing residential dwelling and garden shed on the property (both to be demolished). Other existing features on the property are concrete walkways, patio stones, small retaining walls and trees of various sizes. Much of the property is grass area. The land has minimal slopes that aim towards both roads – the majority of the property drains northeast though. Regardless of the runoff direction, stormwater eventually reaches existing curb & gutter on either York or Tanbark Road, ultimately conveyed by the respective storm sewer. As noted, there is an existing 600mmØ concrete STM located on the west side of Tanbark Road. In addition, there is an existing 300mmØ concrete storm on the south side of York Road, east of the subject property.

Figure 1-1: Aerial View of Site

1.3. Development Proposal

The proposed development is for five (5) residential townhouse units, in one (1) block, as well as one (1) single detached dwelling unit. The impervious areas after development include roof and asphalt pavement. The pervious areas are landscaping areas.

The current site drainage system is overland, with no pronounced/functioning swales. There is curb and gutter along the west and north sides of the property, which conveys runoff to the aforementioned storm sewers.

1.4. Runoff Characteristics and Criteria

It is understood that stormwater management will be required (as specified by the Region) to ensure both the 5-year and 100-year post-development peak flows be controlled to the 5-year pre-development peak flow level prior to discharge from the site to the York Road storm sewer.

The runoff characteristics and design criteria for the site can be summarized as follows:

- The existing SWM Site area is calculated as 84.3% pervious and 15.7% impervious.
- The proposed site plan contains an impervious area of 0.10 ha totalling 38.5% of the entire drainage area and consists of roofs and driveways with an SCS curve number of 98. The remainder pervious area is grass and sod in good condition with an SCS curve number of 75.

1.5. Design Storm Characteristics

The defining parameters for the design storm used for modelling are the IDF Curves and Storm Depths given in the Town of Niagara-on-the-Lake Municipal Engineering Standards Manual (2004), which uses the City of St. Catharines IDF curves and a 3-hour duration. These parameters are summarized in Table 1-1 below and have been incorporated in the computerized modelling. Although the 300mmØ storm on York Road is a regional sewer, the proposed 200mmØ storm sewer connecting the development to the regional sewer will be assumed by the Town.

Table 1-1: Design Storm Parameters

Storm Return Period	IDF Curve Parameters			Maximum intensity (mm/hr)	Total Depth (mm)
	a	b	c		
5 year	664	4.7	0.744	120.81	41.02
100 year	980	3.7	0.732	198.43	64.72

**rainfall intensity, $I = a/(t+b)^c$, where t = time of concentration (min.)*
Ratio of time to peak = 0.375

2. Minor & Major Storm Drainage System and Quantity Management

Software modelling for the 5-year and 100-year return period storm was performed using MIDUSS (Micro Interactive Design of Urban Storm Sewers) software. Details of the

MIDUSS output can be viewed in Appendix A. Pre-development and post-development peak flows for the 5-year and 100-year return period storms are shown in Table 2-1 & 2-2.

Currently, in pre-development conditions, Catchment 101 drains overland to Tanbark Road. It has been noted by the Town that there are capacity constraints downstream of the 600mmØ storm sewer on Tanbark Road, at an existing SWM facility. The Town stated that a storm connection to Tanbark Road cannot be supported. Catchment 102 drains overland to York Road.

In the post-development scenario, runoff from Catchment 201 will drain overland to Tanbark Road, matching pre-development conditions. In order to match the pre-development peak flows to Tanbark Road, all runoff generated from proposed roof areas will drain either to the rear/sides of the proposed buildings. Given the proposed townhouse block roof design, three (3) 100mmØ storm laterals are proposed within Catchment 202, which will be connected to interior piping within the townhouse basements to convey runoff from the front central location of the roof to the underground stormwater detention system. Runoff in Catchment 202 will be conveyed either overland or in swales to either one of two (2) proposed catchbasins or catchbasin maintenance hole (CBMH1). CBMH1 is the furthest downstream structure within the subject property and its outlet pipe will connect to the proposed maintenance hole (STM MH1) in the York Road boulevard. The outlet pipe from STM MH1 will connect to the existing catchbasin on York Road.

It is understood that there is a planned road reconstruction project for this section (fronting the development) of York Road in 2029-2030. Depending on the construction timing of the proposed storm works for this development, the outlet from CBMH1 could connect directly to the future storm sewer on York Road (with proper coordination). The storm servicing layout shown on Drawing 24086-CSS represents what is required to adequately service the development prior to the reconstruction of York Road.

Table 2-1: Peak Flow Pre-Development

Catchment Area	5-Year Peak Outflow (m^3/s)	100-Year Peak Outflow (m^3/s)
101 (Tanbark)	0.003	0.007
102 (York)	0.008	0.021

Table 2-2: Peak Flow Post-Development

Catchment Area	5-Year Peak Outflow (m^3/s)	100-Year Peak Outflow (m^3/s)
201 (Tanbark)	0.003	0.007
202 (York)	0.006 (Controlled)	0.008 (Controlled)

The on-site storage output for the minor/major system stormwater storage is shown in Table 2-3 below.

Table 2-3: On-Site Storage

	Design	On-Site Storage Provided
Design Storm	Underground Storage Volume Required (m^3)	Underground Chamber Storage (m^3)
5	15.7	42.0
100	37.5	42.0

The Solflo Max 900mmØ HDPE underground detention system can provide temporary detention and restrict flow by using a tempest inlet control device at CBMH1. A data sheet for Solflo Max HDPE piping is included as Appendix B – tees, crosses and 90° bends are available to create an interconnected detention system.

The storage volume provided in the on-site detention system is adequate to restrict the peak post-development flows (5-year and 100-year) to the 5-year pre-development peak flow level.

Grading design will direct minor storm runoff to the on-site collection points. Site grading will also take into consideration the existing grades along all boundaries to ensure there is no impact on adjacent properties.

Attachments

1. Drawing 24086-CSS – Conceptual Site Servicing
2. Drawing 24086-STM-1 – Pre-Development Storm Drainage Areas
3. Drawing 24086-STM-2 – Post-Development Storm Drainage Areas
4. Appendix A: MIDUSS Model Output
5. Appendix B: Solflo Max Data Sheet
6. Appendix C: Tempest Inlet Control Device Flow Chart (LMF-105)

Stormwater Management Report
Prepared by: T. Crawford, C.E.T., Quartek Group Inc.
Reviewed by: H. Klassen, P.Eng., Quartek Group Inc.

GENERAL

1. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND EXISTING ELEVATIONS WHICH INCLUDE BUT ARE NOT LIMITED TO THE BENCHMARK ELEVATIONS, EXISTING SERVICE CONNECTIONS, AND EXISTING INVERTS. ANY INCONSISTENCIES AND OMISSIONS ON THIS DRAWING / DRAWING SET SHALL BE REPORTED TO THE ENGINEER FOR CLARIFICATION BEFORE COMMENCING THE WORK.

2. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL CONFIRM THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

3. SURVEY EVIDENCE (MONUMENTS, IRON BARS, ETC.) SHALL NOT BE DISTURBED, DAMAGED, OR REMOVED.

4. COMPUTER DRAWING FILE CO-ORDINATES FOR THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION LAYOUT UNLESS SPECIFICALLY DIRECTED BY THE ENGINEER.

5. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT. THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.

6. ALL CONSTRUCTION SIGNAGE SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR CANADA (MUTCDC) AND THE ONTARIO TRAFFIC MANUAL (OTM).

7. TOWN OF NIAGARA-ON-THE-LAKE STANDARD DRAWINGS AND ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) SHALL APPLY WHEREVER RELEVANT, WHETHER SPECIFICALLY REFERENCED OR NOT.

8. ALL WORK SHALL BE IN ACCORDANCE WITH THE RELEVANT SECTIONS OF THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) AND DRAWINGS (OPSD), AND THE NIAGARA PENINSULA STANDARD CONTRACT DOCUMENT (NPSCD) UNLESS OTHERWISE NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS.

9. ALL MEASUREMENTS ARE IN METRES UNLESS OTHERWISE NOTED.

10. ALL GRANULAR MATERIAL SHALL BE COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD) AND ALL NATIVE BACKFILL SHALL BE COMPACTED TO 95% SPMDD UNLESS OTHERWISE NOTED.

11. ALL AREAS DISTURBED BY THE CONTRACTOR DURING THE CONSTRUCTION OF THE WORKS HEREIN, SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER AS DETERMINED BY THE ENGINEER. ALL GRASS AND VEGETATION COVERED AREAS SHALL BE RESTORED BY PLACING TOPSOIL (MINIMUM 100mm) AND SOD TO ESTABLISH A GRASS COVER TO THE SATISFACTION OF THE TOWN, UNLESS NOTED OTHERWISE.

12. SOD SHALL BE IN ACCORDANCE WITH OPSS 803. PLACED TOPSOIL SHALL BE IN ACCORDANCE WITH OPSS 802 AND FREE OF ALL GRANULAR PARTICLES OR OTHER MATERIALS DELETERIOUS TO PLANT GROWTH.

EROSION AND SEDIMENT CONTROL

13. EROSION AND SEDIMENT CONTROL WORKS SHALL BE INSTALLED AS SHOWN ON DRAWING 24086-CSS. SILTATION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO THE START OF CONSTRUCTION AND MAINTAINED FOR THE DURATION.

14. SILT FENCE SHALL BE HEAVY-DUTY AS PER OPSD 219.130. GEOTEXTILE MATERIAL FOR ANY APPLICATION SHALL BE WOVEN WITH A WEAVE DENSITY OF 270R OR EQUIVALENT.

15. SILT FENCE INSTALLATION AND MAINTENANCE CONSIDERATIONS:

15.1. GEOTEXTILE MATERIAL SHALL BE STRETCHED TIGHT DURING INSTALLATION AND THE BOTTOM EDGE BURIED A MINIMUM OF 150mm WITH COMPACTION OF THE EXCAVATED BACKFILL.
15.2. CLEAR GRANULAR STONE PLACEMENT CAN BE USED IN FROZEN OR UNFROZEN CONDITIONS TO ASSIST IN FILTERING SEDIMENT LADEN WATERS.
15.3. SILT FENCE SHALL BE INSPECTED REGULARLY AND AFTER EVERY RAINFALL TO IDENTIFY FAILED SECTIONS. ANY FAILURE SHALL BE REPAIRED IMMEDIATELY.
15.4. WHEN SEDIMENT ACCUMULATES TO HALF THE HEIGHT OF THE GEOTEXTILE MATERIAL IT SHALL BE REMOVED AND DISPOSED OF IN A CONTROLLED AREA.
15.5. A SUPPLY OF SILT FENCE SHALL BE KEPT ON SITE TO PROVIDE FOR QUICK REPAIRS OR ADDITIONAL FENCING REQUIREMENTS.

16. GEOTEXTILE MATERIAL SHALL BE PLACED UNDER THE GRATES IN ALL CATCH BASINS TO TRAP SEDIMENT. SILT TRAPS SHALL BE CLEANED REGULARLY BY THE CONTRACTOR AND SHALL NOT BE REMOVED UNTIL PAVEMENT OPERATION IS COMPLETED AND ALL VEGETATED AREAS ARE STABILIZED.

ROADS AND EARTHWORKS

17. WHERE DISTURBED OR DAMAGED, REINSTATEMENT OF EXISTING ROADS MUST COMPLY WITH THE REQUIREMENTS OF THE ROAD AUTHORITY. PAVEMENT REINSTATEMENT MUST COMPLY WITH OPSD 509.010 AND OPSS 310 & 314. SERVICE TRENCHES ARE TO BE SAWCUT SQUARE PRIOR TO PAVING OPERATION. MINIMUM ASPHALT AND GRANULAR THICKNESS FOR ROADWAY REINSTATEMENT SHALL MATCH EXISTING CONDITIONS, OR THE SCHEDULE BELOW, WHICHEVER IS GREATER:

SURFACE COURSE	40mm	HL3-HS
BINDER COURSE	80mm	HL8-HS
GRANULAR BASE	450mm	GRAN. 'A'
TOTAL THICKNESS	570mm	

STORM SEWERS

18. CONSTRUCTION OF STORM SEWERS SHALL BE IN ACCORDANCE WITH TOWN STANDARDS & SPECIFICATIONS (LATEST EDITION) AND MINISTRY OF ENVIRONMENT (MOE) GUIDELINES (LATEST EDITION).

19. SINGLE CATCH BASINS SHALL BE IN ACCORDANCE WITH OPSD 705.010.

20. CATCH BASIN FRAME AND GRATES SHALL BE PER OPSD 400.020.

21. ALL STORM SEWERS AND CATCHBASIN LEADS SHALL BE EITHER CONCRETE, CLASS III PER CSA A257.1 & A257.2 WITH CLASS "B" BEDDING PER OPSD 802.030, OR, PVC SDR-35 PER CSA 182.1 & 182.2 WITH GRANULAR 'A' EMBEDMENT PER OPSD 802.010, UNLESS OTHERWISE NOTED.

22. ALL STORM LATERALS TO BE 100mmø DR-28 PVC LAID AT 2% SLOPE CONNECTED TO PROPOSED STORM DETENTION SYSTEM AND CAPPED & STAKED OUTSIDE OF PROPOSED FOUNDATION.

23. STORM SEWER BEDDING SHALL BE PER OPSD 802 SERIES, WITH GRANULAR 'A' COVER. ALL BEDDING AND COVER MATERIAL SHALL BE COMPACTED TO 100% SPMDD.

24. MINIMUM CLEARANCE OF 200mm SHALL BE PROVIDED BETWEEN THE OUTSIDE OF THE PIPE BARRELS AT THE POINT OF PIPE CROSSING FOR SEWERS AND OTHER UTILITIES EXCEPT FOR WATERMAIN CROSSINGS WHEN THE MINIMUM CLEARANCE SHALL NOT BE LESS THAN 500mm. FOR WATERMAIN CROSSINGS WHERE A MINIMUM CLEARANCE OF 500mm CANNOT BE OBTAINED, THE CROSSING SHALL BE CONCRETE ENCASED.

SANITARY SEWERS

25. CONSTRUCTION OF SANITARY SEWERS SHALL BE IN ACCORDANCE WITH CITY STANDARDS & SPECIFICATIONS (LATEST EDITION) AND MINISTRY OF ENVIRONMENT (MOE) GUIDELINES (LATEST EDITION).

26. ALL SANITARY LATERALS TO BE 135mmø DR-28 PVC LAID AT 2% SLOPE AND CONNECTED TO EXISTING SEWER WITH APPROVED MANUFACTURED TEE AND CAPPED & STAKED NEAR THE STREETLINE. SANITARY SERVICE LATERALS SHALL BE CONSTRUCTED WITH A 100mmø PVC VERTICAL CLEANOUT CONNECTION AT THE PROPERTY LINE. ALL PROPOSED WYES AND BENDS SHALL BE OF 'SWEEP' OR 'LONG-RADIUS' TYPE.

27. ALL SANITARY LATERALS SHALL HAVE CLASS 'B' BEDDING PER OPSD 802.010, GRANULAR 'A' COVER MATERIAL AND SELECT NATIVE BACKFILL UNLESS OTHERWISE NOTED.

28. IN EXISTING ROADWAYS, SANITARY SEWER BEDDING SHALL BE AS PER OPSD 802 SERIES, WITH FULL GRANULAR 'A' COVER. ALL BEDDING AND COVER MATERIAL SHALL BE COMPACTED TO 100% SPMDD.

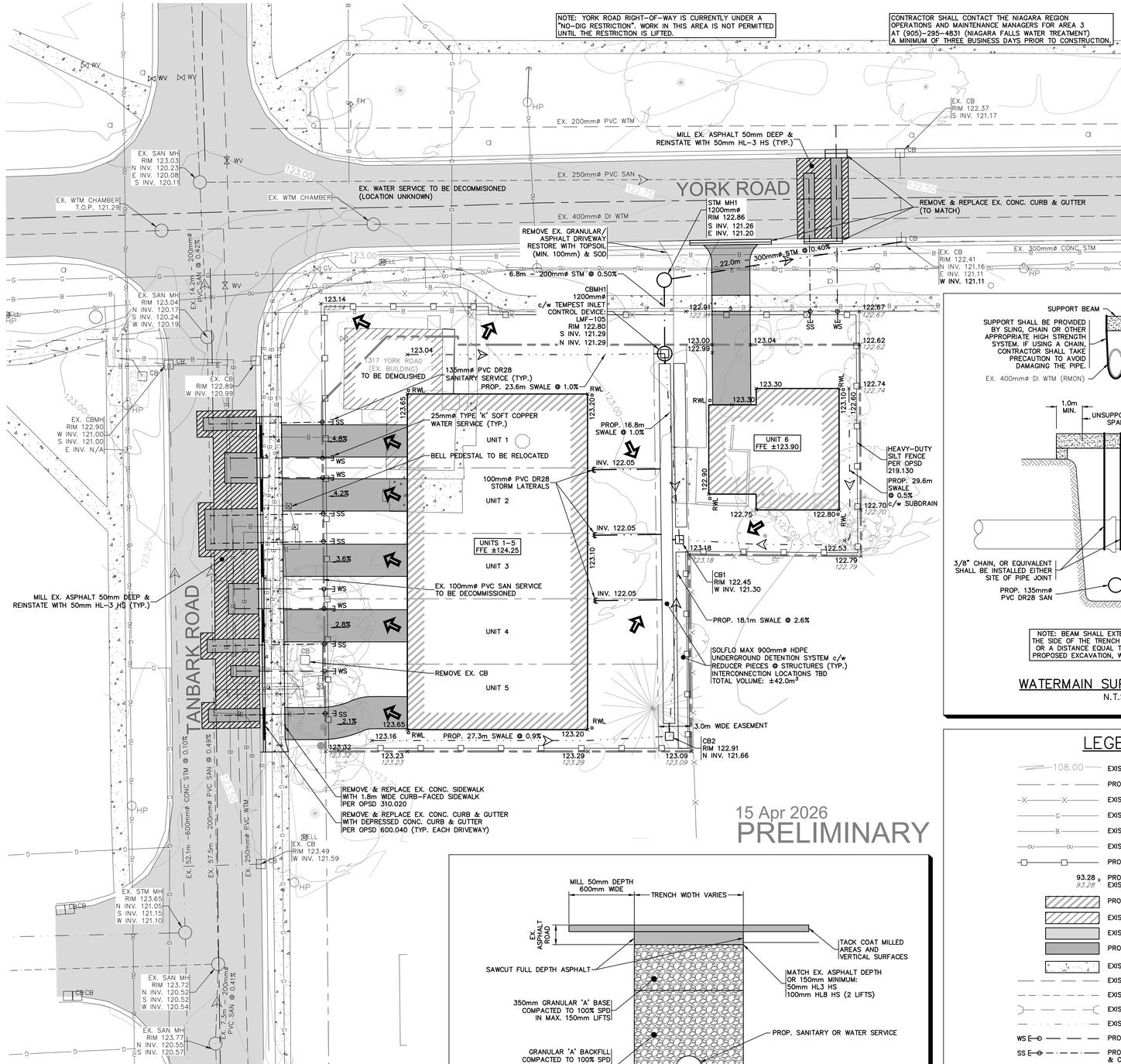
29. MINIMUM CLEARANCE OF 200mm SHALL BE PROVIDED BETWEEN THE OUTSIDE OF THE PIPE BARRELS AT THE POINT OF PIPE CROSSING FOR SEWERS AND OTHER UTILITIES EXCEPT FOR WATERMAIN CROSSINGS WHEN THE MINIMUM CLEARANCE SHALL NOT BE LESS THAN 500mm. FOR WATERMAIN CROSSINGS WHERE A MINIMUM CLEARANCE OF 500mm CANNOT BE OBTAINED, THE CROSSING SHALL BE CONCRETE ENCASED.

WATERMAIN

30. WATER SERVICES SHALL BE 25mmø TYPE 'K' SOFT COPPER AS PER OPSD 1104.010. ALL DOMESTIC WATER SERVICE CONNECTIONS SHALL HAVE MAINSTOPS (COMPRESSION TYPE FITTINGS) INSTALLED AT THE WATERMAIN EQUAL TO THE WATER SERVICE CONNECTION DIAMETER. CURB STOP AND VALVE BOX SHALL BE INSTALLED ON PROPERTY LINE. AT EACH SERVICE SADDLE WATERMAIN PIPE SHALL BE CORED BY A 19mmø "SHELL' OR 'CORE' CUTTER AS RECOMMENDED BY THE PIPE MANUFACTURER. A HOLESAW, TWST DRILL, SPADE OR AUGERING BIT WILL NOT BE PERMITTED UNDER ANY CIRCUMSTANCE.

31. CONNECTIONS TO EXISTING TOWN WATERMAINS SHALL BE BY TOWN FORCES UNLESS AUTHORIZED OTHERWISE.

32. MINIMUM DEPTH OF COVER OVER WATERMAIN AND SERVICES SHALL BE 1.7m FROM THE TOP OF PIPE TO THE FINISHED GROUND ELEVATION.



TYPICAL DETAIL FOR ROAD CUT TRENCH RESTORATION
N.T.S.

WATERMAIN SUPPORT DETAIL
N.T.S.

LEGEND

- 108.00 — EXISTING GROUND CONTOUR
- PROPERTY LINE
- -X-X- EXISTING FENCE
- -G- EXISTING GAS
- -B- EXISTING BELL
- -OU-OU- EXISTING OVERHEAD UTILITIES
- PROPOSED SILT FENCE
- 93.28 / 93.28 — PROPOSED GROUND ELEVATION / EXISTING GROUND ELEVATION
- PROPOSED BUILDING
- EXISTING BUILDING
- EXISTING ASPHALT
- PROPOSED ASPHALT
- EXISTING CONCRETE
- EXISTING WATERMAIN
- EXISTING SANITARY SEWER
- EXISTING CULVERT
- EXISTING DITCH
- WS — PROPOSED WATER SERVICE
- SS — PROPOSED SANITARY SERVICE & CLEAN OUT
- PROPOSED STORM SEWER
- PROPOSED SWALE
- CB — EXISTING CATCHBASIN
- EXISTING MAINTENANCE HOLE
- EXISTING CONIFEROUS TREE
- EXISTING DECIDUOUS TREE
- POST-DEVELOPMENT FLOW DIRECTION

issue	issued for	date	init.
C	OPA/ZBA RESUBMISSION	15 APR 2026	TC
B	OPA/ZBA RESUBMISSION	03 MAR 2026	TC
A	OPA/ZBA APPLICATION	10 JULY 2025	TC

seal

Quartek
Architects Planners Engineers Project Managers
T 905 984 8676
89 - 91 St. Paul Street, Suite 100,
St. Catharines, ON, L2R 3M3
www.quartekgroup.com

project title

YORK ROAD RESIDENTIAL INFILL

1317 YORK ROAD, NIAGARA-ON-THE-LAKE

drawing title

CONCEPTUAL SITE SERVICING

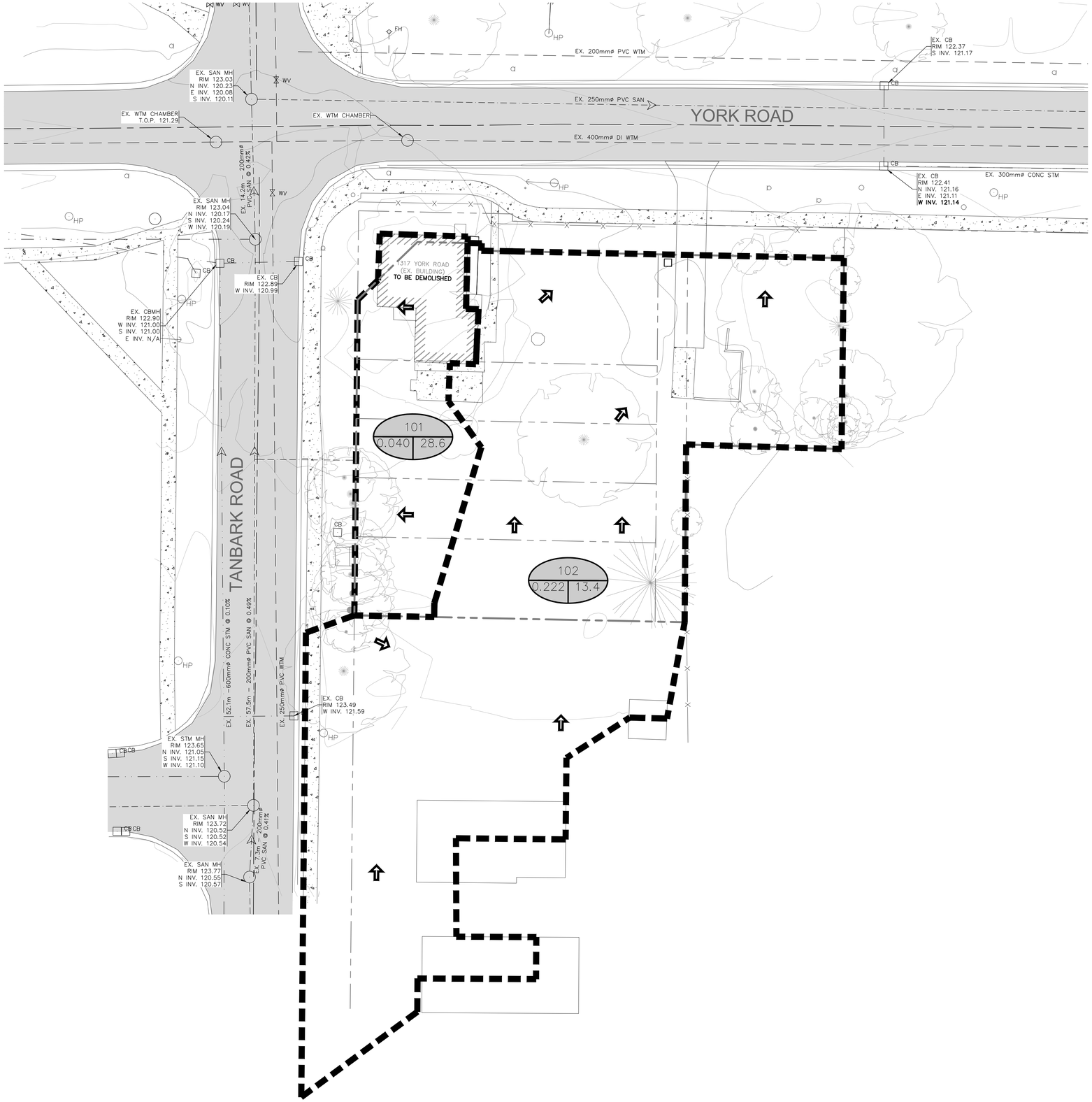
drawn by	designed by
TC	TC

scale	date
1:200	10 JULY 2025

job number	issue
24086	C

drawing number

24086-CSS



LEGEND

- 108.00 — EXISTING GROUND CONTOUR
- PROPERTY LINE
- PRE-DEVELOPMENT DRAINAGE AREA BOUNDARY
- DRAINAGE AREA NUMBER
- 101 / 0.900 / 36.0 — % IMPERVIOUS
- AREA (ha)
- EXISTING ASPHALT
- EXISTING CONCRETE SIDEWALK**
- PROPOSED ASPHALT
- EXISTING CONCRETE SIDEWALK**
- EXISTING STORM SEWER
- EXISTING CULVERT
- EXISTING DITCH
- EXISTING MAINTENANCE HOLE
- EXISTING CATCHBASIN
- FLOW DIRECTION

03 Mar 2026
PRELIMINARY

N

issue	issued for	date	init.
A	OPA/ZBA RESUBMISSION	03 MAR 2026	TC

seal

Quartek
Architects Planners
Engineers Project Managers
T 905 984 8676
89 - 91 St. Paul Street, Suite 100,
St. Catharines, ON, L2R 3M3
www.quartekgroup.com

project title

YORK ROAD RESIDENTIAL INFILL

1317 YORK ROAD, NIAGARA-ON-THE-LAKE

drawing title

PRE-DEVELOPMENT STORM DRAINAGE AREAS

drawn by	designed by
TC	TC

scale	date
1:200	03 MAR 2026

job number	issue
24086	A

drawing number

24086-STM-1

24"x36" Metric - Metric
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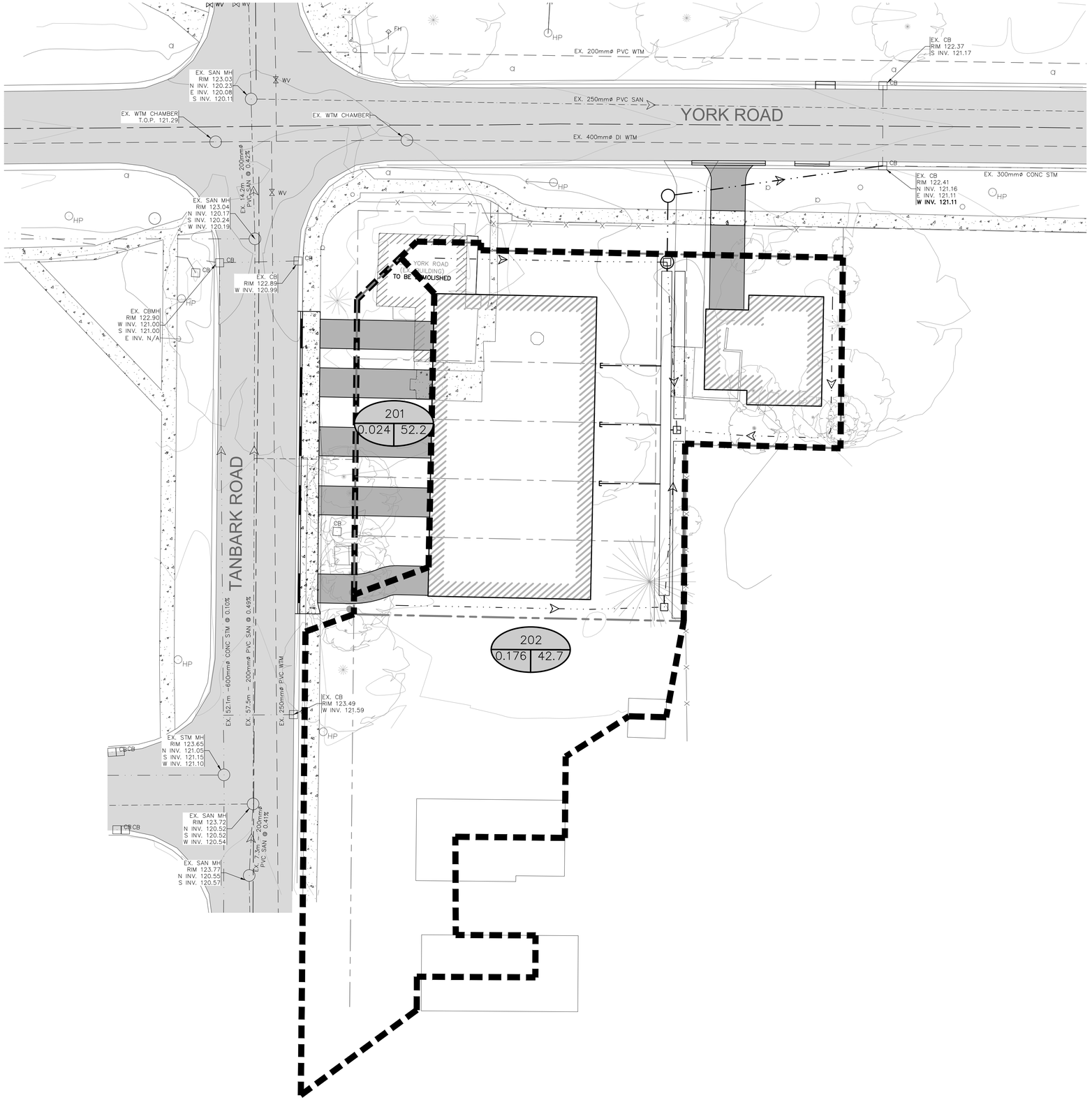
plotted by: tcrawford on Mar 03, 2026 - 11:07am



LEGEND

- 108.00 — EXISTING GROUND CONTOUR
- PROPERTY LINE
- PRE-DEVELOPMENT DRAINAGE AREA BOUNDARY
- DRAINAGE AREA NUMBER
- 101 / 0.900 / 56.0 — % IMPERVIOUS / AREA (ha)
- EXISTING ASPHALT
- EXISTING CONCRETE SIDEWALK**
- PROPOSED ASPHALT
- EXISTING CONCRETE SIDEWALK**
- EXISTING STORM SEWER
- EXISTING CULVERT
- EXISTING DITCH
- EXISTING MAINTENANCE HOLE
- EXISTING CATCHBASIN
- FLOW DIRECTION

14 Apr 2026
PRELIMINARY

issue	issued for	date	init.
B	OPA/ZBA RESUBMISSION	15 APR 2026	TC
A	OPA/ZBA RESUBMISSION	03 MAR 2026	TC

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Quartek
Architects Planners
Engineers Project Managers
T 905 984 8676
89 - 91 St. Paul Street, Suite 100,
St. Catharines, ON, L2R 3M3
www.quartekgroup.com

project title

YORK ROAD RESIDENTIAL INFILL

1317 YORK ROAD, NIAGARA-ON-THE-LAKE

drawing title

POST-DEVELOPMENT STORM DRAINAGE AREAS

drawn by	designed by
TC	TC

scale	date
1:200	03 MAR 2026

job number	issue
24086	B

drawing number

24086-STM-2

STORMWATER MANAGEMENT REPORT

YORK ROAD RESIDENTIAL INFILL
1317 York Road
Niagara-on-the-Lake, ON

APPENDIX A

MIDUSS MODEL OUTPUT

5-yr Pre-Development

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"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 465"
"                MIDUSS created                                  February 5, 2008"
"           10   Units used:                                              ie METRIC"
"                Job folder:          P:\2024 Projects\24086 1317 York Rd NOTL\"
"                                                    Design\Preliminary\MIDUSS"
"                Output filename:                                  5yr-Pre-RevC.out"
"                Licensee name:                                             Quartek"
"                Company                                                           "
"                Date & Time last used:                2026-02-11 at 3:40:21 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      664.000   Coefficient A"
"        4.700   Constant B"
"        0.744   Exponent C"
"        0.375   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           120.814    mm/hr"
"             Total depth                  41.024    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   DRAINS TO TANBARK 600MM  STM"
"       28.600   % Impervious"
"        0.040   Total Area"
"        6.200   Flow length"
"        2.000   Overland Slope"
"        0.029   Pervious Area"
"        6.200   Pervious length"
"        2.000   Pervious slope"
"        0.011   Impervious Area"
"        6.200   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.219   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.838   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
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5-yr Pre-Development

```
"                    0.003     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.029      0.011      0.040      hectare"
"             Time of concentration  9.176      0.821      4.121      minutes"
"             Time to Centroid       113.137    87.511     97.632     minutes"
"             Rainfall depth         41.024     41.024     41.024     mm"
"             Rainfall volume        11.72      4.69       16.41      c.m"
"             Rainfall losses        32.033     6.639      24.771     mm"
"             Runoff depth           8.991      34.385     16.253     mm"
"             Runoff volume          2.57       3.93       6.50       c.m"
"             Runoff coefficient     0.219      0.838      0.396      "
"             Maximum flow           0.001      0.003      0.003      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.003     0.003     0.000     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.003     0.000     0.000     0.000"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          102   DRAINS TO YORK 300MM STM"
"       13.400   % Impervious"
"        0.222   Total Area"
"       20.200   Flow length"
"        2.000   Overland Slope"
"        0.192   Pervious Area"
"       20.200   Pervious length"
"        2.000   Pervious slope"
"        0.030   Impervious Area"
"       20.200   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.220   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.862   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.008     0.000     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.192      0.030      0.222      hectare"
"             Time of concentration  18.639     1.668      12.236     minutes"
"             Time to Centroid       124.400    88.494     110.852    minutes"
"             Rainfall depth         41.024     41.024     41.024     mm"
"             Rainfall volume        78.87      12.20      91.07      c.m"
```

5-yr Pre-Development

```
"             Rainfall losses        31.992     5.652      28.462     mm"
"             Runoff depth           9.032      35.372     12.562     mm"
"             Runoff volume          17.36      10.52      27.89      c.m"
"             Runoff coefficient     0.220      0.862      0.306      "
"             Maximum flow           0.005      0.007      0.008      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.008     0.008     0.000     0.000"
" 38          START/RE-START TOTALS 102"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    0.262    hectare"
"             Total Impervious area                   0.041    hectare"
"             Total % impervious                     15.721"
" 19          EXIT"
```

5-yr Post-Development

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 465"
"                MIDUSS created                                  February 5, 2008"
"           10   Units used:                                              ie METRIC"
"                Job folder:          P:\2024 Projects\24086 1317 York Rd NOTL\"
"                                                    Design\Preliminary\MIDUSS"
"                Output filename:                                 5yr-Post-RevC.out"
"                Licensee name:                                             Quartek"
"                Company                                                           "
"                Date & Time last used:                2026-04-14 at 3:16:44 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      664.000   Coefficient A"
"        4.700   Constant B"
"        0.744   Exponent C"
"        0.375   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           120.814    mm/hr"
"             Total depth                  41.024    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   No description"
"       52.200   % Impervious"
"        0.024   Total Area"
"        3.700   Flow length"
"        2.000   Overland Slope"
"        0.011   Pervious Area"
"        3.700   Pervious length"
"        2.000   Pervious slope"
"        0.013   Impervious Area"
"        3.700   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.218   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.814   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

5-yr Post-Development

```
"                    0.003     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.011      0.013      0.024      hectare"
"             Time of concentration  6.732      0.603      1.810      minutes"
"             Time to Centroid       110.378    87.659     92.134     minutes"
"             Rainfall depth         41.024     41.024     41.024     mm"
"             Rainfall volume        4.71       5.14       9.85       c.m"
"             Rainfall losses        32.079     7.626      19.315     mm"
"             Runoff depth           8.945      33.398     21.709     mm"
"             Runoff volume          1.03       4.18       5.21       c.m"
"             Runoff coefficient     0.218      0.814      0.529      "
"             Maximum flow           0.000      0.003      0.003      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.003     0.003     0.000     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.003     0.000     0.000     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          202   No description"
"       37.100   % Impervious"
"        0.237   Total Area"
"       19.700   Flow length"
"        2.000   Overland Slope"
"        0.149   Pervious Area"
"       19.700   Pervious length"
"        2.000   Pervious slope"
"        0.088   Impervious Area"
"       19.700   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.220   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.862   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.022     0.000     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.149      0.088      0.237      hectare"
"             Time of concentration  18.361     1.644      6.695      minutes"
"             Time to Centroid       124.065    88.473     99.227     minutes"
"             Rainfall depth         41.024     41.024     41.024     mm"
"             Rainfall volume        61.16      36.07      97.23      c.m"
```

5-yr Post-Development

```
"             Rainfall losses        31.993     5.661      22.224     mm"
"             Runoff depth           9.031      35.363     18.800     mm"
"             Runoff volume          13.46      31.09      44.56      c.m"
"             Runoff coefficient     0.220      0.862      0.458      "
"             Maximum flow           0.004      0.022      0.022      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.022     0.022     0.000     0.000"
" 54          POND DESIGN"
"        0.022   Current peak flow    c.m/sec"
"        0.008   Target outflow    c.m/sec"
"         44.6   Hydrograph volume    c.m"
"           21.   Number of stages"
"        0.000   Minimum water level    metre"
"        0.900   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                  0.000     0.000     0.000"
"                0.04500   0.00200    0.7849"
"                0.09000   0.00290     2.185"
"                 0.1350   0.00350     3.949"
"                 0.1800   0.00410     5.978"
"                 0.2250   0.00460     8.209"
"                 0.2700   0.00500    10.594"
"                 0.3150   0.00540    13.097"
"                 0.3600   0.00580    15.684"
"                 0.4050   0.00610    18.325"
"                 0.4500   0.00650    20.994"
"                 0.4950   0.00680    23.662"
"                 0.5400   0.00710    26.304"
"                 0.5850   0.00740    28.891"
"                 0.6300   0.00770    31.393"
"                 0.6750   0.00800    33.779"
"                 0.7200   0.00820    36.009"
"                 0.7650   0.00850    38.038"
"                 0.8100   0.00870    39.802"
"                 0.8550   0.00900    41.203"
"                 0.9000   0.00920    41.987"
"           1.   SUPERPIPES_1"
"           1.   Type 1 is Pipe"
"             Downstream      Pipe      Pipe      Pipe      Pipe Number of"
"                 Invert    Length     Width    Height   Grade %     Pipes"
"                  0.000     6.000     0.900     0.900     0.000    11.000"
"             Peak outflow                 0.006    c.m/sec"
"             Maximum level                0.360    metre"
"             Maximum storage             15.682    c.m"
"             Centroidal lag               2.182   hours"
"                  0.022     0.022     0.006     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
```

5-yr Post-Development

```
"            5   Next link "
"                     0.022     0.006     0.006     0.000"
" 51          PIPE DESIGN"
"         0.006   Current peak flow    c.m/sec"
"         0.013   Manning 'n'"
"         0.200   Diameter    metre"
"         0.500   Gradient   %"
"              Depth of flow                 0.068    metre"
"              Velocity                      0.614    m/sec"
"              Pipe capacity                 0.023    c.m/sec"
"              Critical depth                0.064    metre"
" 53          ROUTE    Pipe Route 7"
"          6.80      Pipe Route 7 Reach length   ( metre)"
"         0.000   X-factor <= 0.5"
"         8.310   K-lag   ( seconds)"
"         0.000   Default(0) or user spec.(1) values used"
"         0.500   X-factor <= 0.5"
"        30.000   K-lag   ( seconds)"
"         0.525   Beta weighting factor"
"        16.667   Routing time step   ( seconds)"
"             1   No. of sub-reaches"
"              Peak outflow                  0.006    c.m/sec"
"                     0.022     0.006     0.006     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.022     0.006     0.006     0.000"
" 51          PIPE DESIGN"
"         0.006   Current peak flow    c.m/sec"
"         0.013   Manning 'n'"
"         0.300   Diameter    metre"
"         0.400   Gradient   %"
"              Depth of flow                 0.062    metre"
"              Velocity                      0.545    m/sec"
"              Pipe capacity                 0.061    c.m/sec"
"              Critical depth                0.057    metre"
" 38          START/RE-START TOTALS 202"
"             3   Runoff Totals on EXIT"
"              Total Catchment area                      0.261    hectare"
"              Total Impervious area                     0.100    hectare"
"              Total % impervious                       38.489"
" 19          EXIT"
```

100-yr Post-Development

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 465"
"                MIDUSS created                                 February 5, 2008"
"           10   Units used:                                              ie METRIC"
"                Job folder:          P:\2024 Projects\24086 1317 York Rd NOTL\"
"                                                    Design\Preliminary\MIDUSS"
"                Output filename:                          100yr-Post-Rev_F.out"
"                Licensee name:                                          Quartek"
"                Company                                                        "
"                Date & Time last used:                2026-04-14 at 3:47:48 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      980.000   Coefficient A"
"        3.700   Constant B"
"        0.732   Exponent C"
"        0.375   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           198.433    mm/hr"
"             Total depth                  64.717    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   No description"
"       52.200   % Impervious"
"        0.024   Total Area"
"        3.700   Flow length"
"        2.000   Overland Slope"
"        0.011   Pervious Area"
"        3.700   Pervious length"
"        2.000   Pervious slope"
"        0.013   Impervious Area"
"        3.700   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.343   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.836   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

100-yr Post-Development

```
"                    0.007     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.011      0.013      0.024      hectare"
"             Time of concentration  4.219      0.487      1.507      minutes"
"             Time to Centroid       104.043    86.259     91.120     minutes"
"             Rainfall depth         64.717     64.717     64.717     mm"
"             Rainfall volume        7.42       8.11       15.53      c.m"
"             Rainfall losses        42.494     10.624     25.858     mm"
"             Runoff depth           22.223     54.093     38.859     mm"
"             Runoff volume          2.55       6.78       9.33       c.m"
"             Runoff coefficient     0.343      0.836      0.600      "
"             Maximum flow           0.001      0.006      0.007      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.007     0.007     0.000     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.007     0.000     0.000     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          202   No description"
"       37.100   % Impervious"
"        0.237   Total Area"
"       19.700   Flow length"
"        2.000   Overland Slope"
"        0.149   Pervious Area"
"       19.700   Pervious length"
"        2.000   Pervious slope"
"        0.088   Impervious Area"
"       19.700   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.346   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.899   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.041     0.000     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.149      0.088      0.237      hectare"
"             Time of concentration  11.508     1.328      5.350      minutes"
"             Time to Centroid       113.541    86.816     97.376     minutes"
"             Rainfall depth         64.717     64.717     64.717     mm"
"             Rainfall volume        96.48      56.90      153.38     c.m"
```

100-yr Post-Development

```
"             Rainfall losses        42.301     6.539      29.033     mm"
"             Runoff depth           22.416     58.178     35.684     mm"
"             Runoff volume          33.42      51.15      84.57      c.m"
"             Runoff coefficient     0.346      0.899      0.551      "
"             Maximum flow           0.013      0.038      0.041      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.041     0.041     0.000     0.000"
" 54          POND DESIGN"
"         0.041   Current peak flow    c.m/sec"
"         0.008   Target outflow    c.m/sec"
"          84.6   Hydrograph volume    c.m"
"           21.   Number of stages"
"         0.000   Minimum water level    metre"
"         0.900   Maximum water level    metre"
"         0.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                   0.000     0.000     0.000"
"                 0.04500   0.00200    0.7849"
"                 0.09000   0.00290     2.185"
"                  0.1350   0.00350     3.949"
"                  0.1800   0.00410     5.978"
"                  0.2250   0.00460     8.209"
"                  0.2700   0.00500    10.594"
"                  0.3150   0.00540    13.097"
"                  0.3600   0.00580    15.684"
"                  0.4050   0.00610    18.325"
"                  0.4500   0.00650    20.994"
"                  0.4950   0.00680    23.662"
"                  0.5400   0.00710    26.304"
"                  0.5850   0.00740    28.891"
"                  0.6300   0.00770    31.393"
"                  0.6750   0.00800    33.779"
"                  0.7200   0.00820    36.009"
"                  0.7650   0.00850    38.038"
"                  0.8100   0.00870    39.802"
"                  0.8550   0.00900    41.203"
"                  0.9000   0.00920    41.987"
"            1.   SUPERPIPES_1"
"            1.   Type 1 is Pipe"
"              Downstream      Pipe      Pipe      Pipe      Pipe Number of"
"                  Invert    Length     Width    Height   Grade %     Pipes"
"                   0.000     6.000     0.900     0.900     0.000    11.000"
"              Peak outflow                  0.008    c.m/sec"
"              Maximum level                 0.754    metre"
"              Maximum storage              37.553    c.m"
"              Centroidal lag                2.538   hours"
"                   0.041     0.041     0.008     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
```

100-yr Post-Development

```
"            5   Next link "
"                     0.041     0.008     0.008     0.000"
" 51          PIPE DESIGN"
"         0.008   Current peak flow    c.m/sec"
"         0.013   Manning 'n'"
"         0.200   Diameter    metre"
"         0.500   Gradient   %"
"              Depth of flow                 0.083    metre"
"              Velocity                      0.680    m/sec"
"              Pipe capacity                 0.023    c.m/sec"
"              Critical depth                0.077    metre"
" 53          ROUTE    Pipe Route 7"
"          6.80      Pipe Route 7 Reach length   ( metre)"
"         0.000   X-factor <= 0.5"
"         7.504   K-lag   ( seconds)"
"         0.000   Default(0) or user spec.(1) values used"
"         0.500   X-factor <= 0.5"
"        30.000   K-lag   ( seconds)"
"         0.582   Beta weighting factor"
"        17.647   Routing time step   ( seconds)"
"             1   No. of sub-reaches"
"              Peak outflow                  0.008    c.m/sec"
"                     0.041     0.008     0.008     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.041     0.008     0.008     0.000"
" 51          PIPE DESIGN"
"         0.008   Current peak flow    c.m/sec"
"         0.013   Manning 'n'"
"         0.300   Diameter    metre"
"         0.400   Gradient   %"
"              Depth of flow                 0.075    metre"
"              Velocity                      0.607    m/sec"
"              Pipe capacity                 0.061    c.m/sec"
"              Critical depth                0.069    metre"
" 38          START/RE-START TOTALS 202"
"            3   Runoff Totals on EXIT"
"              Total Catchment area                      0.261    hectare"
"              Total Impervious area                     0.100    hectare"
"              Total % impervious                       38.489"
" 19          EXIT"
```

STORMWATER MANAGEMENT REPORT

YORK ROAD RESIDENTIAL INFILL
1317 York Road
Niagara-on-the-Lake, ON

APPENDIX B

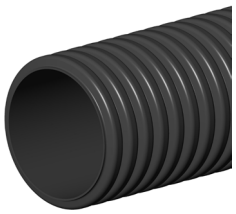
Solflo Max Data Sheet

SOLENO
Mastering Storm Water

DATA SHEET

SOLFLO MAX

PRODUCT DESCRIPTION : Rigid dual wall pipe, with smooth interior and corrugated exterior walls for roadway use.



FUNCTION : Non -perforated pipe: Gravity flow of water in networks and water course piping.
Perforated pipe: Used to collect surface runoff and control the ground water level.

MANUFACTURING STANDARDS : BNQ 3624-120, CSA B182.8, ASTM 2648, ASTM 2306 or AASHTO M294

RAW MATERIAL : Made from HDPE resin that complies with properties classification of ASTM D3350 standard.

TECHNICAL DATA : Structural strength: CAN/CSA S6 (CL-625), AASHTO (HS20 and HS25) and AREMA Cooper (E-80)
Filter: Needle punched nonwoven geotextile Routex IV with 110-micron openings

TECHNICAL DATA

Diameter						Manning	Category[1]		Weight[3]		Minimum backfill				Maximum backfill					
Nominal		Interior		Outside			Class A	Class B			CL-625		E-80		CL-625				E-80	
															Class A		Class B		Class A	
mm	in	mm	in	mm	in	n			kg/m	lb/ft	m	ft	m	ft	m	ft	m	ft	m	ft
100	4	101	4,0	120	4,7	0,010	R320		1,0	0,6	0,3	1,0	0,6	2,0	20,0	65,6			8,5	27,9
150	6	150	5,9	176	6,9	0,010	R320		2,0	1,4	0,3	1,0	0,6	2,0	19,0	62,3			8,5	27,9
200	8	205	8,1	236	9,3	0,010	R320		2,7	1,8	0,3	1,0	0,6	2,0	18,0	59,1			7,9	25,9
250	10	251	9,9	297	11,7	0,010	R320		4,0	2,7	0,3	1,0	0,6	2,0	18,0	59,1			7,9	25,9
300	12	303	11,9	363	14,3	0,010	R320	R210	5,4	3,6	0,3	1,0	0,6	2,0	17,0	55,8	16,0	52,5	8,5	27,9
375	15	381	15,0	449	17,7	0,010	R320	R210	7,9	5,3	0,3	1,0	0,6	2,0	17,0	55,8	17,0	55,8	8,8	28,9
450	18	457	18,0	544	21,4	0,010	R320	R210	11,7	7,8	0,3	1,0	0,6	2,0	17,0	55,8	17,0	55,8	7,9	25,9
525	21	535	21,1	640	25,2	0,012	R320	R210	16,2	10,9	0,3	1,0	0,6	2,0	16,0	52,5	16,0	52,5	7,6	24,9
600	24	603	23,7	741	29,2	0,012	R320	R210	19,5	13,1	0,3	1,0	0,6	2,0	15,0	49,2	15,0	49,2	7,3	24,0
750	30	756	29,8	890	35,0	0,012	R320	R210	32,8	22,0	0,3	1,0	0,6	2,0	15,0	49,2	13,0	42,7	6,1	20,0
900	36	900	35,4	1041	41,0	0,012	R320	R210	51,8	34,8	0,3	1,0	0,9	3,0	15,0	49,2	13,0	42,7	6,7	22,0
1050	42	1067	42,0	1224	48,2	0,012	R140		43,5	29,2	0,3	1,0	1,2	3,9	13,0	42,7			6,7	22,0
1200	48	1220	48,0	1377	54,2	0,012	R125		53,0	35,6	0,3	1,0	1,2	3,9	13,0	42,7			5,8	19,0
1500	60	1514	59,6	1701	67,0	0,012	R95[2]		70,7	47,5	0,5	1,6	1,2	3,9	11,0	36,1			6,4	21,0

Note 1: For reference, a Class A category pipe will have a minimum compression stiffness of 320 kPa at 5% deformation.
Note 2: R95 refers to the categorization of BNQ 3624-120 and CSA B182.8 standards.
Note 3: Values in the table are for Class A pipe.
Note 4: Values in the table are approximate and may change without notice.
Note 5: 100 mm (4 in) to 1500 mm (60 in) pipes are certified BNQ 3624-120 and CSA B182.8 standards. AASHTO M294 certified pipes are available upon request. Please contact your Soleno representative for more information.

SOLENO
Mastering Storm Water

DATA SHEET

SOLFLO MAX (CONT'D)

LENGTHS TABLE - CLASS A
according to available couplers

Nominal Diameter		No coupler		Soil tight couplers						Watertight couplers					
		Plain		BC		DBS		SC		BIGC[1]		BG		DBIG[1]	
mm	in	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft
100	4	6	19,7			6	19,7	6	19,7					4/6	13,1/19,7
150	6	6	19,7			6	19,7	6	19,7					4/6	13,1/19,7
200	8	6	19,7			6	19,7	6	19,7					4/6	13,1/19,7
250	10	6	19,7			6	19,7	6	19,7					4/6	13,1/19,7
300	12	6/9	19,7/29,5	6	19,7			6/9	19,7/29,5	4/6	13,1/19,7				
375	15	6/9	19,7/29,5	6	19,7			6/9	19,7/29,5	4/6	13,1/19,7				
450	18	6/9	19,7/29,5	6	19,7			6/9	19,7/29,5	4/6	13,1/19,7				
525	21	6/9	19,7/29,5	6	19,7			6/9	19,7/29,5	4/6	13,1/19,7				
600	24	6/9	19,7/29,5	6	19,7			6/9	19,7/29,5	4/6	13,1/19,7				
750	30	6/9	19,7/29,5	6	19,7			6/9	19,7/29,5	4/6	13,1/19,7				
900	36	6/9	19,7/29,5	6	19,7			6/9	19,7/29,5	4/6	13,1/19,7				
1 050	42							coupler available[2]				3,3	10,8		
1 200	48	6/9	19,7/29,5	6	19,7			6/9	19,7/29,5	4/6	13,1/19,7				
1 500	60											6	19,7		

Note 1: BIGC and DBIG connectors are available for non-perforated pipe only.
Note 2: The split coupler is available, although the 1050 mm (42 in) pipe is only available with BG type coupler.
Note 3: Values in the table are approximate and may change without notice.
Note 4: Lengths in the table have a tolerance between -1 % to 3 %.

LENGTHS TABLE - CLASS B
according to available couplers

Nominal Diameter		No coupler		Soil tight couplers			
		Plain		BC		SC	
mm	in	m	ft	m	ft	m	ft
300	12	6/9	19,7/29,5	6	19,7	6/9	19,7/29,5
375	15	6/9	19,7/29,5	6	19,7	6/9	19,7/29,5
450	18	6/9	19,7/29,5	6	19,7	6/9	19,7/29,5
525	21	6/9	19,7/29,5	6	19,7	6/9	19,7/29,5
600	24	6/9	19,7/29,5	6	19,7	6/9	19,7/29,5
750	30	6/9	19,7/29,5	6	19,7	6/9	19,7/29,5
900	36	6/9	19,7/29,5	6	19,7	6/9	19,7/29,5

Note 1: Values in the table are approximate and may change without notice.
Note 2: Lengths in the table have a tolerance between -1 % to 3 %.

LEGEND

Plain : plain end
BC : bell with clips
DBS : double bell snap
SC : split couplers
BIGC : bell with integrated gasket
BG : o-ring bell gasket
DBIG : double bell with integrated gasket

APPLICATIONS : Driveway culvert, culvert, stormwater sewer, beaver barrier, ventilation, ditch piping, roadway drainage, drainage collector and outlet, detention or retention system and trench drain.

OPTIONS : Special lengths are available (upon request)
Beveled cut
Welded coupler for service entrance or connecting to cath basin
Fish weir

INSTALLATION : Visit soleno.com to consult the installation guide.

STORMWATER MANAGEMENT REPORT

YORK ROAD RESIDENTIAL INFILL
1317 York Road
Niagara-on-the-Lake, ON

APPENDIX C

Tempest Inlet Control Device Flow Chart (LMF-105)

Tempest Inlet Control Device Flow Chart

Chart 1: LMF 14 Preset Flow Curves