Clayton Subdivision

Preliminary
Stormwater Management Report

Project Location:

Part of Lot 16, Concession 11
Centre Wellington, Ontario

Prepared for:

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MTE File No.: 50250-100

Engineers, Scientists, Surveyors.

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MTE Drawing No. 50250-100-EC1.1 .....Encl.

Existing Conditions Plan (Elora Sands)
MTE Drawing No. 49878-100-EC1.1.....Encl.

1.0 Introduction

1.1 Overview

MTE Consultants Inc. (MTE) was retained by Cachet Developments Inc. (Cachet) to prepare the following Functional Servicing Report (FSR) in support of a Draft Plan of Subdivision application. The lands that comprise the Draft Plan of Subdivision are legally described as Part of Lot 16, Concession 11, in the geographic Township of Nichol, located in the community of Salem, Township of Centre Wellington, County of Wellington. These lands are herein referred to as the 'subject lands'. The subject lands are generally bounded by Woolwich Street East to the northwest, by Irvine Street to the southeast, by existing residential (Elora Meadows Subdivision and rural residential) to the south, and by Salem Public School to the west.

Cachet also owns the adjacent parcel of land on the opposite side of Irvine Street located at 7581 Sideroad 15 (SR15) herein referred to as the Elora Sands. The Elora Sands are generally bounded by SR15 to the northwest, by Gerrie Road to the southeast, by existing agricultural (known as the Keating Lands) to the south, by Irvine Street to the southwest, and bisected by the Nichol Drain No. 1 (ND1). At the completion of Phase 1 of the County of Wellington's (County) Municipal Comprehensive Review in 2022/2023, the Elora Sands (39.2ha) lands were included in the settlement area boundary. The Elora Sands are located within the Community Planning Study Area in accordance with the County of Wellington Official Plan. Refer to the Location Plan in **Figure 1.1**.

The subject lands comprise a total area of approximately 12.49ha. The proposed development plans for the subject lands include a residential subdivision with a mix of single detached, street-oriented and lane access townhouse units, a park block, walkway blocks, and municipal rights-of-way. Refer to the Draft Plan of Subdivision prepared by Malone Given Parsons Ltd. (MGP), dated June 13, 2023, in **Appendix A** for more details. The stormwater management facility (SWMF) block is proposed to be located on the adjacent Elora Sands adjacent to ND1, and is described further in Section 1.2.2. The development plans also include re-constructing Irvine Street, Woolwich Street, and a portion of Sideroad 15 to an urbanized road cross-section with new road profiles. Irvine Street and Woolwich Street East would be urbanized along the frontage of the subject lands matching back into the existing grading.

This report presents the proposed plan detailing the stormwater quality, quantity, and erosion control measures that are proposed for the proposed development. This report should be read in conjunction with the *Clayton Subdivision – Functional Servicing Report*, prepared by MTE (July 11, 2023).

1.2 Background Information

1.2.1 Nichol Drain No. 1 Subwatershed Study

The ND1 is an open channel type municipal drain that starts adjacent to Beatty Line at its most upstream point. The channel flows west approximately 4km and discharges to Irvine Creek immediately west of Irvine Street, with Irvine Creek being a tributary of the Grand River. A subwatershed study for the ND1 was undertaken by the Township and is detailed in the *Nichol Drain Subwatershed Study Phase 1 Existing Conditions Final Report* (NDSS) prepared by Aquafor Beech Limited (February 2008). Based on the NDSS, the ND1 subwatershed encompasses an area of roughly 750ha of mostly agricultural lands. The ND1 is considered a cold-water stream discharging to Irvine Creek, which is a cold-water tributary of the Grand River.

1.2.2 Stormwater Management Strategy Assessment

In 2022, MTE completed a stormwater management strategy assessment for the subject lands, the Elora Sands and the Keating lands, being the Primary Study Area (PSA). Refer to **Appendix F** for the technical memo, *Clayton Subdivision, Elora Sands and Keating Lands – Comprehensive Stormwater Management Strategy Assessment*, revised July 20, 2022. The technical memo was prepared to assess potential SWM strategy alternatives for the PSA. It was concluded that a single SWMF located adjacent the ND1 on the Elora Sands, incorporating drainage from the subject lands and the future development of the Elora Sands and Keating lands would be the ideal SWM strategy for the ultimate future development of the PSA.

The current intention is for the SWMF block to be severed from the Elora Sands with the severed parcel being conveyed to the Township of Centre Wellington (Township).

1.3 Purpose of Study

The purpose of this study is to develop a SWM strategy for the proposed development that is acceptable to the Township of Centre Wellington, the County of Wellington (County), the Grand River Conservation Authority (GRCA), and the Ministry of the Environment, Conservation and Parks (MECP – formerly MOE), taking into consideration the previous studies, municipal standards and MECP guidelines respecting the recommendations of the NDSS.

1.4 Objectives

The objective of this stormwater management plan is to ensure that the proposed development includes the necessary controls to protect the hydrology and water quality of the receiving water systems. Furthermore, this plan also ensures that the proposed Draft Plan of Subdivision provides the necessary blocks and corridors for stormwater management measures. The primary objectives of this study are as follows:

- Document criteria for the management of stormwater runoff from the subject lands;
- Recommend a comprehensive plan for controlling the quality and quantity of stormwater runoff from the subject lands; and
- Prepare preliminary designs for the recommended SWM infrastructure.

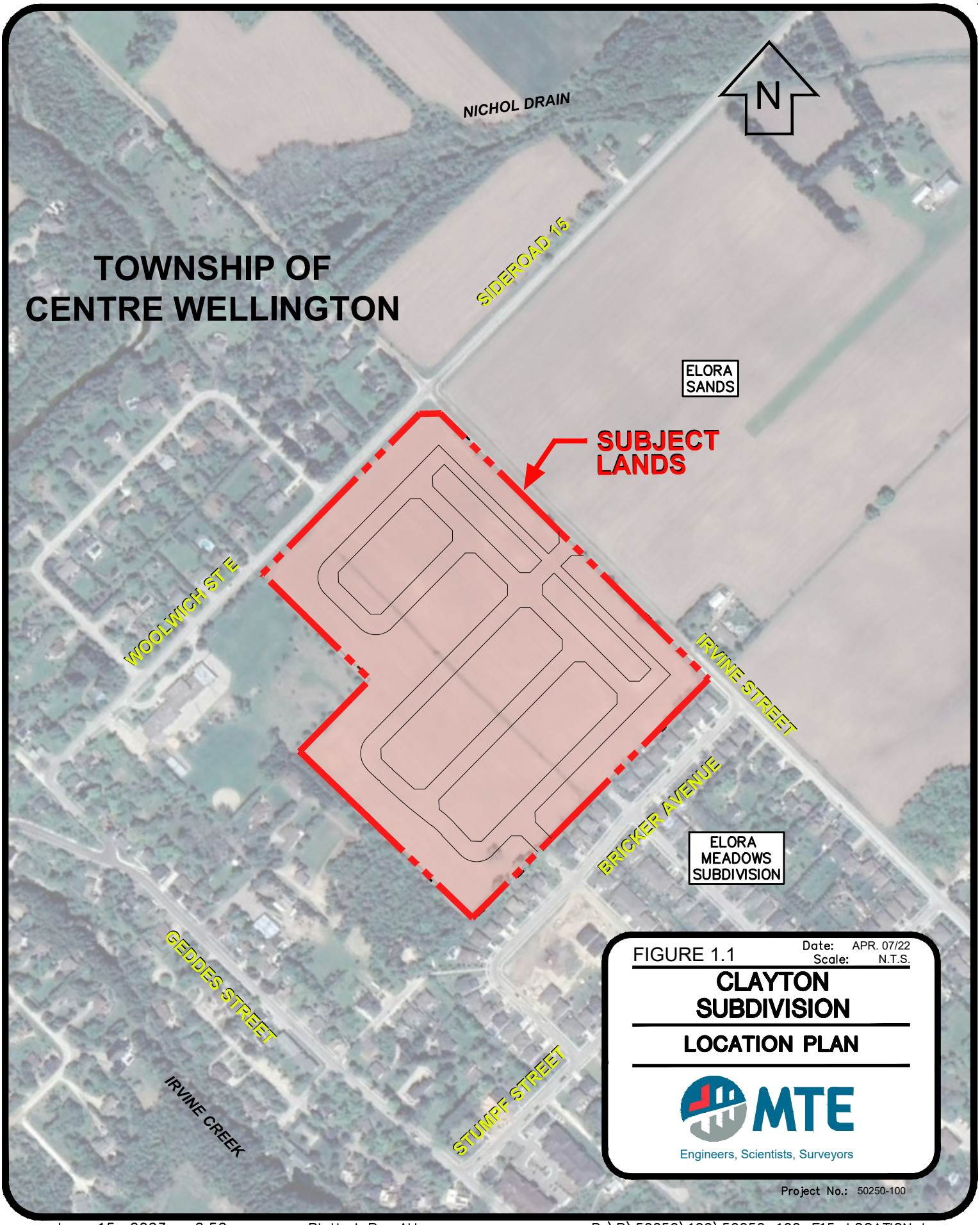

FIGURE 1.1

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CLAYTON SUBDIVISION

LOCATION PLAN

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100

June 15, 2023 — 2:52 p.m. — Plotted By: AHewson

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2.0 Existing Conditions and Background Information

2.1 Topographical Information

The subject lands are generally comprised of rolling agricultural land. A topographical survey was completed for the subject lands by JD Barnes (formerly Black, Shoemaker, Robinson & Donaldson Limited (BSR&D)) in the Fall of 2021. Additional topographical survey surrounding the subject lands and the entire Elora Sands was conducted by MTE in 2022. The existing topography of the subject lands and the Elora Sands are shown in **MTE Drawings 50250-100-EC1.1 and 49878-100-EC1.1**, respectively.

The subject lands generally consist of rolling and moderately sloped topography with slopes typically ranging from 1.0% to 14.5%. Existing elevations within the lands range from approximately 407.3m near Woolwich Street East to 414.4m near the central high ridge of the lands. Under pre-development conditions, a majority of surface runoff from the subject lands flows from south to north towards the south ditch on Woolwich Street East directing flows northeasterly across Irvine Street via a 450mm diameter culvert and through the south ditch on SR15 to ND1. A topographical ridge is present near the south end of the property starting at Irvine Street and curving northwestward to Woolwich Street East. Surface runoff from the balance of the subject lands flows south towards Irvine Creek via several discharge locations, namely Woolwich Street East, existing rural residential properties to the southwest, and Irvine Street and the residential properties to the southeast.

The Elora Sands generally consist of moderately sloped topography with slopes typically ranging from 1.0% to 12.5%. Existing elevations within the lands range from approximately 400.8m in the ND1 to 420.5m at the north corner of the lands.

The topographical ridge on the subject lands extends into the Elora Sands and Keating lands, generally parallel to the ND1. Surface runoff from a majority of the Elora Sands, south of the ND1, flows northerly directly to the ND1 or via the south ditch on SR15 to the ND1. Surface runoff from the balance of the lands south of the ND1 flows southerly towards Irvine Street ultimately discharging into Irvine Creek. Surface runoff from the Elora Sands on the north side of the ND1 flows south directly to the ND1.

2.2 Pre-Development Conditions

A majority of the subject lands are located within the ND1 subwatershed, which is a tributary of Irvine Creek and the Grand River. Based on the existing conditions, the subject lands and downstream lands were modelled as eight separate catchments using the MIDUSS hydrologic modeling program. **Figure 2.1** provides an illustration of the pre-development catchment areas. Drainage Areas 101 to 103 drain northerly, towards the ND1. Drainage Areas 104 to 108 ultimately are directed to Irvine Creek discharging offsite at separate discharge points. **Table 2.1** provides a brief description of the catchments and the design parameters used in the hydrologic modelling.

Table 2.1 – Pre-Development Catchment Parameters

Catchment	Description	Area (ha)	% Impervious	Flow Length (m)	Slope (%)
To Nichol Drain No. 1					
101	Clayton Subdivision	6.67	0.0	200	2.5
102	External municipal roads draining to future SWMF	1.46	47.2	10	2.0
103	Elora Sands draining to ND1 at SR15	13.02	0.0	250	3.0
	Total	**21.15**	**3.3**	**-**	**-**
To Irvine Creek via separate discharge points					
104	Clayton Subdivision to Woolwich Street East	0.54	0.0	85	3.5
105	Woolwich Street East draining west	0.12	35.9	10	2.0
106	Clayton Subdivision to existing rural residential	3.60	0.0	85	4.5
107	Clayton Subdivision to Irvine Street and existing residential	1.68	0.0	70	2.0
108	Irvine Street draining south	0.39	49.8	10	2.0
	Total	**6.33**	**3.7**	**-**	**-**

Hydrologic modelling details and results are further discussed in Section 5.0. A detailed copy of the pre-development catchment parameters and MIDUSS modelling output has been included in **Appendix B**.

2.3 Geotechnical and Hydrogeological Information

In October 2021, Soil-Mat Engineers & Consultants Ltd. (Soil-Mat) prepared two geotechnical and hydrogeological investigations for the subject lands and the Elora Sands, respectively. The fieldwork for the investigations included: 4 boreholes, 3 of which included monitoring wells for the subject lands and an additional 7 boreholes, of which 1 included a monitoring well for the Elora Sands. The boreholes were advanced to depths ranging between 2.1 to 7.6m. In March 2022, Soil-Mat prepared additional preliminary hydrogeological considerations for the subject lands and the Elora Sands.

A supplementary hydrogeological assessment was completed by Soil-Mat dated July 20, 2022 for the subject lands and the Elora Sands, advancing 14 additional boreholes, 12 of which included monitoring wells drilled in February and April 2022. The additional boreholes were advanced to depths ranging between 3.0 to 8.2m. This assessment included groundwater levels in all monitoring wells. Levels were measured from February to June 2022. An updated groundwater contour plan was also provided to supplement the groundwater contours establish within the original March 2022 hydrogeological report.

Based on the results of the detailed investigations, the subsurface stratigraphy is generally described as topsoil underlain by sandy silt, sand, and clayey sandy silt deposits. Based on the hydrostatic groundwater level readings recorded by Soil-Mat, groundwater levels generally rise

and fall with the topography. Groundwater flow is interpreted as having a high point located near the topographical ridge with the groundwater flow generally following surface water runoff direction. Based on the findings in the NDSS and the hydrogeological assessment by Soil-Mat, generally groundwater contributes to the ND1 as shallow interflow and baseflow.

The geotechnical and hydrogeological reports can be found in **Appendix E**.

2.4 Source Water Protection and GRCA Mapping

As illustrated in **Appendix G**, the subject lands are within a Wellhead Protection Area (WHPA) and a Significant Groundwater Recharge Area (SGRA) as defined by the Source Water Protection Plan Mapping. A majority of the lands have a WHPA classification of WHPA-C, while the southeastern portion of the lands has a classification of WHPA-B. The majority of the subject lands are within a wellhead vulnerability score of 6 with a small portion to the south having a vulnerability score of 8. There is an existing municipal drinking water supply well located on Aqua Street approximately 850m south of the subject lands.

The SGRA has a vulnerability score of 4, generally indicative of shallow groundwater flow towards Irvine Creek west of the subject lands.

DRAINS TO IRVINE CREEK

DRAINS TO ND1

WOOLWICH STREET EAST

SIDEROAD 15

105
0.12

104
0.54

102
1.46

101
6.67

103
13.02

108
0.39

106
3.60

107
1.68

IRVINE STREET

NICHOL DRAIN 1

SMVEM PUBLIC SCHOOL

AGRICULTURE

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

RESIDENTIAL

BRICKER AVENUE

MARR DRIVE

CLEGG ROAD

DRAINS TO ND1

DRAINS TO IRVINE CREEK

LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS
- GRCA EXISTING CONTOURS
- DIRECTION OF EXISTING DRAINAGE
- EXISTING DRIPLINE
- APPROXIMATE FLOODPLAIN LIMIT (FROM NDSS)
- EXISTING EMBANKMENT (SLOPE AS NOTED)
- PRE-DEVELOPMENT CATCHMENT
- MAJOR OVERLAND DRAINAGE SPLIT
- 1000 / 1.10 — CATCHMENT No. / AREA (Ha)

FIGURE 2.1

Date: JUN.16/23
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PRE-DEVELOPMENT DRAINAGE AREA PLAN

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July 13, 2023 — 4:21 p.m. — Plotted By: MFelinczak

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3.0 Stormwater Management Criteria

New developments are required to provide stormwater management in accordance with provincial and municipal policies. Relevant documents have been referenced in the design of the stormwater management plan for the subject site; including:

- Stormwater Management Planning and Design Manual (MOE, 2003);
- GRCA Policies for the Administration of Ontario Regulation 150/06 (GRCA, 2015); and
- Nichol Drain Subwatershed Study Phase 1 Existing Conditions Final Report (Aquafor Beech, 2008).

Based on the above policies and relevant documents, background reports, agency requirements, and site specific considerations, the following SWM criteria have been established for this study area:

- **Water Quality** – Provide an Enhanced (MOE, 2003) level of stormwater quality treatment prior to discharge to the ND1.
- **Water Quantity and Erosion Control** – Control the peak flow rates of existing catchment areas for all storms up to and including the 100-year storm event to the allowable flow rates prior to releasing the flows to the receiving ND1; preserve hydraulic and hydrologic functions. Erosion protection will be provided through infiltration of the 25mm storm event.
- **Water Balance**

  Infiltration – Maintain or exceed target groundwater volume inputs established within the NDSS through active and/or passive infiltration measures.

  Surface Water – Maintain existing surface water volume inputs into the ND1.

A brief discussion of each of these criteria is included in the following subsections.

3.1 Nichol Drain No. 1 Channel Health

Based on the NDSS and consistent with the recommendations in the *Scoped Environmental Impact Study – Elora Clayton* dated July 2023 prepared by Beacon Environmental, it was recommended that a 30m wide setback from each streambank of the ND1 be provided to encourage a more natural channel form including riparian vegetation. It was also recommended to reconnect the floodplain with the channel by terracing each side. This will be completed as part of the future development of the Elora Sands adjacent the ND1 and is not required at this time.

At a later date, the floodplain analysis detailed in the NDSS should be updated to include the envisioned development for upstream areas for Salem, Elora and Fergus.

3.2 Water Quality Control

The NDSS required that an Enhanced Level (as defined in the MOE 2003 SWM Planning and Design Manual) of protection be provided to protect the cold-water fishery and prevent increase in erosion stress on the ND1. The requirements for this level of quality control are established in Table 3.2 of the *Stormwater Management Planning and Design Manual* (MOE, 2003). Since the ND1 is a cold-water fisheries habitat, thermal impacts are required to be mitigated prior to discharge.

3.3 Water Quantity and Erosion Control

3.3.1 Quantity Control to ND1

The SWMF proposed for the development will maintain post-development peak flow release rates at existing levels for all storms up to and including the 100-year storm, as well as provide a sufficient outlet to convey the Regional event to the ND1.

Table 3.1 shows the pre-development flow rates from the subject lands and downstream external lands and required post-development release rates to the ND1.

Table 3.1 – Allowable Rates based on Pre-Development Flow Rates to ND1

	25mm-4hr	2yr	5yr	10yr	25yr	50yr	100yr	Regional
101	0.018	0.054	0.157	0.250	0.403	0.528	0.666	0.942
102	0.106	0.163	0.228	0.265	0.321	0.376	0.428	0.209
103	0.033	0.099	0.286	0.456	0.739	0.978	1.230	1.805
***Total**	**0.107**	**0.167**	**0.467**	**0.741**	**1.192**	**1.583**	**1.976**	**2.895**

*Note: The sums may not add up algebraically. They are based on the timing and sum of hydrographs taken directly from MIDUSS.

The flows will be released from the SWMF into a proposed conveyance pipe system through the floodplain and across SR15, and ultimately to the ND1 on the downstream side of SR15.

The SWMF design will allow for future expansion for the development of the Elora Sands. Under the interim development condition, the Elora Sands drainage areas are considered under existing conditions and those areas not draining to the SWMF will maintain their existing drainage patterns.

3.3.2 Areas Draining Uncontrolled Offsite

Areas of the subject lands unable to drain to the SWMF will be limited to predominantly pervious landscaping areas and will discharge uncontrolled offsite. Post-development flow rates from these areas will be limited to their respective peak pre-development release rates for all storms up to and including the 100-year storm event shown in **Table 3.2**.

Table 3.2 – Required Pre-Development Flow Rates for Uncontrolled Areas

	25mm-4hr	2yr	5yr	10yr	25yr	50yr	100yr	Regional
104	0.002	0.007	0.020	0.032	0.050	0.066	0.082	0.079
105	0.007	0.010	0.015	0.017	0.024	0.028	0.032	0.017
***Total to Woolwich St.**	**0.007**	**0.011**	**0.025**	**0.038**	**0.060**	**0.078**	**0.096**	**0.096**
106	0.016	0.049	0.143	0.217	0.355	0.456	0.554	0.526
***Total to rural residential**	**0.016**	**0.049**	**0.143**	**0.217**	**0.355**	**0.456**	**0.554**	**0.526**
107	0.007	0.021	0.060	0.096	0.148	0.196	0.249	0.246
108	0.030	0.046	0.064	0.074	0.089	0.104	0.118	0.056
***Total to Elora Meadows**	**0.030**	**0.047**	**0.075**	**0.116**	**0.183**	**0.236**	**0.295**	**0.301**

*Note: The sums may not add up algebraically. They are based on the timing and sum of hydrographs taken directly from MIDUSS.

3.3.3 Erosion Control

Erosion control will be provided through a minimum of 24-hour extended detention drawdown for the MECP extended detention volume and for the 25mm storm event. All runoff for storm events up to the 25mm event will be infiltrated using an end-of-pipe infiltration facility which will reduce the erosion stress on the ND1 from a majority of rainfall events. Development detailed grading, erosion and sedimentation control measures will be provided during final design.

3.4 Water Balance

3.4.1 Infiltration to Groundwater

Low Impact Design (LID) best management practices will be used to mimic pre-development recharge rates. Infiltration galleries are proposed to convey and infiltrate flows from roofs on-site. The SWMF will introduce an infiltration gallery to further promote groundwater recharge. Pervious landscaped areas throughout the subject lands will be designed to implement amended topsoil and improve groundwater recharge by means of passive infiltration.

An infiltration balance was performed to determine the pre-to-post development net change in infiltration, provided in **Appendix H.**

3.4.2 Surface Runoff

A monthly surface runoff water balance analysis was completed to confirm that existing surface water volume inputs into the ND1 are maintained.

4.0 Proposed Development and SWM Strategy

4.1 Proposed Area Grading

The grading design of the subject lands was controlled by many factors, including:

- Match centreline elevations of existing and proposed road grades;
- Match existing and proposed boundary grades around the perimeter of the subdivision lands;
- Ensure major storm event overland flows are directed towards the proposed SWMF;
- Comply with municipal standards for minimum and maximum road and landscaped area grades;
- Ensure adequate cover is provided, where feasible, over municipal services;
- Manage the cut/fill balance for the development; and,
- Maintain 0.45m from basement floor to seasonal high groundwater levels.

A preliminary finished grade contour plan is shown in **Figure 4.1**.

4.2 Post-Development Conditions

The proposed SWM plan requires the implementation of a wet pond SWMF with an end of pipe infiltration gallery designed to accommodate stormwater runoff from the majority of the subject lands. Stormwater runoff from the existing municipal rights-of-way, Irvine Street, Woolwich Street East and a portion of SR15 will also be treated and controlled by the SWMF. The plan has been designed to meet the criteria presented in Section 3.0 of this report. An overview of the stormwater management plan is discussed below.

The proposed development plans for the subject lands are comprised of residential land uses, municipal road rights-of-way, a park block and walkway blocks. The SWM Block is located on the Elora Sands near the ND1. The proposed SWM scheme receives drainage from approximately 23.92ha of lands.

The location of the proposed SWMF, along with contributing drainage areas, is illustrated in **Figure 4.2**. Minor system runoff from the contributing areas will be conveyed through the proposed storm sewer system to the SWMF. Roof areas for most units, except for the municipal laneway units, will be directed to lot-level infiltration galleries prior to any overflow being released to the SWMF. Excess runoff from the major storms will flow overland to the SWMF via the proposed rights-of-way and designated overland flow routes. Refer to MTE's *Clayton Subdivision - Functional Servicing Report*, dated July 11, 2023 for further details of the storm sewer network.

The major overland flow route from the subject lands will be directed via Woolwich Street East and SR15 and eventually onto the Elora Sands through a designed open channel into the SWMF. The road profile of SR15 is being re-designed to accommodate a low point east of Irvine Street where overland flow will be re-directed onto the Elora Sands transitioning into a 6m wide vegetated flat-bottomed channel designed to convey the 100-year storm event flows with a maximum flow depth of 0.5m.

The SWMF was designed to allow for it to be expanded south accommodating the future development of the Elora Sands and neighbouring Keating Lands.

Under post-development conditions, the subject lands were delineated into 18 catchments. **Table 4.1** provides a brief description of the catchment areas as well as the design parameters used in the hydrologic modelling. A detailed copy of the post-development catchment parameters and MIDUSS modelling output logs have been included in **Appendix C**.

Description of Drainage Areas

Drainage Area 201 - clean stormwater runoff from roofs will be directed to rear yard infiltration galleries, where possible, sized to completely infiltrate all storm events up to the 25mm event. Excess runoff under larger storm events will overflow back into the proposed storm sewer network and be directed to the SWMF.

Drainage Area 202 - stormwater runoff will drain internally through the use of constructed drainage swales and the proposed storm sewer network, and directed towards the proposed SWMF.

Drainage Area 203 - stormwater runoff will drain overland to the proposed storm sewer networks on Woolwich Street East and Irvine Street and directed towards the proposed SWMF.

Drainage Area 204 comprises of municipal road improvements.

Drainage Areas 205 and 206 - stormwater runoff will sheet drain overland to the proposed SWMF.

Drainage Areas 207 and 208 - stormwater runoff will drain directly towards the ND1 matching pre-development conditions.

Drainage Areas 209, 210, 211, 212 and 213 - stormwater runoff will be captured by the proposed storm sewer network for storm events up to the 5-year. Under larger storm events, the 5-year flow or the capacity of the storm sewer network will drain towards the SWMF, whereas the runoff above the capacity of the storm sewer network will discharge offsite towards the existing Marr Drive, Woolrich Street East, and Irvine Street, respectively.

Drainage Areas 214, 215, 216, 217 and 218 - stormwater runoff will drain uncontrolled northwest towards Woolwich Street East, southwest towards the existing rural residential properties, southeast towards the existing residential properties, respectively. These drainage areas mainly consist of pervious landscaped areas or rear yards draining clean water, with Catchment 218 representing a portion of the external urbanized Irvine Street.

Table 4.1 – Post-Development Catchment Parameters

Catchment	Description	Area (ha)	% Impervious	Flow Length (m)	Slope (%)
To Nichol Drain No. 1					
Draining to SWMF					
201	Clayton Subd. roof areas	2.75	100.0	6	33.0
202	Clayton Subd. non-roof areas	8.06	55.0	90	0.5
203	Clayton Subd. rear yards draining to Woolwich St. East and Irvine St.	0.44	31.7	25	5.5
204	External municipal roads draining to SWMF	0.97	65.0	10	2.0
205	Elora Sands draining to SWMF	9.60	0	250	3.0
206	Proposed SWMF and Overland Flow Channel	1.34	40.0	20	25.0
209*	Marr Drive transition grading	0.07	65.0	15	3.5
210*	Clayton Subd. rear yards draining to Woolwich St. East	0.20	16.4	25	5.5
211*	Woolwich St. East	0.23	65.0	10	2.0
212*	Clayton Subd. rear yards draining to Irvine St.	0.05	19.1	12	4.0
213*	Irvine Street	0.19	65.0	10	2.0
Downstream of SWMF draining directly to ND1					
207	Elora Sands	2.08	0.0	100	4.5
208	External municipal roads (SR15)	0.56	49.7	10	2.0
	Total	**26.54**	**34.4**	**-**	**-**
To Irvine Creek via separate discharge points (Discharging Offsite)					
214	Clayton Subd. rear yards draining to Woolwich St. East heading west	0.10	0.0	60	5.0
215	Clayton Subd. rear yards draining to existing rural residential	0.50	0.0	15	4.5
216	Clayton Subd. rear yards draining to existing residential	0.24	7.8	4	33.0
217	Clayton Subd. rear yards draining to Irvine St.	0.07	11.4	12	4.0
218	Irvine Street	0.20	65.0	10	2.0
	Total	**1.11**	**13.9**	**-**	**-**

*Note: Drainage Areas 209-213 - under storm events larger than 5-year, flows in excess of the 5-year storm discharge offsite.

TO SWMF

ELORA SANDS

SIDEROAD 15

IRVINE STREET

CL 406.92

CL 413.92

HP 413.96

EX. 412.72

LANE A

LANE A

STREET B

STREET B

(412.39)

(409.44)LP

(410.39)

(411.83)

(411.66)LP

(413.31)

(413.79)

STREET C

STREET C

STREET D

STREET A

BLOCK 185
PARK
0.64 ha

(410.67)HP

(413.55)HP

(414.25)HP

(413.85)

(412.82)EX

(412.38)EX

HP 407.70

BRICKER AVENUE

CLEGG ROAD

MARR DRIVE

ELORA MEADOWS SUBDIVISION

WOOLWICH STREET EAST

SALEM PUBLIC SCHOOL

95m RETAINING WALL
MAX. HEIGHT 2.5m

(413.17)

LEGEND

- LIMIT OF SUBDIVISION
- PROPOSED CONTOURS
- EXISTING CONTOURS
- (224.35) PROPOSED ELEVATION
- LP LOW POINT
- HP HIGH POINT
- OVERLAND FLOW ROUTE (MAJOR STORM)
- EXISTING DIRECTION OF DRAINAGE

FIGURE 4.1

Date: JUN.13/23
Scale: 1:2000

PRELIMINARY ROAD GRADE PLAN

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100

July 13, 2023 — 4:14 p.m. — Plotted By: MFelinczak

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DRAINS TO IRVINE CREEK

DRAINS TO ND1

FLOWS DIRECTLY TO ND1

WOOLWICH STREET EAST

SIDEROAD 15

IRVINE STREET

NICHOL DRAIN 1

APPROXIMATELY 50m

SALEM PUBLIC SCHOOL

STREET C

STREET C

STREET B

LANE A

STREET A

BLOCK 185
PARK
0.64 ha

STREET D

ROOF AREAS TO BE DIRECTED TO LOT-LEVEL INFILTRATION GALLERIES

STREET A

AGRICULTURE

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

RESIDENTIAL

BLOCK 126

BRICKER AVENUE

MARR DRIVE

CLEGG ROAD

DRAINS TO ND1

DRAINS TO IRVINE CREEK

210	0.20
211	0.23
214	0.10
203	0.44
204	0.97
205	9.60
206	1.34
207	2.08
208	0.56
201 ROOF	2.75
202 NON-ROOF	8.06
215	0.50
212	0.05
213	0.19
217	0.07
209	0.07
218	0.20
216	0.24

LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS (GRCA)
- EXISTING CONTOURS
- PROPOSED FINISHED GRADE CONTOURS
- POST-DEVELOPMENT CATCHMENT
- APPROXIMATE FLOODPLAIN LIMIT (FROM NDSS)
- OVERLAND FLOW ROUTE
- 1000 / 1.10 — CATCHMENT No. / AREA (Ha)
- NO LOT-LEVEL INFILTRATION GALLERIES PROPOSED FOR THESE UNITS. ROOF WATER TO BE DIRECTED TO GRADE

FIGURE 4.2

Date: JUN. 20/23
Scale: 1:2500

POST-DEVELOPMENT DRAINAGE AREA PLAN

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100

July 13, 2023 — 12:46 p.m. — Plotted By: TBerry

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5.0 Stormwater Management Design

5.1 Hydrologic Modelling

As previously noted, a post-development hydrologic model was constructed, using the MIDUSS modelling software, to reflect the detailed drainage conditions proposed for the subject lands. This allows for the quantitative estimate of flows under the proposed development conditions. The proposed development conditions were modelled for the:

- Quality storm event (25mm depth, 4-hour Chicago distribution);
- 2, 5, 10, 25, 50, and 100-year return period rainfall events (3-hour Chicago distribution) utilizing the IDF curve parameters derived from the Fergus Shand Dam data (per the Township) Intensity-Duration-Frequency (IDF) parameters; and,
- Regional storm event (285mm depth, 48-hour Hurricane Hazel).

The IDF parameters, hydrologic parameters, and MIDUSS model output files for each of the pre- and post-development catchment areas are provided in **Appendix B** and **Appendix C**, respectively.

5.2 Water Quality

The proposed SWMF has been designed as a wet pond with a permanent pool depth of 1.5m. The facility will incorporate a sediment forebay with a depth of 1.5m which offers the benefits of dilution and settling of sediment. A planting scheme will be prepared that carefully selects plant species and their location in and around the basins to stabilize banks, mitigate temperature increases, deter waterfowl from nesting within the area, and provide aesthetics and safety benefits.

The forebay design is based on classic particle settling and flow dispersion equations, as presented in the MOE's 2003 *Stormwater Management Planning and Design Manual*. The methodology presented in that document suggests that the design flow for the forebay should be taken as the peak outflow from the facility. A forebay is typically designed to treat minor storm flows. Therefore, the main pond will essentially be empty (or at its permanent pool level) during minor storm events. As such, there will be no mass of water at the outlet of the forebay that would control the flow through the forebay to that of the main pond's discharge rate.

As such, the design of the forebay should be based on the notion that the flow into the forebay equals the flow through the forebay, which equals the flow out of the forebay. In using this approach, the recommended settling velocity of 0.0003m/s (from MOE 2003) results in extremely large and unachievable forebay lengths. Therefore, the forebay is designed to satisfy the following four conditions:

- A settling length based on a settling velocity of 0.0003m/s using the main pond's peak discharge from the 25mm storm event (as per MOE 2003);
- A settling length based on a settling velocity of 0.0055m/s using the forebay inflow/outflow from the 25mm storm event;
- A dispersion length such that, based on flow and depth of water, the velocity through the forebay is less than 0.5m/s; and
- That velocity, based on flow divided by cross-sectional area, is less than 0.15m/s to prevent scouring.

The 2003 MOE document suggests that the clean-out frequency for a SWMF be based on the sediment loading within the entire pond, however, it is recommended that the clean-out frequency be based on the loading within the forebay only. While this typically results in more frequent clean-out, it is restricted to the forebay area only and eliminates disturbance of the main pond. The clean-out frequency for the proposed SWMF can be found in the forebay design calculations in **Appendix D**.

The proposed SWMF will provide quality control for the urbanized areas of the development which amounts to an area of 14.32ha at 61.8% imperviousness. The remaining 9.60ha of undeveloped agricultural lands (drainage area 205) will simply be conveyed through the SWMF. According to Table 3.2 from MOE's 2003 stormwater management guidelines, the constructed wet pond requires 206.0m^3/ha of storage. As described in Section 3.1, 40m^3/ha of which is extended detention and the remainder of which is the permanent pool. The required permanent pool and extended detention volumes are 2377m^3 and 573m^3 respectively.

The forebay will accept minor storm event flows via a splitter structure designed to split off flows in excess of the 25mm quality event. The large flows will be directed into the main cell, avoiding potential resuspension or washout of the forebay. Details for this splitter structure will be provided at the final design stage.

The SWMF will incorporate an end-of-pipe (EOP) infiltration gallery sized to infiltrate all runoff from storm events up to the 25mm event. The infiltration gallery was sized to allow for a drawdown of at least 24 hours for the 25mm storm event. The proposed EOP infiltration gallery will be an Advanced Drainage Solutions (ADS) StormTech type system utilizing the SC-160LP Chamber or approved equivalent.

The proposed SWMF design characteristics are summarized in **Table 5.1**. Refer to **Appendix D** for the relevant design sheets and calculations (e.g. catchment parameters, imperviousness calculations, stage-storage discharge relationships, drawdown calculations, etc.). Refer to **Figure 5.1 to Figure 5.3** for details of the proposed SWMF. As previously mentioned, the SWMF was designed to allow for future expansion as part of the future development of the Elora Sands. A conceptual expansion is shown on **Figure 5.1**.

The preliminary geotechnical and hydrogeological investigations show the closest borehole (MW201) to the proposed infiltration gallery location to have highly permeable sand and gravel soils at a depth of approximately 4.1m. The investigation describes the soil as having an infiltration rate of 150 to 300mm/hr. It is proposed to replace the less permeable sandy silt soil above the sand and gravel and below the proposed footprint of the infiltration gallery near the ground surface with the more permeable soils located elsewhere on the subject lands. This will provide the required infiltration rate for the proposed EOP infiltration strategy. A typical cross-section of the infiltration gallery and associated soil sub-excavation and replacement is shown on **Figure 5.3**.

Table 5.1 – Water Quality Control Details

General	Facility Characteristics
Stormwater Management Facility Type	Wet Pond
Required MECP Water Quality Protection	Enhanced (Level 1)
Total Contributing Area	14.32ha
Imperviousness	61.8%
Bottom Elevation (Wet Pond)	402.10m
Storage	
Unit Area Storage Volume Requirements as per SWMMP (MOE 2003)	206.0m^3/ha
Required Total Volume	2950m^3
Permanent Pool	
Required Permanent Pool Volume	2377m^3
Permanent Pool Volume Provided	5370m^3
Permanent Pool Elevation	403.60m
Extended Detention	
Minimum Required Volume (based on 40m^3/ha)	573m^3
Extended Detention Elevation	403.72m
Peak Release Rate for Extended Detention (Quality)	0.003m^3/s
Quantity and Erosion Control (25mm-4hr)	
Drawdown Volume	1644m^3
Approximate Drawdown Time	108.5 hours
Peak Release Rate	0.007m^3/s
Forebay	
Required Forebay Length	24.0m
Actual Forebay Length	45.0m
Permanent Pool Elevation	403.60m
Bottom Elevation	402.10m
Outlet Controls	
2400mm diameter Outlet Control Manhole	
Orifice Diameter (Extended Detention)	80mm
Orifice Elevation (Extended Detention)	403.60m
Weir Notch 1 Elevation (based on 25mm-4hr)	403.95m
Weir Notch 1 Width	1200mm
Weir Notch 2 Elevation	404.25m
Weir Notch 2 Width	1000mm
Weir Wall top Elevation	404.45m
Weir Wall top Width	2400mm
Emergency Overflow Weir Elevation	405.00m
Emergency Overflow Weir (Bottom Length)	5.00m

SIDEROAD 15

OUTLET TO BE TREATED WITH ROUNDED RIVER ROCK AND PLANTINGS

9.1m–750mmø STM. @ 0.90%

10.0m–450mmø CULVERT @ 1.30%
SW INV.=404.44
NE INV.=404.31

98.4m–1090x1725mm HORIZONTAL ELLIPTICAL STM. @ 0.20%

13.7m–675mmø STM. @ 0.90%

7.6m–675mmø STM. @ 0.90%

Ex. 1.8x3.6m ELLIPTICAL CMP Culvert

MATCH SWMF EMBANKMENT INTO EXISTING GRADE

APPROXIMATE FLOODPLAIN LIMIT (FROM NDSS)

END OF PIPE INFILTRATION GALLERY (STORMTECH SC–160LP)
111 CHAMBERS
TOTAL AREA= 227m²

5.0m EMERGENCY OVERFLOW WEIR
ELEV.= 405.00

80.0m–750mmø STM. @ 0.90%

APPROXIMATELY 80m

OUTLET CONTROL STRUCTURE (SEE DETAIL)

2.0m–200mmø STM. @ 1.00%

21.1m–450mmø STM. @ 7.12% REVERSE SLOPE

6.0m WIDE VEGETATED FLAT BOTTOMED OVERLAND FLOW CHANNEL

MATCH LINE

44.4m–1200mmø STM. @ 0.20%

300mm GABION MAT

30.8m–1200mmø STM. @ 0.20%

6.9m–1200mmø STM. @ 0.20%

5.0m FOREBAY WEIR ELEV.=403.60

600mm THICK CLAY LINER TO EXTEND TO ELEVATION 404.05

CONCEPTUAL EXPANSION OF SWM FACILITY

FOREBAY

SWM FACILITY
BOTTOM OF POND = 402.10
PPE=403.60

MAIN CELL

MICRO-POOL

4.0m MAINTENANCE ACCESS

MW203 SOIL-MAT (FEB, 2022) Elev.=407.137

MW201A SOIL-MAT (FEB, 2022) Elev.=404.750

MW201 SOIL-MAT (FEB, 2022) Elev.=404.802

MW202 SOIL-MAT (FEB, 2022) Elev.=406.598

BH003 SOIL-MAT (OCT, 2021)

NOTE:
THIS FIGURE TO BE READ IN CONJUNCTION WITH FIGURE 5.2 AND 5.3

INSERT
SCALE: 1:750

LEGEND

- SWM BLOCK BOUNDARY
- APPROXIMATE FLOODPLAIN LIMIT (FROM NDSS)
- [404.67] APPROXIMATE REGIONAL FLOODPLAIN CROSS–SECTION AND ELEVATION (FROM NDSS)
- (405.70) PROPOSED SPOT ELEVATIONS
- 3:1 PROPOSED EMBANKMENT
- ARTICULATED CONCRETE BLOCK
- GABION MAT
- PERMANENT POOL ELEV=403.60
- ACCESS ROAD

FIGURE 5.1
Date: JUN.20/23
Scale: 1:750

SWM FACILITY PLAN VIEW

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100

July 12, 2023 — 10:27 a.m. — Plotted By: TBerry

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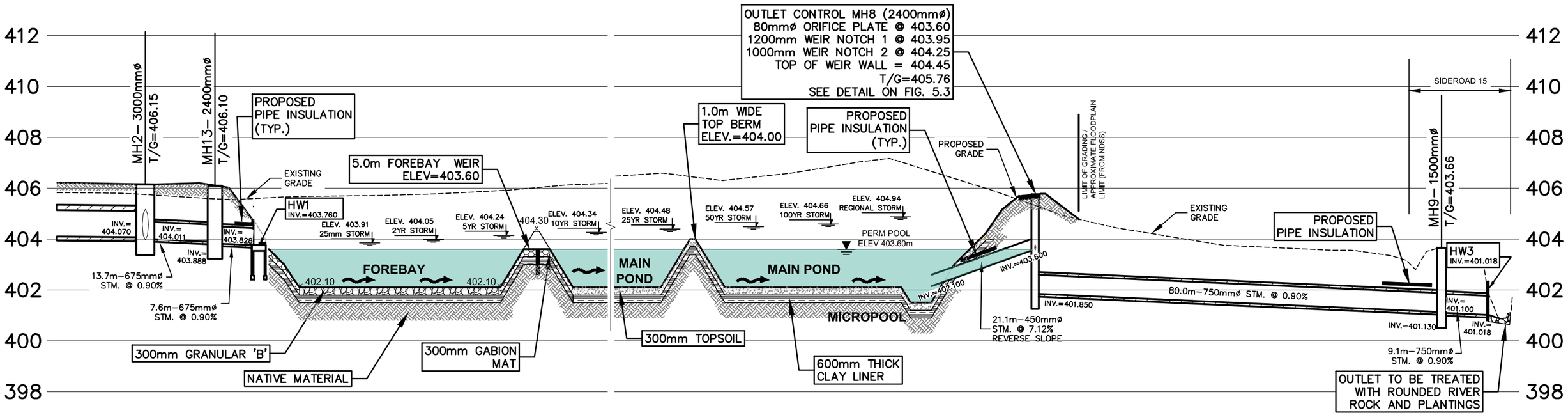
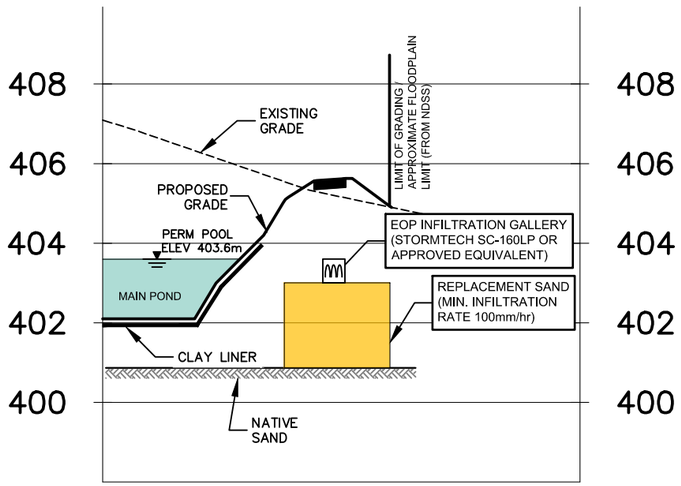


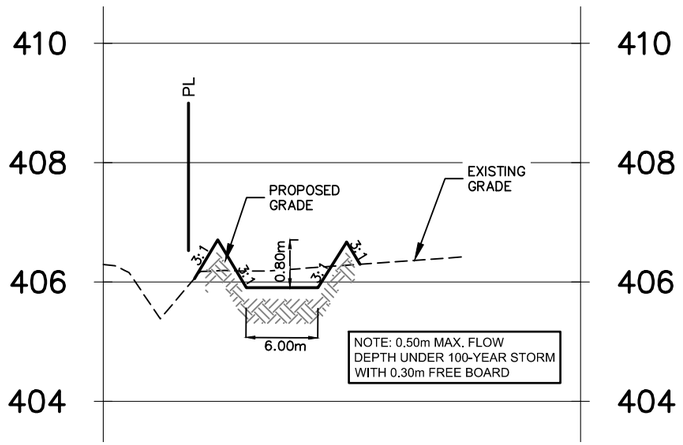
SWM FACILITY - SECTION A-A

SCALE H 1:750 V 1:150



SWM FACILITY - SECTION B-B

SCALE H 1:750 V 1:150



SWM FACILITY - SECTION B-B

SCALE H 1:750 V 1:150

MAXIMUM PONDING LEVELS	
PERMANENT POOL	403.60
25mm/4hr STORM	403.91
2YR STORM	404.05
5YR STORM	404.24
10YR STORM	404.34
25YR STORM	404.48
50YR STORM	404.57
100YR STORM	404.66
REGIONAL STORM	404.94

FIGURE 5.2 Date: JUN.20/23 Scale: AS NOTED

SWM FACILITY SECTIONS

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100

July 12, 2023 – 10:25 a.m. – Plotted By: TBerry

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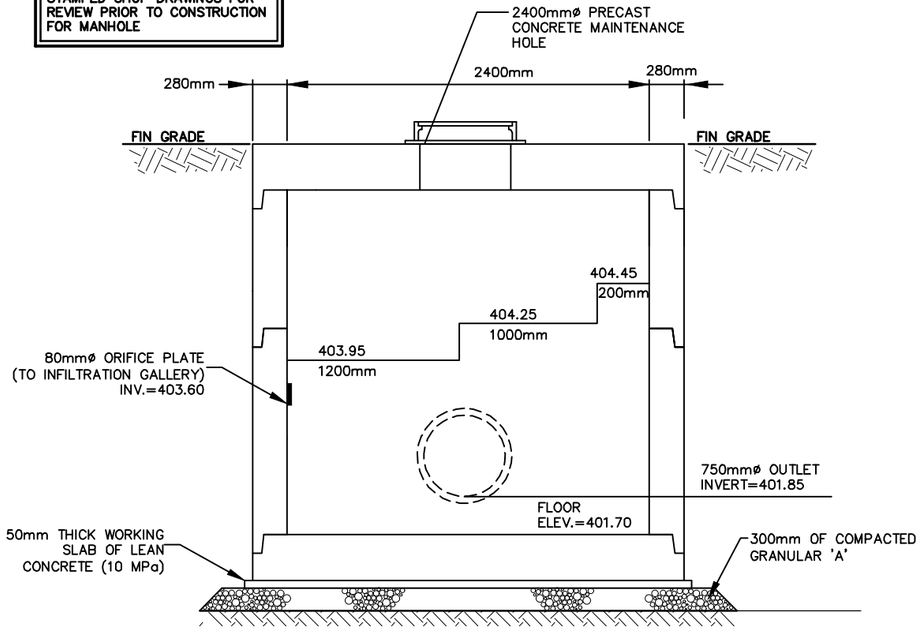
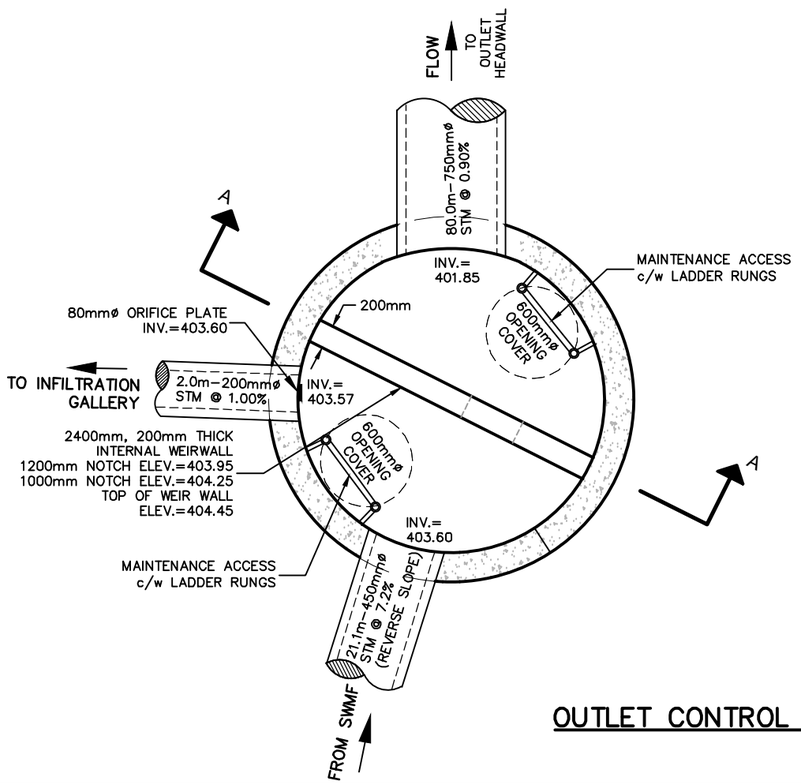
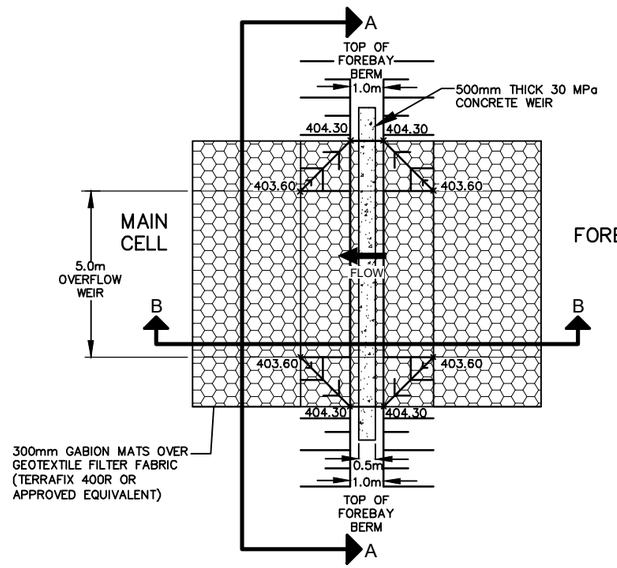
NOTE: CONTRACTOR TO PROVIDE STAMPED SHOP DRAWINGS FOR REVIEW PRIOR TO CONSTRUCTION FOR MANHOLE



SECTION A–A

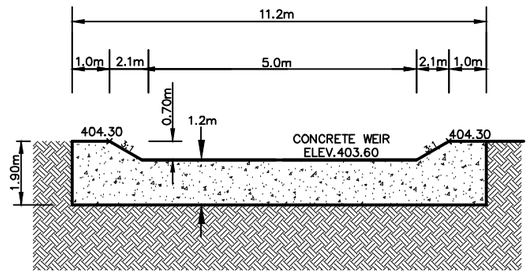


OUTLET CONTROL STRUCTURE
N.T.S.

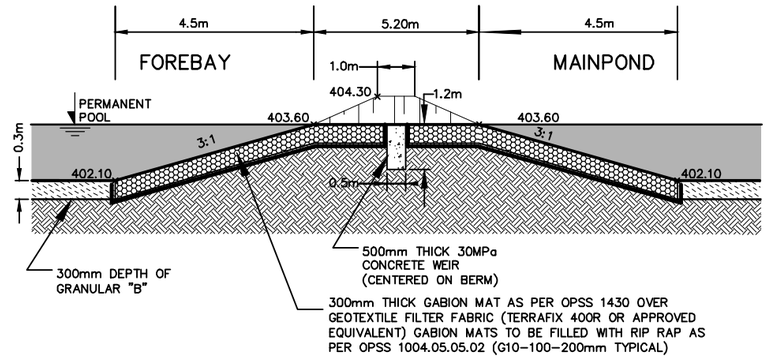


PLAN VIEW
N.T.S.

CONTRACTOR TO PROVIDE STAMPED SHOP DRAWINGS c/w REINFORCING DETAILS FOR CONCRETE WEIR



SECTION A–A



SECTION B–B

CONCRETE OVERFLOW WEIR
N.T.S.

FIGURE 5.3
Date: JUN.14/22
Scale: AS NOTED

SWM FACILITY DETAILS

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100

5.3 Water Quantity

5.3.1 Flows to the ND1

Flows for all storm events will be conveyed to the proposed SWMF by a combination of storm sewers and overland flow routes via road rights-of-way and the designated overland flow channel. The post-development MIDUSS modelling output is included in **Appendix C**.

Discharge from the facility will be controlled via a multi-staged outlet located in a 2400mm diameter manhole structure proposed within the wet pond cell.

Runoff from storm events up to the 25mm event will be completely infiltrated within the EOP infiltration gallery. Larger storm events will discharge to the ND1 via a 750mm diameter outlet storm sewer which will run through the floodplain and outlet on the downstream side of the existing culvert at SR15.

In the event of a blockage in the storm sewer, an emergency overflow weir is provided where the SWMF would spill onto the ND1 floodplain.

A summary of the preliminary stage-storage-discharge relationship of the proposed SWMF is shown in **Table 5.2** below.

Table 5.2 – Stage-Storage-Discharge Summary

Elevation (m)	Discharge (m^3/s)	Active Volume (m^3)	Remarks
403.60	0	0	Permanent Pool, Discharge from SWMF into EOP Infiltration gallery via Orifice begins
403.95	0.006	1884	Weir Notch 1, Surface discharge to ND1 begins
404.10	0.112	2767	Contour
404.25	0.313	3697	Weir Notch 2
404.45	0.778	4985	Weir Wall top
404.70	1.648	6666	Contour
405.00	3.002	8792	Emergency Overflow Weir
405.70	16.279	14283	Top of SWMF

A summary of the peak flows and associated maximum ponding elevations from the SWMF under the post-development conditions and a comparison of pre-development to post-development discharge into the ND1 is provided in **Table 5.3** below.

Table 5.3 – Summary of Peak Flows and Maximum Ponding Elevations

Storm Event	Allowable Flow to ND1 Based on Pre-development	Peak Flow to ND1 (m^3/s)	SWMF Summary		
			Peak Outflow (m^3/s)	Maximum Ponding Volume (m^3)	Maximum Ponding Elevation (m)
25mm Storm Event	0.107	0.043	0.007*	1644	403.91
2-Year Storm Event	0.167	0.071	0.063	2422	404.04
5-Year Storm Event	0.467	0.311	0.284	3584	404.23
10-Year Storm Event	0.741	0.532	0.488	4265	404.34
25-Year Storm Event	1.192	0.935	0.855	5158	404.48
50-Year Storm Event	1.583	1.266	1.156	5770	404.57
100-Year Storm Event	1.976	1.633	1.489	6383	404.66
Regional Storm Event	-	2.957	2.688	8327	404.94

*Note: This flow represents the maximum infiltration flow through the infiltration gallery into the ground yielding as baseflow in the ND1; The surface outflow from the SWMF to the ND1 is 0 for all storms up to the 25mm event.

5.3.2 Areas Discharging Uncontrolled Offsite

A summary of the peak flows from the drainage areas unable to drain to the SWMF under the post development conditions is provided in **Table 5.4** below. Drainage Areas 210-213 flow to the SWMF for all storms up to the 5-year storm event. Under larger storm events, the 5-year flow drains to the SWMF, and excess flows discharge offsite and are combined with flows from Drainage Areas 214, 216, 217 and 218 respectively, as summarized in the table below.

Table 5.4 – Summary of Peak Flows

Storm Event	Total to Woolwich St. E (Drainage Areas 210*, 211* & 214)		Total to rural residential (Drainage Area 215)		Total to Irvine Street (Drainage Areas 212*, 213* 216, 217 & 218)	
	Allowable Flow (m^3/s)	Peak Flow (m^3/s)	Allowable Flow (m^3/s)	Peak Flow (m^3/s)	Allowable Flow (m^3/s)	Peak Flow (m^3/s)
25mm Storm Event	0.007	0.001	0.016	0.008	0.030	0.028
2-Year Storm Event	0.011	0.002	0.049	0.019	0.047	0.047
5-Year Storm Event	0.025	0.006	0.143	0.047	0.075	0.075
10-Year Storm Event	0.038	0.015	0.217	0.066	0.116	0.099
25-Year Storm Event	0.060	0.032	0.355	0.099	0.183	0.142
50-Year Storm Event	0.078	0.053	0.456	0.118	0.236	0.178
100-Year Storm Event	0.096	0.078	0.554	0.140	0.295	0.211
Regional Storm Event	-	0.025	-	0.073	-	0.074

*Note: Drainage Areas 210-213 - under storm events larger than 5-year, flows in excess of the 5-year storm discharge offsite.

5.4 Thermal Mitigation

Urbanization within any watershed will cause temperature increases in stormwater runoff, picking up stored heat from asphalt and other impervious surfaces. Mitigation measures are required for cold water creeks by implementing lot level infiltration and end-of-pipe SWMF management for runoff from high frequency precipitation events prior to discharge to the receiving watercourse.

Since the vast majority of annual rainfall occurs in high frequency storm events, as a best management practice the 25mm storm event was chosen for thermal mitigation as this event accounts for the majority of annual precipitation.

The following mitigation measures have been proposed for the subject lands, and will result in a net enhancement for thermal regime downstream of SR15 in ND1.

5.4.1 Lot Level Infiltration

The majority of the stormwater runoff (thermal impacts) generated from roof areas will be effectively mitigated by directing roof water flows to groundwater systems. Surface water flows which are infiltrated and flowing towards the ND1 subsurface acclimatizing to groundwater temperatures (less than 15^{o}C) and discharge cool water to the creek as baseflow for all rain events up to a 25mm storm.

5.4.2 End-of-Pipe Infiltration/Bottom Draw Outlet

The key component to address temperature concerns will be the implementation of an EOP infiltration gallery that will be sized to infiltrate all runoff from storms up to the 25mm storm event. The infiltration gallery footprint will be approximately 227m^2. The EOP infiltration gallery will provide adequate temperature mitigation for the majority of storm events as the infiltrated runoff will be cooled underground (less than 15^{o}C) prior to discharge to the ND1 as interflow and baseflow. The outlet configuration will also incorporate a reverse-sloped bottom draw pipe which will draw the coldest water from the bottom of the SWMF and discharge into the EOP infiltration gallery.

5.4.3 Landscape Design of the SWMF

A landscape design for the proposed SWMF will be completed during the final design stage of the development. The primary aspect of the landscape design is to address thermal mitigation and aesthetics with secondary aspects being, erosion protection, long term bank stability, and to limit pedestrian access into the permanent pool components. The facility will be designed in accordance to the Township's stormwater management policies and guidelines for aesthetics, landscaping, and safety of stormwater management facilities. A SWMF Planting Plan will be submitted under separate cover at the final design stage.

5.5 Monthly Water Balance

A monthly water budget calculation has been conducted to assess potential hydrologic impacts the proposed development may have on the existing ND1. Refer to the figures provided in **Appendix H** for pre- and post-development catchments used in the analyses.

Annual precipitation for the subject lands was estimated to be approximately 945.9mm/year, based on data gathered at the Fergus Shand Dam weather station between 1971 and 2000. Evapotranspiration, runoff and infiltration/recharge rates for pre- and post-development conditions were estimated using the Thornthwaite and Mather method (1957).

5.5.1 Infiltration to Groundwater – Clayton Subdivision Only

Under pre-development conditions, infiltrated water for a majority of the subject lands contributes to the shallow groundwater table, which flows northerly towards the ND1.

Under pre-development conditions, the subject lands have a passive infiltration of 25,087m^3/year. Under post-development conditions, the subject lands have a passive infiltration of 17,673m^3/year. Through the implementation of lot-level infiltration galleries wherever possible, these facilities can provide additional infiltration of 20,714m^3/year on the subject lands. The total annual at-source infiltration rate can therefore be increased to 38,387m^3/year.

This equates to an equivalent infiltration rate across the subject lands of 307mm/year, providing a 53.0% annual increase over existing.

Refer to **Figures 5.4 and 5.5** below, showing the pre- to post-development infiltration volumes, as well as a breakdown of the post-development infiltration methods.

Refer to the Water Balance Analysis in **Appendix H** for more details.

Figure 5.4 – Clayton Subdivision Pre- & Post-Development Monthly Infiltration Volume

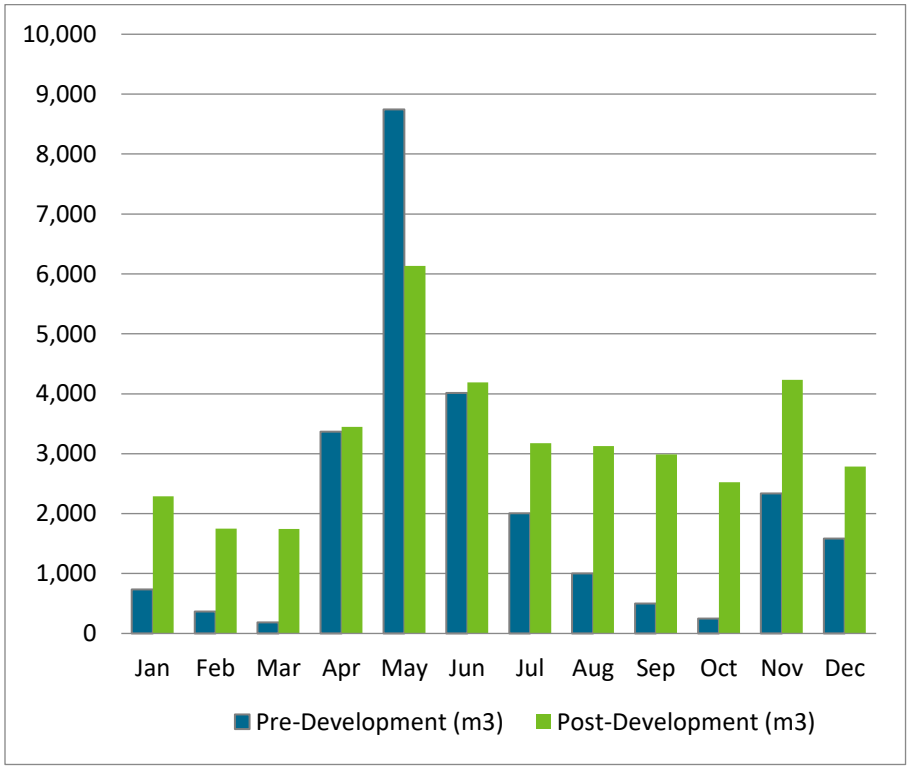
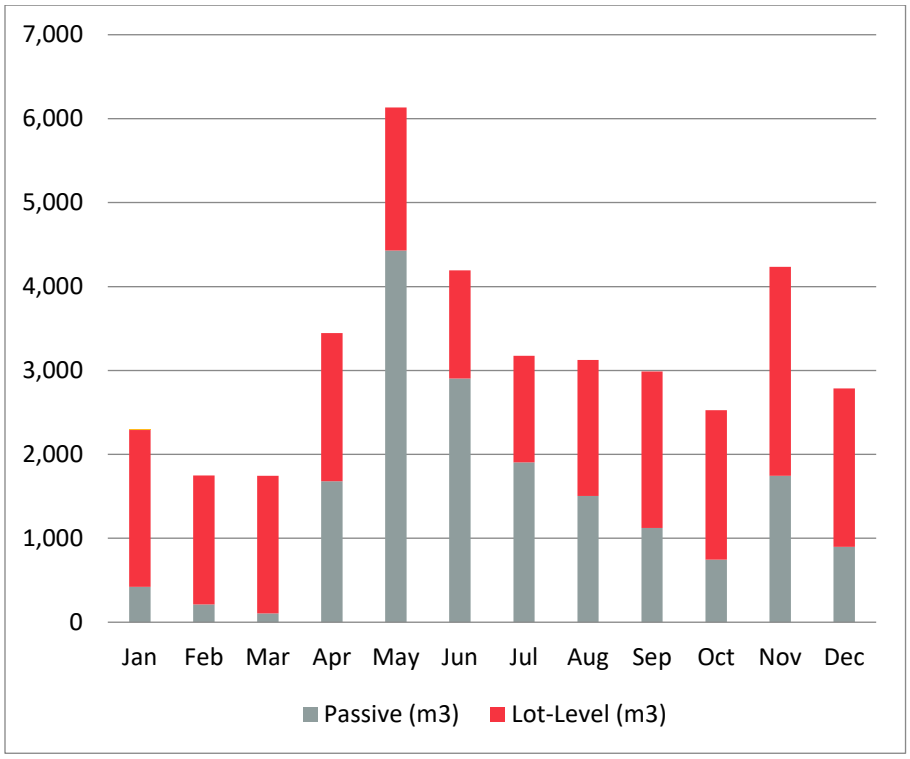


Figure 5.5 – Clayton Subdivision Post-Development Monthly Infiltration Volume Breakdown



*Note: The Thornthwaite and Mather method (1957) underestimates the lot-level infiltration during the winter months.

5.5.2 Overall Surface Flow Inputs to the ND1

As discussed in the hydrogeological assessment prepared by Soil-Mat, the shallow groundwater aquifer yields as baseflow to the ND1 in addition to the surface water inputs under pre-development conditions.

The proposed SWM strategy for the development is to provide adequate temperature mitigation and baseflow enhancement to the ND1 through an EOP infiltration gallery which will infiltrate runoff from storm events up to the 25mm event and return the flows to the ND1 through interflow and baseflow. Under post-development conditions, the water inputs to the ND1 will comprise of three components: the EOP infiltration gallery (yielding as baseflow), the controlled surface discharge from the SWMF, and the uncontrolled surface runoff from the lands downstream of the SWMF (drainage areas 207 and 208). It should be noted that passive infiltration within drainage areas 207 and 208 downstream of the SWMF will provide some surface flow input as baseflow. However, these flows will be identical under both pre- and post-development conditions and thus were omitted from both of these analyses. Refer to **Table 5.5** for a detailed breakdown of the volumes.

Table 5.5 – Summary of Annual Water Volume Inputs to the ND1

General			Annual Volume (m^3/year)
Pre-Development Surface Flow to ND1 (Drainage Areas 101-103)			**31,818** [1]
Post-Development Surface Flow to ND1	SWMF EOP Infiltration – Storm Events up to 25mm (Drainage Areas 201-206, 209-213)	Total SWMF EOP Infiltration	47,004
		Horizontal groundwater flow component yielding as baseflow (80% of total SWMF EOP Infiltration)	**37,603** [2]
	Surface Flow	Controlled Discharge from SWMF – Storm Events larger than 25mm (Drainage Areas 201-206, 209-213)	11,751
		Uncontrolled runoff downstream of SWMF (Drainage Areas 207 & 208)	4,668
		Total	**16,419** [3]
	Total [2+3]		**54,022** [4]
Increased Surface Flow to ND1 [4–1]			**22,204**

As shown in **Table 5.5,** under pre-development conditions, approximately 31,818m^3/year of surface flow discharges to the ND1 from the subject lands and downstream external lands.

Under post-development conditions, a majority of the catchment area (Drainage Areas 201-206 and 209-213) drain to the SWMF. Within the SWMF, most of this volume (storms up to the 25mm event) infiltrates within the EOP infiltration gallery (47,004m^3/year). Based on horizontal groundwater gradients, it is assumed that approximately 80% of this volume yields as baseflow in the ND1 (37,603m^3/year), with the balance flowing downward to the deep aquifer. Under larger storm events exceeding the 25mm event, the EOP infiltration gallery reaches capacity and overflows as surface water drainage to the ND1 (11,751m^3/year).

Additionally, uncontrolled surface runoff from the catchment areas downstream of the SWMF (Drainage Areas 207 and 208), approximately 4,668m^3/year, discharges directly to the ND1.

As a result, the post-development surface runoff to the ND1 is reduced to 16,419m^3/year, of which a majority of the flows are only released under larger storm events as attenuated through the SWMF (i.e., reducing peak flow rates). Ultimately, the combination of attenuated release rates from the SWMF and uncontrolled downstream flows will result in similar hydrograph patterns and functionality to ND1 through surface drainage.

The reduced direct surface runoff is supplemented by the remaining volume (37,603m^3/year) representing the infiltrated water from the EOP infiltration gallery which yields as baseflow to the ND1. This water will take a longer time to discharge to the ND1 compared with the surface runoff. This will reduce the peak of the hydrograph and will also allow for the infiltrated water to cool down to typical groundwater temperature (~15^{o}C) prior to discharge to the ND1 as baseflow, thus providing a net enhancement of the baseflow and temperature of the ND1.

Therefore, the total post-development surface flow to the ND1 is 54,022m^3/year, which represents an increase of 22,203m^3/year (69.8%) increase over existing. On a monthly basis, pre-development surface volumes are generally enhanced where possible. Refer to **Figures 5.6 and 5.7** below, showing the pre- to post-development surface flow volumes, as well as a breakdown of the post-development surface flow methods. It should be noted that despite the increase in surface flow volume, a majority returns as baseflow with long travel times (>10 days)

after rainfall events via the EOP infiltration cell, and addresses concerns and impacts associated with new development and erosion for ND1.

Figure 5.6 – Overall Pre- & Post-Development Monthly Surface Flow Inputs to ND1

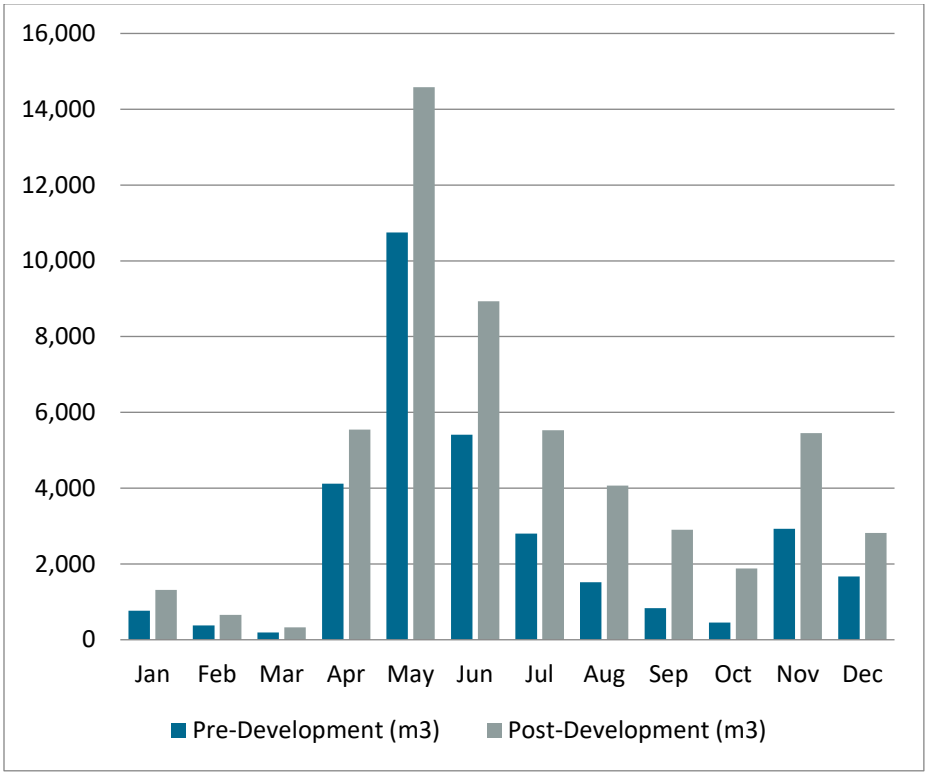
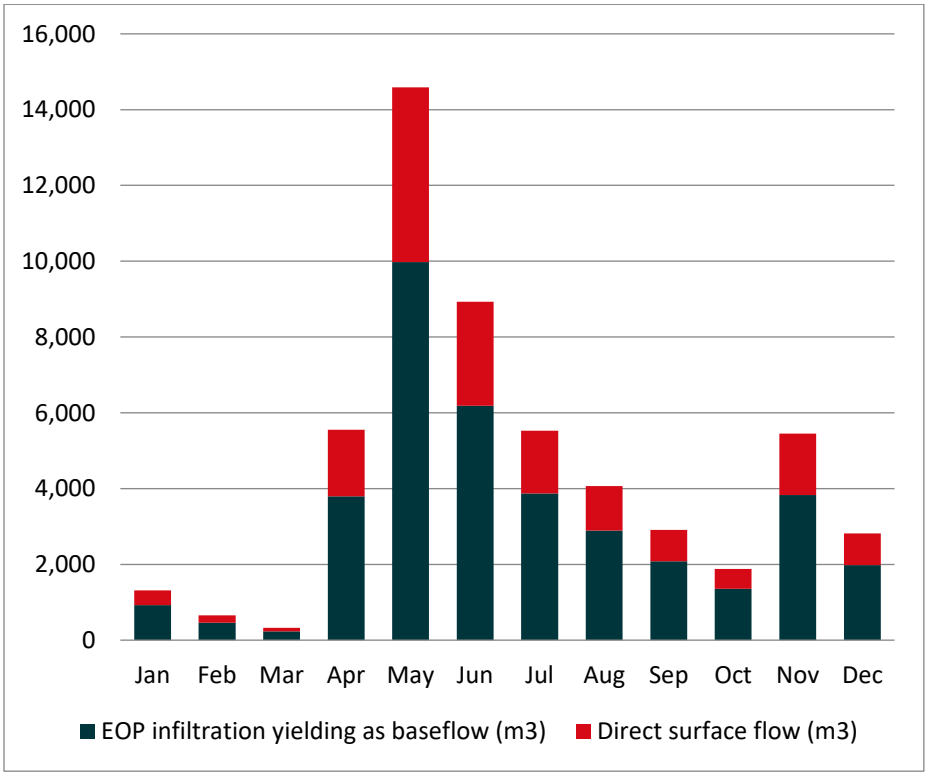


Figure 5.7 – Overall Post-Development Monthly Surface Flow Volume Breakdown



5.6 Erosion Assessment

The MECP recommended that any newly proposed development throughout the watershed should implement a SWM solution that provides at least a 24-hour drawdown for the volume generated during the 25mm storm event; to ensure that threshold flow durations do not exceed pre-development levels. As such, the proposed SWMF has been designed to provide approximately a 108-hour drawdown time on the 25mm storm event volume. This drawdown time represents the time for the 25mm storm event volume to be infiltrated, where the infiltrated water will take even longer to discharge as interflow and baseflow into the ND1.

The final design following Draft Plan approval will require erosion and sedimentation controls in accordance with *Erosion and Sediment Control Guidelines for Urban Construction* (December 2006, Greater Golden Horseshoe Area Conservation Authorities).

6.0 Monitoring Program

A monitoring program will be implemented, which will serve to ensure that the stormwater management plan proposed within this report is implemented and performing at an acceptable level.

6.1 During Development Monitoring Program

This stage will begin at the commencement of area grading of the subdivision and will continue until 90% buildout of the subdivision. Monitoring of the SWMF will include:

- Standard inspection of vegetation, structures, and general operation of hydraulic controls (observations of drawdown) within the SWMF. These inspections are to occur seasonally and typically after a significant rainfall event; and
- Regular inspection and maintenance of erosion and sediment control measures around and within the SWMF.

Standard inspection and maintenance of the SWMF will be provided throughout the “During Development” period.

6.2 Post Development Monitoring Program

This period of the monitoring will begin following 90% buildout of the subdivision (i.e. road is urbanized, buildings are constructed, lots are sodded/landscaped, and open spaces are stabilized). The purpose of this stage of the monitoring is to ensure that the SWMF continues to operate as designed. Monitoring during this stage will include:

- Standard inspection of vegetation, structures, and general operation of hydraulic controls (observations of drawdown) within the SWMF. These inspections are to occur seasonally and typically after a significant rainfall event; until assumption of the facility by the Township.

It is recommended that, following completion of the developer’s portion of the post-development monitoring program and assumption of the SWMF by the Township, the Township continues with a post development inspection and maintenance program to ensure the long term effectiveness of the proposed SWMF.

7.0 Erosion and Sediment Control Measures

The MECP recommended that any newly proposed development throughout the watershed should implement a SWM solution that provides at least a 24-hour drawdown for the volume generated during the 25mm storm event; to ensure that threshold flow durations do not exceed pre-development levels. As such, the proposed SWMF has been designed to provide approximately a 108-hour drawdown time on the 25mm storm event volume.

The final design following Draft Plan approval will require erosion and sedimentation controls in accordance with the *Erosion and Sediment Control Guidelines for Urban Construction* (December 2006, Greater Golden Horseshoe Area Conservation Authorities).

Precautions will be taken during construction to limit erosion and sedimentation. Erosion and Sediment Control Plans will be prepared and provided during the detailed design stage. The plans will illustrate the erosion and sediment control measures to be implemented during construction, which will limit impacts associated with site development.

Typically, the recommended construction sequence for erosion and sediment control measures are as follows:

- Placement of all sediment control fencing where required;
- Stripping and strategic placement of topsoil stockpiles. Placement of sediment control fencing around all stockpile areas;
- Construction of temporary sediment control ponds, which will serve as sedimentation basins for the site during construction;
- Construction of temporary swales to direct runoff to sedimentation basins, with rock check dams as required to control velocities; and
- Re-vegetation of completed areas as soon as possible after construction, including those areas not slated for construction within 60 days.

Where rock check dams are proposed to promote sedimentation and reduce velocities, clean aggregate is to be placed perpendicular to the direction of flow in the swale, with a small volume of excavation on the upstream side to provide storage for accumulated sediment.

Sediment control fencing shall consist of filter fabric attached to page wire fencing and sealed at ground level. It will be installed at the perimeter of the work areas and intermittently on sloped areas where required. Sediment control fencing will be placed around all topsoil stockpiles.

Storage consistent with the GRCA's requirement of 125m^3/ha of live and dead storage respectively (total 250m^3/ha), will be provided. This storage will be provided to ensure that suspended material will have ample time to settle out. The sediment basin will also be sized with sufficient capacity to allow flows to pass without breaching. Once the active construction and grading activities have been completed, the sedimentation basins can be cleaned out.

Access to topsoil or fill storage areas will be located on the upstream side of storage piles. This practice will ensure continuity of the sediment control fencing in the downslope direction; which is most vulnerable to erosion and sediment deposition. Further, topsoil and hydroseed will be placed on all exposed areas following the completion of grading activities.

It is recommended that during construction, monitoring and inspection of the erosion and sediment controls be conducted to ensure satisfactory performance of the measures. Reporting of the inspection and monitoring results should be distributed to the Township and GRCA. If it is found that the erosion and sediment control measures are not working adequately, they shall be augmented to the satisfaction of the Township and GRCA, based on field decisions.

8.0 Conclusions and Recommendations

Based on the foregoing analysis, it is concluded that:

- 'Enhanced' quality control of stormwater runoff can be provided by the proposed stormwater management strategy through the implementation of a SWMF forebay, and a wet pond cell;
- Quantity control targets for post-development peak flows rates attenuation to pre-development levels and directed to the ND1 can be achieved in the proposed SWMF for all storm events up to and including the 100-year event;
- Peak post-development flow rates from drainage areas unable to drain to the SWMF will be limited to pre-development target release rates;
- Conveyance of the Regional storm flows through the SWMF to the ND1 can be achieved;
- Post-development erosion will be mitigated by the use of a minimum 24-hour extended detention of the 25mm storm event;
- Infiltration and surface water balance inputs to the ND1 will be enhanced under post-development; and
- Implementing erosion and sediment controls during construction will minimized any negative impacts of construction activities on the adjacent properties and the receiving watercourses.

The findings of this report and the above conclusions lead to the following recommendations:

- Upon completion of detailed design, a quality/quantity control SWMF be constructed to provide control of stormwater as described in Sections 4.0 and 5.0 of this report;
- The preliminary design and modelling of the proposed SWM measures for the development be reviewed and re-confirmed at the time of final design;
- That sediment and erosion controls during construction will be implemented as described in Section 7.0 of this report; and
- A monitoring program be updated for the Final SWM report at final design.

All of which is respectfully submitted,

MTE Consultants Inc.

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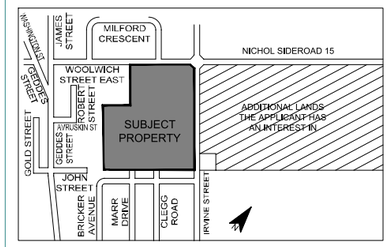
Appendix A

Draft Plan of Subdivision (Reduced)

DRAFT PLAN OF SUBDIVISION

Part of Lot 16,
Concession 11
Township of Centre Wellington
Country of Wellington

KEY PLAN



SUBJECT PROPERTY

SCHEDULE OF LAND USE

LOT/BLOCK	LAND USE		UNITS	AREA (ha)
1-155	Single Detached Min. 12.2m	o	26	1.08
	Single Detached Min. 10.0m	+	129	4.78
156-165	Townhouses Min. 6.1m Street Access	x	47	1.07
166-181	Townhouses Min. 6.22m Lane Access	=	84	1.57
182-183	Vista / Walkways			0.05
184	Overland Flow			0.02
185	Park			0.64
186-187	0.3m Reserves			0.00
Marr Dr.	20.0m Road in m	31		0.06
ST. A-D	18.0m Road in m	1,396		2.94
Lane A	10.0m Lane in m	282		0.28
TOTAL		**1,709**	**286**	**12.49**

OWNER'S AUTHORIZATION

I hereby authorize Malone Given Parsons Ltd. to prepare and submit this Draft Plan of Subdivision to the Township of Centre Wellington.

CACHET DEVELOPMENTS (ELORA) INC. Date

SURVEYOR'S CERTIFICATE

I hereby certify that the boundaries of the lands to be subdivided as shown on this Plan and their relationship to the adjacent lands are accurately and correctly shown.

RAY SIBTHORP, O.L.S.
J.D. BARNES LTD. Date

ADDITIONAL INFORMATION

AS REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT, CHAPTER P.13(R.S.O. 1990).

(a),(e),(f),(g),(j),(l) - As shown of the Draft Plan.
(b),(c) - As shown on the Draft and Key Plan.
(d) - Land to be used in accordance with the Schedule of Land Use.
(i) - Soil is silt and clay loam.
(h),(k) - Full municipal services to be provided.

Prepared For:

CACHET DEVELOPMENTS (ELORA) INC.

MGP File No.: 22-3192
Date: June 13, 2023

Date	Revision	By

MGP Malone Given Parsons.
148 Rainbow Drive, Suite 201 | Manchem, ON | L3R 6B3
905.513.0170 | mgp.ca

0 25 50 125m

Appendix B

Pre-Development Catchment Parameters and MIDUSS Modelling

CLAYTON SUBDIVISION
STORMWATER MANAGEMENT
Centre Wellington, Ontario

Project Number:	50250-100
Date:	6/13/2022
Design By:	MXF
File:	Q:\50250\100\SAN\50250-100 Sanitary Sewer Design Sheet.xlsx

HYDROLOGIC PARAMETERS
Pre-Development Conditions

Sub-Catchment Number	Area	Overland Slope	Overland Length	SCS Curve Number			Percent Impervious	Land Use	Comment
				Pervious (AMC II)	Pervious (AMC III)	Impervious			
	(ha)	*(%)*	*(m)*				*(%)*		
Draining to ND1									
101	6.67	2.5	200	60	78	98	0	Agriculture	Clayton Subdivision
102	1.46	2.0	10	60	78	98	47.2	Road	External ROWs
103	13.02	3.0	250	60	78	98	0	Agriculture	Ext - Elora Sands
Total	**21.15**						**3.3**		
Draining offsite									
104	0.54	3.5	85	60	78	98	0	Agriculture	
105	0.12	2	10	60	78	98	35.9	Road	Woolwich Street East
106	3.60	4.5	85	60	78	98	0	Agriculture	
107	1.68	2.0	70	60	78	98	0	Agriculture	
108	0.39	2.0	10	60	78	98	49.8	Road	Irvine Street
Total	**6.32**						**3.7**		

CLAYTON SUBDIVISION
STORMWATER MANAGEMENT
Centre Wellington, Ontario

Project Number:	50250-100
Date:	6/1/2023
Design By:	MXF
File:	Q:\50250\100\SAN\50250-100 Sanitary Sewer Design Sheet.xlsx

IDF PARAMETERS
Fergus Shand Dam

Frequency (Years)	a	b	c	Comment
25mm (4hr)	501	6	0.7960	Converted from 2-year
2	721	6	0.7960	
5	1,436	11	0.8537	
10	2,126	15	0.8900	
25	3,023	18	0.9161	
50	3,574	19	0.9235	
100	4,382	21	0.9394	

```
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"               MIDUSS created                        Sunday, February 7, 2010"
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"               Company                                                     "
"               Date & Time last used:                  6/7/2023 at 3:34:59 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     3000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"      501.000   Coefficient A"
"        6.000   Constant B"
"        0.796   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           71.355    mm/hr"
"             Total depth                 25.045    mm"
"           6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         101   Clayton Subdivision N to ND1"
"        0.000   % Impervious"
"        6.670   Total Area"
"      200.000   Flow length"
"        2.500   Overland Slope"
"        6.670   Pervious Area"
"      200.000   Pervious length"
"        2.500   Pervious slope"
"        0.000   Impervious Area"
"      200.000   Impervious length"
"        2.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.143   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.018     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           6.670      0.000      6.670      hectare"
"             Time of concentration  108.605    7.755      108.605    minutes"
"             Time to Centroid       281.270    129.597    281.269    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        1670.47    0.00       1670.47    c.m"
"             Rainfall losses        21.473     4.852      21.473     mm"
"             Runoff depth           3.571      20.193     3.571      mm"
"             Runoff volume          238.20     0.00       238.20     c.m"
"             Runoff coefficient     0.143      0.000      0.143      "
"             Maximum flow           0.018      0.000      0.018      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                     0.018     0.018     0.000     0.000"
" 33          CATCHMENT 102"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         102   External ROWs N to ND1"
"       47.200   % Impervious"
"        1.460   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.771   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.689   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.142   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.794   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.106     0.018     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.771      0.689      1.460      hectare"
"             Time of concentration  19.244     1.374      4.357      minutes"
"             Time to Centroid       163.433    119.358    126.714    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        193.06     172.59     365.65     c.m"
"             Rainfall losses        21.482     5.154      13.775     mm"
"             Runoff depth           3.562      19.891     11.270     mm"
"             Runoff volume          27.46      137.07     164.54     c.m"
"             Runoff coefficient     0.142      0.794      0.450      "
"             Maximum flow           0.007      0.105      0.106      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                     0.106     0.106     0.000     0.000"
" 33          CATCHMENT 103"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         103   Elora Sands N to ND1at SR15"
"        0.000   % Impervious"
"       13.020   Total Area"
"      250.000   Flow length"
"        3.000   Overland Slope"
"       13.020   Pervious Area"
"      250.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      250.000   Impervious length"
"        3.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.143   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                  0.033     0.106     0.000     0.000 c.m/sec"
"            Catchment 103          Pervious   Impervious Total Area "
"            Surface Area           13.020     0.000      13.020     hectare"
"            Time of concentration  117.555    8.394      117.555    minutes"
"            Time to Centroid       293.076    130.508    293.075    minutes"
"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        3260.80    0.00       3260.80    c.m"
"            Rainfall losses        21.473     4.820      21.473     mm"
"            Runoff depth           3.571      20.225     3.571      mm"
"            Runoff volume          464.98     0.00       464.98     c.m"
"            Runoff coefficient     0.143      0.000      0.143      "
"            Maximum flow           0.033      0.000      0.033      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.033     0.107     0.000     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.033     0.107     0.107     0.000"
" 40         HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Draining to ND1"
"            Maximum flow                 0.107    c.m/sec"
"            Hydrograph volume          867.718    c.m"
"                  0.033     0.107     0.107     0.107"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.033     0.000     0.107     0.107"
" 33         CATCHMENT 104"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         104   Clayton Subdivision draining NW to Woolwich Street E"
"       0.000   % Impervious"
"       0.540   Total Area"
"      85.000   Flow length"
"       3.500   Overland Slope"
"       0.540   Pervious Area"
"      85.000   Pervious length"
"       3.500   Pervious slope"
"       0.000   Impervious Area"
"      85.000   Impervious length"
"       3.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.143   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.002     0.000     0.107     0.107 c.m/sec"
"            Catchment 104          Pervious   Impervious Total Area "
"            Surface Area           0.540      0.000      0.540      hectare"
"            Time of concentration  58.755     4.195      58.755     minutes"
"            Time to Centroid       215.513    123.967    215.513    minutes"
"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        135.24     0.00       135.24     c.m"
"            Rainfall losses        21.473     5.009      21.473     mm"
"            Runoff depth           3.571      20.036     3.571      mm"
"            Runoff volume          19.28      0.00       19.28      c.m"
"            Runoff coefficient     0.143      0.000      0.143      "
"            Maximum flow           0.002      0.000      0.002      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.002     0.002     0.107     0.107"
" 33         CATCHMENT 105"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         105   Woolwich St E draining west to Irvine Creek"
"      35.900   % Impervious"
"       0.120   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.077   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.043   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.142   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.794   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.007     0.002     0.107     0.107 c.m/sec"
"            Catchment 105          Pervious   Impervious Total Area "
"            Surface Area           0.077      0.043      0.120      hectare"
"            Time of concentration  19.244     1.374      5.704      minutes"
"            Time to Centroid       163.432    119.358    130.037    minutes"
"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        19.26      10.79      30.05      c.m"
"            Rainfall losses        21.482     5.154      15.620     mm"
"            Runoff depth           3.562      19.891     9.424      mm"
"            Runoff volume          2.74       8.57       11.31      c.m"
"            Runoff coefficient     0.142      0.794      0.376      "
"            Maximum flow           0.001      0.007      0.007      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.007     0.007     0.107     0.107"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.007     0.007     0.007     0.107"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining NW to Woolwich Street E"
"            Maximum flow                 0.007    c.m/sec"
"            Hydrograph volume           30.593    c.m"
"                  0.007     0.007     0.007     0.007"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.007     0.000     0.007     0.007"
" 33         CATCHMENT 106"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         106   Clayton Subdivision draining SW to rural residential"
"       0.000   % Impervious"
"       3.600   Total Area"
"      85.000   Flow length"
"       4.500   Overland Slope"
```

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"        3.600   Pervious Area"
"       85.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       85.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.143   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.016     0.000     0.007     0.007 c.m/sec"
"             Catchment 106          Pervious   Impervious Total Area "
"             Surface Area           3.600      0.000      3.600      hectare"
"             Time of concentration  54.488     3.891      54.488     minutes"
"             Time to Centroid       209.886    123.550    209.886    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        901.60     0.00       901.60     c.m"
"             Rainfall losses        21.474     5.098      21.474     mm"
"             Runoff depth           3.571      19.947     3.571      mm"
"             Runoff volume          128.55     0.00       128.55     c.m"
"             Runoff coefficient     0.143      0.000      0.143      "
"             Maximum flow           0.016      0.000      0.016      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.016     0.016     0.007     0.007"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.016     0.016     0.016     0.007"
" 40          HYDROGRAPH   Combine    3"
"           6   Combine "
"           3   Node #"
"               Draining SW to rural residential"
"            Maximum flow                  0.016    c.m/sec"
"            Hydrograph volume           128.548    c.m"
"                    0.016     0.016     0.016     0.016"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.016     0.000     0.016     0.016"
" 33          CATCHMENT 107"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         107   Clayton Subdivision draining SE to residential + Irvine Street"
"       0.000   % Impervious"
"       1.680   Total Area"
"      70.000   Flow length"
"       2.000   Overland Slope"
"       1.680   Pervious Area"
"      70.000   Pervious length"
"       2.000   Pervious slope"
"       0.000   Impervious Area"
"      70.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.143   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.007     0.000     0.016     0.016 c.m/sec"
"             Catchment 107          Pervious   Impervious Total Area "
"             Surface Area           1.680      0.000      1.680      hectare"
"             Time of concentration  61.854     4.416      61.853     minutes"
"             Time to Centroid       219.598    124.318    219.598    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        420.75     0.00       420.75     c.m"
"             Rainfall losses        21.474     4.985      21.474     mm"
"             Runoff depth           3.571      20.059     3.571      mm"
"             Runoff volume          59.99      0.00       59.99      c.m"
"             Runoff coefficient     0.143      0.000      0.143      "
"             Maximum flow           0.007      0.000      0.007      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.007     0.007     0.016     0.016"
" 33          CATCHMENT 108"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         108   Irvine St drawing S to Elora Meadows"
"      49.800   % Impervious"
"       0.390   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.196   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.194   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.142   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.794   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.030     0.007     0.016     0.016 c.m/sec"
"             Catchment 108          Pervious   Impervious Total Area "
"             Surface Area           0.196      0.194      0.390      hectare"
"             Time of concentration  19.244     1.374      4.107      minutes"
"             Time to Centroid       163.433    119.358    126.098    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        49.03      48.64      97.67      c.m"
"             Rainfall losses        21.482     5.154      13.350     mm"
"             Runoff depth           3.562      19.891     11.694     mm"
"             Runoff volume          6.97       38.63      45.61      c.m"
"             Runoff coefficient     0.142      0.794      0.467      "
"             Maximum flow           0.002      0.030      0.030      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.030     0.030     0.016     0.016"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.030     0.030     0.030     0.016"
" 40          HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
```

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"               Draining SE to residential + Irvine Street"
"             Maximum flow                  0.030    c.m/sec"
"             Hydrograph volume           105.597    c.m"
"                    0.030     0.030     0.030     0.030"
" 38          START/RE-START TOTALS 108"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     27.480    hectare"
"             Total Impervious area                     0.926    hectare"
"             Total % impervious                        3.371"
" 19          EXIT"
```

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"             MIDUSS Output ----------------------------------------------->"
"             MIDUSS version                          Version 2.25  rev. 473"
"             MIDUSS created                        Sunday, February 7, 2010"
"          10 Units used:                                        ie METRIC"
"             Job folder:              Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                  Pre-Dev"
"             Output filename:                              2yr_Pre-Dev.out"
"             Licensee name:                                              A"
"             Company                                                     "
"             Date & Time last used:                 6/7/2023 at 3:43:41 PM"
" 31          TIME PARAMETERS"
"           5.000   Time Step"
"         180.000   Max. Storm length"
"        3000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"             1   Chicago storm"
"         721.000   Coefficient A"
"           6.000   Constant B"
"           0.796   Exponent C"
"           0.400   Fraction R"
"         180.000   Duration"
"           1.000   Time step multiplier"
"                Maximum intensity          106.902    mm/hr"
"                Total depth                 33.769    mm"
"               6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           101   Clayton Subdivision N to ND1"
"           0.000   % Impervious"
"           6.670   Total Area"
"         200.000   Flow length"
"           2.500   Overland Slope"
"           6.670   Pervious Area"
"         200.000   Pervious length"
"           2.500   Pervious slope"
"           0.000   Impervious Area"
"         200.000   Impervious length"
"           2.500   Impervious slope"
"           0.300   Pervious Manning 'n'"
"          78.000   Pervious SCS Curve No."
"           0.213   Pervious Runoff coefficient"
"           0.100   Pervious Ia/S coefficient"
"           7.164   Pervious Initial abstraction"
"           0.015   Impervious Manning 'n'"
"          98.000   Impervious SCS Curve No."
"           0.000   Impervious Runoff coefficient"
"           0.100   Impervious Ia/S coefficient"
"           0.518   Impervious Initial abstraction"
"                    0.054     0.000     0.000     0.000 c.m/sec"
"                Catchment 101          Pervious   Impervious Total Area "
"                Surface Area           6.670      0.000      6.670      hectare"
"                Time of concentration  76.864     6.514      76.864     minutes"
"                Time to Centroid       198.813    97.969     198.812    minutes"
"                Rainfall depth         33.769     33.769     33.769     mm"
"                Rainfall volume        2252.42    0.00       2252.42    c.m"
"                Rainfall losses        26.565     5.278      26.565     mm"
"                Runoff depth           7.204      28.491     7.204      mm"
"                Runoff volume          480.52     0.00       480.52     c.m"
"                Runoff coefficient     0.213      0.000      0.213      "
"                Maximum flow           0.054      0.000      0.054      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                    0.054     0.054     0.000     0.000"
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" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          102   External ROWs N to ND1"
"       47.200   % Impervious"
"        1.460   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.771   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.689   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.213   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.830   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.163     0.054     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.771      0.689      1.460      hectare"
"             Time of concentration  13.620     1.154      3.933      minutes"
"             Time to Centroid       119.195    89.721     96.290     minutes"
"             Rainfall depth         33.769     33.769     33.769     mm"
"             Rainfall volume        260.32     232.71     493.03     c.m"
"             Rainfall losses        26.583     5.740      16.745     mm"
"             Runoff depth           7.187      28.030     17.024     mm"
"             Runoff volume          55.40      193.16     248.56     c.m"
"             Runoff coefficient     0.213      0.830      0.504      "
"             Maximum flow           0.021      0.160      0.163      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.163     0.164     0.000     0.000"
" 33          CATCHMENT 103"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          103   Elora Sands N to ND1at SR15"
"        0.000   % Impervious"
"       13.020   Total Area"
"      250.000   Flow length"
"        3.000   Overland Slope"
"       13.020   Pervious Area"
"      250.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      250.000   Impervious length"
"        3.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.213   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.099     0.164     0.000     0.000 c.m/sec"
"             Catchment 103          Pervious   Impervious Total Area "
"             Surface Area           13.020     0.000      13.020     hectare"
"             Time of concentration  83.199     7.051      83.198     minutes"
"             Time to Centroid       206.792    98.777     206.791    minutes"
"             Rainfall depth         33.769     33.769     33.769     mm"
"             Rainfall volume        4396.78    0.00       4396.79    c.m"
"             Rainfall losses        26.565     5.288      26.565     mm"
"             Runoff depth           7.205      28.481     7.205      mm"
"             Runoff volume          938.03     0.00       938.03     c.m"
"             Runoff coefficient     0.213      0.000      0.213      "
"             Maximum flow           0.099      0.000      0.099      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.099     0.167     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.099     0.167     0.167     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Draining to ND1"
"             Maximum flow                  0.167    c.m/sec"
"             Hydrograph volume          1667.110    c.m"
"                    0.099     0.167     0.167     0.167"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.099     0.000     0.167     0.167"
" 33          CATCHMENT 104"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          104   Clayton Subdivision draining NW to Woolwich Street E"
"        0.000   % Impervious"
"        0.540   Total Area"
"       85.000   Flow length"
"        3.500   Overland Slope"
"        0.540   Pervious Area"
"       85.000   Pervious length"
"        3.500   Pervious slope"
"        0.000   Impervious Area"
"       85.000   Impervious length"
"        3.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.213   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.007     0.000     0.167     0.167 c.m/sec"
"             Catchment 104          Pervious   Impervious Total Area "
"             Surface Area           0.540      0.000      0.540      hectare"
"             Time of concentration  41.583     3.524      41.583     minutes"
"             Time to Centroid       154.390    93.523     154.389    minutes"
"             Rainfall depth         33.769     33.769     33.769     mm"
"             Rainfall volume        182.35     0.00       182.36     c.m"
"             Rainfall losses        26.568     5.576      26.568     mm"
"             Runoff depth           7.201      28.193     7.201      mm"
"             Runoff volume          38.89      0.00       38.89      c.m"
"             Runoff coefficient     0.213      0.000      0.213      "
"             Maximum flow           0.007      0.000      0.007      c.m/sec"
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" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.007     0.007     0.167     0.167"
" 33          CATCHMENT 105"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          105   Woolwich St E draining west to Irvine Creek"
"       35.900   % Impervious"
"        0.120   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.077   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.043   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.213   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.830   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.010     0.007     0.167     0.167 c.m/sec"
"             Catchment 105          Pervious   Impervious Total Area "
"             Surface Area           0.077      0.043      0.120      hectare"
"             Time of concentration  13.620     1.154      5.069      minutes"
"             Time to Centroid       119.195    89.721     98.977     minutes"
"             Rainfall depth         33.769     33.769     33.769     mm"
"             Rainfall volume        25.98      14.55      40.52      c.m"
"             Rainfall losses        26.583     5.740      19.100     mm"
"             Runoff depth           7.187      28.030     14.669     mm"
"             Runoff volume          5.53       12.08      17.60      c.m"
"             Runoff coefficient     0.213      0.830      0.434      "
"             Maximum flow           0.002      0.010      0.010      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.010     0.011     0.167     0.167"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.010     0.011     0.011     0.167"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Draining NW to Woolwich Street E"
"             Maximum flow                  0.011    c.m/sec"
"             Hydrograph volume            56.490    c.m"
"                    0.010     0.011     0.011     0.011"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.010     0.000     0.011     0.011"
" 33          CATCHMENT 106"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          106   Clayton Subdivision draining SW to rural residential"
"        0.000   % Impervious"
"        3.600   Total Area"
"       85.000   Flow length"
"        4.500   Overland Slope"
"        3.600   Pervious Area"
"       85.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       85.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.213   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.049     0.000     0.011     0.011 c.m/sec"
"             Catchment 106          Pervious   Impervious Total Area "
"             Surface Area           3.600      0.000      3.600      hectare"
"             Time of concentration  38.563     3.268      38.563     minutes"
"             Time to Centroid       150.581    93.064     150.581    minutes"
"             Rainfall depth         33.769     33.769     33.769     mm"
"             Rainfall volume        1215.70    0.00       1215.70    c.m"
"             Rainfall losses        26.569     5.496      26.569     mm"
"             Runoff depth           7.201      28.274     7.201      mm"
"             Runoff volume          259.23     0.00       259.23     c.m"
"             Runoff coefficient     0.213      0.000      0.213      "
"             Maximum flow           0.049      0.000      0.049      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.049     0.049     0.011     0.011"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.049     0.049     0.049     0.011"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                Draining SW to rural residential"
"             Maximum flow                  0.049    c.m/sec"
"             Hydrograph volume           259.231    c.m"
"                    0.049     0.049     0.049     0.049"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.049     0.000     0.049     0.049"
" 33          CATCHMENT 107"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          107   Clayton Subdivision draining SE to residential + Irvine Street"
"        0.000   % Impervious"
"        1.680   Total Area"
"       70.000   Flow length"
"        2.000   Overland Slope"
"        1.680   Pervious Area"
"       70.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       70.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.213   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
```

```
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.021     0.000     0.049     0.049 c.m/sec"
"             Catchment 107          Pervious   Impervious Total Area "
"             Surface Area           1.680      0.000      1.680      hectare"
"             Time of concentration  43.776     3.710      43.776     minutes"
"             Time to Centroid       157.142    93.811     157.142    minutes"
"             Rainfall depth         33.769     33.769     33.769     mm"
"             Rainfall volume        567.33     0.00       567.33     c.m"
"             Rainfall losses        26.568     5.603      26.568     mm"
"             Runoff depth           7.202      28.166     7.202      mm"
"             Runoff volume          120.99     0.00       120.99     c.m"
"             Runoff coefficient     0.213      0.000      0.213      "
"             Maximum flow           0.021      0.000      0.021      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.021     0.021     0.049     0.049"
" 33          CATCHMENT 108"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         108   Irvine St drawing S to Elora Meadows"
"       49.800   % Impervious"
"        0.390   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.196   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.194   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.213   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.830   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.046     0.021     0.049     0.049 c.m/sec"
"             Catchment 108          Pervious   Impervious Total Area "
"             Surface Area           0.196      0.194      0.390      hectare"
"             Time of concentration  13.620     1.154      3.714      minutes"
"             Time to Centroid       119.195    89.721     95.774     minutes"
"             Rainfall depth         33.769     33.769     33.769     mm"
"             Rainfall volume        66.11      65.59      131.70     c.m"
"             Rainfall losses        26.583     5.740      16.203     mm"
"             Runoff depth           7.187      28.030     17.566     mm"
"             Runoff volume          14.07      54.44      68.51      c.m"
"             Runoff coefficient     0.213      0.830      0.520      "
"             Maximum flow           0.005      0.045      0.046      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.046     0.047     0.049     0.049"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.046     0.047     0.047     0.049"
" 40          HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"                  Draining SE to residential + Irvine Street"
"             Maximum flow                  0.047    c.m/sec"
"             Hydrograph volume           189.502    c.m"
"                    0.046     0.047     0.047     0.047"
" 38          START/RE-START TOTALS 108"
"           3   Runoff Totals on EXIT"
"             Total Catchment area                    27.480    hectare"
"             Total Impervious area                    0.926    hectare"
"             Total % impervious                       3.371"
" 19          EXIT"
```

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"               MIDUSS Output ----------------------------------------------->"
"               MIDUSS version                          Version 2.25  rev. 473"
"               MIDUSS created                        Sunday, February 7, 2010"
"          10   Units used:                                        ie METRIC"
"               Job folder:                Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                     Pre-Dev"
"               Output filename:                                 5yr_Pre-Dev.out"
"               Licensee name:                                               A"
"               Company                                                      "
"               Date & Time last used:                  6/7/2023 at 3:48:55 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    3000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    1436.000   Coefficient A"
"      11.000   Constant B"
"       0.854   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"             Maximum intensity          134.647    mm/hr"
"             Total depth                 48.636    mm"
"           6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         101   Clayton Subdivision N to ND1"
"       0.000   % Impervious"
"       6.670   Total Area"
"     200.000   Flow length"
"       2.500   Overland Slope"
"       6.670   Pervious Area"
"     200.000   Pervious length"
"       2.500   Pervious slope"
"       0.000   Impervious Area"
"     200.000   Impervious length"
"       2.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.313   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.157     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           6.670      0.000      6.670      hectare"
"             Time of concentration  57.127     5.855      57.127     minutes"
"             Time to Centroid       169.913    95.068     169.912    minutes"
"             Rainfall depth         48.636     48.636     48.636     mm"
"             Rainfall volume        3244.02    0.00       3244.02    c.m"
"             Rainfall losses        33.434     5.392      33.434     mm"
"             Runoff depth           15.202     43.244     15.202     mm"
"             Runoff volume          1013.97    0.00       1013.98    c.m"
"             Runoff coefficient     0.313      0.000      0.313      "
"             Maximum flow           0.157      0.000      0.157      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.157     0.157     0.000     0.000"
" 33          CATCHMENT 102"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         102   External ROWs N to ND1"
"      47.200   % Impervious"
"       1.460   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.771   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.689   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.311   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.866   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.228     0.157     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.771      0.689      1.460      hectare"
"             Time of concentration  10.123     1.037      3.642      minutes"
"             Time to Centroid       110.983    87.982     94.577     minutes"
"             Rainfall depth         48.636     48.636     48.636     mm"
"             Rainfall volume        374.92     335.16     710.09     c.m"
"             Rainfall losses        33.500     6.515      20.763     mm"
"             Runoff depth           15.136     42.121     27.873     mm"
"             Runoff volume          116.68     290.26     406.94     c.m"
"             Runoff coefficient     0.311      0.866      0.573      "
"             Maximum flow           0.054      0.215      0.228      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.228     0.234     0.000     0.000"
" 33          CATCHMENT 103"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         103   Elora Sands N to ND1at SR15"
"       0.000   % Impervious"
"      13.020   Total Area"
"     250.000   Flow length"
"       3.000   Overland Slope"
"      13.020   Pervious Area"
"     250.000   Pervious length"
"       3.000   Pervious slope"
"       0.000   Impervious Area"
"     250.000   Impervious length"
"       3.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.313   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
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"                  0.286     0.234     0.000     0.000 c.m/sec"
"            Catchment 103          Pervious   Impervious Total Area "
"            Surface Area           13.020     0.000      13.020     hectare"
"            Time of concentration  61.834     6.337      61.834     minutes"
"            Time to Centroid       175.818    95.757     175.818    minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        6332.40    0.01       6332.40    c.m"
"            Rainfall losses        33.433     5.494      33.433     mm"
"            Runoff depth           15.203     43.142     15.203     mm"
"            Runoff volume          1979.48    0.01       1979.48    c.m"
"            Runoff coefficient     0.313      0.000      0.313      "
"            Maximum flow           0.286      0.000      0.286      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.286     0.467     0.000     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.286     0.467     0.467     0.000"
" 40         HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Draining to ND1"
"            Maximum flow                 0.467    c.m/sec"
"            Hydrograph volume          3400.401    c.m"
"                  0.286     0.467     0.467     0.467"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.286     0.000     0.467     0.467"
" 33         CATCHMENT 104"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         104   Clayton Subdivision draining NW to Woolwich Street E"
"       0.000   % Impervious"
"       0.540   Total Area"
"      85.000   Flow length"
"       3.500   Overland Slope"
"       0.540   Pervious Area"
"      85.000   Pervious length"
"       3.500   Pervious slope"
"       0.000   Impervious Area"
"      85.000   Impervious length"
"       3.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.312   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.020     0.000     0.467     0.467 c.m/sec"
"            Catchment 104          Pervious   Impervious Total Area "
"            Surface Area           0.540      0.000      0.540      hectare"
"            Time of concentration  30.905     3.167      30.905     minutes"
"            Time to Centroid       137.017    91.195     137.017    minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        262.63     0.00       262.63     c.m"
"            Rainfall losses        33.443     5.977      33.443     mm"
"            Runoff depth           15.193     42.659     15.193     mm"
"            Runoff volume          82.04      0.00       82.04      c.m"
"            Runoff coefficient     0.312      0.000      0.312      "
"            Maximum flow           0.020      0.000      0.020      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.020     0.020     0.467     0.467"
" 33         CATCHMENT 105"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         105   Woolwich St E draining west to Irvine Creek"
"      35.900   % Impervious"
"       0.120   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.077   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.043   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.311   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.866   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.015     0.020     0.467     0.467 c.m/sec"
"            Catchment 105          Pervious   Impervious Total Area "
"            Surface Area           0.077      0.043      0.120      hectare"
"            Time of concentration  10.123     1.037      4.588      minutes"
"            Time to Centroid       110.983    87.982     96.971     minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        37.41      20.95      58.36      c.m"
"            Rainfall losses        33.500     6.515      23.813     mm"
"            Runoff depth           15.136     42.121     24.823     mm"
"            Runoff volume          11.64      18.15      29.79      c.m"
"            Runoff coefficient     0.311      0.866      0.510      "
"            Maximum flow           0.005      0.013      0.015      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.015     0.025     0.467     0.467"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.015     0.025     0.025     0.467"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining NW to Woolwich Street E"
"            Maximum flow                 0.025    c.m/sec"
"            Hydrograph volume          111.831    c.m"
"                  0.015     0.025     0.025     0.025"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.015     0.000     0.025     0.025"
" 33         CATCHMENT 106"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         106   Clayton Subdivision draining SW to rural residential"
"       0.000   % Impervious"
"       3.600   Total Area"
"      85.000   Flow length"
"       4.500   Overland Slope"
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```
"        3.600   Pervious Area"
"       85.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       85.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.312   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.143     0.000     0.025     0.025 c.m/sec"
"             Catchment 106          Pervious   Impervious Total Area "
"             Surface Area           3.600      0.000      3.600      hectare"
"             Time of concentration  28.661     2.937      28.661     minutes"
"             Time to Centroid       134.211    90.862     134.210    minutes"
"             Rainfall depth         48.636     48.636     48.636     mm"
"             Rainfall volume        1750.89    0.00       1750.89    c.m"
"             Rainfall losses        33.451     6.037      33.451     mm"
"             Runoff depth           15.185     42.599     15.185     mm"
"             Runoff volume          546.67     0.00       546.68     c.m"
"             Runoff coefficient     0.312      0.000      0.312      "
"             Maximum flow           0.143      0.000      0.143      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.143     0.143     0.025     0.025"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.143     0.143     0.143     0.025"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                Draining SW to rural residential"
"             Maximum flow                  0.143    c.m/sec"
"             Hydrograph volume           546.676    c.m"
"                    0.143     0.143     0.143     0.143"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.143     0.000     0.143     0.143"
" 33          CATCHMENT 107"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          107   Clayton Subdivision draining SE to residential + Irvine Street"
"        0.000   % Impervious"
"        1.680   Total Area"
"       70.000   Flow length"
"        2.000   Overland Slope"
"        1.680   Pervious Area"
"       70.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       70.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.313   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.060     0.000     0.143     0.143 c.m/sec"
"             Catchment 107          Pervious   Impervious Total Area "
"             Surface Area           1.680      0.000      1.680      hectare"
"             Time of concentration  32.535     3.334      32.535     minutes"
"             Time to Centroid       139.071    91.465     139.071    minutes"
"             Rainfall depth         48.636     48.636     48.636     mm"
"             Rainfall volume        817.08     0.00       817.08     c.m"
"             Rainfall losses        33.436     5.984      33.436     mm"
"             Runoff depth           15.200     42.652     15.200     mm"
"             Runoff volume          255.36     0.00       255.36     c.m"
"             Runoff coefficient     0.313      0.000      0.313      "
"             Maximum flow           0.060      0.000      0.060      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.060     0.060     0.143     0.143"
" 33          CATCHMENT 108"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          108   Irvine St drawing S to Elora Meadows"
"       49.800   % Impervious"
"        0.390   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.196   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.194   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.311   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.866   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.064     0.060     0.143     0.143 c.m/sec"
"             Catchment 108          Pervious   Impervious Total Area "
"             Surface Area           0.196      0.194      0.390      hectare"
"             Time of concentration  10.123     1.037      3.453      minutes"
"             Time to Centroid       110.982    87.982     94.098     minutes"
"             Rainfall depth         48.636     48.636     48.636     mm"
"             Rainfall volume        95.22      94.46      189.68     c.m"
"             Rainfall losses        33.500     6.515      20.062     mm"
"             Runoff depth           15.136     42.121     28.574     mm"
"             Runoff volume          29.63      81.81      111.44     c.m"
"             Runoff coefficient     0.311      0.866      0.588      "
"             Maximum flow           0.014      0.061      0.064      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.064     0.075     0.143     0.143"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.064     0.075     0.075     0.143"
" 40          HYDROGRAPH   Combine    4"
"            6   Combine "
"            4   Node #"
```

```
"               Draining SE to residential + Irvine Street"
"             Maximum flow                  0.075    c.m/sec"
"             Hydrograph volume           366.803    c.m"
"                    0.064     0.075     0.075     0.075"
" 38          START/RE-START TOTALS 108"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     27.480    hectare"
"             Total Impervious area                     0.926    hectare"
"             Total % impervious                        3.371"
" 19          EXIT"
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```
"             MIDUSS Output ----------------------------------------------->"
"             MIDUSS version                          Version 2.25  rev. 473"
"             MIDUSS created                        Sunday, February 7, 2010"
"          10 Units used:                                        ie METRIC"
"             Job folder:              Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                  Pre-Dev"
"             Output filename:                              10yr_Pre-Dev.out"
"             Licensee name:                                               A"
"             Company                                                      "
"             Date & Time last used:                6/7/2023 at 3:50:22 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     3000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"     2126.000   Coefficient A"
"       15.000   Constant B"
"        0.890   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          147.791    mm/hr"
"             Total depth                 58.419    mm"
"           6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         101   Clayton Subdivision N to ND1"
"        0.000   % Impervious"
"        6.670   Total Area"
"      200.000   Flow length"
"        2.500   Overland Slope"
"        6.670   Pervious Area"
"      200.000   Pervious length"
"        2.500   Pervious slope"
"        0.000   Impervious Area"
"      200.000   Impervious length"
"        2.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.366   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.250     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           6.670      0.000      6.670      hectare"
"             Time of concentration  50.864     5.614      50.864     minutes"
"             Time to Centroid       159.747    93.928     159.747    minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        3896.54    0.00       3896.54    c.m"
"             Rainfall losses        37.052     5.676      37.052     mm"
"             Runoff depth           21.367     52.743     21.367     mm"
"             Runoff volume          1425.20    0.00       1425.21    c.m"
"             Runoff coefficient     0.366      0.000      0.366      "
"             Maximum flow           0.250      0.000      0.250      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                     0.250     0.250     0.000     0.000"
```

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" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          102   External ROWs N to ND1"
"       47.200   % Impervious"
"        1.460   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.771   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.689   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.364   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.880   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.265     0.250     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.771      0.689      1.460      hectare"
"             Time of concentration  9.013      0.995      3.532      minutes"
"             Time to Centroid       108.041    87.362     93.905     minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        450.34     402.58     852.92     c.m"
"             Rainfall losses        37.151     7.016      22.927     mm"
"             Runoff depth           21.268     51.403     35.492     mm"
"             Runoff volume          163.95     354.23     518.18     c.m"
"             Runoff coefficient     0.364      0.880      0.608      "
"             Maximum flow           0.080      0.241      0.265      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.265     0.292     0.000     0.000"
" 33          CATCHMENT 103"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          103   Elora Sands N to ND1at SR15"
"        0.000   % Impervious"
"       13.020   Total Area"
"      250.000   Flow length"
"        3.000   Overland Slope"
"       13.020   Pervious Area"
"      250.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      250.000   Impervious length"
"        3.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.366   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.456     0.292     0.000     0.000 c.m/sec"
"             Catchment 103          Pervious   Impervious Total Area "
"             Surface Area           13.020     0.000      13.020     hectare"
"             Time of concentration  55.056     6.076      55.056     minutes"
"             Time to Centroid       164.929    94.594     164.929    minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        7606.14    0.01       7606.15    c.m"
"             Rainfall losses        37.045     5.573      37.045     mm"
"             Runoff depth           21.374     52.846     21.374     mm"
"             Runoff volume          2782.83    0.01       2782.84    c.m"
"             Runoff coefficient     0.366      0.000      0.366      "
"             Maximum flow           0.456      0.000      0.456      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.456     0.741     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.456     0.741     0.741     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Draining to ND1"
"             Maximum flow                  0.741    c.m/sec"
"             Hydrograph volume          4726.225    c.m"
"                    0.456     0.741     0.741     0.741"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.456     0.000     0.741     0.741"
" 33          CATCHMENT 104"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          104   Clayton Subdivision draining NW to Woolwich Street E"
"        0.000   % Impervious"
"        0.540   Total Area"
"       85.000   Flow length"
"        3.500   Overland Slope"
"        0.540   Pervious Area"
"       85.000   Pervious length"
"        3.500   Pervious slope"
"        0.000   Impervious Area"
"       85.000   Impervious length"
"        3.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.366   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.032     0.000     0.741     0.741 c.m/sec"
"             Catchment 104          Pervious   Impervious Total Area "
"             Surface Area           0.540      0.000      0.540      hectare"
"             Time of concentration  27.518     3.037      27.517     minutes"
"             Time to Centroid       130.897    90.337     130.897    minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        315.46     0.00       315.46     c.m"
"             Rainfall losses        37.049     6.397      37.049     mm"
"             Runoff depth           21.370     52.022     21.370     mm"
"             Runoff volume          115.40     0.00       115.40     c.m"
"             Runoff coefficient     0.366      0.000      0.366      "
"             Maximum flow           0.032      0.000      0.032      c.m/sec"
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" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.032     0.032     0.741     0.741"
" 33          CATCHMENT 105"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          105   Woolwich St E draining west to Irvine Creek"
"       35.900   % Impervious"
"        0.120   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.077   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.043   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.364   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.880   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.017     0.032     0.741     0.741 c.m/sec"
"             Catchment 105          Pervious   Impervious Total Area "
"             Surface Area           0.077      0.043      0.120      hectare"
"             Time of concentration  9.013      0.995      4.402      minutes"
"             Time to Centroid       108.041    87.362     96.148     minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        44.94      25.17      70.10      c.m"
"             Rainfall losses        37.151     7.016      26.332     mm"
"             Runoff depth           21.268     51.403     32.086     mm"
"             Runoff volume          16.36      22.14      38.50      c.m"
"             Runoff coefficient     0.364      0.880      0.549      "
"             Maximum flow           0.008      0.015      0.017      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.017     0.038     0.741     0.741"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.017     0.038     0.038     0.741"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Draining NW to Woolwich Street E"
"             Maximum flow                  0.038    c.m/sec"
"             Hydrograph volume           153.900    c.m"
"                    0.017     0.038     0.038     0.038"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.017     0.000     0.038     0.038"
" 33          CATCHMENT 106"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          106   Clayton Subdivision draining SW to rural residential"
"        0.000   % Impervious"
"        3.600   Total Area"
"       85.000   Flow length"
"        4.500   Overland Slope"
"        3.600   Pervious Area"
"       85.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       85.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.365   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.217     0.000     0.038     0.038 c.m/sec"
"             Catchment 106          Pervious   Impervious Total Area "
"             Surface Area           3.600      0.000      3.600      hectare"
"             Time of concentration  25.519     2.816      25.519     minutes"
"             Time to Centroid       128.431    90.031     128.431    minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        2103.08    0.00       2103.08    c.m"
"             Rainfall losses        37.075     6.438      37.075     mm"
"             Runoff depth           21.344     51.981     21.344     mm"
"             Runoff volume          768.40     0.00       768.40     c.m"
"             Runoff coefficient     0.365      0.000      0.365      "
"             Maximum flow           0.217      0.000      0.217      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.217     0.217     0.038     0.038"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.217     0.217     0.217     0.038"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                Draining SW to rural residential"
"             Maximum flow                  0.217    c.m/sec"
"             Hydrograph volume           768.398    c.m"
"                    0.217     0.217     0.217     0.217"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.217     0.000     0.217     0.217"
" 33          CATCHMENT 107"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          107   Clayton Subdivision draining SE to residential + Irvine Street"
"        0.000   % Impervious"
"        1.680   Total Area"
"       70.000   Flow length"
"        2.000   Overland Slope"
"        1.680   Pervious Area"
"       70.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       70.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.366   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
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```
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.096     0.000     0.217     0.217 c.m/sec"
"             Catchment 107          Pervious   Impervious Total Area "
"             Surface Area           1.680      0.000      1.680      hectare"
"             Time of concentration  28.969     3.197      28.969     minutes"
"             Time to Centroid       132.696    90.581     132.696    minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        981.44     0.00       981.44     c.m"
"             Rainfall losses        37.065     6.301      37.065     mm"
"             Runoff depth           21.354     52.118     21.354     mm"
"             Runoff volume          358.75     0.00       358.75     c.m"
"             Runoff coefficient     0.366      0.000      0.366      "
"             Maximum flow           0.096      0.000      0.096      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.096     0.096     0.217     0.217"
" 33          CATCHMENT 108"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         108   Irvine St drawing S to Elora Meadows"
"       49.800   % Impervious"
"        0.390   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.196   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.194   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.364   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.880   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.074     0.096     0.217     0.217 c.m/sec"
"             Catchment 108          Pervious   Impervious Total Area "
"             Surface Area           0.196      0.194      0.390      hectare"
"             Time of concentration  9.013      0.995      3.355      minutes"
"             Time to Centroid       108.041    87.362     93.449     minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        114.37     113.46     227.83     c.m"
"             Rainfall losses        37.151     7.016      22.144     mm"
"             Runoff depth           21.268     51.403     36.275     mm"
"             Runoff volume          41.64      99.83      141.47     c.m"
"             Runoff coefficient     0.364      0.880      0.621      "
"             Maximum flow           0.020      0.068      0.074      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.074     0.116     0.217     0.217"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.074     0.116     0.116     0.217"
" 40          HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"                  Draining SE to residential + Irvine Street"
"             Maximum flow                  0.116    c.m/sec"
"             Hydrograph volume           500.228    c.m"
"                    0.074     0.116     0.116     0.116"
" 38          START/RE-START TOTALS 108"
"           3   Runoff Totals on EXIT"
"             Total Catchment area                    27.480    hectare"
"             Total Impervious area                    0.926    hectare"
"             Total % impervious                       3.371"
" 19          EXIT"
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"               MIDUSS Output ----------------------------------------------->"
"               MIDUSS version                          Version 2.25  rev. 473"
"               MIDUSS created                        Sunday, February 7, 2010"
"          10   Units used:                                        ie METRIC"
"               Job folder:                Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                     Pre-Dev"
"               Output filename:                                25yr_Pre-Dev.out"
"               Licensee name:                                               A"
"               Company                                                      "
"               Date & Time last used:                  6/7/2023 at 3:51:32 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     3000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"     3023.000   Coefficient A"
"       18.000   Constant B"
"        0.916   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          170.985    mm/hr"
"             Total depth                 71.381    mm"
"           6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         101   Clayton Subdivision N to ND1"
"        0.000   % Impervious"
"        6.670   Total Area"
"      200.000   Flow length"
"        2.500   Overland Slope"
"        6.670   Pervious Area"
"      200.000   Pervious length"
"        2.500   Pervious slope"
"        0.000   Impervious Area"
"      200.000   Impervious length"
"        2.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.425   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.403     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           6.670      0.000      6.670      hectare"
"             Time of concentration  44.550     5.275      44.550     minutes"
"             Time to Centroid       150.536    92.848     150.536    minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        4761.13    0.00       4761.13    c.m"
"             Rainfall losses        41.037     5.903      41.037     mm"
"             Runoff depth           30.344     65.479     30.344     mm"
"             Runoff volume          2023.93    0.00       2023.94    c.m"
"             Runoff coefficient     0.425      0.000      0.425      "
"             Maximum flow           0.403      0.000      0.403      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                     0.403     0.403     0.000     0.000"
" 33          CATCHMENT 102"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         102   External ROWs N to ND1"
"       47.200   % Impervious"
"        1.460   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.771   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.689   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.424   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.891   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.321     0.403     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.771      0.689      1.460      hectare"
"             Time of concentration  7.894      0.935      3.352      minutes"
"             Time to Centroid       105.378    86.797     93.251     minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        550.26     491.90     1042.17    c.m"
"             Rainfall losses        41.136     7.807      25.405     mm"
"             Runoff depth           30.245     63.574     45.977     mm"
"             Runoff volume          233.16     438.10     671.26     c.m"
"             Runoff coefficient     0.424      0.891      0.644      "
"             Maximum flow           0.119      0.283      0.321      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                     0.321     0.469     0.000     0.000"
" 33          CATCHMENT 103"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         103   Elora Sands N to ND1at SR15"
"        0.000   % Impervious"
"       13.020   Total Area"
"      250.000   Flow length"
"        3.000   Overland Slope"
"       13.020   Pervious Area"
"      250.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      250.000   Impervious length"
"        3.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.425   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                0.739     0.469     0.000     0.000 c.m/sec"
"            Catchment 103          Pervious   Impervious Total Area "
"            Surface Area           13.020     0.000      13.020     hectare"
"            Time of concentration  48.222     5.710      48.222     minutes"
"            Time to Centroid       155.058    93.425     155.058    minutes"
"            Rainfall depth         71.381     71.381     71.381     mm"
"            Rainfall volume        9293.83    0.01       9293.84    c.m"
"            Rainfall losses        41.035     5.882      41.035     mm"
"            Runoff depth           30.346     65.499     30.346     mm"
"            Runoff volume          3951.04    0.01       3951.05    c.m"
"            Runoff coefficient     0.425      0.000      0.425      "
"            Maximum flow           0.739      0.000      0.739      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                0.739     1.192     0.000     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                0.739     1.192     1.192     0.000"
" 40         HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Draining to ND1"
"            Maximum flow                 1.192    c.m/sec"
"            Hydrograph volume          6646.247    c.m"
"                0.739     1.192     1.192     1.192"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                0.739     0.000     1.192     1.192"
" 33         CATCHMENT 104"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         104   Clayton Subdivision draining NW to Woolwich Street E"
"       0.000   % Impervious"
"       0.540   Total Area"
"      85.000   Flow length"
"       3.500   Overland Slope"
"       0.540   Pervious Area"
"      85.000   Pervious length"
"       3.500   Pervious slope"
"       0.000   Impervious Area"
"      85.000   Impervious length"
"       3.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.425   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                0.050     0.000     1.192     1.192 c.m/sec"
"            Catchment 104          Pervious   Impervious Total Area "
"            Surface Area           0.540      0.000      0.540      hectare"
"            Time of concentration  24.102     2.854      24.102     minutes"
"            Time to Centroid       125.320    89.526     125.320    minutes"
"            Rainfall depth         71.381     71.381     71.381     mm"
"            Rainfall volume        385.46     0.00       385.46     c.m"
"            Rainfall losses        41.041     6.853      41.041     mm"
"            Runoff depth           30.340     64.528     30.340     mm"
"            Runoff volume          163.83     0.00       163.84     c.m"
"            Runoff coefficient     0.425      0.000      0.425      "
"            Maximum flow           0.050      0.000      0.050      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                0.050     0.050     1.192     1.192"
" 33         CATCHMENT 105"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         105   Woolwich St E draining west to Irvine Creek"
"      35.900   % Impervious"
"       0.120   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.077   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.043   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.424   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.891   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                0.024     0.050     1.192     1.192 c.m/sec"
"            Catchment 105          Pervious   Impervious Total Area "
"            Surface Area           0.077      0.043      0.120      hectare"
"            Time of concentration  7.894      0.935      4.131      minutes"
"            Time to Centroid       105.378    86.797     95.331     minutes"
"            Rainfall depth         71.381     71.381     71.381     mm"
"            Rainfall volume        54.91      30.75      85.66      c.m"
"            Rainfall losses        41.136     7.807      29.171     mm"
"            Runoff depth           30.245     63.574     42.210     mm"
"            Runoff volume          23.26      27.39      50.65      c.m"
"            Runoff coefficient     0.424      0.891      0.591      "
"            Maximum flow           0.012      0.018      0.024      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                0.024     0.060     1.192     1.192"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                0.024     0.060     0.060     1.192"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining NW to Woolwich Street E"
"            Maximum flow                   0.060    c.m/sec"
"            Hydrograph volume            214.488    c.m"
"                0.024     0.060     0.060     0.060"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                0.024     0.000     0.060     0.060"
" 33         CATCHMENT 106"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         106   Clayton Subdivision draining SW to rural residential"
"       0.000   % Impervious"
"       3.600   Total Area"
"      85.000   Flow length"
"       4.500   Overland Slope"
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"        3.600   Pervious Area"
"       85.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       85.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.425   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.355     0.000     0.060     0.060 c.m/sec"
"             Catchment 106          Pervious   Impervious Total Area "
"             Surface Area           3.600      0.000      3.600      hectare"
"             Time of concentration  22.351     2.647      22.351     minutes"
"             Time to Centroid       123.181    89.198     123.181    minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        2569.72    0.00       2569.73    c.m"
"             Rainfall losses        41.079     6.672      41.079     mm"
"             Runoff depth           30.302     64.709     30.302     mm"
"             Runoff volume          1090.87    0.00       1090.87    c.m"
"             Runoff coefficient     0.425      0.000      0.425      "
"             Maximum flow           0.355      0.000      0.355      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.355     0.355     0.060     0.060"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.355     0.355     0.355     0.060"
" 40          HYDROGRAPH   Combine    3"
"           6   Combine "
"           3   Node #"
"               Draining SW to rural residential"
"             Maximum flow                  0.355    c.m/sec"
"             Hydrograph volume          1090.868    c.m"
"                    0.355     0.355     0.355     0.355"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.355     0.000     0.355     0.355"
" 33          CATCHMENT 107"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         107   Clayton Subdivision draining SE to residential + Irvine Street"
"        0.000   % Impervious"
"        1.680   Total Area"
"       70.000   Flow length"
"        2.000   Overland Slope"
"        1.680   Pervious Area"
"       70.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       70.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.425   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.148     0.000     0.355     0.355 c.m/sec"
"             Catchment 107          Pervious   Impervious Total Area "
"             Surface Area           1.680      0.000      1.680      hectare"
"             Time of concentration  25.373     3.004      25.373     minutes"
"             Time to Centroid       126.891    89.724     126.891    minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        1199.20    0.00       1199.21    c.m"
"             Rainfall losses        41.064     6.864      41.064     mm"
"             Runoff depth           30.317     64.517     30.317     mm"
"             Runoff volume          509.33     0.00       509.33     c.m"
"             Runoff coefficient     0.425      0.000      0.425      "
"             Maximum flow           0.148      0.000      0.148      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.148     0.148     0.355     0.355"
" 33          CATCHMENT 108"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         108   Irvine St drawing S to Elora Meadows"
"       49.800   % Impervious"
"        0.390   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.196   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.194   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.424   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.891   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.089     0.148     0.355     0.355 c.m/sec"
"             Catchment 108          Pervious   Impervious Total Area "
"             Surface Area           0.196      0.194      0.390      hectare"
"             Time of concentration  7.894      0.935      3.190      minutes"
"             Time to Centroid       105.378    86.797     92.820     minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        139.75     138.64     278.39     c.m"
"             Rainfall losses        41.136     7.807      24.538     mm"
"             Runoff depth           30.245     63.574     46.843     mm"
"             Runoff volume          59.21      123.47     182.69     c.m"
"             Runoff coefficient     0.424      0.891      0.656      "
"             Maximum flow           0.030      0.080      0.089      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.089     0.183     0.355     0.355"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.089     0.183     0.183     0.355"
" 40          HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
```

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"               Draining SE to residential + Irvine Street"
"             Maximum flow                  0.183    c.m/sec"
"             Hydrograph volume           692.021    c.m"
"                    0.089     0.183     0.183     0.183"
" 38          START/RE-START TOTALS 108"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     27.480    hectare"
"             Total Impervious area                     0.926    hectare"
"             Total % impervious                        3.371"
" 19          EXIT"
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"             MIDUSS Output ----------------------------------------------->"
"             MIDUSS version                          Version 2.25  rev. 473"
"             MIDUSS created                        Sunday, February 7, 2010"
"          10 Units used:                                        ie METRIC"
"             Job folder:              Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                  Pre-Dev"
"             Output filename:                              50yr_Pre-Dev.out"
"             Licensee name:                                               A"
"             Company                                                      "
"             Date & Time last used:                 6/7/2023 at 3:52:58 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     3000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     3574.000   Coefficient A"
"       19.000   Constant B"
"        0.924   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"              Maximum intensity          189.902    mm/hr"
"              Total depth                 80.776    mm"
"            6   050hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   Clayton Subdivision N to ND1"
"        0.000   % Impervious"
"        6.670   Total Area"
"      200.000   Flow length"
"        2.500   Overland Slope"
"        6.670   Pervious Area"
"      200.000   Pervious length"
"        2.500   Pervious slope"
"        0.000   Impervious Area"
"      200.000   Impervious length"
"        2.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.462   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.528     0.000     0.000     0.000 c.m/sec"
"              Catchment 101          Pervious   Impervious Total Area "
"              Surface Area           6.670      0.000      6.670      hectare"
"              Time of concentration  41.030     5.049      41.030     minutes"
"              Time to Centroid       145.706    92.242     145.706    minutes"
"              Rainfall depth         80.776     80.776     80.776     mm"
"              Rainfall volume        5387.79    0.01       5387.79    c.m"
"              Rainfall losses        43.487     5.907      43.487     mm"
"              Runoff depth           37.289     74.869     37.289     mm"
"              Runoff volume          2487.18    0.00       2487.19    c.m"
"              Runoff coefficient     0.462      0.000      0.462      "
"              Maximum flow           0.528      0.000      0.528      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.528     0.528     0.000     0.000"
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" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          102   External ROWs N to ND1"
"       47.200   % Impervious"
"        1.460   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.771   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.689   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.459   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.895   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.376     0.528     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.771      0.689      1.460      hectare"
"             Time of concentration  7.270      0.895      3.219      minutes"
"             Time to Centroid       104.034    86.523     92.908     minutes"
"             Rainfall depth         80.776     80.776     80.776     mm"
"             Rainfall volume        622.69     556.65     1179.34    c.m"
"             Rainfall losses        43.679     8.458      27.055     mm"
"             Runoff depth           37.098     72.318     53.722     mm"
"             Runoff volume          285.98     498.36     784.34     c.m"
"             Runoff coefficient     0.459      0.895      0.665      "
"             Maximum flow           0.158      0.316      0.376      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.376     0.607     0.000     0.000"
" 33          CATCHMENT 103"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          103   Elora Sands N to ND1at SR15"
"        0.000   % Impervious"
"       13.020   Total Area"
"      250.000   Flow length"
"        3.000   Overland Slope"
"       13.020   Pervious Area"
"      250.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      250.000   Impervious length"
"        3.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.462   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.978     0.607     0.000     0.000 c.m/sec"
"             Catchment 103          Pervious   Impervious Total Area "
"             Surface Area           13.020     0.000      13.020     hectare"
"             Time of concentration  44.411     5.465      44.411     minutes"
"             Time to Centroid       149.889    92.832     149.889    minutes"
"             Rainfall depth         80.776     80.776     80.776     mm"
"             Rainfall volume        1.0517     0.0000     1.0517     ha-m"
"             Rainfall losses        43.485     6.024      43.485     mm"
"             Runoff depth           37.292     74.753     37.292     mm"
"             Runoff volume          4855.35    0.01       4855.36    c.m"
"             Runoff coefficient     0.462      0.000      0.462      "
"             Maximum flow           0.978      0.000      0.978      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.978     1.583     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.978     1.583     1.583     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Draining to ND1"
"             Maximum flow                  1.583    c.m/sec"
"             Hydrograph volume          8126.884    c.m"
"                    0.978     1.583     1.583     1.583"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.978     0.000     1.583     1.583"
" 33          CATCHMENT 104"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          104   Clayton Subdivision draining NW to Woolwich Street E"
"        0.000   % Impervious"
"        0.540   Total Area"
"       85.000   Flow length"
"        3.500   Overland Slope"
"        0.540   Pervious Area"
"       85.000   Pervious length"
"        3.500   Pervious slope"
"        0.000   Impervious Area"
"       85.000   Impervious length"
"        3.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.461   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.066     0.000     1.583     1.583 c.m/sec"
"             Catchment 104          Pervious   Impervious Total Area "
"             Surface Area           0.540      0.000      0.540      hectare"
"             Time of concentration  22.197     2.731      22.197     minutes"
"             Time to Centroid       122.417    89.071     122.417    minutes"
"             Rainfall depth         80.776     80.776     80.776     mm"
"             Rainfall volume        436.19     0.00       436.19     c.m"
"             Rainfall losses        43.524     6.984      43.524     mm"
"             Runoff depth           37.253     73.793     37.253     mm"
"             Runoff volume          201.16     0.00       201.17     c.m"
"             Runoff coefficient     0.461      0.000      0.461      "
"             Maximum flow           0.066      0.000      0.066      c.m/sec"
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" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.066     0.066     1.583     1.583"
" 33          CATCHMENT 105"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          105   Woolwich St E draining west to Irvine Creek"
"       35.900   % Impervious"
"        0.120   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.077   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.043   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.459   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.895   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.028     0.066     1.583     1.583 c.m/sec"
"             Catchment 105          Pervious   Impervious Total Area "
"             Surface Area           0.077      0.043      0.120      hectare"
"             Time of concentration  7.270      0.895      3.943      minutes"
"             Time to Centroid       104.034    86.523     94.894     minutes"
"             Rainfall depth         80.776     80.776     80.776     mm"
"             Rainfall volume        62.13      34.80      96.93      c.m"
"             Rainfall losses        43.679     8.458      31.035     mm"
"             Runoff depth           37.098     72.318     49.742     mm"
"             Runoff volume          28.54      31.15      59.69      c.m"
"             Runoff coefficient     0.459      0.895      0.616      "
"             Maximum flow           0.016      0.020      0.028      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.028     0.078     1.583     1.583"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.028     0.078     0.078     1.583"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Draining NW to Woolwich Street E"
"             Maximum flow                  0.078    c.m/sec"
"             Hydrograph volume           260.855    c.m"
"                    0.028     0.078     0.078     0.078"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.028     0.000     0.078     0.078"
" 33          CATCHMENT 106"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          106   Clayton Subdivision draining SW to rural residential"
"        0.000   % Impervious"
"        3.600   Total Area"
"       85.000   Flow length"
"        4.500   Overland Slope"
"        3.600   Pervious Area"
"       85.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       85.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.462   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.456     0.000     0.078     0.078 c.m/sec"
"             Catchment 106          Pervious   Impervious Total Area "
"             Surface Area           3.600      0.000      3.600      hectare"
"             Time of concentration  20.585     2.533      20.585     minutes"
"             Time to Centroid       120.412    88.755     120.412    minutes"
"             Rainfall depth         80.776     80.776     80.776     mm"
"             Rainfall volume        2907.95    0.00       2907.95    c.m"
"             Rainfall losses        43.494     6.851      43.494     mm"
"             Runoff depth           37.282     73.925     37.282     mm"
"             Runoff volume          1342.15    0.00       1342.16    c.m"
"             Runoff coefficient     0.462      0.000      0.462      "
"             Maximum flow           0.456      0.000      0.456      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.456     0.456     0.078     0.078"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.456     0.456     0.456     0.078"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                Draining SW to rural residential"
"             Maximum flow                  0.456    c.m/sec"
"             Hydrograph volume          1342.157    c.m"
"                    0.456     0.456     0.456     0.456"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.456     0.000     0.456     0.456"
" 33          CATCHMENT 107"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          107   Clayton Subdivision draining SE to residential + Irvine Street"
"        0.000   % Impervious"
"        1.680   Total Area"
"       70.000   Flow length"
"        2.000   Overland Slope"
"        1.680   Pervious Area"
"       70.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       70.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.461   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
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"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.196     0.000     0.456     0.456 c.m/sec"
"             Catchment 107          Pervious   Impervious Total Area "
"             Surface Area           1.680      0.000      1.680      hectare"
"             Time of concentration  23.368     2.876      23.368     minutes"
"             Time to Centroid       123.855    89.295     123.855    minutes"
"             Rainfall depth         80.776     80.776     80.776     mm"
"             Rainfall volume        1357.04    0.00       1357.05    c.m"
"             Rainfall losses        43.502     7.132      43.502     mm"
"             Runoff depth           37.274     73.645     37.275     mm"
"             Runoff volume          626.21     0.00       626.21     c.m"
"             Runoff coefficient     0.461      0.000      0.461      "
"             Maximum flow           0.196      0.000      0.196      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.196     0.196     0.456     0.456"
" 33          CATCHMENT 108"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         108   Irvine St drawing S to Elora Meadows"
"       49.800   % Impervious"
"        0.390   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.196   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.194   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.459   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.895   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.104     0.196     0.456     0.456 c.m/sec"
"             Catchment 108          Pervious   Impervious Total Area "
"             Surface Area           0.196      0.194      0.390      hectare"
"             Time of concentration  7.270      0.895      3.068      minutes"
"             Time to Centroid       104.034    86.523     92.492     minutes"
"             Rainfall depth         80.776     80.776     80.776     mm"
"             Rainfall volume        158.14     156.88     315.03     c.m"
"             Rainfall losses        43.679     8.458      26.139     mm"
"             Runoff depth           37.098     72.318     54.638     mm"
"             Runoff volume          72.63      140.46     213.09     c.m"
"             Runoff coefficient     0.459      0.895      0.676      "
"             Maximum flow           0.040      0.089      0.104      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.104     0.236     0.456     0.456"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.104     0.236     0.236     0.456"
" 40          HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"                  Draining SE to residential + Irvine Street"
"             Maximum flow                  0.236    c.m/sec"
"             Hydrograph volume           839.299    c.m"
"                    0.104     0.236     0.236     0.236"
" 38          START/RE-START TOTALS 108"
"           3   Runoff Totals on EXIT"
"             Total Catchment area                    27.480    hectare"
"             Total Impervious area                    0.926    hectare"
"             Total % impervious                       3.371"
" 19          EXIT"
```

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"               MIDUSS Output ----------------------------------------------->"
"               MIDUSS version                          Version 2.25  rev. 473"
"               MIDUSS created                        Sunday, February 7, 2010"
"          10   Units used:                                        ie METRIC"
"               Job folder:                Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                      Pre-Dev"
"               Output filename:                            100yr_Pre-Dev.out"
"               Licensee name:                                              A"
"               Company                                                     "
"               Date & Time last used:                  6/7/2023 at 3:53:59 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    3000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    4382.000   Coefficient A"
"      21.000   Constant B"
"       0.939   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"             Maximum intensity          205.327    mm/hr"
"             Total depth                 90.193    mm"
"           6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         101   Clayton Subdivision N to ND1"
"       0.000   % Impervious"
"       6.670   Total Area"
"     200.000   Flow length"
"       2.500   Overland Slope"
"       6.670   Pervious Area"
"     200.000   Pervious length"
"       2.500   Pervious slope"
"       0.000   Impervious Area"
"     200.000   Impervious length"
"       2.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.494   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.666     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           6.670      0.000      6.670      hectare"
"             Time of concentration  38.491     4.887      38.491     minutes"
"             Time to Centroid       141.798    91.760     141.797    minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        6015.85    0.01       6015.85    c.m"
"             Rainfall losses        45.639     5.990      45.639     mm"
"             Runoff depth           44.554     84.203     44.554     mm"
"             Runoff volume          2971.75    0.01       2971.75    c.m"
"             Runoff coefficient     0.494      0.000      0.494      "
"             Maximum flow           0.666      0.000      0.666      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.666     0.666     0.000     0.000"
" 33          CATCHMENT 102"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         102   External ROWs N to ND1"
"      47.200   % Impervious"
"       1.460   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.771   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.689   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.489   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   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"
"                    0.428     0.666     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.771      0.689      1.460      hectare"
"             Time of concentration  6.820      0.866      3.118      minutes"
"             Time to Centroid       102.891    86.293     92.570     minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        695.28     621.54     1316.81    c.m"
"             Rainfall losses        46.114     9.114      28.650     mm"
"             Runoff depth           44.079     81.079     61.543     mm"
"             Runoff volume          339.80     558.73     898.53     c.m"
"             Runoff coefficient     0.489      0.899      0.682      "
"             Maximum flow           0.185      0.343      0.428      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.428     0.773     0.000     0.000"
" 33          CATCHMENT 103"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         103   Elora Sands N to ND1at SR15"
"       0.000   % Impervious"
"      13.020   Total Area"
"     250.000   Flow length"
"       3.000   Overland Slope"
"      13.020   Pervious Area"
"     250.000   Pervious length"
"       3.000   Pervious slope"
"       0.000   Impervious Area"
"     250.000   Impervious length"
"       3.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.494   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
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"                  1.230     0.773     0.000     0.000 c.m/sec"
"            Catchment 103          Pervious   Impervious Total Area "
"            Surface Area           13.020     0.000      13.020     hectare"
"            Time of concentration  41.663     5.290      41.663     minutes"
"            Time to Centroid       145.713    92.287     145.712    minutes"
"            Rainfall depth         90.193     90.193     90.193     mm"
"            Rainfall volume        1.1743     0.0000     1.1743     ha-m"
"            Rainfall losses        45.637     6.118      45.637     mm"
"            Runoff depth           44.555     84.074     44.555     mm"
"            Runoff volume          5801.11    0.01       5801.12    c.m"
"            Runoff coefficient     0.494      0.000      0.494      "
"            Maximum flow           1.230      0.000      1.230      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  1.230     1.976     0.000     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  1.230     1.976     1.976     0.000"
" 40         HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Draining to ND1"
"            Maximum flow                 1.976    c.m/sec"
"            Hydrograph volume          9671.402    c.m"
"                  1.230     1.976     1.976     1.976"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  1.230     0.000     1.976     1.976"
" 33         CATCHMENT 104"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         104   Clayton Subdivision draining NW to Woolwich Street E"
"       0.000   % Impervious"
"       0.540   Total Area"
"      85.000   Flow length"
"       3.500   Overland Slope"
"       0.540   Pervious Area"
"      85.000   Pervious length"
"       3.500   Pervious slope"
"       0.000   Impervious Area"
"      85.000   Impervious length"
"       3.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.494   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.082     0.000     1.976     1.976 c.m/sec"
"            Catchment 104          Pervious   Impervious Total Area "
"            Surface Area           0.540      0.000      0.540      hectare"
"            Time of concentration  20.824     2.644      20.824     minutes"
"            Time to Centroid       120.019    88.678     120.019    minutes"
"            Rainfall depth         90.193     90.193     90.193     mm"
"            Rainfall volume        487.04     0.00       487.04     c.m"
"            Rainfall losses        45.641     7.132      45.641     mm"
"            Runoff depth           44.552     83.060     44.552     mm"
"            Runoff volume          240.58     0.00       240.58     c.m"
"            Runoff coefficient     0.494      0.000      0.494      "
"            Maximum flow           0.082      0.000      0.082      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.082     0.082     1.976     1.976"
" 33         CATCHMENT 105"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         105   Woolwich St E draining west to Irvine Creek"
"      35.900   % Impervious"
"       0.120   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.077   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.043   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.489   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   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"
"                  0.032     0.082     1.976     1.976 c.m/sec"
"            Catchment 105          Pervious   Impervious Total Area "
"            Surface Area           0.077      0.043      0.120      hectare"
"            Time of concentration  6.820      0.866      3.799      minutes"
"            Time to Centroid       102.891    86.293     94.469     minutes"
"            Rainfall depth         90.193     90.193     90.193     mm"
"            Rainfall volume        69.38      38.86      108.23     c.m"
"            Rainfall losses        46.114     9.114      32.831     mm"
"            Runoff depth           44.079     81.079     57.362     mm"
"            Runoff volume          33.91      34.93      68.83      c.m"
"            Runoff coefficient     0.489      0.899      0.636      "
"            Maximum flow           0.018      0.021      0.032      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.032     0.096     1.976     1.976"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.032     0.096     0.096     1.976"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining NW to Woolwich Street E"
"            Maximum flow                 0.096    c.m/sec"
"            Hydrograph volume          309.415    c.m"
"                  0.032     0.096     0.096     0.096"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.032     0.000     0.096     0.096"
" 33         CATCHMENT 106"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         106   Clayton Subdivision draining SW to rural residential"
"       0.000   % Impervious"
"       3.600   Total Area"
"      85.000   Flow length"
"       4.500   Overland Slope"
```

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"        3.600   Pervious Area"
"       85.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       85.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.493   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.554     0.000     0.096     0.096 c.m/sec"
"             Catchment 106          Pervious   Impervious Total Area "
"             Surface Area           3.600      0.000      3.600      hectare"
"             Time of concentration  19.311     2.452      19.311     minutes"
"             Time to Centroid       118.154    88.377     118.154    minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        3246.93    0.00       3246.94    c.m"
"             Rainfall losses        45.719     6.995      45.719     mm"
"             Runoff depth           44.474     83.198     44.474     mm"
"             Runoff volume          1601.05    0.00       1601.05    c.m"
"             Runoff coefficient     0.493      0.000      0.493      "
"             Maximum flow           0.554      0.000      0.554      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.554     0.554     0.096     0.096"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.554     0.554     0.554     0.096"
" 40          HYDROGRAPH   Combine    3"
"           6   Combine "
"           3   Node #"
"               Draining SW to rural residential"
"            Maximum flow                  0.554    c.m/sec"
"            Hydrograph volume          1601.051    c.m"
"                    0.554     0.554     0.554     0.554"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.554     0.000     0.554     0.554"
" 33          CATCHMENT 107"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         107   Clayton Subdivision draining SE to residential + Irvine Street"
"        0.000   % Impervious"
"        1.680   Total Area"
"       70.000   Flow length"
"        2.000   Overland Slope"
"        1.680   Pervious Area"
"       70.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       70.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.494   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.249     0.000     0.554     0.554 c.m/sec"
"             Catchment 107          Pervious   Impervious Total Area "
"             Surface Area           1.680      0.000      1.680      hectare"
"             Time of concentration  21.922     2.783      21.922     minutes"
"             Time to Centroid       121.380    88.891     121.380    minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        1515.24    0.00       1515.24    c.m"
"             Rainfall losses        45.675     7.267      45.675     mm"
"             Runoff depth           44.518     82.926     44.518     mm"
"             Runoff volume          747.90     0.00       747.90     c.m"
"             Runoff coefficient     0.494      0.000      0.494      "
"             Maximum flow           0.249      0.000      0.249      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.249     0.249     0.554     0.554"
" 33          CATCHMENT 108"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         108   Irvine St drawing S to Elora Meadows"
"       49.800   % Impervious"
"        0.390   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.196   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.194   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.489   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   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"
"                    0.118     0.249     0.554     0.554 c.m/sec"
"             Catchment 108          Pervious   Impervious Total Area "
"             Surface Area           0.196      0.194      0.390      hectare"
"             Time of concentration  6.820      0.866      2.974      minutes"
"             Time to Centroid       102.891    86.293     92.169     minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        176.58     175.17     351.75     c.m"
"             Rainfall losses        46.114     9.114      27.688     mm"
"             Runoff depth           44.079     81.079     62.505     mm"
"             Runoff volume          86.30      157.47     243.77     c.m"
"             Runoff coefficient     0.489      0.899      0.693      "
"             Maximum flow           0.047      0.097      0.118      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.118     0.295     0.554     0.554"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.118     0.295     0.295     0.554"
" 40          HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
```

```
"               Draining SE to residential + Irvine Street"
"             Maximum flow                  0.295    c.m/sec"
"             Hydrograph volume           991.673    c.m"
"                    0.118     0.295     0.295     0.295"
" 38          START/RE-START TOTALS 108"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     27.480    hectare"
"             Total Impervious area                     0.926    hectare"
"             Total % impervious                        3.371"
" 19          EXIT"
```

```
"             MIDUSS Output ----------------------------------------------->"
"             MIDUSS version                          Version 2.25  rev. 473"
"             MIDUSS created                        Sunday, February 7, 2010"
"          10 Units used:                                        ie METRIC"
"             Job folder:              Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                  Pre-Dev"
"             Output filename:                       Regional_Pre-Dev.out"
"             Licensee name:                                              A"
"             Company                                                     "
"             Date & Time last used:                 6/7/2023 at 3:55:08 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"     2880.000   Max. Storm length"
"     9000.000   Max. Hydrograph"
" 32          STORM Mass Curve"
"           3   Mass Curve"
"      285.000   Rainfall depth"
"     2880.000   Duration"
"          68   Q:\50250\100\SWM\MIDUSS\2023-XX-XX\Pre-Dev\Hazel entire 48 hours.mrd   Hurricane
Hazel (entire 48 h)"
"             Maximum intensity           53.012    mm/hr"
"             Total depth                285.000    mm"
"           8   99999hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         101   Clayton Subdivision N to ND1"
"       0.000   % Impervious"
"       6.670   Total Area"
"     200.000   Flow length"
"       2.500   Overland Slope"
"       6.670   Pervious Area"
"     200.000   Pervious length"
"       2.500   Pervious slope"
"       0.000   Impervious Area"
"     200.000   Impervious length"
"       2.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.775   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.942     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           6.670      0.000      6.670      hectare"
"             Time of concentration  51.600     8.349      51.600     minutes"
"             Time to Centroid       2534.313   2277.696   2534.313   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        1.9009     0.0000     1.9009     ha-m"
"             Rainfall losses        64.135     6.357      64.135     mm"
"             Runoff depth           220.865    278.643    220.865    mm"
"             Runoff volume          1.4732     0.0000     1.4732     ha-m"
"             Runoff coefficient     0.775      0.000      0.775      "
"             Maximum flow           0.942      0.000      0.942      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.942     0.942     0.000     0.000"
" 33          CATCHMENT 102"
"           1   Triangular SCS"
```

```
"           1   Equal length"
"           1   SCS method"
"         102   External ROWs N to ND1"
"      47.200   % Impervious"
"       1.460   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.771   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.689   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.771   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.970   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.209     0.942     0.000     0.000 c.m/sec"
"            Catchment 102          Pervious   Impervious Total Area "
"            Surface Area           0.771      0.689      1.460      hectare"
"            Time of concentration  9.143      1.479      5.085      minutes"
"            Time to Centroid       2472.891   2266.251   2363.468   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        2197.01    1963.99    4161.00    c.m"
"            Rainfall losses        65.351     8.442      38.490     mm"
"            Runoff depth           219.649    276.558    246.510    mm"
"            Runoff volume          1693.23    1905.81    3599.04    c.m"
"            Runoff coefficient     0.771      0.970      0.865      "
"            Maximum flow           0.110      0.100      0.209      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                   0.209     1.096     0.000     0.000"
" 33         CATCHMENT 103"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         103   Elora Sands N to ND1at SR15"
"       0.000   % Impervious"
"      13.020   Total Area"
"     250.000   Flow length"
"       3.000   Overland Slope"
"      13.020   Pervious Area"
"     250.000   Pervious length"
"       3.000   Pervious slope"
"       0.000   Impervious Area"
"     250.000   Impervious length"
"       3.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.775   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   1.805     1.096     0.000     0.000 c.m/sec"
"            Catchment 103          Pervious   Impervious Total Area "
"            Surface Area           13.020     0.000      13.020     hectare"
"            Time of concentration  55.852     9.037      55.852     minutes"
"            Time to Centroid       2540.304   2277.725   2540.303   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        3.7107     0.0000     3.7107     ha-m"
"            Rainfall losses        64.160     6.883      64.160     mm"
"            Runoff depth           220.840    278.117    220.840    mm"
"            Runoff volume          2.8753     0.0000     2.8753     ha-m"
"            Runoff coefficient     0.775      0.000      0.775      "
"            Maximum flow           1.805      0.000      1.805      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                   1.805     2.895     0.000     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"          8   Copy to Outflow"
"                   1.805     2.895     2.895     0.000"
" 40         HYDROGRAPH   Combine    1"
"          6   Combine "
"          1   Node #"
"              Draining to ND1"
"           Maximum flow                 2.895    c.m/sec"
"           Hydrograph volume         47084.105    c.m"
"                   1.805     2.895     2.895     2.895"
" 40         HYDROGRAPH Start - New Tributary"
"          2   Start - New Tributary"
"                   1.805     0.000     2.895     2.895"
" 33         CATCHMENT 104"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         104   Clayton Subdivision draining NW to Woolwich Street E"
"       0.000   % Impervious"
"       0.540   Total Area"
"      85.000   Flow length"
"       3.500   Overland Slope"
"       0.540   Pervious Area"
"      85.000   Pervious length"
"       3.500   Pervious slope"
"       0.000   Impervious Area"
"      85.000   Impervious length"
"       3.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.774   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.079     0.000     2.895     2.895 c.m/sec"
"            Catchment 104          Pervious   Impervious Total Area "
"            Surface Area           0.540      0.000      0.540      hectare"
"            Time of concentration  27.915     4.517      27.915     minutes"
"            Time to Centroid       2500.472   2271.813   2500.472   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        1539.00    0.00       1539.00    c.m"
"            Rainfall losses        64.324     7.248      64.324     mm"
"            Runoff depth           220.676    277.752    220.676    mm"
"            Runoff volume          1191.65    0.00       1191.65    c.m"
"            Runoff coefficient     0.774      0.000      0.774      "
"            Maximum flow           0.079      0.000      0.079      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
```

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"                   0.079     0.079     2.895     2.895"
" 33          CATCHMENT 105"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          105   Woolwich St E draining west to Irvine Creek"
"       35.900   % Impervious"
"        0.120   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.077   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.043   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.771   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.970   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.017     0.079     2.895     2.895 c.m/sec"
"             Catchment 105          Pervious   Impervious Total Area "
"             Surface Area           0.077      0.043      0.120      hectare"
"             Time of concentration  9.143      1.479      5.974      minutes"
"             Time to Centroid       2472.891   2266.252   2387.436   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        219.22     122.78     342.00     c.m"
"             Rainfall losses        65.351     8.442      44.921     mm"
"             Runoff depth           219.649    276.558    240.079    mm"
"             Runoff volume          168.95     119.14     288.09     c.m"
"             Runoff coefficient     0.771      0.970      0.842      "
"             Maximum flow           0.011      0.006      0.017      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                   0.017     0.096     2.895     2.895"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                   0.017     0.096     0.096     2.895"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Draining NW to Woolwich Street E"
"             Maximum flow                 0.096    c.m/sec"
"             Hydrograph volume          1479.743    c.m"
"                   0.017     0.096     0.096     0.096"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.017     0.000     0.096     0.096"
" 33          CATCHMENT 106"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          106   Clayton Subdivision draining SW to rural residential"
"        0.000   % Impervious"
"        3.600   Total Area"
"       85.000   Flow length"
"        4.500   Overland Slope"
"        3.600   Pervious Area"
"       85.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       85.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.774   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.526     0.000     0.096     0.096 c.m/sec"
"             Catchment 106          Pervious   Impervious Total Area "
"             Surface Area           3.600      0.000      3.600      hectare"
"             Time of concentration  25.888     4.189      25.888     minutes"
"             Time to Centroid       2497.674   2269.784   2497.674   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        1.0260     0.0000     1.0260     ha-m"
"             Rainfall losses        64.277     8.853      64.277     mm"
"             Runoff depth           220.723    276.147    220.723    mm"
"             Runoff volume          7946.01    0.01       7946.02    c.m"
"             Runoff coefficient     0.774      0.000      0.774      "
"             Maximum flow           0.526      0.000      0.526      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                   0.526     0.526     0.096     0.096"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                   0.526     0.526     0.526     0.096"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                Draining SW to rural residential"
"             Maximum flow                 0.526    c.m/sec"
"             Hydrograph volume          7946.018    c.m"
"                   0.526     0.526     0.526     0.526"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.526     0.000     0.526     0.526"
" 33          CATCHMENT 107"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          107   Clayton Subdivision draining SE to residential + Irvine Street"
"        0.000   % Impervious"
"        1.680   Total Area"
"       70.000   Flow length"
"        2.000   Overland Slope"
"        1.680   Pervious Area"
"       70.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       70.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.775   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
```

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"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.246     0.000     0.526     0.526 c.m/sec"
"            Catchment 107          Pervious   Impervious Total Area "
"            Surface Area           1.680      0.000      1.680      hectare"
"            Time of concentration  29.388     4.755      29.388     minutes"
"            Time to Centroid       2502.763   2272.116   2502.762   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        4788.00    0.00       4788.00    c.m"
"            Rainfall losses        64.179     6.701      64.179     mm"
"            Runoff depth           220.821    278.299    220.821    mm"
"            Runoff volume          3709.79    0.00       3709.79    c.m"
"            Runoff coefficient     0.775      0.000      0.775      "
"            Maximum flow           0.246      0.000      0.246      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.246     0.246     0.526     0.526"
" 33         CATCHMENT 108"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         108   Irvine St drawing S to Elora Meadows"
"      49.800   % Impervious"
"       0.390   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.196   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.194   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.771   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.970   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.056     0.246     0.526     0.526 c.m/sec"
"            Catchment 108          Pervious   Impervious Total Area "
"            Surface Area           0.196      0.194      0.390      hectare"
"            Time of concentration  9.143      1.479      4.887      minutes"
"            Time to Centroid       2472.892   2266.252   2358.130   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        557.97     553.53     1111.50    c.m"
"            Rainfall losses        65.351     8.442      37.011     mm"
"            Runoff depth           219.649    276.558    247.989    mm"
"            Runoff volume          430.03     537.13     967.16     c.m"
"            Runoff coefficient     0.771      0.970      0.870      "
"            Maximum flow           0.028      0.028      0.056      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.056     0.301     0.526     0.526"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.056     0.301     0.301     0.526"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining SE to residential + Irvine Street"
"            Maximum flow                 0.301    c.m/sec"
"            Hydrograph volume          4676.951    c.m"
"                   0.056     0.301     0.301     0.301"
" 38         START/RE-START TOTALS 108"
"           3   Runoff Totals on EXIT"
"            Total Catchment area                    27.480    hectare"
"            Total Impervious area                    0.926    hectare"
"            Total % impervious                       3.371"
" 19         EXIT"
```

Appendix C

Post-Development Catchment Parameters and MIDUSS Modelling

CLAYTON SUBDIVISION
STORMWATER MANAGEMENT
Centre Wellington, Ontario

Project Number: 50250-100
Date: 6/12/2023
Design By: MXF
File: Q:\50250\100\SAN\50250-100 Sanitary Sewer Design Sheet.xlsx

HYDROLOGIC PARAMETERS
Post-Development Conditions

Sub-Catchment Number	Area	Overland Slope	Overland Length	SCS Curve Number			Percent Impervious	Land Use	Comment
				Pervious (AMC II)	Pervious (AMC III)	Impervious			
	(ha)	*(%)*	*(m)*				*(%)*		
Draining to ND1									
to SWMF									
201	2.75	33.0	6	67	82	98	100.0	Residential	Roof Areas
202	8.06	0.5	90	67	82	98	55.0	Residential	Clayrton - Main site area
203	0.44	5.5	25	67	82	98	31.7	Residential	RYs draining to Woolwich/Irvine
204	0.97	2.0	10	67	82	98	65.0	Road	Ext. Roads (urbanized)
205	9.60	3.0	250	60	78	98	0.0	Agriculture	Ext - Elora Sands
206	1.34	25.0	20	67	82	98	40.0	SWMF	Open Water
*209**	*0.07*	*3.5*	*15*	*67*	*82*	*98*	65.0	*Road*	**Drains offsite > 5yr*
*210**	*0.20*	5.5	25	67	82	98	16.4	Residential	**Drains offsite > 5yr*
*211**	*0.23*	2.0	10	67	82	98	65.0	*Road*	**Drains offsite > 5yr*
*212**	*0.05*	4.0	12	67	82	98	19.1	*Residential*	**Drains offsite > 5yr*
*213**	*0.19*	2.0	10	67	82	99	65.0	*Road*	**Drains offsite > 5yr*
Bypassing SWMF									
207	2.08	4.5	100	60	78	98	0.0	Agriculture	Elora Sands (bypass SWMF)
208	0.56	2.0	10	60	78	98	49.7	Road	Ext. Roads (bypass SWMF)
Total to SWMF	**23.92**						**37.0**		
Total to ND1	**26.55**						**34.4**		
Total urban (for MOE)	**14.32**						**61.8**		
Draining offsite									
214	0.10	5.0	60	67	82	98	0.0	Residential-RY	Drains offsite
215	0.50	4.5	15	67	82	98	0.0	Residential-RY	Drains offsite
216	0.24	33.0	4	67	82	98	7.8	Residential-RY	Drains offsite
217	0.07	4.0	12	67	82	98	11.4	Residential-RY	Drains offsite
218	0.20	2.0	10	67	82	98	65.0	Residential-RY	Drains offsite
Total	**1.11**						**13.9**		

```
"               MIDUSS Output ----------------------------------------------->"
"               MIDUSS version                          Version 2.25  rev. 473"
"               MIDUSS created                        Sunday, February 7, 2010"
"          10   Units used:                                        ie METRIC"
"               Job folder:                Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                    Post-Dev"
"               Output filename:                          25mm4hr_Post-Dev.out"
"               Licensee name:                                              A"
"               Company                                                     "
"               Date & Time last used:                 6/13/2023 at 6:48:26 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     240.000   Max. Storm length"
"    3000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"     501.000   Coefficient A"
"       6.000   Constant B"
"       0.796   Exponent C"
"       0.400   Fraction R"
"     240.000   Duration"
"       1.000   Time step multiplier"
"             Maximum intensity           71.355    mm/hr"
"             Total depth                 25.045    mm"
"           6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Clayton Subdivision roof areas to lot-level infiltration galleries"
"     100.000   % Impervious"
"       2.750   Total Area"
"       6.000   Flow length"
"      33.000   Overland Slope"
"       0.000   Pervious Area"
"       6.000   Pervious length"
"      33.000   Pervious slope"
"       2.750   Impervious Area"
"       6.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.728   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.415     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      2.750      2.750      hectare"
"             Time of concentration  4.993      0.436      0.436      minutes"
"             Time to Centroid       141.423    118.964    118.964    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        0.00       688.72     688.73     c.m"
"             Rainfall losses        20.034     6.811      6.811      mm"
"             Runoff depth           5.011      18.233     18.233     mm"
"             Runoff volume          0.00       501.41     501.41     c.m"
"             Runoff coefficient     0.000      0.728      0.728      "
"             Maximum flow           0.000      0.415      0.415      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.415     0.415     0.000     0.000"
" 57          TRENCH Design d/s of 201"
"       0.415   Peak inflow"
"     501.410   Hydrograph volume"
"       2.500   Ground elevation"
"       1.000   Downstream trench invert"
"       1.000   Trench height"
"       0.000   Water table elevation"
"       1.000   Trench top width"
"       1.000   Trench bottom width"
"      40.000   Voids ratio (%)"
"     100.000   Hydraulic conductivity"
"       0.000   Trench gradient (%)"
"     600.000   Trench length"
"       1.000   Include base width"
"         16.   Number of stages"
"                 Level Discharge    Volume"
"                 1.000     0.000      0.0"
"                 1.100     0.000     24.0"
"                 1.200     0.000     48.0"
"                 1.300     0.000     72.0"
"                 1.400     0.000     96.0"
"                 1.500     0.000    120.0"
"                 1.600     0.000    144.0"
"                 1.700     0.000    168.0"
"                 1.800     0.000    192.0"
"                 1.900     0.000    216.0"
"                 2.000     0.000    240.0"
"                 2.100     0.975    240.1"
"                 2.200     3.905    240.2"
"                 2.300     8.694    240.3"
"                 2.400    15.452    240.5"
"                 2.500    23.923    240.6"
"          1.   TRENCH PIPES"
"            Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                Invert    length     diam.    grade%     0=Yes  distance"
"                 2.000    20.000     0.000     0.000     1.000     0.000"
"          1.   MANHOLE"
"               Access"
"              diameter"
"                 1.200"
"          1.   OUTFLOW PIPE"
"          0.   Inflow at upstream end of trench: 1=True; 0=False"
"              Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                invert    invert    Length  Diameter       'n'   loss Ke"
"                 2.000     2.000    20.000 10000.000     0.013     0.500"
"               Peak outflow                  0.000    c.m/sec"
"               Outflow volume                0.001    c.m"
"               Peak exfiltration             0.071    c.m/sec"
"               Exfiltration volume         501.305    c.m"
"               Maximum level                 1.951    metre"
"               Maximum storage             228.337    c.m"
"               Centroidal lag                2.948    hours"
"               Infiltration area 2 sides   1141.686   sq.metre"
"               Infiltration Base area       600.000   sq.metre"
"                    0.415     0.415     0.000     0.071 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Clayton Main Area"
"               Maximum flow                  0.000    c.m/sec"
"               Hydrograph volume             0.001    c.m"
"                       0.415     0.415     0.000     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.415     0.000     0.000     0.000"
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" 33          CATCHMENT 209"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          209   Marr Drive transition grading to Bricker Ave."
"       65.000   % Impervious"
"        0.070   Total Area"
"       15.000   Flow length"
"        3.500   Overland Slope"
"        0.025   Pervious Area"
"       15.000   Pervious length"
"        3.500   Pervious slope"
"        0.045   Impervious Area"
"       15.000   Impervious length"
"        3.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.201   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.796   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.007     0.000     0.000     0.000 c.m/sec"
"             Catchment 209          Pervious   Impervious Total Area "
"             Surface Area           0.025      0.045      0.070      hectare"
"             Time of concentration  16.961     1.482      3.335      minutes"
"             Time to Centroid       158.021    119.434    124.054    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        6.14       11.40      17.53      c.m"
"             Rainfall losses        20.011     5.119      10.331     mm"
"             Runoff depth           5.034      19.926     14.713     mm"
"             Runoff volume          1.23       9.07       10.30      c.m"
"             Runoff coefficient     0.201      0.796      0.587      "
"             Maximum flow           0.000      0.007      0.007      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.007     0.007     0.000     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          202   Clayton Subdivision areas draining to SWMF (bypassing infiltration galleries)"
"       55.000   % Impervious"
"        8.060   Total Area"
"       90.000   Flow length"
"        0.500   Overland Slope"
"        3.627   Pervious Area"
"       90.000   Pervious length"
"        0.500   Pervious slope"
"        4.433   Impervious Area"
"       90.000   Impervious length"
"        0.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.201   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.806   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.602     0.007     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           3.627      4.433      8.060      hectare"
"             Time of concentration  89.100     7.784      21.567     minutes"
"             Time to Centroid       258.288    129.642    151.449    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        908.37     1110.23    2018.59    c.m"
"             Rainfall losses        20.006     4.847      11.669     mm"
"             Runoff depth           5.039      20.198     13.376     mm"
"             Runoff volume          182.75     895.36     1078.11    c.m"
"             Runoff coefficient     0.201      0.806      0.534      "
"             Maximum flow           0.016      0.600      0.602      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.602     0.606     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.602     0.606     0.606     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"             Maximum flow                  0.606    c.m/sec"
"             Hydrograph volume          1088.407    c.m"
"                    0.602     0.606     0.606     0.606"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.602     0.000     0.606     0.606"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Clayton Subdivision RY draining to SWMF via Woolwich St & Irvine St"
"       31.700   % Impervious"
"        0.440   Total Area"
"       25.000   Flow length"
"        5.500   Overland Slope"
"        0.301   Pervious Area"
"       25.000   Pervious length"
"        5.500   Pervious slope"
"        0.139   Impervious Area"
"       25.000   Impervious length"
"        5.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.201   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.797   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.021     0.000     0.606     0.606 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.301      0.139      0.440      hectare"
"             Time of concentration  20.122     1.758      8.224      minutes"
"             Time to Centroid       162.419    119.931    134.890    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        75.26      34.93      110.20     c.m"
"             Rainfall losses        20.010     5.082      15.278     mm"
"             Runoff depth           5.035      19.962     9.767      mm"
"             Runoff volume          15.13      27.84      42.97      c.m"
"             Runoff coefficient     0.201      0.797      0.390      "
"             Maximum flow           0.004      0.021      0.021      c.m/sec"
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" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.021     0.021     0.606     0.606"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.021     0.021     0.021     0.606"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"            Maximum flow                  0.622    c.m/sec"
"            Hydrograph volume          1131.381    c.m"
"                    0.021     0.021     0.021     0.622"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
"                Clayton Main Area"
"            Maximum flow                  0.622    c.m/sec"
"            Hydrograph volume          1131.381    c.m"
"                    0.021     0.622     0.021     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.021     0.622     0.622     0.000"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Draining to SWMF"
"            Maximum flow                  0.622    c.m/sec"
"            Hydrograph volume          1131.381    c.m"
"                    0.021     0.622     0.622     0.622"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.021     0.000     0.622     0.622"
" 33          CATCHMENT 210"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          210   Clayton RYs draining to Woolwich St"
"       16.400   % Impervious"
"        0.200   Total Area"
"       25.000   Flow length"
"        5.500   Overland Slope"
"        0.167   Pervious Area"
"       25.000   Pervious length"
"        5.500   Pervious slope"
"        0.033   Impervious Area"
"       25.000   Impervious length"
"        5.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.201   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.797   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.005     0.000     0.622     0.622 c.m/sec"
"             Catchment 210          Pervious   Impervious Total Area "
"             Surface Area           0.167      0.033      0.200      hectare"
"             Time of concentration  20.122     1.758      12.088     minutes"
"             Time to Centroid       162.419    119.931    143.830    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        41.87      8.21       50.09      c.m"
"             Rainfall losses        20.010     5.082      17.562     mm"
"             Runoff depth           5.035      19.962     7.483      mm"
"             Runoff volume          8.42       6.55       14.97      c.m"
"             Runoff coefficient     0.201      0.797      0.299      "
"             Maximum flow           0.002      0.005      0.005      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.005     0.005     0.622     0.622"
" 33          CATCHMENT 211"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          211   Woolwich St transition grading (up to 5yr flow)"
"       65.000   % Impervious"
"        0.230   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.081   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.149   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.201   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.794   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.023     0.005     0.622     0.622 c.m/sec"
"             Catchment 211          Pervious   Impervious Total Area "
"             Surface Area           0.081      0.149      0.230      hectare"
"             Time of concentration  15.729     1.374      3.093      minutes"
"             Time to Centroid       156.349    119.358    123.788    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        20.16      37.44      57.60      c.m"
"             Rainfall losses        20.018     5.154      10.356     mm"
"             Runoff depth           5.026      19.891     14.688     mm"
"             Runoff volume          4.05       29.74      33.78      c.m"
"             Runoff coefficient     0.201      0.794      0.586      "
"             Maximum flow           0.001      0.023      0.023      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.023     0.028     0.622     0.622"
" 33          CATCHMENT 212"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          212   Clayton laneway towns to Irvine Street (up to 5yr flow)"
"       19.100   % Impervious"
"        0.050   Total Area"
"       12.000   Flow length"
"        4.000   Overland Slope"
"        0.040   Pervious Area"
"       12.000   Pervious length"
"        4.000   Pervious slope"
"        0.010   Impervious Area"
"       12.000   Impervious length"
"        4.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
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"       0.201   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.792   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.002     0.028     0.622     0.622 c.m/sec"
"            Catchment 212          Pervious   Impervious Total Area "
"            Surface Area           0.040      0.010      0.050      hectare"
"            Time of concentration  14.253     1.245      7.986      minutes"
"            Time to Centroid       154.249    119.195    137.361    minutes"
"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        10.13      2.39       12.52      c.m"
"            Rainfall losses        20.009     5.217      17.184     mm"
"            Runoff depth           5.035      19.828     7.861      mm"
"            Runoff volume          2.04       1.89       3.93       c.m"
"            Runoff coefficient     0.201      0.792      0.314      "
"            Maximum flow           0.001      0.001      0.002      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                   0.002     0.030     0.622     0.622"
" 33         CATCHMENT 213"
"          1   Triangular SCS"
"          1   Equal length"
"          1   SCS method"
"        213   Irvine St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.190   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.067   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.123   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.201   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.794   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.019     0.030     0.622     0.622 c.m/sec"
"            Catchment 213          Pervious   Impervious Total Area "
"            Surface Area           0.067      0.123      0.190      hectare"
"            Time of concentration  15.729     1.374      3.093      minutes"
"            Time to Centroid       156.349    119.358    123.789    minutes"
"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        16.65      30.93      47.58      c.m"
"            Rainfall losses        20.018     5.154      10.356     mm"
"            Runoff depth           5.026      19.891     14.688     mm"
"            Runoff volume          3.34       24.57      27.91      c.m"
"            Runoff coefficient     0.201      0.794      0.586      "
"            Maximum flow           0.001      0.019      0.019      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                   0.019     0.049     0.622     0.622"
" 33         CATCHMENT 204"
"          1   Triangular SCS"
"          1   Equal length"
"          1   SCS method"
"        204   Woolwich St & Irvine Street draining to SWMF"
"      65.000   % Impervious"
"       0.970   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.340   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.631   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.201   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.794   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.097     0.049     0.622     0.622 c.m/sec"
"            Catchment 204          Pervious   Impervious Total Area "
"            Surface Area           0.340      0.631      0.970      hectare"
"            Time of concentration  15.729     1.374      3.093      minutes"
"            Time to Centroid       156.349    119.358    123.788    minutes"
"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        85.03      157.91     242.93     c.m"
"            Rainfall losses        20.018     5.154      10.356     mm"
"            Runoff depth           5.026      19.891     14.688     mm"
"            Runoff volume          17.06      125.41     142.48     c.m"
"            Runoff coefficient     0.201      0.794      0.586      "
"            Maximum flow           0.005      0.096      0.097      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                   0.097     0.146     0.622     0.622"
" 40         HYDROGRAPH Copy to Outflow"
"          8   Copy to Outflow"
"                   0.097     0.146     0.146     0.622"
" 40         HYDROGRAPH   Combine    2"
"          6   Combine "
"          2   Node #"
"              Draining to SWMF"
"              Maximum flow                 0.714    c.m/sec"
"              Hydrograph volume         1354.446    c.m"
"                   0.097     0.146     0.146     0.714"
" 40         HYDROGRAPH   Confluence    2"
"          7   Confluence "
"          2   Node #"
"              Draining to SWMF"
"              Maximum flow                 0.714    c.m/sec"
"              Hydrograph volume         1354.446    c.m"
"                   0.097     0.714     0.146     0.000"
" 33         CATCHMENT 205"
"          1   Triangular SCS"
"          1   Equal length"
"          1   SCS method"
"        205   Elora Sands existing drainage to SWMF"
"       0.000   % Impervious"
"       9.600   Total Area"
"     250.000   Flow length"
"       3.000   Overland Slope"
"       9.600   Pervious Area"
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"      250.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      250.000   Impervious length"
"        3.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.143   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.024     0.714     0.146     0.000 c.m/sec"
"             Catchment 205          Pervious   Impervious Total Area "
"             Surface Area           9.600      0.000      9.600      hectare"
"             Time of concentration  117.555    8.394      117.555    minutes"
"             Time to Centroid       293.076    130.508    293.076    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        2404.28    0.00       2404.28    c.m"
"             Rainfall losses        21.473     4.820      21.473     mm"
"             Runoff depth           3.571      20.225     3.571      mm"
"             Runoff volume          342.84     0.00       342.84     c.m"
"             Runoff coefficient     0.143      0.000      0.143      "
"             Maximum flow           0.024      0.000      0.024      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.024     0.715     0.146     0.000"
" 33          CATCHMENT 206"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          206   SWMF + Overland Flow Channel"
"       40.000   % Impervious"
"        1.340   Total Area"
"       20.000   Flow length"
"       25.000   Overland Slope"
"        0.804   Pervious Area"
"       20.000   Pervious length"
"       25.000   Pervious slope"
"        0.536   Impervious Area"
"       20.000   Impervious length"
"       25.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.201   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.780   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.086     0.715     0.146     0.000 c.m/sec"
"             Catchment 206          Pervious   Impervious Total Area "
"             Surface Area           0.804      0.536      1.340      hectare"
"             Time of concentration  11.175     0.976      3.817      minutes"
"             Time to Centroid       149.979    118.667    127.389    minutes"
"             Rainfall depth         25.045     25.045     25.045     mm"
"             Rainfall volume        201.36     134.24     335.60     c.m"
"             Rainfall losses        20.014     5.501      14.209     mm"
"             Runoff depth           5.030      19.544     10.836     mm"
"             Runoff volume          40.44      104.76     145.20     c.m"
"             Runoff coefficient     0.201      0.780      0.433      "
"             Maximum flow           0.015      0.083      0.086      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.086     0.769     0.146     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.086     0.769     0.769     0.000"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                Draining to SWMF"
"             Maximum flow                  0.769    c.m/sec"
"             Hydrograph volume          1842.489    c.m"
"                    0.086     0.769     0.769     0.769"
" 40          HYDROGRAPH   Confluence    3"
"            7   Confluence "
"            3   Node #"
"                Draining to SWMF"
"             Maximum flow                  0.769    c.m/sec"
"             Hydrograph volume          1842.489    c.m"
"                    0.086     0.769     0.769     0.000"
" 54          POND DESIGN"
"        0.769   Current peak flow    c.m/sec"
"        0.385   Target outflow    c.m/sec"
"       1842.5   Hydrograph volume    c.m"
"         22.   Number of stages"
"      403.600   Minimum water level    metre"
"      405.700   Maximum water level    metre"
"      403.600   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                403.600     0.000     0.000"
"                403.700   0.00300   512.000"
"                403.800   0.00600  1044.000"
"                403.900   0.00700  1597.000"
"                404.000   0.02800  2171.000"
"                404.100    0.1120  2767.000"
"                404.200    0.2320  3382.000"
"                404.300    0.3950  4013.000"
"                404.400    0.6330  4657.000"
"                404.500    0.9240  5314.000"
"                404.600     1.265  5983.000"
"                404.700     1.648  6666.000"
"                404.800     2.067  7361.000"
"                404.900     2.519  8070.000"
"                405.000     3.002  8792.000"
"                405.100     3.785  9528.000"
"                405.200     4.924  10280.00"
"                405.300     6.413  11047.00"
"                405.400     8.269  11831.00"
"                405.500    10.517  12632.00"
"                405.600    13.180  13449.00"
"                405.700    16.279  14283.00"
"             Peak outflow                  0.009    c.m/sec"
"             Maximum level               403.908    metre"
"             Maximum storage            1643.669    c.m"
"             Centroidal lag               47.857   hours"
"                  0.086     0.769     0.009     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.086     0.009     0.009     0.000"
" 54          POND DESIGN"
"        0.009   Current peak flow    c.m/sec"
"        0.385   Target outflow    c.m/sec"
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"       1084.5   Hydrograph volume    c.m"
"          25.   Number of stages"
"       403.300   Minimum water level    metre"
"       405.700   Maximum water level    metre"
"       403.300   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 403.300   0.00630     0.000"
"                 403.400   0.00630     6.000"
"                 403.500   0.00630    18.000"
"                 403.600   0.00630    29.000"
"                 403.700   0.00630    37.000"
"                 403.800   0.00630    44.000"
"                 403.900   0.00630    47.000"
"                 404.000   0.02610    47.000"
"                 404.100    0.1092    47.000"
"                 404.200    0.2278    47.000"
"                 404.300    0.3897    47.000"
"                 404.400    0.6269    47.000"
"                 404.500    0.9169    47.000"
"                 404.600     1.258    47.000"
"                 404.700     1.640    47.000"
"                 404.800     2.058    47.000"
"                 404.900     2.510    47.000"
"                 405.000     2.992    47.000"
"                 405.100     3.774    47.000"
"                 405.200     4.913    47.000"
"                 405.300     6.401    47.000"
"                 405.400     8.257    47.000"
"                 405.500    10.505    47.000"
"                 405.600    13.167    47.000"
"                 405.700    16.265    47.000"
"              Peak outflow                 0.007    c.m/sec"
"              Maximum level              403.900    metre"
"              Maximum storage             47.000    c.m"
"              Centroidal lag              25.942   hours"
"                   0.086     0.009     0.007     0.000 c.m/sec"
" 40           HYDROGRAPH   Combine    4"
"              6   Combine "
"              4   Node #"
"                  Draining to ND1"
"              Maximum flow                 0.007    c.m/sec"
"              Hydrograph volume          1066.177    c.m"
"                     0.086     0.009     0.007     0.007"
" 40           HYDROGRAPH Start - New Tributary"
"              2   Start - New Tributary"
"                     0.086     0.000     0.007     0.007"
" 33           CATCHMENT 207"
"              1   Triangular SCS"
"              1   Equal length"
"              1   SCS method"
"            207   Elora Sands draining to ND1 bypassing SWMF"
"          0.000   % Impervious"
"          2.080   Total Area"
"        100.000   Flow length"
"          4.500   Overland Slope"
"          2.080   Pervious Area"
"        100.000   Pervious length"
"          4.500   Pervious slope"
"          0.000   Impervious Area"
"        100.000   Impervious length"
"          4.500   Impervious slope"
"          0.300   Pervious Manning 'n'"
"         78.000   Pervious SCS Curve No."
"          0.143   Pervious Runoff coefficient"
"          0.100   Pervious Ia/S coefficient"
"          7.164   Pervious Initial abstraction"
"          0.015   Impervious Manning 'n'"
"         98.000   Impervious SCS Curve No."
"          0.000   Impervious Runoff coefficient"
"          0.100   Impervious Ia/S coefficient"
"          0.518   Impervious Initial abstraction"
"                     0.009     0.000     0.007     0.007 c.m/sec"
"                  Catchment 207          Pervious   Impervious Total Area "
"                  Surface Area           2.080      0.000      2.080      hectare"
"                  Time of concentration  60.069     4.289      60.069     minutes"
"                  Time to Centroid       217.248    124.109    217.247    minutes"
"                  Rainfall depth         25.045     25.045     25.045     mm"
"                  Rainfall volume        520.93     0.00       520.93     c.m"
"                  Rainfall losses        21.474     4.997      21.474     mm"
"                  Runoff depth           3.570      20.048     3.570      mm"
"                  Runoff volume          74.26      0.00       74.26      c.m"
"                  Runoff coefficient     0.143      0.000      0.143      "
"                  Maximum flow           0.009      0.000      0.009      c.m/sec"
" 40               HYDROGRAPH Add Runoff "
"                4   Add Runoff "
"                       0.009     0.009     0.007     0.007"
" 40               HYDROGRAPH Copy to Outflow"
"                8   Copy to Outflow"
"                       0.009     0.009     0.009     0.007"
" 40               HYDROGRAPH   Combine    4"
"                6   Combine "
"                4   Node #"
"                    Draining to ND1"
"                  Maximum flow                  0.014    c.m/sec"
"                  Hydrograph volume          1140.442    c.m"
"                         0.009     0.009     0.009     0.014"
" 40               HYDROGRAPH Start - New Tributary"
"                2   Start - New Tributary"
"                       0.009     0.000     0.009     0.014"
" 33               CATCHMENT 208"
"                1   Triangular SCS"
"                1   Equal length"
"                1   SCS method"
"              208   External ROWs draining to ND1 bypassing SWMF"
"           49.700   % Impervious"
"            0.560   Total Area"
"           10.000   Flow length"
"            2.000   Overland Slope"
"            0.282   Pervious Area"
"           10.000   Pervious length"
"            2.000   Pervious slope"
"            0.278   Impervious Area"
"           10.000   Impervious length"
"            2.000   Impervious slope"
"            0.300   Pervious Manning 'n'"
"           78.000   Pervious SCS Curve No."
"            0.142   Pervious Runoff coefficient"
"            0.100   Pervious Ia/S coefficient"
"            7.164   Pervious Initial abstraction"
"            0.015   Impervious Manning 'n'"
"           98.000   Impervious SCS Curve No."
"            0.794   Impervious Runoff coefficient"
"            0.100   Impervious Ia/S coefficient"
"            0.518   Impervious Initial abstraction"
"                     0.043     0.000     0.009     0.014 c.m/sec"
"                  Catchment 208          Pervious   Impervious Total Area "
"                  Surface Area           0.282      0.278      0.560      hectare"
"                  Time of concentration  19.244     1.374      4.116      minutes"
"                  Time to Centroid       163.433    119.358    126.121    minutes"
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"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        70.55      69.70      140.25     c.m"
"            Rainfall losses        21.482     5.154      13.367     mm"
"            Runoff depth           3.562      19.891     11.678     mm"
"            Runoff volume          10.03      55.36      65.40      c.m"
"            Runoff coefficient     0.142      0.794      0.466      "
"            Maximum flow           0.003      0.042      0.043      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.043     0.043     0.009     0.014"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.043     0.043     0.043     0.014"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                 0.043    c.m/sec"
"            Hydrograph volume          1205.837    c.m"
"                   0.043     0.043     0.043     0.043"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.043     0.000     0.043     0.043"
" 33         CATCHMENT 214"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         214   Clayton Subdivision RYs draining NW offsite to Woolwich Street E"
"       0.000   % Impervious"
"       0.100   Total Area"
"      60.000   Flow length"
"       5.000   Overland Slope"
"       0.100   Pervious Area"
"      60.000   Pervious length"
"       5.000   Pervious slope"
"       0.000   Impervious Area"
"      60.000   Impervious length"
"       5.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.201   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.001     0.000     0.043     0.043 c.m/sec"
"            Catchment 214          Pervious   Impervious Total Area "
"            Surface Area           0.100      0.000      0.100      hectare"
"            Time of concentration  35.012     3.059      35.012     minutes"
"            Time to Centroid       183.112    122.171    183.111    minutes"
"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        25.04      0.00       25.04      c.m"
"            Rainfall losses        20.009     5.112      20.009     mm"
"            Runoff depth           5.036      19.933     5.036      mm"
"            Runoff volume          5.04       0.00       5.04       c.m"
"            Runoff coefficient     0.201      0.000      0.201      "
"            Maximum flow           0.001      0.000      0.001      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.001     0.001     0.043     0.043"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.001     0.001     0.001     0.043"
" 40         HYDROGRAPH   Combine    5"
"           6   Combine "
"           5   Node #"
"               Draining NW to Woolwich St E"
"            Maximum flow                 0.001    c.m/sec"
"            Hydrograph volume            5.036    c.m"
"                   0.001     0.001     0.001     0.001"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.001     0.000     0.001     0.001"
" 33         CATCHMENT 215"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         215   Clayton Subdivision RYs draining offsite SW to rural residental"
"       0.000   % Impervious"
"       0.500   Total Area"
"      15.000   Flow length"
"       4.500   Overland Slope"
"       0.500   Pervious Area"
"      15.000   Pervious length"
"       4.500   Pervious slope"
"       0.000   Impervious Area"
"      15.000   Impervious length"
"       4.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.201   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.008     0.000     0.001     0.001 c.m/sec"
"            Catchment 215          Pervious   Impervious Total Area "
"            Surface Area           0.500      0.000      0.500      hectare"
"            Time of concentration  15.729     1.374      15.729     minutes"
"            Time to Centroid       156.349    119.358    156.349    minutes"
"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        125.22     0.00       125.22     c.m"
"            Rainfall losses        20.018     5.154      20.018     mm"
"            Runoff depth           5.026      19.891     5.026      mm"
"            Runoff volume          25.13      0.00       25.13      c.m"
"            Runoff coefficient     0.201      0.000      0.201      "
"            Maximum flow           0.008      0.000      0.008      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.008     0.008     0.001     0.001"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.008     0.008     0.008     0.001"
" 40         HYDROGRAPH   Combine    6"
"           6   Combine "
"           6   Node #"
"               Draining SW to rural residential"
"            Maximum flow                 0.008    c.m/sec"
"            Hydrograph volume           25.132    c.m"
"                   0.008     0.008     0.008     0.008"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.008     0.000     0.008     0.008"
" 33         CATCHMENT 216"
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"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         216   Clayton Subd. RYs draining SE offsite to Elora Meadows"
"       7.800   % Impervious"
"       0.240   Total Area"
"       4.000   Flow length"
"      33.000   Overland Slope"
"       0.221   Pervious Area"
"       4.000   Pervious length"
"      33.000   Pervious slope"
"       0.019   Impervious Area"
"       4.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.198   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.714   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.007     0.000     0.008     0.008 c.m/sec"
"            Catchment 216          Pervious   Impervious Total Area "
"            Surface Area           0.221      0.019      0.240      hectare"
"            Time of concentration  3.915      0.342      3.081      minutes"
"            Time to Centroid       140.109    118.570    135.081    minutes"
"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        55.42      4.69       60.11      c.m"
"            Rainfall losses        20.078     7.165      19.070     mm"
"            Runoff depth           4.967      17.880     5.974      mm"
"            Runoff volume          10.99      3.35       14.34      c.m"
"            Runoff coefficient     0.198      0.714      0.239      "
"            Maximum flow           0.006      0.003      0.007      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.007     0.007     0.008     0.008"
" 33         CATCHMENT 217"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         217   Clayton Subd. draining SE offsite to Elora Meadows (via Irvine St.)"
"      11.400   % Impervious"
"       0.070   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.062   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.008   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.201   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.792   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.001     0.007     0.008     0.008 c.m/sec"
"            Catchment 217          Pervious   Impervious Total Area "
"            Surface Area           0.062      0.008      0.070      hectare"
"            Time of concentration  14.253     1.245      9.879      minutes"
"            Time to Centroid       154.249    119.195    142.461    minutes"
"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        15.53      2.00       17.53      c.m"
"            Rainfall losses        20.009     5.217      18.323     mm"
"            Runoff depth           5.035      19.828     6.722      mm"
"            Runoff volume          3.12       1.58       4.71       c.m"
"            Runoff coefficient     0.201      0.792      0.268      "
"            Maximum flow           0.001      0.001      0.001      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.001     0.008     0.008     0.008"
" 33         CATCHMENT 218"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         218   Irvine St drawing S to Elora Meadows"
"      65.000   % Impervious"
"       0.200   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.070   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.130   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.201   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.794   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.020     0.008     0.008     0.008 c.m/sec"
"            Catchment 218          Pervious   Impervious Total Area "
"            Surface Area           0.070      0.130      0.200      hectare"
"            Time of concentration  15.729     1.374      3.093      minutes"
"            Time to Centroid       156.349    119.358    123.789    minutes"
"            Rainfall depth         25.045     25.045     25.045     mm"
"            Rainfall volume        17.53      32.56      50.09      c.m"
"            Rainfall losses        20.018     5.154      10.356     mm"
"            Runoff depth           5.026      19.891     14.688     mm"
"            Runoff volume          3.52       25.86      29.38      c.m"
"            Runoff coefficient     0.201      0.794      0.586      "
"            Maximum flow           0.001      0.020      0.020      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.020     0.028     0.008     0.008"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.020     0.028     0.028     0.008"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.028    c.m/sec"
"            Hydrograph volume            48.420    c.m"
"                   0.020     0.028     0.028     0.028"
" 38         START/RE-START TOTALS 218"
```

```
"           3   Runoff Totals on EXIT"
"            Total Catchment area                    27.650    hectare"
"            Total Impervious area                    9.285    hectare"
"            Total % impervious                      33.580"
" 19         EXIT"
```

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"               MIDUSS Output ----------------------------------------------->"
"               MIDUSS version                          Version 2.25  rev. 473"
"               MIDUSS created                  Sunday, February 7, 2010"
"          10   Units used:                                    ie METRIC"
"               Job folder:              Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                               Post-Dev"
"               Output filename:                        2yr_Post-Dev.out"
"               Licensee name:                                         A"
"               Company                                                "
"               Date & Time last used:          6/13/2023 at 6:59:45 PM"
" 31         TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     3000.000   Max. Hydrograph"
" 32         STORM Chicago storm"
"           1   Chicago storm"
"      721.000   Coefficient A"
"        6.000   Constant B"
"        0.796   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          106.902    mm/hr"
"             Total depth                 33.769    mm"
"           6   002hyd   Hydrograph extension used in this file"
" 33         CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Clayton Subdivision roof areas to lot-level infiltration galleries"
"      100.000   % Impervious"
"        2.750   Total Area"
"        6.000   Flow length"
"       33.000   Overland Slope"
"        0.000   Pervious Area"
"        6.000   Pervious length"
"       33.000   Pervious slope"
"        2.750   Impervious Area"
"        6.000   Impervious length"
"       33.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.752   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.642     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      2.750      2.750      hectare"
"             Time of concentration  3.720      0.366      0.366      minutes"
"             Time to Centroid       105.059    89.052     89.052     minutes"
"             Rainfall depth         33.769     33.769     33.769     mm"
"             Rainfall volume        0.00       928.66     928.66     c.m"
"             Rainfall losses        24.490     8.381      8.381      mm"
"             Runoff depth           9.279      25.388     25.388     mm"
"             Runoff volume          0.00       698.17     698.17     c.m"
"             Runoff coefficient     0.000      0.752      0.752      "
"             Maximum flow           0.000      0.642      0.642      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.642     0.642     0.000     0.000"
```

```
" 57          TRENCH Design d/s of 201"
"        0.642   Peak inflow"
"      698.170   Hydrograph volume"
"        2.500   Ground elevation"
"        1.000   Downstream trench invert"
"        1.000   Trench height"
"        0.000   Water table elevation"
"        1.000   Trench top width"
"        1.000   Trench bottom width"
"       40.000   Voids ratio (%)"
"      100.000   Hydraulic conductivity"
"        0.000   Trench gradient (%)"
"      600.000   Trench length"
"        1.000   Include base width"
"          16.   Number of stages"
"                  Level Discharge    Volume"
"                  1.000     0.000       0.0"
"                  1.100     0.000      24.0"
"                  1.200     0.000      48.0"
"                  1.300     0.000      72.0"
"                  1.400     0.000      96.0"
"                  1.500     0.000     120.0"
"                  1.600     0.000     144.0"
"                  1.700     0.000     168.0"
"                  1.800     0.000     192.0"
"                  1.900     0.000     216.0"
"                  2.000     0.000     240.0"
"                  2.100     0.975     240.1"
"                  2.200     3.905     240.2"
"                  2.300     8.694     240.3"
"                  2.400    15.452     240.5"
"                  2.500    23.923     240.6"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"                  2.000    20.000     0.000     0.000     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"              diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"              Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                invert    invert    Length  Diameter       'n'   loss Ke"
"                 2.000     2.000    20.000 10000.000     0.013     0.500"
"               Peak outflow                 0.196    c.m/sec"
"               Outflow volume              90.858    c.m"
"               Peak exfiltration            0.077    c.m/sec"
"               Exfiltration volume        565.561    c.m"
"               Maximum level                2.061    metre"
"               Maximum storage            240.069    c.m"
"               Centroidal lag               1.375   hours"
"               Infiltration area 2 sides   1200.000   sq.metre"
"               Infiltration Base area       600.000   sq.metre"
"                    0.642     0.642     0.196     0.077 c.m/sec"
" 40           HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"               Maximum flow                 0.196    c.m/sec"
"               Hydrograph volume           90.858    c.m"
"                       0.642     0.642     0.196     0.196"
" 40           HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                       0.642     0.000     0.196     0.196"

" 33           CATCHMENT 209"
"              1   Triangular SCS"
"              1   Equal length"
"              1   SCS method"
"            209   Marr Drive transition grading to Bricker Ave."
"         65.000   % Impervious"
"          0.070   Total Area"
"         15.000   Flow length"
"          3.500   Overland Slope"
"          0.025   Pervious Area"
"         15.000   Pervious length"
"          3.500   Pervious slope"
"          0.045   Impervious Area"
"         15.000   Impervious length"
"          3.500   Impervious slope"
"          0.300   Pervious Manning 'n'"
"         82.000   Pervious SCS Curve No."
"          0.280   Pervious Runoff coefficient"
"          0.100   Pervious Ia/S coefficient"
"          5.576   Pervious Initial abstraction"
"          0.015   Impervious Manning 'n'"
"         98.000   Impervious SCS Curve No."
"          0.833   Impervious Runoff coefficient"
"          0.100   Impervious Ia/S coefficient"
"          0.518   Impervious Initial abstraction"
"                       0.011     0.000     0.196     0.196 c.m/sec"
"               Catchment 209          Pervious   Impervious Total Area "
"               Surface Area           0.025      0.045      0.070      hectare"
"               Time of concentration  12.637     1.245      2.988      minutes"
"               Time to Centroid       116.492    89.890     93.961     minutes"
"               Rainfall depth         33.769     33.769     33.769     mm"
"               Rainfall volume        8.27       15.37      23.64      c.m"
"               Rainfall losses        24.327     5.624      12.170     mm"
"               Runoff depth           9.443      28.146     21.600     mm"
"               Runoff volume          2.31       12.81      15.12      c.m"
"               Runoff coefficient     0.280      0.833      0.640      "
"               Maximum flow           0.001      0.010      0.011      c.m/sec"
" 40           HYDROGRAPH Add Runoff "
"              4   Add Runoff "
"                       0.011     0.011     0.196     0.196"
" 33           CATCHMENT 202"
"              1   Triangular SCS"
"              1   Equal length"
"              1   SCS method"
"            202   Clayton Subdivision areas draining to SWMF (bypassing infiltration galleries)"
"         55.000   % Impervious"
"          8.060   Total Area"
"         90.000   Flow length"
"          0.500   Overland Slope"
"          3.627   Pervious Area"
"         90.000   Pervious length"
"          0.500   Pervious slope"
"          4.433   Impervious Area"
"         90.000   Impervious length"
"          0.500   Impervious slope"
"          0.300   Pervious Manning 'n'"
"         82.000   Pervious SCS Curve No."
"          0.280   Pervious Runoff coefficient"
"          0.100   Pervious Ia/S coefficient"
"          5.576   Pervious Initial abstraction"
"          0.015   Impervious Manning 'n'"
"         98.000   Impervious SCS Curve No."
"          0.844   Impervious Runoff coefficient"
"          0.100   Impervious Ia/S coefficient"
"          0.518   Impervious Initial abstraction"
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"                  0.923     0.011     0.196     0.196 c.m/sec"
"            Catchment 202          Pervious   Impervious Total Area "
"            Surface Area           3.627      4.433      8.060      hectare"
"            Time of concentration  66.384     6.538      19.332     minutes"
"            Time to Centroid       186.855    98.008     117.001    minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        1224.82    1497.00    2721.82    c.m"
"            Rainfall losses        24.303     5.283      13.842     mm"
"            Runoff depth           9.467      28.486     19.927     mm"
"            Runoff volume          343.36     1262.79    1606.15    c.m"
"            Runoff coefficient     0.280      0.844      0.590      "
"            Maximum flow           0.044      0.918      0.923      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.923     0.930     0.196     0.196"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.923     0.930     0.930     0.196"
" 40         HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                  1.126    c.m/sec"
"            Hydrograph volume          1712.123    c.m"
"                  0.923     0.930     0.930     1.126"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.923     0.000     0.930     1.126"
" 33         CATCHMENT 203"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         203   Clayton Subdivision RY draining to SWMF via Woolwich St & Irvine St"
"      31.700   % Impervious"
"       0.440   Total Area"
"      25.000   Flow length"
"       5.500   Overland Slope"
"       0.301   Pervious Area"
"      25.000   Pervious length"
"       5.500   Pervious slope"
"       0.139   Impervious Area"
"      25.000   Impervious length"
"       5.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.280   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   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"
"                  0.033     0.000     0.930     1.126 c.m/sec"
"            Catchment 203          Pervious   Impervious Total Area "
"            Surface Area           0.301      0.139      0.440      hectare"
"            Time of concentration  14.992     1.477      7.134      minutes"
"            Time to Centroid       119.549    90.236     102.506    minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        101.48     47.10      148.59     c.m"
"            Rainfall losses        24.310     5.458      18.334     mm"
"            Runoff depth           9.460      28.312     15.436     mm"
"            Runoff volume          28.43      39.49      67.92      c.m"
"            Runoff coefficient     0.280      0.838      0.457      "
"            Maximum flow           0.010      0.031      0.033      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.033     0.033     0.930     1.126"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.033     0.033     0.033     1.126"
" 40         HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                  1.154    c.m/sec"
"            Hydrograph volume          1780.041    c.m"
"                  0.033     0.033     0.033     1.154"
" 40         HYDROGRAPH   Confluence    1"
"           7   Confluence "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                  1.154    c.m/sec"
"            Hydrograph volume          1780.041    c.m"
"                  0.033     1.154     0.033     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.033     1.154     1.154     0.000"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                  1.154    c.m/sec"
"            Hydrograph volume          1780.041    c.m"
"                  0.033     1.154     1.154     1.154"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.033     0.000     1.154     1.154"
" 33         CATCHMENT 210"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         210   Clayton RYs draining to Woolwich St"
"      16.400   % Impervious"
"       0.200   Total Area"
"      25.000   Flow length"
"       5.500   Overland Slope"
"       0.167   Pervious Area"
"      25.000   Pervious length"
"       5.500   Pervious slope"
"       0.033   Impervious Area"
"      25.000   Impervious length"
"       5.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.280   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   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"
"                  0.008     0.000     1.154     1.154 c.m/sec"
"            Catchment 210          Pervious   Impervious Total Area "
"            Surface Area           0.167      0.033      0.200      hectare"
"            Time of concentration  14.992     1.477      9.992      minutes"
"            Time to Centroid       119.549    90.236     108.705    minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        56.46      11.08      67.54      c.m"
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"            Rainfall losses        24.310     5.458      21.218     mm"
"            Runoff depth           9.460      28.312     12.552     mm"
"            Runoff volume          15.82      9.29       25.10      c.m"
"            Runoff coefficient     0.280      0.838      0.372      "
"            Maximum flow           0.006      0.007      0.008      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.008     0.008     1.154     1.154"
" 33         CATCHMENT 211"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         211   Woolwich St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.230   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.081   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.149   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.280   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.830   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.035     0.008     1.154     1.154 c.m/sec"
"            Catchment 211          Pervious   Impervious Total Area "
"            Surface Area           0.081      0.149      0.230      hectare"
"            Time of concentration  11.719     1.154      2.779      minutes"
"            Time to Centroid       115.255    89.721     93.647     minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        27.18      50.49      77.67      c.m"
"            Rainfall losses        24.312     5.740      12.240     mm"
"            Runoff depth           9.457      28.030     21.529     mm"
"            Runoff volume          7.61       41.90      49.52      c.m"
"            Runoff coefficient     0.280      0.830      0.638      "
"            Maximum flow           0.003      0.035      0.035      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.035     0.044     1.154     1.154"
" 33         CATCHMENT 212"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         212   Clayton laneway towns to Irvine Street (up to 5yr flow)"
"      19.100   % Impervious"
"       0.050   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.040   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.010   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.279   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.825   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.003     0.044     1.154     1.154 c.m/sec"
"            Catchment 212          Pervious   Impervious Total Area "
"            Surface Area           0.040      0.010      0.050      hectare"
"            Time of concentration  10.619     1.046      6.686      minutes"
"            Time to Centroid       113.843    89.506     103.844    minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        13.66      3.22       16.88      c.m"
"            Rainfall losses        24.335     5.901      20.814     mm"
"            Runoff depth           9.435      27.868     12.955     mm"
"            Runoff volume          3.82       2.66       6.48       c.m"
"            Runoff coefficient     0.279      0.825      0.384      "
"            Maximum flow           0.002      0.002      0.003      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.003     0.046     1.154     1.154"
" 33         CATCHMENT 213"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         213   Irvine St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.190   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.067   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.123   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.280   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.830   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.029     0.046     1.154     1.154 c.m/sec"
"            Catchment 213          Pervious   Impervious Total Area "
"            Surface Area           0.067      0.123      0.190      hectare"
"            Time of concentration  11.719     1.154      2.779      minutes"
"            Time to Centroid       115.255    89.721     93.647     minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        22.46      41.71      64.16      c.m"
"            Rainfall losses        24.312     5.740      12.240     mm"
"            Runoff depth           9.457      28.030     21.529     mm"
"            Runoff volume          6.29       34.62      40.91      c.m"
"            Runoff coefficient     0.280      0.830      0.638      "
"            Maximum flow           0.003      0.029      0.029      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.029     0.075     1.154     1.154"
" 33         CATCHMENT 204"
"           1   Triangular SCS"
```

```
"           1   Equal length"
"           1   SCS method"
"         204   Woolwich St & Irvine Street draining to SWMF"
"      65.000   % Impervious"
"       0.970   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.340   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.631   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.280   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.830   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.149     0.075     1.154     1.154 c.m/sec"
"            Catchment 204          Pervious   Impervious Total Area "
"            Surface Area           0.340      0.631      0.970      hectare"
"            Time of concentration  11.719     1.154      2.779      minutes"
"            Time to Centroid       115.255    89.721     93.647     minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        114.65     212.92     327.56     c.m"
"            Rainfall losses        24.312     5.740      12.240     mm"
"            Runoff depth           9.457      28.030     21.529     mm"
"            Runoff volume          32.11      176.73     208.83     c.m"
"            Runoff coefficient     0.280      0.830      0.638      "
"            Maximum flow           0.013      0.146      0.149      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.149     0.224     1.154     1.154"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.149     0.224     0.224     1.154"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 1.305    c.m/sec"
"            Hydrograph volume         2110.877    c.m"
"                   0.149     0.224     0.224     1.305"
" 40         HYDROGRAPH   Confluence    2"
"           7   Confluence "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 1.305    c.m/sec"
"            Hydrograph volume         2110.877    c.m"
"                   0.149     1.305     0.224     0.000"
" 33         CATCHMENT 205"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         205   Elora Sands existing drainage to SWMF"
"       0.000   % Impervious"
"       9.600   Total Area"
"     250.000   Flow length"
"       3.000   Overland Slope"
"       9.600   Pervious Area"
"     250.000   Pervious length"
"       3.000   Pervious slope"
"       0.000   Impervious Area"
"     250.000   Impervious length"
"       3.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.213   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.073     1.305     0.224     0.000 c.m/sec"
"            Catchment 205          Pervious   Impervious Total Area "
"            Surface Area           9.600      0.000      9.600      hectare"
"            Time of concentration  83.199     7.051      83.198     minutes"
"            Time to Centroid       206.791    98.777     206.791    minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        3241.87    0.00       3241.87    c.m"
"            Rainfall losses        26.565     5.288      26.565     mm"
"            Runoff depth           7.205      28.481     7.205      mm"
"            Runoff volume          691.64     0.00       691.64     c.m"
"            Runoff coefficient     0.213      0.000      0.213      "
"            Maximum flow           0.073      0.000      0.073      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.073     1.311     0.224     0.000"
" 33         CATCHMENT 206"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         206   SWMF + Overland Flow Channel"
"      40.000   % Impervious"
"       1.340   Total Area"
"      20.000   Flow length"
"      25.000   Overland Slope"
"       0.804   Pervious Area"
"      20.000   Pervious length"
"      25.000   Pervious slope"
"       0.536   Impervious Area"
"      20.000   Impervious length"
"      25.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.279   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.812   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.134     1.311     0.224     0.000 c.m/sec"
"            Catchment 206          Pervious   Impervious Total Area "
"            Surface Area           0.804      0.536      1.340      hectare"
"            Time of concentration  8.326      0.820      3.373      minutes"
"            Time to Centroid       110.905    89.374     96.698     minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        271.51     181.00     452.51     c.m"
"            Rainfall losses        24.341     6.335      17.138     mm"
"            Runoff depth           9.429      27.435     16.631     mm"
"            Runoff volume          75.81      147.05     222.86     c.m"
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"            Runoff coefficient     0.279      0.812      0.492      "
"            Maximum flow           0.037      0.126      0.134      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.134     1.413     0.224     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.134     1.413     1.413     0.000"
" 40          HYDROGRAPH   Combine    3"
"           6   Combine "
"           3   Node #"
"               Draining to SWMF"
"            Maximum flow                  1.413    c.m/sec"
"            Hydrograph volume          3025.372    c.m"
"                   0.134     1.413     1.413     1.413"
" 40          HYDROGRAPH   Confluence    3"
"           7   Confluence "
"           3   Node #"
"               Draining to SWMF"
"            Maximum flow                  1.413    c.m/sec"
"            Hydrograph volume          3025.372    c.m"
"                   0.134     1.413     1.413     0.000"
" 54          POND DESIGN"
"       1.413   Current peak flow    c.m/sec"
"       0.385   Target outflow    c.m/sec"
"      3025.4   Hydrograph volume    c.m"
"         22.   Number of stages"
"     403.600   Minimum water level    metre"
"     405.700   Maximum water level    metre"
"     403.600   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
               403.600     0.000     0.000"
               403.700   0.00300   512.000"
               403.800   0.00600  1044.000"
               403.900   0.00700  1597.000"
               404.000   0.02800  2171.000"
               404.100    0.1120  2767.000"
               404.200    0.2320  3382.000"
               404.300    0.3950  4013.000"
               404.400    0.6330  4657.000"
               404.500    0.9240  5314.000"
               404.600     1.265  5983.000"
               404.700     1.648  6666.000"
               404.800     2.067  7361.000"
               404.900     2.519  8070.000"
               405.000     3.002  8792.000"
               405.100     3.785  9528.000"
               405.200     4.924  10280.00"
               405.300     6.413  11047.00"
               405.400     8.269  11831.00"
               405.500    10.517  12632.00"
               405.600    13.180  13449.00"
               405.700    16.279  14283.00"
            Peak outflow                  0.063    c.m/sec"
            Maximum level               404.042    metre"
            Maximum storage            2421.935    c.m"
            Centroidal lag               35.024   hours"
                 0.134     1.413     0.063     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                  0.063    c.m/sec"
"            Hydrograph volume          2152.300    c.m"
"                   0.134     1.413     0.063     0.063"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.134     0.000     0.063     0.063"
" 33          CATCHMENT 207"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         207   Elora Sands draining to ND1 bypassing SWMF"
"       0.000   % Impervious"
"       2.080   Total Area"
"     100.000   Flow length"
"       4.500   Overland Slope"
"       2.080   Pervious Area"
"     100.000   Pervious length"
"       4.500   Pervious slope"
"       0.000   Impervious Area"
"     100.000   Impervious length"
"       4.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.213   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
                   0.027     0.000     0.063     0.063 c.m/sec"
            Catchment 207          Pervious   Impervious Total Area "
            Surface Area           2.080      0.000      2.080      hectare"
            Time of concentration  42.513     3.603      42.513     minutes"
            Time to Centroid       155.556    93.652     155.556    minutes"
            Rainfall depth         33.769     33.769     33.769     mm"
            Rainfall volume        702.40     0.00       702.40     c.m"
            Rainfall losses        26.565     5.623      26.565     mm"
            Runoff depth           7.204      28.147     7.204      mm"
            Runoff volume          149.85     0.00       149.85     c.m"
            Runoff coefficient     0.213      0.000      0.213      "
            Maximum flow           0.027      0.000      0.027      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.027     0.027     0.063     0.063"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.027     0.027     0.027     0.063"
" 40          HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                  0.071    c.m/sec"
"            Hydrograph volume          2302.147    c.m"
"                   0.027     0.027     0.027     0.071"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.027     0.000     0.027     0.071"
" 33          CATCHMENT 208"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         208   External ROWs draining to ND1 bypassing SWMF"
"      49.700   % Impervious"
"       0.560   Total Area"
"      10.000   Flow length"
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"        2.000   Overland Slope"
"        0.282   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.278   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.213   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.830   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.066     0.000     0.027     0.071 c.m/sec"
"             Catchment 208          Pervious   Impervious Total Area "
"             Surface Area           0.282      0.278      0.560      hectare"
"             Time of concentration  13.620     1.154      3.723      minutes"
"             Time to Centroid       119.195    89.721     95.793     minutes"
"             Rainfall depth         33.769     33.769     33.769     mm"
"             Rainfall volume        95.12      93.99      189.11     c.m"
"             Rainfall losses        26.583     5.740      16.224     mm"
"             Runoff depth           7.187      28.030     17.546     mm"
"             Runoff volume          20.24      78.01      98.26      c.m"
"             Runoff coefficient     0.213      0.830      0.520      "
"             Maximum flow           0.008      0.064      0.066      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.066     0.066     0.027     0.071"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.066     0.066     0.066     0.071"
" 40          HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                  0.071    c.m/sec"
"            Hydrograph volume          2400.402    c.m"
"                    0.066     0.066     0.066     0.071"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.066     0.000     0.066     0.071"
" 33          CATCHMENT 214"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         214   Clayton Subdivision RYs draining NW offsite to Woolwich Street E"
"       0.000   % Impervious"
"       0.100   Total Area"
"      60.000   Flow length"
"       5.000   Overland Slope"
"       0.100   Pervious Area"
"      60.000   Pervious length"
"       5.000   Pervious slope"
"       0.000   Impervious Area"
"      60.000   Impervious length"
"       5.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.280   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.002     0.000     0.066     0.071 c.m/sec"
"             Catchment 214          Pervious   Impervious Total Area "
"             Surface Area           0.100      0.000      0.100      hectare"
"             Time of concentration  26.086     2.569      26.086     minutes"
"             Time to Centroid       134.083    91.952     134.083    minutes"
"             Rainfall depth         33.769     33.769     33.769     mm"
"             Rainfall volume        33.77      0.00       33.77      c.m"
"             Rainfall losses        24.309     5.502      24.309     mm"
"             Runoff depth           9.460      28.267     9.460      mm"
"             Runoff volume          9.46       0.00       9.46       c.m"
"             Runoff coefficient     0.280      0.000      0.280      "
"             Maximum flow           0.002      0.000      0.002      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.002     0.002     0.066     0.071"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.002     0.002     0.002     0.071"
" 40          HYDROGRAPH   Combine    5"
"           6   Combine "
"           5   Node #"
"               Draining NW to Woolwich St E"
"            Maximum flow                  0.002    c.m/sec"
"            Hydrograph volume             9.460    c.m"
"                    0.002     0.002     0.002     0.002"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.002     0.000     0.002     0.002"
" 33          CATCHMENT 215"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         215   Clayton Subdivision RYs draining offsite SW to rural residental"
"       0.000   % Impervious"
"       0.500   Total Area"
"      15.000   Flow length"
"       4.500   Overland Slope"
"       0.500   Pervious Area"
"      15.000   Pervious length"
"       4.500   Pervious slope"
"       0.000   Impervious Area"
"      15.000   Impervious length"
"       4.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.280   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.019     0.000     0.002     0.002 c.m/sec"
"             Catchment 215          Pervious   Impervious Total Area "
"             Surface Area           0.500      0.000      0.500      hectare"
"             Time of concentration  11.719     1.154      11.719     minutes"
"             Time to Centroid       115.255    89.721     115.255    minutes"
"             Rainfall depth         33.769     33.769     33.769     mm"
"             Rainfall volume        168.85     0.00       168.85     c.m"
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"            Rainfall losses        24.312     5.740      24.312     mm"
"            Runoff depth           9.457      28.030     9.457      mm"
"            Runoff volume          47.29      0.00       47.29      c.m"
"            Runoff coefficient     0.280      0.000      0.280      "
"            Maximum flow           0.019      0.000      0.019      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.019     0.019     0.002     0.002"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.019     0.019     0.019     0.002"
" 40         HYDROGRAPH   Combine    6"
"           6   Combine "
"           6   Node #"
"               Draining SW to rural residential"
"            Maximum flow                  0.019    c.m/sec"
"            Hydrograph volume            47.286    c.m"
"                   0.019     0.019     0.019     0.019"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.019     0.000     0.019     0.019"
" 33         CATCHMENT 216"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         216   Clayton Subd. RYs draining SE offsite to Elora Meadows"
"       7.800   % Impervious"
"       0.240   Total Area"
"       4.000   Flow length"
"      33.000   Overland Slope"
"       0.221   Pervious Area"
"       4.000   Pervious length"
"      33.000   Pervious slope"
"       0.019   Impervious Area"
"       4.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.275   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.741   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.015     0.000     0.019     0.019 c.m/sec"
"            Catchment 216          Pervious   Impervious Total Area "
"            Surface Area           0.221      0.019      0.240      hectare"
"            Time of concentration  2.917      0.287      2.428      minutes"
"            Time to Centroid       103.915    88.549     101.061    minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        74.73      6.32       81.05      c.m"
"            Rainfall losses        24.489     8.744      23.261     mm"
"            Runoff depth           9.280      25.026     10.508     mm"
"            Runoff volume          20.54      4.68       25.22      c.m"
"            Runoff coefficient     0.275      0.741      0.311      "
"            Maximum flow           0.013      0.004      0.015      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.015     0.015     0.019     0.019"
" 33         CATCHMENT 217"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         217   Clayton Subd. draining SE offsite to Elora Meadows (via Irvine St.)"
"      11.400   % Impervious"
"       0.070   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.062   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.008   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.279   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.825   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.003     0.015     0.019     0.019 c.m/sec"
"            Catchment 217          Pervious   Impervious Total Area "
"            Surface Area           0.062      0.008      0.070      hectare"
"            Time of concentration  10.619     1.046      7.983      minutes"
"            Time to Centroid       113.843    89.506     107.141    minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        20.94      2.69       23.64      c.m"
"            Rainfall losses        24.335     5.901      22.233     mm"
"            Runoff depth           9.435      27.868     11.536     mm"
"            Runoff volume          5.85       2.22       8.08       c.m"
"            Runoff coefficient     0.279      0.825      0.342      "
"            Maximum flow           0.003      0.002      0.003      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.003     0.018     0.019     0.019"
" 33         CATCHMENT 218"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         218   Irvine St drawing S to Elora Meadows"
"      65.000   % Impervious"
"       0.200   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.070   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.130   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.280   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.830   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.031     0.018     0.019     0.019 c.m/sec"
"            Catchment 218          Pervious   Impervious Total Area "
"            Surface Area           0.070      0.130      0.200      hectare"
"            Time of concentration  11.719     1.154      2.779      minutes"
```

```
"            Time to Centroid       115.255    89.721     93.647     minutes"
"            Rainfall depth         33.769     33.769     33.769     mm"
"            Rainfall volume        23.64      43.90      67.54      c.m"
"            Rainfall losses        24.312     5.740      12.240     mm"
"            Runoff depth           9.457      28.030     21.529     mm"
"            Runoff volume          6.62       36.44      43.06      c.m"
"            Runoff coefficient     0.280      0.830      0.638      "
"            Maximum flow           0.003      0.030      0.031      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.031     0.047     0.019     0.019"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.031     0.047     0.047     0.019"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.047    c.m/sec"
"            Hydrograph volume            76.353    c.m"
"                   0.031     0.047     0.047     0.047"
" 38         START/RE-START TOTALS 218"
"           3   Runoff Totals on EXIT"
"            Total Catchment area                    27.650    hectare"
"            Total Impervious area                    9.285    hectare"
"            Total % impervious                      33.580"
" 19         EXIT"
```

```
"               MIDUSS Output ----------------------------------------------->"
"               MIDUSS version                          Version 2.25  rev. 473"
"               MIDUSS created                  Sunday, February 7, 2010"
"          10   Units used:                                    ie METRIC"
"               Job folder:              Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                               Post-Dev"
"               Output filename:                          5yr_Post-Dev.out"
"               Licensee name:                                          A"
"               Company                                                 "
"               Date & Time last used:          6/13/2023 at 7:08:08 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     3000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"     1436.000   Coefficient A"
"       11.000   Constant B"
"        0.854   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"            Maximum intensity          134.647    mm/hr"
"            Total depth                 48.636    mm"
"           6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Clayton Subdivision roof areas to lot-level infiltration galleries"
"      100.000   % Impervious"
"        2.750   Total Area"
"        6.000   Flow length"
"       33.000   Overland Slope"
"        0.000   Pervious Area"
"        6.000   Pervious length"
"       33.000   Pervious slope"
"        2.750   Impervious Area"
"        6.000   Impervious length"
"       33.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.778   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.837     0.000     0.000     0.000 c.m/sec"
"            Catchment 201          Pervious   Impervious Total Area "
"            Surface Area           0.000      2.750      2.750      hectare"
"            Time of concentration  2.888      0.329      0.329      minutes"
"            Time to Centroid       100.390    87.220     87.220     minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        0.00       1337.49    1337.49    c.m"
"            Rainfall losses        30.230     10.807     10.807     mm"
"            Runoff depth           18.406     37.829     37.829     mm"
"            Runoff volume          0.00       1040.31    1040.31    c.m"
"            Runoff coefficient     0.000      0.778      0.778      "
"            Maximum flow           0.000      0.837      0.837      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.837     0.837     0.000     0.000"
```

```
" 57          TRENCH Design d/s of 201"
"        0.837   Peak inflow"
"     1040.306   Hydrograph volume"
"        2.500   Ground elevation"
"        1.000   Downstream trench invert"
"        1.000   Trench height"
"        0.000   Water table elevation"
"        1.000   Trench top width"
"        1.000   Trench bottom width"
"       40.000   Voids ratio (%)"
"      100.000   Hydraulic conductivity"
"        0.000   Trench gradient (%)"
"      600.000   Trench length"
"        1.000   Include base width"
"          16.   Number of stages"
"                  Level Discharge    Volume"
"                  1.000     0.000       0.0"
"                  1.100     0.000      24.0"
"                  1.200     0.000      48.0"
"                  1.300     0.000      72.0"
"                  1.400     0.000      96.0"
"                  1.500     0.000     120.0"
"                  1.600     0.000     144.0"
"                  1.700     0.000     168.0"
"                  1.800     0.000     192.0"
"                  1.900     0.000     216.0"
"                  2.000     0.000     240.0"
"                  2.100     0.975     240.1"
"                  2.200     3.905     240.2"
"                  2.300     8.694     240.3"
"                  2.400    15.452     240.5"
"                  2.500    23.923     240.6"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"                  2.000    20.000     0.000     0.000     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"              diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"              Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                invert    invert    Length  Diameter       'n'   loss Ke"
"                 2.000     2.000    20.000 10000.000     0.013     0.500"
"               Peak outflow                 0.760    c.m/sec"
"               Outflow volume             440.454    c.m"
"               Peak exfiltration            0.077    c.m/sec"
"               Exfiltration volume        643.117    c.m"
"               Maximum level                2.090    metre"
"               Maximum storage            240.102    c.m"
"               Centroidal lag               1.328   hours"
"               Infiltration area 2 sides 1200.000   sq.metre"
"               Infiltration Base area     600.000   sq.metre"
"                    0.837     0.837     0.760     0.077 c.m/sec"
" 40           HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"               Maximum flow                 0.760    c.m/sec"
"               Hydrograph volume          440.454    c.m"
"                       0.837     0.837     0.760     0.760"
" 40           HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                       0.837     0.000     0.760     0.760"
```

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" 33          CATCHMENT 209"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           209   Marr Drive transition grading to Bricker Ave."
"        65.000   % Impervious"
"         0.070   Total Area"
"        15.000   Flow length"
"         3.500   Overland Slope"
"         0.025   Pervious Area"
"        15.000   Pervious length"
"         3.500   Pervious slope"
"         0.045   Impervious Area"
"        15.000   Impervious length"
"         3.500   Impervious slope"
"         0.300   Pervious Manning 'n'"
"        82.000   Pervious SCS Curve No."
"         0.384   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         5.576   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.870   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                       0.015     0.000     0.760     0.760 c.m/sec"
"              Catchment 209          Pervious   Impervious Total Area "
"              Surface Area           0.025      0.045      0.070      hectare"
"              Time of concentration  9.812      1.119      2.787      minutes"
"              Time to Centroid       109.290    88.117     92.180     minutes"
"              Rainfall depth         48.636     48.636     48.636     mm"
"              Rainfall volume        11.92      22.13      34.05      c.m"
"              Rainfall losses        29.975     6.317      14.598     mm"
"              Runoff depth           18.661     42.318     34.038     mm"
"              Runoff volume          4.57       19.25      23.83      c.m"
"              Runoff coefficient     0.384      0.870      0.700      "
"              Maximum flow           0.002      0.014      0.015      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                       0.015     0.015     0.760     0.760"
" 33          CATCHMENT 202"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           202   Clayton Subdivision areas draining to SWMF (bypassing infiltration galleries)"
"        55.000   % Impervious"
"         8.060   Total Area"
"        90.000   Flow length"
"         0.500   Overland Slope"
"         3.627   Pervious Area"
"        90.000   Pervious length"
"         0.500   Pervious slope"
"         4.433   Impervious Area"
"        90.000   Impervious length"
"         0.500   Impervious slope"
"         0.300   Pervious Manning 'n'"
"        82.000   Pervious SCS Curve No."
"         0.386   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         5.576   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.889   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
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"                  1.279     0.015     0.760     0.760 c.m/sec"
"            Catchment 202          Pervious   Impervious Total Area "
"            Surface Area           3.627      4.433      8.060      hectare"
"            Time of concentration  51.545     5.877      17.841     minutes"
"            Time to Centroid       162.968    95.101     112.880    minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        1764.03    2156.03    3920.06    c.m"
"            Rainfall losses        29.875     5.395      16.411     mm"
"            Runoff depth           18.761     43.241     32.225     mm"
"            Runoff volume          680.44     1916.89    2597.33    c.m"
"            Runoff coefficient     0.386      0.889      0.663      "
"            Maximum flow           0.114      1.262      1.279      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  1.279     1.290     0.760     0.760"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  1.279     1.290     1.290     0.760"
" 40         HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                  1.683    c.m/sec"
"            Hydrograph volume          3061.615    c.m"
"                  1.279     1.290     1.290     1.683"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  1.279     0.000     1.290     1.683"
" 33         CATCHMENT 203"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         203   Clayton Subdivision RY draining to SWMF via Woolwich St & Irvine St"
"      31.700   % Impervious"
"       0.440   Total Area"
"      25.000   Flow length"
"       5.500   Overland Slope"
"       0.301   Pervious Area"
"      25.000   Pervious length"
"       5.500   Pervious slope"
"       0.139   Impervious Area"
"      25.000   Impervious length"
"       5.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.385   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.877   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.049     0.000     1.290     1.683 c.m/sec"
"            Catchment 203          Pervious   Impervious Total Area "
"            Surface Area           0.301      0.139      0.440      hectare"
"            Time of concentration  11.641     1.327      6.338      minutes"
"            Time to Centroid       111.605    88.444     99.697     minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        146.16     67.84      214.00     c.m"
"            Rainfall losses        29.921     5.970      22.329     mm"
"            Runoff depth           18.715     42.666     26.307     mm"
"            Runoff volume          56.24      59.51      115.75     c.m"
"            Runoff coefficient     0.385      0.877      0.541      "
"            Maximum flow           0.025      0.043      0.049      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.049     0.049     1.290     1.683"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.049     0.049     0.049     1.683"
" 40         HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                  1.732    c.m/sec"
"            Hydrograph volume          3177.366    c.m"
"                  0.049     0.049     0.049     1.732"
" 40         HYDROGRAPH   Confluence    1"
"           7   Confluence "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                  1.732    c.m/sec"
"            Hydrograph volume          3177.365    c.m"
"                  0.049     1.732     0.049     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.049     1.732     1.732     0.000"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                  1.732    c.m/sec"
"            Hydrograph volume          3177.365    c.m"
"                  0.049     1.732     1.732     1.732"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.049     0.000     1.732     1.732"
" 33         CATCHMENT 210"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         210   Clayton RYs draining to Woolwich St"
"      16.400   % Impervious"
"       0.200   Total Area"
"      25.000   Flow length"
"       5.500   Overland Slope"
"       0.167   Pervious Area"
"      25.000   Pervious length"
"       5.500   Pervious slope"
"       0.033   Impervious Area"
"      25.000   Impervious length"
"       5.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.385   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.877   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.018     0.000     1.732     1.732 c.m/sec"
"            Catchment 210          Pervious   Impervious Total Area "
"            Surface Area           0.167      0.033      0.200      hectare"
"            Time of concentration  11.641     1.327      8.454      minutes"
"            Time to Centroid       111.605    88.444     104.448    minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        81.32      15.95      97.27      c.m"
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"            Rainfall losses        29.921     5.970      25.993     mm"
"            Runoff depth           18.715     42.666     22.643     mm"
"            Runoff volume          31.29      13.99      45.29      c.m"
"            Runoff coefficient     0.385      0.877      0.466      "
"            Maximum flow           0.014      0.010      0.018      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.018     0.018     1.732     1.732"
" 33         CATCHMENT 211"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         211   Woolwich St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.230   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.081   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.149   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.384   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.866   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.049     0.018     1.732     1.732 c.m/sec"
"            Catchment 211          Pervious   Impervious Total Area "
"            Surface Area           0.081      0.149      0.230      hectare"
"            Time of concentration  9.100      1.037      2.592      minutes"
"            Time to Centroid       108.338    87.982     91.906     minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        39.15      72.71      111.86     c.m"
"            Rainfall losses        29.956     6.515      14.719     mm"
"            Runoff depth           18.680     42.121     33.917     mm"
"            Runoff volume          15.04      62.97      78.01      c.m"
"            Runoff coefficient     0.384      0.866      0.697      "
"            Maximum flow           0.007      0.047      0.049      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.049     0.062     1.732     1.732"
" 33         CATCHMENT 212"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         212   Clayton laneway towns to Irvine Street (up to 5yr flow)"
"      19.100   % Impervious"
"       0.050   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.040   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.010   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.384   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.860   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.006     0.062     1.732     1.732 c.m/sec"
"            Catchment 212          Pervious   Impervious Total Area "
"            Surface Area           0.040      0.010      0.050      hectare"
"            Time of concentration  8.246      0.940      5.721      minutes"
"            Time to Centroid       107.293    87.851     100.574    minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        19.67      4.64       24.32      c.m"
"            Rainfall losses        29.939     6.809      25.521     mm"
"            Runoff depth           18.697     41.827     23.115     mm"
"            Runoff volume          7.56       3.99       11.56      c.m"
"            Runoff coefficient     0.384      0.860      0.475      "
"            Maximum flow           0.004      0.003      0.006      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.006     0.066     1.732     1.732"
" 33         CATCHMENT 213"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         213   Irvine St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.190   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.067   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.123   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.384   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.866   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.040     0.066     1.732     1.732 c.m/sec"
"            Catchment 213          Pervious   Impervious Total Area "
"            Surface Area           0.067      0.123      0.190      hectare"
"            Time of concentration  9.100      1.037      2.592      minutes"
"            Time to Centroid       108.338    87.982     91.906     minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        32.34      60.07      92.41      c.m"
"            Rainfall losses        29.956     6.515      14.719     mm"
"            Runoff depth           18.680     42.121     33.917     mm"
"            Runoff volume          12.42      52.02      64.44      c.m"
"            Runoff coefficient     0.384      0.866      0.697      "
"            Maximum flow           0.006      0.038      0.040      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.040     0.107     1.732     1.732"
" 33         CATCHMENT 204"
"           1   Triangular SCS"
```

```
"           1   Equal length"
"           1   SCS method"
"         204   Woolwich St & Irvine Street draining to SWMF"
"       65.000  % Impervious"
"        0.970  Total Area"
"       10.000  Flow length"
"        2.000  Overland Slope"
"        0.340  Pervious Area"
"       10.000  Pervious length"
"        2.000  Pervious slope"
"        0.631  Impervious Area"
"       10.000  Impervious length"
"        2.000  Impervious slope"
"        0.300  Pervious Manning 'n'"
"       82.000  Pervious SCS Curve No."
"        0.384  Pervious Runoff coefficient"
"        0.100  Pervious Ia/S coefficient"
"        5.576  Pervious Initial abstraction"
"        0.015  Impervious Manning 'n'"
"       98.000  Impervious SCS Curve No."
"        0.866  Impervious Runoff coefficient"
"        0.100  Impervious Ia/S coefficient"
"        0.518  Impervious Initial abstraction"
"                   0.206     0.107     1.732     1.732 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.340      0.631      0.970      hectare"
"             Time of concentration  9.100      1.037      2.592      minutes"
"             Time to Centroid       108.338    87.982     91.906     minutes"
"             Rainfall depth         48.636     48.636     48.636     mm"
"             Rainfall volume        165.12     306.65     471.77     c.m"
"             Rainfall losses        29.956     6.515      14.719     mm"
"             Runoff depth           18.680     42.121     33.917     mm"
"             Runoff volume          63.42      265.57     328.99     c.m"
"             Runoff coefficient     0.384      0.866      0.697      "
"             Maximum flow           0.032      0.196      0.206      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.206     0.313     1.732     1.732"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.206     0.313     0.313     1.732"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"             Maximum flow                 2.044    c.m/sec"
"             Hydrograph volume         3705.650    c.m"
"                   0.206     0.313     0.313     2.044"
" 40          HYDROGRAPH   Confluence    2"
"           7   Confluence "
"           2   Node #"
"               Draining to SWMF"
"             Maximum flow                 2.044    c.m/sec"
"             Hydrograph volume         3705.650    c.m"
"                   0.206     2.044     0.313     0.000"
" 33          CATCHMENT 205"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         205   Elora Sands existing drainage to SWMF"
"       0.000   % Impervious"
"       9.600   Total Area"
"     250.000   Flow length"
"       3.000   Overland Slope"
"       9.600   Pervious Area"
"     250.000   Pervious length"
"       3.000   Pervious slope"
"       0.000   Impervious Area"
"     250.000   Impervious length"
"       3.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.313   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.211     2.044     0.313     0.000 c.m/sec"
"             Catchment 205          Pervious   Impervious Total Area "
"             Surface Area           9.600      0.000      9.600      hectare"
"             Time of concentration  61.834     6.337      61.834     minutes"
"             Time to Centroid       175.818    95.757     175.818    minutes"
"             Rainfall depth         48.636     48.636     48.636     mm"
"             Rainfall volume        4669.05    0.00       4669.05    c.m"
"             Rainfall losses        33.433     5.494      33.433     mm"
"             Runoff depth           15.203     43.142     15.203     mm"
"             Runoff volume          1459.52    0.00       1459.53    c.m"
"             Runoff coefficient     0.313      0.000      0.313      "
"             Maximum flow           0.211      0.000      0.211      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.211     2.052     0.313     0.000"
" 33          CATCHMENT 206"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         206   SWMF + Overland Flow Channel"
"       40.000  % Impervious"
"        1.340  Total Area"
"       20.000  Flow length"
"       25.000  Overland Slope"
"        0.804  Pervious Area"
"       20.000  Pervious length"
"       25.000  Pervious slope"
"        0.536  Impervious Area"
"       20.000  Impervious length"
"       25.000  Impervious slope"
"        0.300  Pervious Manning 'n'"
"       82.000  Pervious SCS Curve No."
"        0.382  Pervious Runoff coefficient"
"        0.100  Pervious Ia/S coefficient"
"        5.576  Pervious Initial abstraction"
"        0.015  Impervious Manning 'n'"
"       98.000  Impervious SCS Curve No."
"        0.843  Impervious Runoff coefficient"
"        0.100  Impervious Ia/S coefficient"
"        0.518  Impervious Initial abstraction"
"                   0.200     2.052     0.313     0.000 c.m/sec"
"             Catchment 206          Pervious   Impervious Total Area "
"             Surface Area           0.804      0.536      1.340      hectare"
"             Time of concentration  6.465      0.737      3.057      minutes"
"             Time to Centroid       105.065    87.894     94.848     minutes"
"             Rainfall depth         48.636     48.636     48.636     mm"
"             Rainfall volume        391.03     260.69     651.72     c.m"
"             Rainfall losses        30.034     7.637      21.075     mm"
"             Runoff depth           18.602     40.999     27.561     mm"
"             Runoff volume          149.56     219.76     369.32     c.m"
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"            Runoff coefficient     0.382      0.843      0.567      "
"            Maximum flow           0.083      0.167      0.200      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.200     2.252     0.313     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.200     2.252     2.252     0.000"
" 40         HYDROGRAPH   Combine    3"
"           6   Combine "
"           3   Node #"
"               Draining to SWMF"
"            Maximum flow                  2.252    c.m/sec"
"            Hydrograph volume          5534.496    c.m"
"                   0.200     2.252     2.252     2.252"
" 40         HYDROGRAPH   Confluence    3"
"           7   Confluence "
"           3   Node #"
"               Draining to SWMF"
"            Maximum flow                  2.252    c.m/sec"
"            Hydrograph volume          5534.496    c.m"
"                   0.200     2.252     2.252     0.000"
" 54         POND DESIGN"
"       2.252   Current peak flow    c.m/sec"
"       0.385   Target outflow    c.m/sec"
"      5534.5   Hydrograph volume    c.m"
"         22.   Number of stages"
"     403.600   Minimum water level    metre"
"     405.700   Maximum water level    metre"
"     403.600   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
                  403.600     0.000     0.000"
                  403.700   0.00300   512.000"
                  403.800   0.00600  1044.000"
                  403.900   0.00700  1597.000"
                  404.000   0.02800  2171.000"
                  404.100    0.1120  2767.000"
                  404.200    0.2320  3382.000"
                  404.300    0.3950  4013.000"
                  404.400    0.6330  4657.000"
                  404.500    0.9240  5314.000"
                  404.600     1.265  5983.000"
                  404.700     1.648  6666.000"
                  404.800     2.067  7361.000"
                  404.900     2.519  8070.000"
                  405.000     3.002  8792.000"
                  405.100     3.785  9528.000"
                  405.200     4.924  10280.00"
                  405.300     6.413  11047.00"
                  405.400     8.269  11831.00"
                  405.500    10.517  12632.00"
                  405.600    13.180  13449.00"
                  405.700    16.279  14283.00"
"            Peak outflow                  0.284    c.m/sec"
"            Maximum level               404.232    metre"
"            Maximum storage            3584.459    c.m"
"            Centroidal lag               21.189   hours"
"                 0.200     2.252     0.284     0.000 c.m/sec"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                  0.284    c.m/sec"
"            Hydrograph volume          4641.917    c.m"
"                   0.200     2.252     0.284     0.284"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.200     0.000     0.284     0.284"
" 33         CATCHMENT 207"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         207   Elora Sands draining to ND1 bypassing SWMF"
"       0.000   % Impervious"
"       2.080   Total Area"
"     100.000   Flow length"
"       4.500   Overland Slope"
"       2.080   Pervious Area"
"     100.000   Pervious length"
"       4.500   Pervious slope"
"       0.000   Impervious Area"
"     100.000   Impervious length"
"       4.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.312   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.075     0.000     0.284     0.284 c.m/sec"
"            Catchment 207          Pervious   Impervious Total Area "
"            Surface Area           2.080      0.000      2.080      hectare"
"            Time of concentration  31.597     3.238      31.596     minutes"
"            Time to Centroid       137.894    91.310     137.893    minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        1011.63    0.00       1011.63    c.m"
"            Rainfall losses        33.442     5.972      33.442     mm"
"            Runoff depth           15.193     42.664     15.194     mm"
"            Runoff volume          316.02     0.00       316.03     c.m"
"            Runoff coefficient     0.312      0.000      0.312      "
"            Maximum flow           0.075      0.000      0.075      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.075     0.075     0.284     0.284"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.075     0.075     0.075     0.284"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                  0.305    c.m/sec"
"            Hydrograph volume          4957.940    c.m"
"                   0.075     0.075     0.075     0.305"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.075     0.000     0.075     0.305"
" 33         CATCHMENT 208"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         208   External ROWs draining to ND1 bypassing SWMF"
"      49.700   % Impervious"
"       0.560   Total Area"
"      10.000   Flow length"
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"        2.000   Overland Slope"
"        0.282   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.278   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.311   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.866   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                  0.092     0.000     0.075     0.305 c.m/sec"
"             Catchment 208          Pervious   Impervious Total Area "
"             Surface Area           0.282      0.278      0.560      hectare"
"             Time of concentration  10.123     1.037      3.460      minutes"
"             Time to Centroid       110.983    87.982     94.116     minutes"
"             Rainfall depth         48.636     48.636     48.636     mm"
"             Rainfall volume        137.00     135.36     272.36     c.m"
"             Rainfall losses        33.500     6.515      20.089     mm"
"             Runoff depth           15.136     42.121     28.547     mm"
"             Runoff volume          42.63      117.23     159.86     c.m"
"             Runoff coefficient     0.311      0.866      0.587      "
"             Maximum flow           0.020      0.087      0.092      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.092     0.092     0.075     0.305"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.092     0.092     0.092     0.305"
" 40          HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                  0.311    c.m/sec"
"            Hydrograph volume          5117.804    c.m"
"                  0.092     0.092     0.092     0.311"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.092     0.000     0.092     0.311"
" 33          CATCHMENT 214"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         214   Clayton Subdivision RYs draining NW offsite to Woolwich Street E"
"       0.000   % Impervious"
"       0.100   Total Area"
"      60.000   Flow length"
"       5.000   Overland Slope"
"       0.100   Pervious Area"
"      60.000   Pervious length"
"       5.000   Pervious slope"
"       0.000   Impervious Area"
"      60.000   Impervious length"
"       5.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.386   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.006     0.000     0.092     0.311 c.m/sec"
"             Catchment 214          Pervious   Impervious Total Area "
"             Surface Area           0.100      0.000      0.100      hectare"
"             Time of concentration  20.255     2.309      20.255     minutes"
"             Time to Centroid       122.696    89.867     122.696    minutes"
"             Rainfall depth         48.636     48.636     48.636     mm"
"             Rainfall volume        48.64      0.00       48.64      c.m"
"             Rainfall losses        29.886     5.911      29.886     mm"
"             Runoff depth           18.750     42.725     18.750     mm"
"             Runoff volume          18.75      0.00       18.75      c.m"
"             Runoff coefficient     0.386      0.000      0.386      "
"             Maximum flow           0.006      0.000      0.006      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.006     0.006     0.092     0.311"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.006     0.006     0.006     0.311"
" 40          HYDROGRAPH   Combine    5"
"           6   Combine "
"           5   Node #"
"               Draining NW to Woolwich St E"
"            Maximum flow                  0.006    c.m/sec"
"            Hydrograph volume            18.750    c.m"
"                  0.006     0.006     0.006     0.006"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.006     0.000     0.006     0.006"
" 33          CATCHMENT 215"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         215   Clayton Subdivision RYs draining offsite SW to rural residental"
"       0.000   % Impervious"
"       0.500   Total Area"
"      15.000   Flow length"
"       4.500   Overland Slope"
"       0.500   Pervious Area"
"      15.000   Pervious length"
"       4.500   Pervious slope"
"       0.000   Impervious Area"
"      15.000   Impervious length"
"       4.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.384   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.047     0.000     0.006     0.006 c.m/sec"
"             Catchment 215          Pervious   Impervious Total Area "
"             Surface Area           0.500      0.000      0.500      hectare"
"             Time of concentration  9.100      1.037      9.100      minutes"
"             Time to Centroid       108.338    87.982     108.338    minutes"
"             Rainfall depth         48.636     48.636     48.636     mm"
"             Rainfall volume        243.18     0.00       243.18     c.m"
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"            Rainfall losses        29.956     6.515      29.956     mm"
"            Runoff depth           18.680     42.121     18.680     mm"
"            Runoff volume          93.40      0.00       93.40      c.m"
"            Runoff coefficient     0.384      0.000      0.384      "
"            Maximum flow           0.047      0.000      0.047      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.047     0.047     0.006     0.006"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.047     0.047     0.047     0.006"
" 40         HYDROGRAPH   Combine    6"
"           6   Combine "
"           6   Node #"
"               Draining SW to rural residential"
"            Maximum flow                  0.047    c.m/sec"
"            Hydrograph volume            93.402    c.m"
"                   0.047     0.047     0.047     0.047"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.047     0.000     0.047     0.047"
" 33         CATCHMENT 216"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         216   Clayton Subd. RYs draining SE offsite to Elora Meadows"
"       7.800   % Impervious"
"       0.240   Total Area"
"       4.000   Flow length"
"      33.000   Overland Slope"
"       0.221   Pervious Area"
"       4.000   Pervious length"
"      33.000   Pervious slope"
"       0.019   Impervious Area"
"       4.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.379   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.770   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.028     0.000     0.047     0.047 c.m/sec"
"            Catchment 216          Pervious   Impervious Total Area "
"            Surface Area           0.221      0.019      0.240      hectare"
"            Time of concentration  2.265      0.258      1.971      minutes"
"            Time to Centroid       99.449     86.737     97.585     minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        107.62     9.10       116.73     c.m"
"            Rainfall losses        30.192     11.174     28.708     mm"
"            Runoff depth           18.444     37.462     19.928     mm"
"            Runoff volume          40.81      7.01       47.83      c.m"
"            Runoff coefficient     0.379      0.770      0.410      "
"            Maximum flow           0.025      0.006      0.028      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.028     0.028     0.047     0.047"
" 33         CATCHMENT 217"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         217   Clayton Subd. draining SE offsite to Elora Meadows (via Irvine St.)"
"      11.400   % Impervious"
"       0.070   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.062   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.008   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.384   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.860   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.008     0.028     0.047     0.047 c.m/sec"
"            Catchment 217          Pervious   Impervious Total Area "
"            Surface Area           0.062      0.008      0.070      hectare"
"            Time of concentration  8.246      0.940      6.613      minutes"
"            Time to Centroid       107.293    87.851     102.948    minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        30.16      3.88       34.05      c.m"
"            Rainfall losses        29.939     6.809      27.302     mm"
"            Runoff depth           18.697     41.827     21.334     mm"
"            Runoff volume          11.60      3.34       14.93      c.m"
"            Runoff coefficient     0.384      0.860      0.439      "
"            Maximum flow           0.006      0.002      0.008      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.008     0.036     0.047     0.047"
" 33         CATCHMENT 218"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         218   Irvine St drawing S to Elora Meadows"
"      65.000   % Impervious"
"       0.200   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.070   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.130   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.384   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.866   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.042     0.036     0.047     0.047 c.m/sec"
"            Catchment 218          Pervious   Impervious Total Area "
"            Surface Area           0.070      0.130      0.200      hectare"
"            Time of concentration  9.100      1.037      2.592      minutes"
```

```
"            Time to Centroid       108.338    87.982     91.906     minutes"
"            Rainfall depth         48.636     48.636     48.636     mm"
"            Rainfall volume        34.05      63.23      97.27      c.m"
"            Rainfall losses        29.956     6.515      14.719     mm"
"            Runoff depth           18.680     42.121     33.917     mm"
"            Runoff volume          13.08      54.76      67.83      c.m"
"            Runoff coefficient     0.384      0.866      0.697      "
"            Maximum flow           0.007      0.041      0.042      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.042     0.075     0.047     0.047"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.042     0.075     0.075     0.047"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                0.075    c.m/sec"
"            Hydrograph volume         130.593    c.m"
"                   0.042     0.075     0.075     0.075"
" 38         START/RE-START TOTALS 218"
"           3   Runoff Totals on EXIT"
"            Total Catchment area                   27.650    hectare"
"            Total Impervious area                   9.285    hectare"
"            Total % impervious                     33.580"
" 19         EXIT"
```

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"               MIDUSS Output ----------------------------------------------->"
"               MIDUSS version                          Version 2.25  rev. 473"
"               MIDUSS created                  Sunday, February 7, 2010"
"          10   Units used:                                    ie METRIC"
"               Job folder:              Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                               Post-Dev"
"               Output filename:                        10yr_Post-Dev.out"
"               Licensee name:                                          A"
"               Company                                                 "
"               Date & Time last used:          6/13/2023 at 7:28:13 PM"
" 31         TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    3000.000   Max. Hydrograph"
" 32         STORM Chicago storm"
"           1   Chicago storm"
"    2126.000   Coefficient A"
"      15.000   Constant B"
"       0.890   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          147.791    mm/hr"
"            Total depth                 58.419    mm"
"           6   010hyd   Hydrograph extension used in this file"
" 33         CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Clayton Subdivision roof areas to lot-level infiltration galleries"
"     100.000   % Impervious"
"       2.750   Total Area"
"       6.000   Flow length"
"      33.000   Overland Slope"
"       0.000   Pervious Area"
"       6.000   Pervious length"
"      33.000   Pervious slope"
"       2.750   Impervious Area"
"       6.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.788   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.932     0.000     0.000     0.000 c.m/sec"
"            Catchment 201          Pervious   Impervious Total Area "
"            Surface Area           0.000      2.750      2.750      hectare"
"            Time of concentration  2.610      0.316      0.316      minutes"
"            Time to Centroid       98.719     86.516     86.516     minutes"
"            Rainfall depth         58.419     58.419     58.419     mm"
"            Rainfall volume        0.00       1606.52    1606.52    c.m"
"            Rainfall losses        33.203     12.388     12.388     mm"
"            Runoff depth           25.216     46.031     46.031     mm"
"            Runoff volume          0.00       1265.86    1265.86    c.m"
"            Runoff coefficient     0.000      0.788      0.788      "
"            Maximum flow           0.000      0.932      0.932      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.932     0.932     0.000     0.000"
```

```
" 57          TRENCH Design d/s of 201"
"        0.932   Peak inflow"
"     1265.860   Hydrograph volume"
"        2.500   Ground elevation"
"        1.000   Downstream trench invert"
"        1.000   Trench height"
"        0.000   Water table elevation"
"        1.000   Trench top width"
"        1.000   Trench bottom width"
"       40.000   Voids ratio (%)"
"      100.000   Hydraulic conductivity"
"        0.000   Trench gradient (%)"
"      600.000   Trench length"
"        1.000   Include base width"
"          16.   Number of stages"
"                  Level Discharge    Volume"
"                  1.000     0.000       0.0"
"                  1.100     0.000      24.0"
"                  1.200     0.000      48.0"
"                  1.300     0.000      72.0"
"                  1.400     0.000      96.0"
"                  1.500     0.000     120.0"
"                  1.600     0.000     144.0"
"                  1.700     0.000     168.0"
"                  1.800     0.000     192.0"
"                  1.900     0.000     216.0"
"                  2.000     0.000     240.0"
"                  2.100     0.975     240.1"
"                  2.200     3.905     240.2"
"                  2.300     8.694     240.3"
"                  2.400    15.452     240.5"
"                  2.500    23.923     240.6"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"                  2.000    20.000     0.000     0.000     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"              diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"              Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                invert    invert    Length  Diameter       'n'   loss Ke"
"                 2.000     2.000    20.000 10000.000     0.013     0.500"
"               Peak outflow                 0.854    c.m/sec"
"               Outflow volume             563.951    c.m"
"               Peak exfiltration            0.077    c.m/sec"
"               Exfiltration volume        682.761    c.m"
"               Maximum level                2.094    metre"
"               Maximum storage            240.106    c.m"
"               Centroidal lag               1.351   hours"
"               Infiltration area 2 sides   1200.000   sq.metre"
"               Infiltration Base area       600.000   sq.metre"
"                    0.932     0.932     0.854     0.077 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"               Maximum flow                 0.854    c.m/sec"
"               Hydrograph volume          563.951    c.m"
"                       0.932     0.932     0.854     0.854"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                       0.932     0.000     0.854     0.854"

" 33          CATCHMENT 209"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           209   Marr Drive transition grading to Bricker Ave."
"        65.000   % Impervious"
"         0.070   Total Area"
"        15.000   Flow length"
"         3.500   Overland Slope"
"         0.025   Pervious Area"
"        15.000   Pervious length"
"         3.500   Pervious slope"
"         0.045   Impervious Area"
"        15.000   Impervious length"
"         3.500   Impervious slope"
"         0.300   Pervious Manning 'n'"
"        82.000   Pervious SCS Curve No."
"         0.438   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         5.576   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.884   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                       0.017     0.000     0.854     0.854 c.m/sec"
"              Catchment 209          Pervious   Impervious Total Area "
"              Surface Area           0.025      0.045      0.070      hectare"
"              Time of concentration  8.867      1.073      2.714      minutes"
"              Time to Centroid       106.597    87.470     91.498     minutes"
"              Rainfall depth         58.419     58.419     58.419     mm"
"              Rainfall volume        14.31      26.58      40.89      c.m"
"              Rainfall losses        32.819     6.750      15.874     mm"
"              Runoff depth           25.600     51.669     42.545     mm"
"              Runoff volume          6.27       23.51      29.78      c.m"
"              Runoff coefficient     0.438      0.884      0.728      "
"              Maximum flow           0.003      0.016      0.017      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                       0.017     0.017     0.854     0.854"
" 56          DIVERSION"
"           209   Node number"
"         0.015   Overflow threshold"
"         1.000   Required diverted fraction"
"             0   Conduit type; 1=Pipe;2=Channel"
"              Peak of diverted flow         0.002    c.m/sec"
"              Volume of diverted flow       0.603    c.m"
"              DIV00209.010hyd"
"              Major flow at 209"
"                       0.017     0.017     0.015     0.854 c.m/sec"
" 40          HYDROGRAPH Next link "
"             5   Next link "
"                       0.017     0.015     0.015     0.854"
" 33          CATCHMENT 202"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           202   Clayton Subdivision areas draining to SWMF (bypassing infiltration galleries)"
"        55.000   % Impervious"
"         8.060   Total Area"
"        90.000   Flow length"
"         0.500   Overland Slope"
"         3.627   Pervious Area"
"        90.000   Pervious length"
"         0.500   Pervious slope"
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"        4.433   Impervious Area"
"       90.000   Impervious length"
"        0.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.440   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.903   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    1.484     0.015     0.015     0.854 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           3.627      4.433      8.060      hectare"
"             Time of concentration  46.579     5.635      17.306     minutes"
"             Time to Centroid       154.246    93.958     111.144    minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        2118.86    2589.71    4708.57    c.m"
"             Rainfall losses        32.711     5.665      17.836     mm"
"             Runoff depth           25.708     52.754     40.583     mm"
"             Runoff volume          932.44     2338.58    3271.02    c.m"
"             Runoff coefficient     0.440      0.903      0.695      "
"             Maximum flow           0.176      1.455      1.484      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.484     1.498     0.015     0.854"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    1.484     1.498     1.498     0.854"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"             Maximum flow                  1.998    c.m/sec"
"             Hydrograph volume          3864.151    c.m"
"                    1.484     1.498     1.498     1.998"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    1.484     0.000     1.498     1.998"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Clayton Subdivision RY draining to SWMF via Woolwich St & Irvine St"
"       31.700   % Impervious"
"        0.440   Total Area"
"       25.000   Flow length"
"        5.500   Overland Slope"
"        0.301   Pervious Area"
"       25.000   Pervious length"
"        5.500   Pervious slope"
"        0.139   Impervious Area"
"       25.000   Impervious length"
"        5.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.439   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.893   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.065     0.000     1.498     1.998 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.301      0.139      0.440      hectare"
"             Time of concentration  10.519     1.273      6.029      minutes"
"             Time to Centroid       108.692    87.764     98.528     minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        175.56     81.48      257.04     c.m"
"             Rainfall losses        32.785     6.270      24.380     mm"
"             Runoff depth           25.634     52.149     34.039     mm"
"             Runoff volume          77.03      72.74      149.77     c.m"
"             Runoff coefficient     0.439      0.893      0.583      "
"             Maximum flow           0.036      0.049      0.065      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.065     0.065     1.498     1.998"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.065     0.065     0.065     1.998"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"             Maximum flow                  2.057    c.m/sec"
"             Hydrograph volume          4013.923    c.m"
"                    0.065     0.065     0.065     2.057"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
"                Clayton Main Area"
"             Maximum flow                  2.057    c.m/sec"
"             Hydrograph volume          4013.923    c.m"
"                    0.065     2.057     0.065     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.065     2.057     2.057     0.000"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Draining to SWMF"
"             Maximum flow                  2.057    c.m/sec"
"             Hydrograph volume          4013.923    c.m"
"                    0.065     2.057     2.057     2.057"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.065     0.000     2.057     2.057"
" 33          CATCHMENT 210"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          210   Clayton RYs draining to Woolwich St"
"       16.400   % Impervious"
"        0.200   Total Area"
"       25.000   Flow length"
"        5.500   Overland Slope"
"        0.167   Pervious Area"
"       25.000   Pervious length"
"        5.500   Pervious slope"
"        0.033   Impervious Area"
"       25.000   Impervious length"
"        5.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.439   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
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"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.893   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.025     0.000     2.057     2.057 c.m/sec"
"            Catchment 210          Pervious   Impervious Total Area "
"            Surface Area           0.167      0.033      0.200      hectare"
"            Time of concentration  10.519     1.273      7.882      minutes"
"            Time to Centroid       108.692    87.764     102.722    minutes"
"            Rainfall depth         58.419     58.419     58.419     mm"
"            Rainfall volume        97.68      19.16      116.84     c.m"
"            Rainfall losses        32.785     6.270      28.437     mm"
"            Runoff depth           25.634     52.149     29.982     mm"
"            Runoff volume          42.86      17.10      59.96      c.m"
"            Runoff coefficient     0.439      0.893      0.513      "
"            Maximum flow           0.020      0.011      0.025      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                   0.025     0.025     2.057     2.057"
" 56         DIVERSION"
"        210   Node number"
"       0.018   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.007    c.m/sec"
"            Volume of diverted flow       5.347    c.m"
"            DIV00210.010hyd"
"            Major flow at 210"
"                   0.025     0.025     0.018     2.057 c.m/sec"
" 40         HYDROGRAPH   Combine    2"
"          6   Combine "
"          2   Node #"
"              Draining to SWMF"
"            Maximum flow                  2.074    c.m/sec"
"            Hydrograph volume          4068.541    c.m"
"                   0.025     0.025     0.018     2.074"
" 40         HYDROGRAPH Start - New Tributary"
"          2   Start - New Tributary"
"                   0.025     0.000     0.018     2.074"
" 33         CATCHMENT 211"
"          1   Triangular SCS"
"          1   Equal length"
"          1   SCS method"
"        211   Woolwich St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.230   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.081   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.149   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.439   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.880   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.055     0.000     0.018     2.074 c.m/sec"
"            Catchment 211          Pervious   Impervious Total Area "
"            Surface Area           0.081      0.149      0.230      hectare"
"            Time of concentration  8.223      0.995      2.524      minutes"
"            Time to Centroid       105.844    87.362     91.273     minutes"
"            Rainfall depth         58.419     58.419     58.419     mm"
"            Rainfall volume        47.03      87.34      134.36     c.m"
"            Rainfall losses        32.799     7.016      16.040     mm"
"            Runoff depth           25.620     51.403     42.379     mm"
"            Runoff volume          20.62      76.85      97.47      c.m"
"            Runoff coefficient     0.439      0.880      0.725      "
"            Maximum flow           0.011      0.052      0.055      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                   0.055     0.055     0.018     2.074"
" 56         DIVERSION"
"        211   Node number"
"       0.049   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.006    c.m/sec"
"            Volume of diverted flow       1.917    c.m"
"            DIV00211.010hyd"
"            Major flow at 211"
"                   0.055     0.055     0.049     2.074 c.m/sec"
" 40         HYDROGRAPH   Combine    2"
"          6   Combine "
"          2   Node #"
"              Draining to SWMF"
"            Maximum flow                  2.123    c.m/sec"
"            Hydrograph volume          4164.096    c.m"
"                   0.055     0.055     0.049     2.123"
" 40         HYDROGRAPH Start - New Tributary"
"          2   Start - New Tributary"
"                   0.055     0.000     0.049     2.123"
" 33         CATCHMENT 212"
"          1   Triangular SCS"
"          1   Equal length"
"          1   SCS method"
"        212   Clayton laneway towns to Irvine Street (up to 5yr flow)"
"      19.100   % Impervious"
"       0.050   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.040   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.010   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.438   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.873   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.008     0.000     0.049     2.123 c.m/sec"
"            Catchment 212          Pervious   Impervious Total Area "
"            Surface Area           0.040      0.010      0.050      hectare"
"            Time of concentration  7.451      0.901      5.355      minutes"
```

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"            Time to Centroid       104.862    87.274     99.232     minutes"
"            Rainfall depth         58.419     58.419     58.419     mm"
"            Rainfall volume        23.63      5.58       29.21      c.m"
"            Rainfall losses        32.838     7.407      27.981     mm"
"            Runoff depth           25.581     51.012     30.438     mm"
"            Runoff volume          10.35      4.87       15.22      c.m"
"            Runoff coefficient     0.438      0.873      0.521      "
"            Maximum flow           0.006      0.003      0.008      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                  0.008     0.008     0.049     2.123"
" 56         DIVERSION"
"        212   Node number"
"      0.006   Overflow threshold"
"      1.000   Required diverted fraction"
"          0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.002    c.m/sec"
"            Volume of diverted flow       0.772    c.m"
"            DIV00212.010hyd"
"            Major flow at 212"
"                  0.008     0.008     0.006     2.123 c.m/sec"
" 40         HYDROGRAPH   Combine    2"
"          6   Combine "
"          2   Node #"
"              Draining to SWMF"
"            Maximum flow                  2.129    c.m/sec"
"            Hydrograph volume          4178.542    c.m"
"                  0.008     0.008     0.006     2.129"
" 40         HYDROGRAPH Start - New Tributary"
"          2   Start - New Tributary"
"                  0.008     0.000     0.006     2.129"
" 33         CATCHMENT 213"
"          1   Triangular SCS"
"          1   Equal length"
"          1   SCS method"
"        213   Irvine St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.190   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.067   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.123   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.439   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.880   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.046     0.000     0.006     2.129 c.m/sec"
"            Catchment 213          Pervious   Impervious Total Area "
"            Surface Area           0.067      0.123      0.190      hectare"
"            Time of concentration  8.223      0.995      2.524      minutes"
"            Time to Centroid       105.844    87.362     91.273     minutes"
"            Rainfall depth         58.419     58.419     58.419     mm"
"            Rainfall volume        38.85      72.15      111.00     c.m"
"            Rainfall losses        32.799     7.016      16.040     mm"
"            Runoff depth           25.620     51.403     42.379     mm"
"            Runoff volume          17.04      63.48      80.52      c.m"
"            Runoff coefficient     0.439      0.880      0.725      "
"            Maximum flow           0.009      0.043      0.046      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                  0.046     0.046     0.006     2.129"
" 56         DIVERSION"
"        213   Node number"
"      0.040   Overflow threshold"
"      1.000   Required diverted fraction"
"          0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.006    c.m/sec"
"            Volume of diverted flow       1.727    c.m"
"            DIV00213.010hyd"
"            Major flow at 213"
"                  0.046     0.046     0.040     2.129 c.m/sec"
" 40         HYDROGRAPH Next link "
"          5   Next link "
"                  0.046     0.040     0.040     2.129"
" 33         CATCHMENT 204"
"          1   Triangular SCS"
"          1   Equal length"
"          1   SCS method"
"        204   Woolwich St & Irvine Street draining to SWMF"
"      65.000   % Impervious"
"       0.970   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.340   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.631   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.439   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.880   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.234     0.040     0.040     2.129 c.m/sec"
"            Catchment 204          Pervious   Impervious Total Area "
"            Surface Area           0.340      0.631      0.970      hectare"
"            Time of concentration  8.223      0.995      2.524      minutes"
"            Time to Centroid       105.844    87.362     91.273     minutes"
"            Rainfall depth         58.419     58.419     58.419     mm"
"            Rainfall volume        198.33     368.33     566.66     c.m"
"            Rainfall losses        32.799     7.016      16.040     mm"
"            Runoff depth           25.620     51.403     42.379     mm"
"            Runoff volume          86.98      324.10     411.08     c.m"
"            Runoff coefficient     0.439      0.880      0.725      "
"            Maximum flow           0.045      0.221      0.234      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                  0.234     0.274     0.040     2.129"
" 40         HYDROGRAPH Copy to Outflow"
"          8   Copy to Outflow"
"                  0.234     0.274     0.274     2.129"
" 40         HYDROGRAPH   Combine    2"
"          6   Combine "
"          2   Node #"
```

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"               Draining to SWMF"
"             Maximum flow                 2.402    c.m/sec"
"             Hydrograph volume          4668.411    c.m"
"                    0.234     0.274     0.274     2.402"
" 40          HYDROGRAPH   Confluence    2"
"             7   Confluence "
"             2   Node #"
"                 Draining to SWMF"
"             Maximum flow                 2.402    c.m/sec"
"             Hydrograph volume          4668.411    c.m"
"                    0.234     2.402     0.274     0.000"
" 33          CATCHMENT 205"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           205   Elora Sands existing drainage to SWMF"
"         0.000   % Impervious"
"         9.600   Total Area"
"       250.000   Flow length"
"         3.000   Overland Slope"
"         9.600   Pervious Area"
"       250.000   Pervious length"
"         3.000   Pervious slope"
"         0.000   Impervious Area"
"       250.000   Impervious length"
"         3.000   Impervious slope"
"         0.300   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.366   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.000   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                    0.336     2.402     0.274     0.000 c.m/sec"
"               Catchment 205          Pervious   Impervious Total Area "
"               Surface Area           9.600      0.000      9.600      hectare"
"               Time of concentration  55.056     6.076      55.056     minutes"
"               Time to Centroid       164.929    94.594     164.929    minutes"
"               Rainfall depth         58.419     58.419     58.419     mm"
"               Rainfall volume        5608.21    0.01       5608.22    c.m"
"               Rainfall losses        37.045     5.573      37.045     mm"
"               Runoff depth           21.374     52.846     21.374     mm"
"               Runoff volume          2051.86    0.01       2051.86    c.m"
"               Runoff coefficient     0.366      0.000      0.366      "
"               Maximum flow           0.336      0.000      0.336      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                    0.336     2.416     0.274     0.000"
" 33          CATCHMENT 206"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           206   SWMF + Overland Flow Channel"
"        40.000   % Impervious"
"         1.340   Total Area"
"        20.000   Flow length"
"        25.000   Overland Slope"
"         0.804   Pervious Area"
"        20.000   Pervious length"
"        25.000   Pervious slope"
"         0.536   Impervious Area"
"        20.000   Impervious length"
"        25.000   Impervious slope"
"         0.300   Pervious Manning 'n'"
"        82.000   Pervious SCS Curve No."
"         0.436   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         5.576   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.854   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                    0.245     2.416     0.274     0.000 c.m/sec"
"               Catchment 206          Pervious   Impervious Total Area "
"               Surface Area           0.804      0.536      1.340      hectare"
"               Time of concentration  5.842      0.707      2.936      minutes"
"               Time to Centroid       102.867    87.325     94.071     minutes"
"               Rainfall depth         58.419     58.419     58.419     mm"
"               Rainfall volume        469.69     313.13     782.81     c.m"
"               Rainfall losses        32.924     8.556      23.177     mm"
"               Runoff depth           25.495     49.863     35.242     mm"
"               Runoff volume          204.98     267.27     472.25     c.m"
"               Runoff coefficient     0.436      0.854      0.603      "
"               Maximum flow           0.116      0.186      0.245      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                    0.245     2.661     0.274     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"             8   Copy to Outflow"
"                    0.245     2.661     2.661     0.000"
" 40          HYDROGRAPH   Combine    3"
"             6   Combine "
"             3   Node #"
"                 Draining to SWMF"
"             Maximum flow                 2.661    c.m/sec"
"             Hydrograph volume          7192.516    c.m"
"                    0.245     2.661     2.661     2.661"
" 40          HYDROGRAPH   Confluence    3"
"             7   Confluence "
"             3   Node #"
"                 Draining to SWMF"
"             Maximum flow                 2.661    c.m/sec"
"             Hydrograph volume          7192.516    c.m"
"                    0.245     2.661     2.661     0.000"
" 54          POND DESIGN"
"          2.661   Current peak flow    c.m/sec"
"          0.385   Target outflow    c.m/sec"
"         7192.5   Hydrograph volume    c.m"
"            22.   Number of stages"
"        403.600   Minimum water level    metre"
"        405.700   Maximum water level    metre"
"        403.600   Starting water level    metre"
"              0   Keep Design Data: 1 = True; 0 = False"
"                    Level Discharge    Volume"
"                  403.600     0.000     0.000"
"                  403.700   0.00300   512.000"
"                  403.800   0.00600  1044.000"
"                  403.900   0.00700  1597.000"
"                  404.000   0.02800  2171.000"
"                  404.100    0.1120  2767.000"
"                  404.200    0.2320  3382.000"
"                  404.300    0.3950  4013.000"
"                  404.400    0.6330  4657.000"
"                  404.500    0.9240  5314.000"
"                  404.600     1.265  5983.000"
"                  404.700     1.648  6666.000"
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"               404.800     2.067  7361.000"
"               404.900     2.519  8070.000"
"               405.000     3.002  8792.000"
"               405.100     3.785  9528.000"
"               405.200     4.924  10280.00"
"               405.300     6.413  11047.00"
"               405.400     8.269  11831.00"
"               405.500    10.517  12632.00"
"               405.600    13.180  13449.00"
"               405.700    16.279  14283.00"
"            Peak outflow                 0.488    c.m/sec"
"            Maximum level              404.339    metre"
"            Maximum storage           4264.926    c.m"
"            Centroidal lag              17.086   hours"
"                0.245     2.661     0.488     0.000 c.m/sec"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                 0.488    c.m/sec"
"            Hydrograph volume         6295.299    c.m"
"                    0.245     2.661     0.488     0.488"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.245     0.000     0.488     0.488"
" 33         CATCHMENT 207"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         207   Elora Sands draining to ND1 bypassing SWMF"
"       0.000   % Impervious"
"       2.080   Total Area"
"     100.000   Flow length"
"       4.500   Overland Slope"
"       2.080   Pervious Area"
"     100.000   Pervious length"
"       4.500   Pervious slope"
"       0.000   Impervious Area"
"     100.000   Impervious length"
"       4.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.366   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.121     0.000     0.488     0.488 c.m/sec"
"            Catchment 207          Pervious   Impervious Total Area "
"            Surface Area           2.080      0.000      2.080      hectare"
"            Time of concentration  28.133     3.105      28.133     minutes"
"            Time to Centroid       131.657    90.440     131.657    minutes"
"            Rainfall depth         58.419     58.419     58.419     mm"
"            Rainfall volume        1215.11    0.00       1215.11    c.m"
"            Rainfall losses        37.058     6.353      37.058     mm"
"            Runoff depth           21.361     52.066     21.361     mm"
"            Runoff volume          444.31     0.00       444.31     c.m"
"            Runoff coefficient     0.366      0.000      0.366      "
"            Maximum flow           0.121      0.000      0.121      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.121     0.121     0.488     0.488"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.121     0.121     0.121     0.488"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                 0.524    c.m/sec"
"            Hydrograph volume         6739.604    c.m"
"                    0.121     0.121     0.121     0.524"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.121     0.000     0.121     0.524"
" 33         CATCHMENT 208"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         208   External ROWs draining to ND1 bypassing SWMF"
"      49.700   % Impervious"
"       0.560   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.282   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.278   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.364   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.880   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.106     0.000     0.121     0.524 c.m/sec"
"            Catchment 208          Pervious   Impervious Total Area "
"            Surface Area           0.282      0.278      0.560      hectare"
"            Time of concentration  9.013      0.995      3.361      minutes"
"            Time to Centroid       108.041    87.362     93.466     minutes"
"            Rainfall depth         58.419     58.419     58.419     mm"
"            Rainfall volume        164.55     162.59     327.15     c.m"
"            Rainfall losses        37.151     7.016      22.174     mm"
"            Runoff depth           21.268     51.403     36.245     mm"
"            Runoff volume          59.91      143.06     202.97     c.m"
"            Runoff coefficient     0.364      0.880      0.620      "
"            Maximum flow           0.029      0.097      0.106      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.106     0.106     0.121     0.524"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.106     0.106     0.106     0.524"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                 0.532    c.m/sec"
"            Hydrograph volume         6942.576    c.m"
"                    0.106     0.106     0.106     0.532"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
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"                   0.106     0.000     0.106     0.532"
" 33          CATCHMENT 214"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          214   Clayton Subdivision RYs draining NW offsite to Woolwich Street E"
"        0.000   % Impervious"
"        0.100   Total Area"
"       60.000   Flow length"
"        5.000   Overland Slope"
"        0.100   Pervious Area"
"       60.000   Pervious length"
"        5.000   Pervious slope"
"        0.000   Impervious Area"
"       60.000   Impervious length"
"        5.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.440   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.009     0.000     0.106     0.532 c.m/sec"
"             Catchment 214          Pervious   Impervious Total Area "
"             Surface Area           0.100      0.000      0.100      hectare"
"             Time of concentration  18.304     2.214      18.304     minutes"
"             Time to Centroid       118.516    89.096     118.516    minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        58.42      0.00       58.42      c.m"
"             Rainfall losses        32.728     6.103      32.728     mm"
"             Runoff depth           25.691     52.316     25.691     mm"
"             Runoff volume          25.69      0.00       25.69      c.m"
"             Runoff coefficient     0.440      0.000      0.440      "
"             Maximum flow           0.009      0.000      0.009      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                   0.009     0.009     0.106     0.532"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                   0.009     0.009     0.009     0.532"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                  0.009    c.m/sec"
"             Hydrograph volume            25.691    c.m"
"                   0.009     0.009     0.009     0.009"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.009     0.000     0.009     0.009"
" 47          FILEI_O Read/Open DIV00210.010hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00210.010hyd"
"             Major flow at 210"
"             Total volume                  5.347    c.m"
"             Maximum flow                  0.007    c.m/sec"
"                 0.009     0.007     0.009     0.009 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                   0.009     0.007     0.007     0.009"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                  0.015    c.m/sec"
"             Hydrograph volume            31.038    c.m"
"                   0.009     0.007     0.007     0.015"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.009     0.000     0.007     0.015"
" 47          FILEI_O Read/Open DIV00211.010hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00211.010hyd"
"             Major flow at 211"
"             Total volume                  1.917    c.m"
"             Maximum flow                  0.006    c.m/sec"
"                 0.009     0.006     0.007     0.015 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                   0.009     0.006     0.006     0.015"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                  0.015    c.m/sec"
"             Hydrograph volume            32.955    c.m"
"                   0.009     0.006     0.006     0.015"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.009     0.000     0.006     0.015"
" 33          CATCHMENT 215"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          215   Clayton Subdivision RYs draining offsite SW to rural residental"
"        0.000   % Impervious"
"        0.500   Total Area"
"       15.000   Flow length"
"        4.500   Overland Slope"
"        0.500   Pervious Area"
"       15.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       15.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.439   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.066     0.000     0.006     0.015 c.m/sec"
"             Catchment 215          Pervious   Impervious Total Area "
"             Surface Area           0.500      0.000      0.500      hectare"
"             Time of concentration  8.223      0.995      8.223      minutes"
"             Time to Centroid       105.844    87.362     105.844    minutes"
"             Rainfall depth         58.419     58.419     58.419     mm"
"             Rainfall volume        292.09     0.00       292.09     c.m"
```

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"            Rainfall losses        32.799     7.016      32.799     mm"
"            Runoff depth           25.620     51.403     25.620     mm"
"            Runoff volume          128.10     0.00       128.10     c.m"
"            Runoff coefficient     0.439      0.000      0.439      "
"            Maximum flow           0.066      0.000      0.066      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.066     0.066     0.006     0.015"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.066     0.066     0.066     0.015"
" 40         HYDROGRAPH   Combine    6"
"           6   Combine "
"           6   Node #"
"               Draining SW to rural residential"
"            Maximum flow                  0.066    c.m/sec"
"            Hydrograph volume           128.101    c.m"
"                   0.066     0.066     0.066     0.066"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.066     0.000     0.066     0.066"
" 47         FILEI_O Read/Open DIV00209.010hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00209.010hyd"
"            Major flow at 209"
"            Total volume                  0.603    c.m"
"            Maximum flow                  0.002    c.m/sec"
"                 0.066     0.002     0.066     0.066 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.066     0.002     0.002     0.066"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.002    c.m/sec"
"            Hydrograph volume             0.603    c.m"
"                   0.066     0.002     0.002     0.002"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.066     0.000     0.002     0.002"
" 33         CATCHMENT 216"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         216   Clayton Subd. RYs draining SE offsite to Elora Meadows"
"       7.800   % Impervious"
"       0.240   Total Area"
"       4.000   Flow length"
"      33.000   Overland Slope"
"       0.221   Pervious Area"
"       4.000   Pervious length"
"      33.000   Pervious slope"
"       0.019   Impervious Area"
"       4.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.433   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.782   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.038     0.000     0.002     0.002 c.m/sec"
"            Catchment 216          Pervious   Impervious Total Area "
"            Surface Area           0.221      0.019      0.240      hectare"
"            Time of concentration  2.047      0.248      1.808      minutes"
"            Time to Centroid       97.797     86.053     96.242     minutes"
"            Rainfall depth         58.419     58.419     58.419     mm"
"            Rainfall volume        129.27     10.94      140.21     c.m"
"            Rainfall losses        33.097     12.725     31.508     mm"
"            Runoff depth           25.322     45.694     26.911     mm"
"            Runoff volume          56.03      8.55       64.59      c.m"
"            Runoff coefficient     0.433      0.782      0.461      "
"            Maximum flow           0.033      0.006      0.038      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.038     0.038     0.002     0.002"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.038     0.038     0.038     0.002"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.040    c.m/sec"
"            Hydrograph volume            65.189    c.m"
"                   0.038     0.038     0.038     0.040"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.038     0.000     0.038     0.040"
" 33         CATCHMENT 217"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         217   Clayton Subd. draining SE offsite to Elora Meadows (via Irvine St.)"
"      11.400   % Impervious"
"       0.070   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.062   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.008   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.438   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.873   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.010     0.000     0.038     0.040 c.m/sec"
"            Catchment 217          Pervious   Impervious Total Area "
"            Surface Area           0.062      0.008      0.070      hectare"
"            Time of concentration  7.451      0.901      6.114      minutes"
"            Time to Centroid       104.862    87.274     101.271    minutes"
"            Rainfall depth         58.419     58.419     58.419     mm"
"            Rainfall volume        36.23      4.66       40.89      c.m"
"            Rainfall losses        32.838     7.407      29.939     mm"
"            Runoff depth           25.581     51.012     28.480     mm"
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"            Runoff volume          15.87      4.07       19.94      c.m"
"            Runoff coefficient     0.438      0.873      0.488      "
"            Maximum flow           0.009      0.003      0.010      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.010     0.010     0.038     0.040"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.010     0.010     0.010     0.040"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.047    c.m/sec"
"            Hydrograph volume            85.125    c.m"
"                    0.010     0.010     0.010     0.047"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.010     0.000     0.010     0.047"
" 47         FILEI_O Read/Open DIV00212.010hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00212.010hyd"
"            Major flow at 212"
"            Total volume                  0.772    c.m"
"            Maximum flow                  0.002    c.m/sec"
"                 0.010     0.002     0.010     0.047 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.010     0.002     0.002     0.047"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.048    c.m/sec"
"            Hydrograph volume            85.897    c.m"
"                    0.010     0.002     0.002     0.048"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.010     0.000     0.002     0.048"
" 47         FILEI_O Read/Open DIV00213.010hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00213.010hyd"
"            Major flow at 213"
"            Total volume                  1.727    c.m"
"            Maximum flow                  0.006    c.m/sec"
"                 0.010     0.006     0.002     0.048 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.010     0.006     0.006     0.048"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.051    c.m/sec"
"            Hydrograph volume            87.624    c.m"
"                    0.010     0.006     0.006     0.051"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.010     0.000     0.006     0.051"
" 33         CATCHMENT 218"
"           1   Triangular SCS"
"               1   Equal length"
"               1   SCS method"
"             218   Irvine St drawing S to Elora Meadows"
"           65.000  % Impervious"
"            0.200  Total Area"
"           10.000  Flow length"
"            2.000  Overland Slope"
"            0.070  Pervious Area"
"           10.000  Pervious length"
"            2.000  Pervious slope"
"            0.130  Impervious Area"
"           10.000  Impervious length"
"            2.000  Impervious slope"
"            0.300  Pervious Manning 'n'"
"           82.000  Pervious SCS Curve No."
"            0.439  Pervious Runoff coefficient"
"            0.100  Pervious Ia/S coefficient"
"            5.576  Pervious Initial abstraction"
"            0.015  Impervious Manning 'n'"
"           98.000  Impervious SCS Curve No."
"            0.880  Impervious Runoff coefficient"
"            0.100  Impervious Ia/S coefficient"
"            0.518  Impervious Initial abstraction"
"                    0.048     0.000     0.006     0.051 c.m/sec"
"                 Catchment 218          Pervious   Impervious Total Area "
"                 Surface Area           0.070      0.130      0.200      hectare"
"                 Time of concentration  8.223      0.995      2.524      minutes"
"                 Time to Centroid       105.844    87.362     91.273     minutes"
"                 Rainfall depth         58.419     58.419     58.419     mm"
"                 Rainfall volume        40.89      75.94      116.84     c.m"
"                 Rainfall losses        32.799     7.016      16.040     mm"
"                 Runoff depth           25.620     51.403     42.379     mm"
"                 Runoff volume          17.93      66.82      84.76      c.m"
"                 Runoff coefficient     0.439      0.880      0.725      "
"                 Maximum flow           0.009      0.045      0.048      c.m/sec"
" 40              HYDROGRAPH Add Runoff "
"                4   Add Runoff "
"                         0.048     0.048     0.006     0.051"
" 40              HYDROGRAPH Copy to Outflow"
"                8   Copy to Outflow"
"                         0.048     0.048     0.048     0.051"
" 40              HYDROGRAPH   Combine    7"
"                6   Combine "
"                7   Node #"
"                    Draining SE to Elora Meadows"
"                 Maximum flow                  0.099    c.m/sec"
"                 Hydrograph volume           172.382    c.m"
"                         0.048     0.048     0.048     0.099"
" 38              START/RE-START TOTALS 218"
"                3   Runoff Totals on EXIT"
"                 Total Catchment area                    27.650    hectare"
"                 Total Impervious area                    9.285    hectare"
"                 Total % impervious                      33.580"
" 19              EXIT"
```

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"               MIDUSS Output ----------------------------------------------->"
"               MIDUSS version                          Version 2.25  rev. 473"
"               MIDUSS created                        Sunday, February 7, 2010"
"          10   Units used:                                        ie METRIC"
"               Job folder:                Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                    Post-Dev"
"               Output filename:                              25yr_Post-Dev.out"
"               Licensee name:                                               A"
"               Company                                                      "
"               Date & Time last used:                 6/13/2023 at 8:18:42 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    3000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    3023.000   Coefficient A"
"      18.000   Constant B"
"       0.916   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"             Maximum intensity          170.985    mm/hr"
"             Total depth                 71.381    mm"
"           6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Clayton Subdivision roof areas to lot-level infiltration galleries"
"     100.000   % Impervious"
"       2.750   Total Area"
"       6.000   Flow length"
"      33.000   Overland Slope"
"       0.000   Pervious Area"
"       6.000   Pervious length"
"      33.000   Pervious slope"
"       2.750   Impervious Area"
"       6.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.798   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   1.092     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      2.750      2.750      hectare"
"             Time of concentration  2.318      0.297      0.297      minutes"
"             Time to Centroid       97.078     85.852     85.852     minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        0.00       1962.98    1962.99    c.m"
"             Rainfall losses        36.400     14.449     14.449     mm"
"             Runoff depth           34.982     56.933     56.933     mm"
"             Runoff volume          0.00       1565.64    1565.65    c.m"
"             Runoff coefficient     0.000      0.798      0.798      "
"             Maximum flow           0.000      1.092      1.092      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   1.092     1.092     0.000     0.000"
" 57          TRENCH Design d/s of 201"
"       1.092   Peak inflow"
"    1565.646   Hydrograph volume"
"       2.500   Ground elevation"
"       1.000   Downstream trench invert"
"       1.000   Trench height"
"       0.000   Water table elevation"
"       1.000   Trench top width"
"       1.000   Trench bottom width"
"      40.000   Voids ratio (%)"
"     100.000   Hydraulic conductivity"
"       0.000   Trench gradient (%)"
"     600.000   Trench length"
"       1.000   Include base width"
"         16.   Number of stages"
"                 Level Discharge    Volume"
"                 1.000     0.000      0.0"
"                 1.100     0.000     24.0"
"                 1.200     0.000     48.0"
"                 1.300     0.000     72.0"
"                 1.400     0.000     96.0"
"                 1.500     0.000    120.0"
"                 1.600     0.000    144.0"
"                 1.700     0.000    168.0"
"                 1.800     0.000    192.0"
"                 1.900     0.000    216.0"
"                 2.000     0.000    240.0"
"                 2.100     0.975    240.1"
"                 2.200     3.905    240.2"
"                 2.300     8.694    240.3"
"                 2.400    15.452    240.5"
"                 2.500    23.923    240.6"
"          1.   TRENCH PIPES"
"            Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                Invert    length     diam.    grade%     0=Yes  distance"
"                 2.000    20.000     0.000     0.000     1.000     0.000"
"          1.   MANHOLE"
"               Access"
"              diameter"
"                 1.200"
"          1.   OUTFLOW PIPE"
"          0.   Inflow at upstream end of trench: 1=True; 0=False"
"             Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"               invert    invert    Length  Diameter       'n'   loss Ke"
"                2.000     2.000    20.000 10000.000     0.013     0.500"
"            Peak outflow                  1.015    c.m/sec"
"            Outflow volume              884.328    c.m"
"            Peak exfiltration             0.078    c.m/sec"
"            Exfiltration volume         727.098    c.m"
"            Maximum level                 2.101    metre"
"            Maximum storage             240.115    c.m"
"            Centroidal lag                1.338   hours"
"            Infiltration area 2 sides  1200.000   sq.metre"
"            Infiltration Base area      600.000   sq.metre"
"                 1.092     1.092     1.015     0.078 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                  1.015    c.m/sec"
"            Hydrograph volume           884.328    c.m"
"                   1.092     1.092     1.015     1.015"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   1.092     0.000     1.015     1.015"
```

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" 33          CATCHMENT 209"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          209   Marr Drive transition grading to Bricker Ave."
"       65.000   % Impervious"
"        0.070   Total Area"
"       15.000   Flow length"
"        3.500   Overland Slope"
"        0.025   Pervious Area"
"       15.000   Pervious length"
"        3.500   Pervious slope"
"        0.045   Impervious Area"
"       15.000   Impervious length"
"        3.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.498   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.896   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.020     0.000     1.015     1.015 c.m/sec"
"             Catchment 209          Pervious   Impervious Total Area "
"             Surface Area           0.025      0.045      0.070      hectare"
"             Time of concentration  7.873      1.008      2.588      minutes"
"             Time to Centroid       104.153    86.878     90.855     minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        17.49      32.48      49.97      c.m"
"             Rainfall losses        35.864     7.440      17.389     mm"
"             Runoff depth           35.517     63.941     53.993     mm"
"             Runoff volume          8.70       29.09      37.79      c.m"
"             Runoff coefficient     0.498      0.896      0.756      "
"             Maximum flow           0.005      0.019      0.020      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.020     0.020     1.015     1.015"
" 56          DIVERSION"
"          209   Node number"
"        0.015   Overflow threshold"
"        1.000   Required diverted fraction"
"            0   Conduit type; 1=Pipe;2=Channel"
"             Peak of diverted flow         0.005    c.m/sec"
"             Volume of diverted flow       2.432    c.m"
"             DIV00209.025hyd"
"             Major flow at 209"
"                    0.020     0.020     0.015     1.015 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.020     0.015     0.015     1.015"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          202   Clayton Subdivision areas draining to SWMF (bypassing infiltration galleries)"
"       55.000   % Impervious"
"        8.060   Total Area"
"       90.000   Flow length"
"        0.500   Overland Slope"
"        3.627   Pervious Area"
"       90.000   Pervious length"
"        0.500   Pervious slope"
"        4.433   Impervious Area"
"       90.000   Impervious length"
"        0.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.499   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.917   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    1.777     0.015     0.015     1.015 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           3.627      4.433      8.060      hectare"
"             Time of concentration  41.356     5.295      16.399     minutes"
"             Time to Centroid       146.200    92.875     109.295    minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        2589.00    3164.33    5753.33    c.m"
"             Rainfall losses        35.773     5.901      19.343     mm"
"             Runoff depth           35.608     65.481     52.038     mm"
"             Runoff volume          1291.51    2902.76    4194.27    c.m"
"             Runoff coefficient     0.499      0.917      0.729      "
"             Maximum flow           0.274      1.725      1.777      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.777     1.792     0.015     1.015"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    1.777     1.792     1.792     1.015"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"             Maximum flow                  2.456    c.m/sec"
"             Hydrograph volume          5113.960    c.m"
"                    1.777     1.792     1.792     2.456"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    1.777     0.000     1.792     2.456"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Clayton Subdivision RY draining to SWMF via Woolwich St & Irvine St"
"       31.700   % Impervious"
"        0.440   Total Area"
"       25.000   Flow length"
"        5.500   Overland Slope"
"        0.301   Pervious Area"
"       25.000   Pervious length"
"        5.500   Pervious slope"
"        0.139   Impervious Area"
"       25.000   Impervious length"
"        5.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.497   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.905   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
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"       0.518   Impervious Initial abstraction"
"                   0.089     0.000     1.792     2.456 c.m/sec"
"            Catchment 203          Pervious   Impervious Total Area "
"            Surface Area           0.301      0.139      0.440      hectare"
"            Time of concentration  9.340      1.196      5.608      minutes"
"            Time to Centroid       105.968    87.133     97.337     minutes"
"            Rainfall depth         71.381     71.381     71.381     mm"
"            Rainfall volume        214.52     99.56      314.08     c.m"
"            Rainfall losses        35.914     6.748      26.668     mm"
"            Runoff depth           35.467     64.634     44.713     mm"
"            Runoff volume          106.59     90.15      196.74     c.m"
"            Runoff coefficient     0.497      0.905      0.626      "
"            Maximum flow           0.053      0.057      0.089      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.089     0.089     1.792     2.456"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.089     0.089     0.089     2.456"
" 40         HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                 2.533    c.m/sec"
"            Hydrograph volume          5310.697    c.m"
"                   0.089     0.089     0.089     2.533"
" 40         HYDROGRAPH   Confluence    1"
"           7   Confluence "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                 2.533    c.m/sec"
"            Hydrograph volume          5310.697    c.m"
"                   0.089     2.533     0.089     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.089     2.533     2.533     0.000"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 2.533    c.m/sec"
"            Hydrograph volume          5310.697    c.m"
"                   0.089     2.533     2.533     2.533"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.089     0.000     2.533     2.533"
" 33         CATCHMENT 210"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         210   Clayton RYs draining to Woolwich St"
"      16.400   % Impervious"
"       0.200   Total Area"
"      25.000   Flow length"
"       5.500   Overland Slope"
"       0.167   Pervious Area"
"      25.000   Pervious length"
"       5.500   Pervious slope"
"       0.033   Impervious Area"
"      25.000   Impervious length"
"       5.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.497   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.905   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.036     0.000     2.533     2.533 c.m/sec"
"            Catchment 210          Pervious   Impervious Total Area "
"            Surface Area           0.167      0.033      0.200      hectare"
"            Time of concentration  9.340      1.196      7.195      minutes"
"            Time to Centroid       105.968    87.133     101.008    minutes"
"            Rainfall depth         71.381     71.381     71.381     mm"
"            Rainfall volume        119.35     23.41      142.76     c.m"
"            Rainfall losses        35.914     6.748      31.131     mm"
"            Runoff depth           35.467     64.634     40.251     mm"
"            Runoff volume          59.30      21.20      80.50      c.m"
"            Runoff coefficient     0.497      0.905      0.564      "
"            Maximum flow           0.030      0.013      0.036      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.036     0.036     2.533     2.533"
" 56         DIVERSION"
"         210   Node number"
"       0.018   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.018    c.m/sec"
"            Volume of diverted flow      16.717    c.m"
"            DIV00210.025hyd"
"            Major flow at 210"
"                   0.036     0.036     0.018     2.533 c.m/sec"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 2.551    c.m/sec"
"            Hydrograph volume          5374.481    c.m"
"                   0.036     0.036     0.018     2.551"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.036     0.000     0.018     2.551"
" 33         CATCHMENT 211"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         211   Woolwich St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.230   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.081   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.149   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.496   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.891   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
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"       0.518   Impervious Initial abstraction"
"                    0.068     0.000     0.018     2.551 c.m/sec"
"             Catchment 211          Pervious   Impervious Total Area "
"             Surface Area           0.081      0.149      0.230      hectare"
"             Time of concentration  7.301      0.935      2.404      minutes"
"             Time to Centroid       103.507    86.797     90.654     minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        57.46      106.72     164.18     c.m"
"             Rainfall losses        35.956     7.807      17.659     mm"
"             Runoff depth           35.425     63.574     53.722     mm"
"             Runoff volume          28.52      95.04      123.56     c.m"
"             Runoff coefficient     0.496      0.891      0.753      "
"             Maximum flow           0.016      0.061      0.068      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.068     0.068     0.018     2.551"
" 56          DIVERSION"
"             211   Node number"
"           0.049   Overflow threshold"
"           1.000   Required diverted fraction"
"               0   Conduit type; 1=Pipe;2=Channel"
"             Peak of diverted flow         0.019    c.m/sec"
"             Volume of diverted flow       7.929    c.m"
"             DIV00211.025hyd"
"             Major flow at 211"
"                    0.068     0.068     0.049     2.551 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"             Maximum flow                  2.600    c.m/sec"
"             Hydrograph volume          5490.112    c.m"
"                    0.068     0.068     0.049     2.600"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.068     0.000     0.049     2.600"
" 33          CATCHMENT 212"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         212   Clayton laneway towns to Irvine Street (up to 5yr flow)"
"       19.100  % Impervious"
"        0.050  Total Area"
"       12.000  Flow length"
"        4.000  Overland Slope"
"        0.040  Pervious Area"
"       12.000  Pervious length"
"        4.000  Pervious slope"
"        0.010  Impervious Area"
"       12.000  Impervious length"
"        4.000  Impervious slope"
"        0.300  Pervious Manning 'n'"
"       82.000  Pervious SCS Curve No."
"        0.494  Pervious Runoff coefficient"
"        0.100  Pervious Ia/S coefficient"
"        5.576  Pervious Initial abstraction"
"        0.015  Impervious Manning 'n'"
"       98.000  Impervious SCS Curve No."
"        0.883  Impervious Runoff coefficient"
"        0.100  Impervious Ia/S coefficient"
"        0.518  Impervious Initial abstraction"
"                    0.010     0.000     0.049     2.600 c.m/sec"
"             Catchment 212          Pervious   Impervious Total Area "
"             Surface Area           0.040      0.010      0.050      hectare"
"             Time of concentration  6.616      0.847      4.903      minutes"
"             Time to Centroid       102.674    86.754     97.946     minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        28.87      6.82       35.69      c.m"
"             Rainfall losses        36.148     8.341      30.837     mm"
"             Runoff depth           35.234     63.040     40.545     mm"
"             Runoff volume          14.25      6.02       20.27      c.m"
"             Runoff coefficient     0.494      0.883      0.568      "
"             Maximum flow           0.008      0.004      0.010      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.010     0.010     0.049     2.600"
" 56          DIVERSION"
"             212   Node number"
"           0.006   Overflow threshold"
"           1.000   Required diverted fraction"
"               0   Conduit type; 1=Pipe;2=Channel"
"             Peak of diverted flow         0.004    c.m/sec"
"             Volume of diverted flow       2.874    c.m"
"             DIV00212.025hyd"
"             Major flow at 212"
"                    0.010     0.010     0.006     2.600 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"             Maximum flow                  2.606    c.m/sec"
"             Hydrograph volume          5507.512    c.m"
"                    0.010     0.010     0.006     2.606"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.010     0.000     0.006     2.606"
" 33          CATCHMENT 213"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         213   Irvine St transition grading (up to 5yr flow)"
"       65.000  % Impervious"
"        0.190  Total Area"
"       10.000  Flow length"
"        2.000  Overland Slope"
"        0.067  Pervious Area"
"       10.000  Pervious length"
"        2.000  Pervious slope"
"        0.123  Impervious Area"
"       10.000  Impervious length"
"        2.000  Impervious slope"
"        0.300  Pervious Manning 'n'"
"       82.000  Pervious SCS Curve No."
"        0.496  Pervious Runoff coefficient"
"        0.100  Pervious Ia/S coefficient"
"        5.576  Pervious Initial abstraction"
"        0.015  Impervious Manning 'n'"
"       98.000  Impervious SCS Curve No."
"        0.891  Impervious Runoff coefficient"
"        0.100  Impervious Ia/S coefficient"
"        0.518  Impervious Initial abstraction"
"                    0.056     0.000     0.006     2.606 c.m/sec"
"             Catchment 213          Pervious   Impervious Total Area "
"             Surface Area           0.067      0.123      0.190      hectare"
"             Time of concentration  7.301      0.935      2.404      minutes"
"             Time to Centroid       103.507    86.797     90.654     minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        47.47      88.16      135.62     c.m"
"             Rainfall losses        35.956     7.807      17.659     mm"
"             Runoff depth           35.425     63.574     53.722     mm"
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"            Runoff volume          23.56      78.51      102.07     c.m"
"            Runoff coefficient     0.496      0.891      0.753      "
"            Maximum flow           0.013      0.051      0.056      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.056     0.056     0.006     2.606"
" 56         DIVERSION"
"         213   Node number"
"       0.040   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.016    c.m/sec"
"            Volume of diverted flow       6.837    c.m"
"            DIV00213.025hyd"
"            Major flow at 213"
"                   0.056     0.056     0.040     2.606 c.m/sec"
" 40         HYDROGRAPH Next link "
"           5   Next link "
"                   0.056     0.040     0.040     2.606"
" 33         CATCHMENT 204"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         204   Woolwich St & Irvine Street draining to SWMF"
"      65.000   % Impervious"
"       0.970   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.340   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.631   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.496   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.891   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.286     0.040     0.040     2.606 c.m/sec"
"            Catchment 204          Pervious   Impervious Total Area "
"            Surface Area           0.340      0.631      0.970      hectare"
"            Time of concentration  7.301      0.935      2.404      minutes"
"            Time to Centroid       103.507    86.797     90.654     minutes"
"            Rainfall depth         71.381     71.381     71.381     mm"
"            Rainfall volume        242.34     450.06     692.40     c.m"
"            Rainfall losses        35.956     7.807      17.659     mm"
"            Runoff depth           35.425     63.574     53.722     mm"
"            Runoff volume          120.27     400.84     521.10     c.m"
"            Runoff coefficient     0.496      0.891      0.753      "
"            Maximum flow           0.067      0.259      0.286      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.286     0.326     0.040     2.606"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.286     0.326     0.326     2.606"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 2.931    c.m/sec"
"            Hydrograph volume         6123.852    c.m"
"                   0.286     0.326     0.326     2.931"
" 40         HYDROGRAPH   Confluence    2"
"           7   Confluence "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 2.931    c.m/sec"
"            Hydrograph volume         6123.852    c.m"
"                   0.286     2.931     0.326     0.000"
" 33         CATCHMENT 205"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         205   Elora Sands existing drainage to SWMF"
"       0.000   % Impervious"
"       9.600   Total Area"
"     250.000   Flow length"
"       3.000   Overland Slope"
"       9.600   Pervious Area"
"     250.000   Pervious length"
"       3.000   Pervious slope"
"       0.000   Impervious Area"
"     250.000   Impervious length"
"       3.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.425   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.545     2.931     0.326     0.000 c.m/sec"
"            Catchment 205          Pervious   Impervious Total Area "
"            Surface Area           9.600      0.000      9.600      hectare"
"            Time of concentration  48.222     5.710      48.222     minutes"
"            Time to Centroid       155.058    93.425     155.058    minutes"
"            Rainfall depth         71.381     71.381     71.381     mm"
"            Rainfall volume        6852.60    0.01       6852.60    c.m"
"            Rainfall losses        41.035     5.882      41.035     mm"
"            Runoff depth           30.346     65.499     30.346     mm"
"            Runoff volume          2913.21    0.01       2913.22    c.m"
"            Runoff coefficient     0.425      0.000      0.425      "
"            Maximum flow           0.545      0.000      0.545      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.545     2.959     0.326     0.000"
" 33         CATCHMENT 206"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         206   SWMF + Overland Flow Channel"
"      40.000   % Impervious"
"       1.340   Total Area"
"      20.000   Flow length"
"      25.000   Overland Slope"
"       0.804   Pervious Area"
"      20.000   Pervious length"
"      25.000   Pervious slope"
"       0.536   Impervious Area"
"      20.000   Impervious length"
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"       25.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.496   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.861   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                  0.321     2.959     0.326     0.000 c.m/sec"
"             Catchment 206          Pervious   Impervious Total Area "
"             Surface Area           0.804      0.536      1.340      hectare"
"             Time of concentration  5.187      0.664      2.761      minutes"
"             Time to Centroid       100.795    86.792     93.285     minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        573.91     382.60     956.51     c.m"
"             Rainfall losses        35.974     9.952      25.565     mm"
"             Runoff depth           35.407     61.430     45.816     mm"
"             Runoff volume          284.67     329.26     613.94     c.m"
"             Runoff coefficient     0.496      0.861      0.642      "
"             Maximum flow           0.167      0.217      0.321      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.321     3.280     0.326     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.321     3.280     3.280     0.000"
" 40          HYDROGRAPH   Combine    3"
"           6   Combine "
"           3   Node #"
"               Draining to SWMF"
"            Maximum flow                 3.280    c.m/sec"
"            Hydrograph volume         9651.012    c.m"
"                  0.321     3.280     3.280     3.280"
" 40          HYDROGRAPH   Confluence    3"
"           7   Confluence "
"           3   Node #"
"               Draining to SWMF"
"            Maximum flow                 3.280    c.m/sec"
"            Hydrograph volume         9651.014    c.m"
"                  0.321     3.280     3.280     0.000"
" 54          POND DESIGN"
"        3.280   Current peak flow    c.m/sec"
"        0.385   Target outflow    c.m/sec"
"       9651.0   Hydrograph volume    c.m"
"          22.   Number of stages"
"      403.600   Minimum water level    metre"
"      405.700   Maximum water level    metre"
"      403.600   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"               403.600     0.000     0.000"
"               403.700   0.00300   512.000"
"               403.800   0.00600  1044.000"
"               403.900   0.00700  1597.000"
"               404.000   0.02800  2171.000"
"               404.100    0.1120  2767.000"
"               404.200    0.2320  3382.000"
"               404.300    0.3950  4013.000"
"               404.400    0.6330  4657.000"
"               404.500    0.9240  5314.000"
"               404.600     1.265  5983.000"
"               404.700     1.648  6666.000"
"               404.800     2.067  7361.000"
"               404.900     2.519  8070.000"
"               405.000     3.002  8792.000"
"               405.100     3.785  9528.000"
"               405.200     4.924  10280.00"
"               405.300     6.413  11047.00"
"               405.400     8.269  11831.00"
"               405.500    10.517  12632.00"
"               405.600    13.180  13449.00"
"               405.700    16.279  14283.00"
"            Peak outflow                  0.855    c.m/sec"
"            Maximum level               404.476    metre"
"            Maximum storage            5157.667    c.m"
"            Centroidal lag               13.451   hours"
"                 0.321     3.280     0.855     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                  0.855    c.m/sec"
"            Hydrograph volume          8751.305    c.m"
"                   0.321     3.280     0.855     0.855"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.321     0.000     0.855     0.855"
" 33          CATCHMENT 207"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         207   Elora Sands draining to ND1 bypassing SWMF"
"       0.000   % Impervious"
"       2.080   Total Area"
"     100.000   Flow length"
"       4.500   Overland Slope"
"       2.080   Pervious Area"
"     100.000   Pervious length"
"       4.500   Pervious slope"
"       0.000   Impervious Area"
"     100.000   Impervious length"
"       4.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.425   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                 0.188     0.000     0.855     0.855 c.m/sec"
"            Catchment 207          Pervious   Impervious Total Area "
"            Surface Area           2.080      0.000      2.080      hectare"
"            Time of concentration  24.641     2.918      24.641     minutes"
"            Time to Centroid       125.991    89.611     125.991    minutes"
"            Rainfall depth         71.381     71.381     71.381     mm"
"            Rainfall volume        1484.73    0.00       1484.73    c.m"
"            Rainfall losses        41.051     6.858      41.051     mm"
"            Runoff depth           30.330     64.523     30.330     mm"
"            Runoff volume          630.87     0.00       630.87     c.m"
"            Runoff coefficient     0.425      0.000      0.425      "
"            Maximum flow           0.188      0.000      0.188      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.188     0.188     0.855     0.855"
```

```
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.188     0.188     0.188     0.855"
" 40          HYDROGRAPH   Combine    4"
"            6   Combine "
"            4   Node #"
"                Draining to ND1"
"             Maximum flow                  0.921    c.m/sec"
"             Hydrograph volume          9382.175    c.m"
"                    0.188     0.188     0.188     0.921"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.188     0.000     0.188     0.921"
" 33          CATCHMENT 208"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          208   External ROWs draining to ND1 bypassing SWMF"
"       49.700   % Impervious"
"        0.560   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.282   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.278   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.424   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.891   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.128     0.000     0.188     0.921 c.m/sec"
"             Catchment 208          Pervious   Impervious Total Area "
"             Surface Area           0.282      0.278      0.560      hectare"
"             Time of concentration  7.894      0.935      3.197      minutes"
"             Time to Centroid       105.378    86.797     92.836     minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        201.07     198.67     399.74     c.m"
"             Rainfall losses        41.136     7.807      24.571     mm"
"             Runoff depth           30.245     63.574     46.810     mm"
"             Runoff volume          85.20      176.94     262.13     c.m"
"             Runoff coefficient     0.424      0.891      0.656      "
"             Maximum flow           0.044      0.114      0.128      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.128     0.128     0.188     0.921"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.128     0.128     0.128     0.921"
" 40          HYDROGRAPH   Combine    4"
"            6   Combine "
"            4   Node #"
"                Draining to ND1"
"             Maximum flow                  0.935    c.m/sec"
"             Hydrograph volume          9644.308    c.m"
"                    0.128     0.128     0.128     0.935"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.128     0.000     0.128     0.935"
" 33          CATCHMENT 214"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          214   Clayton Subdivision RYs draining NW offsite to Woolwich Street E"
"        0.000   % Impervious"
"        0.100   Total Area"
"       60.000   Flow length"
"        5.000   Overland Slope"
"        0.100   Pervious Area"
"       60.000   Pervious length"
"        5.000   Pervious slope"
"        0.000   Impervious Area"
"       60.000   Impervious length"
"        5.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.498   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.014     0.000     0.128     0.935 c.m/sec"
"             Catchment 214          Pervious   Impervious Total Area "
"             Surface Area           0.100      0.000      0.100      hectare"
"             Time of concentration  16.251     2.081      16.251     minutes"
"             Time to Centroid       114.685    88.357     114.685    minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        71.38      0.00       71.38      c.m"
"             Rainfall losses        35.838     6.369      35.838     mm"
"             Runoff depth           35.544     65.013     35.544     mm"
"             Runoff volume          35.54      0.00       35.54      c.m"
"             Runoff coefficient     0.498      0.000      0.498      "
"             Maximum flow           0.014      0.000      0.014      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.014     0.014     0.128     0.935"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.014     0.014     0.014     0.935"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                  0.014    c.m/sec"
"             Hydrograph volume            35.544    c.m"
"                    0.014     0.014     0.014     0.014"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.014     0.000     0.014     0.014"
" 47          FILEI_O Read/Open DIV00210.025hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00210.025hyd"
"             Major flow at 210"
"             Total volume                 16.717    c.m"
"             Maximum flow                  0.018    c.m/sec"
"                  0.014     0.018     0.014     0.014 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
```

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"                    0.014     0.018     0.018     0.014"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                 0.031    c.m/sec"
"             Hydrograph volume           52.261    c.m"
"                    0.014     0.018     0.018     0.031"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.014     0.000     0.018     0.031"
" 47          FILEI_O Read/Open DIV00211.025hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00211.025hyd"
"             Major flow at 211"
"             Total volume                 7.929    c.m"
"             Maximum flow                 0.019    c.m/sec"
"                  0.014     0.019     0.018     0.031 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.014     0.019     0.019     0.031"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                 0.032    c.m/sec"
"             Hydrograph volume           60.190    c.m"
"                    0.014     0.019     0.019     0.032"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.014     0.000     0.019     0.032"
" 33          CATCHMENT 215"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          215   Clayton Subdivision RYs draining offsite SW to rural residental"
"        0.000   % Impervious"
"        0.500   Total Area"
"       15.000   Flow length"
"        4.500   Overland Slope"
"        0.500   Pervious Area"
"       15.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       15.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.496   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.099     0.000     0.019     0.032 c.m/sec"
"             Catchment 215          Pervious   Impervious Total Area "
"             Surface Area           0.500      0.000      0.500      hectare"
"             Time of concentration  7.301      0.935      7.301      minutes"
"             Time to Centroid       103.507    86.797     103.507    minutes"
"             Rainfall depth         71.381     71.381     71.381     mm"
"             Rainfall volume        356.91     0.00       356.91     c.m"
"             Rainfall losses        35.956     7.807      35.956     mm"
"             Runoff depth           35.425     63.574     35.425     mm"
"             Runoff volume          177.13     0.00       177.13     c.m"
"             Runoff coefficient     0.496      0.000      0.496      "
"             Maximum flow           0.099      0.000      0.099      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.099     0.099     0.019     0.032"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.099     0.099     0.099     0.032"
" 40          HYDROGRAPH   Combine    6"
"            6   Combine "
"            6   Node #"
"                Draining SW to rural residential"
"             Maximum flow                 0.099    c.m/sec"
"             Hydrograph volume          177.127    c.m"
"                    0.099     0.099     0.099     0.099"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.099     0.000     0.099     0.099"
" 47          FILEI_O Read/Open DIV00209.025hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00209.025hyd"
"             Major flow at 209"
"             Total volume                 2.432    c.m"
"             Maximum flow                 0.005    c.m/sec"
"                  0.099     0.005     0.099     0.099 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.099     0.005     0.005     0.099"
" 40          HYDROGRAPH   Combine    7"
"            6   Combine "
"            7   Node #"
"                Draining SE to Elora Meadows"
"             Maximum flow                 0.005    c.m/sec"
"             Hydrograph volume            2.432    c.m"
"                    0.099     0.005     0.005     0.005"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.099     0.000     0.005     0.005"
" 33          CATCHMENT 216"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          216   Clayton Subd. RYs draining SE offsite to Elora Meadows"
"        7.800   % Impervious"
"        0.240   Total Area"
"        4.000   Flow length"
"       33.000   Overland Slope"
"        0.221   Pervious Area"
"        4.000   Pervious length"
"       33.000   Pervious slope"
"        0.019   Impervious Area"
"        4.000   Impervious length"
"       33.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.493   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
```

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"       0.794   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.051     0.000     0.005     0.005 c.m/sec"
"            Catchment 216          Pervious   Impervious Total Area "
"            Surface Area           0.221      0.019      0.240      hectare"
"            Time of concentration  1.817      0.233      1.627      minutes"
"            Time to Centroid       96.278     85.414     94.974     minutes"
"            Rainfall depth         71.381     71.381     71.381     mm"
"            Rainfall volume        157.95     13.36      171.32     c.m"
"            Rainfall losses        36.223     14.697     34.544     mm"
"            Runoff depth           35.158     56.685     36.837     mm"
"            Runoff volume          77.80      10.61      88.41      c.m"
"            Runoff coefficient     0.493      0.794      0.516      "
"            Maximum flow           0.044      0.008      0.051      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.051     0.051     0.005     0.005"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.051     0.051     0.051     0.005"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                0.057    c.m/sec"
"            Hydrograph volume           90.841    c.m"
"                   0.051     0.051     0.051     0.057"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.051     0.000     0.051     0.057"
" 33         CATCHMENT 217"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         217   Clayton Subd. draining SE offsite to Elora Meadows (via Irvine St.)"
"      11.400   % Impervious"
"       0.070   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.062   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.008   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.494   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.883   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.014     0.000     0.051     0.057 c.m/sec"
"            Catchment 217          Pervious   Impervious Total Area "
"            Surface Area           0.062      0.008      0.070      hectare"
"            Time of concentration  6.616      0.847      5.536      minutes"
"            Time to Centroid       102.674    86.754     99.695     minutes"
"            Rainfall depth         71.381     71.381     71.381     mm"
"            Rainfall volume        44.27      5.70       49.97      c.m"
"            Rainfall losses        36.148     8.341      32.978     mm"
"            Runoff depth           35.234     63.040     38.404     mm"
"            Runoff volume          21.85      5.03       26.88      c.m"
"            Runoff coefficient     0.494      0.883      0.538      "
"            Maximum flow           0.012      0.003      0.014      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.014     0.014     0.051     0.057"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.014     0.014     0.014     0.057"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                0.066    c.m/sec"
"            Hydrograph volume           117.724    c.m"
"                   0.014     0.014     0.014     0.066"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.014     0.000     0.014     0.066"
" 47         FILEI_O Read/Open DIV00212.025hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00212.025hyd"
"            Major flow at 212"
"            Total volume                2.874    c.m"
"            Maximum flow                0.004    c.m/sec"
"                 0.014     0.004     0.014     0.066 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.014     0.004     0.004     0.066"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                0.069    c.m/sec"
"            Hydrograph volume           120.597    c.m"
"                   0.014     0.004     0.004     0.069"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.014     0.000     0.004     0.069"
" 47         FILEI_O Read/Open DIV00213.025hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00213.025hyd"
"            Major flow at 213"
"            Total volume                6.837    c.m"
"            Maximum flow                0.016    c.m/sec"
"                 0.014     0.016     0.004     0.069 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.014     0.016     0.016     0.069"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                0.083    c.m/sec"
"            Hydrograph volume           127.434    c.m"
"                   0.014     0.016     0.016     0.083"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.014     0.000     0.016     0.083"
" 33         CATCHMENT 218"
"           1   Triangular SCS"
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```
"           1   Equal length"
"           1   SCS method"
"         218   Irvine St drawing S to Elora Meadows"
"      65.000   % Impervious"
"       0.200   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.070   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.130   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.496   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.891   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                0.059     0.000     0.016     0.083 c.m/sec"
"            Catchment 218          Pervious   Impervious Total Area "
"            Surface Area           0.070      0.130      0.200      hectare"
"            Time of concentration  7.301      0.935      2.404      minutes"
"            Time to Centroid       103.507    86.797     90.654     minutes"
"            Rainfall depth         71.381     71.381     71.381     mm"
"            Rainfall volume        49.97      92.80      142.76     c.m"
"            Rainfall losses        35.956     7.807      17.659     mm"
"            Runoff depth           35.425     63.574     53.722     mm"
"            Runoff volume          24.80      82.65      107.44     c.m"
"            Runoff coefficient     0.496      0.891      0.753      "
"            Maximum flow           0.014      0.053      0.059      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                0.059     0.059     0.016     0.083"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                0.059     0.059     0.059     0.083"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                0.142    c.m/sec"
"            Hydrograph volume           234.879    c.m"
"                0.059     0.059     0.059     0.142"
" 38         START/RE-START TOTALS 218"
"           3   Runoff Totals on EXIT"
"            Total Catchment area                   27.650    hectare"
"            Total Impervious area                   9.285    hectare"
"            Total % impervious                     33.580"
" 19         EXIT"
```

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"               MIDUSS Output ----------------------------------------------->"
"               MIDUSS version                          Version 2.25  rev. 473"
"               MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                        ie METRIC"
"               Job folder:              Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                   Post-Dev"
"               Output filename:                          50yr_Post-Dev.out"
"               Licensee name:                                             A"
"               Company                                                    "
"               Date & Time last used:              6/13/2023 at 8:25:05 PM"
" 31         TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    3000.000   Max. Hydrograph"
" 32         STORM Chicago storm"
"           1   Chicago storm"
"    3574.000   Coefficient A"
"      19.000   Constant B"
"       0.924   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          189.902    mm/hr"
"            Total depth                 80.776    mm"
"           6   050hyd   Hydrograph extension used in this file"
" 33         CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Clayton Subdivision roof areas to lot-level infiltration galleries"
"     100.000   % Impervious"
"       2.750   Total Area"
"       6.000   Flow length"
"      33.000   Overland Slope"
"       0.000   Pervious Area"
"       6.000   Pervious length"
"      33.000   Pervious slope"
"       2.750   Impervious Area"
"       6.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.803   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                1.221     0.000     0.000     0.000 c.m/sec"
"            Catchment 201          Pervious   Impervious Total Area "
"            Surface Area           0.000      2.750      2.750      hectare"
"            Time of concentration  2.150      0.284      0.284      minutes"
"            Time to Centroid       96.184     85.508     85.508     minutes"
"            Rainfall depth         80.776     80.776     80.776     mm"
"            Rainfall volume        0.00       2221.35    2221.35    c.m"
"            Rainfall losses        38.289     15.876     15.876     mm"
"            Runoff depth           42.488     64.901     64.901     mm"
"            Runoff volume          0.00       1784.77    1784.77    c.m"
"            Runoff coefficient     0.000      0.803      0.803      "
"            Maximum flow           0.000      1.221      1.221      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                1.221     1.221     0.000     0.000"
```

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" 57          TRENCH Design d/s of 201"
"        1.221   Peak inflow"
"     1784.772   Hydrograph volume"
"        2.500   Ground elevation"
"        1.000   Downstream trench invert"
"        1.000   Trench height"
"        0.000   Water table elevation"
"        1.000   Trench top width"
"        1.000   Trench bottom width"
"       40.000   Voids ratio (%)"
"      100.000   Hydraulic conductivity"
"        0.000   Trench gradient (%)"
"      600.000   Trench length"
"        1.000   Include base width"
"          16.   Number of stages"
"                  Level Discharge    Volume"
"                  1.000     0.000       0.0"
"                  1.100     0.000      24.0"
"                  1.200     0.000      48.0"
"                  1.300     0.000      72.0"
"                  1.400     0.000      96.0"
"                  1.500     0.000     120.0"
"                  1.600     0.000     144.0"
"                  1.700     0.000     168.0"
"                  1.800     0.000     192.0"
"                  1.900     0.000     216.0"
"                  2.000     0.000     240.0"
"                  2.100     0.975     240.1"
"                  2.200     3.905     240.2"
"                  2.300     8.694     240.3"
"                  2.400    15.452     240.5"
"                  2.500    23.923     240.6"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"                  2.000    20.000     0.000     0.000     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"              diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"              Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                invert    invert    Length  Diameter       'n'   loss Ke"
"                 2.000     2.000    20.000 10000.000     0.013     0.500"
"               Peak outflow                 1.144    c.m/sec"
"               Outflow volume            1039.279    c.m"
"               Peak exfiltration            0.078    c.m/sec"
"               Exfiltration volume        754.542    c.m"
"               Maximum level                2.106    metre"
"               Maximum storage            240.120    c.m"
"               Centroidal lag               1.348   hours"
"               Infiltration area 2 sides   1200.000   sq.metre"
"               Infiltration Base area       600.000   sq.metre"
"                    1.221     1.221     1.144     0.078 c.m/sec"
" 40           HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"               Maximum flow                 1.144    c.m/sec"
"               Hydrograph volume          1039.279    c.m"
"                       1.221     1.221     1.144     1.144"
" 40           HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                       1.221     0.000     1.144     1.144"

" 33           CATCHMENT 209"
"              1   Triangular SCS"
"              1   Equal length"
"              1   SCS method"
"            209   Marr Drive transition grading to Bricker Ave."
"         65.000   % Impervious"
"          0.070   Total Area"
"         15.000   Flow length"
"          3.500   Overland Slope"
"          0.025   Pervious Area"
"         15.000   Pervious length"
"          3.500   Pervious slope"
"          0.045   Impervious Area"
"         15.000   Impervious length"
"          3.500   Impervious slope"
"          0.300   Pervious Manning 'n'"
"         82.000   Pervious SCS Curve No."
"          0.531   Pervious Runoff coefficient"
"          0.100   Pervious Ia/S coefficient"
"          5.576   Pervious Initial abstraction"
"          0.015   Impervious Manning 'n'"
"         98.000   Impervious SCS Curve No."
"          0.901   Impervious Runoff coefficient"
"          0.100   Impervious Ia/S coefficient"
"          0.518   Impervious Initial abstraction"
"                       0.023     0.000     1.144     1.144 c.m/sec"
"               Catchment 209          Pervious   Impervious Total Area "
"               Surface Area           0.025      0.045      0.070      hectare"
"               Time of concentration  7.305      0.965      2.493      minutes"
"               Time to Centroid       102.921    86.580     90.519     minutes"
"               Rainfall depth         80.776     80.776     80.776     mm"
"               Rainfall volume        19.79      36.75      56.54      c.m"
"               Rainfall losses        37.850     8.006      18.451     mm"
"               Runoff depth           42.927     72.771     62.325     mm"
"               Runoff volume          10.52      33.11      43.63      c.m"
"               Runoff coefficient     0.531      0.901      0.772      "
"               Maximum flow           0.006      0.021      0.023      c.m/sec"
" 40           HYDROGRAPH Add Runoff "
"              4   Add Runoff "
"                       0.023     0.023     1.144     1.144"
" 56           DIVERSION"
"            209   Node number"
"          0.015   Overflow threshold"
"          1.000   Required diverted fraction"
"              0   Conduit type; 1=Pipe;2=Channel"
"               Peak of diverted flow         0.008    c.m/sec"
"               Volume of diverted flow       4.183    c.m"
"               DIV00209.050hyd"
"               Major flow at 209"
"                       0.023     0.023     0.015     1.144 c.m/sec"
" 40           HYDROGRAPH Next link "
"              5   Next link "
"                       0.023     0.015     0.015     1.144"
" 33           CATCHMENT 202"
"              1   Triangular SCS"
"              1   Equal length"
"              1   SCS method"
"            202   Clayton Subdivision areas draining to SWMF (bypassing infiltration galleries)"
"         55.000   % Impervious"
"          8.060   Total Area"
"         90.000   Flow length"
"          0.500   Overland Slope"
"          3.627   Pervious Area"
"         90.000   Pervious length"
"          0.500   Pervious slope"
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"        4.433   Impervious Area"
"       90.000   Impervious length"
"        0.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.534   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.927   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    2.002     0.015     0.015     1.144 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           3.627      4.433      8.060      hectare"
"             Time of concentration  38.372     5.068      15.743     minutes"
"             Time to Centroid       141.933    92.268     108.188    minutes"
"             Rainfall depth         80.776     80.776     80.776     mm"
"             Rainfall volume        2929.76    3580.82    6510.59    c.m"
"             Rainfall losses        37.612     5.914      20.178     mm"
"             Runoff depth           43.165     74.862     60.598     mm"
"             Runoff volume          1565.59    3318.64    4884.23    c.m"
"             Runoff coefficient     0.534      0.927      0.750      "
"             Maximum flow           0.352      1.927      2.002      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    2.002     2.017     0.015     1.144"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    2.002     2.017     2.017     1.144"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"             Maximum flow                  2.808    c.m/sec"
"             Hydrograph volume          5962.958    c.m"
"                    2.002     2.017     2.017     2.808"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    2.002     0.000     2.017     2.808"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Clayton Subdivision RY draining to SWMF via Woolwich St & Irvine St"
"       31.700   % Impervious"
"        0.440   Total Area"
"       25.000   Flow length"
"        5.500   Overland Slope"
"        0.301   Pervious Area"
"       25.000   Pervious length"
"        5.500   Pervious slope"
"        0.139   Impervious Area"
"       25.000   Impervious length"
"        5.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.532   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.911   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.108     0.000     2.017     2.808 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.301      0.139      0.440      hectare"
"             Time of concentration  8.666      1.145      5.334      minutes"
"             Time to Centroid       104.511    86.814     96.671     minutes"
"             Rainfall depth         80.776     80.776     80.776     mm"
"             Rainfall volume        242.75     112.67     355.42     c.m"
"             Rainfall losses        37.818     7.156      28.098     mm"
"             Runoff depth           42.959     73.621     52.679     mm"
"             Runoff volume          129.10     102.69     231.79     c.m"
"             Runoff coefficient     0.532      0.911      0.652      "
"             Maximum flow           0.066      0.064      0.108      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.108     0.108     2.017     2.808"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.108     0.108     0.108     2.808"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"             Maximum flow                  2.899    c.m/sec"
"             Hydrograph volume          6194.746    c.m"
"                    0.108     0.108     0.108     2.899"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
"                Clayton Main Area"
"             Maximum flow                  2.899    c.m/sec"
"             Hydrograph volume          6194.747    c.m"
"                    0.108     2.899     0.108     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.108     2.899     2.899     0.000"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Draining to SWMF"
"             Maximum flow                  2.899    c.m/sec"
"             Hydrograph volume          6194.747    c.m"
"                    0.108     2.899     2.899     2.899"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.108     0.000     2.899     2.899"
" 33          CATCHMENT 210"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          210   Clayton RYs draining to Woolwich St"
"       16.400   % Impervious"
"        0.200   Total Area"
"       25.000   Flow length"
"        5.500   Overland Slope"
"        0.167   Pervious Area"
"       25.000   Pervious length"
"        5.500   Pervious slope"
"        0.033   Impervious Area"
"       25.000   Impervious length"
"        5.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.532   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
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"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.911   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.045     0.000     2.899     2.899 c.m/sec"
"            Catchment 210          Pervious   Impervious Total Area "
"            Surface Area           0.167      0.033      0.200      hectare"
"            Time of concentration  8.666      1.145      6.774      minutes"
"            Time to Centroid       104.511    86.814     100.059    minutes"
"            Rainfall depth         80.776     80.776     80.776     mm"
"            Rainfall volume        135.06     26.49      161.55     c.m"
"            Rainfall losses        37.818     7.156      32.789     mm"
"            Runoff depth           42.959     73.621     47.987     mm"
"            Runoff volume          71.83      24.15      95.97      c.m"
"            Runoff coefficient     0.532      0.911      0.594      "
"            Maximum flow           0.037      0.015      0.045      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                   0.045     0.045     2.899     2.899"
" 56         DIVERSION"
"        210   Node number"
"       0.018   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.027    c.m/sec"
"            Volume of diverted flow      26.173    c.m"
"            DIV00210.050hyd"
"            Major flow at 210"
"                   0.045     0.045     0.018     2.899 c.m/sec"
" 40         HYDROGRAPH   Combine    2"
"          6   Combine "
"          2   Node #"
"              Draining to SWMF"
"            Maximum flow                  2.917    c.m/sec"
"            Hydrograph volume          6264.545    c.m"
"                   0.045     0.045     0.018     2.917"
" 40         HYDROGRAPH Start - New Tributary"
"          2   Start - New Tributary"
"                   0.045     0.000     0.018     2.917"
" 33         CATCHMENT 211"
"          1   Triangular SCS"
"          1   Equal length"
"          1   SCS method"
"        211   Woolwich St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.230   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.081   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.149   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.529   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.895   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.078     0.000     0.018     2.917 c.m/sec"
"            Catchment 211          Pervious   Impervious Total Area "
"            Surface Area           0.081      0.149      0.230      hectare"
"            Time of concentration  6.774      0.895      2.313      minutes"
"            Time to Centroid       102.288    86.523     90.326     minutes"
"            Rainfall depth         80.776     80.776     80.776     mm"
"            Rainfall volume        65.03      120.76     185.79     c.m"
"            Rainfall losses        38.073     8.458      18.823     mm"
"            Runoff depth           42.703     72.318     61.953     mm"
"            Runoff volume          34.38      108.12     142.49     c.m"
"            Runoff coefficient     0.529      0.895      0.767      "
"            Maximum flow           0.019      0.068      0.078      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                   0.078     0.078     0.018     2.917"
" 56         DIVERSION"
"        211   Node number"
"       0.049   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.029    c.m/sec"
"            Volume of diverted flow      13.809    c.m"
"            DIV00211.050hyd"
"            Major flow at 211"
"                   0.078     0.078     0.049     2.917 c.m/sec"
" 40         HYDROGRAPH   Combine    2"
"          6   Combine "
"          2   Node #"
"              Draining to SWMF"
"            Maximum flow                  2.966    c.m/sec"
"            Hydrograph volume          6393.227    c.m"
"                   0.078     0.078     0.049     2.966"
" 40         HYDROGRAPH Start - New Tributary"
"          2   Start - New Tributary"
"                   0.078     0.000     0.049     2.966"
" 33         CATCHMENT 212"
"          1   Triangular SCS"
"          1   Equal length"
"          1   SCS method"
"        212   Clayton laneway towns to Irvine Street (up to 5yr flow)"
"      19.100   % Impervious"
"       0.050   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.040   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.010   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.530   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.887   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.013     0.000     0.049     2.966 c.m/sec"
"            Catchment 212          Pervious   Impervious Total Area "
"            Surface Area           0.040      0.010      0.050      hectare"
"            Time of concentration  6.138      0.811      4.629      minutes"
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"            Time to Centroid       101.447    86.519     97.217     minutes"
"            Rainfall depth         80.776     80.776     80.776     mm"
"            Rainfall volume        32.67      7.71       40.39      c.m"
"            Rainfall losses        37.980     9.096      32.463     mm"
"            Runoff depth           42.796     71.681     48.313     mm"
"            Runoff volume          17.31      6.85       24.16      c.m"
"            Runoff coefficient     0.530      0.887      0.598      "
"            Maximum flow           0.010      0.004      0.013      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.013     0.013     0.049     2.966"
" 56         DIVERSION"
"         212   Node number"
"       0.006   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.007    c.m/sec"
"            Volume of diverted flow       4.932    c.m"
"            DIV00212.050hyd"
"            Major flow at 212"
"                   0.013     0.013     0.006     2.966 c.m/sec"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 2.972    c.m/sec"
"            Hydrograph volume          6412.454    c.m"
"                   0.013     0.013     0.006     2.972"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.013     0.000     0.006     2.972"
" 33         CATCHMENT 213"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         213   Irvine St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.190   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.067   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.123   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.529   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.895   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.064     0.000     0.006     2.972 c.m/sec"
"            Catchment 213          Pervious   Impervious Total Area "
"            Surface Area           0.067      0.123      0.190      hectare"
"            Time of concentration  6.774      0.895      2.313      minutes"
"            Time to Centroid       102.288    86.523     90.326     minutes"
"            Rainfall depth         80.776     80.776     80.776     mm"
"            Rainfall volume        53.72      99.76      153.48     c.m"
"            Rainfall losses        38.073     8.458      18.823     mm"
"            Runoff depth           42.703     72.318     61.953     mm"
"            Runoff volume          28.40      89.31      117.71     c.m"
"            Runoff coefficient     0.529      0.895      0.767      "
"            Maximum flow           0.016      0.057      0.064      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.064     0.064     0.006     2.972"
" 56         DIVERSION"
"         213   Node number"
"       0.040   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.024    c.m/sec"
"            Volume of diverted flow      11.838    c.m"
"            DIV00213.050hyd"
"            Major flow at 213"
"                   0.064     0.064     0.040     2.972 c.m/sec"
" 40         HYDROGRAPH Next link "
"           5   Next link "
"                   0.064     0.040     0.040     2.972"
" 33         CATCHMENT 204"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         204   Woolwich St & Irvine Street draining to SWMF"
"      65.000   % Impervious"
"       0.970   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.340   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.631   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.529   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.895   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.328     0.040     0.040     2.972 c.m/sec"
"            Catchment 204          Pervious   Impervious Total Area "
"            Surface Area           0.340      0.631      0.970      hectare"
"            Time of concentration  6.774      0.895      2.313      minutes"
"            Time to Centroid       102.288    86.523     90.326     minutes"
"            Rainfall depth         80.776     80.776     80.776     mm"
"            Rainfall volume        274.24     509.30     783.53     c.m"
"            Rainfall losses        38.073     8.458      18.823     mm"
"            Runoff depth           42.703     72.318     61.953     mm"
"            Runoff volume          144.98     455.97     600.95     c.m"
"            Runoff coefficient     0.529      0.895      0.767      "
"            Maximum flow           0.080      0.289      0.328      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.328     0.368     0.040     2.972"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.328     0.368     0.368     2.972"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
```

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"               Draining to SWMF"
"             Maximum flow                 3.340    c.m/sec"
"             Hydrograph volume          7119.273    c.m"
"                    0.328     0.368     0.368     3.340"
" 40          HYDROGRAPH   Confluence    2"
"             7   Confluence "
"             2   Node #"
"                 Draining to SWMF"
"             Maximum flow                 3.340    c.m/sec"
"             Hydrograph volume          7119.272    c.m"
"                    0.328     3.340     0.368     0.000"
" 33          CATCHMENT 205"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           205   Elora Sands existing drainage to SWMF"
"         0.000   % Impervious"
"         9.600   Total Area"
"       250.000   Flow length"
"         3.000   Overland Slope"
"         9.600   Pervious Area"
"       250.000   Pervious length"
"         3.000   Pervious slope"
"         0.000   Impervious Area"
"       250.000   Impervious length"
"         3.000   Impervious slope"
"         0.300   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.462   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.000   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                    0.721     3.340     0.368     0.000 c.m/sec"
"              Catchment 205          Pervious   Impervious Total Area "
"              Surface Area           9.600      0.000      9.600      hectare"
"              Time of concentration  44.411     5.465      44.411     minutes"
"              Time to Centroid       149.889    92.832     149.889    minutes"
"              Rainfall depth         80.776     80.776     80.776     mm"
"              Rainfall volume        7754.54    0.01       7754.54    c.m"
"              Rainfall losses        43.485     6.024      43.485     mm"
"              Runoff depth           37.292     74.753     37.292     mm"
"              Runoff volume          3579.98    0.01       3579.99    c.m"
"              Runoff coefficient     0.462      0.000      0.462      "
"              Maximum flow           0.721      0.000      0.721      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                    0.721     3.383     0.368     0.000"
" 33          CATCHMENT 206"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           206   SWMF + Overland Flow Channel"
"        40.000   % Impervious"
"         1.340   Total Area"
"        20.000   Flow length"
"        25.000   Overland Slope"
"         0.804   Pervious Area"
"        20.000   Pervious length"
"        25.000   Pervious slope"
"         0.536   Impervious Area"
"        20.000   Impervious length"
"        25.000   Impervious slope"
"         0.300   Pervious Manning 'n'"
"        82.000   Pervious SCS Curve No."
"         0.531   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         5.576   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.863   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                    0.379     3.383     0.368     0.000 c.m/sec"
"              Catchment 206          Pervious   Impervious Total Area "
"              Surface Area           0.804      0.536      1.340      hectare"
"              Time of concentration  4.813      0.636      2.640      minutes"
"              Time to Centroid       99.744     86.521     92.866     minutes"
"              Rainfall depth         80.776     80.776     80.776     mm"
"              Rainfall volume        649.44     432.96     1082.41    c.m"
"              Rainfall losses        37.906     11.054     27.165     mm"
"              Runoff depth           42.871     69.723     53.612     mm"
"              Runoff volume          344.68     373.71     718.39     c.m"
"              Runoff coefficient     0.531      0.863      0.664      "
"              Maximum flow           0.206      0.241      0.379      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                    0.379     3.762     0.368     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"             8   Copy to Outflow"
"                    0.379     3.762     3.762     0.000"
" 40          HYDROGRAPH   Combine    3"
"             6   Combine "
"             3   Node #"
"                 Draining to SWMF"
"             Maximum flow                 3.762    c.m/sec"
"             Hydrograph volume          11417.658    c.m"
"                    0.379     3.762     3.762     3.762"
" 40          HYDROGRAPH   Confluence    3"
"             7   Confluence "
"             3   Node #"
"                 Draining to SWMF"
"             Maximum flow                 3.762    c.m/sec"
"             Hydrograph volume          11417.657    c.m"
"                    0.379     3.762     3.762     0.000"
" 54          POND DESIGN"
"         3.762   Current peak flow    c.m/sec"
"         0.385   Target outflow    c.m/sec"
"      11417.7    Hydrograph volume    c.m"
"          22.    Number of stages"
"       403.600   Minimum water level    metre"
"       405.700   Maximum water level    metre"
"       403.600   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 403.600     0.000     0.000"
"                 403.700   0.00300   512.000"
"                 403.800   0.00600  1044.000"
"                 403.900   0.00700  1597.000"
"                 404.000   0.02800  2171.000"
"                 404.100    0.1120  2767.000"
"                 404.200    0.2320  3382.000"
"                 404.300    0.3950  4013.000"
"                 404.400    0.6330  4657.000"
"                 404.500    0.9240  5314.000"
"                 404.600     1.265  5983.000"
"                 404.700     1.648  6666.000"
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"               404.800     2.067  7361.000"
"               404.900     2.519  8070.000"
"               405.000     3.002  8792.000"
"               405.100     3.785  9528.000"
"               405.200     4.924  10280.00"
"               405.300     6.413  11047.00"
"               405.400     8.269  11831.00"
"               405.500    10.517  12632.00"
"               405.600    13.180  13449.00"
"               405.700    16.279  14283.00"
"            Peak outflow                 1.156    c.m/sec"
"            Maximum level              404.568    metre"
"            Maximum storage           5769.543    c.m"
"            Centroidal lag              11.771   hours"
"                0.379     3.762     1.156     0.000 c.m/sec"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                 1.156    c.m/sec"
"            Hydrograph volume        10517.233    c.m"
"                    0.379     3.762     1.156     1.156"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.379     0.000     1.156     1.156"
" 33         CATCHMENT 207"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         207   Elora Sands draining to ND1 bypassing SWMF"
"       0.000   % Impervious"
"       2.080   Total Area"
"     100.000   Flow length"
"       4.500   Overland Slope"
"       2.080   Pervious Area"
"     100.000   Pervious length"
"       4.500   Pervious slope"
"       0.000   Impervious Area"
"     100.000   Impervious length"
"       4.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.461   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.247     0.000     1.156     1.156 c.m/sec"
"            Catchment 207          Pervious   Impervious Total Area "
"            Surface Area           2.080      0.000      2.080      hectare"
"            Time of concentration  22.693     2.793      22.693     minutes"
"            Time to Centroid       123.013    89.175     123.012    minutes"
"            Rainfall depth         80.776     80.776     80.776     mm"
"            Rainfall volume        1680.15    0.00       1680.15    c.m"
"            Rainfall losses        43.529     7.063      43.529     mm"
"            Runoff depth           37.247     73.714     37.247     mm"
"            Runoff volume          774.74     0.00       774.74     c.m"
"            Runoff coefficient     0.461      0.000      0.461      "
"            Maximum flow           0.247      0.000      0.247      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.247     0.247     1.156     1.156"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.247     0.247     0.247     1.156"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                 1.247    c.m/sec"
"            Hydrograph volume        11291.972    c.m"
"                    0.247     0.247     0.247     1.247"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.247     0.000     0.247     1.247"
" 33         CATCHMENT 208"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         208   External ROWs draining to ND1 bypassing SWMF"
"      49.700   % Impervious"
"       0.560   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.282   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.278   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.459   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.895   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.149     0.000     0.247     1.247 c.m/sec"
"            Catchment 208          Pervious   Impervious Total Area "
"            Surface Area           0.282      0.278      0.560      hectare"
"            Time of concentration  7.270      0.895      3.074      minutes"
"            Time to Centroid       104.034    86.523     92.507     minutes"
"            Rainfall depth         80.776     80.776     80.776     mm"
"            Rainfall volume        227.53     224.82     452.35     c.m"
"            Rainfall losses        43.679     8.458      26.174     mm"
"            Runoff depth           37.098     72.318     54.602     mm"
"            Runoff volume          104.50     201.28     305.77     c.m"
"            Runoff coefficient     0.459      0.895      0.676      "
"            Maximum flow           0.058      0.127      0.149      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.149     0.149     0.247     1.247"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.149     0.149     0.149     1.247"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                 1.266    c.m/sec"
"            Hydrograph volume        11597.743    c.m"
"                    0.149     0.149     0.149     1.266"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
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"                   0.149     0.000     0.149     1.266"
" 33          CATCHMENT 214"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          214   Clayton Subdivision RYs draining NW offsite to Woolwich Street E"
"        0.000   % Impervious"
"        0.100   Total Area"
"       60.000   Flow length"
"        5.000   Overland Slope"
"        0.100   Pervious Area"
"       60.000   Pervious length"
"        5.000   Pervious slope"
"        0.000   Impervious Area"
"       60.000   Impervious length"
"        5.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.534   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.018     0.000     0.149     1.266 c.m/sec"
"             Catchment 214          Pervious   Impervious Total Area "
"             Surface Area           0.100      0.000      0.100      hectare"
"             Time of concentration  15.079     1.991      15.079     minutes"
"             Time to Centroid       112.601    87.961     112.601    minutes"
"             Rainfall depth         80.776     80.776     80.776     mm"
"             Rainfall volume        80.78      0.00       80.78      c.m"
"             Rainfall losses        37.659     6.455      37.659     mm"
"             Runoff depth           43.117     74.322     43.117     mm"
"             Runoff volume          43.12      0.00       43.12      c.m"
"             Runoff coefficient     0.534      0.000      0.534      "
"             Maximum flow           0.018      0.000      0.018      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                   0.018     0.018     0.149     1.266"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                   0.018     0.018     0.018     1.266"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                  0.018    c.m/sec"
"             Hydrograph volume            43.117    c.m"
"                   0.018     0.018     0.018     0.018"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.018     0.000     0.018     0.018"
" 47          FILEI_O Read/Open DIV00210.050hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00210.050hyd"
"             Major flow at 210"
"             Total volume                 26.173    c.m"
"             Maximum flow                  0.027    c.m/sec"
"                 0.018     0.027     0.018     0.018 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                   0.018     0.027     0.027     0.018"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                  0.043    c.m/sec"
"             Hydrograph volume            69.291    c.m"
"                   0.018     0.027     0.027     0.043"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.018     0.000     0.027     0.043"
" 47          FILEI_O Read/Open DIV00211.050hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00211.050hyd"
"             Major flow at 211"
"             Total volume                 13.809    c.m"
"             Maximum flow                  0.029    c.m/sec"
"                 0.018     0.029     0.027     0.043 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                   0.018     0.029     0.029     0.043"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                  0.053    c.m/sec"
"             Hydrograph volume            83.099    c.m"
"                   0.018     0.029     0.029     0.053"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.018     0.000     0.029     0.053"
" 33          CATCHMENT 215"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          215   Clayton Subdivision RYs draining offsite SW to rural residental"
"        0.000   % Impervious"
"        0.500   Total Area"
"       15.000   Flow length"
"        4.500   Overland Slope"
"        0.500   Pervious Area"
"       15.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       15.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.529   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.118     0.000     0.029     0.053 c.m/sec"
"             Catchment 215          Pervious   Impervious Total Area "
"             Surface Area           0.500      0.000      0.500      hectare"
"             Time of concentration  6.774      0.895      6.774      minutes"
"             Time to Centroid       102.288    86.523     102.288    minutes"
"             Rainfall depth         80.776     80.776     80.776     mm"
"             Rainfall volume        403.88     0.00       403.88     c.m"
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"            Rainfall losses        38.073     8.458      38.073     mm"
"            Runoff depth           42.703     72.318     42.703     mm"
"            Runoff volume          213.52     0.00       213.52     c.m"
"            Runoff coefficient     0.529      0.000      0.529      "
"            Maximum flow           0.118      0.000      0.118      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.118     0.118     0.029     0.053"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.118     0.118     0.118     0.053"
" 40         HYDROGRAPH   Combine    6"
"           6   Combine "
"           6   Node #"
"               Draining SW to rural residential"
"            Maximum flow                  0.118    c.m/sec"
"            Hydrograph volume           213.516    c.m"
"                   0.118     0.118     0.118     0.118"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.118     0.000     0.118     0.118"
" 47         FILEI_O Read/Open DIV00209.050hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00209.050hyd"
"            Major flow at 209"
"            Total volume                  4.183    c.m"
"            Maximum flow                  0.008    c.m/sec"
"                 0.118     0.008     0.118     0.118 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.118     0.008     0.008     0.118"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.008    c.m/sec"
"            Hydrograph volume             4.183    c.m"
"                   0.118     0.008     0.008     0.008"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.118     0.000     0.008     0.008"
" 33         CATCHMENT 216"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         216   Clayton Subd. RYs draining SE offsite to Elora Meadows"
"       7.800   % Impervious"
"       0.240   Total Area"
"       4.000   Flow length"
"      33.000   Overland Slope"
"       0.221   Pervious Area"
"       4.000   Pervious length"
"      33.000   Pervious slope"
"       0.019   Impervious Area"
"       4.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.528   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.801   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.062     0.000     0.008     0.008 c.m/sec"
"            Catchment 216          Pervious   Impervious Total Area "
"            Surface Area           0.221      0.019      0.240      hectare"
"            Time of concentration  1.686      0.223      1.519      minutes"
"            Time to Centroid       95.539     85.092     94.350     minutes"
"            Rainfall depth         80.776     80.776     80.776     mm"
"            Rainfall volume        178.74     15.12      193.86     c.m"
"            Rainfall losses        38.157     16.094     36.436     mm"
"            Runoff depth           42.619     64.683     44.340     mm"
"            Runoff volume          94.31      12.11      106.42     c.m"
"            Runoff coefficient     0.528      0.801      0.549      "
"            Maximum flow           0.054      0.008      0.062      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.062     0.062     0.008     0.008"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.062     0.062     0.062     0.008"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.070    c.m/sec"
"            Hydrograph volume           110.600    c.m"
"                   0.062     0.062     0.062     0.070"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.062     0.000     0.062     0.070"
" 33         CATCHMENT 217"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         217   Clayton Subd. draining SE offsite to Elora Meadows (via Irvine St.)"
"      11.400   % Impervious"
"       0.070   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.062   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.008   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.530   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.887   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.017     0.000     0.062     0.070 c.m/sec"
"            Catchment 217          Pervious   Impervious Total Area "
"            Surface Area           0.062      0.008      0.070      hectare"
"            Time of concentration  6.138      0.811      5.194      minutes"
"            Time to Centroid       101.447    86.519     98.800     minutes"
"            Rainfall depth         80.776     80.776     80.776     mm"
"            Rainfall volume        50.10      6.45       56.54      c.m"
"            Rainfall losses        37.980     9.096      34.688     mm"
"            Runoff depth           42.796     71.681     46.089     mm"
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"            Runoff volume          26.54      5.72       32.26      c.m"
"            Runoff coefficient     0.530      0.887      0.571      "
"            Maximum flow           0.015      0.004      0.017      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.017     0.017     0.062     0.070"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.017     0.017     0.017     0.070"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.082    c.m/sec"
"            Hydrograph volume           142.862    c.m"
"                    0.017     0.017     0.017     0.082"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.017     0.000     0.017     0.082"
" 47         FILEI_O Read/Open DIV00212.050hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00212.050hyd"
"            Major flow at 212"
"            Total volume                  4.932    c.m"
"            Maximum flow                  0.007    c.m/sec"
"                 0.017     0.007     0.017     0.082 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.017     0.007     0.007     0.082"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.086    c.m/sec"
"            Hydrograph volume           147.794    c.m"
"                    0.017     0.007     0.007     0.086"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.017     0.000     0.007     0.086"
" 47         FILEI_O Read/Open DIV00213.050hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00213.050hyd"
"            Major flow at 213"
"            Total volume                 11.838    c.m"
"            Maximum flow                  0.024    c.m/sec"
"                 0.017     0.024     0.007     0.086 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.017     0.024     0.024     0.086"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.110    c.m/sec"
"            Hydrograph volume           159.632    c.m"
"                    0.017     0.024     0.024     0.110"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.017     0.000     0.024     0.110"
" 33         CATCHMENT 218"
"           1   Triangular SCS"
"              1   Equal length"
"              1   SCS method"
"            218   Irvine St drawing S to Elora Meadows"
"         65.000   % Impervious"
"          0.200   Total Area"
"         10.000   Flow length"
"          2.000   Overland Slope"
"          0.070   Pervious Area"
"         10.000   Pervious length"
"          2.000   Pervious slope"
"          0.130   Impervious Area"
"         10.000   Impervious length"
"          2.000   Impervious slope"
"          0.300   Pervious Manning 'n'"
"         82.000   Pervious SCS Curve No."
"          0.529   Pervious Runoff coefficient"
"          0.100   Pervious Ia/S coefficient"
"          5.576   Pervious Initial abstraction"
"          0.015   Impervious Manning 'n'"
"         98.000   Impervious SCS Curve No."
"          0.895   Impervious Runoff coefficient"
"          0.100   Impervious Ia/S coefficient"
"          0.518   Impervious Initial abstraction"
"                       0.068     0.000     0.024     0.110 c.m/sec"
"                  Catchment 218          Pervious   Impervious Total Area "
"                  Surface Area           0.070      0.130      0.200      hectare"
"                  Time of concentration  6.774      0.895      2.313      minutes"
"                  Time to Centroid       102.288    86.523     90.326     minutes"
"                  Rainfall depth         80.776     80.776     80.776     mm"
"                  Rainfall volume        56.54      105.01     161.55     c.m"
"                  Rainfall losses        38.073     8.458      18.823     mm"
"                  Runoff depth           42.703     72.318     61.953     mm"
"                  Runoff volume          29.89      94.01      123.91     c.m"
"                  Runoff coefficient     0.529      0.895      0.767      "
"                  Maximum flow           0.017      0.060      0.068      c.m/sec"
" 40               HYDROGRAPH Add Runoff "
"                 4   Add Runoff "
"                          0.068     0.068     0.024     0.110"
" 40               HYDROGRAPH Copy to Outflow"
"                 8   Copy to Outflow"
"                          0.068     0.068     0.068     0.110"
" 40               HYDROGRAPH   Combine    7"
"                 6   Combine "
"                 7   Node #"
"                     Draining SE to Elora Meadows"
"                  Maximum flow                  0.178    c.m/sec"
"                  Hydrograph volume           283.538    c.m"
"                          0.068     0.068     0.068     0.178"
" 38               START/RE-START TOTALS 218"
"                 3   Runoff Totals on EXIT"
"                  Total Catchment area                     27.650    hectare"
"                  Total Impervious area                     9.285    hectare"
"                  Total % impervious                       33.580"
" 19               EXIT"
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"               MIDUSS Output ----------------------------------------------->"
"               MIDUSS version                          Version 2.25  rev. 473"
"               MIDUSS created                        Sunday, February 7, 2010"
"          10   Units used:                                        ie METRIC"
"               Job folder:                Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                    Post-Dev"
"               Output filename:                              100yr_Post-Dev.out"
"               Licensee name:                                               A"
"               Company                                                      "
"               Date & Time last used:                 6/13/2023 at 8:29:58 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    3000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    4382.000   Coefficient A"
"      21.000   Constant B"
"       0.939   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"             Maximum intensity          205.327    mm/hr"
"             Total depth                 90.193    mm"
"           6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Clayton Subdivision roof areas to lot-level infiltration galleries"
"     100.000   % Impervious"
"       2.750   Total Area"
"       6.000   Flow length"
"      33.000   Overland Slope"
"       0.000   Pervious Area"
"       6.000   Pervious length"
"      33.000   Pervious slope"
"       2.750   Impervious Area"
"       6.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.808   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   1.327     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      2.750      2.750      hectare"
"             Time of concentration  2.030      0.275      0.275      minutes"
"             Time to Centroid       95.415     85.210     85.210     minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        0.00       2480.30    2480.30    c.m"
"             Rainfall losses        39.907     17.341     17.341     mm"
"             Runoff depth           50.285     72.852     72.852     mm"
"             Runoff volume          0.00       2003.43    2003.43    c.m"
"             Runoff coefficient     0.000      0.808      0.808      "
"             Maximum flow           0.000      1.327      1.327      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   1.327     1.327     0.000     0.000"
" 57          TRENCH Design d/s of 201"
"       1.327   Peak inflow"
"    2003.429   Hydrograph volume"
"       2.500   Ground elevation"
"       1.000   Downstream trench invert"
"       1.000   Trench height"
"       0.000   Water table elevation"
"       1.000   Trench top width"
"       1.000   Trench bottom width"
"      40.000   Voids ratio (%)"
"     100.000   Hydraulic conductivity"
"       0.000   Trench gradient (%)"
"     600.000   Trench length"
"       1.000   Include base width"
"         16.   Number of stages"
"                 Level Discharge    Volume"
"                 1.000     0.000      0.0"
"                 1.100     0.000     24.0"
"                 1.200     0.000     48.0"
"                 1.300     0.000     72.0"
"                 1.400     0.000     96.0"
"                 1.500     0.000    120.0"
"                 1.600     0.000    144.0"
"                 1.700     0.000    168.0"
"                 1.800     0.000    192.0"
"                 1.900     0.000    216.0"
"                 2.000     0.000    240.0"
"                 2.100     0.975    240.1"
"                 2.200     3.905    240.2"
"                 2.300     8.694    240.3"
"                 2.400    15.452    240.5"
"                 2.500    23.923    240.6"
"          1.   TRENCH PIPES"
"            Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                Invert    length     diam.    grade%     0=Yes  distance"
"                 2.000    20.000     0.000     0.000     1.000     0.000"
"          1.   MANHOLE"
"               Access"
"              diameter"
"                 1.200"
"          1.   OUTFLOW PIPE"
"          0.   Inflow at upstream end of trench: 1=True; 0=False"
"             Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"               invert    invert    Length  Diameter       'n'   loss Ke"
"                2.000     2.000    20.000 10000.000     0.013     0.500"
"            Peak outflow                  1.249    c.m/sec"
"            Outflow volume             1195.385    c.m"
"            Peak exfiltration             0.078    c.m/sec"
"            Exfiltration volume         778.249    c.m"
"            Maximum level                 2.109    metre"
"            Maximum storage             240.124    c.m"
"            Centroidal lag                1.359   hours"
"            Infiltration area 2 sides   1200.000   sq.metre"
"            Infiltration Base area       600.000   sq.metre"
"                 1.327     1.327     1.249     0.078 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                  1.249    c.m/sec"
"            Hydrograph volume          1195.385    c.m"
"                   1.327     1.327     1.249     1.249"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   1.327     0.000     1.249     1.249"
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" 33          CATCHMENT 209"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          209   Marr Drive transition grading to Bricker Ave."
"       65.000   % Impervious"
"        0.070   Total Area"
"       15.000   Flow length"
"        3.500   Overland Slope"
"        0.025   Pervious Area"
"       15.000   Pervious length"
"        3.500   Pervious slope"
"        0.045   Impervious Area"
"       15.000   Impervious length"
"        3.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.560   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.905   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.026     0.000     1.249     1.249 c.m/sec"
"             Catchment 209          Pervious   Impervious Total Area "
"             Surface Area           0.025      0.045      0.070      hectare"
"             Time of concentration  6.894      0.934      2.424      minutes"
"             Time to Centroid       101.831    86.335     90.209     minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        22.10      41.04      63.13      c.m"
"             Rainfall losses        39.672     8.582      19.463     mm"
"             Runoff depth           50.521     81.611     70.729     mm"
"             Runoff volume          12.38      37.13      49.51      c.m"
"             Runoff coefficient     0.560      0.905      0.784      "
"             Maximum flow           0.007      0.023      0.026      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.026     0.026     1.249     1.249"
" 56          DIVERSION"
"          209   Node number"
"        0.015   Overflow threshold"
"        1.000   Required diverted fraction"
"            0   Conduit type; 1=Pipe;2=Channel"
"             Peak of diverted flow         0.011    c.m/sec"
"             Volume of diverted flow       6.369    c.m"
"             DIV00209.100hyd"
"             Major flow at 209"
"                    0.026     0.026     0.015     1.249 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.026     0.015     0.015     1.249"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          202   Clayton Subdivision areas draining to SWMF (bypassing infiltration galleries)"
"       55.000   % Impervious"
"        8.060   Total Area"
"       90.000   Flow length"
"        0.500   Overland Slope"
"        3.627   Pervious Area"
"       90.000   Pervious length"
"        0.500   Pervious slope"
"        4.433   Impervious Area"
"       90.000   Impervious length"
"        0.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.565   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.934   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    2.199     0.015     0.015     1.249 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           3.627      4.433      8.060      hectare"
"             Time of concentration  36.218     4.905      15.279     minutes"
"             Time to Centroid       138.439    91.786     107.242    minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        3271.29    3998.24    7269.53    c.m"
"             Rainfall losses        39.206     5.989      20.937     mm"
"             Runoff depth           50.987     84.204     69.256     mm"
"             Runoff volume          1849.30    3732.74    5582.04    c.m"
"             Runoff coefficient     0.565      0.934      0.768      "
"             Maximum flow           0.442      2.099      2.199      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    2.199     2.214     0.015     1.249"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    2.199     2.214     2.214     1.249"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Clayton Main Area"
"             Maximum flow                  3.118    c.m/sec"
"             Hydrograph volume          6820.565    c.m"
"                    2.199     2.214     2.214     3.118"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    2.199     0.000     2.214     3.118"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Clayton Subdivision RY draining to SWMF via Woolwich St & Irvine St"
"       31.700   % Impervious"
"        0.440   Total Area"
"       25.000   Flow length"
"        5.500   Overland Slope"
"        0.301   Pervious Area"
"       25.000   Pervious length"
"        5.500   Pervious slope"
"        0.139   Impervious Area"
"       25.000   Impervious length"
"        5.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.564   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
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"       0.518   Impervious Initial abstraction"
"                   0.133     0.000     2.214     3.118 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.301      0.139      0.440      hectare"
"             Time of concentration  8.179      1.108      5.140      minutes"
"             Time to Centroid       103.352    86.537     96.124     minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        271.05     125.80     396.85     c.m"
"             Rainfall losses        39.316     7.553      29.247     mm"
"             Runoff depth           50.877     82.640     60.945     mm"
"             Runoff volume          152.89     115.27     268.16     c.m"
"             Runoff coefficient     0.564      0.916      0.676      "
"             Maximum flow           0.081      0.070      0.133      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.133     0.133     2.214     3.118"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.133     0.133     0.133     3.118"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                 3.219    c.m/sec"
"            Hydrograph volume          7088.726    c.m"
"                   0.133     0.133     0.133     3.219"
" 40          HYDROGRAPH   Confluence    1"
"           7   Confluence "
"           1   Node #"
"               Clayton Main Area"
"            Maximum flow                 3.219    c.m/sec"
"            Hydrograph volume          7088.726    c.m"
"                   0.133     3.219     0.133     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.133     3.219     3.219     0.000"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 3.219    c.m/sec"
"            Hydrograph volume          7088.726    c.m"
"                   0.133     3.219     3.219     3.219"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.133     0.000     3.219     3.219"
" 33          CATCHMENT 210"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         210   Clayton RYs draining to Woolwich St"
"      16.400   % Impervious"
"       0.200   Total Area"
"      25.000   Flow length"
"       5.500   Overland Slope"
"       0.167   Pervious Area"
"      25.000   Pervious length"
"       5.500   Pervious slope"
"       0.033   Impervious Area"
"      25.000   Impervious length"
"       5.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.564   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.916   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.057     0.000     3.219     3.219 c.m/sec"
"             Catchment 210          Pervious   Impervious Total Area "
"             Surface Area           0.167      0.033      0.200      hectare"
"             Time of concentration  8.179      1.108      6.471      minutes"
"             Time to Centroid       103.352    86.537     99.289     minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        150.80     29.58      180.39     c.m"
"             Rainfall losses        39.316     7.553      34.107     mm"
"             Runoff depth           50.877     82.640     56.086     mm"
"             Runoff volume          85.07      27.11      112.17     c.m"
"             Runoff coefficient     0.564      0.916      0.622      "
"             Maximum flow           0.045      0.016      0.057      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.057     0.057     3.219     3.219"
" 56          DIVERSION"
"         210   Node number"
"       0.018   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.039    c.m/sec"
"            Volume of diverted flow      36.174    c.m"
"            DIV00210.100hyd"
"            Major flow at 210"
"                   0.057     0.057     0.018     3.219 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 3.237    c.m/sec"
"            Hydrograph volume          7164.723    c.m"
"                   0.057     0.057     0.018     3.237"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.057     0.000     0.018     3.237"
" 33          CATCHMENT 211"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         211   Woolwich St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.230   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.081   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.149   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.560   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   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"
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"       0.518   Impervious Initial abstraction"
"                    0.087     0.000     0.018     3.237 c.m/sec"
"             Catchment 211          Pervious   Impervious Total Area "
"             Surface Area           0.081      0.149      0.230      hectare"
"             Time of concentration  6.394      0.866      2.255      minutes"
"             Time to Centroid       101.165    86.293     90.031     minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        72.61      134.84     207.44     c.m"
"             Rainfall losses        39.654     9.114      19.803     mm"
"             Runoff depth           50.539     81.079     70.390     mm"
"             Runoff volume          40.68      121.21     161.90     c.m"
"             Runoff coefficient     0.560      0.899      0.780      "
"             Maximum flow           0.023      0.074      0.087      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.087     0.087     0.018     3.237"
" 56          DIVERSION"
"             211   Node number"
"           0.049   Overflow threshold"
"           1.000   Required diverted fraction"
"               0   Conduit type; 1=Pipe;2=Channel"
"             Peak of diverted flow          0.038    c.m/sec"
"             Volume of diverted flow       20.900    c.m"
"             DIV00211.100hyd"
"             Major flow at 211"
"                    0.087     0.087     0.049     3.237 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"             Maximum flow                   3.286    c.m/sec"
"             Hydrograph volume           7305.719    c.m"
"                    0.087     0.087     0.049     3.286"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.087     0.000     0.049     3.286"
" 33          CATCHMENT 212"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         212   Clayton laneway towns to Irvine Street (up to 5yr flow)"
"       19.100  % Impervious"
"        0.050  Total Area"
"       12.000  Flow length"
"        4.000  Overland Slope"
"        0.040  Pervious Area"
"       12.000  Pervious length"
"        4.000  Pervious slope"
"        0.010  Impervious Area"
"       12.000  Impervious length"
"        4.000  Impervious slope"
"        0.300  Pervious Manning 'n'"
"       82.000  Pervious SCS Curve No."
"        0.561  Pervious Runoff coefficient"
"        0.100  Pervious Ia/S coefficient"
"        5.576  Pervious Initial abstraction"
"        0.015  Impervious Manning 'n'"
"       98.000  Impervious SCS Curve No."
"        0.891  Impervious Runoff coefficient"
"        0.100  Impervious Ia/S coefficient"
"        0.518  Impervious Initial abstraction"
"                    0.015     0.000     0.049     3.286 c.m/sec"
"             Catchment 212          Pervious   Impervious Total Area "
"             Surface Area           0.040      0.010      0.050      hectare"
"             Time of concentration  5.794      0.785      4.429      minutes"
"             Time to Centroid       100.403    86.299     96.560     minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        36.48      8.61       45.10      c.m"
"             Rainfall losses        39.558     9.867      33.887     mm"
"             Runoff depth           50.635     80.325     56.306     mm"
"             Runoff volume          20.48      7.67       28.15      c.m"
"             Runoff coefficient     0.561      0.891      0.624      "
"             Maximum flow           0.012      0.005      0.015      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.015     0.015     0.049     3.286"
" 56          DIVERSION"
"             212   Node number"
"           0.006   Overflow threshold"
"           1.000   Required diverted fraction"
"               0   Conduit type; 1=Pipe;2=Channel"
"             Peak of diverted flow          0.009    c.m/sec"
"             Volume of diverted flow        7.080    c.m"
"             DIV00212.100hyd"
"             Major flow at 212"
"                    0.015     0.015     0.006     3.286 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"             Maximum flow                   3.292    c.m/sec"
"             Hydrograph volume           7326.790    c.m"
"                    0.015     0.015     0.006     3.292"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.015     0.000     0.006     3.292"
" 33          CATCHMENT 213"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         213   Irvine St transition grading (up to 5yr flow)"
"       65.000  % Impervious"
"        0.190  Total Area"
"       10.000  Flow length"
"        2.000  Overland Slope"
"        0.067  Pervious Area"
"       10.000  Pervious length"
"        2.000  Pervious slope"
"        0.123  Impervious Area"
"       10.000  Impervious length"
"        2.000  Impervious slope"
"        0.300  Pervious Manning 'n'"
"       82.000  Pervious SCS Curve No."
"        0.560  Pervious Runoff coefficient"
"        0.100  Pervious Ia/S coefficient"
"        5.576  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"
"                    0.072     0.000     0.006     3.292 c.m/sec"
"             Catchment 213          Pervious   Impervious Total Area "
"             Surface Area           0.067      0.123      0.190      hectare"
"             Time of concentration  6.394      0.866      2.255      minutes"
"             Time to Centroid       101.165    86.293     90.031     minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        59.98      111.39     171.37     c.m"
"             Rainfall losses        39.654     9.114      19.803     mm"
"             Runoff depth           50.539     81.079     70.390     mm"
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"            Runoff volume          33.61      100.13     133.74     c.m"
"            Runoff coefficient     0.560      0.899      0.780      "
"            Maximum flow           0.019      0.061      0.072      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.072     0.072     0.006     3.292"
" 56         DIVERSION"
"         213   Node number"
"       0.040   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.032    c.m/sec"
"            Volume of diverted flow      17.696    c.m"
"            DIV00213.100hyd"
"            Major flow at 213"
"                   0.072     0.072     0.040     3.292 c.m/sec"
" 40         HYDROGRAPH Next link "
"           5   Next link "
"                   0.072     0.040     0.040     3.292"
" 33         CATCHMENT 204"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         204   Woolwich St & Irvine Street draining to SWMF"
"      65.000   % Impervious"
"       0.970   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.340   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.631   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.560   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   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"
"                   0.365     0.040     0.040     3.292 c.m/sec"
"            Catchment 204          Pervious   Impervious Total Area "
"            Surface Area           0.340      0.631      0.970      hectare"
"            Time of concentration  6.394      0.866      2.255      minutes"
"            Time to Centroid       101.165    86.293     90.031     minutes"
"            Rainfall depth         90.193     90.193     90.193     mm"
"            Rainfall volume        306.20     568.66     874.87     c.m"
"            Rainfall losses        39.654     9.114      19.803     mm"
"            Runoff depth           50.539     81.079     70.390     mm"
"            Runoff volume          171.58     511.20     682.78     c.m"
"            Runoff coefficient     0.560      0.899      0.780      "
"            Maximum flow           0.095      0.314      0.365      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.365     0.405     0.040     3.292"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.365     0.405     0.405     3.292"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 3.697    c.m/sec"
"            Hydrograph volume         8125.618    c.m"
"                   0.365     0.405     0.405     3.697"
" 40         HYDROGRAPH   Confluence    2"
"           7   Confluence "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 3.697    c.m/sec"
"            Hydrograph volume         8125.618    c.m"
"                   0.365     3.697     0.405     0.000"
" 33         CATCHMENT 205"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         205   Elora Sands existing drainage to SWMF"
"       0.000   % Impervious"
"       9.600   Total Area"
"     250.000   Flow length"
"       3.000   Overland Slope"
"       9.600   Pervious Area"
"     250.000   Pervious length"
"       3.000   Pervious slope"
"       0.000   Impervious Area"
"     250.000   Impervious length"
"       3.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.494   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.907     3.697     0.405     0.000 c.m/sec"
"            Catchment 205          Pervious   Impervious Total Area "
"            Surface Area           9.600      0.000      9.600      hectare"
"            Time of concentration  41.663     5.290      41.663     minutes"
"            Time to Centroid       145.713    92.287     145.712    minutes"
"            Rainfall depth         90.193     90.193     90.193     mm"
"            Rainfall volume        8658.49    0.01       8658.50    c.m"
"            Rainfall losses        45.637     6.118      45.637     mm"
"            Runoff depth           44.555     84.074     44.555     mm"
"            Runoff volume          4277.32    0.01       4277.32    c.m"
"            Runoff coefficient     0.494      0.000      0.494      "
"            Maximum flow           0.907      0.000      0.907      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.907     3.759     0.405     0.000"
" 33         CATCHMENT 206"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         206   SWMF + Overland Flow Channel"
"      40.000   % Impervious"
"       1.340   Total Area"
"      20.000   Flow length"
"      25.000   Overland Slope"
"       0.804   Pervious Area"
"      20.000   Pervious length"
"      25.000   Pervious slope"
"       0.536   Impervious Area"
"      20.000   Impervious length"
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"       25.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.560   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.865   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                  0.434     3.759     0.405     0.000 c.m/sec"
"            Catchment 206          Pervious   Impervious Total Area "
"            Surface Area           0.804      0.536      1.340      hectare"
"            Time of concentration  4.543      0.615      2.551      minutes"
"            Time to Centroid       98.808     86.274     92.453     minutes"
"            Rainfall depth         90.193     90.193     90.193     mm"
"            Rainfall volume        725.15     483.43     1208.58    c.m"
"            Rainfall losses        39.648     12.204     28.670     mm"
"            Runoff depth           50.545     77.989     61.522     mm"
"            Runoff volume          406.38     418.02     824.40     c.m"
"            Runoff coefficient     0.560      0.865      0.682      "
"            Maximum flow           0.243      0.261      0.434      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                  0.434     4.192     0.405     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"          8   Copy to Outflow"
"                  0.434     4.192     4.192     0.000"
" 40         HYDROGRAPH   Combine    3"
"          6   Combine "
"          3   Node #"
"              Draining to SWMF"
"            Maximum flow                 4.192    c.m/sec"
"            Hydrograph volume        13227.339    c.m"
"                  0.434     4.192     4.192     4.192"
" 40         HYDROGRAPH   Confluence    3"
"          7   Confluence "
"          3   Node #"
"              Draining to SWMF"
"            Maximum flow                 4.192    c.m/sec"
"            Hydrograph volume        13227.339    c.m"
"                  0.434     4.192     4.192     0.000"
" 54         POND DESIGN"
"        4.192   Current peak flow    c.m/sec"
"        0.385   Target outflow    c.m/sec"
"     13227.3    Hydrograph volume    c.m"
"          22.   Number of stages"
"      403.600   Minimum water level    metre"
"      405.700   Maximum water level    metre"
"      403.600   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                403.600     0.000     0.000"
"                403.700   0.00300   512.000"
"                403.800   0.00600  1044.000"
"                403.900   0.00700  1597.000"
"                404.000   0.02800  2171.000"
"                404.100    0.1120  2767.000"
"                404.200    0.2320  3382.000"
"                404.300    0.3950  4013.000"
"                404.400    0.6330  4657.000"
"                404.500    0.9240  5314.000"
"                404.600     1.265  5983.000"
"                404.700     1.648  6666.000"
"                404.800     2.067  7361.000"
"                404.900     2.519  8070.000"
"                405.000     3.002  8792.000"
"                405.100     3.785  9528.000"
"                405.200     4.924  10280.00"
"                405.300     6.413  11047.00"
"                405.400     8.269  11831.00"
"                405.500    10.517  12632.00"
"                405.600    13.180  13449.00"
"                405.700    16.279  14283.00"
"              Peak outflow                  1.489    c.m/sec"
"              Maximum level               404.659    metre"
"              Maximum storage            6382.892    c.m"
"              Centroidal lag               10.525   hours"
"                  0.434     4.192     1.489     0.000 c.m/sec"
" 40         HYDROGRAPH   Combine    4"
"          6   Combine "
"          4   Node #"
"              Draining to ND1"
"            Maximum flow                  1.489    c.m/sec"
"            Hydrograph volume         12323.415    c.m"
"                  0.434     4.192     1.489     1.489"
" 40         HYDROGRAPH Start - New Tributary"
"          2   Start - New Tributary"
"                  0.434     0.000     1.489     1.489"
" 33         CATCHMENT 207"
"          1   Triangular SCS"
"          1   Equal length"
"          1   SCS method"
"        207   Elora Sands draining to ND1 bypassing SWMF"
"        0.000   % Impervious"
"        2.080   Total Area"
"      100.000   Flow length"
"        4.500   Overland Slope"
"        2.080   Pervious Area"
"      100.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"      100.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.494   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                  0.313     0.000     1.489     1.489 c.m/sec"
"            Catchment 207          Pervious   Impervious Total Area "
"            Surface Area           2.080      0.000      2.080      hectare"
"            Time of concentration  21.289     2.703      21.289     minutes"
"            Time to Centroid       120.581    88.769     120.581    minutes"
"            Rainfall depth         90.193     90.193     90.193     mm"
"            Rainfall volume        1876.01    0.00       1876.01    c.m"
"            Rainfall losses        45.654     7.172      45.654     mm"
"            Runoff depth           44.538     83.021     44.538     mm"
"            Runoff volume          926.40     0.00       926.40     c.m"
"            Runoff coefficient     0.494      0.000      0.494      "
"            Maximum flow           0.313      0.000      0.313      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                  0.313     0.313     1.489     1.489"
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" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.313     0.313     0.313     1.489"
" 40          HYDROGRAPH   Combine    4"
"            6   Combine "
"            4   Node #"
"                Draining to ND1"
"             Maximum flow                  1.609    c.m/sec"
"             Hydrograph volume         13249.815    c.m"
"                    0.313     0.313     0.313     1.609"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.313     0.000     0.313     1.609"
" 33          CATCHMENT 208"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          208   External ROWs draining to ND1 bypassing SWMF"
"       49.700   % Impervious"
"        0.560   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.282   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.278   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.489   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   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"
"                    0.170     0.000     0.313     1.609 c.m/sec"
"             Catchment 208          Pervious   Impervious Total Area "
"             Surface Area           0.282      0.278      0.560      hectare"
"             Time of concentration  6.820      0.866      2.979      minutes"
"             Time to Centroid       102.891    86.293     92.184     minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        254.05     251.02     505.08     c.m"
"             Rainfall losses        46.114     9.114      27.725     mm"
"             Runoff depth           44.079     81.079     62.468     mm"
"             Runoff volume          124.16     225.66     349.82     c.m"
"             Runoff coefficient     0.489      0.899      0.693      "
"             Maximum flow           0.068      0.138      0.170      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.170     0.170     0.313     1.609"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.170     0.170     0.170     1.609"
" 40          HYDROGRAPH   Combine    4"
"            6   Combine "
"            4   Node #"
"                Draining to ND1"
"             Maximum flow                  1.633    c.m/sec"
"             Hydrograph volume         13599.636    c.m"
"                    0.170     0.170     0.170     1.633"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.170     0.000     0.170     1.633"
" 33          CATCHMENT 214"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          214   Clayton Subdivision RYs draining NW offsite to Woolwich Street E"
"        0.000   % Impervious"
"        0.100   Total Area"
"       60.000   Flow length"
"        5.000   Overland Slope"
"        0.100   Pervious Area"
"       60.000   Pervious length"
"        5.000   Pervious slope"
"        0.000   Impervious Area"
"       60.000   Impervious length"
"        5.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.564   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.022     0.000     0.170     1.633 c.m/sec"
"             Catchment 214          Pervious   Impervious Total Area "
"             Surface Area           0.100      0.000      0.100      hectare"
"             Time of concentration  14.232     1.928      14.232     minutes"
"             Time to Centroid       110.905    87.619     110.905    minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        90.19      0.00       90.19      c.m"
"             Rainfall losses        39.294     6.610      39.294     mm"
"             Runoff depth           50.899     83.582     50.899     mm"
"             Runoff volume          50.90      0.00       50.90      c.m"
"             Runoff coefficient     0.564      0.000      0.564      "
"             Maximum flow           0.022      0.000      0.022      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.022     0.022     0.170     1.633"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.022     0.022     0.022     1.633"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                  0.022    c.m/sec"
"             Hydrograph volume            50.899    c.m"
"                    0.022     0.022     0.022     0.022"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.022     0.000     0.022     0.022"
" 47          FILEI_O Read/Open DIV00210.100hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00210.100hyd"
"             Major flow at 210"
"             Total volume                 36.174    c.m"
"             Maximum flow                  0.039    c.m/sec"
"                  0.022     0.039     0.022     0.022 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
```

```
"                   0.022     0.039     0.039     0.022"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                 0.054    c.m/sec"
"             Hydrograph volume           87.072    c.m"
"                   0.022     0.039     0.039     0.054"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.022     0.000     0.039     0.054"
" 47          FILEI_O Read/Open DIV00211.100hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00211.100hyd"
"             Major flow at 211"
"             Total volume                20.900    c.m"
"             Maximum flow                 0.038    c.m/sec"
"                  0.022     0.038     0.039     0.054 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                   0.022     0.038     0.038     0.054"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                Draining NW to Woolwich St E"
"             Maximum flow                 0.078    c.m/sec"
"             Hydrograph volume          107.973    c.m"
"                   0.022     0.038     0.038     0.078"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.022     0.000     0.038     0.078"
" 33          CATCHMENT 215"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          215   Clayton Subdivision RYs draining offsite SW to rural residental"
"        0.000   % Impervious"
"        0.500   Total Area"
"       15.000   Flow length"
"        4.500   Overland Slope"
"        0.500   Pervious Area"
"       15.000   Pervious length"
"        4.500   Pervious slope"
"        0.000   Impervious Area"
"       15.000   Impervious length"
"        4.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.560   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.000   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.140     0.000     0.038     0.078 c.m/sec"
"             Catchment 215          Pervious   Impervious Total Area "
"             Surface Area           0.500      0.000      0.500      hectare"
"             Time of concentration  6.394      0.866      6.394      minutes"
"             Time to Centroid       101.165    86.293     101.165    minutes"
"             Rainfall depth         90.193     90.193     90.193     mm"
"             Rainfall volume        450.96     0.00       450.96     c.m"
"             Rainfall losses        39.654     9.114      39.654     mm"
"             Runoff depth           50.539     81.079     50.539     mm"
"             Runoff volume          252.69     0.00       252.69     c.m"
"             Runoff coefficient     0.560      0.000      0.560      "
"             Maximum flow           0.140      0.000      0.140      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                   0.140     0.140     0.038     0.078"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                   0.140     0.140     0.140     0.078"
" 40          HYDROGRAPH   Combine    6"
"            6   Combine "
"            6   Node #"
"                Draining SW to rural residential"
"             Maximum flow                 0.140    c.m/sec"
"             Hydrograph volume          252.694    c.m"
"                   0.140     0.140     0.140     0.140"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.140     0.000     0.140     0.140"
" 47          FILEI_O Read/Open DIV00209.100hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00209.100hyd"
"             Major flow at 209"
"             Total volume                 6.369    c.m"
"             Maximum flow                 0.011    c.m/sec"
"                  0.140     0.011     0.140     0.140 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                   0.140     0.011     0.011     0.140"
" 40          HYDROGRAPH   Combine    7"
"            6   Combine "
"            7   Node #"
"                Draining SE to Elora Meadows"
"             Maximum flow                 0.011    c.m/sec"
"             Hydrograph volume            6.369    c.m"
"                   0.140     0.011     0.011     0.011"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                   0.140     0.000     0.011     0.011"
" 33          CATCHMENT 216"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          216   Clayton Subd. RYs draining SE offsite to Elora Meadows"
"        7.800   % Impervious"
"        0.240   Total Area"
"        4.000   Flow length"
"       33.000   Overland Slope"
"        0.221   Pervious Area"
"        4.000   Pervious length"
"       33.000   Pervious slope"
"        0.019   Impervious Area"
"        4.000   Impervious length"
"       33.000   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.558   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
```

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"       0.806   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.072     0.000     0.011     0.011 c.m/sec"
"            Catchment 216          Pervious   Impervious Total Area "
"            Surface Area           0.221      0.019      0.240      hectare"
"            Time of concentration  1.591      0.216      1.441      minutes"
"            Time to Centroid       94.861     84.815     93.767     minutes"
"            Rainfall depth         90.193     90.193     90.193     mm"
"            Rainfall volume        199.58     16.88      216.46     c.m"
"            Rainfall losses        39.843     17.477     38.099     mm"
"            Runoff depth           50.349     72.715     52.094     mm"
"            Runoff volume          111.41     13.61      125.02     c.m"
"            Runoff coefficient     0.558      0.806      0.578      "
"            Maximum flow           0.063      0.009      0.072      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.072     0.072     0.011     0.011"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.072     0.072     0.072     0.011"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                 0.083    c.m/sec"
"            Hydrograph volume          131.394    c.m"
"                   0.072     0.072     0.072     0.083"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.072     0.000     0.072     0.083"
" 33         CATCHMENT 217"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         217   Clayton Subd. draining SE offsite to Elora Meadows (via Irvine St.)"
"      11.400   % Impervious"
"       0.070   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.062   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.008   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.561   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.891   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.021     0.000     0.072     0.083 c.m/sec"
"            Catchment 217          Pervious   Impervious Total Area "
"            Surface Area           0.062      0.008      0.070      hectare"
"            Time of concentration  5.794      0.785      4.945      minutes"
"            Time to Centroid       100.403    86.299     98.013     minutes"
"            Rainfall depth         90.193     90.193     90.193     mm"
"            Rainfall volume        55.94      7.20       63.13      c.m"
"            Rainfall losses        39.558     9.867      36.173     mm"
"            Runoff depth           50.635     80.325     54.020     mm"
"            Runoff volume          31.40      6.41       37.81      c.m"
"            Runoff coefficient     0.561      0.891      0.599      "
"            Maximum flow           0.018      0.004      0.021      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.021     0.021     0.072     0.083"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.021     0.021     0.021     0.083"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                 0.098    c.m/sec"
"            Hydrograph volume          169.208    c.m"
"                   0.021     0.021     0.021     0.098"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.021     0.000     0.021     0.098"
" 47         FILEI_O Read/Open DIV00212.100hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00212.100hyd"
"            Major flow at 212"
"            Total volume                 7.080    c.m"
"            Maximum flow                 0.009    c.m/sec"
"                 0.021     0.009     0.021     0.098 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.021     0.009     0.009     0.098"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                 0.104    c.m/sec"
"            Hydrograph volume          176.289    c.m"
"                   0.021     0.009     0.009     0.104"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.021     0.000     0.009     0.104"
" 47         FILEI_O Read/Open DIV00213.100hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00213.100hyd"
"            Major flow at 213"
"            Total volume                17.696    c.m"
"            Maximum flow                 0.032    c.m/sec"
"                 0.021     0.032     0.009     0.104 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.021     0.032     0.032     0.104"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                 0.136    c.m/sec"
"            Hydrograph volume          193.985    c.m"
"                   0.021     0.032     0.032     0.136"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.021     0.000     0.032     0.136"
" 33         CATCHMENT 218"
"           1   Triangular SCS"
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```
"           1   Equal length"
"           1   SCS method"
"         218   Irvine St drawing S to Elora Meadows"
"      65.000   % Impervious"
"       0.200   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.070   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.130   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.560   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   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"
"                0.075     0.000     0.032     0.136 c.m/sec"
"            Catchment 218          Pervious   Impervious Total Area "
"            Surface Area           0.070      0.130      0.200      hectare"
"            Time of concentration  6.394      0.866      2.255      minutes"
"            Time to Centroid       101.165    86.293     90.031     minutes"
"            Rainfall depth         90.193     90.193     90.193     mm"
"            Rainfall volume        63.13      117.25     180.39     c.m"
"            Rainfall losses        39.654     9.114      19.803     mm"
"            Runoff depth           50.539     81.079     70.390     mm"
"            Runoff volume          35.38      105.40     140.78     c.m"
"            Runoff coefficient     0.560      0.899      0.780      "
"            Maximum flow           0.020      0.065      0.075      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                0.075     0.075     0.032     0.136"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                0.075     0.075     0.075     0.136"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                0.211    c.m/sec"
"            Hydrograph volume           334.764    c.m"
"                0.075     0.075     0.075     0.211"
" 38         START/RE-START TOTALS 218"
"           3   Runoff Totals on EXIT"
"            Total Catchment area                   27.650    hectare"
"            Total Impervious area                   9.285    hectare"
"            Total % impervious                     33.580"
" 19         EXIT"
```

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"               MIDUSS Output ----------------------------------------------->"
"               MIDUSS version                          Version 2.25  rev. 473"
"               MIDUSS created                        Sunday, February 7, 2010"
"          10   Units used:                                        ie METRIC"
"               Job folder:              Q:\50250\100\SWM\MIDUSS\2023-XX-XX\"
"                                                                   Post-Dev"
"               Output filename:                      Regional_Post-Dev.out"
"               Licensee name:                                              A"
"               Company                                                     "
"               Date & Time last used:              6/13/2023 at 8:37:22 PM"
" 31         TIME PARAMETERS"
"       5.000   Time Step"
"    2880.000   Max. Storm length"
"    9000.000   Max. Hydrograph"
" 32         STORM Mass Curve"
"           3   Mass Curve"
"     285.000   Rainfall depth"
"    2880.000   Duration"
"          69   Q:\50250\100\SWM\MIDUSS\2023-XX-XX\Post-Dev\Hazel entire 48 hours.mrd   Hurricane
Hazel (entire 48 h)"
"               Maximum intensity           53.012    mm/hr"
"               Total depth                285.000    mm"
"           8   99999hyd   Hydrograph extension used in this file"
" 33         CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Clayton Subdivision roof areas to lot-level infiltration galleries"
"     100.000   % Impervious"
"       2.750   Total Area"
"       6.000   Flow length"
"      33.000   Overland Slope"
"       0.000   Pervious Area"
"       6.000   Pervious length"
"      33.000   Pervious slope"
"       2.750   Impervious Area"
"       6.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.880   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                0.348     0.000     0.000     0.000 c.m/sec"
"            Catchment 201          Pervious   Impervious Total Area "
"            Surface Area           0.000      2.750      2.750      hectare"
"            Time of concentration  2.879      0.470      0.470      minutes"
"            Time to Centroid       2434.204   2223.230   2223.231   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        0.01       7837.49    7837.50    c.m"
"            Rainfall losses        55.574     34.134     34.134     mm"
"            Runoff depth           229.426    250.866    250.866    mm"
"            Runoff volume          0.01       6898.80    6898.81    c.m"
"            Runoff coefficient     0.000      0.880      0.880      "
"            Maximum flow           0.000      0.348      0.348      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                0.348     0.348     0.000     0.000"
" 57         TRENCH Design d/s of 201"
"       0.348   Peak inflow"
```

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"     6898.808   Hydrograph volume"
"        2.500   Ground elevation"
"        1.000   Downstream trench invert"
"        1.000   Trench height"
"        0.000   Water table elevation"
"        1.000   Trench top width"
"        1.000   Trench bottom width"
"       40.000   Voids ratio (%)"
"      100.000   Hydraulic conductivity"
"        0.000   Trench gradient (%)"
"      600.000   Trench length"
"        1.000   Include base width"
"          16.   Number of stages"
"                  Level Discharge    Volume"
"                  1.000     0.000       0.0"
"                  1.100     0.000      24.0"
"                  1.200     0.000      48.0"
"                  1.300     0.000      72.0"
"                  1.400     0.000      96.0"
"                  1.500     0.000     120.0"
"                  1.600     0.000     144.0"
"                  1.700     0.000     168.0"
"                  1.800     0.000     192.0"
"                  1.900     0.000     216.0"
"                  2.000     0.000     240.0"
"                  2.100     0.975     240.1"
"                  2.200     3.905     240.2"
"                  2.300     8.694     240.3"
"                  2.400    15.452     240.5"
"                  2.500    23.923     240.6"
"            1.   TRENCH PIPES"
"              Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                  Invert    length     diam.    grade%     0=Yes  distance"
"                   2.000    20.000     0.000     0.000     1.000     0.000"
"            1.   MANHOLE"
"                  Access"
"                 diameter"
"                   1.200"
"            1.   OUTFLOW PIPE"
"            0.   Inflow at upstream end of trench: 1=True; 0=False"
"                 Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                   invert    invert    Length  Diameter       'n'   loss Ke"
"                   2.000     2.000    20.000 10000.000     0.013     0.500"
"              Peak outflow                  0.272    c.m/sec"
"              Outflow volume             2132.649    c.m"
"              Peak exfiltration             0.076    c.m/sec"
"              Exfiltration volume        4772.422    c.m"
"              Maximum level                 2.028    metre"
"              Maximum storage             240.032    c.m"
"              Centroidal lag               45.015   hours"
"              Infiltration area 2 sides   1200.000   sq.metre"
"              Infiltration Base area      600.000   sq.metre"
"                   0.348     0.348     0.272     0.076 c.m/sec"
" 40           HYDROGRAPH   Combine    1"
"              6   Combine "
"              1   Node #"
"                 Clayton Main Area"
"              Maximum flow                  0.272    c.m/sec"
"              Hydrograph volume          2132.649    c.m"
"                     0.348     0.348     0.272     0.272"
" 40           HYDROGRAPH Start - New Tributary"
"              2   Start - New Tributary"
"                     0.348     0.000     0.272     0.272"
" 33           CATCHMENT 209"
"              1   Triangular SCS"
"              1   Equal length"
"              1   SCS method"
"            209   Marr Drive transition grading to Bricker Ave."
"         65.000   % Impervious"
"          0.070   Total Area"
"         15.000   Flow length"
"          3.500   Overland Slope"
"          0.025   Pervious Area"
"         15.000   Pervious length"
"          3.500   Pervious slope"
"          0.045   Impervious Area"
"         15.000   Impervious length"
"          3.500   Impervious slope"
"          0.300   Pervious Manning 'n'"
"         82.000   Pervious SCS Curve No."
"          0.813   Pervious Runoff coefficient"
"          0.100   Pervious Ia/S coefficient"
"          5.576   Pervious Initial abstraction"
"          0.015   Impervious Manning 'n'"
"         98.000   Impervious SCS Curve No."
"          0.969   Impervious Runoff coefficient"
"          0.100   Impervious Ia/S coefficient"
"          0.518   Impervious Initial abstraction"
"                     0.010     0.000     0.272     0.272 c.m/sec"
"                  Catchment 209          Pervious   Impervious Total Area "
"                  Surface Area           0.025      0.045      0.070      hectare"
"                  Time of concentration  9.779      1.595      4.143      minutes"
"                  Time to Centroid       2446.293   2268.580   2323.894   minutes"
"                  Rainfall depth         285.000    285.000    285.000    mm"
"                  Rainfall volume        69.83      129.68     199.50     c.m"
"                  Rainfall losses        53.216     8.824      24.361     mm"
"                  Runoff depth           231.784    276.176    260.639    mm"
"                  Runoff volume          56.79      125.66     182.45     c.m"
"                  Runoff coefficient     0.813      0.969      0.915      "
"                  Maximum flow           0.004      0.007      0.010      c.m/sec"
" 40           HYDROGRAPH Add Runoff "
"              4   Add Runoff "
"                     0.010     0.010     0.272     0.272"
" 56           DIVERSION"
"            209   Node number"
"          0.015   Overflow threshold"
"          1.000   Required diverted fraction"
"              0   Conduit type; 1=Pipe;2=Channel"
"                  Peak of diverted flow         0.000    c.m/sec"
"                  Volume of diverted flow       0.000    c.m"
"                  DIV00209.99999hyd"
"                  Major flow at 209"
"                     0.010     0.010     0.010     0.272 c.m/sec"
" 40           HYDROGRAPH Next link "
"              5   Next link "
"                     0.010     0.010     0.010     0.272"
" 33           CATCHMENT 202"
"              1   Triangular SCS"
"              1   Equal length"
"              1   SCS method"
"            202   Clayton Subdivision areas draining to SWMF (bypassing infiltration galleries)"
"         55.000   % Impervious"
"          8.060   Total Area"
"         90.000   Flow length"
"          0.500   Overland Slope"
"          3.627   Pervious Area"
"         90.000   Pervious length"
"          0.500   Pervious slope"
"          4.433   Impervious Area"
"         90.000   Impervious length"
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"        0.500   Impervious slope"
"        0.300   Pervious Manning 'n'"
"       82.000   Pervious SCS Curve No."
"        0.817   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        5.576   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.978   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                  1.146     0.010     0.010     0.272 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           3.627      4.433      8.060      hectare"
"             Time of concentration  51.373     8.380      25.842     minutes"
"             Time to Centroid       2506.972   2277.731   2370.842   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        1.0337     1.2634     2.2971     ha-m"
"             Rainfall losses        52.085     6.384      26.949     mm"
"             Runoff depth           232.915    278.616    258.051    mm"
"             Runoff volume          0.8448     1.2351     2.0799     ha-m"
"             Runoff coefficient     0.817      0.978      0.905      "
"             Maximum flow           0.524      0.681      1.146      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                   1.146     1.156     0.010     0.272"
" 40          HYDROGRAPH Copy to Outflow"
"             8   Copy to Outflow"
"                   1.146     1.156     1.156     0.272"
" 40          HYDROGRAPH   Combine    1"
"             6   Combine "
"             1   Node #"
"                 Clayton Main Area"
"             Maximum flow                  1.417    c.m/sec"
"             Hydrograph volume         23114.008    c.m"
"                   1.146     1.156     1.156     1.417"
" 40          HYDROGRAPH Start - New Tributary"
"             2   Start - New Tributary"
"                   1.146     0.000     1.156     1.417"
" 33          CATCHMENT 203"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           203   Clayton Subdivision RY draining to SWMF via Woolwich St & Irvine St"
"        31.700   % Impervious"
"         0.440   Total Area"
"        25.000   Flow length"
"         5.500   Overland Slope"
"         0.301   Pervious Area"
"        25.000   Pervious length"
"         5.500   Pervious slope"
"         0.139   Impervious Area"
"        25.000   Impervious length"
"         5.500   Impervious slope"
"         0.300   Pervious Manning 'n'"
"        82.000   Pervious SCS Curve No."
"         0.815   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         5.576   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.963   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                   0.065     0.000     1.156     1.417 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.301      0.139      0.440      hectare"
"             Time of concentration  11.602     1.893      8.165      minutes"
"             Time to Centroid       2449.506   2269.437   2385.760   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        856.48     397.52     1254.00    c.m"
"             Rainfall losses        52.660     10.677     39.352     mm"
"             Runoff depth           232.340    274.323    245.648    mm"
"             Runoff volume          698.23     382.63     1080.85    c.m"
"             Runoff coefficient     0.815      0.963      0.862      "
"             Maximum flow           0.044      0.020      0.065      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                   0.065     0.065     1.156     1.417"
" 40          HYDROGRAPH Copy to Outflow"
"             8   Copy to Outflow"
"                   0.065     0.065     0.065     1.417"
" 40          HYDROGRAPH   Combine    1"
"             6   Combine "
"             1   Node #"
"                 Clayton Main Area"
"             Maximum flow                  1.480    c.m/sec"
"             Hydrograph volume         24194.846    c.m"
"                   0.065     0.065     0.065     1.480"
" 40          HYDROGRAPH   Confluence    1"
"             7   Confluence "
"             1   Node #"
"                 Clayton Main Area"
"             Maximum flow                  1.480    c.m/sec"
"             Hydrograph volume         24194.846    c.m"
"                   0.065     1.480     0.065     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"             8   Copy to Outflow"
"                   0.065     1.480     1.480     0.000"
" 40          HYDROGRAPH   Combine    2"
"             6   Combine "
"             2   Node #"
"                 Draining to SWMF"
"             Maximum flow                  1.480    c.m/sec"
"             Hydrograph volume         24194.846    c.m"
"                   0.065     1.480     1.480     1.480"
" 40          HYDROGRAPH Start - New Tributary"
"             2   Start - New Tributary"
"                   0.065     0.000     1.480     1.480"
" 33          CATCHMENT 210"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           210   Clayton RYs draining to Woolwich St"
"        16.400   % Impervious"
"         0.200   Total Area"
"        25.000   Flow length"
"         5.500   Overland Slope"
"         0.167   Pervious Area"
"        25.000   Pervious length"
"         5.500   Pervious slope"
"         0.033   Impervious Area"
"        25.000   Impervious length"
"         5.500   Impervious slope"
"         0.300   Pervious Manning 'n'"
"        82.000   Pervious SCS Curve No."
"         0.815   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         5.576   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
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"       98.000   Impervious SCS Curve No."
"        0.963   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.029     0.000     1.480     1.480 c.m/sec"
"             Catchment 210          Pervious   Impervious Total Area "
"             Surface Area           0.167      0.033      0.200      hectare"
"             Time of concentration  11.602     1.893      9.776      minutes"
"             Time to Centroid       2449.505   2269.436   2415.641   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        476.52     93.48      570.00     c.m"
"             Rainfall losses        52.660     10.677     45.775     mm"
"             Runoff depth           232.340    274.323    239.225    mm"
"             Runoff volume          388.47     89.98      478.45     c.m"
"             Runoff coefficient     0.815      0.963      0.839      "
"             Maximum flow           0.025      0.005      0.029      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.029     0.029     1.480     1.480"
" 56          DIVERSION"
"           210   Node number"
"         0.018   Overflow threshold"
"         1.000   Required diverted fraction"
"             0   Conduit type; 1=Pipe;2=Channel"
"             Peak of diverted flow         0.011    c.m/sec"
"             Volume of diverted flow      42.153    c.m"
"             DIV00210.99999hyd"
"             Major flow at 210"
"                    0.029     0.029     0.018     1.480 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Draining to SWMF"
"             Maximum flow                 1.498    c.m/sec"
"             Hydrograph volume        24631.146    c.m"
"                    0.029     0.029     0.018     1.498"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.029     0.000     0.018     1.498"
" 33          CATCHMENT 211"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          211   Woolwich St transition grading (up to 5yr flow)"
"        65.000  % Impervious"
"         0.230  Total Area"
"        10.000  Flow length"
"         2.000  Overland Slope"
"         0.081  Pervious Area"
"        10.000  Pervious length"
"         2.000  Pervious slope"
"         0.149  Impervious Area"
"        10.000  Impervious length"
"         2.000  Impervious slope"
"         0.300  Pervious Manning 'n'"
"        82.000  Pervious SCS Curve No."
"         0.813  Pervious Runoff coefficient"
"         0.100  Pervious Ia/S coefficient"
"         5.576  Pervious Initial abstraction"
"         0.015  Impervious Manning 'n'"
"        98.000  Impervious SCS Curve No."
"         0.970  Impervious Runoff coefficient"
"         0.100  Impervious Ia/S coefficient"
"         0.518  Impervious Initial abstraction"
"                    0.033     0.000     0.018     1.498 c.m/sec"
"             Catchment 211          Pervious   Impervious Total Area "
"             Surface Area           0.081      0.149      0.230      hectare"
"             Time of concentration  9.069      1.479      3.838      minutes"
"             Time to Centroid       2445.180   2266.253   2321.863   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        229.43     426.07     655.50     c.m"
"             Rainfall losses        53.384     8.442      24.172     mm"
"             Runoff depth           231.616    276.558    260.828    mm"
"             Runoff volume          186.45     413.45     599.90     c.m"
"             Runoff coefficient     0.813      0.970      0.915      "
"             Maximum flow           0.012      0.022      0.033      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.033     0.033     0.018     1.498"
" 56          DIVERSION"
"           211   Node number"
"         0.049   Overflow threshold"
"         1.000   Required diverted fraction"
"             0   Conduit type; 1=Pipe;2=Channel"
"             Peak of diverted flow         0.000    c.m/sec"
"             Volume of diverted flow       0.000    c.m"
"             DIV00211.99999hyd"
"             Major flow at 211"
"                    0.033     0.033     0.033     1.498 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Draining to SWMF"
"             Maximum flow                 1.531    c.m/sec"
"             Hydrograph volume        25231.055    c.m"
"                    0.033     0.033     0.033     1.531"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.033     0.000     0.033     1.531"
" 33          CATCHMENT 212"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          212   Clayton laneway towns to Irvine Street (up to 5yr flow)"
"        19.100  % Impervious"
"         0.050  Total Area"
"        12.000  Flow length"
"         4.000  Overland Slope"
"         0.040  Pervious Area"
"        12.000  Pervious length"
"         4.000  Pervious slope"
"         0.010  Impervious Area"
"        12.000  Impervious length"
"         4.000  Impervious slope"
"         0.300  Pervious Manning 'n'"
"        82.000  Pervious SCS Curve No."
"         0.816  Pervious Runoff coefficient"
"         0.100  Pervious Ia/S coefficient"
"         5.576  Pervious Initial abstraction"
"         0.015  Impervious Manning 'n'"
"        98.000  Impervious SCS Curve No."
"         0.970  Impervious Runoff coefficient"
"         0.100  Impervious Ia/S coefficient"
"         0.518  Impervious Initial abstraction"
"                    0.007     0.000     0.033     1.531 c.m/sec"
"             Catchment 212          Pervious   Impervious Total Area "
"             Surface Area           0.040      0.010      0.050      hectare"
"             Time of concentration  8.218      1.341      6.711      minutes"
"             Time to Centroid       2444.886   2264.431   2405.337   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
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"            Rainfall volume        115.28     27.22      142.50     c.m"
"            Rainfall losses        52.561     8.679      44.180     mm"
"            Runoff depth           232.439    276.321    240.820    mm"
"            Runoff volume          94.02      26.39      120.41     c.m"
"            Runoff coefficient     0.816      0.970      0.845      "
"            Maximum flow           0.006      0.001      0.007      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.007     0.007     0.033     1.531"
" 56         DIVERSION"
"         212   Node number"
"       0.006   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.001    c.m/sec"
"            Volume of diverted flow       3.440    c.m"
"            DIV00212.99999hyd"
"            Major flow at 212"
"                   0.007     0.007     0.006     1.531 c.m/sec"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                1.537    c.m/sec"
"            Hydrograph volume       25348.020    c.m"
"                   0.007     0.007     0.006     1.537"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.007     0.000     0.006     1.537"
" 33         CATCHMENT 213"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         213   Irvine St transition grading (up to 5yr flow)"
"      65.000   % Impervious"
"       0.190   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.067   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.123   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.813   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.970   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.028     0.000     0.006     1.537 c.m/sec"
"            Catchment 213          Pervious   Impervious Total Area "
"            Surface Area           0.067      0.123      0.190      hectare"
"            Time of concentration  9.069      1.479      3.838      minutes"
"            Time to Centroid       2445.179   2266.252   2321.864   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        189.53     351.98     541.50     c.m"
"            Rainfall losses        53.384     8.442      24.172     mm"
"            Runoff depth           231.616    276.558    260.828    mm"
"            Runoff volume          154.02     341.55     495.57     c.m"
"            Runoff coefficient     0.813      0.970      0.915      "
"            Maximum flow           0.010      0.018      0.028      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.028     0.028     0.006     1.537"
" 56         DIVERSION"
"         213   Node number"
"       0.040   Overflow threshold"
"       1.000   Required diverted fraction"
"           0   Conduit type; 1=Pipe;2=Channel"
"            Peak of diverted flow         0.000    c.m/sec"
"            Volume of diverted flow       0.000    c.m"
"            DIV00213.99999hyd"
"            Major flow at 213"
"                   0.028     0.028     0.028     1.537 c.m/sec"
" 40         HYDROGRAPH Next link "
"           5   Next link "
"                   0.028     0.028     0.028     1.537"
" 33         CATCHMENT 204"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         204   Woolwich St & Irvine Street draining to SWMF"
"      65.000   % Impervious"
"       0.970   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.340   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.631   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.813   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.970   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.141     0.028     0.028     1.537 c.m/sec"
"            Catchment 204          Pervious   Impervious Total Area "
"            Surface Area           0.340      0.631      0.970      hectare"
"            Time of concentration  9.069      1.479      3.838      minutes"
"            Time to Centroid       2445.180   2266.252   2321.864   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        967.58     1796.93    2764.50    c.m"
"            Rainfall losses        53.384     8.442      24.172     mm"
"            Runoff depth           231.616    276.558    260.828    mm"
"            Runoff volume          786.34     1743.70    2530.03    c.m"
"            Runoff coefficient     0.813      0.970      0.915      "
"            Maximum flow           0.050      0.091      0.141      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.141     0.168     0.028     1.537"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.141     0.168     0.168     1.537"
" 40         HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                1.703    c.m/sec"
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"            Hydrograph volume         28373.627    c.m"
"                    0.141     0.168     0.168     1.703"
" 40         HYDROGRAPH   Confluence    2"
"           7   Confluence "
"           2   Node #"
"               Draining to SWMF"
"            Maximum flow                 1.703    c.m/sec"
"            Hydrograph volume         28373.629    c.m"
"                    0.141     1.703     0.168     0.000"
" 33         CATCHMENT 205"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         205   Elora Sands existing drainage to SWMF"
"       0.000   % Impervious"
"       9.600   Total Area"
"     250.000   Flow length"
"       3.000   Overland Slope"
"       9.600   Pervious Area"
"     250.000   Pervious length"
"       3.000   Pervious slope"
"       0.000   Impervious Area"
"     250.000   Impervious length"
"       3.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.775   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    1.331     1.703     0.168     0.000 c.m/sec"
"            Catchment 205          Pervious   Impervious Total Area "
"            Surface Area           9.600      0.000      9.600      hectare"
"            Time of concentration  55.852     9.037      55.852     minutes"
"            Time to Centroid       2540.305   2277.724   2540.304   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        2.7360     0.0000     2.7360     ha-m"
"            Rainfall losses        64.160     6.883      64.160     mm"
"            Runoff depth           220.840    278.117    220.840    mm"
"            Runoff volume          2.1201     0.0000     2.1201     ha-m"
"            Runoff coefficient     0.775      0.000      0.775      "
"            Maximum flow           1.331      0.000      1.331      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    1.331     2.921     0.168     0.000"
" 33         CATCHMENT 206"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         206   SWMF + Overland Flow Channel"
"      40.000   % Impervious"
"       1.340   Total Area"
"      20.000   Flow length"
"      25.000   Overland Slope"
"       0.804   Pervious Area"
"      20.000   Pervious length"
"      25.000   Pervious slope"
"       0.536   Impervious Area"
"      20.000   Impervious length"
"      25.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.811   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.950   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.190     2.921     0.168     0.000 c.m/sec"
"            Catchment 206          Pervious   Impervious Total Area "
"            Surface Area           0.804      0.536      1.340      hectare"
"            Time of concentration  6.443      1.051      4.078      minutes"
"            Time to Centroid       2440.766   2267.838   2364.895   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        2291.40    1527.60    3819.00    c.m"
"            Rainfall losses        53.995     14.125     38.047     mm"
"            Runoff depth           231.005    270.875    246.953    mm"
"            Runoff volume          1857.28    1451.89    3309.17    c.m"
"            Runoff coefficient     0.811      0.950      0.867      "
"            Maximum flow           0.116      0.074      0.190      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.190     3.106     0.168     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.190     3.106     3.106     0.000"
" 40         HYDROGRAPH   Combine    3"
"           6   Combine "
"           3   Node #"
"               Draining to SWMF"
"            Maximum flow                 3.106    c.m/sec"
"            Hydrograph volume         52883.477    c.m"
"                    0.190     3.106     3.106     3.106"
" 40         HYDROGRAPH   Confluence    3"
"           7   Confluence "
"           3   Node #"
"               Draining to SWMF"
"            Maximum flow                 3.106    c.m/sec"
"            Hydrograph volume         52883.477    c.m"
"                    0.190     3.106     3.106     0.000"
" 54         POND DESIGN"
"       3.106   Current peak flow    c.m/sec"
"       0.385   Target outflow    c.m/sec"
"    52883.5    Hydrograph volume    c.m"
"         22.   Number of stages"
"     403.600   Minimum water level    metre"
"     405.700   Maximum water level    metre"
"     403.600   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"               403.600     0.000     0.000"
"               403.700   0.00300   512.000"
"               403.800   0.00600  1044.000"
"               403.900   0.00700  1597.000"
"               404.000   0.02800  2171.000"
"               404.100    0.1120  2767.000"
"               404.200    0.2320  3382.000"
"               404.300    0.3950  4013.000"
"               404.400    0.6330  4657.000"
"               404.500    0.9240  5314.000"
"               404.600     1.265  5983.000"
"               404.700     1.648  6666.000"
"               404.800     2.067  7361.000"
"               404.900     2.519  8070.000"
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"               405.000     3.002  8792.000"
"               405.100     3.785  9528.000"
"               405.200     4.924  10280.00"
"               405.300     6.413  11047.00"
"               405.400     8.269  11831.00"
"               405.500    10.517  12632.00"
"               405.600    13.180  13449.00"
"               405.700    16.279  14283.00"
"            Peak outflow                 2.688    c.m/sec"
"            Maximum level              404.936    metre"
"            Maximum storage           8326.551    c.m"
"            Centroidal lag              44.556   hours"
"                 0.190     3.106     2.688     0.000 c.m/sec"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                2.688    c.m/sec"
"            Hydrograph volume         52598.004    c.m"
"                   0.190     3.106     2.688     2.688"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.190     0.000     2.688     2.688"
" 33         CATCHMENT 207"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         207   Elora Sands draining to ND1 bypassing SWMF"
"       0.000   % Impervious"
"       2.080   Total Area"
"     100.000   Flow length"
"       4.500   Overland Slope"
"       2.080   Pervious Area"
"     100.000   Pervious length"
"       4.500   Pervious slope"
"       0.000   Impervious Area"
"     100.000   Impervious length"
"       4.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.774   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.305     0.000     2.688     2.688 c.m/sec"
"            Catchment 207          Pervious   Impervious Total Area "
"            Surface Area           2.080      0.000      2.080      hectare"
"            Time of concentration  28.540     4.618      28.540     minutes"
"            Time to Centroid       2501.334   2271.917   2501.334   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        5927.99    0.01       5928.00    c.m"
"            Rainfall losses        64.389     6.905      64.389     mm"
"            Runoff depth           220.611    278.095    220.611    mm"
"            Runoff volume          4588.71    0.01       4588.71    c.m"
"            Runoff coefficient     0.774      0.000      0.774      "
"            Maximum flow           0.305      0.000      0.305      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.305     0.305     2.688     2.688"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.305     0.305     0.305     2.688"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                2.900    c.m/sec"
"            Hydrograph volume         57186.703    c.m"
"                   0.305     0.305     0.305     2.900"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.305     0.000     0.305     2.900"
" 33         CATCHMENT 208"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         208   External ROWs draining to ND1 bypassing SWMF"
"      49.700   % Impervious"
"       0.560   Total Area"
"      10.000   Flow length"
"       2.000   Overland Slope"
"       0.282   Pervious Area"
"      10.000   Pervious length"
"       2.000   Pervious slope"
"       0.278   Impervious Area"
"      10.000   Impervious length"
"       2.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.771   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.970   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.080     0.000     0.305     2.900 c.m/sec"
"            Catchment 208          Pervious   Impervious Total Area "
"            Surface Area           0.282      0.278      0.560      hectare"
"            Time of concentration  9.143      1.479      4.895      minutes"
"            Time to Centroid       2472.893   2266.251   2358.334   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        802.79     793.21     1596.00    c.m"
"            Rainfall losses        65.351     8.442      37.068     mm"
"            Runoff depth           219.649    276.558    247.932    mm"
"            Runoff volume          618.71     769.72     1388.42    c.m"
"            Runoff coefficient     0.771      0.970      0.870      "
"            Maximum flow           0.040      0.040      0.080      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.080     0.080     0.305     2.900"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.080     0.080     0.080     2.900"
" 40         HYDROGRAPH   Combine    4"
"           6   Combine "
"           4   Node #"
"               Draining to ND1"
"            Maximum flow                2.957    c.m/sec"
"            Hydrograph volume         58575.125    c.m"
"                   0.080     0.080     0.080     2.957"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.080     0.000     0.080     2.957"
" 33         CATCHMENT 214"
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"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         214   Clayton Subdivision RYs draining NW offsite to Woolwich Street E"
"       0.000   % Impervious"
"       0.100   Total Area"
"      60.000   Flow length"
"       5.000   Overland Slope"
"       0.100   Pervious Area"
"      60.000   Pervious length"
"       5.000   Pervious slope"
"       0.000   Impervious Area"
"      60.000   Impervious length"
"       5.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.817   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.015     0.000     0.080     2.957 c.m/sec"
"            Catchment 214          Pervious   Impervious Total Area "
"            Surface Area           0.100      0.000      0.100      hectare"
"            Time of concentration  20.187     3.293      20.187     minutes"
"            Time to Centroid       2462.151   2263.919   2462.150   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        285.00     0.00       285.00     c.m"
"            Rainfall losses        52.287     10.723     52.287     mm"
"            Runoff depth           232.713    274.277    232.713    mm"
"            Runoff volume          232.71     0.00       232.71     c.m"
"            Runoff coefficient     0.817      0.000      0.817      "
"            Maximum flow           0.015      0.000      0.015      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.015     0.015     0.080     2.957"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.015     0.015     0.015     2.957"
" 40         HYDROGRAPH   Combine    5"
"           6   Combine "
"           5   Node #"
"               Draining NW to Woolwich St E"
"            Maximum flow                  0.015    c.m/sec"
"            Hydrograph volume           232.713    c.m"
"                   0.015     0.015     0.015     0.015"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.015     0.000     0.015     0.015"
" 47         FILEI_O Read/Open DIV00210.99999hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00210.99999hyd"
"            Major flow at 210"
"            Total volume                42.153    c.m"
"            Maximum flow                 0.011    c.m/sec"
"                 0.015     0.011     0.015     0.015 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.015     0.011     0.011     0.015"
" 40         HYDROGRAPH   Combine    5"
"           6   Combine "
"           5   Node #"
"               Draining NW to Woolwich St E"
"            Maximum flow                  0.025    c.m/sec"
"            Hydrograph volume           274.865    c.m"
"                   0.015     0.011     0.011     0.025"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.015     0.000     0.011     0.025"
" 47         FILEI_O Read/Open DIV00211.99999hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00211.99999hyd"
"            Major flow at 211"
"            Total volume                  0.000    c.m"
"            Maximum flow                  0.000    c.m/sec"
"                 0.015     0.000     0.011     0.025 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.015     0.000     0.000     0.025"
" 40         HYDROGRAPH   Combine    5"
"           6   Combine "
"           5   Node #"
"               Draining NW to Woolwich St E"
"            Maximum flow                  0.025    c.m/sec"
"            Hydrograph volume           274.865    c.m"
"                   0.015     0.000     0.000     0.025"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.015     0.000     0.000     0.025"
" 33         CATCHMENT 215"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         215   Clayton Subdivision RYs draining offsite SW to rural residental"
"       0.000   % Impervious"
"       0.500   Total Area"
"      15.000   Flow length"
"       4.500   Overland Slope"
"       0.500   Pervious Area"
"      15.000   Pervious length"
"       4.500   Pervious slope"
"       0.000   Impervious Area"
"      15.000   Impervious length"
"       4.500   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.813   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.000   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.073     0.000     0.000     0.025 c.m/sec"
"            Catchment 215          Pervious   Impervious Total Area "
"            Surface Area           0.500      0.000      0.500      hectare"
"            Time of concentration  9.069      1.479      9.069      minutes"
"            Time to Centroid       2445.179   2266.253   2445.179   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        1425.00    0.00       1425.00    c.m"
"            Rainfall losses        53.384     8.442      53.384     mm"
"            Runoff depth           231.616    276.558    231.616    mm"
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"            Runoff volume          1158.08    0.00       1158.08    c.m"
"            Runoff coefficient     0.813      0.000      0.813      "
"            Maximum flow           0.073      0.000      0.073      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.073     0.073     0.000     0.025"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.073     0.073     0.073     0.025"
" 40         HYDROGRAPH   Combine    6"
"           6   Combine "
"           6   Node #"
"               Draining SW to rural residential"
"            Maximum flow                  0.073    c.m/sec"
"            Hydrograph volume          1158.081    c.m"
"                   0.073     0.073     0.073     0.073"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.073     0.000     0.073     0.073"
" 47         FILEI_O Read/Open DIV00209.99999hyd"
"           1   1=read/open; 2=write/save"
"           2   1=rainfall; 2=hydrograph"
"           2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"            DIV00209.99999hyd"
"            Major flow at 209"
"            Total volume                  0.000    c.m"
"            Maximum flow                  0.000    c.m/sec"
"                 0.073     0.000     0.073     0.073 c.m/sec"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.073     0.000     0.000     0.073"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.000    c.m/sec"
"            Hydrograph volume             0.000    c.m"
"                   0.073     0.000     0.000     0.000"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.073     0.000     0.000     0.000"
" 33         CATCHMENT 216"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         216   Clayton Subd. RYs draining SE offsite to Elora Meadows"
"       7.800   % Impervious"
"       0.240   Total Area"
"       4.000   Flow length"
"      33.000   Overland Slope"
"       0.221   Pervious Area"
"       4.000   Pervious length"
"      33.000   Pervious slope"
"       0.019   Impervious Area"
"       4.000   Impervious length"
"      33.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.802   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.863   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.034     0.000     0.000     0.000 c.m/sec"
"            Catchment 216          Pervious   Impervious Total Area "
"            Surface Area           0.221      0.019      0.240      hectare"
"            Time of concentration  2.257      0.368      2.099      minutes"
"            Time to Centroid       2435.395   2225.511   2417.876   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        630.65     53.35      684.00     c.m"
"            Rainfall losses        56.559     39.083     55.196     mm"
"            Runoff depth           228.441    245.917    229.804    mm"
"            Runoff volume          505.49     46.04      551.53     c.m"
"            Runoff coefficient     0.802      0.863      0.806      "
"            Maximum flow           0.031      0.002      0.034      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.034     0.034     0.000     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.034     0.034     0.034     0.000"
" 40         HYDROGRAPH   Combine    7"
"           6   Combine "
"           7   Node #"
"               Draining SE to Elora Meadows"
"            Maximum flow                  0.034    c.m/sec"
"            Hydrograph volume           551.530    c.m"
"                   0.034     0.034     0.034     0.034"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.034     0.000     0.034     0.034"
" 33         CATCHMENT 217"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         217   Clayton Subd. draining SE offsite to Elora Meadows (via Irvine St.)"
"      11.400   % Impervious"
"       0.070   Total Area"
"      12.000   Flow length"
"       4.000   Overland Slope"
"       0.062   Pervious Area"
"      12.000   Pervious length"
"       4.000   Pervious slope"
"       0.008   Impervious Area"
"      12.000   Impervious length"
"       4.000   Impervious slope"
"       0.300   Pervious Manning 'n'"
"      82.000   Pervious SCS Curve No."
"       0.816   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       5.576   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.970   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.010     0.000     0.034     0.034 c.m/sec"
"            Catchment 217          Pervious   Impervious Total Area "
"            Surface Area           0.062      0.008      0.070      hectare"
"            Time of concentration  8.218      1.341      7.306      minutes"
"            Time to Centroid       2444.884   2264.430   2420.944   minutes"
"            Rainfall depth         285.000    285.000    285.000    mm"
"            Rainfall volume        176.76     22.74      199.50     c.m"
"            Rainfall losses        52.561     8.679      47.559     mm"
"            Runoff depth           232.439    276.321    237.441    mm"
"            Runoff volume          144.16     22.05      166.21     c.m"
"            Runoff coefficient     0.816      0.970      0.833      "
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"             Maximum flow           0.009      0.001      0.010      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.010     0.010     0.034     0.034"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.010     0.010     0.010     0.034"
" 40          HYDROGRAPH   Combine    7"
"            6   Combine "
"            7   Node #"
"                Draining SE to Elora Meadows"
"             Maximum flow                  0.043    c.m/sec"
"             Hydrograph volume           717.739    c.m"
"                    0.010     0.010     0.010     0.043"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.010     0.000     0.010     0.043"
" 47          FILEI_O Read/Open DIV00212.99999hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00212.99999hyd"
"             Major flow at 212"
"             Total volume                  3.440    c.m"
"             Maximum flow                  0.001    c.m/sec"
"                  0.010     0.001     0.010     0.043 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.010     0.001     0.001     0.043"
" 40          HYDROGRAPH   Combine    7"
"            6   Combine "
"            7   Node #"
"                Draining SE to Elora Meadows"
"             Maximum flow                  0.045    c.m/sec"
"             Hydrograph volume           721.179    c.m"
"                    0.010     0.001     0.001     0.045"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.010     0.000     0.001     0.045"
" 47          FILEI_O Read/Open DIV00213.99999hyd"
"            1   1=read/open; 2=write/save"
"            2   1=rainfall; 2=hydrograph"
"            2   1=runoff; 2=inflow; 3=outflow; 4=junction"
"             DIV00213.99999hyd"
"             Major flow at 213"
"             Total volume                  0.000    c.m"
"             Maximum flow                  0.000    c.m/sec"
"                  0.010     0.000     0.001     0.045 c.m/sec"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.010     0.000     0.000     0.045"
" 40          HYDROGRAPH   Combine    7"
"            6   Combine "
"            7   Node #"
"                Draining SE to Elora Meadows"
"             Maximum flow                  0.045    c.m/sec"
"             Hydrograph volume           721.179    c.m"
"                    0.010     0.000     0.000     0.045"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.010     0.000     0.000     0.045"
" 33          CATCHMENT 218"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"               218   Irvine St drawing S to Elora Meadows"
"            65.000   % Impervious"
"             0.200   Total Area"
"            10.000   Flow length"
"             2.000   Overland Slope"
"             0.070   Pervious Area"
"            10.000   Pervious length"
"             2.000   Pervious slope"
"             0.130   Impervious Area"
"            10.000   Impervious length"
"             2.000   Impervious slope"
"             0.300   Pervious Manning 'n'"
"            82.000   Pervious SCS Curve No."
"             0.813   Pervious Runoff coefficient"
"             0.100   Pervious Ia/S coefficient"
"             5.576   Pervious Initial abstraction"
"             0.015   Impervious Manning 'n'"
"            98.000   Impervious SCS Curve No."
"             0.970   Impervious Runoff coefficient"
"             0.100   Impervious Ia/S coefficient"
"             0.518   Impervious Initial abstraction"
"                    0.029     0.000     0.000     0.045 c.m/sec"
"                 Catchment 218          Pervious   Impervious Total Area "
"                 Surface Area           0.070      0.130      0.200      hectare"
"                 Time of concentration  9.069      1.479      3.838      minutes"
"                 Time to Centroid       2445.179   2266.252   2321.863   minutes"
"                 Rainfall depth         285.000    285.000    285.000    mm"
"                 Rainfall volume        199.50     370.50     570.00     c.m"
"                 Rainfall losses        53.384     8.442      24.172     mm"
"                 Runoff depth           231.616    276.558    260.828    mm"
"                 Runoff volume          162.13     359.52     521.66     c.m"
"                 Runoff coefficient     0.813      0.970      0.915      "
"                 Maximum flow           0.010      0.019      0.029      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.029     0.029     0.000     0.045"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.029     0.029     0.029     0.045"
" 40          HYDROGRAPH   Combine    7"
"            6   Combine "
"            7   Node #"
"                Draining SE to Elora Meadows"
"             Maximum flow                  0.074    c.m/sec"
"             Hydrograph volume          1242.836    c.m"
"                    0.029     0.029     0.029     0.074"
" 38          START/RE-START TOTALS 218"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     27.650    hectare"
"             Total Impervious area                     9.285    hectare"
"             Total % impervious                       33.580"
" 19          EXIT"
```

Appendix D

Proposed SWMF Design Calculations

CLAYTON SUBDIVISION
STORMWATER MANAGEMENT
Centre Wellington, Ontario

Project Number:	50250-100
Date:	6/12/2023
Design By:	MXF
File:	Q:\50250\100\SWM\50250-100 Master SWM Facility Design Sheet.xlsx

Step 1: Choose Level of Water Quality Control

Enhanced 80% long-term S.S. removal

Step 2: Choose Type of Facility

Wet Pond

Step 3: Define Catchment area and Imperviousness

Catchment Area (ha)	Imperviousness (%)
14.32	61.8

Interpolated Storage Volume Requirement (m^3/ha)

206.0

Permanent Pool Required (m^3)

2377

Extended Detention Volume Required (m^3)

573

Table 3.2 Water Quality Storage Requirements based on Receiving Waters (from MOE Stormwater Management Planning and Design Manual, March 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35	55	70	85
Enhanced 80% long-term S.S. removal	*Wetlands*	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. Removal	*Wetlands*	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. Removal	*Wetlands*	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

CLAYTON SUBDIVISION
STORMWATER MANAGEMENT
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STAGE-STORAGE RELATIONSHIP

Stage	Active Depth	Forebay			Main Pond			Total Pond Volume	Active Storage Volume	Volume Summary	Ponding Elevation	Comments	Stage
		Area	Volume	Cumulative Volume	Area	Volume	Cumulative Volume						
m	*m*	m^2	m^3	m^3	m^2	m^3	m^3	m^3	m^3	m^3	*m*		*m*
402.10		613	0	0	1915	0	0	0					402.10
402.20		652	63	63	1998	196	196	259					402.20
402.30		692	67	130	2082	204	400	530					402.30
402.40		733	71	202	2167	212	612	814					402.40
402.50		775	75	277	2252	221	833	1110					402.50
402.60		817	80	357	2339	230	1063	1419					402.60
402.70		859	84	440	2426	238	1301	1741					402.70
402.80		903	88	529	2514	247	1548	2077					402.80
402.90		947	92	621	2603	256	1804	2425					402.90
403.00		996	97	718	2696	265	2069	2787					403.00
403.10		1064	103	821	2830	276	2345	3166					403.10
403.20		1131	110	931	2965	290	2635	3566					403.20
403.30		1199	116	1047	3102	303	2938	3986					403.30
403.40		1268	123	1171	3240	317	3255	4426					403.40
403.50		1340	130	1301	3379	331	3586	4887					403.50
403.60		1418	138	**1439**	3524	345	**3931**	**5370**		5370		Permanent Pool	403.60
403.60	0.00		0	1439	5014	0	3931	5370	0				403.60
403.70	0.10		0	1439	5219	512	4443	5882	512				403.70
403.80	0.20		0	1439	5425	532	4975	6414	1044	573	403.72	MOE Extended Detention	403.80
403.90	0.30		0	1439	5634	553	5528	6967	1597				403.90
404.00	0.40		0	1439	5855	574	6102	7542	2171	1644	403.91	25mm Event	404.00
404.10	0.50		0	1439	6051	595	6698	8137	2767	2422	404.05	1:2 Year Event	404.10
404.20	0.60		0	1439	6250	615	7313	8752	3382				404.20
404.30	0.70		0	1439	6377	631	7944	9383	4013	3584	404.24	1:5 Year Event	404.30
404.40	0.80		0	1439	6504	644	8588	10027	4657	4265	404.34	1:10 Year Event	404.40
404.50	0.90		0	1439	6630	657	9245	10684	5314	5158	404.48	1:25 Year Event	404.50
404.60	1.00		0	1439	6759	669	9914	11354	5983	5770	404.57	1:50 Year Event	404.60
404.70	1.10		0	1439	6889	682	10597	12036	6666	6383	404.66	1:100 Year Event	404.70
404.80	1.20		0	1439	7021	696	11292	12731	7361				404.80
404.90	1.30		0	1439	7155	709	12001	13440	8070				404.90
405.00	1.40		0	1439	7291	722	12724	14163	8792	8327	404.94	Regional Event	405.00
405.10	1.50		0	1439	7431	736	13460	14899	9528				405.10
405.20	1.60		0	1439	7594	751	14211	15650	10280				405.20
405.30	1.70		0	1439	7758	768	14979	16418	11047				405.30
405.40	1.80		0	1439	7921	784	15763	17202	11831				405.40
405.50	1.90		0	1439	8087	800	16563	18002	12632				405.50
405.60	2.00		0	1439	8254	817	17380	18819	13449				405.60
405.70	2.10		0	1439	8424	834	18214	19653	14283			Freeboard/Top of Pond	405.70

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Orifice Calculations

$Q_o=C_d*A_o*(2*g*H_o)^{0.5}$

	Orifice 1	Orifice 2	Orifice 3
C_d	0.63	0.63	0.63
Invert (m)	403.60	999.00	999.00
Width (m)	0.000		
Diameter/Height (m)	0.080		
Type (H/V)	V		

C_d	Description
0.63	Orifice Plate
0.80	Orifice Tube

Weir Calculations

$Q_w = 2/3*C_d*(2g)^{1/2}*L*H_w^{3/2} + 8/15*C_d*(2g)^{1/2}*\tan\theta*H_w^{5/2}$

	Weir 1	Weir 2	Weir 3	Weir 4
C_d	0.50	0.50	0.50	0.50
Invert (m)	403.95	404.25	404.45	405.00
Length (m)	1.200	1.000	0.200	5.000
Side Slope (H:V)	0	0	0	10
Side Slope (rad)	0.000	0.000	0.000	1.471
	MH notch 1	MH notch 2	Top of MH weir	Emergency

STAGE-DISCHARGE RELATIONSHIP

Stage	Active Volume	Orifice 1			Orifice 2			Orifice 3			Weir 1 Flow	Weir 2 Flow	Weir 3 Flow	Weir 4 Flow	TotalFlow
		Area	H_o	Flow	Area	H_o	Flow	Area	H_o	Flow					
m	m^3	m^2	*m*	m^3/s	m^2	*m*	m^3/s	m^2	*m*	m^3/s	m^3/s				m^3/s
403.60	0	0.00	0.00	0.0000	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
403.70	512	0.01	0.06	0.0034	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0034
403.80	1044	0.01	0.16	0.0056	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0056
403.90	1597	0.01	0.26	0.0072	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0072
404.00	2171	0.01	0.36	0.0084	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0198	0.0000	0.0000	0.0000	0.0282
404.10	2767	0.01	0.46	0.0095	0.00	0.00	0.0000	0.00	0.00	0.0000	0.1029	0.0000	0.0000	0.0000	0.1124
404.20	3382	0.01	0.56	0.0105	0.00	0.00	0.0000	0.00	0.00	0.0000	0.2215	0.0000	0.0000	0.0000	0.2320
404.30	4013	0.01	0.66	0.0114	0.00	0.00	0.0000	0.00	0.00	0.0000	0.3669	0.0165	0.0000	0.0000	0.3948
404.40	4657	0.01	0.76	0.0122	0.00	0.00	0.0000	0.00	0.00	0.0000	0.5348	0.0858	0.0000	0.0000	0.6328
404.50	5314	0.01	0.86	0.0130	0.00	0.00	0.0000	0.00	0.00	0.0000	0.7227	0.1846	0.0033	0.0000	0.9236
404.60	5983	0.01	0.96	0.0137	0.00	0.00	0.0000	0.00	0.00	0.0000	0.9285	0.3057	0.0172	0.0000	1.2651
404.70	6666	0.01	1.06	0.0144	0.00	0.00	0.0000	0.00	0.00	0.0000	1.1508	0.4457	0.0369	0.0000	1.6479
404.80	7361	0.01	1.16	0.0151	0.00	0.00	0.0000	0.00	0.00	0.0000	1.3885	0.6022	0.0611	0.0000	2.0670
404.90	8070	0.01	1.26	0.0157	0.00	0.00	0.0000	0.00	0.00	0.0000	1.6406	0.7737	0.0891	0.0000	2.5192
405.00	8792	0.01	1.36	0.0164	0.00	0.00	0.0000	0.00	0.00	0.0000	1.9063	0.9590	0.1204	0.0000	3.0021
405.10	9528	0.01	1.46	0.0169	0.00	0.00	0.0000	0.00	0.00	0.0000	2.1850	1.1571	0.1547	0.2708	3.7846
405.20	10280	0.01	1.56	0.0175	0.00	0.00	0.0000	0.00	0.00	0.0000	2.4761	1.3671	0.1918	0.8716	4.9242
405.30	11047	0.01	1.66	0.0181	0.00	0.00	0.0000	0.00	0.00	0.0000	2.7791	1.5886	0.2314	1.7953	6.4125
405.40	11831	0.01	1.76	0.0186	0.00	0.00	0.0000	0.00	0.00	0.0000	3.0936	1.8209	0.2734	3.0629	8.2694
405.50	12632	0.01	1.86	0.0191	0.00	0.00	0.0000	0.00	0.00	0.0000	3.4191	2.0634	0.3177	4.6981	10.5175
405.60	13449	0.01	1.96	0.0196	0.00	0.00	0.0000	0.00	0.00	0.0000	3.7552	2.3159	0.3642	6.7248	13.1798
405.70	14283	0.01	2.06	0.0201	0.00	0.00	0.0000	0.00	0.00	0.0000	4.1017	2.5780	0.4127	9.1660	16.2786

CLAYTON SUBDIVISION
STORMWATER MANAGEMENT
Centre Wellington, Ontario

Project Number:	50250-100
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FALLING HEAD DRAWDOWN CALCULATION
MOE SWM Planning and Design Manual, 2003

$$t = \frac{0.66C_2h^{1.5} + 2C_3h^{0.5}}{2.75A_O}$$ Equation 4.11

where

t =	207380.68	*s*	
	57.6	*hr*	drawdown time
A_p =	5177.875	m^2	surface area of the pond
C =	0.63		discharge coefficient
d =	80	*mm*	diameter of the orifice
A_O =	0.0050265	m^2	cross-sectional area of the orifice
g =	9.81	m/s^2	gravitational acceleration constant
h_1 =	403.720	*m*	starting water elevation above the orifice
h_2 =	403.640	*m*	ending water elevation above the orifice
h =	0.08	*m*	maximum water elevation above the orifice
C_2 =	2058.7797		slope coefficient from the area-depth linear regression
C_3 =	5013.1726		intercept from the area-depth linear regression

	ELEVATION *m*	STAGE *m*	AREA m^2	COMMENTS
1	403.600	0	5013.6	Permanent pool
2	403.700	0.1	5218.5	
3	403.720	0.12	5259.9	Extended detention
4	403.800	0.2	5425.4	

DRAWDOWN TIME: 207381 *s*
57.6 *hr*

Regression Output:

m_1 =	2058.78	slope coefficient from the area-depth linear regression
b =	5013.17	intercept from the area-depth linear regression
se_1 =	4.46	standard error for coefficient m_1
se_b =	0.57	standard error for constant b
R^2 =	1.0000	coefficient of determination
se_y =	0.63	standard error of the *y* estimate
F =	213451.01	F statistic
df =	2	degrees of freedom
ss_{reg} =	86043	regression sum of squares
ss_{resid} =	1	residual sum of squares

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FALLING HEAD DRAWDOWN CALCULATION
MOE SWM Planning and Design Manual, 2003

$$t = \frac{0.66C_2h^{1.5} + 2C_3h^{0.5}}{2.75A_O}$$ Equation 4.11

where

t =	390660.45	*s*	
	108.5	*hr*	drawdown time
A_p =	5574.983	m^2	surface area of the pond
C =	0.63		discharge coefficient
d =	80	*mm*	diameter of the orifice
A_O =	0.0050265	m^2	cross-sectional area of the orifice
g =	9.81	m/s^2	gravitational acceleration constant
h_1 =	403.910	*m*	starting water elevation above the orifice
h_2 =	403.640	*m*	ending water elevation above the orifice
h =	0.27	*m*	maximum water elevation above the orifice
C_2 =	2093.5992		slope coefficient from the area-depth linear regression
C_3 =	5009.7112		intercept from the area-depth linear regression

	ELEVATION *m*	STAGE *m*	AREA m^2	COMMENTS
1	403.600	0	5013.6	Permanent pool
2	403.700	0.1	5218.5	
3	403.800	0.2	5425.4	
4	403.910	0.31	5654.6	25mm Storm
5	403.900	0.3	5633.8	
6	404.000	0.4	5855.0	

DRAWDOWN TIME: 390660 *s*
108.5 *hr*

Regression Output:

m_1 =	2093.60	slope coefficient from the area-depth linear regression
b =	5009.71	intercept from the area-depth linear regression
se_1 =	16.47	standard error for coefficient m_1
se_b =	4.23	standard error for constant b
R^2 =	0.9998	coefficient of determination
se_y =	5.47	standard error of the *y* estimate
F =	16154.42	F statistic
df =	4	degrees of freedom
ss_{reg} =	482513	regression sum of squares
ss_{resid} =	119	residual sum of squares

CLAYTON SUBDIVISION
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FOREBAY DESIGN CALCULATIONS

MOE SWM Planning and Design Manual, 2003

Forebay Design Flows

Flow into forebay during the 1:5-year return period event	2.252	m^3/s
Flow into forebay during the 25 mm - 4 hour design storm event	0.769	m^3/s
Peak flow from main pond outlet for the 25mm design storm (from MIDUSS)	0.009	m^3/s

Forebay Characteristics

b =	15.0	*m*	bottom width
y =	1.5	*m*	depth
z =	4	:1	side slope
w =	21.0	*m*	average width
R =	1.15	*m*	hydraulic radius
A =	31.5	m^2	cross-sectional area

1. Length Calculation Based on Settling Velocity

L = forebay flow length *(m)*
r = length-to-width ratio
Q_p = peak flow rate through forebay *(m^3/s)*
v_s = settling velocity *(m/s)*

Equation 4.5: Forebay Settling Length

a) Required Settling Length (assuming Q_p = forebay through-flow & v_s = 0.0055 m/s)

Q_p =	0.77	m^3/s	peak flow rate through forebay
v_s =	0.0055	*m/s*	settling velocity
r =	0.32		length-to-width ratio
L =	6.7	*m*	required settling length
L =	*6.7*	*m*	*trial length*

b) Required Settling Length (assuming Q_p = pond discharge & v_s = 0.0003 m/s)

Q_p =	0.009	m^3/s	peak flow rate through forebay
v_s =	0.0003	*m/s*	settling velocity
r =	0.07		length-to-width ratio
L =	1.4	*m*	required settling length
L =	*1.4*	*m*	*trial length*

Table 1: Average settling velocities

	Mass Removed	Particle Size Range	Average Settling Velocity
	%	*µm*	*m/s*
	80 - 100	x ≤ 20	0.00000254
Enhanced:	70 - 80	20 < x ≤ 40	0.00001300
Normal:	60 - 70	40 < x ≤ 60	0.00002540
Basic:	40 - 60	60 < x ≤ 130	0.00012700
Medium Sand:	20 - 40	130 < x ≤ 400	0.00059267
Gross Grit:	0 - 20	400 < x ≤ 4000	0.00550333

2. Length Calculation Based on Flow Dispersion Length

Q =	2.25	m^3/s	inlet flow rate
d =	1.5	*m*	depth of permanent pool in forebay
V_f =	0.50	*m/s*	desired velocity in forebay (typical value ≤ 0.50 *m/s*)
L =	24.0	m	required length of dispersion

Equation 4.6: Dispersion Length

3. Required Forebay Length

L =	24.0	*m*	required length
L =	**45.0**	***m***	**provided length**
r =	2.14		design length-to-width ratio (typical minimum of 2.0)

4. Scour Velocity

v_s =	0.15	*m/s*	scour velocity (typical value = 0.15 *m/s*)
v =	**0.071**	***m/s***	**actual velocity**

OK The actual velocity through the forebay is less than the scour velocity.

5. Weir Flow From Forebay

L =	5	*m*	length of crest of weir
α =	1.65		coefficient
H =	0.7	*m*	head
Q =	**4.83**	***m^3/s***	**discharge**

Equation 4.4: Weir Flow

OK The weir flow from the forebay exceeds the flow entering the forebay

6. Estimated Cleanout Frequencies

a) Forebay

Forebay volume	1439	m^3
Estimated TSS removal efficiency	50%	
Impervious level	61.8%	
Estimated annual sediment loading	2.32	m^3/ha
Contributing area	14.32	*ha*
Annual sediment volume	16.6	m^3/yr
Cleanout frequency for 33% volume reduction	**28.6**	***years***

Table 2: Annual sediment loading

Impervious Level	Annual Loading
%	m^3/ha
35%	0.6
55%	1.9
70%	2.8
85%	3.8

b) Stormwater Management Pond

Wetpond volume (excluding forebay)	3931	m^3
Estimated TSS removal efficiency	30%	
Impervious level	62%	
Estimated annual sediment loading	2.32	m^3/ha
Contributing area	14.32	*ha*
Annual sediment volume	10	m^3/yr
Cleanout frequency for 33% volume reduction	**130.2**	***years***

Appendix E

Geotechnical and Hydrogeological Investigations

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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PROJECT NO.: SM 301951B-G October 14, 2021

CACHET DEVELOPMENTS
361 CONNIE CRESCENT, SUITE 200
Concord, Ontario
L4K 5R2

Attention: Marcus Gagliardi
Development Planner

PRELIMINARY GEOTECHNICAL AND HYDROGEOLOGICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
75 WOOLWICH STREET EAST
ELORA, ONTARIO

Dear Mr. Gagliardi,

Further to your authorisation and subsequent discussions with Mr. Michael DeBiasio, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has completed the fieldwork, laboratory testing, and report preparation in connection with the above noted project. The scope of work was completed in general accordance with our proposal P301951, dated July 1, 2021, later revised and confirmed through email communication on August 3, 2021. This report should be read in conjunction with the formal report for the Gibson Farms to the east SM 301951A-G, dated October 5, 2021. Our comments and recommendations based on our findings at the four [4] borehole locations are presented in the following paragraphs.

1. INTRODUCTION

We understand that the project will involve the construction of a residential development consisting of single-family dwellings and townhouses along asphalt paved roadways, including the installation of associated underground municipal services, located at 75 Woolwich Street East [Clayton Lands] in Elora, Ontario. The purpose of this preliminary geotechnical investigation work was to assess the subsurface soil and groundwater conditions, and to provide our comments and recommendations with respect to the design and construction of the proposed development, from a geotechnical point of view.

SOIL-MAT ENGINEERS was provided with a sub-watershed study that encompasses the surrounding area – including the subject site – prepared by Aquafor Beech Limited, dated February 2008. The results of this investigation have been considered in preparation of this geotechnical report.

This report is based on the above summarised project description, and on the assumption that the design and construction will be performed in accordance with applicable codes and standards. Any significant deviations from the proposed project design may void the recommendations given in this report. If significant changes are made to the proposed design, this office must be consulted to review the new design with respect to the results of this investigation. It is noted that SOIL-MAT ENGINEERS has also conducted Phase One and Two Environmental Site Assessments (ESAs) for the subject site, which have been reported under a separate cover.

2. PROCEDURE

A total of four [4] sampled boreholes were advanced at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The boreholes were advanced using continuous flight power auger equipment on August 6, 2021 under the direction and supervision of a staff member of SOIL-MAT ENGINEERS & CONSULTANTS LTD., to termination at depths of between approximately 3.6 and 7.6 metres below the existing ground surface.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of ASTM test specification D1586, Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the SOIL-MAT laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on all soil samples recovered from the borings. Selected samples were also subjected to laboratory grain size analyses.

Upon completion of drilling, groundwater monitoring wells were installed at Borehole Nos. 1, 2, and 4 to allow for the future monitoring of the groundwater level. The monitoring well consisted of 50-millimetre PVC pipe screened in the lower 1.5 to 3.0 metres. The monitoring well was encased in well filter sand up to approximately 0.3 metres above the screened portion, then with bentonite ‘hole plug’ to the surface and fitted with a protective steel ‘stick up’ casing. The remaining boreholes were backfilled in

general accordance with Ontario Regulation 903, and the ground surface was reinstated even with the surrounding grade.

The boreholes were located in the field by representatives of SOIL-MAT ENGINEERS, based on accessibility over the site, clearance of underground utilities, and the drawing that was forwarded to our office. Best efforts were made to minimize crop damage by locating the majority of the boreholes to the perimeter of the fields. The ground surface elevation at the borehole locations has been referenced to a geodetic benchmark, described as North American 1983 CSRS, as per the survey plan completed by POI Aerial, dated August 10, 2021, which was provided to our office.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Log of Borehole Nos. 1 to 4, inclusive, following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed at the exact depths of geological change.

3. SITE DESCRIPTION AND SUBSURFACE CONDITIONS

The subject site is currently an undeveloped agricultural property located at Woolwich Street East in Elora, Ontario. The parcel is bordered to the east by Irvine Street, to the south by Bricker Avenue, to the west by residential dwellings and a public school, and to the north by Woolwich Street East. The grade is relatively flat and even at the south portion of the site, sloping gently up towards the north, before quickly descending to the north towards Woolwich Street East with an approximate relief of 6 metres measured across the boreholes.

The subsurface conditions encountered at the borehole locations are summarised as follows:

Topsoil

A surficial veneer of topsoil approximately 100 to 250 millimetres in thickness was encountered at all borehole locations. It is noted that the depth of topsoil may vary across the site and from the depths encountered at the borehole locations. It is also noted that the term ‘topsoil’ has been used from a geotechnical point of view, and does

not necessarily reflect its nutrient content or ability to support plant life. Given the property has been historically used for agricultural purposes the upper levels of the soils would be expected to have a reworked nature resulting in more variable depths of topsoil over the site. As such, it is recommended that a conservative approach be taken when estimating topsoil quantities across the site for stripping, i.e. account for slightly greater stripping depth than those specifically noted at the borehole locations.

Sandy Silt/Clayey Silt

Native sandy silt/clayey silt was encountered beneath the topsoil in Borehole Nos. 1, 2, and 3. The fine-grained granular to slightly cohesive soils were brown in colour, with trace to some clay and gravel, with a notable increasing clay content with depth in some of the boreholes. The native sandy silt/clayey silt soils were generally noted to have a reworked or weathered appearance in the upper levels, and were generally noted to have a compact state. The sandy silt/clayey silt deposit was present to depths of approximately 0.9 to 2.2 metres in Borehole Nos. 2 and 3, and proven to termination within Borehole No. 1 at a depth of approximately 6.1 metres below the existing ground surface.

Sand

A native sand deposit was encountered beneath the topsoil in Borehole No. 4, and beneath the sandy silt/clayey silt layer in Borehole Nos. 2 and 3. The fine to medium grained soils were brown in colour, contained trace amounts of clay, silt, and gravel, and was generally in a loose to compact state. The native sand soils were proven to termination at depths of approximately 3.6 and 7.6 metres below the existing ground surface.

Grain Size Analyses

Grain size analyses were conducted on three [3] selected samples of the native soils recovered from the boreholes. The results of this grain size testing can be found appended to the end of this report, and are summarized as follows:

TABLE A
GRAIN SIZE ANALYSES

Sample ID	Depth	% Clay	% Silt	% Sand	% Gravel	Hydraulic Conductivity, k [cm/s]	Estimated Infiltration Rate, [mm/hr]
BH2 SS6	4.6 m	2	6	91	1	10^{-2}	150 to 300
BH3 SS3	1.5 m	14	45	34	7	10^{-6}	<10
BH4 SS4	2.3 m	2	9	89	0	10^{-3} to 10^{-2}	100 to 150

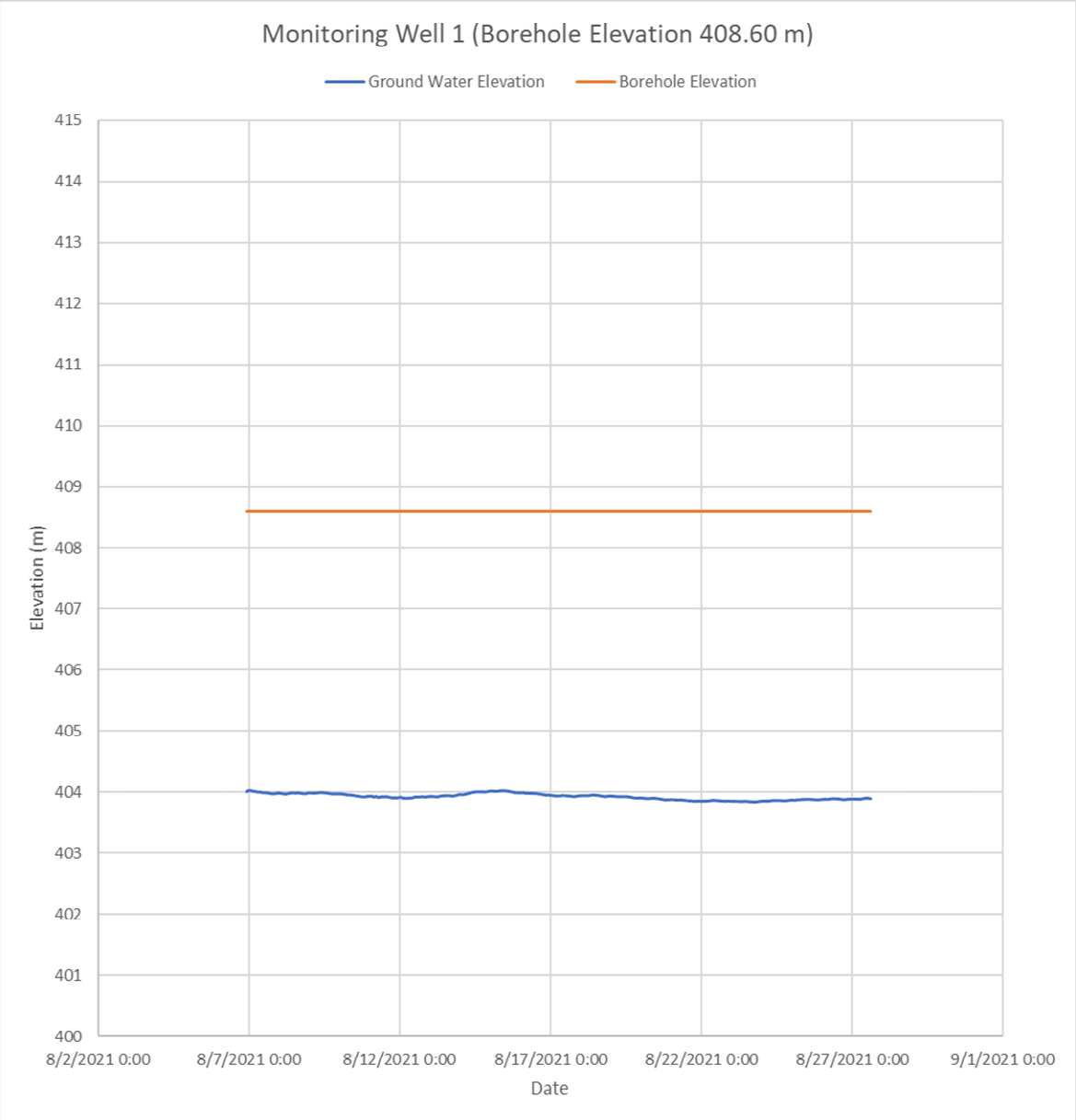
The field and laboratory testing demonstrate the native soils to generally consist of a sandy silt/clayey silt with some clay and traces of gravel in the upper levels, transitioning to a highly permeable sand with traces of clay, silt, and gravel at depth. According to the Unified Soil Classification System (USCS), the soils are classified as M.L. – inorganic silts and very fine sands, clayey silts with slight plasticity in the upper levels overlying S.P. – poorly graded sands, with little to no fines at depth. The sandy silt/clayey silt in the upper levels would generally behave as a low permeable material, but would not be considered as an impermeable material, and would be highly frost susceptible. The underlying sand deposit is highly permeable, relatively free draining.

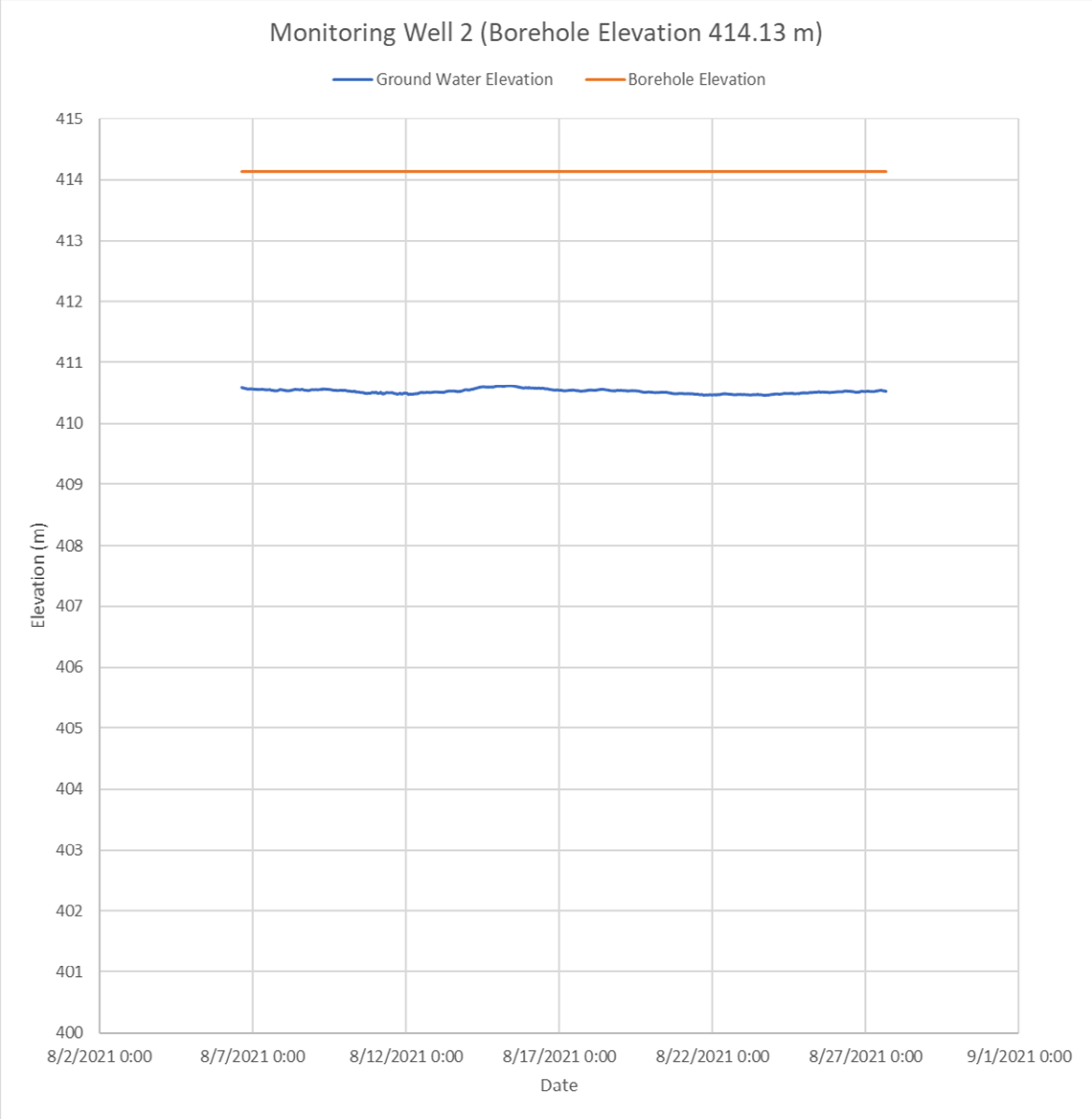
A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soils to be in areas noting to consist of stone-poor sandy silt to silty sand-textured till, ice-contact stratified deposits of sand and gravel, with minor silt and clay, as well as river deposits of coarse gravel. These conditions are consistent with the observations during drilling.

Groundwater Observations

Borehole No. 2 was noted to have ‘caved’ to a depth of approximately 3.8 metres and ‘wet’ at a depth of approximately 3.6 metres, while Borehole No. 4 was noted to be open and ‘wet’ at a depth of 7.0 metres upon completion. Borehole Nos. 3 was noted to have cave to a depth of 2.7 metres, and dry upon completion. Borehole No. 1 was noted as being open and ‘dry’ [i.e. no free groundwater present] upon completion of drilling. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes.

As noted above, a monitoring well was installed at Borehole Nos. 1, 2, and 4, to allow for future measurements of the static groundwater level. Furthermore, it is noted that an additional monitoring well was installed on the abutting parcel of land to the east, the work of which was completed in concert with the fieldwork on the Clayton Lands. A data logger was installed in Borehole Nos. 1 and 2 to allow for continuous monitoring of the groundwater level between August 6 and August 27, 2021, the readings of which have been illustrated in the following graphs:




Monitoring Well 2 (Borehole Elevation 414.13 m)
Ground Water Elevation
Borehole Elevation
Elevation (m)
415
414
413
412
411
410
409
408
407
406
405
404
403
402
401
400
8/2/2021 0:00
8/7/2021 0:00
8/12/2021 0:00
8/17/2021 0:00
8/22/2021 0:00
8/27/2021 0:00
9/1/2021 0:00
Date

In addition to this, manual monitoring well readings were also taken from all of the installed monitoring well locations across the site on August 6 and August 27, 2021 and have been summarized in the following chart:

TABLE B
SUMMARY OF GROUNDWATER LEVELS

Monitoring Well	Ground Surface Elevation [m]	August 6, 2021		August 27, 2021	
		Groundwater Depth [m]	Groundwater Elevation [m]	Groundwater Depth [m]	Groundwater Elevation [m]
MW1	408.60	4.78	403.82	4.71	403.89
MW2	414.13	3.58	410.55	3.61	410.52
MW4	414.87	6.78	408.09	6.96	407.91

The groundwater levels observed at these monitoring well locations, as well as the monitoring well installed at the adjacent property [summarised in our geotechnical report SM 301951A-G under a separate cover] indicate a stabilized groundwater level on the order of approximately 2 to 7 metres below the existing grade, at an elevation of roughly 403.8 to 410.5 metres, varying with the physical topography. This data is based on the groundwater data collected from Borehole Nos. 1, 2, and 4, as well as the monitoring well installed on the Gibson Farm land to the east. It is noted that the groundwater level would be expected to fluctuate seasonally. It is also noted that the observed groundwater levels may be influenced by more localised shallower 'perched' deposits in more permeable seams within the sandy silt/clayey silt. Further long-term monitoring may allow for a more accurate estimate of the static groundwater level, including more data during the 'wet' and 'dry' seasons.

As noted above, SOIL-MAT ENGINEERS was also provided a sub-watershed study by Aquafor Beech, which included a number of monitoring wells to the east to monitor the groundwater elevations. The conditions and groundwater levels described in this geotechnical report are consistent with those encountered during our fieldwork as described above.

General Soil Conditions

As noted above the subsurface conditions are generally characterized as sandy silt/clayey silt deposit in the upper levels, underlain by a permeably cohesionless sand deposit. The grain size analyses indicate the sandy silt/clayey silt soils to have 10 to 20 percent clay content, lending a slightly cohesive characteristic. The sandy silt/clayey silt soils are relatively consistent in terms of its constituents but are noted to contain an increasing clay content with depth in some of the boreholes, as noted above. Where the material transitions into a sand the native soils are generally fine in gradation in the upper levels, becoming medium to coarse with depth. As demonstrated above the subsurface conditions exhibit a relatively inconsistent layered structure across the large area, but can be generally distinguished by a layer of slightly cohesive sandy silt overlying a cohesionless sand. The conditions will be best assessed during excavations on an area-by-area basis. As such it may also be prudent to advance a series of test excavations in the area of proposed deeper excavations and/or stormwater management ponds to confirm soil composition and groundwater conditions in the area of deep excavations.

4. EXCAVATIONS

Excavations for the installation of foundations and underground services are anticipated to extend to depths of up to approximately 2 to 5 metres below the existing grade. Excavations through the native sandy silt/clayey silt and sand soils, as well as any engineered fill placed as part of site grading works, should be relatively straightforward, with the sides remaining stable for short construction periods at inclinations of up to 45 degrees to the horizontal, and possibly steeper depending on moisture condition and clay content. Where wet or more permeable seams are encountered, during periods of extended precipitation, or where excavations extend below the static groundwater level, the sides of excavations should be expected to ‘slough in’ to as flat as 3 horizontal to 1 vertical, or flatter.

Nevertheless, all excavations must comply with the current Occupational Health and Safety Act and Regulations for Construction Projects. The native sandy silt/clayey silt and sand soils would generally be considered a Type 2 or 3 soil, depending on the moisture content and relative compact to dense condition, as outlined in the Ontario Health and Safety Act III – Excavations. Excavation slopes steeper than those required in the Safety Act must be supported and a senior geotechnical engineer from this office should monitor the work.

As noted above, the groundwater level varies between depths of approximately 2 to 7 metres below the existing grade, roughly elevation 403.8 to 410.5 metres. The majority of excavations are anticipated to be above the groundwater level. Nevertheless, some infiltration of water from more permeable seams and surface runoff into the open excavations should be anticipated. Such infiltration should be readily controlled using typical construction dewatering methods. 'Perched' deposits of water may be encountered within more permeable pockets, which may require greater initial dewatering efforts and instability in the excavations, especially during the 'wet' times of the year. Where excavations extend to greater depths, to and below the groundwater level, especially within the sand deposit, the rate of infiltration will be much greater and additional pumping or more sophisticated dewatering methods should be anticipated. In this regard, ongoing monitoring of the groundwater levels, and careful review of the design servicing elevations, is recommended. As noted above, the advancement of test excavations in the area of proposed deep services and stormwater management ponds would allow for a first hand look at how groundwater levels may affect such excavations. More water should be expected when connections are made to existing services. Surface water should be directed away from the excavations.

The base of the excavations in the native soils, above the groundwater level, encountered in the boreholes should generally remain firm and stable. Where excavations extend to greater depths, to or below the groundwater level, or where 'perched' water is encountered, some base instability should be expected, especially during 'wet' times of the year. This will be especially likely in the high silt content sandy silt/clayey silt soils. Areas of base instability may be stabilised with the placement of additional bedding or ballast stone, the use of coarser stone material, etc. The appropriate measures are best assessed based on the actual conditions at the time of construction. With a firm and stable base condition, stabilised where warranted, standard pipe bedding material as specified by the Ontario Provincial Standard Specification [OPSS] or County of Wellington should be satisfactory. The bedding should be well compacted to provide sufficient support to the pipes and components (i.e. valve chambers, manholes etc.), and to minimize settlements of the roadway above the service trenches. Special attention should be paid to compaction under the pipe haunches.

We recommend that the invert elevations of any storm sewer pipes for rear yard catch basins be located above the proposed underside of footing elevations of adjacent residential structures, or that the trench excavations should be filled with 5 MPa 'lean mix' concrete product to the proposed underside of footing level where the excavations

extend below an imaginary 10 horizontal to 7 vertical line extending outwards and down from a point 0.3 metres beyond the proposed townhouse foundations.

Any utility poles, light poles, etc. located within 3 metres of the top of an excavation slope should be braced to ensure their stability. Likewise, temporary support might be required for other existing above and below ground structures, including existing underground services, roadways, etc. depending on their proximity to the trench excavations.

5. BACKFILL CONSIDERATIONS

The excavated material will consist primarily of the sandy silt/clayey silt and sand soils encountered in the boreholes as described above. These soils are generally considered suitable for use as engineered fill, trench backfill, etc., provided that they are free of organics, construction debris, or other deleterious material, and that its moisture content can be controlled to within 3 per cent of its standard Proctor optimum moisture content.

It is noted that the sandy silt/clayey silt soils encountered are not considered to be free draining and should not be used where this characteristic is necessary. It is also noted that these fine grained granular soils will present difficulties in achieving effective compaction when they become 'wet' of optimum, and where access with compaction equipment is restricted. The sandy silt/clayey silt soils encountered are generally considered to be near to slightly 'dry' of their standard Proctor optimum moisture content, with some noted 'wet' seams. Some moisture conditioning will be required depending upon the weather conditions at the time of construction. It is noted that these silty soils will become nearly impossible to compact when wet of its optimum moisture content. Any material that becomes wet to saturated should be spread out to allow to dry, or removed and discarded, or utilised in non-settlement sensitive areas. The sand soils are generally well draining, and tend to be near optimum moisture content. At depth, approaching or below the water level, the sand soils will be expected to be saturated, requiring time to drain excess moisture or other drying efforts in order to achieve effective compaction.

We note that where backfill material is placed near or slightly above its optimum moisture content, the potential for long term settlements due to the ingress of groundwater and collapse of the fill structure is reduced. Correspondingly, the shear strength of the 'wet' backfill material is also lowered, thereby reducing its ability to support construction traffic and therefore impacting roadway construction. If the soil is

well dry of its optimum value, it will appear to be very strong when compacted, but will tend to settle with time as the moisture content in the fill increases to equilibrium condition. The fine grained to cohesive soils encountered may require high compaction energy to achieve acceptable densities if the moisture content is not close to its standard Proctor optimum value. It is therefore very important that the moisture content of the backfill soils be within 3 per cent of its standard Proctor optimum moisture content during placement and compaction to minimise long term subsidence [settlement] of the fill mass. Any imported fill required in service trenches or to raise the subgrade elevation should have its moisture content within 3 per cent of its optimum moisture content and meet the necessary environmental guidelines.

A representative of SOIL-MAT should be present on-site during the backfilling and compaction operations to confirm the uniform compaction of the backfill material to project specification requirements. Close supervision is prudent in areas that are not readily accessible to compaction equipment, for instance near the end of compaction 'runs'. Backfill within service trenches, areas to be paved, etc., should be placed in loose lifts not exceeding 300 millimetres in thickness and compacted to a minimum of 95 per cent of its standard Proctor maximum dry density [SPMDD], and to 100 per cent of its SPMDD in the upper 1 metre below the design subgrade level. All structural fill should be compacted to 100 per cent of its SPMDD. The appropriate compaction equipment should be employed based on soil type, i.e. pad-toe for cohesive soils and smooth drum/vibratory plate for granular soils. A method should be developed to assess compaction efficiency employing the on-site compaction equipment and backfill materials during construction.

6. MANHOLES, CATCH BASINS AND THRUST BLOCKS

Properly prepared bearing surfaces for manholes, valve chambers, etc. in the native competent soils, stabilised where required, will be practically non-yielding under the anticipated loads. Proper preparation of the founding soils will tend to accentuate the protrusion of these structures above the pavement surface if compaction of the fill around these structures is not adequate, causing settlement of the surrounding paved surfaces. Conversely, the pavement surfaces may rise above the valve chambers and around manholes under frost action. To alleviate the potential for these types of differential movements, free-draining, non-frost susceptible material should be employed as backfill around the structures located within the paved roadway limits, and compacted to 100 per cent of its standard Proctor maximum dry density. A geofabric separator

should be provided between the free draining material and the on-site silt soils to prevent the intrusion of fines.

The thrust blocks in the native soils or engineered fill may be conservatively sized as recommended by the applicable Ontario Provincial Standard Specification conservatively using a horizontal allowable bearing pressure of up to 150 kPa [~2,000 psf]. Any backfill required behind the blocks should be a well-graded granular product and should be compacted to 100 per cent of its standard Proctor maximum dry density.

7. PAVEMENT STRUCTURE DESIGN CONSIDERATIONS

All areas to be paved must be cleared of all organic and otherwise unsuitable materials, and the exposed subgrade proof rolled with 3 to 4 passes of a loaded tandem-axle truck in the presence of a representative of SOIL-MAT ENGINEERS & CONSULTANTS LTD., immediately prior to the placement of the sub-base material. Any areas of distress revealed by this or other means should be subexcavated and replaced with suitable backfill material. Where the subgrade condition is poorer it may be necessary to implement more aggressive stabilisation methods, such as the use of coarse aggregate [50-millimetre clear stone, 'rip rap', etc.] 'punched' into the soft areas.

Good drainage provisions will optimise the long-term performance of the pavement structure. The subgrade must be properly crowned and shaped to promote drainage to the subdrain system. Subdrains should be installed to intercept excess subsurface water and to prevent softening of the subgrade material. Surface water should not be allowed to pond adjacent to the outer limits of the paved areas.

The most severe loading conditions on the subgrade typically occur during the course of construction, therefore precautionary measures may have to be taken to ensure that the subgrade is not unduly disturbed by construction traffic. SOIL-MAT should be given the opportunity to review the final pavement structure design and subdrain scheme prior to construction to ensure that they are consistent with the recommendations of this report.

If construction is conducted under adverse weather conditions, additional subgrade preparation may be required. During wet weather conditions, such as during the fall and spring months, it should be anticipated that additional subgrade preparation will be required, such as additional depth of Ontario Provincial Standard Specification [OPSS] Granular 'B', Type II (crushed limestone bedrock) sub-base material. It is also important

that the sub-base and base granular layers of the pavement structure be placed as soon as possible after exposure, preparation and approval of the subgrade level.

The roadways through the residential subdivision would be required to adequately support cars, trucks and intermittent delivery and garbage trucks. A typical generic pavement structure would consist of 350 millimetres of OPSS Granular 'B', Type II (crushed bedrock) sub-base course, 150 millimetres of OPSS Granular 'A' base course, 60 millimetres of HL8 or HL4 binder course asphaltic concrete, and 40 millimetres of HL3 surface course asphaltic concrete. Where a pit run, Granular B Type I, aggregate is utilised in the granular base, it should be increased to a minimum thickness of 450 millimetres. It is our opinion that this design is suitable for use on a residential roadway section, provided that the subgrade has been prepared as specified and is good and firm before the sub-base course material is placed. Notwithstanding, the pavement structure should conform to the relevant County of Wellington requirements where they are to be assumed by the County. If the subgrade is soft, remedial measures as discussed above may have to be implemented and/or the sub-base thickness may have to be increased. The granular sub-base and base courses and asphaltic concrete layers should be compacted to OPSS or County of Wellington requirements. A program of in-place density testing must be carried out to monitor that compaction requirements are being met. We note that this pavement structure is not to be considered as a construction roadway design.

To minimise segregation of the finished asphalt mat, the asphalt temperature must be maintained uniform throughout the mat during placement and compaction. All too often, significant temperature gradients exist in the delivered and placed asphalt with the cooler portions of the mat resisting compaction and presenting a honeycomb surface. As the spreader moves forward, a responsible member of the paving crew should monitor the pavement surface, to ensure a smooth uniform surface. The contractor can mitigate the surface segregation by 'back-casting' or scattering shovels of the full mix material over the segregated areas and raking out the coarse particles during compaction operations. Of course, the above assumes that the asphalt mix is sufficiently hot to allow the 'back-casting' to be performed.

Asphalt paving of driveways should be consistent with the general recommendations provided above. Proper preparation of the subgrade soils is essential to good long-term performance of the pavement. Likewise, sufficient depth and compaction of granular base materials and adequate drainage will be important in achieving good long-term performance, i.e. preventing/limiting premature cracking, subgrade failure, rutting, etc. A typical recommended light duty pavement structure for residential driveways would

consist of a minimum of 200 millimetres of OPSS Granular 'A' base course, compacted to 100 percent standard Proctor maximum dry density, followed by a minimum of 50 millimetres of HL3 or HL3F asphaltic concrete, compacted to a minimum of 92 per cent of their Marshall maximum relative density [MRD].

8. HOUSE AND TOWNHOUSE CONSTRUCTION

The native soils encountered at the borehole locations are considered capable of supporting the loads associated with typical residential dwelling and townhouse structures on conventional spread footings, below any fill, organic, or otherwise unsuitable materials. Bearing pressures of up to 150 kPa [~3,000 psf] SLS and 225 kPa [~4,500 psf] ULS may be considered in the competent native soils. In areas where 'wet' seams are present, or the native soils present in less compact condition, reduced bearing values of 100 kPa [~2,000 psf] SLS and 150 kPa [~3,000 psf] are recommended. The founding surfaces must be hand cleaned of any loose or disturbed material, along with any ponded water, immediately prior to placement of foundation concrete.

In the event that site grading works result in engineered fill below founding elevations, the general recommendations presented in the Backfill Considerations above should be strictly adhered to, with compaction to 100 percent standard Proctor maximum dry density, verified by monitoring and testing by a representative of SOIL-MAT ENGINEERS present on a full time basis. If there is a short fall in the volume of fill required, then the source of imported fill should be reviewed for gradation, Proctor value, compatibility with existing fill, environmental characteristics and be approved by this office prior to use. The design bearing capacity for footings within the engineered fill should be limited to 100 kPa [~2,000 psf] SLS and 150 kPa [~3,000 psf] ULS.

The support conditions afforded by the native soils and/or engineered fill are generally not uniform across the building footprint, nor are the loads on the various foundation elements. As such it is recommended that consideration be given to the provision of nominal reinforcement in the footings and foundation walls to account for variable support and loading conditions. The use of nominal reinforcement is considered good construction practice as it will act to reduce the potential for cracking in the foundation walls due to minor settlements, heaving, shrinkage, etc. and will assist in resisting the pressures generated against the foundation walls by the backfill. Such nominal reinforcement is an economical approach to the reduction and prevention of costly foundation repairs after completion and later in the life of the buildings. This

reinforcement would typically consist of two continuous 15M steel bars placed in the footings [directly below the foundation wall], and similarly two steel bars placed approximately 300 millimeters from the top of the foundation walls at a minimum, depending on ground conditions exposed during construction. These reinforcement bars would be bent to reinforce all corners and under basement windows, and be provided with sufficient overlap at staggered splice locations. At 'steps' in the foundations and at window locations, the reinforcing steel should transition diagonally, rather than at 90 degrees, to maintain the continuous tensile capacity of the reinforcement. Where footings are founded on, or partially on, engineered fill the above provision for nominal reinforcement would be required.

All basement foundation walls should be suitably damp proofed, including the provision of a 'dimple board' type drainage product, and provided with a perimeter drainage tile system outlet to a gravity sewer connection or positive sump pit a minimum of 150 millimetres below the basement floor slab. The clear stone material surrounding the weeping tile should be encased with a geotextile material to prevent the migration of fines from the foundation wall backfill into the clear stone product. In the event that sump pit systems are required we would recommend that the sump pump system should be constructed with an 'oversized' reservoir and a 'back-flow' prevention valve so that the sump pump will not cycle repeatedly within short time periods.

All footings exposed to the environment must be provided with a minimum of 1.2 meters of earth or equivalent insulation to protect against frost penetration. This frost protection would also be required if construction were undertaken during the winter months. All footings must be proportioned to satisfy the requirements of the Ontario Provincial Building Code.

It is imperative that a soils engineer be retained from this office to provide geotechnical engineering services during the excavation and foundation construction phases of the project. This is to observe compliance with the design concepts and recommendations outlined in this report, and to allow changes to be made in the event that subsurface conditions differ from the conditions identified at the borehole locations.

9. PRELIMINARY HYDROGEOLOGICAL CONSIDERATIONS

As noted above, it is understood that the development will consist of single family dwellings and townhouse blocks, including the installation of associated underground municipal services along asphalt paved roadways. Excavations for the proposed development services are expected to extend to depths of up to approximately to 2 to 5 metres below the existing ground surface, while excavations for foundations would be expected to extend up to approximately 2 metres. Measurements of the groundwater level at the monitoring well locations indicate a groundwater level on the order of approximately 2 to 7 metres below the existing ground surface, however further groundwater monitoring may be conducted to more accurately assess the static groundwater level.

The short term excavations for the proposed servicing are generally anticipated to extend into the sandy silt/clayey silt and sand soils to depths above the static groundwater level. Depths of excavations should be confirmed via a preliminary site servicing and grading plan, which should be forwarded onto our office for further review and comments. Such excavations would be expected to be subject to relatively minor groundwater infiltration, such that it should be possibly to adequately control such infiltration using conventional construction dewatering techniques such as pumping from sumps in the base of the excavation. During wet times of year, some instability of the excavations may be experienced. The rate of dewatering would be expected to be below 50,000 L/day, and certainly below 400,000 L/day, such that an EASR or PTTW should not be required. Where deeper excavations are identified to be required, extending below the static groundwater level, the need for temporary dewatering controls during construction should be more closely evaluated. Depending on the proposed depths of excavations for the proposed footings and site services, the rate of dewatering could approach or be greater than 50,000 L/day, potentially requiring an EASR. As such, once available, the site servicing and grading plans detailing depths of construction should be forwarded onto our office for further review and comments.

The generally permeable condition of the native sand deposit present over the site will generally allow for natural drainage and movement of groundwater. As such, it is not considered likely that service trenches would present any conflict or impact to the natural groundwater conditions. As such, the provision of clay ‘cut-offs’ within trench backfill is not expected to be required.

Excavations for the proposed basement levels should be well above the groundwater level, and so would not be expected to require significant ongoing groundwater control,

other than typical perimeter weeping tile and sump pump as noted above. This should be confirmed once our office has had a chance to review the site servicing and grading plans.

The final grading of the site should appropriately consider the groundwater levels in order to minimise or avoid conflict or impact to the groundwater during and post construction. In this regard the grading and storm water management plan should accommodate surface runoff that follows the existing overall drainage patterns as much as possible.

It is also noted that the use of Low Impact Design [LID] methods as part of the stormwater management for the proposed development would be viable for much of the site and should be considered. The permeable sand deposit, above the groundwater level, would afford an opportunity for natural infiltration of surface runoff, such is in 'dry' ponds, infiltration galleries, etc.

Based on our observations and details of the proposed development, it is not anticipated that the proposed construction will have an adverse impact on the groundwater condition in the area, and further detailed hydrogeological assessment is not considered warranted at this time. As the detailed design of the proposed development proceeds, this office should be consulted to review the hydrogeological conditions and assess the potential for concern, or need for additional study.

10. GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.

Scott Wylie, B.Eng., EIT.

Ian Shaw, P. Eng.
Senior Engineer

Enclosures: Drawing No. 1, Borehole Location Plan
Log of Borehole Nos. 1 to 4, inclusive
Grain Size Analyses
Drawing No. 2, Recommended Design Requirements for Basement Construction

Distribution: Cachet Developments [pdf]

LEGEND

Borehole Location
BH#

Monitoring Well Location
MW#

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301951B-G.

2. Borehole locations are approximate.

SOIL-MAT
ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
Proposed Residential Development
75 Woolwich Street East
Elora, Ontario

Borehole Location Plan

Project No. SM 301591B-G

Date: October 2021

Drawn: SW | Checked: KR

SM 301591B-G Borehole Location Plan

Drawing No. 1

Log of Borehole No. 1

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838437
E: 545149

Depth (ft)	Depth (m)	Elevation (m)	Description	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	SAMPLE PP (kgf/cm2)	SAMPLE U.Wt.(kN/m3)
0	0	408.60	Ground Surface							
20	6	402.50	End of Borehole							

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 6.10 metres.
2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.
4. A monitoring well was installed. No soil samples were retrieved. The following free groundwater level readings have been measured:

August 6, 2021 - 4.78 metres below ground surface.

August 27, 2021 - 4.71 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 6, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 2

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838180
E: 545422

Depth (ft)	Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		414.13	Ground Surface							
0	0	413.90	**Topsoil** Approximately 250 millimetres of topsoil.							
3	1	413.20	**Sandy Silt** Brown, trace clay, trace gravel, reworked in upper levels, loose to compact.	SS	1	4 5 7 8	12			
				SS	2	2 3 6 5	9			
			Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, loose to compact.	SS	3	3 9 12 14	21			
				SS	4	7 8 11 10	19			
				SS	5	6 9 11 17	20			
16	5	408.90	End of Borehole	SS	6	7 5 4 9	9			

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 5.2 metres.

2. Borehole was recorded as caved to a depth of 3.8 metres and 'wet' at a depth of 3.6 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

August 6, 2021 - 3.58 metres below ground surface.

August 27, 2021 - 3.61 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 6, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

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T: 905.318.7440 F: 905.318.7455
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Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 3

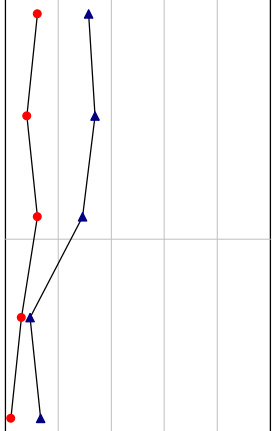
Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4837942
E: 545194

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
ft m	412.55	Ground Surface								
0 0		**Topsoil** Approximately 100 millimetres of topsoil.		SS	1	5 5 7 8	12			
1		**Sandy Silt** Brown, trace to some gravel and clay, reworked in upper levels, compact.		AS	2	6 5 3 3	8			
2 1				SS	3	5 6 6 6	12			
7 2	410.30									
8		**Sand** Brown, trace clay, silt, and gravel, medium gradation, loose.		SS	4	2 3 3 2	6			
10 3				SS	5	2 1 1 2	2			
12	408.90									
13 4		End of Borehole								
16 5										
20 6										
23 7										
26 8										
29 9										

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.

2. Borehole was recorded dry and caved to a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 6, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

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130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 4

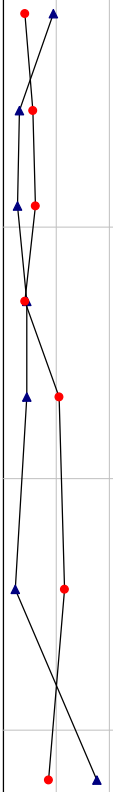
Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838174
E: 545084

Depth (ft)	Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		414.87	Ground Surface							
0	0	414.60	**Topsoil** Approximately 250 millimetres of topsoil.							
1			**Sand** Brown, reworked in upper levels, trace clay, silt, and gravel, fine to medium gradation, compact.	SS	1	5 5 6 7	11			
2										
3	1			SS	2	8 9 9 7	18			
4										
5				SS	3	2 5 8 7	13			
6	2									
7										
8				SS	4	6 11 16 13	27			
9										
10	3			SS	5	10 12 11 13	23			
11										
12										
13	4									
14										
15										
16				SS	6	5 10 13 15	23			
17	5									
18										
19										
20	6	408.80	Wet spoon							
21				SS	7	9 9 8 6	17			
22										
23	7									
24		407.30								
25			End of Borehole							
26	8									
27										
28										
29										
30	9									
31										

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 7.6 metres.
2. Borehole was recorded as open and 'wet' at depth of 7.0 metres upon completion and backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.
4. A monitoring well was installed. The following free groundwater level readings have been measured:

August 6, 2021 - 6.78 metres below ground surface.
August 27, 2021 - 6.96 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 6, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

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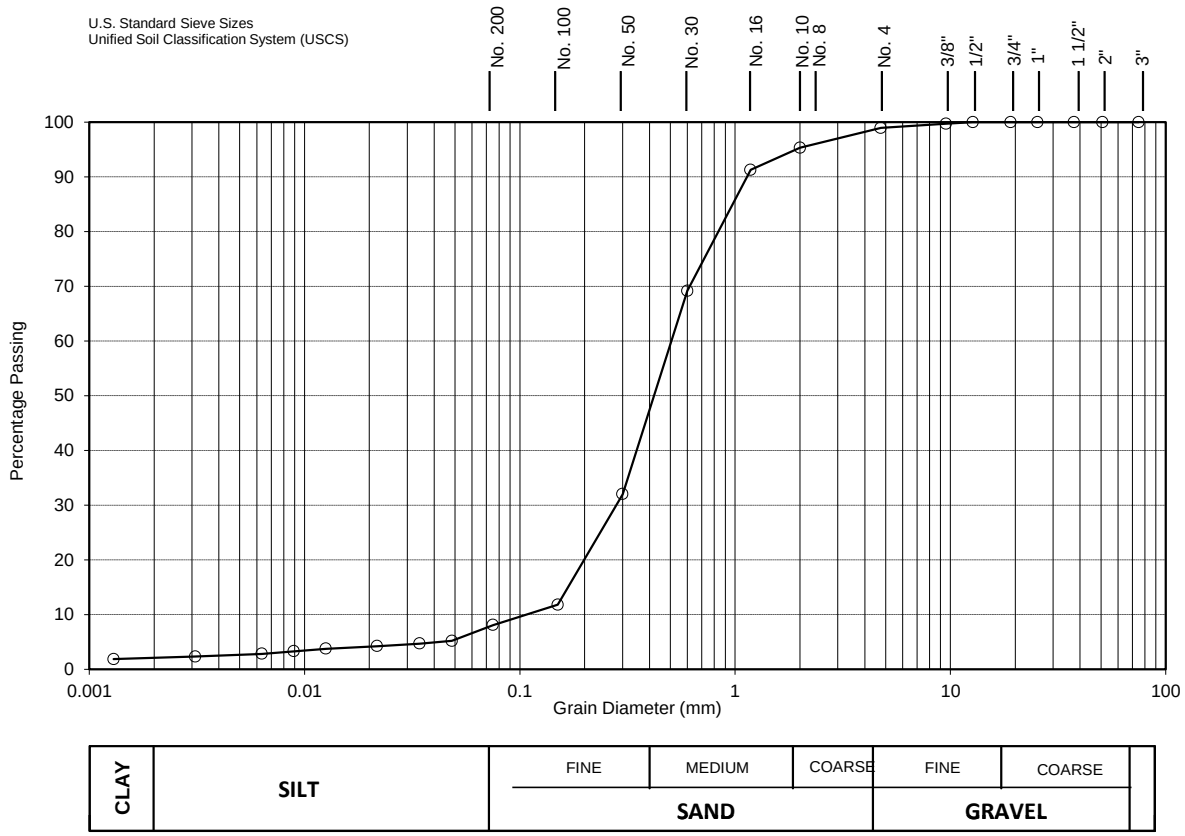
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Mechanical & Hydrometer Analyses



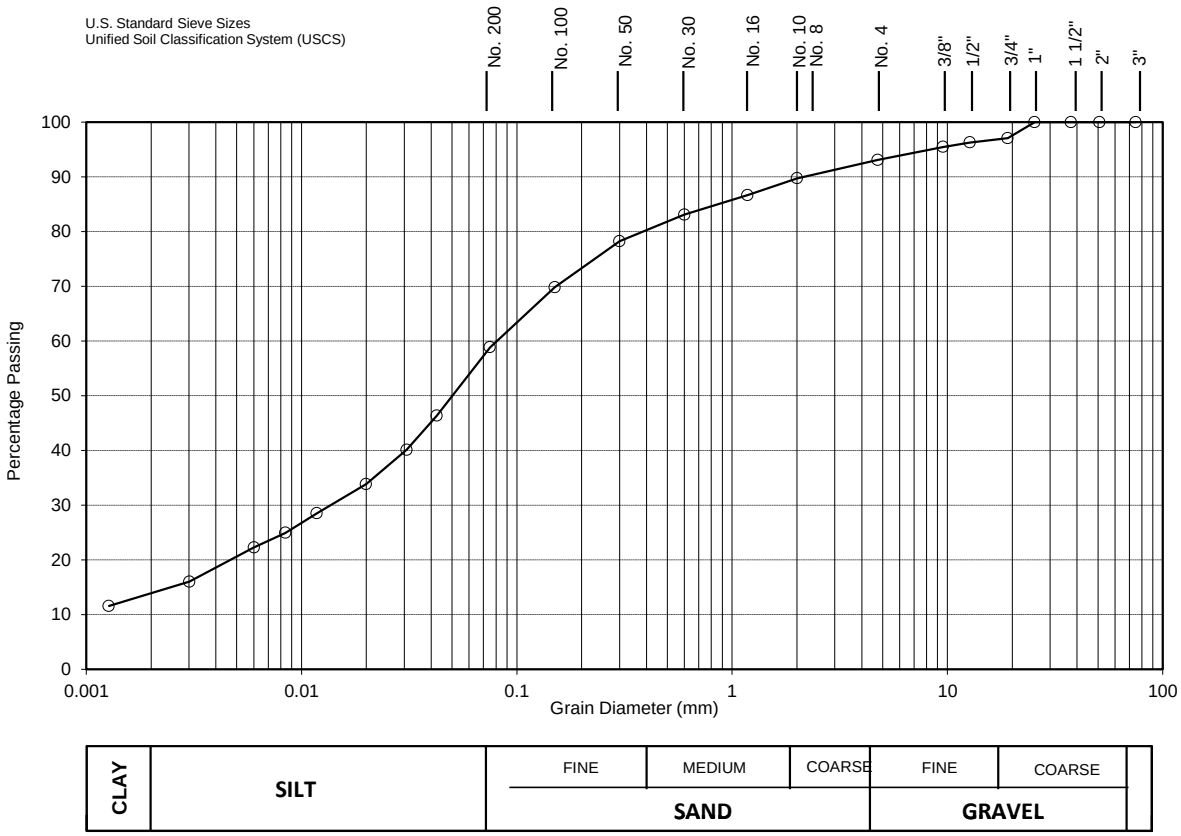
Lab No.:	**21-339**	Notes: Depth: 15'	
Sample No.:	**6**		
Borehole No.:	**2**		
CLAY [%]:	**2**	Soil Description: **Brown Sand w/ traces of Silt, Clay and Gravel**	
SILT [%]:	**6**	**S.P. - Poorly graded sands, little or no fines**	
SAND [%]:	**91**		
GRAVEL [%]:	**1**	Estimated Infiltration Rate [mm/hr] : **150 to 300**	Estimated Permeability, k [cm/s] **10^{-2}**
D_{10} (Effective Diam. in mm):	**0.10**	Coefficient of Uniformity C_U: **5.1**	Coefficient of Curvature C_C: **1.5**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

August 2021	**Grain Size Analysis No. 1**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



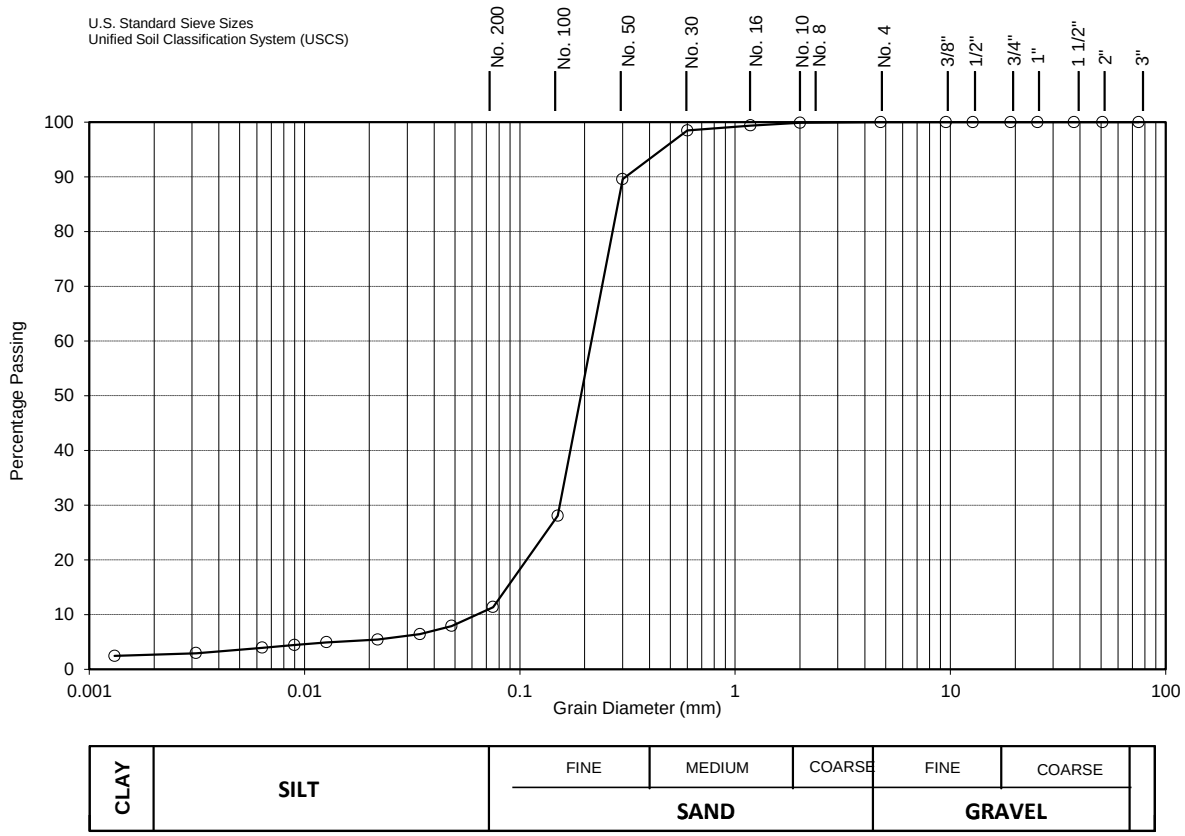
Lab No.:	**21-338**	Notes: Depth: 5'	
Sample No.:	**3**		
Borehole No.:	**3**		
CLAY [%]:	**14**	Soil Description: **Brown Sandy Silt w/ some Clay and trace Gravel**	
SILT [%]:	**45**	**M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity**	
SAND [%]:	**34**		
GRAVEL [%]:	**7**	Estimated Infiltration Rate [mm/hr] : **< 10**	Estimated Permeability, k [cm/s] **10^{-6}**
D_{10} (Effective Diam. in mm):	**0.00100**	Coefficient of Uniformity C_U: **80.0**	Coefficient of Curvature C_C: **2.1**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

August 2021	**Grain Size Analysis No. 2**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses

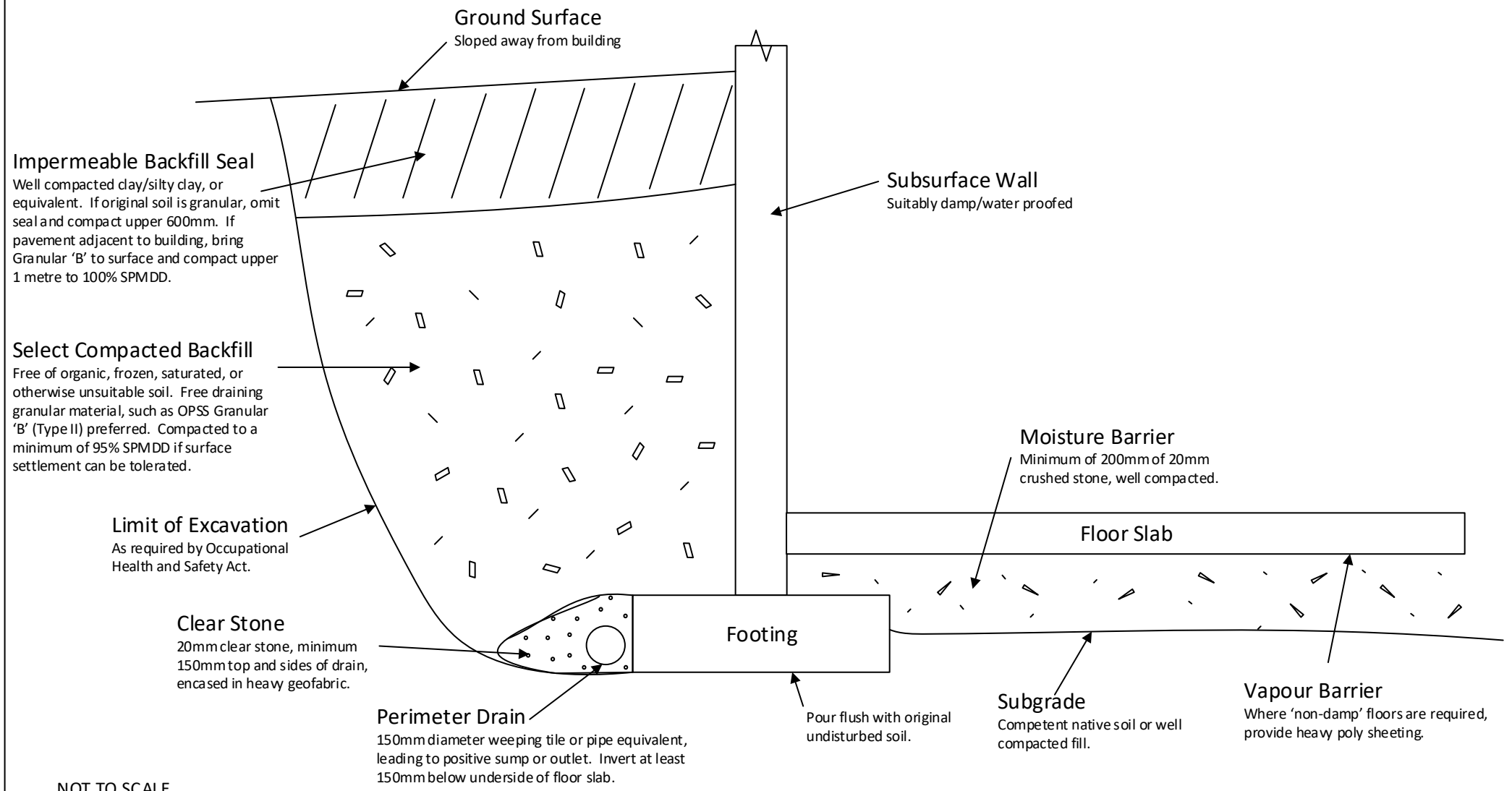


Lab No.:	**21-337**	Notes: Depth: 7.5'	
Sample No.:	**4**		
Borehole No.:	**4**		
CLAY [%]:	**2**	Soil Description: **Brown Sand w/ traces of Silt and Clay**	
SILT [%]:	**9**	**S.P. - Poorly graded sands, little or no fines**	
SAND [%]:	**89**		
GRAVEL [%]:	**0**	Estimated Infiltration Rate [mm/hr] : **100 to 150**	Estimated Permeability, k [cm/s] **10^{-3} to 10^{-2}**
D_{10} (Effective Diam. in mm):	**0.0600**	Coefficient of Uniformity C_U: **3.7**	Coefficient of Curvature C_C: **1.9**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

August 2021	**Grain Size Analysis No. 3**	**Project No.: SM 301951-T**



NOT TO SCALE

Soil-Mat

Soil-Mat Engineers & Consultants Ltd.

Project No.:	SM 301951-G
Date:	September 2021

Typical Design Requirements
Drainage and Backfill for Basement Walls

Drawing No. 2

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

www.soil-mat.ca info@soil-mat.ca TF: 800.243.1922

Hamilton: 130 Lancing Drive L8W 3A1 T: 905.318.7440 F: 905.318.7455
Milton: PO Box 40012 Derry Heights PO L9T 7W4 T: 800.243.1922

PROJECT NO.: SM 301951A-G October 14, 2021

CACHET DEVELOPMENTS
361 CONNIE CRESCENT, SUITE 200
Concord, Ontario
L4K 5R2

Attention: Marcus Gagliardi
Development Planner

PRELIMINARY GEOTECHNICAL AND HYDROGEOLOGICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
7581 SIDEROAD 15
ELORA, ONTARIO

Dear Mr. Gagliardi,

Further to your authorisation and subsequent discussions with Mr. Michael DeBiasio, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has completed the fieldwork, laboratory testing, and report preparation in connection with the above noted project. The scope of work was completed in general accordance with our proposal P301951, dated July 1, 2021, later revised and confirmed through email communication on August 3, 2021. This report should be read in conjunction with the formal report for the Clayton Lands to the west SM 301951B-G, dated October 5, 2021. Our comments and recommendations based on our findings at the seven [7] borehole locations are presented in the following paragraphs.

1. INTRODUCTION

We understand that the project will involve the construction of a residential development consisting of single-family dwellings and townhouses along asphalt paved roadways, including the installation of associated underground municipal services, located at 7581 Sideroad 15 [Gibson Farms] in Elora, Ontario. The purpose of this preliminary geotechnical investigation work was to assess the subsurface soil and groundwater conditions, and to provide our comments and recommendations with respect to the design and construction of the proposed development, from a geotechnical point of view.

SOIL-MAT ENGINEERS was provided with a sub-watershed study that encompasses the surrounding area – including the subject site – prepared by Aquafor Beech Limited, dated February 2008. The results of this investigation have been considered in preparation of this geotechnical report.

This report is based on the above summarised project description, and on the assumption that the design and construction will be performed in accordance with applicable codes and standards. Any significant deviations from the proposed project design may void the recommendations given in this report. If significant changes are made to the proposed design, this office must be consulted to review the new design with respect to the results of this investigation. It is noted that SOIL-MAT ENGINEERS has also conducted Phase One and Two Environmental Site Assessments (ESAs) for the subject site, which have been reported under a separate cover.

2. PROCEDURE

A total of seven [7] sampled boreholes were advanced at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The boreholes were advanced using continuous flight power auger equipment on August 5 and 6, 2021 under the direction and supervision of a staff member of SOIL-MAT ENGINEERS & CONSULTANTS LTD., to termination at depths of between approximately 2.1 and 5.2 metres below the existing ground surface.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of ASTM test specification D1586, Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the SOIL-MAT laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on all soil samples recovered from the borings. Selected samples were also subjected to laboratory grain size analyses.

Upon completion of drilling, a groundwater monitoring well was installed at Borehole No. 4 to allow for the future monitoring of the groundwater level. The monitoring well consisted of 50-millimetre PVC pipe screened in the lower 1.5 metres. The monitoring well was encased in well filter sand up to approximately 0.3 metres above the screened portion, then with bentonite ‘hole plug’ to the surface and fitted with a protective steel ‘stick up’ casing. The remaining boreholes were backfilled in general accordance with

Ontario Regulation 903, and the ground surface was reinstated even with the surrounding grade.

The boreholes were located in the field by representatives of SOIL-MAT ENGINEERS, based on accessibility over the site, clearance of underground utilities, and the drawing that was forwarded to our office. Best efforts were made to minimize crop damage by locating the majority of the boreholes to the perimeter of the fields. The ground surface elevation at the borehole locations has been referenced to a geodetic benchmark, described as North American 1983 CSRS, as per the survey plan completed by POI Aerial, dated August 10, 2021, which was provided to our office.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Log of Borehole Nos. 1 to 7, inclusive, following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed at the exact depths of geological change.

3. SITE DESCRIPTION AND SUBSURFACE CONDITIONS

The subject site is currently an undeveloped agricultural property located at 7581 Sideroad 15 in Elora, Ontario. There is a single-family dwelling and an existing barn structure near the middle of the site, setback approximately 200 metres from Sideroad 15. The parcel is bordered to the south by an existing agricultural field, to the east by Gerrie Road, to the north by Sideroad 15, and to the west by Irvine Street, assuming a north-south orientation of Irvine Street. The field is bisected by a tributary of the Irvine Creek – a ditch-like drainage feature – at the north eastern portion of the site. West of the tributary, the two parcels generally slope down to the north, with a relief of approximately 6 metres, as measured across the boreholes. The grade is relatively flat and even with Gerrie Road on the east side of the tributary descending towards the creek with an approximate relief of 15 metres measured across the boreholes.

The subsurface conditions encountered at the borehole locations are summarised as follows:

Topsoil

A surficial veneer of topsoil approximately 150 to 250 millimetres in thickness was encountered at all borehole locations. It is noted that the depth of topsoil may vary across the site and from the depths encountered at the borehole locations. It is also noted that the term 'topsoil' has been used from a geotechnical point of view, and does not necessarily reflect its nutrient content or ability to support plant life. Given the property has been historically used for agricultural purposes the upper levels of the soils would be expected to have a reworked nature resulting in more variable depths of topsoil over the site. As such, it is recommended that a conservative approach be taken when estimating topsoil quantities across the site for stripping, i.e. account for slightly greater stripping depth than those specifically noted at the borehole locations.

Sandy Silt/Clayey Silt

Native sandy silt/clayey silt was encountered beneath the topsoil in the majority of the boreholes, and beneath a sand deposit in Borehole Nos. 3 and 6. The fine-grained granular to slightly cohesive soils were brown in colour, transitioning to grey below about 2.5 metres in Borehole No. 2, with trace to some clay and gravel, with a notable increasing clay content with depth in some of the boreholes. The native sandy silt/clayey silt soils were generally noted to have a reworked or weathered appearance in the upper levels, and were generally noted to have a loose to compact state. The sandy silt/clayey silt deposit was present to depths of approximately 1.1 to 1.9 metres in Borehole Nos. 1 and 4, and was proven to termination at depths of approximately 2.1 to 3.7 metres below the existing ground surface in Borehole Nos. 2, 3, 5, 6, and 7.

Sand

A native sand deposit was encountered beneath the topsoil in Borehole Nos. 3 and 6, and beneath the sandy silt/clayey silt layer in Borehole Nos. 1 and 4. The fine to medium grained soils were brown in colour, with a noted to transition to grey at a depth of approximately 4.8 metres in Borehole No. 4, contained trace amounts of clay, silt, and gravel, and was generally in a compact to dense state. The native sand soils were proven to a depth of approximately 1.5 and 1.8 metres within Borehole Nos. 3 and 6, and proven to termination at depths of between approximately 3.6 and 5.2 metres below the existing ground surface in Borehole Nos. 1 and 4.

Grain Size Analyses

Grain size analyses were conducted on three [3] selected samples of the native soils recovered from the boreholes. The results of this grain size testing can be found appended to the end of this report, and are summarized as follows:

TABLE A
GRAIN SIZE ANALYSES

Sample ID	Depth	% Clay	% Silt	% Sand	% Gravel	Hydraulic Conductivity, k [cm/s]	Estimated Infiltration Rate, [mm/hr]
BH3 SS3	1.5 m	22	44	28	6	10^{-7}	<10
BH4 SS5	3.0 m	2	7	80	11	10^{-2}	150 to 300
BH6 SS5	3.0 m	11	44	36	9	10^{-6}	10 to 15

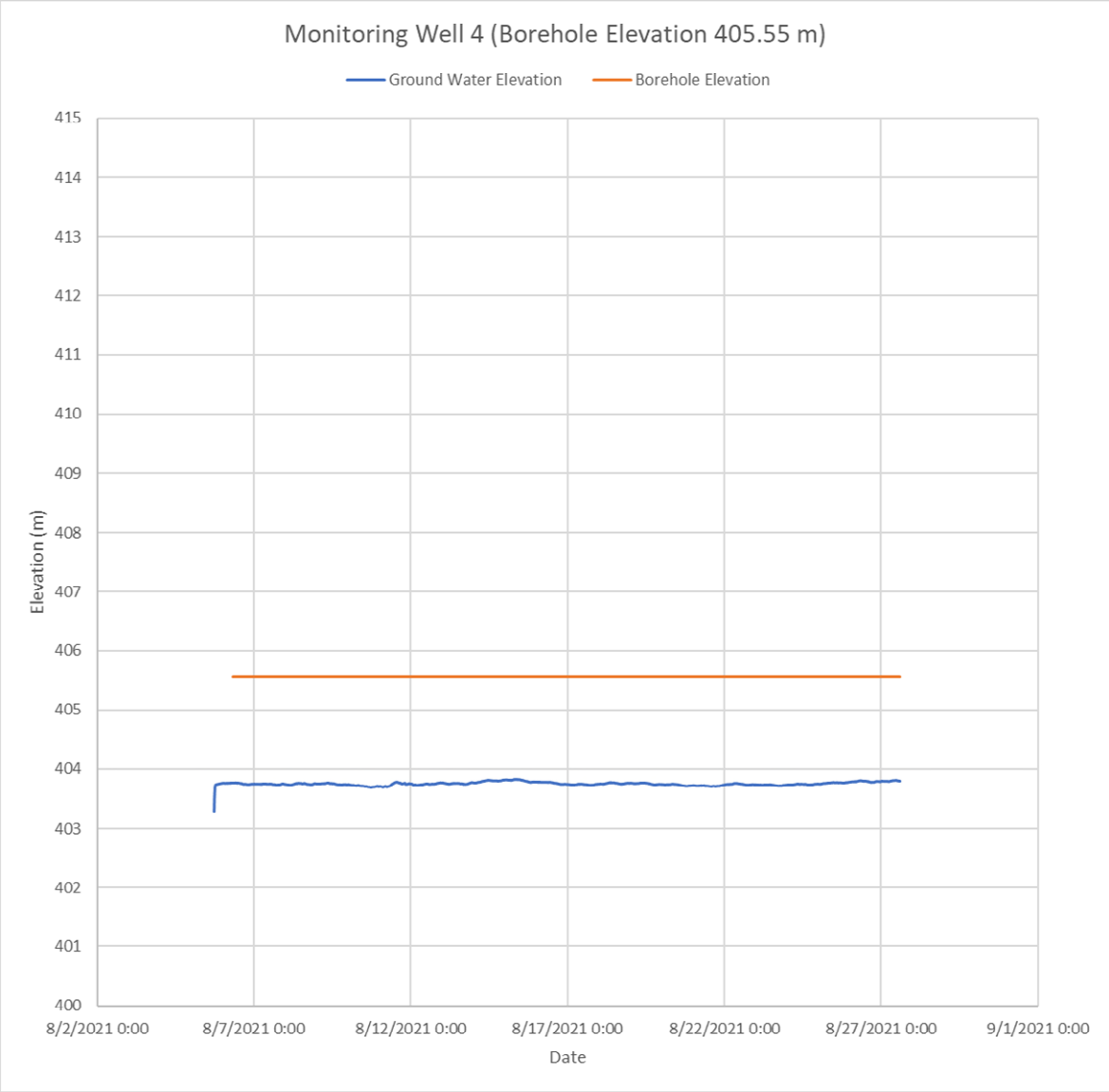
The field and laboratory testing demonstrate the native soils to generally consist of a sandy silt/clayey silt with some clay and traces of gravel in the upper levels, transitioning to a highly permeable sand with traces of clay, silt, and gravel at depth. According to the Unified Soil Classification System (USCS), the soils are classified as M.L. – inorganic silts and very fine sands, clayey silts with slight plasticity in the upper levels overlying S.P. – poorly graded sands, with little to no fines at depth. The sandy silt/clayey silt in the upper levels would generally behave as a low permeable material, but would not be considered as an impermeable material, and would be highly frost susceptible. The underlying sand deposit is highly permeable, relatively free draining.

A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soils to be in areas noting to consist of stone-poor sandy silt to silty sand-textured till, ice-contact stratified deposits of sand and gravel, with minor silt and clay, as well as river deposits of coarse gravel. These conditions are consistent with the observations during drilling.

Groundwater Observations

Borehole No. 6 was noted to have 'caved' to a depth of approximately 2.4 metres and 'wet' at a depth of approximately 2.0 metres, while Borehole No. 4 was noted to be open and 'wet' at a depth of 2.7 metres upon completion. Borehole Nos. 1 was noted to have cave to a depth of 1.5 metres, and dry upon completion. The remainder of the boreholes were noted as being open and 'dry' [i.e. no free groundwater present] upon completion of drilling. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes.

As noted above, a monitoring well was installed at Borehole No. 4, to allow for future measurements of the static groundwater level. Furthermore, it is noted that 3 additional monitoring wells were installed on the abutting parcel of land to the west, the work of which was completed in concert with the fieldwork on the Gibson Farm lands. A data logger was installed in Borehole No. 4 to allow for continuous monitoring of the groundwater level between August 6 and August 27, 2021, the readings of which have been illustrated in the following graph:


Monitoring Well 4 (Borehole Elevation 405.55 m)
Ground Water Elevation
Borehole Elevation
Elevation (m)
415
414
413
412
411
410
409
408
407
406
405
404
403
402
401
400
8/2/2021 0:00
8/7/2021 0:00
8/12/2021 0:00
8/17/2021 0:00
8/22/2021 0:00
8/27/2021 0:00
9/1/2021 0:00
Date

In addition to this, manual monitoring well readings were also taken from all of the installed monitoring well locations across the site on August 6 and August 27, 2021 and have been summarized in the following chart:

TABLE B
SUMMARY OF GROUNDWATER LEVELS

Monitoring Well	Ground Surface Elevation [m]	August 6, 2021		August 27, 2021	
		Groundwater Depth [m]	Groundwater Elevation [m]	Groundwater Depth [m]	Groundwater Elevation [m]
MW4	405.55	2.74	402.81	1.75	403.80

The groundwater level observed at this monitoring well location, as well as the monitoring wells installed on the adjacent property [summarised in our geotechnical report SM 301951B-G under a separate cover] indicate a groundwater level on the order of approximately 2 to 7 metres below the existing grade, at an elevation of roughly 403.8 to 410.5 metres, varying with the physical topography, and shallower closer the tributary. As noted above this estimate is based on the groundwater data collected from Borehole No. 4, as well as the monitoring wells installed on the Clayton Lands to the west. There is an evident drop in the groundwater level from southwest to northeast, generally following the topography towards the Irvine Creek Tributary. It is noted that the groundwater level would be expected to fluctuate seasonally. It is also noted that the observed groundwater levels may be influenced by more localised shallower 'perched' deposits in more permeable seams within the sandy silt/clayey silt. Further long-term monitoring may allow for a more accurate estimate of the static groundwater level, including more data during the 'wet' and 'dry' seasons.

As noted above, SOIL-MAT ENGINEERS was also provided a sub-watershed study by Aquafor Beech, which included a number of monitoring wells to the east to monitor the groundwater elevations. The conditions and groundwater levels described in this geotechnical report are consistent with those encountered during our fieldwork as described above.

General Soil Conditions

As noted above the subsurface conditions are generally characterized as sandy silt/clayey silt deposit in the upper levels, underlain by a permeably cohesionless sand deposit. The grain size analyses indicate the sandy silt/clayey silt soils to have 10 to 20 percent clay content, lending a slightly cohesive characteristic. The sandy silt/clayey silt soils are relatively consistent in terms of its constituents but are noted to contain an increasing clay content with depth in some of the boreholes, as noted above. Where the material transitions into a sand the native soils are generally fine in gradation in the upper levels, becoming medium to coarse with depth. As demonstrated above the subsurface conditions exhibit a relatively inconsistent layered structure across the large area, but can be generally distinguished by a layer of slightly cohesive sandy silt overlying a cohesionless sand. The conditions will be best assessed during excavations on an area-by-area basis. As such it may also be prudent to advance a series of test excavations in the area of proposed deeper excavations and/or stormwater management ponds to confirm soil composition and groundwater conditions in the area of deep excavations.

4. EXCAVATIONS

Excavations for the installation of foundations and underground services are anticipated to extend to depths of up to approximately 2 to 5 metres below the existing grade. Excavations through the native sandy silt/clayey silt and sand soils, as well as any engineered fill placed as part of site grading works, should be relatively straightforward, with the sides remaining stable for short construction periods at inclinations of up to 45 degrees to the horizontal, and possibly steeper depending on moisture condition and clay content. Where wet or more permeable seams are encountered, during periods of extended precipitation, or where excavations extend below the static groundwater level, the sides of excavations should be expected to ‘slough in’ to as flat as 3 horizontal to 1 vertical, or flatter.

Nevertheless, all excavations must comply with the current Occupational Health and Safety Act and Regulations for Construction Projects. The native sandy silt/clayey silt and sand soils would generally be considered a Type 2 or 3 soil, depending on the moisture content and relative compact to dense condition, as outlined in the Ontario Health and Safety Act III – Excavations. Excavation slopes steeper than those required in the Safety Act must be supported and a senior geotechnical engineer from this office should monitor the work.

As noted above, the groundwater level varies between depths of approximately 2 to 7 metres below the existing grade, roughly elevation 403.8 to 410.5 metres. The majority of excavations are anticipated to be above the groundwater level. Nevertheless, some infiltration of water from more permeable seams and surface runoff into the open excavations should be anticipated. Such infiltration should be readily controlled using typical construction dewatering methods. 'Perched' deposits of water may be encountered within more permeable pockets, which may require greater initial dewatering efforts and instability in the excavations, especially during the 'wet' times of the year. Where excavations extend to greater depths, to and below the groundwater level, especially within the sand deposit, the rate of infiltration will be much greater and additional pumping or more sophisticated dewatering methods should be anticipated. In this regard, ongoing monitoring of the groundwater levels, and careful review of the design servicing elevations, is recommended. As noted above, the advancement of test excavations in the area of proposed deep services and stormwater management ponds would allow for a first hand look at how groundwater levels may affect such excavations. More water should be expected when connections are made to existing services. Surface water should be directed away from the excavations.

The base of the excavations in the native soils, above the groundwater level, encountered in the boreholes should generally remain firm and stable. Where excavations extend to greater depths, to or below the groundwater level, or where 'perched' water is encountered, some base instability should be expected, especially during 'wet' times of the year. This will be especially likely in the high silt content sandy silt/clayey silt soils. Areas of base instability may be stabilised with the placement of additional bedding or ballast stone, the use of coarser stone material, etc. The appropriate measures are best assessed based on the actual conditions at the time of construction. With a firm and stable base condition, stabilised where warranted, standard pipe bedding material as specified by the Ontario Provincial Standard Specification [OPSS] or County of Wellington should be satisfactory. The bedding should be well compacted to provide sufficient support to the pipes and components (i.e. valve chambers, manholes etc.), and to minimize settlements of the roadway above the service trenches. Special attention should be paid to compaction under the pipe haunches.

We recommend that the invert elevations of any storm sewer pipes for rear yard catch basins be located above the proposed underside of footing elevations of adjacent residential structures, or that the trench excavations should be filled with 5 MPa 'lean mix' concrete product to the proposed underside of footing level where the excavations

extend below an imaginary 10 horizontal to 7 vertical line extending outwards and down from a point 0.3 metres beyond the proposed townhouse foundations.

Any utility poles, light poles, etc. located within 3 metres of the top of an excavation slope should be braced to ensure their stability. Likewise, temporary support might be required for other existing above and below ground structures, including existing underground services, roadways, etc. depending on their proximity to the trench excavations.

5. BACKFILL CONSIDERATIONS

The excavated material will consist primarily of the sandy silt/clayey silt and sand soils encountered in the boreholes as described above. These soils are generally considered suitable for use as engineered fill, trench backfill, etc., provided that they are free of organics, construction debris, or other deleterious material, and that its moisture content can be controlled to within 3 per cent of its standard Proctor optimum moisture content.

It is noted that the sandy silt/clayey silt soils encountered are not considered to be free draining and should not be used where this characteristic is necessary. It is also noted that these fine grained granular soils will present difficulties in achieving effective compaction when they become 'wet' of optimum, and where access with compaction equipment is restricted. The sandy silt/clayey silt soils encountered are generally considered to be near to slightly 'dry' of their standard Proctor optimum moisture content, with some noted 'wet' seams. Some moisture conditioning will be required depending upon the weather conditions at the time of construction. It is noted that these silty soils will become nearly impossible to compact when wet of its optimum moisture content. Any material that becomes wet to saturated should be spread out to allow to dry, or removed and discarded, or utilised in non-settlement sensitive areas. The sand soils are generally well draining, and tend to be near optimum moisture content. At depth, approaching or below the water level, the sand soils will be expected to be saturated, requiring time to drain excess moisture or other drying efforts in order to achieve effective compaction.

We note that where backfill material is placed near or slightly above its optimum moisture content, the potential for long term settlements due to the ingress of groundwater and collapse of the fill structure is reduced. Correspondingly, the shear strength of the 'wet' backfill material is also lowered, thereby reducing its ability to support construction traffic and therefore impacting roadway construction. If the soil is

well dry of its optimum value, it will appear to be very strong when compacted, but will tend to settle with time as the moisture content in the fill increases to equilibrium condition. The fine grained to cohesive soils encountered may require high compaction energy to achieve acceptable densities if the moisture content is not close to its standard Proctor optimum value. It is therefore very important that the moisture content of the backfill soils be within 3 per cent of its standard Proctor optimum moisture content during placement and compaction to minimise long term subsidence [settlement] of the fill mass. Any imported fill required in service trenches or to raise the subgrade elevation should have its moisture content within 3 per cent of its optimum moisture content and meet the necessary environmental guidelines.

A representative of SOIL-MAT should be present on-site during the backfilling and compaction operations to confirm the uniform compaction of the backfill material to project specification requirements. Close supervision is prudent in areas that are not readily accessible to compaction equipment, for instance near the end of compaction 'runs'. Backfill within service trenches, areas to be paved, etc., should be placed in loose lifts not exceeding 300 millimetres in thickness and compacted to a minimum of 95 per cent of its standard Proctor maximum dry density [SPMDD], and to 100 per cent of its SPMDD in the upper 1 metre below the design subgrade level. All structural fill should be compacted to 100 per cent of its SPMDD. The appropriate compaction equipment should be employed based on soil type, i.e. pad-toe for cohesive soils and smooth drum/vibratory plate for granular soils. A method should be developed to assess compaction efficiency employing the on-site compaction equipment and backfill materials during construction.

6. MANHOLES, CATCH BASINS AND THRUST BLOCKS

Properly prepared bearing surfaces for manholes, valve chambers, etc. in the native competent soils, stabilised where required, will be practically non-yielding under the anticipated loads. Proper preparation of the founding soils will tend to accentuate the protrusion of these structures above the pavement surface if compaction of the fill around these structures is not adequate, causing settlement of the surrounding paved surfaces. Conversely, the pavement surfaces may rise above the valve chambers and around manholes under frost action. To alleviate the potential for these types of differential movements, free-draining, non-frost susceptible material should be employed as backfill around the structures located within the paved roadway limits, and compacted to 100 per cent of its standard Proctor maximum dry density. A geofabric separator

should be provided between the free draining material and the on-site silt soils to prevent the intrusion of fines.

The thrust blocks in the native soils or engineered fill may be conservatively sized as recommended by the applicable Ontario Provincial Standard Specification conservatively using a horizontal allowable bearing pressure of up to 150 kPa [~2,000 psf]. Any backfill required behind the blocks should be a well-graded granular product and should be compacted to 100 per cent of its standard Proctor maximum dry density.

7. PAVEMENT STRUCTURE DESIGN CONSIDERATIONS

All areas to be paved must be cleared of all organic and otherwise unsuitable materials, and the exposed subgrade proof rolled with 3 to 4 passes of a loaded tandem-axle truck in the presence of a representative of SOIL-MAT ENGINEERS & CONSULTANTS LTD., immediately prior to the placement of the sub-base material. Any areas of distress revealed by this or other means should be subexcavated and replaced with suitable backfill material. Where the subgrade condition is poorer it may be necessary to implement more aggressive stabilisation methods, such as the use of coarse aggregate [50-millimetre clear stone, 'rip rap', etc.] 'punched' into the soft areas.

Good drainage provisions will optimise the long-term performance of the pavement structure. The subgrade must be properly crowned and shaped to promote drainage to the subdrain system. Subdrains should be installed to intercept excess subsurface water and to prevent softening of the subgrade material. Surface water should not be allowed to pond adjacent to the outer limits of the paved areas.

The most severe loading conditions on the subgrade typically occur during the course of construction, therefore precautionary measures may have to be taken to ensure that the subgrade is not unduly disturbed by construction traffic. SOIL-MAT should be given the opportunity to review the final pavement structure design and subdrain scheme prior to construction to ensure that they are consistent with the recommendations of this report.

If construction is conducted under adverse weather conditions, additional subgrade preparation may be required. During wet weather conditions, such as during the fall and spring months, it should be anticipated that additional subgrade preparation will be required, such as additional depth of Ontario Provincial Standard Specification [OPSS] Granular 'B', Type II (crushed limestone bedrock) sub-base material. It is also important

that the sub-base and base granular layers of the pavement structure be placed as soon as possible after exposure, preparation and approval of the subgrade level.

The roadways through the residential subdivision would be required to adequately support cars, trucks and intermittent delivery and garbage trucks. A typical generic pavement structure would consist of 350 millimetres of OPSS Granular 'B', Type II (crushed bedrock) sub-base course, 150 millimetres of OPSS Granular 'A' base course, 60 millimetres of HL8 or HL4 binder course asphaltic concrete, and 40 millimetres of HL3 surface course asphaltic concrete. Where a pit run, Granular B Type I, aggregate is utilised in the granular base, it should be increased to a minimum thickness of 450 millimetres. It is our opinion that this design is suitable for use on a residential roadway section, provided that the subgrade has been prepared as specified and is good and firm before the sub-base course material is placed. Notwithstanding, the pavement structure should conform to the relevant County of Wellington requirements where they are to be assumed by the County. If the subgrade is soft, remedial measures as discussed above may have to be implemented and/or the sub-base thickness may have to be increased. The granular sub-base and base courses and asphaltic concrete layers should be compacted to OPSS or County of Wellington requirements. A program of in-place density testing must be carried out to monitor that compaction requirements are being met. We note that this pavement structure is not to be considered as a construction roadway design.

To minimise segregation of the finished asphalt mat, the asphalt temperature must be maintained uniform throughout the mat during placement and compaction. All too often, significant temperature gradients exist in the delivered and placed asphalt with the cooler portions of the mat resisting compaction and presenting a honeycomb surface. As the spreader moves forward, a responsible member of the paving crew should monitor the pavement surface, to ensure a smooth uniform surface. The contractor can mitigate the surface segregation by 'back-casting' or scattering shovels of the full mix material over the segregated areas and raking out the coarse particles during compaction operations. Of course, the above assumes that the asphalt mix is sufficiently hot to allow the 'back-casting' to be performed.

Asphalt paving of driveways should be consistent with the general recommendations provided above. Proper preparation of the subgrade soils is essential to good long-term performance of the pavement. Likewise, sufficient depth and compaction of granular base materials and adequate drainage will be important in achieving good long-term performance, i.e. preventing/limiting premature cracking, subgrade failure, rutting, etc. A typical recommended light duty pavement structure for residential driveways would

consist of a minimum of 200 millimetres of OPSS Granular 'A' base course, compacted to 100 percent standard Proctor maximum dry density, followed by a minimum of 50 millimetres of HL3 or HL3F asphaltic concrete, compacted to a minimum of 92 per cent of their Marshall maximum relative density [MRD].

8. HOUSE AND TOWNHOUSE CONSTRUCTION

The native soils encountered at the borehole locations are considered capable of supporting the loads associated with typical residential dwelling and townhouse structures on conventional spread footings, below any fill, organic, or otherwise unsuitable materials. Bearing pressures of up to 150 kPa [~3,000 psf] SLS and 225 kPa [~4,500 psf] ULS may be considered in the competent native soils. In areas where 'wet' seams are present, or the native soils present in less compact condition, reduced bearing values of 100 kPa [~2,000 psf] SLS and 150 kPa [~3,000 psf] are recommended. The founding surfaces must be hand cleaned of any loose or disturbed material, along with any ponded water, immediately prior to placement of foundation concrete.

In the event that site grading works result in engineered fill below founding elevations, the general recommendations presented in the Backfill Considerations above should be strictly adhered to, with compaction to 100 percent standard Proctor maximum dry density, verified by monitoring and testing by a representative of SOIL-MAT ENGINEERS present on a full time basis. If there is a short fall in the volume of fill required, then the source of imported fill should be reviewed for gradation, Proctor value, compatibility with existing fill, environmental characteristics and be approved by this office prior to use. The design bearing capacity for footings within the engineered fill should be limited to 100 kPa [~2,000 psf] SLS and 150 kPa [~3,000 psf] ULS.

The support conditions afforded by the native soils and/or engineered fill are generally not uniform across the building footprint, nor are the loads on the various foundation elements. As such it is recommended that consideration be given to the provision of nominal reinforcement in the footings and foundation walls to account for variable support and loading conditions. The use of nominal reinforcement is considered good construction practice as it will act to reduce the potential for cracking in the foundation walls due to minor settlements, heaving, shrinkage, etc. and will assist in resisting the pressures generated against the foundation walls by the backfill. Such nominal reinforcement is an economical approach to the reduction and prevention of costly foundation repairs after completion and later in the life of the buildings. This

reinforcement would typically consist of two continuous 15M steel bars placed in the footings [directly below the foundation wall], and similarly two steel bars placed approximately 300 millimeters from the top of the foundation walls at a minimum, depending on ground conditions exposed during construction. These reinforcement bars would be bent to reinforce all corners and under basement windows, and be provided with sufficient overlap at staggered splice locations. At 'steps' in the foundations and at window locations, the reinforcing steel should transition diagonally, rather than at 90 degrees, to maintain the continuous tensile capacity of the reinforcement. Where footings are founded on, or partially on, engineered fill the above provision for nominal reinforcement would be required.

All basement foundation walls should be suitably damp proofed, including the provision of a 'dimple board' type drainage product, and provided with a perimeter drainage tile system outlet to a gravity sewer connection or positive sump pit a minimum of 150 millimetres below the basement floor slab. The clear stone material surrounding the weeping tile should be encased with a geotextile material to prevent the migration of fines from the foundation wall backfill into the clear stone product. In the event that sump pit systems are required we would recommend that the sump pump system should be constructed with an 'oversized' reservoir and a 'back-flow' prevention valve so that the sump pump will not cycle repeatedly within short time periods.

All footings exposed to the environment must be provided with a minimum of 1.2 meters of earth or equivalent insulation to protect against frost penetration. This frost protection would also be required if construction were undertaken during the winter months. All footings must be proportioned to satisfy the requirements of the Ontario Provincial Building Code.

It is imperative that a soils engineer be retained from this office to provide geotechnical engineering services during the excavation and foundation construction phases of the project. This is to observe compliance with the design concepts and recommendations outlined in this report, and to allow changes to be made in the event that subsurface conditions differ from the conditions identified at the borehole locations.

9. PRELIMINARY HYDROGEOLOGICAL CONSIDERATIONS

As noted above, it is understood that the development will consist of single family dwellings and townhouse blocks, including the installation of associated underground municipal services along asphalt paved roadways. Excavations for the proposed development services are expected to extend to depths of up to approximately to 2 to 5 metres below the existing ground surface, while excavations for foundations would be expected to extend to up to approximately 2 metres. Measurements of the groundwater level at the monitoring well locations indicate a groundwater level on the order of approximately 2 to 7 metres below the existing ground surface, however further groundwater monitoring may be conducted to more accurately assess the static groundwater level.

The short term excavations for the proposed servicing are generally anticipated to extend into the sandy silt/clayey silt and sand soils to depths above the static groundwater level. Such excavations would be expected to be subject to relatively minor groundwater infiltration, such that it should be possibly to adequately control such infiltration using conventional construction dewatering techniques such as pumping from sumps in the base of the excavation. During wet times of year, some instability of the excavations may be experienced. The rate of dewatering would be expected to be below 50,000 L/day, and certainly below 400,000 L/day, such that an EASR or PTTW should not be required. Where deeper excavations are identified to be required, extending below the static groundwater level, the need for temporary dewatering controls during construction should be more closely evaluated. Depending on the proposed depths of excavations for the proposed footings and site services, the rate of dewatering could approach or be greater than 50,000 L/day, potentially requiring an EASR. As such, once available, the site servicing and grading plans detailing depths of construction should be forwarded onto our office for further review and comments.

The generally permeable condition of the native sand deposit present over the site will generally allow for natural drainage and movement of groundwater. As such, it is not considered likely that service trenches would present any conflict or impact to the natural groundwater conditions. As such, the provision of clay ‘cut-offs’ within trench backfill is not expected to be required.

Excavations for the proposed basement levels should be well above the groundwater level, and so would not be expected to require significant ongoing groundwater control, other than typical perimeter weeping tile and sump pump as noted above.

The final grading of the site should appropriately consider the groundwater levels in order to minimise or avoid conflict or impact to the groundwater during and post construction. In this regard the grading and storm water management plan should accommodate surface runoff that follows the existing overall drainage patterns as much as possible.

It is also noted that the use of Low Impact Design [LID] methods as part of the stormwater management for the proposed development would be viable for much of the site and should be considered. The permeable sand deposit, above the groundwater level, would afford an opportunity for natural infiltration of surface runoff, such is in 'dry' ponds, infiltration galleries, etc.

Based on our observations and details of the proposed development, it is not anticipated that the proposed construction will have an adverse impact on the groundwater condition in the area, and further detailed hydrogeological assessment is not considered warranted at this time. As the detailed design of the proposed development proceeds, this office should be consulted to review the hydrogeological conditions and assess the potential for concern, or need for additional study.

10. GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

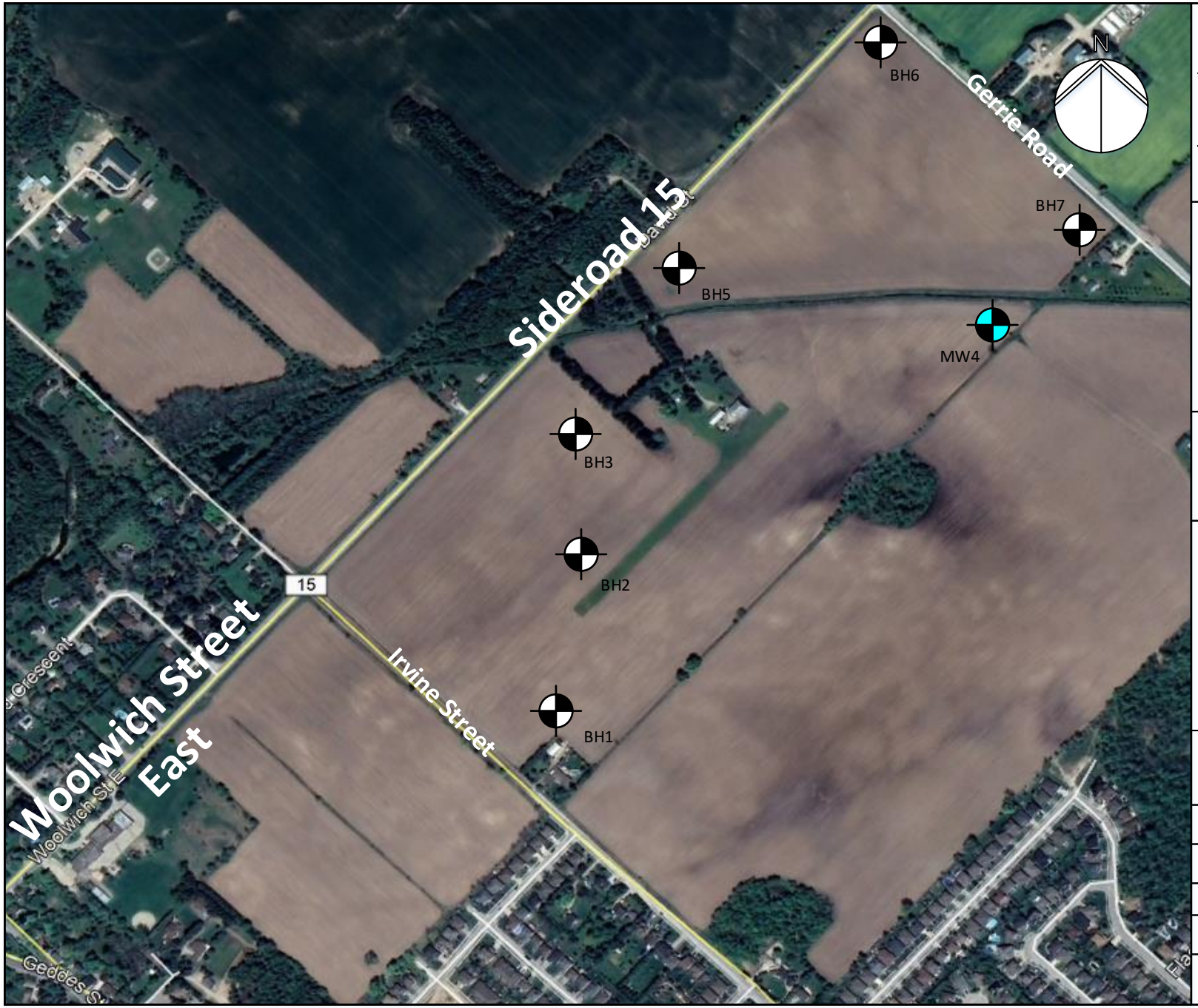
Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.

Scott Wylie, B.Eng., EIT.

Ian Shaw, P. Eng.
Senior Engineer

Enclosures: Drawing No. 1, Borehole Location Plan
Log of Borehole Nos. 1 to 7, inclusive
Grain Size Analyses
Drawing No. 2, Recommended Design Requirements for Basement Construction

Distribution: Cachet Developments [pdf]



LEGEND

Borehole Location
BH#

Monitoring Well Location
MW#

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301951A-G.

2. Borehole locations are approximate.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
Proposed Residential Development
7581 Sideroad 15
Elora, Ontario

Borehole Location Plan

Project No. SM 301591A-G

Date: September 2021

Drawn: SW	Checked: KR

SM 301591A-G Borehole Location Plan

Drawing No. 1

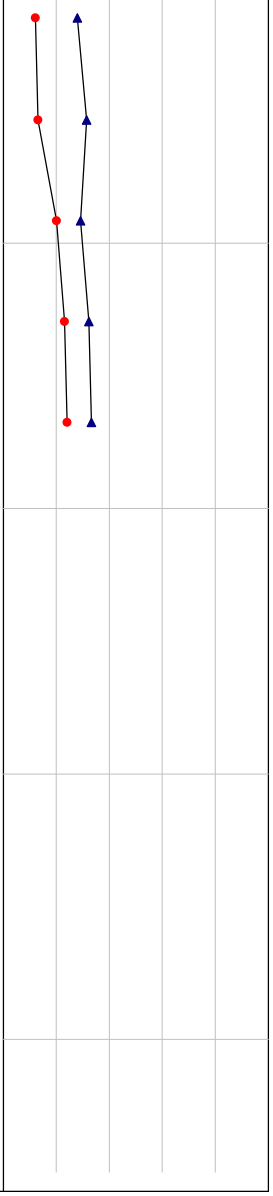
Log of Borehole No. 1

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838268
E: 545454

Depth (ft)	Depth (m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		413.05		Ground Surface								
0	0	412.80		**Topsoil** Approximately 250 millimetres of topsoil.		SS	1	4 5 7 6	12			
3	1	411.90		**Sandy Silt** Brown, trace clay, trace gravel, reworked in upper levels, compact.		SS	2	6 7 6 6	13			
				Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, compact.		SS	3	5 8 12 14	20			
9	3					SS	4	12 10 13 10	23			
11		409.40				SS	5	6 11 13 15	24			
12	4			End of Borehole								

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.

2. Borehole was recorded as dry and caved to a depth of 1.5 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 6, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

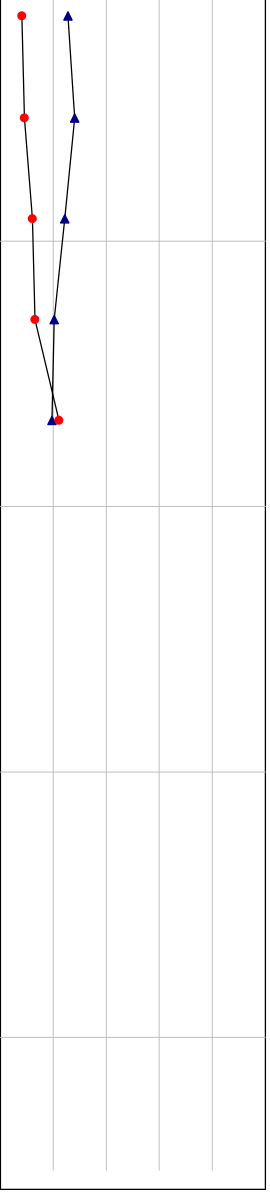
Log of Borehole No. 2

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838469
E: 545516

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	415.00	Ground Surface								
0 / 0	414.80	**Topsoil** Approximately 250 millimetres of topsoil.		SS	1	2 4 4 5	8			
3 / 1	413.50	**Sandy Silt** Brown, reworked in upper levels, trace clay, silt, and gravel, loose.		SS	2	4 3 6 8	9			
7 / 2	412.50	**Clayey Silt** Brown, trace to some sand and gravel, stiff to very stiff.		SS	3	6 6 6 7	12		3.5	
8 / 2		Transition to grey.		SS	4	3 7 6 7	13		4.0	
11 / 3	411.30			SS	5	9 7 15 18	22		>4.5	
12 / 4		End of Borehole								

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.7 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
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Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 3

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838652
E: 545505

Depth (ft)	Depth (m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)	Moisture Content w% (10 20 30 40) / Standard Penetration Test blows/300mm (20 40 60 80)
		409.93		Ground Surface									
0	0			**Topsoil** Approximately 150 millimetres of topsoil.		SS	1	4 6 10 8	16				
3	1			**Sand** Brown, reworked in upper levels, trace clay, silt, and gravel, compact.		SS	2	6 10 10 7	20				
6		408.10				SS	3	6 8 10 11	18				
7	2	407.80		**Sandy Silt** Brown, trace to some gravel and clay, compact.									
				End of Borehole									

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 2.1 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 6, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

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Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 4

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838792
E: 546044

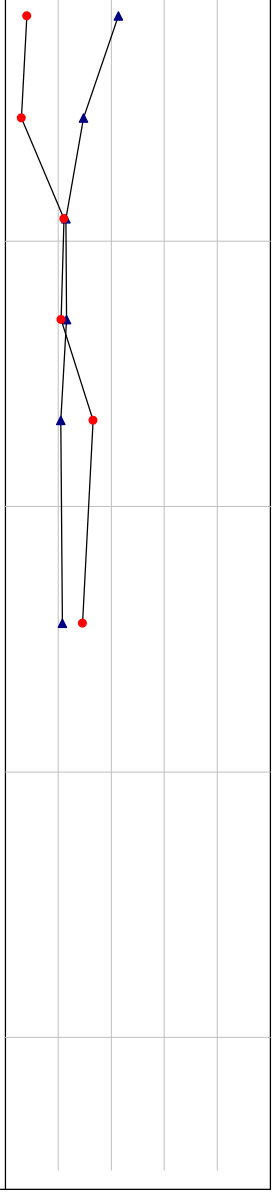
Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		405.55	Ground Surface							
0	0	405.35	**Topsoil** Approximatelty 200 millimetres of topsoil.							
1			**Sandy Silt** Brown, trace to some clay, trace gravel, reworked in upper levels, loose.	SS	1	2 3 5 6	8			
2				SS	2	4 3 3 5	6			
3	1									
4										
5										
6		403.70	**Sand** Brown, trace clay, silt, and gravel, medium to coarse gradation, wet, compact to dense.	SS	3	8 10 12 15	22			
7	2									
8				SS	4	8 10 11 10	21			
9										
10	3			SS	5	8 10 23 30	33			
11										
12										
13	4									
14										
15		400.70								
16	5	400.40	Transition to grey.	SS	6	3 11 18 23	29			
17			End of Borehole							
18										
19										
20	6									
21										
22										
23	7									
24										
25										
26	8									
27										
28										
29	9									

Well Data

SAMPLE

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 5, 2021 to termination at a depth of 5.2 metres.

2. Borehole was recorded as open and 'wet' at a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

August 6, 2021 - 2.74 metres below ground surface.

August 27, 2021 - 1.75 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 5, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 5

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838939
E: 545636

Depth (ft)	Depth (m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		412.10		Ground Surface								
0	0	411.90		**Topsoil** Approximately 200 millimetres of topsoil.		SS	1	2 4 5 7	9			
3	1			**Sandy Silt** Brown, reworked in upper levels, trace to some clay, increasing clay content with depth, occasional gravel, loose to compact.		SS	2	1 3 3 5	6			
6	2	410.00				SS	3	3 5 7 9	12			
				End of Borehole								

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 2.1 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

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Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 6

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4839162
E: 545871

Depth (ft / m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	420.91		Ground Surface								
0 / 0	420.70		**Topsoil** Approximately 200 millimetres of topsoil.		SS	1	4 4 4 4	8			
3 / 1	419.40		**Sand** Brown, reworked in upper levels, trace rootlets, loose to compact.		SS	2	3 5 6 6	11			
6 / 2			**Sandy Silt** Brown, trace clay, increasing clay content with depth, loose to compact.		SS	3	5 6 6 7	12			
9 / 3					SS	4	3 4 4 4	8			
11 / 3	417.30				SS	5	5 11 10 15	21			
12 / 4			End of Borehole								

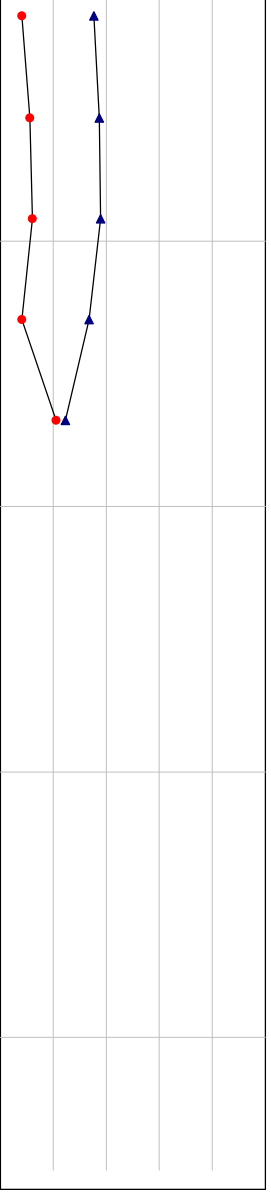
NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.6 metres.

2. Borehole was recorded as wet at depth of 2.0 metres, and caved to a depth of 2.4 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Moisture Content w%: 10 20 30 40
Standard Penetration Test blows/300mm: 20 40 60 80



Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

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Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 7

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838910
E: 546126

Depth (ft / m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	408.39		Ground Surface								
0 / 0	408.10		**Topsoil** Approximately 250 millimetres of topsoil.		SS	1	3 5 6 7	11			
3 / 1	406.90		**Sandy Silt** Brown, trace rootlets, trace clay, reworked in upper levels, increasing clay content with depth, compact.		SS	2	10 8 10 10	18			
6 / 2			**Clayey Silt** Brown, trace to some sand and gravel, stiff to hard.		SS	3	3 5 6 6	11		2.0	
9 / 3					SS	4	5 7 10 18	17		2.5	
11 / 3	404.70				SS	5	24 36 50/5"	100		>4.5	
12 / 4			End of Borehole								

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.0 metres.

2. Borehole was recorded as open and dry upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

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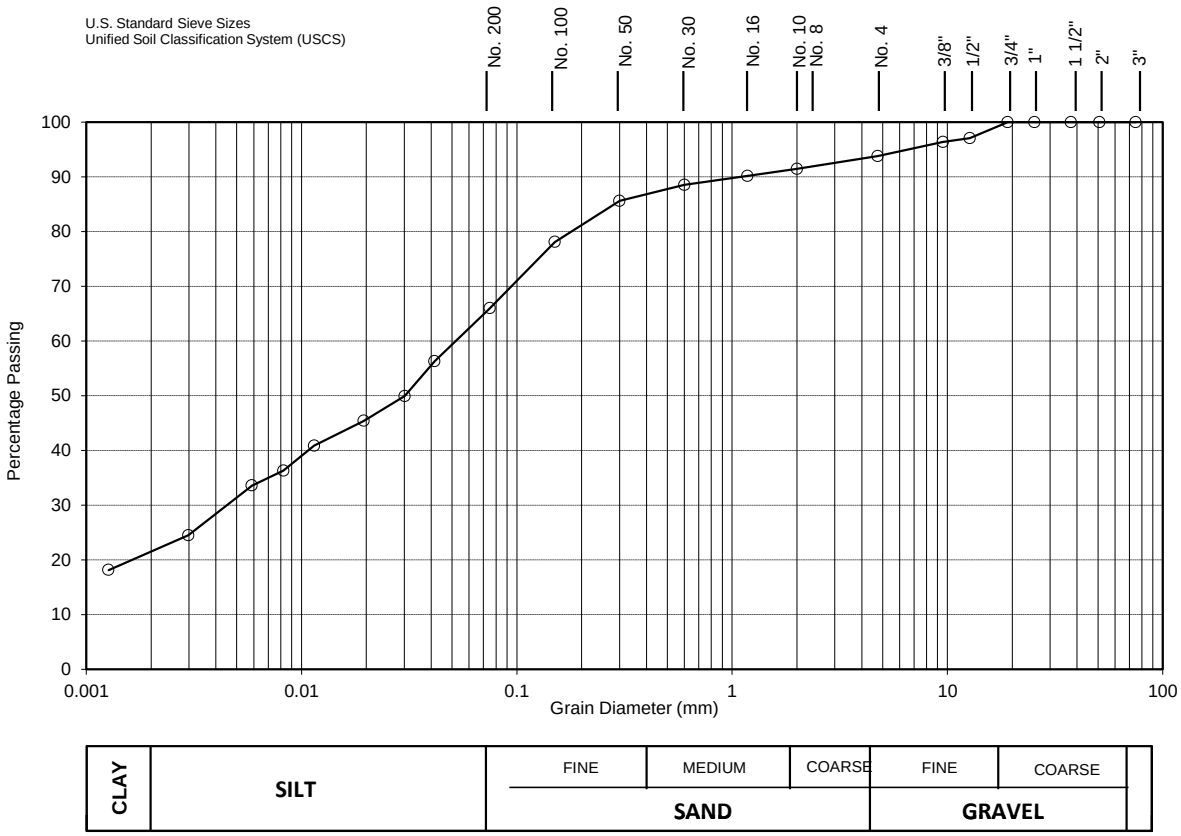
Mechanical & Hydrometer Analyses



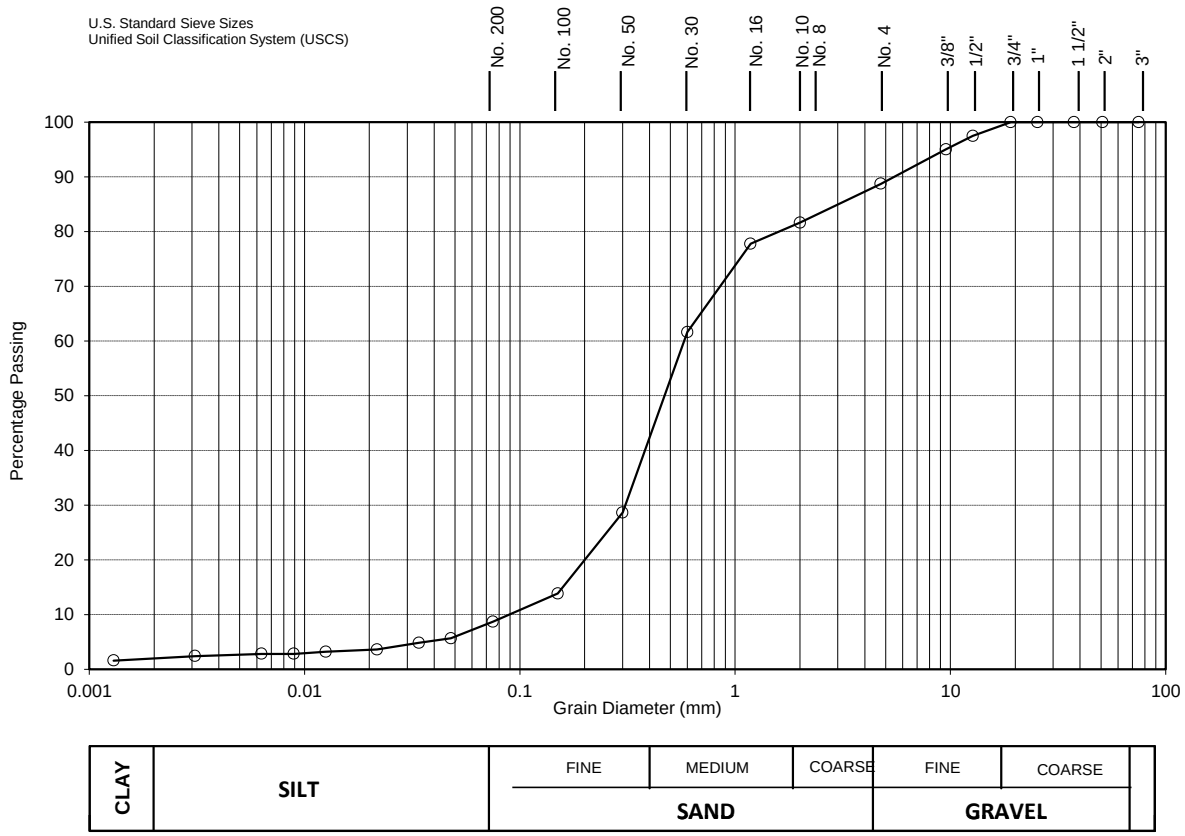
Lab No.:	**21-335**	Notes: Depth: 5'			
Sample No.:	**3**				
Borehole No.:	**3**				
CLAY [%]:	**22**	Soil Description:	**Brown Sandy Silt w/ some Clay and trace Gravel**		
SILT [%]:	**44**		**M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity**		
SAND [%]:	**28**				
GRAVEL [%]:	**6**	Estimated Infiltration Rate [mm/hr] :	**< 10**	Estimated Permeability, k [cm/s]	**10^{-7}**
D_{10} (Effective Diam. in mm):	**0.0005**	Coefficient of Uniformity C_U:	**102.0**	Coefficient of Curvature C_C:	**0.8**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Sideroad 15, Elora ON

August 2021	**Grain Size Analysis No. 1**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



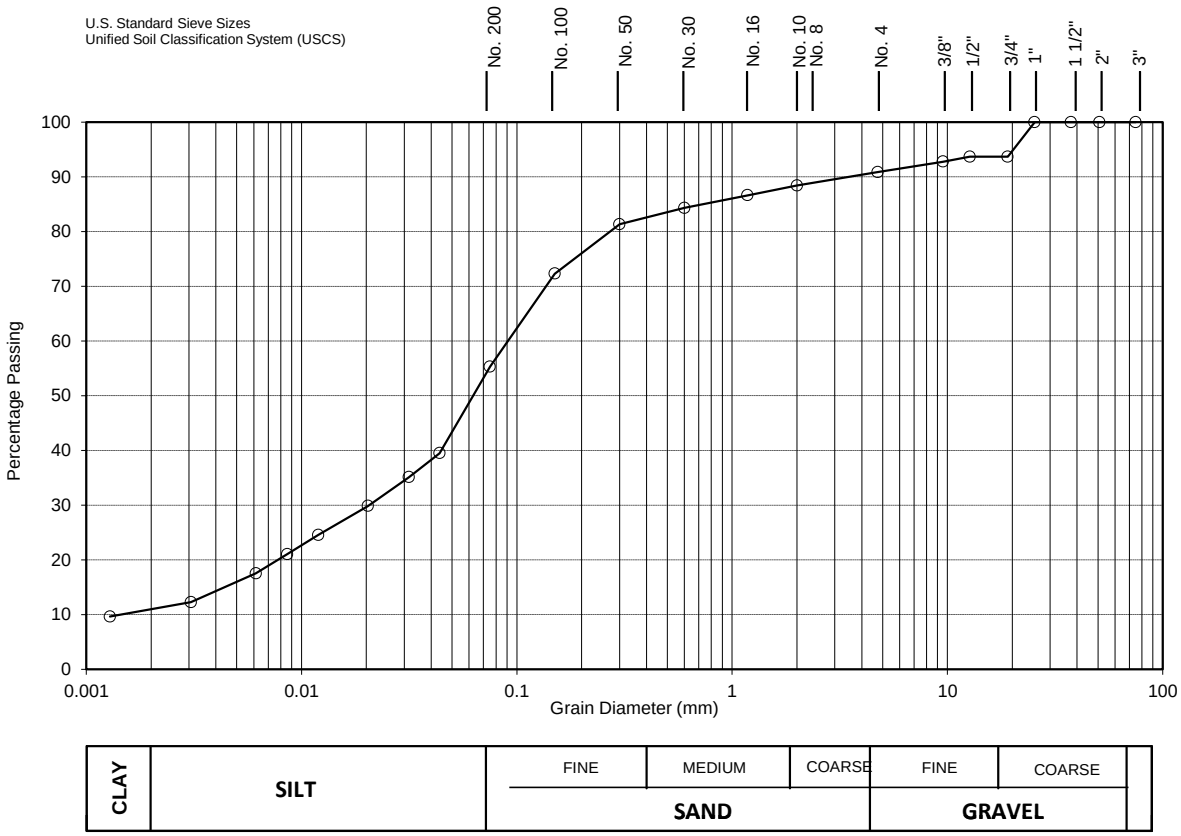
Lab No.:	**21-340**	Notes: Depth: 10'	
Sample No.:	**5**		
Borehole No.:	**4**		
CLAY [%]:	**2**	Soil Description: **Brown Sand w/ some Gravel and traces of Silt and Clay**	
SILT [%]:	**7**	**S.P. - Poorly graded sands, little or no fines**	
SAND [%]:	**80**		
GRAVEL [%]:	**11**	Estimated Infiltration Rate [mm/hr] : **150 to 300**	Estimated Permeability, k [cm/s] **10^{-2}**
D_{10} (Effective Diam. in mm):	**0.090**	Coefficient of Uniformity C_U: **6.6**	Coefficient of Curvature C_C: **1.8**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Sideroad 15, Elora ON

August 2021	**Grain Size Analysis No. 2**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



Lab No.:	**21-336**	Notes: Depth: 10'	
Sample No.:	**5**		
Borehole No.:	**6**		
CLAY [%]:	**11**	Soil Description: **Brown Sandy Silt w/ some Clay and trace Gravel**	
SILT [%]:	**44**	**M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity**	
SAND [%]:	**36**		
GRAVEL [%]:	**9**	Estimated Infiltration Rate [mm/hr] : **10 to 15**	Estimated Permeability, k [cm/s] **10^{-6}**
D_{10} (Effective Diam. in mm):	**0.0015**	Coefficient of Uniformity C_U: **60.0**	Coefficient of Curvature C_C: **3.3**

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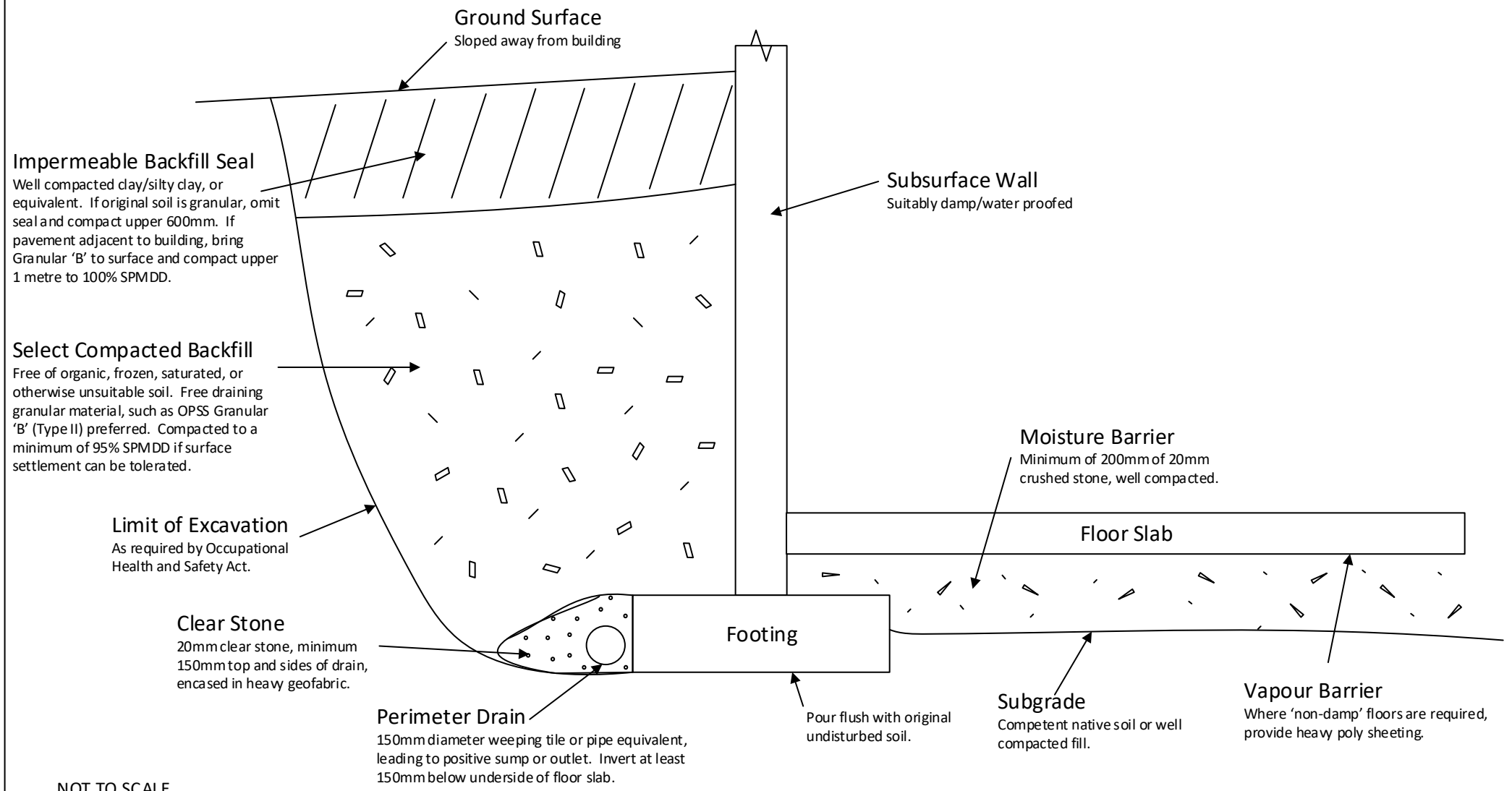
7581 Sideroad 15, Elora ON

August 2021	**Grain Size Analysis No. 3**	**Project No.: SM 301951-T**



NOT TO SCALE

Soil-Mat

Soil-Mat Engineers & Consultants Ltd.

Project No.:	SM 301951-G
Date:	September 2021

Typical Design Requirements
Drainage and Backfill for Basement Walls

Drawing No. 2

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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Milton: PO Box 40012 Derry Heights PO L9T 7W4 T: 800.243.1922

PROJECT NO.: SM 301951-G March 11, 2022

CACHET DEVELOPMENTS
361 CONNIE CRESCENT, SUITE 200
Concord, Ontario
L4K 5R2

Attention: Marcus Gagliardi
Development Planner

PRELIMINARY HYDROGEOLOGICAL CONSIDERATIONS
PROPOSED RESIDENTIAL DEVELOPMENT
CLAYTON LANDS
ELORA, ONTARIO

Dear Mr. Gagliardi,

Further to your recent correspondence and discussions, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has prepared the following preliminary hydrogeological considerations memo. These comments are further to our Preliminary Geotechnical and Hydrogeological Investigation reports for the subject lands [SM 301951A-G and SM 301951B-G, dated October 14, 2021], and recent discussions with the design team. It is also noted that further more detailed hydrogeological assessment works are presently underway, and will be formally reported once complete.

1. INTRODUCTION

We understand that the project will involve the construction of a residential development on the Clayton Lands located at 75 Woolwich Street East [Clayton Lands] in Elora, Ontario, along with potential future development on the Elora Sands [Gibson Lands] to the east. The development details are to be established, but are anticipated to consist of single-family dwellings and townhouses along asphalt paved roadways, including the installation of associated underground municipal services. The purpose of these preliminary hydrogeological considerations is to provide initial information and comments to support the assessment of site servicing options for the proposed development, from a geotechnical point of view.

2. PROCEDURE

A total of eleven [11] sampled boreholes were advanced at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The boreholes were advanced using continuous flight power auger equipment on August 5 and 6, 2021 under the direction and supervision of a staff member of SOIL-MAT ENGINEERS & CONSULTANTS LTD., to termination at depths of between approximately 3.6 and 7.6 metres below the existing ground surface.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of ASTM test specification D1586, Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the SOIL-MAT laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on all soil samples recovered from the borings. Selected samples were also subjected to laboratory grain size analyses.

Upon completion of drilling, groundwater monitoring wells were installed at Borehole Nos. 004, 101, 102, and 104 to allow for the future monitoring of the groundwater level. The monitoring well consisted of 50-millimetre PVC pipe screened in the lower 1.5 to 3.0 metres. The monitoring well was encased in well filter sand up to approximately 0.3 metres above the screened portion, then with bentonite 'hole plug' to the surface and fitted with a protective steel 'stick up' casing. The remaining boreholes were backfilled in general accordance with Ontario Regulation 903, and the ground surface was reinstated even with the surrounding grade.

The boreholes were located in the field by representatives of SOIL-MAT ENGINEERS, based on accessibility over the site, clearance of underground utilities, and the drawing that was forwarded to our office. Best efforts were made to minimize crop damage by locating the majority of the boreholes to the perimeter of the fields. The ground surface elevation at the borehole locations has been referenced to a geodetic benchmark, described as North American 1983 CSRS, as per the survey plan completed by POI Aerial, dated August 10, 2021, which was provided to our office.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Log of Borehole Nos. 001 to 007, and 101 to 104, inclusive, following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed at the exact depths of geological change.

3. SITE DESCRIPTION AND SUBSURFACE CONDITIONS

The subject site is currently two [2] undeveloped agricultural properties located at 7581 Sideroad 15 and 75 Woolwich Street East in Elora, Ontario. The eastern parcel, 7581 Sideroad 15, is bordered to the south by an existing agricultural field, to the east by Gerrie Road, to the north by Sideroad 15, and to the west by Irvine Street, assuming a north-south orientation of Irvine Street. The field is bisected by a tributary of the Irvine Creek [Nichol Drain] at the north eastern corner of the site. There is also a single-family dwelling and an existing barn structure near the middle of the site, setback approximately 200 metres from Sideroad 15.

The western parcel, located at 75 Woolwich Street East, is bordered to the east by Irvine Street, to the south by Bricker Avenue, to the west by residential dwellings and a public school, and to the north by Woolwich Street East. West of the tributary, the two parcels generally slope down to the north, with a relief of approximately 6 metres measured across the boreholes. The grade is relatively flat and even with Gerrie Road on the east side of the tributary but quickly descends towards it with an approximate relief of 15 metres measured across the boreholes.

The subsurface conditions encountered at the borehole locations are summarised as follows:

Topsoil

A surficial veneer of topsoil approximately 100 to 250 millimetres in thickness was encountered at all borehole locations. It is noted that the depth of topsoil may vary across the site and from the depths encountered at the borehole locations. It is also noted that the term ‘topsoil’ has been used from a geotechnical point of view, and does not necessarily reflect its nutrient content or ability to support plant life.

Sandy Silt/Clayey Silt

Native sandy silt/clayey silt was encountered beneath the topsoil in the majority of the boreholes, and beneath a sand deposit in Borehole Nos. 003, 006, and 002. The fine-grained granular to slightly cohesive soils were brown in colour, transitioning to grey below about 2.5 metres in Borehole No. 002, with trace to some clay and gravel, with a notable increasing clay content with depth in some of the boreholes. The native sandy silt/clayey silt soils were generally noted to have a reworked or weathered appearance in the upper levels, and were generally noted to have a loose to compact state. The sandy silt/clayey silt deposit was present to depths of approximately 0.9 to 2.2 metres in Borehole Nos. 103, 102, 001 and 004, and was proven to termination at depths of approximately 2.1 to 6.1 metres below the existing ground surface in Borehole Nos. 101, 003, 005, 006, 002, and 007.

Sand

A native sand deposit was encountered beneath the topsoil in Borehole Nos. 003, 006, and 104 and beneath the sandy silt/clayey silt layer in Borehole Nos. 103, 102, 001, and 004. The fine to medium grained soils were brown in colour, with a noted to transition to grey at a depth of approximately 4.8 metres in Borehole No. 10, contained trace amounts of clay, silt, and gravel, and was generally in a compact to dense state. The native sand soils were proven to a depth of approximately 1.5 and 1.8 metres within Borehole Nos. 003 and 006, and proven to termination at depths of between approximately 3.6 and 7.6 metres below the existing ground surface in Borehole Nos. 104, 103, 102, 001 and 004.

Grain Size Analyses

Grain size analyses were conducted on six [6] selected samples of the native soils recovered from the boreholes. The results of this grain size testing can be found appended to the end of this report, and are summarized as follows:

TABLE A
GRAIN SIZE ANALYSES

Sample ID	Depth	% Clay	% Silt	% Sand	% Gravel	Hydraulic Conductivity, k [cm/s]	Estimated Infiltration Rate, [mm/hr]
BH003 SS3	1.5 m	22	44	28	6	10^{-7}	<10
BH006 SS5	3.0 m	11	44	36	9	10^{-6}	10 to 15
BH104 SS4	2.3 m	2	9	89	0	10^{-3} to 10^{-2}	100 to 150
BH103 SS3	1.5 m	14	45	34	7	10^{-6}	<10
BH102 SS6	4.6 m	2	6	91	1	10^{-2}	150 to 300
BH004 SS5	3.0 m	2	7	80	11	10^{-2}	150 to 300

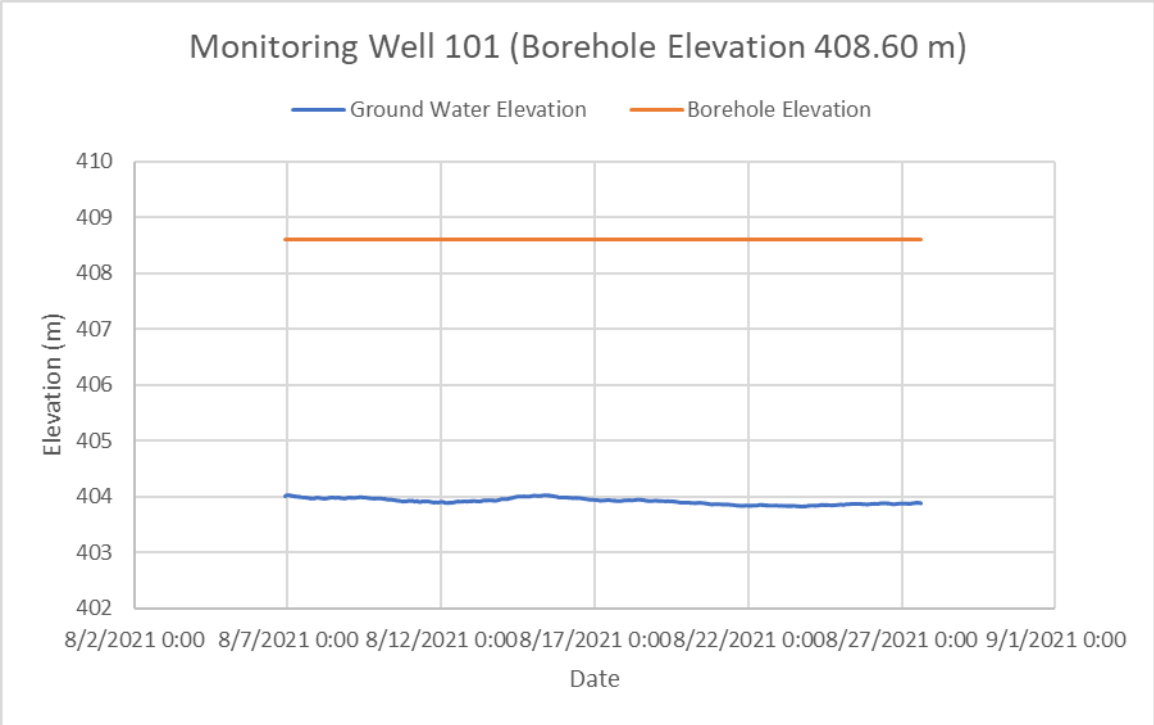
The field and laboratory testing demonstrate the native soils to generally consist of a sandy silt/clayey silt with some clay and traces of gravel in the upper levels, transitioning to a highly permeable sand with traces of clay, silt, and gravel at depth. According to the Unified Soil Classification System (USCS), the soils are classified as M.L. – inorganic silts and very fine sands, clayey silts with slight plasticity in the upper levels overlying S.P. – poorly graded sands, with little to no fines at depth. The sandy silt/clayey silt in the upper levels would generally behave as a low permeable material, but would not be considered as an impermeable material, and would be highly frost susceptible. The underlying sand deposit is highly permeable, relatively free draining.

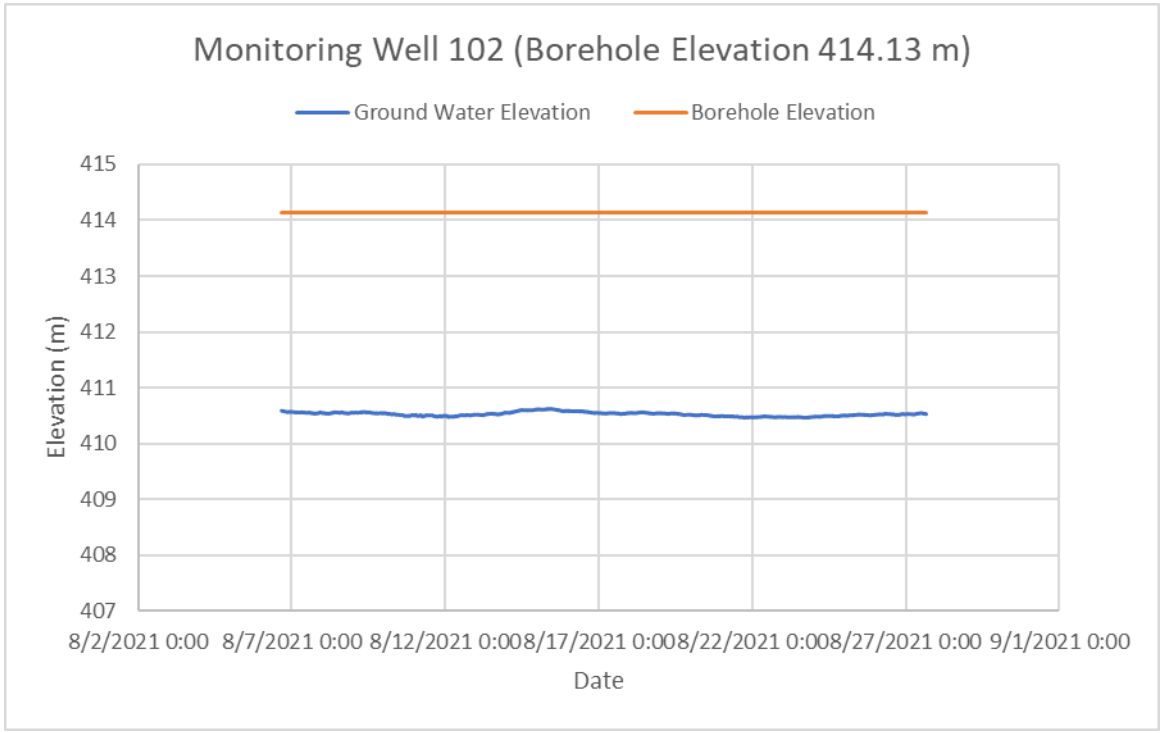
A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soils to be in areas noting to consist of stone-poor sandy silt to silty sand-textured till, ice-contact stratified deposits of sand and gravel, with minor silt and clay, as well as river deposits of coarse gravel. These conditions are consistent with the observations during drilling.

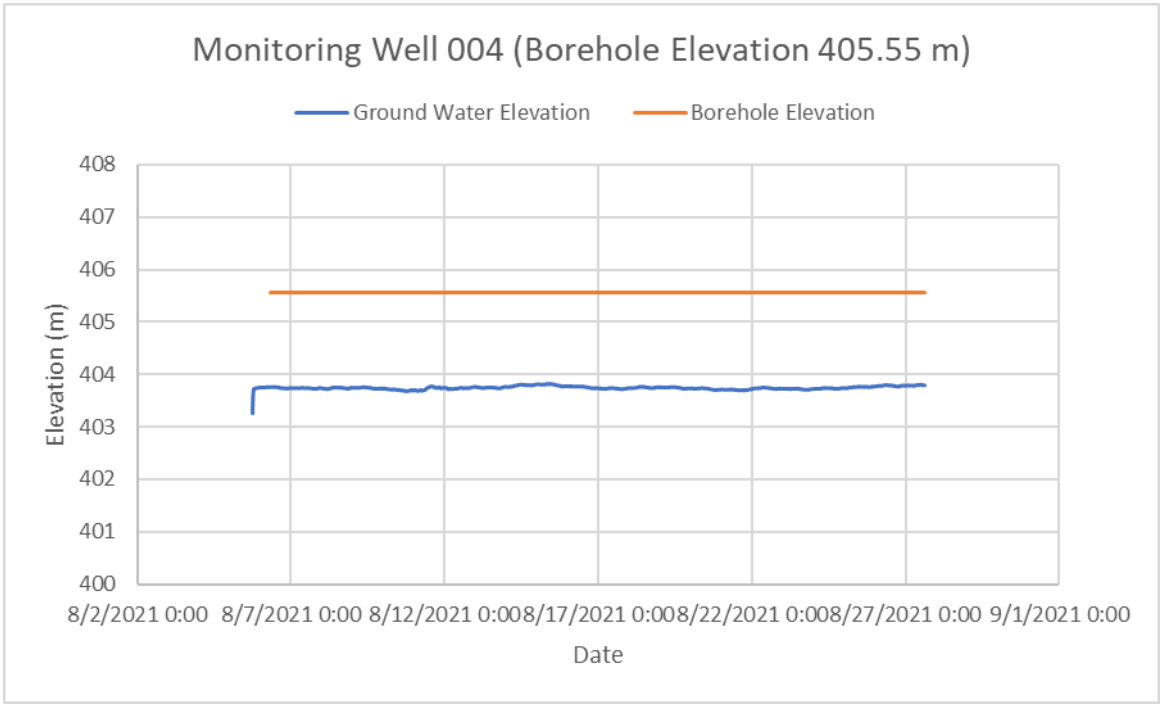
Groundwater Observations

Borehole Nos. 006, 102, and 004 were noted to have 'caved' to depths of between approximately 2.4 to 3.8 metres and 'wet' at depths of between approximately 2.0 to 3.4 metres, while Borehole No. 104 was noted to be open and 'wet' at a depth of 7.0 metres upon completion. Borehole Nos. 103 and 001 were noted to have cave to depths of 2.7 and 1.5 metres, respectively, and dry upon completion. The remainder of the boreholes were noted as being open and 'dry' [i.e. no free groundwater present] upon completion of drilling. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes.

As noted above, a monitoring well was installed at Borehole Nos. 101, 102, 104, and 004, to allow for future measurements of the static groundwater level. A data logger was installed in Borehole Nos. 101, 102, and 004 to allow for continuous monitoring of the groundwater level between August 6 and August 27, 2021, the readings of which have been illustrated in the following graphs:




Monitoring Well 102 (Borehole Elevation 414.13 m)
Ground Water Elevation
Borehole Elevation
Elevation (m)
415
414
413
412
411
410
409
408
407
8/2/2021 0:00
8/7/2021 0:00
8/12/2021 0:00
8/17/2021 0:00
8/22/2021 0:00
8/27/2021 0:00
9/1/2021 0:00
Date


Monitoring Well 004 (Borehole Elevation 405.55 m)
Ground Water Elevation
Borehole Elevation
Elevation (m)
408
407
406
405
404
403
402
401
400
8/2/2021 0:00
8/7/2021 0:00
8/12/2021 0:00
8/17/2021 0:00
8/22/2021 0:00
8/27/2021 0:00
9/1/2021 0:00
Date

In addition, manual monitoring well readings were also taken from all of the installed monitoring well locations across the site on August 6 and 27, 2021 and February 23, 2022. These have been summarized in the following chart:

TABLE B
SUMMARY OF GROUNDWATER LEVELS

	MW 101		MW 102		MW 104		MW 004	
Surface Elevation [m]	408.60		414.13		414.87		405.55	
	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
Aug 6, 2021	4.78	403.82	3.58	410.55	6.78	408.09	2.74	402.81
Aug 27, 2021	4.71	403.89	3.61	410.52	6.96	407.91	1.75	403.80
Feb 23, 2022	4.31	404.29	3.50	410.63	6.83	408.04	1.33	404.22

The groundwater level observed indicates a stabilized groundwater level on the order of approximately 2 to 7 metres below the existing grade, at an elevation of roughly 403.8 to 410.5 metres, varying with the physical topography. There is an evident drop in the groundwater level with a groundwater flow direction of NNE, generally following the topography towards the Irvine Creek Tributary. The approximate groundwater contours are illustrated in the attached Drawing No. 2.

Given the time of year of monitoring, the observed levels in August of 2021 would be considered reasonably representative of a seasonal ‘low’. The readings in February show seasonal fluctuation, but would not be considered representative of the seasonal ‘high’. However, the present data does provide an indication that the static groundwater level remains relatively steady over the year, with seasonal fluctuations on the order of perhaps 0.5 to 1.0 metre.

General Discussion of Subsurface Conditions

As noted above the subsurface conditions are generally characterized as sandy silt/clayey silt deposit in the upper levels, underlain by a permeably cohesionless sand deposit. The static groundwater level is within the permeable sand deposit, generally following the topography dropping to the north down to the Irvine Creek tributary. Representative geological cross sections are illustrated in Drawing Nos. 3, 4 and 5, attached.

4. PRELIMINARY HYDROGEOLOGICAL CONSIDERATIONS

As noted above, it is understood that the development is anticipated to consist of single family dwellings and townhouse blocks, including the installation of associated underground municipal services along asphalt paved roadways. Excavations for the proposed development services are expected to extend to depths of up to approximately to 2 to 5 metres below the existing ground surface, while excavations for foundations would be expected to extend up to approximately 2 metres. Measurements of the groundwater level at the monitoring well locations indicate a groundwater level on the order of approximately 2 to 7 metres below the existing ground surface, generally 3.5 to 7 metres over the Clayton lands presently proposed for development. The groundwater level is shallower to the east, approaching the Irvine Creek tributary, generally following the drop in topography toward the creek.

These conditions, with relatively permeable soil conditions at depth, and groundwater at sufficient depth, are well suited to proposed development. Site earthworks and servicing should be readily designed to avoid or limit encountering the natural groundwater level and thus minimise any potential interaction with the groundwater. The generally permeable condition of the native sand deposit present over the site will generally allow for natural drainage and movement of groundwater. As such, it is not considered likely that service trenches would present any conflict or impact to the natural groundwater conditions. The exception might be deeper trunk sewers, which would warrant closer assessment as the detailed design proceeds. As noted above, additional detailed hydrogeological assessment work is presently underway to help further inform the design and construction.

The short-term excavations for the proposed servicing are generally anticipated to extend into the sandy silt/clayey silt and sand soils to depths above the static groundwater level. Such excavations would be expected to be subject to relatively minor groundwater infiltration, such that it should be possibly to adequately control such infiltration using conventional construction dewatering techniques such as pumping from sumps in the base of the excavation. During wet times of year, some instability of the excavations may be experienced. The rate of dewatering would be expected to be below 50,000 L/day for most shallow excavations, and certainly below 400,000 L/day, such that an EASR or PTTW should not be required. Where deeper excavations are identified to be required, extending below the static groundwater level, [i.e. deeper sewer mains, pumping chambers, etc.] the need for temporary dewatering controls during construction should be more closely evaluated. Depending on the proposed depths of excavations for the proposed footings and site services, the rate of dewatering could be

greater than 50,000 L/day, potentially requiring an EASR. As such, once available, the site servicing and grading plans detailing depths of construction should be forwarded onto our office for further review and comments.

The final grading of the site should appropriately consider the groundwater levels in order to minimise or avoid conflict or impact to the groundwater during and post construction. In this regard the grading and storm water management plan should accommodate surface runoff that follows the existing overall drainage patterns as much as possible. This would suggest SWM pond as best located to the north of the site, adjacent to Woolwich Street and ideally as far east as possible.

It is also noted that the use of Low Impact Design [LID] methods as part of the stormwater management for the proposed development would be viable for much of the site and should be considered. The permeable sand deposit, above the groundwater level, would afford an opportunity for natural infiltration of surface runoff, such as in 'dry' ponds, infiltration galleries, etc. As noted above, the sand deposit would have hydraulic conductivity on the order of 10^{-2} to 10^{-3} cm/sec, correlating to design infiltration rates on the order of 100 to 300 mm/hr. The use of infiltration systems could be readily utilised for lot level infiltration of rain water from downspouts, and also within the overall SWM pond.

Based on our present observations and available information, it is not anticipated that the proposed development will have an adverse impact on the groundwater condition in the area. As noted, further detailed hydrogeological assessment is presently underway, and will be formally reported to support the detailed design processes. As the detailed design of the proposed development proceeds, this office should be consulted to review the hydrogeological conditions and assess the potential for concern.

5. GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.

Scott Wylie, B.Eng., EIT.

Ian Shaw, P. Eng., QP_{ESA}
Senior Engineer

Enclosures: Drawing No. 1, Borehole Location Plan
Drawing No. 2, Groundwater Contour Map
Drawing Nos. 3, 4 and 5, Geological Cross-Sections
Log of Borehole Nos. 101 to 104, and 001 to 007 inclusive
Grain Size Analyses

Distribution: Cachet Developments [pdf]

LEGEND

- Borehole Location — BH#
- Monitoring Well Location — MW#
- Geological Cross Section Location

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301951-G.

2. Borehole locations are approximate.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
Proposed Residential Development
7581 Sideroad 15 and 75 Woolwich Street East
Elora, Ontario

Borehole Location Plan

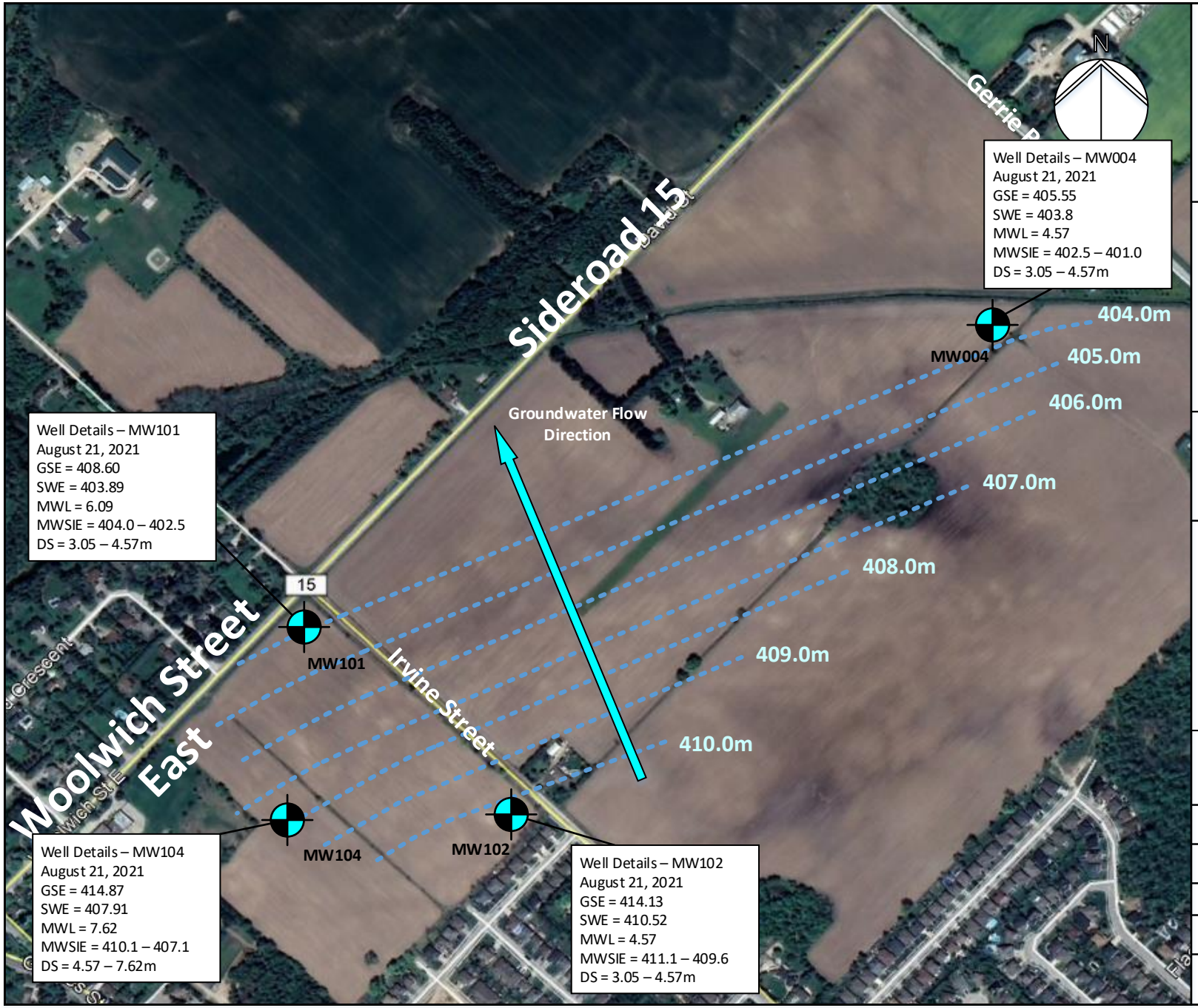
Project No. SM 301591-G

Date: February 2022

Drawn: SW	Checked: IS

SM 301591-G Borehole Location Plan

Drawing No. 1



LEGEND

Monitoring Well Location
MW#

GSE = Monitoring Well Ground Surface Elevation
SWE = Static Water Elevation [taken on Aug. 21, 2021]
MWL = Monitoring Well Length
MWSIE = Monitoring Well Screen Interval Elevation
DS = Depth of Screen

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301951-G.

2. Borehole locations are approximate.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
Proposed Residential Development
7581 Sideroad 15 and 75 Woolwich Street East
Elora, Ontario

Groundwater Contour Map

Project No. SM 301591-G

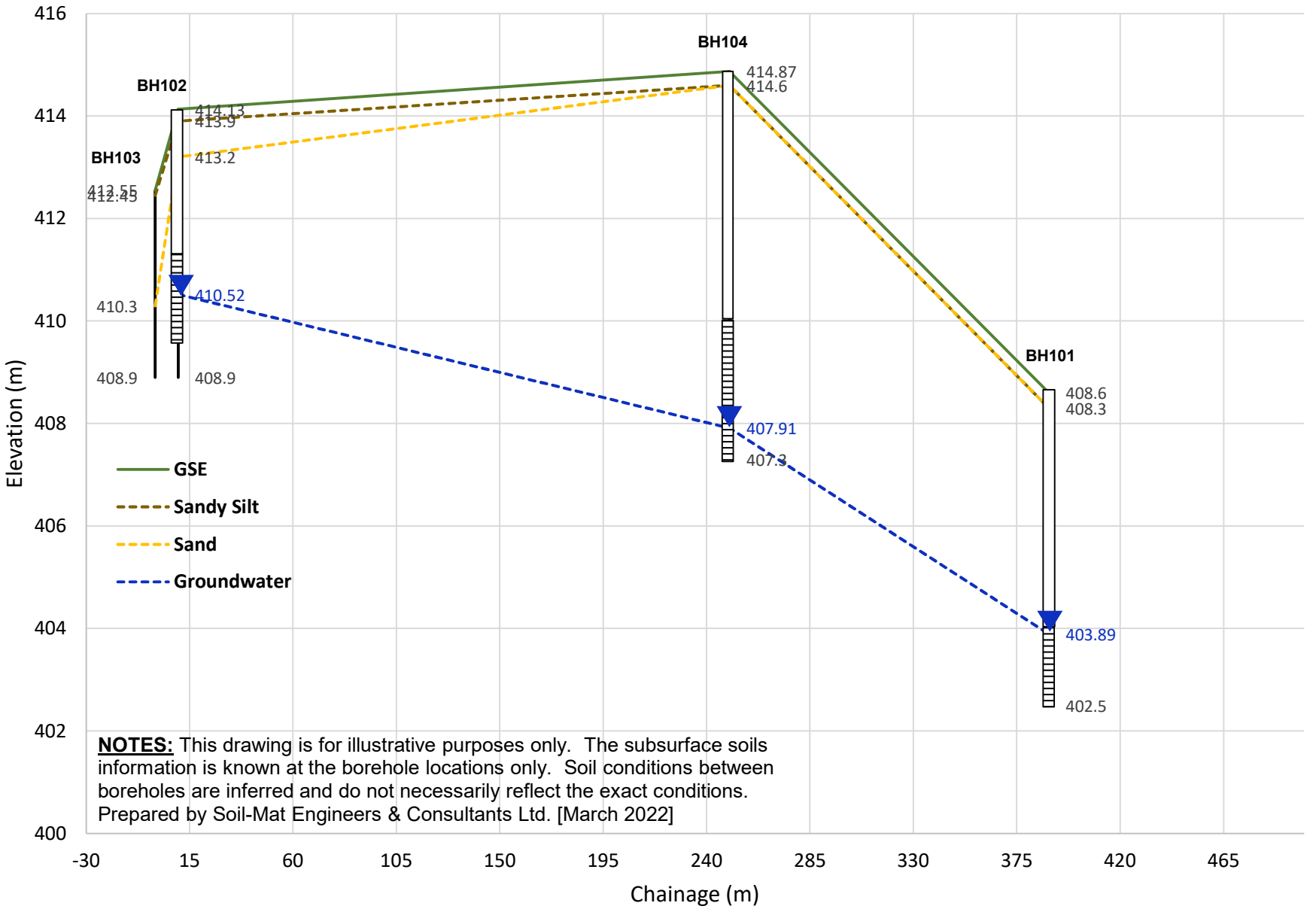
Date: February 2022

Drawn: SW | Checked: IS

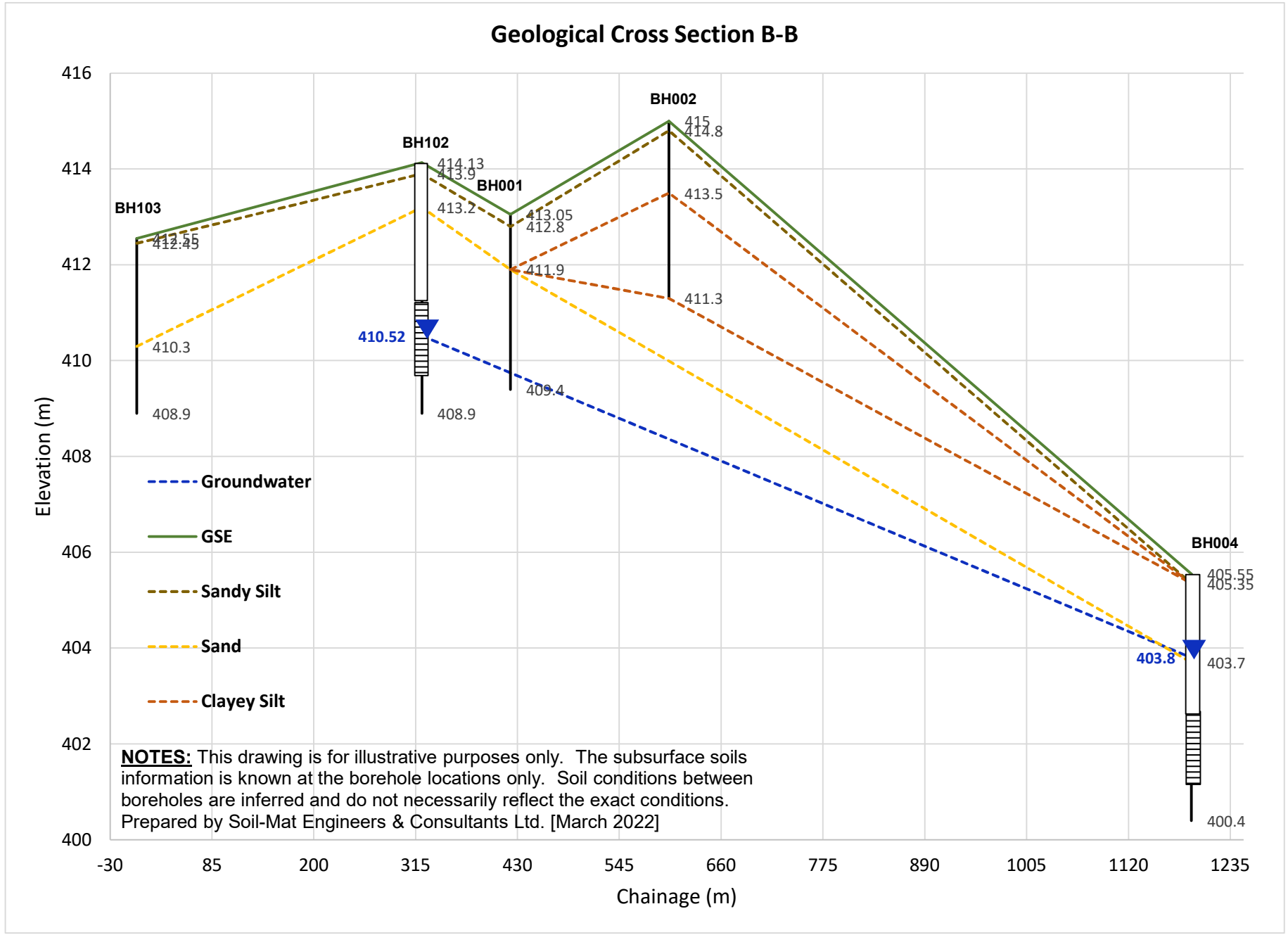
SM 301591-G Groundwater Contour Map

Drawing No. 2

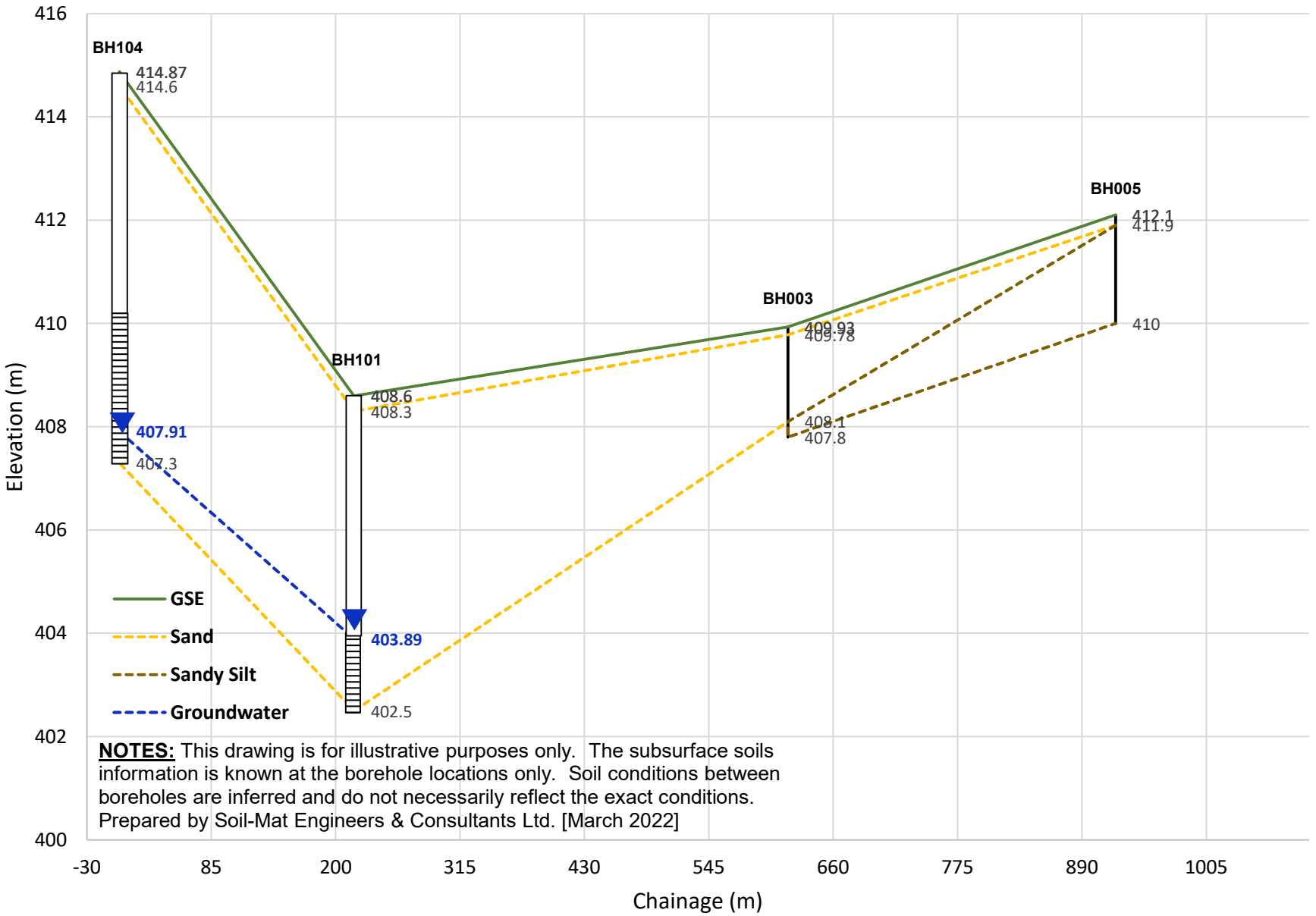
Geological Cross Section A-A



NOTES: This drawing is for illustrative purposes only. The subsurface soils information is known at the borehole locations only. Soil conditions between boreholes are inferred and do not necessarily reflect the exact conditions.
Prepared by Soil-Mat Engineers & Consultants Ltd. [March 2022]


Geological Cross Section B-B
Elevation (m)
Chainage (m)
416
414
412
410
408
406
404
402
400
-30
85
200
315
430
545
660
775
890
1005
1120
1235
BH103
412.55
412.45
410.3
408.9
BH102
414.13
413.9
413.2
410.52
408.9
BH001
413.05
412.8
411.9
409.4
BH002
415
414.8
413.5
411.3
403.8
BH004
405.55
405.35
403.7
400.4
Groundwater
GSE
Sandy Silt
Sand
Clayey Silt
NOTES: This drawing is for illustrative purposes only. The subsurface soils information is known at the borehole locations only. Soil conditions between boreholes are inferred and do not necessarily reflect the exact conditions.
Prepared by Soil-Mat Engineers & Consultants Ltd. [March 2022]

Geological Cross Section C-C

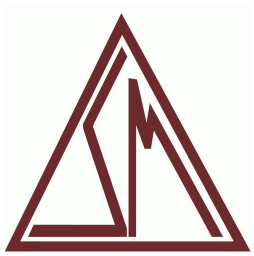


NOTES: This drawing is for illustrative purposes only. The subsurface soils information is known at the borehole locations only. Soil conditions between boreholes are inferred and do not necessarily reflect the exact conditions.
Prepared by Soil-Mat Engineers & Consultants Ltd. [March 2022]

Log of Borehole No. 101

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838437
E: 545149



Depth (ft)	Depth (m)	Elevation (m)	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	SAMPLE PP (kgf/cm2)	SAMPLE U.Wt.(kN/m3)	Moisture Content w% (10 20 30 40) / Standard Penetration Test blows/300mm (20 40 60 80)
		408.60	Ground Surface									
0	0	408.30	**Topsoil** Approximately 250 millimetres of topsoil.									
			Sand Brown, trace gravel.									
		403.10	Transition to grey in colour									
		402.50	End of Borehole									

NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 6.10 metres.
2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.
4. A monitoring well was installed. No soil samples were retrieved. The following free groundwater level readings have been measured:

August 6, 2021 - 4.78 metres below ground surface.

August 27, 2021 - 4.71 metres below ground surface.

October 14, 2021 - 4.33 metres below ground surface.

February 23, 2021 - 4.31 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 6, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 102

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838180
E: 545422

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	414.13	Ground Surface								
0 / 0	413.90	**Topsoil** 250 millimetres of topsoil.								
3 / 1	413.20	**Sandy Silt** Brown, trace clay, trace gravel, reworked in upper levels, loose to compact.		SS	1	4 5 7 8	12			
				SS	2	2 3 6 5	9			
		Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, loose to compact.		SS	3	3 9 12 14	21			
				SS	4	7 8 11 10	19			
				SS	5	6 9 11 17	20			
16 / 5	408.90	End of Borehole		SS	6	7 5 4 9	9			

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 5.2 metres.

2. Borehole was recorded as caved to a depth of 3.8 metres and 'wet' at a depth of 3.6 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

August 6, 2021 - 3.58 metres below ground surface.

August 27, 2021 - 3.61 metres below ground surface.

October 14, 2021 - 3.62 metres below ground surface.

February 23, 2021 - 3.5 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 6, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

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130 Lancing Drive, Hamilton, ON L8W 3A1
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Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 103

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4837942
E: 545194

Depth (ft)	Depth (m)	Elevation (m)	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		412.55	Ground Surface								
0	0		**Topsoil** Approximately 100 millimetres of topsoil.		SS	1	5 5 7 8	12			
3	1		**Sandy Silt** Brown, trace to some gravel and clay, reworked in upper levels, compact.		AS	2	6 5 3 3	8			
6	2				SS	3	5 6 6 6	12			
7		410.30									
8			**Sand** Brown, trace clay, silt, and gravel, medium gradation, loose.		SS	4	2 3 3 2	6			
11	3				SS	5	2 1 1 2	2			
12		408.90									
13	4		End of Borehole								
29	9										

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.

2. Borehole was recorded dry and caved to a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 6, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
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Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 104

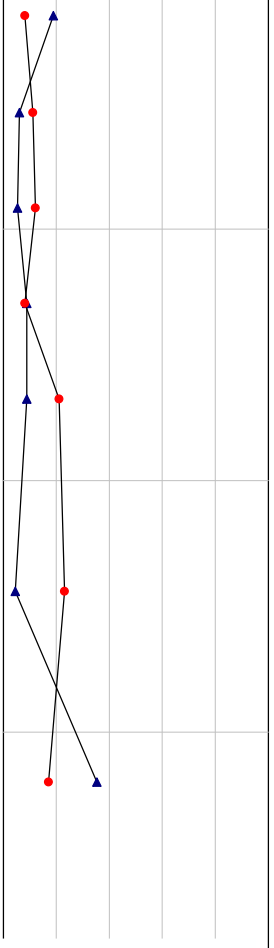
Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838174
E: 545084

Depth (ft)	Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		414.87	Ground Surface							
0	0	414.60	**Topsoil** Approximately 250 millimetres of topsoil.							
1			**Sand** Brown, reworked in upper levels, trace clay, silt, and gravel, fine to medium gradation, compact.	SS	1	5 5 6 7	11			
2										
3	1			SS	2	8 9 9 7	18			
4										
5				SS	3	2 5 8 7	13			
6	2									
7				SS	4	6 11 16 13	27			
8										
9				SS	5	10 12 11 13	23			
10	3									
11										
12										
13	4									
14										
15				SS	6	5 10 13 15	23			
16										
17	5									
18										
19										
20	6	408.80	Wet spoon							
21				SS	7	9 9 8 6	17			
22										
23	7									
24		407.30								
25			End of Borehole							
26	8									
27										
28										
29										
30	9									
31										

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 7.6 metres.

2. Borehole was recorded as open and 'wet' at depth of 7.0 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

August 6, 2021 - 6.78 metres below ground surface.

August 27, 2021 - 6.96 metres below ground surface.

October 14, 2021 - 7.09 metres below ground surface.

February 23, 2022 - 6.83 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 6, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
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Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

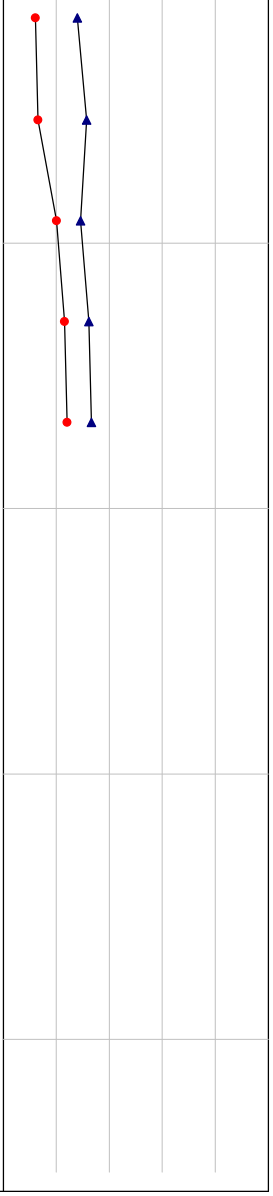
Log of Borehole No. 001

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838268
E: 545454

Depth (ft / m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
	413.05		Ground Surface								
0 / 0	412.80		**Topsoil** Approximately 250 millimetres of topsoil.		SS	1	4 5 7 6	12			
3 / 1	411.90		**Sandy Silt** Brown, trace clay, trace gravel, reworked in upper levels, compact.		SS	2	6 7 6 6	13			
			Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, compact.		SS	3	5 8 12 14	20			
					SS	4	12 10 13 10	23			
11 / 3	409.40				SS	5	6 11 13 15	24			
12 / 4			End of Borehole								

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.

2. Borehole was recorded as dry and caved to a depth of 1.5 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 6, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
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E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 002

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838469
E: 545516

Depth (ft)	Depth (m)	Elevation (m)	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		415.00	Ground Surface								
0	0	414.80	**Topsoil** Approximately 250 millimetres of topsoil.		SS	1	2 4 4 5	8			
3	1	413.50	**Sandy Silt** Brown, reworked in upper levels, trace clay, silt, and gravel, loose.		SS	2	4 3 6 8	9			
7	2	412.50	**Clayey Silt** Brown, trace to some sand and gravel, stiff to very stiff.		SS	3	6 6 6 7	12		3.5	
			Transition to grey.		SS	4	3 7 6 7	13		4.0	
11	3	411.30			SS	5	9 7 15 18	22		>4.5	
12	4		End of Borehole								

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.7 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
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E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 003

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838652
E: 545505

Depth (ft)	Depth (m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)	Moisture Content w% (10 20 30 40) / Standard Penetration Test blows/300mm (20 40 60 80)
		409.93		Ground Surface									
0	0			**Topsoil** Approximately 150 millimetres of topsoil.		SS	1	4 6 10 8	16				
3	1			**Sand** Brown, reworked in upper levels, trace clay, silt, and gravel, compact.		SS	2	6 10 10 7	20				
6		408.10				SS	3	6 8 10 11	18				
7	2	407.80		**Sandy Silt** Brown, trace to some gravel and clay, compact.									
				End of Borehole									

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 2.1 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 6, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 004

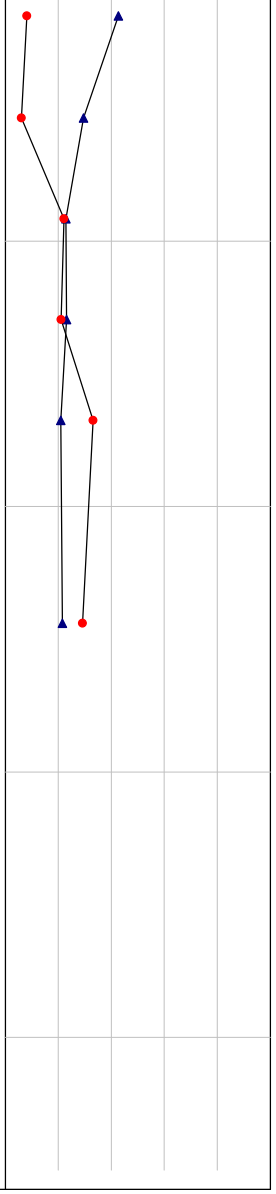
Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838792
E: 546044

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		405.55	Ground Surface							
0	0	405.35	**Topsoil** Approximatelty 200 millimetres of topsoil.							
1			**Sandy Silt** Brown, trace to some clay, trace gravel, reworked in upper levels, loose.	SS	1	2 3 5 6	8			
2										
3	1			SS	2	4 3 3 5	6			
4										
5										
6		403.70	**Sand** Brown, trace clay, silt, and gravel, medium to coarse gradation, wet, compact to dense.	SS	3	8 10 12 15	22			
7	2									
8				SS	4	8 10 11 10	21			
9										
10	3			SS	5	8 10 23 30	33			
11										
12										
13	4									
14										
15		400.70								
16	5	400.40	Transition to grey.	SS	6	3 11 18 23	29			
17			End of Borehole							
18										
19										
20	6									
21										
22										
23	7									
24										
25										
26	8									
27										
28										
29	9									

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 5, 2021 to termination at a depth of 5.2 metres.

2. Borehole was recorded as open and 'wet' at a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

August 6, 2021 - 2.74 metres below ground surface.

August 27, 2021 - 1.75 metres below ground surface.

February 23, 2021 - 1.33 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 5, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
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Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 005

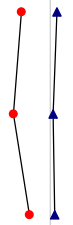
Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838939
E: 545636

Depth (ft)	Depth (m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		412.10		Ground Surface								
0	0	411.90		**Topsoil** Approximately 200 millimetres of topsoil.		SS	1	2 4 5 7	9			
3	1			**Sandy Silt** Brown, reworked in upper levels, trace to some clay, increasing clay content with depth, occasional gravel, loose to compact.		SS	2	1 3 3 5	6			
6	2	410.00				SS	3	3 5 7 9	12			
				End of Borehole								
10	3											
13	4											
16	5											
20	6											
23	7											
26	8											
29	9											

Moisture Content w%
10 20 30 40

Standard Penetration Test blows/300mm
20 40 60 80



NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 2.1 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 006

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4839162
E: 545871

Depth (ft)	Depth (m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		420.91		Ground Surface								
0	0	420.70		**Topsoil** Approximately 200 millimetres of topsoil.		SS	1	4 4 4 4	8			
1				**Sand** Brown, reworked in upper levels, trace rootlets, loose to compact.		SS	2	3 5 6 6	11			
2	1	419.40		**Sandy Silt** Brown, trace clay, increasing clay content with depth, loose to compact.		SS	3	5 6 6 7	12			
3						SS	4	3 4 4 4	8			
4		417.30				SS	5	5 11 10 15	21			
5				End of Borehole								
6	2											
7												
8	3											
9												
10												
11	4											
12												
13												
14												
15	5											
16												
17												
18												
19	6											
20												
21												
22												
23	7											
24												
25												
26	8											
27												
28												
29	9											

Moisture Content w%: 10 20 30 40

Standard Penetration Test blows/300mm: 20 40 60 80

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.6 metres.

2. Borehole was recorded as wet at depth of 2.0 metres, and caved to a depth of 2.4 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

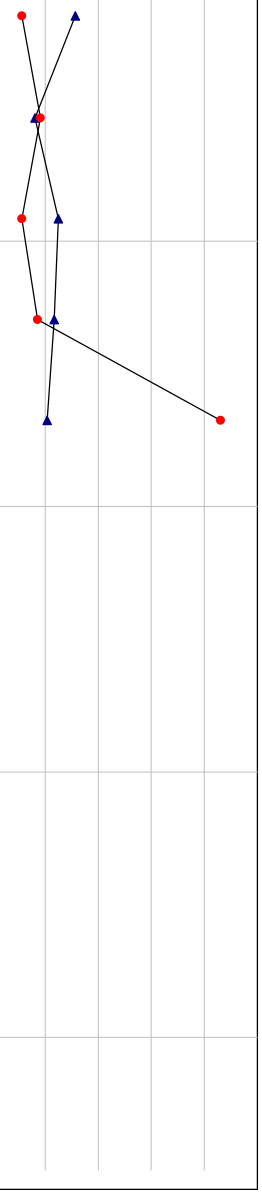
Log of Borehole No. 007

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838910
E: 546126

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	408.39	Ground Surface								
0 / 0	408.10	**Topsoil** Approximately 250 millimetres of topsoil.		SS	1	3 5 6 7	11			
3 / 1	406.90	**Sandy Silt** Brown, trace rootlets, trace clay, reworked in upper levels, increasing clay content with depth, compact.		SS	2	10 8 10 10	18			
6 / 2		**Clayey Silt** Brown, trace to some sand and gravel, stiff to hard.		SS	3	3 5 6 6	11		2.0	
9 / 3				SS	4	5 7 10 18	17		2.5	
11 / 3	404.70			SS	5	24 36 50/5"	100		>4.5	
12 / 4		End of Borehole								

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.0 metres.

2. Borehole was recorded as open and dry upon completion and backfilled as per Ontario Regulation 903.

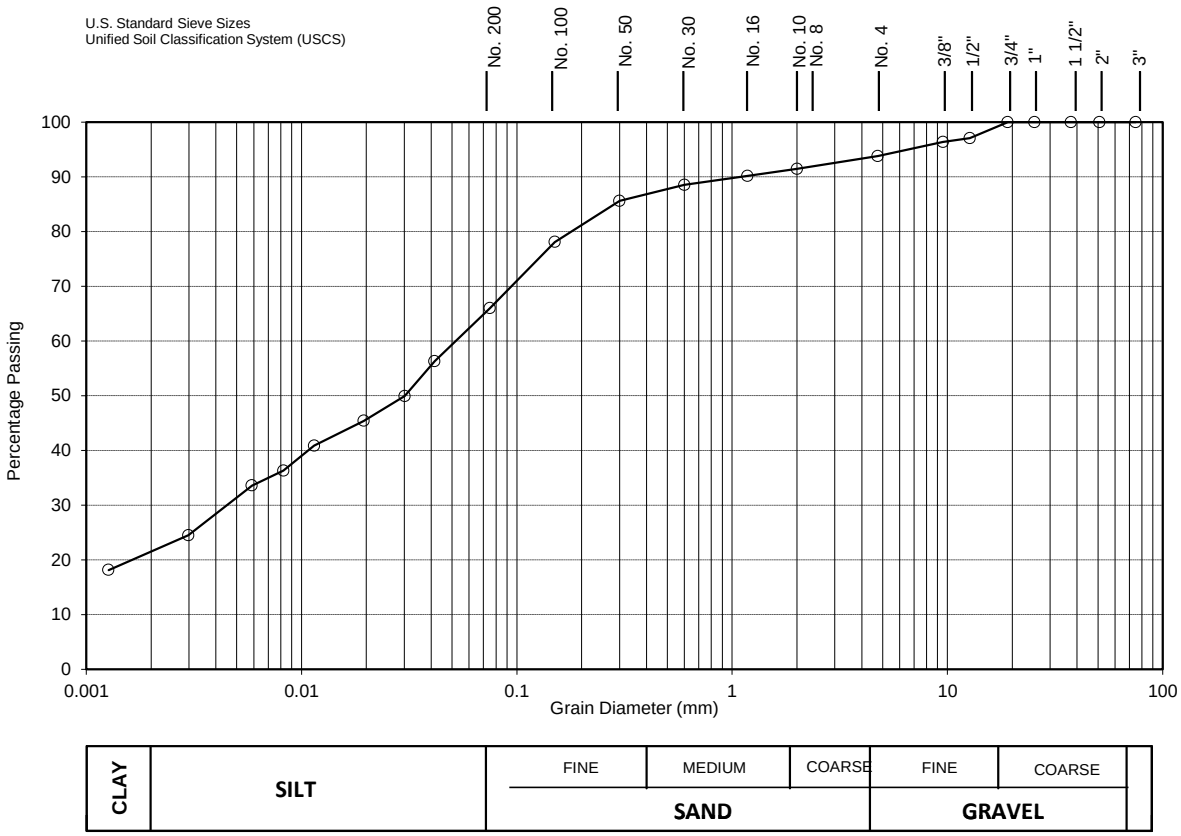
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Mechanical & Hydrometer Analyses



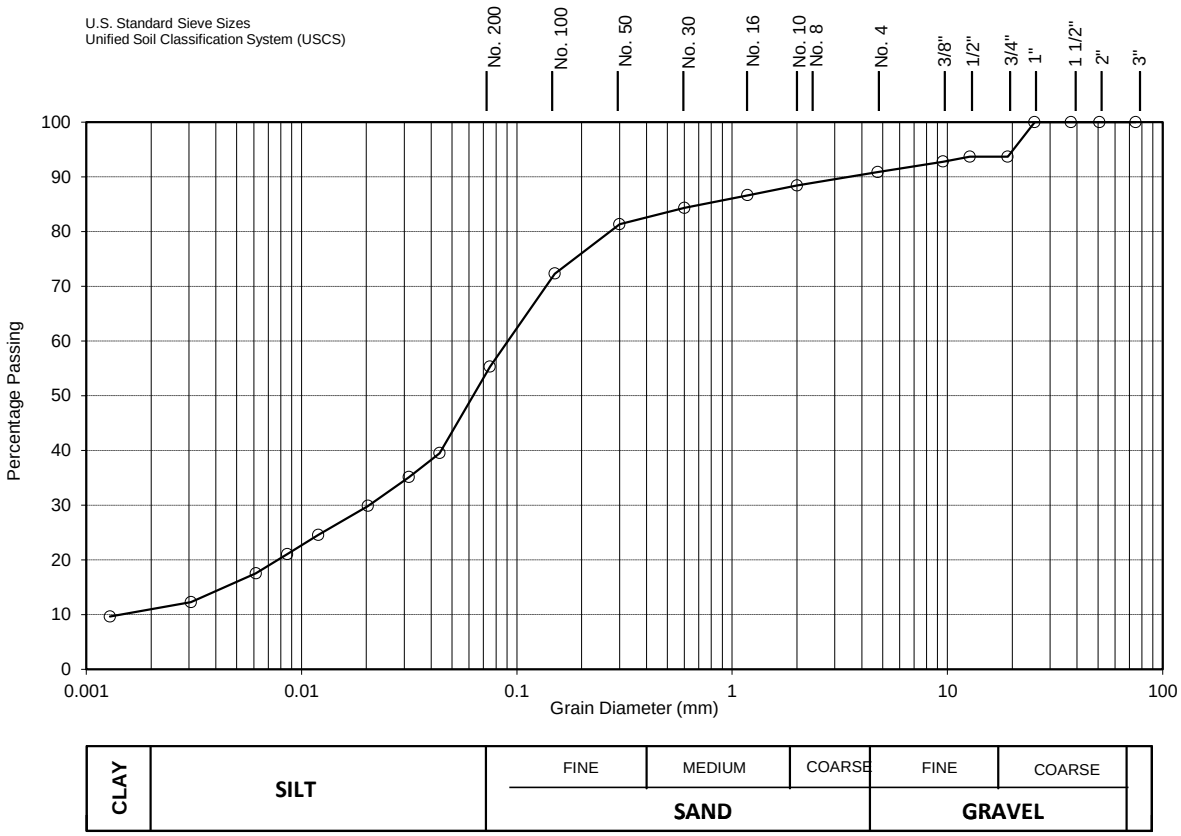
Lab No.:	**21-335**	Notes: Depth: 5'			
Sample No.:	**3**				
Borehole No.:	**2**				
CLAY [%]:	**22**	Soil Description:	**Brown Sandy Silt w/ some Clay and trace Gravel**		
SILT [%]:	**44**		**M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity**		
SAND [%]:	**28**				
GRAVEL [%]:	**6**	Estimated Infiltration Rate [mm/hr] :	**< 10**	Estimated Permeability, k [cm/s]	**10^{-7}**
D_{10} (Effective Diam. in mm):	**0.0005**	Coefficient of Uniformity C_U:	**102.0**	Coefficient of Curvature C_C:	**0.8**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Sideroad 15, Elora ON

August 2021	**Grain Size Analysis No. 1**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



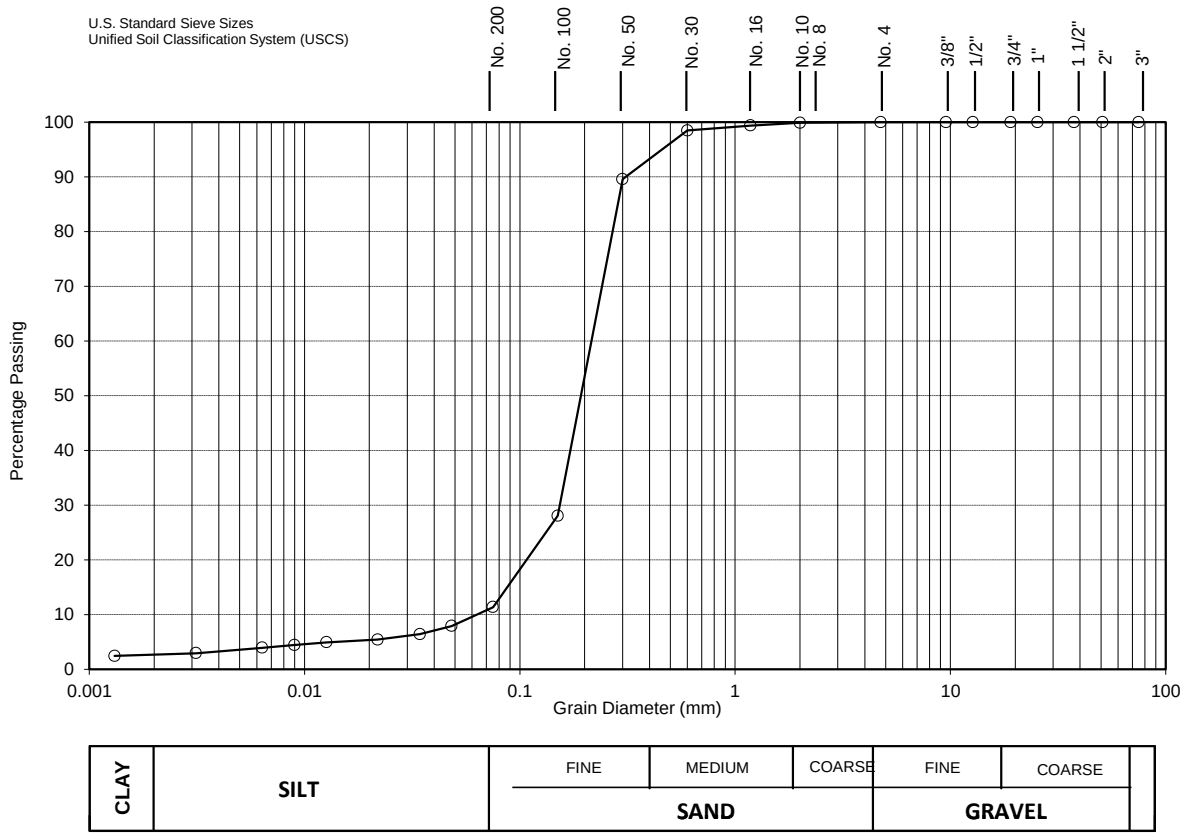
Lab No.:	**21-336**	Notes: Depth: 10'			
Sample No.:	**5**				
Borehole No.:	**4**				
CLAY [%]:	**11**	Soil Description:	**Brown Sandy Silt w/ some Clay and trace Gravel**		
SILT [%]:	**44**		**M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity**		
SAND [%]:	**36**				
GRAVEL [%]:	**9**	Estimated Infiltration Rate [mm/hr] :	**10 to 15**	Estimated Permeability, k [cm/s]	**10^{-6}**
D_{10} (Effective Diam. in mm):	**0.0015**	Coefficient of Uniformity C_U:	**60.0**	Coefficient of Curvature C_C:	**3.3**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Sideroad 15, Elora ON

August 2021	**Grain Size Analysis No. 2**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



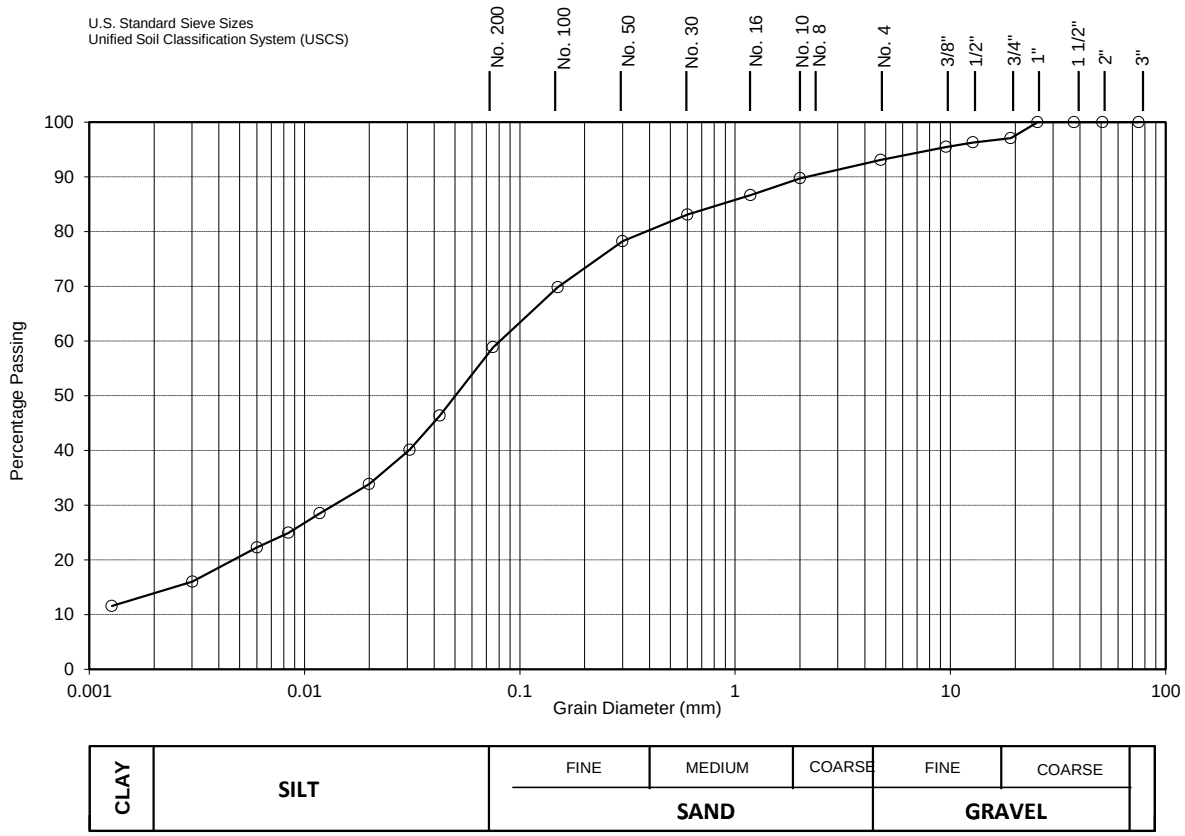
Lab No.:	**21-337**	Notes: Depth: 7.5'	
Sample No.:	**4**		
Borehole No.:	**5**		
CLAY [%]:	**2**	Soil Description: **Brown Sand w/ traces of Silt and Clay**	
SILT [%]:	**9**	**S.P. - Poorly graded sands, little or no fines**	
SAND [%]:	**89**		
GRAVEL [%]:	**0**	Estimated Infiltration Rate [mm/hr] : **100 to 150**	Estimated Permeability, k [cm/s] **10^{-3} to 10^{-2}**
D_{10} (Effective Diam. in mm):	**0.0600**	Coefficient of Uniformity C_U: **3.7**	Coefficient of Curvature C_C: **1.9**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

August 2021	**Grain Size Analysis No. 3**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



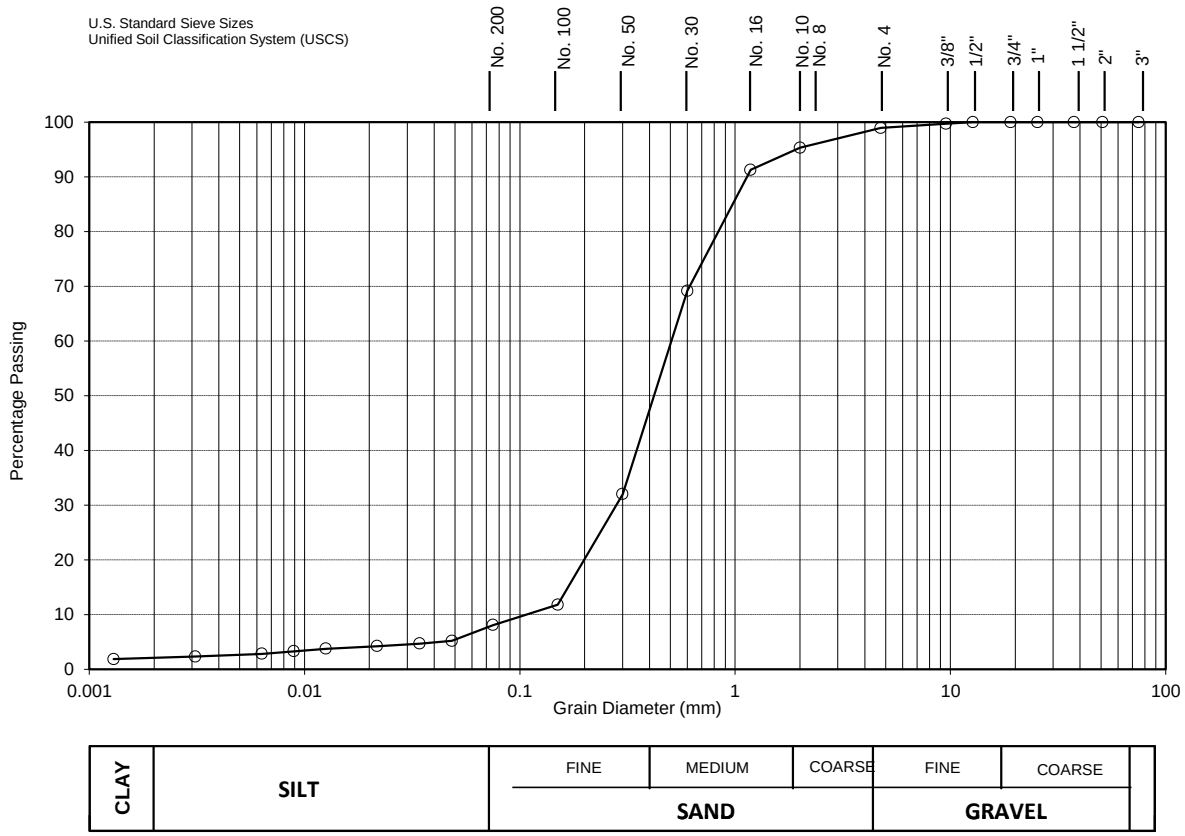
Lab No.:	**21-338**	Notes: Depth: 5'	
Sample No.:	**3**		
Borehole No.:	**7**		
CLAY [%]:	**14**	Soil Description: **Brown Sandy Silt w/ some Clay and trace Gravel**	
SILT [%]:	**45**	**M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity**	
SAND [%]:	**34**		
GRAVEL [%]:	**7**	Estimated Infiltration Rate [mm/hr] : **< 10**	Estimated Permeability, k [cm/s] **10^{-6}**
D_{10} (Effective Diam. in mm):	**0.00100**	Coefficient of Uniformity C_U: **80.0**	Coefficient of Curvature C_C: **2.1**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

August 2021	**Grain Size Analysis No. 4**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



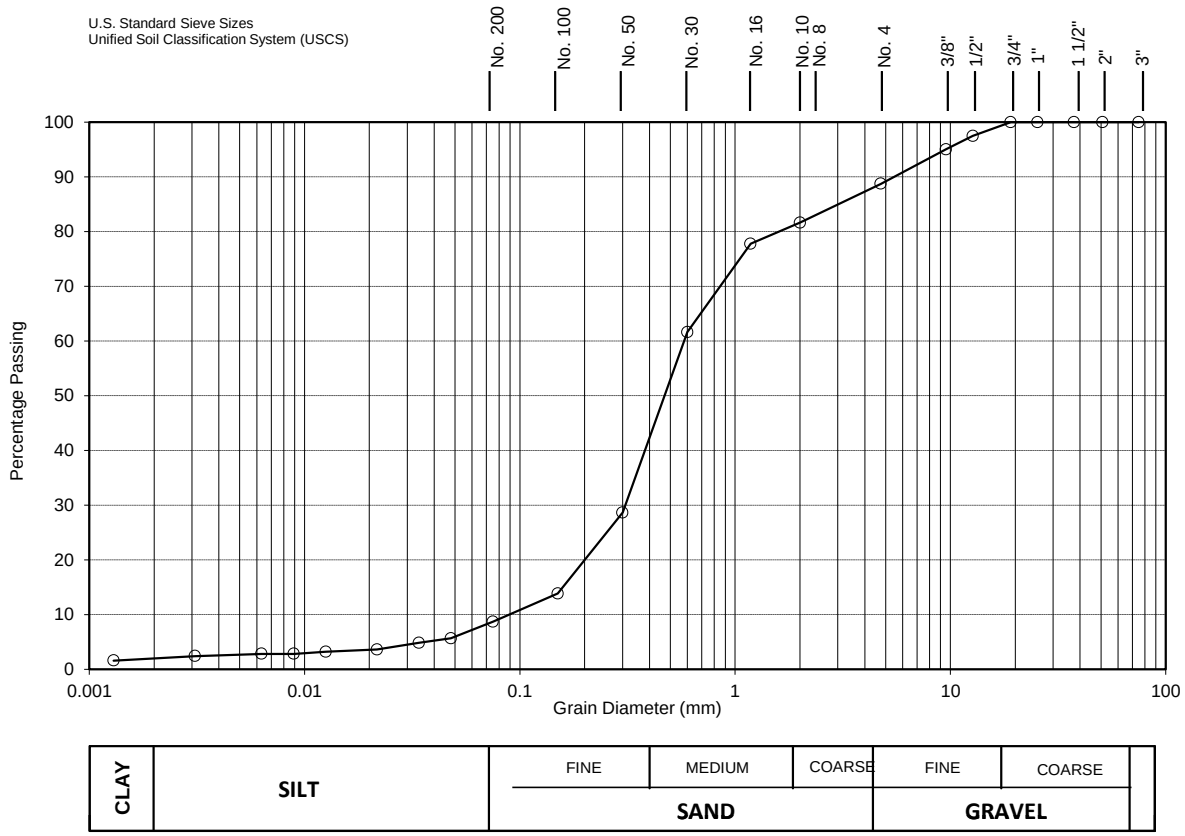
Lab No.:	**21-339**	Notes: Depth: 15'	
Sample No.:	**6**		
Borehole No.:	**8**		
CLAY [%]:	**2**	Soil Description: **Brown Sand w/ traces of Silt, Clay and Gravel**	
SILT [%]:	**6**	**S.P. - Poorly graded sands, little or no fines**	
SAND [%]:	**91**		
GRAVEL [%]:	**1**	Estimated Infiltration Rate [mm/hr] : **150 to 300**	Estimated Permeability, k [cm/s] **10^{-2}**
D_{10} (Effective Diam. in mm):	**0.10**	Coefficient of Uniformity C_U: **5.1**	Coefficient of Curvature C_C: **1.5**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

August 2021	**Grain Size Analysis No. 5**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



Lab No.:	**21-340**	Notes: Depth: 10'	
Sample No.:	**5**		
Borehole No.:	**10**		
CLAY [%]:	**2**	Soil Description: **Brown Sand w/ some Gravel and traces of Silt and Clay**	
SILT [%]:	**7**	**S.P. - Poorly graded sands, little or no fines**	
SAND [%]:	**80**		
GRAVEL [%]:	**11**	Estimated Infiltration Rate [mm/hr] : **150 to 300**	Estimated Permeability, k [cm/s] **10^{-2}**
D_{10} (Effective Diam. in mm):	**0.090**	Coefficient of Uniformity C_U: **6.6**	Coefficient of Curvature C_C: **1.8**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Sideroad 15, Elora ON

August 2021	**Grain Size Analysis No. 6**	**Project No.: SM 301951-T**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

www.soil-mat.ca info@soil-mat.ca TF: 800.243.1922

Hamilton: 130 Lancing Drive L8W 3A1 T: 905.318.7440 F: 905.318.7455
Milton: PO Box 40012 Derry Heights PO L9T 7W4 T: 800.243.1922

PROJECT NO.: SM 301951-G July 20, 2022

CACHET DEVELOPMENTS
361 CONNIE CRESCENT, SUITE 200
Concord, Ontario
L4K 5R2

Attention: Marcus Gagliardi
Development Planner

DRAFT HYDROGEOLOGICAL ASSESSMENT
PROPOSED RESIDENTIAL DEVELOPMENT
CLAYTON AND ELORA SANDS
ELORA, ONTARIO

Dear Mr. Gagliardi,

Further to your recent correspondence and discussions, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has prepared the following hydrogeological assessment based on the updated groundwater information to date. These comments are further to our Preliminary Geotechnical and Hydrogeological Investigation reports for the subject lands [SM 301951A-G and SM 301951B-G, dated October 14, 2021 and March 11, 2022], and recent discussions with the design team. As such, this hydrogeological report should be read in conjunction with our previous reports stated above. It is also noted that this report marks the completion of all of the proposed drilling fieldwork, and as such a new borehole numbering system has been implemented.

1. INTRODUCTION

We understand that the project will involve the construction of a residential development on the Clayton Lands located at 75 Woolwich Street East [Clayton Lands] in Elora, Ontario, along with potential future development on the Elora Sands [Elora Sands] to the east. The development details are to be established, but are anticipated to consist of single-family dwellings and townhouses along asphalt paved roadways, including the installation of associated underground municipal services. The purpose of this hydrogeological assessment is to provide additional and more detailed information and comments to support the assessment of site servicing options for the proposed development, from a geotechnical point of view.

2. PROCEDURE

Ten [10] and fifteen [15] sampled boreholes were advanced on the Clayton and Elora Sands respectively, totalling twenty-five [25] boreholes at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The boreholes were advanced using continuous flight power auger equipment between August 5, 2021 and April 18, 2022 under the direction and supervision of a staff member of SOIL-MAT ENGINEERS & CONSULTANTS LTD., to termination at depths of between approximately 2.1 and 8.2 metres below the existing ground surface.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of ASTM test specification D1586, Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the SOIL-MAT laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on all soil samples recovered from the borings. Selected samples were also subjected to laboratory grain size analyses to allow for an estimate of the hydraulic conductivity of the subsurface soils. It is noted that slug testing will be performed on a number of the monitoring wells to get a more accurate in-situ measurement of the hydraulic conductivity, results of which will be summarised in a subsequent supplemental report.

Upon completion of drilling, groundwater monitoring wells were installed at Borehole Nos. 004, 101, 102, 104, 201, 201A, 202, 203, 204, 205, 206, 301 through 305, and 401 to allow for the future monitoring of the groundwater level. The monitoring well consisted of 50-millimetre PVC pipe screened in the lower 1.5 to 3.0 metres. The monitoring wells were encased in well filter sand up to approximately 0.3 metres above the screened portion, then with bentonite ‘hole plug’ to the surface and fitted with a protective steel ‘stick up’ casing. The remaining boreholes were backfilled in general accordance with Ontario Regulation 903, and the ground surface was reinstated even with the surrounding grade. The depths screening intervals for each monitoring well has been summarized below.

Monitoring Well ID	Depth (m)	Screening Interval (m)
MW004	4.6	3.0 – 4.6
MW101	6.1	4.6 – 6.1
MW102	4.6	3.8 – 4.6
MW104	7.6	4.6 – 7.6
MW201	4.6	3.8 – 4.6
MW201A	3.0	2.2 – 3.0
MW202	6.1	4.6 – 6.1

Monitoring Well ID	Depth (m)	Screening Interval (m)
MW203	6.1	4.6 – 6.1
MW204	4.6	3.0 – 4.6
MW205	4.6	3.0 – 4.6
MW206	7.6	6.1 – 7.6
MW301	7.6	6.1 – 7.6
MW302	7.6	6.1 – 7.6
MW303	7.6	6.1 – 7.6
MW304	6.1	4.6 – 6.1
MW305	3.0	2.3 – 3.0
MW401	6.1	4.6 – 6.1

The boreholes were located in the field by representatives of SOIL-MAT ENGINEERS, based on accessibility over the site, clearance of underground utilities, and the drawing that was forwarded to our office. Best efforts were made to minimize crop damage by locating the majority of the boreholes to the perimeter of the fields. The ground surface elevation at all of the borehole locations with the exception of Borehole Nos. 301 through 307 have been referenced to a geodetic benchmark, described as North American 1983 CSRS, as per the survey plan completed by POI Aerial, dated August 10, 2021, which was provided to our office. The ground surface elevations at Borehole Nos. 301 through 307 have been linearly interpolated based on the topographic survey provided by BSR&D (Reference No. 21-14-573-00-topo) dated January 4, 2022 which was provided to our office. Once a complete topographic survey has been completed with up-to-date geodetic elevations of Borehole Nos. 301 through 307, this report will be updated.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Log of Borehole Nos. 001 to 007, 101 to 104, 201 to 206, 301 to 307, and 401, inclusive, following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed at the exact depths of geological change.

2. SUBSURFACE CONDITIONS

The subsurface are presented in detail in our referenced Preliminary Geotechnical Investigation report. To summarize, the soil conditions encountered on the Elora Sands generally consisted of a sandy silt/silty sand deposit in the upper levels with some areas and layers of clayey sandy silt till with depth. The soils encountered on the perimeter of the site were highly variable, often encountering layered deposits of clayey sandy silt till

or sand. Occasional deposits of gravelly sand were encountered within some of the boreholes. As such, the presence of permeable granular deposits or 'veins' should be expected across the site. In areas where the presence of a predominately clayey material is expected or would be beneficial, such as in the area of the proposed SWM pond, it may be prudent to advance a series of test excavations to confirm the condition of the subsurface soils including composition, groundwater conditions, suitability for use as an impermeable SWM pond liner, etc.

The Clayton Lands was generally characterised by an upper layer consisting of a clayey sandy silt till underlain by a sand deposit that extended to deep depths. Some isolated areas were encountered that contained a more impermeable clayey sandy silt till. Representative geological cross sections are illustrated in Drawing Nos. 3, 4 and 5, attached.

A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soils to be in areas noting to consist of stone-poor sandy silt to silty sand-textured till, ice-contact stratified deposits of sand and gravel, with minor silt and clay, as well as river deposits of coarse gravel. These conditions are consistent with the observations during drilling.

Grain size analyses were conducted on sixteen [16] selected samples of the native soils recovered from the boreholes. The results of this grain size testing can be found appended to the end of this report, and are summarized as follows:

TABLE A
GRAIN SIZE ANALYSES

Elora Sands							
Sample ID	Depth	% Clay	% Silt	% Sand	% Gravel	Hydraulic Conductivity, k [cm/s]	Estimated Infiltration Rate, [mm/hr]
BH003 SS3	1.5 m	22	44	28	6	10^{-7}	<10
BH004 SS5	3.0 m	2	7	80	11	10^{-2}	150 to 300
BH006 SS5	3.0 m	11	44	36	9	10^{-6}	10 to 15
BH201 SS2	1.5 m	5	17	76	2	10^{-4}	50
BH202 SS2	1.5 m	30	38	26	0	10^{-8}	<10
BH202 SS5	6.1 m	10	51	39	0	10^{-6}	10 to 15
BH203 SS2	1.5 m	3	17	37	43	10^{-4}	50 to 60
BH203 SS5	6.1 m	3	8	87	2	10^{-3}	125 to 150
BH204 SS2	1.5 m	16	34	30	20	10^{-7}	10
BH205 SS3	3.0 m	2	4	94	0	10^{-3}	150 to 300

Clayton Lands							
Sample ID	Depth	% Clay	% Silt	% Sand	% Gravel	Hydraulic Conductivity, k [cm/s]	Estimated Infiltration Rate, [mm/hr]
BH102 SS6	4.6 m	2	6	91	1	10^{-2}	150 to 300
BH103 SS3	1.5 m	14	45	34	7	10^{-6}	10
BH104 SS4	2.3 m	2	9	89	0	10^{-3} to 10^{-2}	100 to 150
BH302 SS2	1.5 m	2	3	95	0	10^{-2}	150 to 300
BH304 SS2	1.5 m	16	40	33	11	10^{-7}	10
BH305 SS2	1.5 m	7	16	77	0	10^{-4}	50 to 60

The field and laboratory testing demonstrate the native soils to generally consist of a sandy silt/clayey silt with some clay and traces of gravel in the upper levels, transitioning to a highly permeable sand with traces of clay, silt, and gravel at depth. According to the Unified Soil Classification System (USCS), the soils are classified as M.L. – inorganic silts and very fine sands, clayey silts with slight plasticity in the upper levels overlying S.P. – poorly graded sands, with little to no fines to S.M. – Sand-silt mixtures at depth.

The clay and silt soils would generally behave as a cohesive material with slight to medium plasticity, and low hydraulic conductivity, on the order of 10^{-6} to 10^{-7} cm/sec, and would be of low permeability to effectively impermeable. The on-site clayey soils would generally be considered suitable for use as an impermeable clay liner for the stormwater management (SWM) pond, however should be confirmed with more specific testing and assessment, and would require selecting sorting to separate out from more sandy deposits. Further testing should be conducted within the area of the proposed stormwater management pond [SWM] in order to confirm the suitability of the clayey material for use as an impermeable liner.

The sand deposit would tend to yield a highly permeable characteristic. Provided that the low impact development (LID) stormwater management systems are located within the highly permeable sand deposits, the hydraulic conductivity for this material would be on the order of 10^{-2} to 10^{-4} cm/sec yielding infiltrations rates in the range of 50 to 300 mm/hr. LID systems such as rear yard catch basins, infiltration swales, etc. will be highly effective within the permeable sand soils and will be able to help with natural groundwater recharge as well as maintain pre and post development runoff volumes, specifically on the Clayton Lands. As noted previously, slug testing is slated to be performed within a number of the monitoring wells across the site to yield a more accurate estimate of the hydraulic conductivity of the native soils. Once available,

information on the location of these LID systems should be forwarded to our office in order to target specific areas with the slug testing.

Groundwater Observations

Borehole Nos. 006, 102, and 004 were noted to have 'caved' to depths of between approximately 2.4 to 3.8 metres and 'wet' at depths of between approximately 2.0 to 3.4 metres, while Borehole No. 104 was noted to be open and 'wet' at a depth of 7.0 metres upon completion. Borehole Nos. 103 and 001 were noted to have cave to depths of 2.7 and 1.5 metres, respectively, and dry upon completion. The remainder of the boreholes were noted as being open and 'dry' [i.e. no free groundwater present] upon completion of drilling. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes.

As noted above, monitoring wells were installed at Borehole Nos. 004, 101, 102, 104, 201, 201A, 202, 203, 204, 205, 206, 301 through 305, and 401, to allow for future measurements of the static groundwater level. A data logger was in each of the monitoring wells to allow for continuous monitoring of the groundwater level between August 2021 to June 2022, the readings of which have been illustrated in graphs which can be found appended to the end of this report.

In addition, manual monitoring well readings were also taken from all of the installed monitoring well locations across the site on various dates, ranging from August 2021 to June 2022. These have been summarized in the following charts:

TABLE B
SUMMARY OF MANUAL GROUNDWATER READINGS (ELORA SANDS)

Borehole No. 004 (Ground Surface Elevation of 405.55 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	2.74	402.8
August 27, 2021	1.75	403.8
February 23, 2022	1.33	404.2
April 22, 2022	1.47	404.1
June 1, 2022	1.78	403.8

Borehole No. 201 (Ground Surface Elevation of 404.80 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.69	402.1
April 22, 2022	1.88	402.9
June 1, 2022	2.44	402.4

Borehole No. 201A (Ground Surface Elevation of 404.75 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	Dry	<401.8
April 22, 2022	2.05	402.7
June 1, 2022	2.43	402.3

Borehole No. 202 (Ground Surface Elevation of 406.59 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	5.5	401.1
April 22, 2022	4.76	401.8
June 1, 2022	5.43	401.2

Borehole No. 203 (Ground Surface Elevation of 407.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	Dry	<401.0
April 22, 2022	5.90	401.2
June 1, 2022	5.91	401.2

Borehole No. 204 (Ground Surface Elevation of 409.56 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.81	406.7
April 22, 2022	1.16	408.4
June 1, 2022	1.53	408.0

Borehole No. 205 (Ground Surface Elevation of 412.99 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.56	410.4
April 22, 2022	2.25	410.7
June 1, 2022	2.39	410.6

Borehole No. 206 (Ground Surface Elevation of 412.88 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	6.83	406.1
April 22, 2022	4.60	408.3
June 1, 2022	4.66	408.2

Borehole No. 401 (Ground Surface Elevation of 420.91 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
April 22, 2022	2.29	418.6
June 1, 2022	2.39	418.5

TABLE C
SUMMARY OF MANUAL GROUNDWATER READINGS (CLAYTON LANDS)

Borehole No. 101 (Ground Surface Elevation of 408.60 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	4.78	403.8
August 27, 2021	4.71	403.9
October 14, 2021	4.33	404.3
February 23, 2022	4.31	404.3
April 22, 2022	4.07	404.5
June 1, 2022	4.15	404.5

Borehole No. 102 (Ground Surface Elevation of 414.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	3.58	410.6
August 27, 2021	3.61	410.5
October 14, 2021	3.62	410.5
February 23, 2022	3.50	410.6
April 22, 2022	2.89	411.2
June 1, 2022	3.05	411.1

Borehole No. 103 (Ground Surface Elevation of 414.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	6.78	408.1
August 27, 2021	6.96	407.9
October 14, 2021	7.09	407.8
February 23, 2022	6.83	408.0
April 22, 2022	6.13	408.7
June 1, 2022	6.28	408.6

Borehole No. 301 (Ground Surface Elevation of 412.75 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	6.29	406.5
April 22, 2022	5.65	407.1
June 1, 2022	5.71	407.0

Borehole No. 302 (Ground Surface Elevation of 413.00 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	6.62	406.4
April 22, 2022	6.06	406.9
June 1, 2022	6.12	406.9

Borehole No. 303 (Ground Surface Elevation of 414.00 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	5.40	408.6
April 22, 2022	6.04	407.9
June 1, 2022	6.11	407.9

Borehole No. 304 (Ground Surface Elevation of 407.90 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	2.87	405.0
April 22, 2022	2.60	405.3
June 1, 2022	2.96	404.9

Borehole No. 305 (Ground Surface Elevation of 408.60 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	Dry	<405.6
April 22, 2022	Dry	<405.6
June 1, 2022	Dry	<405.6

*Ground surface elevations have been interpolated based on contours from current topographic survey

The available data to date presented above illustrates a variable groundwater level, ranging from about 3 to 6 metres (elevations of between 407 to 411 metres) below the existing ground surface at Borehole Nos. 102, 104, 301, 302, and 303, at the southern half of the Clayton Lands, with the highest groundwater levels during the wet spring months. The groundwater drops to the southwest and to the north, as illustrated on Drawing No. 2, Groundwater Contour Map. The groundwater level drops to ranges of between 3 to 4 metres (elevations of between 404.5 to 405.3 metres) below the existing ground surface at the northern limits of the Clayton Lands. Based on the visual data displayed within the groundwater graphs, the data indicates a relatively stable groundwater level with small fluctuations between the 'wet' and 'dry' months of the year. This can be attributed to highly permeable fine to coarse grained sand and silty sand deposits within the southern half of the Clayton lands. The groundwater level within Borehole No. 304 was noted to be higher in comparison to the other wells, however may be more susceptible to precipitation, resulting in 'perched deposits' of water within the

more permeable above the clayey soils. The groundwater was noted to be deepest on the southern portion of the Clayton Lands, where the soil conditions at the borehole conditions generally indicated more permeable sandy soils until termination. The groundwater was shallowest at the northern portion of the Clayton lands, generally following the physical topography. Where encountered within the boreholes, the clayey deposits would tend to 'trap' the water within the low permeable layer and present a high groundwater condition than would otherwise be found within areas of permeable sandy soils. The manual readings gathered in April 2022 would be considered representative of a seasonal 'high'

The groundwater data gathered on the Elora Sands to date indicate a groundwater level on the order of 1.2 to 4.6 metres (elevations of between 408.5 to 410.7 metres) below the existing ground surface at Borehole Nos. 204, 205, and 206, predominantly located south of the landing strip within the farmer's field. The groundwater drops to the east towards a tributary of the Irvine Creek [also identified as Nichol Drain] with a groundwater elevation of between 402.8 to 404.2 metres measured manually periodically within Borehole No. 004 from August 2021 to June 2022. The groundwater level drops to the north as well towards Nichol Road 15 and where the storm water management pond is proposed. The groundwater level at this location is noted to be stabilizing at an elevation of between roughly 401 to 403 metres. The magnitude of fluctuations demonstrated within these areas are on the order of approximately 2 metres, according to the groundwater data graphs and may be attributed to the soil conditions, which is noted to be more layered.

It is also noted that the groundwater levels and elevations would tend to vary with the elevation changes across the site, which varies significantly. As such, it would be prudent to advance a series of test pits or additional boreholes across the site, specifically in the areas of notably higher groundwater levels and areas of large excavations for deeper services or pumping stations, in order to assess first hand how the groundwater will affect the excavations during site earthworks and servicing.

The direction of groundwater flow has been inferred from these groundwater levels, and has been illustrated on the groundwater contour map Drawing No. 2, Groundwater Contour Map. The direction of groundwater is locally flowing towards the Irvine Creek to the north and west on the Clayton Lands. The groundwater is flowing towards the tributary of the Irvine Creek [Nichol Drain] on the east side of the Elora Sands and to the north towards the Irvine Creek on the west side of the site. As such, the shallow groundwater is contributing to the base flow to the Nichol Drain. Best efforts should be exercised to maintain the overall natural drainage as part of the site grading, stormwater management plan and water balance across the site.

The subsurface soil and groundwater conditions described above are illustrated in the attached geological cross sections, Drawing Nos. 3, 4 and 5.

3. HYDROGEOLOGICAL SETTING AND WATER WELL STUDY

A review of available information, including water well records within an approximate 250 metre radius, was undertaken to inform the hydrogeological setting of the subject lands.

3.1.1 METHODS

Information was compiled for this hydrogeological assessment from sources including:

- Topographic, Bedrock Geology, and Soils maps.
- Ministry of Environment, Conservation and Parks [MOE] Water Well Records.
- Site visit of the property and review of adjacent lands.
- Site specific geotechnical investigation program involving a series of boreholes.

3.1.2 LIMITATIONS AND CONDITIONS

Information for this study was compiled from geological maps and well records for water wells drilled in the study area. Water well locations are approximated in well records using the UTM coordinate system and in some instances may be in error by more than 50 metres. Potential for mapping error therefore exists in correlation of well registration numbers with street addresses. Soils and bedrock descriptions in the well records are limited and generalized regarding formation lithology. Stratigraphic interpretation in this report is based on information from water well records, topographic maps, Paleozoic Geology maps of the area, and geotechnical investigations performed by SOIL-MAT ENGINEERS in the area.

3.2.1 GEOLOGY – OVERBURDEN SOIL

Local soils identified in the Ministry of Northern Development and Mine's "Quaternary Geology of Ontario, Southern Sheet Map M2556" are described predominantly as a silt to sandy silt 'till'. This is consistent with our geotechnical investigation, which found the overburden soils to consist primarily of sandy silt with some areas of sand with trace silt. Grain size analyses of representative soil samples yielded clay content in the range of 2 to 22 percent, silt content of 6 to 45 percent, sand content of 28 to 91 percent, and gravel content of 0 to 11 percent.

3.2.2 GEOLOGY – BEDROCK

Bedrock in the in the vicinity of the Site is recorded from the Ministry of Northern Development and Mine's "Bedrock Geology of Ontario, Southern Sheet Map M2344," as Limestone and Dolostone of the Guelph Formation. The depth to bedrock, as reported

in MOE water well records for wells in the proximity of the Site, is on the order of approximately 0.3 to 22.6 metres below ground surface.

3.2.3 GROUNDWATER CONDITIONS

The referenced geotechnical investigation for the site provides an estimate of the static groundwater level at approximately 2 to 7 metres below the existing grade. This is consistent with our experience on other nearby development projects. It is noted that the groundwater conditions within the overburden soils would be influenced by prevailing weather conditions and would experience seasonal fluctuation.

3.2.4 WATER WELL INVENTORY

MOE water well records revealed forty-four [44] wells located within an approximate 250 metre radius of the limits of the Site. The location of these available well records is illustrated in the attached Drawing No. 3. The water well records [https://www.ontario.ca/environment-and-energy/map-well-records] locations are approximated in well records using the UTM co-ordinate system and in some instances may be in error by more than 50 metres. Potential for mapping error therefore exists in correlation of well registration numbers with street addresses. Soils and bedrock descriptions in the well records are limited and generalized regarding formation lithology.

It is understood that the existing residential properties to the west and north are privately serviced with water wells or cisterns and septic systems, with the existing residential properties to the south and east are serviced with municipal water, storm and sanitary sewers.

The data contained in the water well records suggests that there are two [2] predominant aquifers in the Study Area, one which is considered a confined aquifer within the limestone bedrock at an estimated depth between 17.7 to 79.0 m bgs, with an average static water level of 11.3m. The other is an unconfined aquifer within the sandy silt, situated at an estimated depth between 2 and 7 m bgs. Data contained in MOE Water Well Records for forty-four [44] water wells within the *Study Area* are presented for statistical observations in Table A below.

The information gathered from the records indicates the following:

- Ground water was encountered as shallow as 17.7 metres below ground surface [“m bgs”] and as deep as 79.0 m bgs, with an average depth of 52.5 m bgs during the well drilling.
- Static water levels varied from 0.3 to 41.2 m bgs, with an average static level of 11.3 m bgs, and;
- The Pressure Head varied from 13.4 to 71.0 metres with an average of 41.2 metres.
- Recommended available pumping rates ranging between 3.5 and 25 gpm.
- The water bearing formation lithology reported in the majority of the wells was within the limestone bedrock.

Table 1: Water Well Records – Statistical Observations

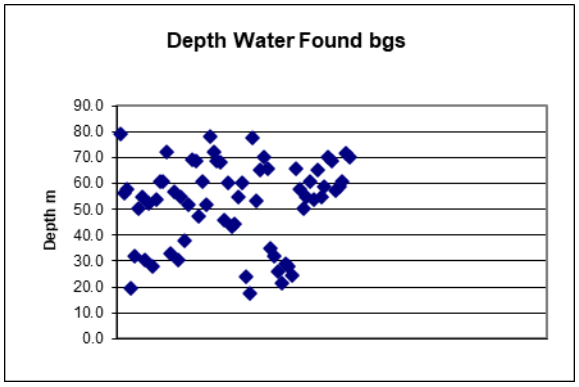
Part Lots 15-17 **Total wells =**
Concessions 8-10 **44**

Surface Elevation		Depth found bgs		Elevation found		Static depth bgs		Static Elevation		Pressure Head
fasl	masl	fasl	masl	fasl	masl	ft	m	fasl	masl	m
1380	420.7	*259*	79.0	*1121*	341.8	*26*	7.9	*1354*	412.8	71.0
1380	420.7	*184*	56.1	*1196*	364.6	*65*	19.8	*1315*	400.9	36.3
1358	414.0	*189*	57.6	*1169*	356.4	*20*	6.1	*1338*	407.9	51.5
1355	413.1	*64*	19.5	*1291*	393.6	*5*	1.5	*1350*	411.6	18.0
1350	411.6	*104*	31.7	*1246*	379.9	*23*	7.0	*1327*	404.6	24.7
1320	402.4	*165*	50.3	*1155*	352.1	*57*	17.4	*1263*	385.1	32.9
1300	396.3	*180*	54.9	*1120*	341.5	*47*	14.3	*1253*	382.0	40.5
1300	396.3	*100*	30.5	*1200*	365.9	*30*	9.1	*1270*	387.2	21.3
1300	396.3	*172*	52.4	*1128*	343.9	*53*	16.2	*1247*	380.2	36.3
1298	395.7	*91*	27.7	*1207*	368.0	*30*	9.1	*1268*	386.6	18.6
1305	397.9	*176*	53.7	*1129*	344.2	*30*	9.1	*1275*	388.7	44.5
1314	400.6	*200*	61.0	*1114*	339.6	*35*	10.7	*1279*	389.9	50.3
1314	400.6	*200*	61.0	*1114*	339.6	*135*	41.2	*1179*	359.5	19.8
1314	400.6	*237*	72.3	*1077*	328.4	*55*	16.8	*1259*	383.8	55.5
1315	400.9	*108*	32.9	*1207*	368.0	*36*	11.0	*1279*	389.9	22.0
1300	396.3	*186*	56.7	*1114*	339.6	*48*	14.6	*1252*	381.7	42.1
1290	393.3	*100*	30.5	*1190*	362.8	*35*	10.7	*1255*	382.6	19.8
1295	394.8	*180*	54.9	*1115*	339.9	*60*	18.3	*1235*	376.5	36.6
1300	396.3	*125*	38.1	*1175*	358.2	*20*	6.1	*1280*	390.2	32.0
1325	404.0	*170*	51.8	*1155*	352.1	*30*	9.1	*1295*	394.8	42.7
1335	407.0	*227*	69.2	*1108*	337.8	*50*	15.2	*1285*	391.8	54.0
1335	407.0	*226*	68.9	*1109*	338.1	*44*	13.4	*1291*	393.6	55.5
1335	407.0	*155*	47.3	*1180*	359.8	*66*	20.1	*1269*	386.9	27.1
1335	407.0	*200*	61.0	*1135*	346.0	*45*	13.7	*1290*	393.3	47.3
1330	405.5	*170*	51.8	*1160*	353.7	*46*	14.0	*1284*	391.5	37.8
1330	405.5	*257*	78.4	*1073*	327.1	*73*	22.3	*1257*	383.2	56.1
1330	405.5	*237*	72.3	*1093*	333.2	*33*	10.1	*1297*	395.4	62.2
1325	404.0	*225*	68.6	*1100*	335.4	*89*	27.1	*1236*	376.8	41.5
1325	404.0	*223*	68.0	*1102*	336.0	*61*	18.6	*1264*	385.4	49.4
1325	404.0	*150*	45.7	*1175*	358.2	*27*	8.2	*1298*	395.7	37.5
1325	404.0	*198*	60.4	*1127*	343.6	*47*	14.3	*1278*	389.6	46.0
1325	404.0	*142*	43.3	*1183*	360.7	*38*	11.6	*1287*	392.4	31.7
1350	411.6	*145*	44.2	*1205*	367.4	*39*	11.9	*1311*	399.7	32.3
1345	410.1	*180*	54.9	*1165*	355.2	*57*	17.4	*1288*	392.7	37.5
1345	410.1	*198*	60.4	*1147*	349.7	*53*	16.2	*1292*	393.9	44.2
1340	408.5	*78*	23.8	*1262*	384.8	*4*	1.2	*1336*	407.3	22.6
1325	404.0	*58*	17.7	*1267*	386.3	*1*	0.3	*1324*	403.7	17.4
1325	404.0	*255*	77.7	*1070*	326.2	*23*	7.0	*1302*	397.0	70.7

1315	400.9	*175*	53.4	*1140*	347.6	*24*	7.3	*1291*	393.6	46.0
1320	402.4	*214*	65.2	*1106*	337.2	*19*	5.8	*1301*	396.6	59.5
1310	399.4	*230*	70.1	*1080*	329.3	*15*	4.6	*1295*	394.8	65.5
1305	397.9	*215*	65.5	*1090*	332.3	*22*	6.7	*1283*	391.2	58.8
1305	397.9	*114*	34.8	*1191*	363.1	*1*	0.3	*1304*	397.6	34.5
1310	399.4	*105*	32.0	*1205*	367.4	*23*	7.0	*1287*	392.4	25.0
1305	397.9	*85*	25.9	*1220*	372.0	*6*	1.8	*1299*	396.0	24.1
1310	399.4	*70*	21.3	*1240*	378.0	*26*	7.9	*1284*	391.5	13.4
1310	399.4	*95*	29.0	*1215*	370.4	*22*	6.7	*1288*	392.7	22.3
1315	400.9	*91*	27.7	*1224*	373.2	*14*	4.3	*1301*	396.6	23.5
1315	400.9	*81*	24.7	*1234*	376.2	*35*	10.7	*1280*	390.2	14.0
1315	400.9	*215*	65.5	*1100*	335.4	*24*	7.3	*1291*	393.6	58.2
1310	399.4	*190*	57.9	*1120*	341.5	*30*	9.1	*1280*	390.2	48.8
1305	397.9	*165*	50.3	*1140*	347.6	*24*	7.3	*1281*	390.5	43.0
1310	399.4	*179*	54.6	*1131*	344.8	*20*	6.1	*1290*	393.3	48.5
1320	402.4	*200*	61.0	*1120*	341.5	*34*	10.4	*1286*	392.1	50.6
1320	402.4	*176*	53.7	*1144*	348.8	*30*	9.1	*1290*	393.3	44.5
1320	402.4	*214*	65.2	*1106*	337.2	*43*	13.1	*1277*	389.3	52.1
1315	400.9	*180*	54.9	*1135*	346.0	*38*	11.6	*1277*	389.3	43.3
1305	397.9	*193*	58.8	*1112*	339.0	*40*	12.2	*1265*	385.7	46.6
1305	397.9	*230*	70.1	*1075*	327.7	*39*	11.9	*1266*	386.0	58.2
1315	400.9	*225*	68.6	*1090*	332.3	*34*	10.4	*1281*	390.5	58.2
1305	397.9	*188*	57.3	*1117*	340.5	*26*	7.9	*1279*	389.9	49.4
1310	399.4	*192*	58.5	*1118*	340.9	*30*	9.1	*1280*	390.2	49.4
1310	399.4	*200*	61.0	*1110*	338.4	*77*	23.5	*1233*	375.9	37.5
1325	404.0	*235*	71.6	*1090*	332.3	*35*	10.7	*1290*	393.3	61.0
1325	404.0	*230*	70.1	*1095*	333.8	*44*	13.4	*1281*	390.5	56.7
		Avg.=	*52.5*	Avg.=	*350.1*	Avg.=	*11.3*	Avg.=	*391.3*	*41.2*
		SdevP=	*16.2*	SdevP=	*16.3*	SdevP=	*6.6*	SdevP=	*8.4*	*14.6*

Water bearing formation

Formation	#	%
Overburden	0	0
Bedrock	44	100



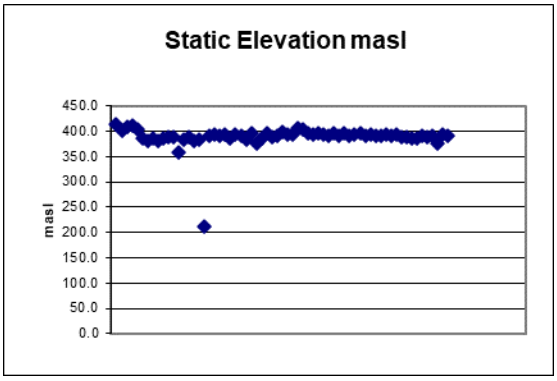


Table D – MOE Water Well Record Statistical Observations

The term aquifer here generally refers to a geologic unit(s) or formation permeable enough to yield economic quantities of water to wells. The term aquitard refers to a geologic unit(s) or formation with insufficient permeability to supply production wells. Aquifers and aquitards are interpreted here based on statistical observation of data contained in the MOE water well records. Hydrographs of water levels are normally not kept for private wells, therefore historical fluctuations in water levels are not known.

3.3 HYDROGEOLOGICAL SETTING

Based on the available information the following comments can be made:

- There are two [2] predominant aquifers in the Study Area, one which is considered a confined aquifer within the limestone bedrock at an estimated depth between 17.7 to 79.0 m bgs, with an average static water level of 11.3m. The other is an unconfined aquifer within the sandy silt, situated at an estimated depth between 2 and 7 m bgs.;
- In each case the aquifer within the limestone bedrock exhibited a positive pressure head [i.e., the static water level is above the elevation where the groundwater was encountered] in each well record, indicating the aquifer was under confined artesian conditions with respect to the confining layer.
- Pressure head (hydraulic head above aquifer) ranged from 13.4 to 71.0 metres with an average of 41.2 metres;
- Recommended available pumping rates ranging between 3.5 and 25 gpm.

Given the above, any active potable water wells in the area would be at greater depths as drilled bedrock wells. Such wells would be drawing water from within the limestone bedrock aquifer. The overburden soils consist of primarily sand and silty sands, with less permeable clayey silt. The shallow groundwater condition on the site is typical of an unconfined near surface aquifer, which would be influenced by seasonal weather conditions, drainage, and the presence of variable more permeable seams in the overburden soils.

4. EARTHWORKS AND SITE GRADING OPERATIONS

Based on the provided preliminary grading plan forwarded to our office by MTE (Project No. 50250-100, F16-FG.dwg) dated April 7, 2022 some cut and fill on the order of 2 to 4 metres will take place. Despite the moderate cut and fill operations, the preliminary grading plan has taken into consideration the groundwater elevations across this parcel of land, such that fill operations will take place on the northern portion of the site where groundwater was noted to be highest and cut operations in the middle and south portions of the site, where groundwater was observed to be deepest. It would be expected that natural surface drainage would result in pooling of water in low spots across the site, which are noted to be within the areas of fill. The predominantly sandy soils on the Clayton Lands will promote natural infiltration and will make site servicing easier, provided that contractors work their way from the low end of the site to the high end of the site.

At this time a preliminary site servicing and grading plan for the Elora Sands has not been provided to our office, as the potential development of those lands is a future

consideration. However, the existing topography of this parcel of land contains larger undulations and changes in elevations. Therefore, it is anticipated that the cut and fill operations for this parcel of land will require more significant regrading. It is recommended that the cut/fill operations be handled in a similar manner as the Clayton Lands, such that fill operations take place where groundwater is shallowest at the northern portion of the site and cut operations take place where the deepest groundwater was encountered at the southern end of the site. As noted above, the Elora Sands generally consists of sandy silt/silty sand within the upper levels, transitioning to a clayey sandy silt with depth, however is more variable at times with clayey or gravelly deposits. As such, 'perched' water deposits within the permeable seams may yield 'wet' excavated material. Contractors should anticipate difficulties with base stabilisation and engineered fill works when work is conducted during the 'wet' times of the year. It is recommended that where possible, earthworks be conducted during the dry summer months. Where engineered fill occurs during the 'wet' times of the year, considerable delays and challenges in achieving effective compaction associated with wet soil conditions may be incurred and should be anticipated. It may be necessary to spread a thin lift of wet backfill to 'air dry' for several days or more if engineered fill is undertaken during the 'wet' times of the year.

5. HYDROGEOLOGICAL CONSIDERATIONS

As noted above, it is understood that the development is anticipated to consist of single-family dwellings and townhouse blocks, including the installation of associated underground municipal services along asphalt paved roadways. Excavations for the proposed development services are expected to extend to depths of up to approximately to 2 to 5 metres below the existing ground surface, while excavations for foundations would be expected to extend up to approximately 1.5 to 2 metres. Measurements of the groundwater level at the monitoring well locations indicate a groundwater level on the order of approximately 2 to 7 metres below the existing ground surface, generally 3.5 to 7 metres over the Clayton lands presently proposed for development. The groundwater level is shallower to the east, approaching the Irvine Creek tributary [Nichol Drain], generally following the drop in topography toward the creek. As the conditions consisted mostly of the permeable sand on the Clayton Lands, the groundwater level between the 'wet' and 'dry' seasons of the year was relatively consistent with little to no fluctuation. These conditions, with relatively permeable soil conditions at depth, and groundwater at sufficient depth, are well suited to proposed development. The generally permeable condition of the native sand deposit present over the site will generally allow for natural drainage and movement of groundwater. As such, it is not considered likely that service trenches would present any conflict or impact to the natural groundwater conditions.

The exception might be deeper trunk sewers, which would warrant closer assessment as the detailed design proceeds.

Shallower groundwater was observed on the Elora Sands at the northern portion of the site where more clayey and gravelly deposits were encountered, as noted above. These deposits are likely to trap and create a 'perched' water condition which may exacerbate the infiltration of groundwater into open excavations, however would likely be able to be handled with conventional dewatering methods and techniques. Furthermore, the fluctuations in groundwater level were higher on the Elora Sands as the soils conditions encountered within the boreholes consisted of more clayey deposits.

The short-term excavations for the proposed servicing are generally anticipated to extend through the permeable sandy soils and into the clayey sandy silt till where deeper excavations are required. Where the site calls for the placement of engineered fill, raising the grade, it would create an even larger separation between the groundwater table and the proposed servicing and foundation construction. Excavations would be expected to be subject to relatively minor groundwater infiltration, such that it should be possibly to adequately control such infiltration using conventional construction dewatering techniques such as pumping from sumps in the base of the excavation. However, during wet times of year and in deeper excavations, some instability of the excavations should be expected. In the event that deeper excavations are required below the groundwater level or where more permeable sand and gravel seams are encountered, a greater rate of infiltration should be anticipated, requiring multiple pumps and possibly more sophisticated dewatering techniques for deeper excavations.

The rate of dewatering would be a function of the time of year, depth of excavation, length of trench opened by the contractor, etc. In most cases it is expected to be below 50,000 L/day, though for deeper excavations may be as much as up to 400,000 L/day. Where dewatering rates of greater than 50,000 L/day are anticipated it would be necessary to file an EASR notice for construction dewatering. However, it is not anticipated that dewatering would be greater than 400,000 L/day, and so the need for a permit to take water [PTTW] is not expected. As noted above, the advancement of a number of test pits, would be prudent to assist in refining the anticipated construction dewatering requirements as the design of the site grading and servicing proceeds.

The layering of sandy and clayey soils encountered specifically on the Elora Sands would allow for some natural drainage and movement of groundwater, however given the high silt content this should not be solely relied upon. As such, excavations may have the potential to intercept shallow groundwater on parts of the site and thus create a "French Drain" within the bedding material, with possible affect to the groundwater.

Consequently, if groundwater is encountered during digging of the service trenches, measures may need to be implemented to mitigate/eliminate groundwater interference. These would include clay cut-offs within the service trench fill encasing the pipe/service. Such clay cut-offs should be installed in accordance with OPSD 80.095, using a suitable clay soil or alternatively a blend of 1 part bentonite chips to 3 parts OPSS Granular A, or suitably clayey soil encountered on site. The need for such measures is best assessed as the detailed design proceeds, and in the field during construction. Regardless, any such locally lowering of the groundwater associated with site servicing would be limited to the near surface soils, and would not be expected to significantly impact the regional groundwater conditions.

Excavations for the proposed basement levels should be well above the groundwater level, pending review of the final site grading plans and foundation depths, along with more detailed assessment such as test pits in the area of observed shallow groundwater levels. With proper consideration to the site grading and design founding elevations, it is not anticipated that foundation excavations would require ongoing groundwater control, other than typical perimeter weeping tile and sump pumps.

The final grading of the site should appropriately consider the groundwater levels in order to minimise or avoid conflict or impact to the groundwater during pre and post construction. In this regard the grading and storm water management plan should accommodate surface runoff that follows the existing overall drainage patterns as much as possible.

It is also noted that the use of Low Impact Design [LID] methods as part of the stormwater management for the proposed development would be viable for much of the site and should be considered. The permeable sand deposit predominantly on the Clayton Lands, above the groundwater level, would afford an opportunity for natural infiltration of surface runoff, such as in 'dry' ponds, infiltration galleries, rear yard infiltration swales or galleries, etc. As noted above, the sand deposit would have hydraulic conductivity on the order of 10^{-2} to 10^{-3} cm/sec, correlating to design infiltration rates on the order of 100 to 300 mm/hr. The use of infiltration systems could be readily utilised for lot level infiltration of rain water from downspouts, and also within the overall SWM plan. The soil conditions on the Elora Sands are more variable and contain more clayey deposits which are considered to have a low permeability characteristic. Preliminary grain size analyses on the clayey sandy silt till indicate a hydraulic conductivity on the order of 10^{-6} to 10^{-8} cm/sec, correlating to design infiltration rates on the order of less than 10 to 15 mm/hr. As such, LID systems aren't recommended where areas of clayey sandy silt till are encountered [generally the lower areas of the site, towards the tributary to Irvine Creek] but should be considered in areas consisting

of the more permeable sandy deposits [generally the higher portions of the site, to the south]. This would be better addressed during the detailed design process, supported with the advancement of test pits at specific locations proposed for LID measures. It is noted that single well response testing will be performed in a number of the monitoring wells installed which will allow for a more accurate estimate of the hydraulic conductivity for the various soil layers.

Based on our observations and details of the proposed development, it is not anticipated that the proposed construction will have an adverse impact on the groundwater condition in the area, provided the comments and recommendations provided in this report are adhered to. There is not expected to be a significant or long-term impact on the development, such as ongoing dewatering, etc., provided the above discussion and recommendations are considered in the site grading, servicing and stormwater design.

As outlined above, the hydrogeological setting of the site is such that potable wells in the area would be drawing from a deep confined bedrock aquifer, and would be largely unaffected by potential construction activities encountering the shallow near surface groundwater regime. Construction of the proposed development would involve relatively shallow excavations only, with limited interaction with the shallow groundwater regime, and would not have an impact on deeper supply aquifers. As such, there would be no anticipated negative impact from the proposed development on nearby potable wells, including municipal supply wells. Further, as the proposed development would be provided with municipal water supply, there would be no impact to potential supply aquifers or associated water wells in the area, if any.

It is noted that the subject lands are within a Wellhead Protection Area (WHPA). However, based on the comments noted above, there will be no anticipated negative impact with respect to the deep bedrock aquifer serving as the potable supply source for private and municipal potable wells within the area.

6. STORMWATER MANAGEMENT (SWM) POND DESIGN CONSIDERATIONS

As noted above, the static groundwater level at the northern portion of the Elora Sands is on the order of 0.5 to 4.5 metres below the existing ground surface, at a relative elevation of roughly 403 to 401 metres, based on the available groundwater data to date. The groundwater charts for the monitoring wells at these locations have illustrated the large fluctuations that are experienced during the ‘wet’ and ‘dry’ seasons of the year. At this time the design details of the proposed SWM pond proposed at the north edge of the Elora Sands are not known, however it is anticipated that the pool will have a

permanent pool elevation near the observed groundwater level, and the use of an impermeable liner would be expected to be required.

In general, where the permanent pool elevation is below the static groundwater elevation, it will be necessary to provide a low permeability layer over the base of the pond to resist the infiltration of natural groundwater, and of sufficient weight to resist the hydrostatic uplift pressures. Conversely, where the permanent pool elevation is above the static groundwater level, a low permeability liner will be required to prevent the exfiltration of water out of the pond. This could be accomplished through the use of a compacted clay liner, or with a weighed down proprietary liner system, etc. The weight of the liner system would have to exceed the uplift pressure of the ground water during the most severe periods of the year, likely when maximum storage is required. In approximate terms for example, one metre of clay liner, or equivalent, would be required for about every two meters of water storage below static ground water level, i.e., when the water level in the pond is 2 metres below the static ground water table, the clay liner would have to be at least one metre thick; if 3 metres below the static level, then 1.5 metres thick, etc.

Where the permanent pool elevation is below the static groundwater elevation, it will be necessary to provide a low permeability layer over the base of the pond to resist the infiltration of natural groundwater, and of sufficient weight to resist the hydrostatic uplift pressures. Conversely, where the permanent pool elevation is above the static groundwater level, a low permeability liner will be required to prevent the exfiltration of water out of the pond. This could be accomplished through the use of a compacted clay liner, or with a weighed down proprietary liner system, etc. The weight of the liner system would have to exceed the uplift pressure of the ground water during the most severe periods of the year, likely when maximum storage is required. In approximate terms for example, one metre of clay liner, or equivalent, would be required for about every two meters of water storage below static ground water level, i.e., when the water level in the pond is 2 metres below the static ground water table, the clay liner would have to be at least one metre thick; if 3 metres below the static level, then 1.5 metres thick, etc. It is recommended that best efforts be made to design the static pool elevation close to the static groundwater elevation so that the natural seasonal fluctuations of the groundwater elevation dictate the permanent pool elevation. This would eliminate the need to construct a weighted liner to resist the hydrostatic uplift pressures of the static groundwater elevation. That being said, this would only work if the former solution could be achieved whilst attaining the required water storage volume for the development.

An impermeable compacted clay liner would consist of a sufficiently plastic clay soil, with a recommended minimum clay content of 20 per cent and plasticity index of 7. Based on the current laboratory testing of the native soils, the majority of the clayey silt soils are generally suitable for use as an impermeable liner for the proposed SWM ponds, however any sandy deposits or silt material encountered should be selectively sorted and separated from its distinctly different counterpart to avoid use of the more permeable material. As such, during site grading and servicing activities, it would be prudent to stockpile such clayey soil near the area of the proposed SWM pond for use as such an impermeable liner. Additional testing may then be conducted on the stockpiled material, to confirm its suitability for use as an impermeable clay liner.

As noted above, the clayey soils encountered might be suitable for use as an impermeable clay liner but would require additional testing on at the specific location of the SWM pond. The base of the SWM pond may be prepared by scarifying or 'discing' in the upper perhaps 0.3 to 0.5 metres to destroy any natural layering structure, moisture conditioned to within -2 to +4 per cent of its optimum moisture content, and recompacted in place, however the soils present at the proposed base of the SWM pond should be confirmed. In the event that an imported clayey soil is required for use as an impermeable liner, the clay liner should be placed in nominal lifts of 300 millimetres, sufficiently worked and moisture conditions as noted above, and compacted to 95 per cent of its SPMDD. It is noted as well, regardless of the provision of an impermeable liner, the sides of the pond should be well worked or scarified to destroy any natural layers or seams, specifically any more permeable sandy or gravely seams. Where such layers are encountered, a layer of available on-site clayey soil should be placed and compacted, as outlined above, to restrict the natural infiltration of groundwater into the pond through these more permeable horizontal seams.

Alternatively, weighed down proprietary liners could be considered, however the suppliers of such materials (such as Layfield, Terrafix, Suprema) would have to be consulted for recommendations on the appropriate product and installation methods for the site conditions. Such artificial liners would not require compaction efforts and could be weighed down with practically any available soil or granular material.

Interior pond slopes beneath the permanent pool elevation should be limited to inclinations no steeper than 4 horizontal to 1 vertical, with interior slopes above permanent pool elevation and exterior slopes no steeper than 3 horizontal to 1 vertical. Should steeper slopes be required, it will be necessary to provide some form of stabilisation such as the placement of coarse 'rip rap' stone, or proprietary product such as Turfstone or Cable-Crete, or construction as a reinforced earth embankment. It is recommended that all interior pond slopes be provided with at least some form of

nominal stabilisation/protection to control loss erosion/loss of ground. Above the pond level this may consist of appropriate vegetation.

Material utilised in construction of pond slopes must be free of significant organic deposits, construction debris, or any other deleterious materials which would affect stability of the pond walls. Our office should be retained to review any imported material to the site, as well as to provide quality control services during construction.

It is also noted that appropriate care and effort will be required by the contractor around inlet and outlet structures to ensure the impermeable liner is continuous and avoid the potential of 'piping'. In this regard the clay liner should be completely constructed prior to the installation of inlet/outlet structures. A bentonite clay material could be utilised within the fill around any structures to provide a continuous impermeable seal.

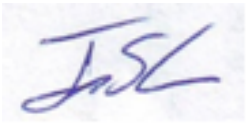
7. GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.

Scott Wylie, B.Eng., EIT.



Ian Shaw, P. Eng., QP_{ESA}
Senior Engineer

Enclosures: Drawing No. 1, Borehole Location Plan
Drawing No. 2, Groundwater Contour Map
Drawing No. 3, Water Well Records
Drawing Nos. 4, 5 and 6, Geologic Cross Sections
Log of Borehole Nos. 001 to 007, 101 to 104, 201 to 206, 301 to 307 and 401, inclusive
Grain Size Analyses

Distribution: Cachet Developments [pdf]

LEGEND

- Borehole Location — BH#
- Monitoring Well Location — MW#
- Geological Cross Section Location

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301591-G.

2. Borehole and monitoring well locations are approximate.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
Proposed Residential Development
7581 Nichol Road 15
Elora, Ontario

Borehole Location Plan

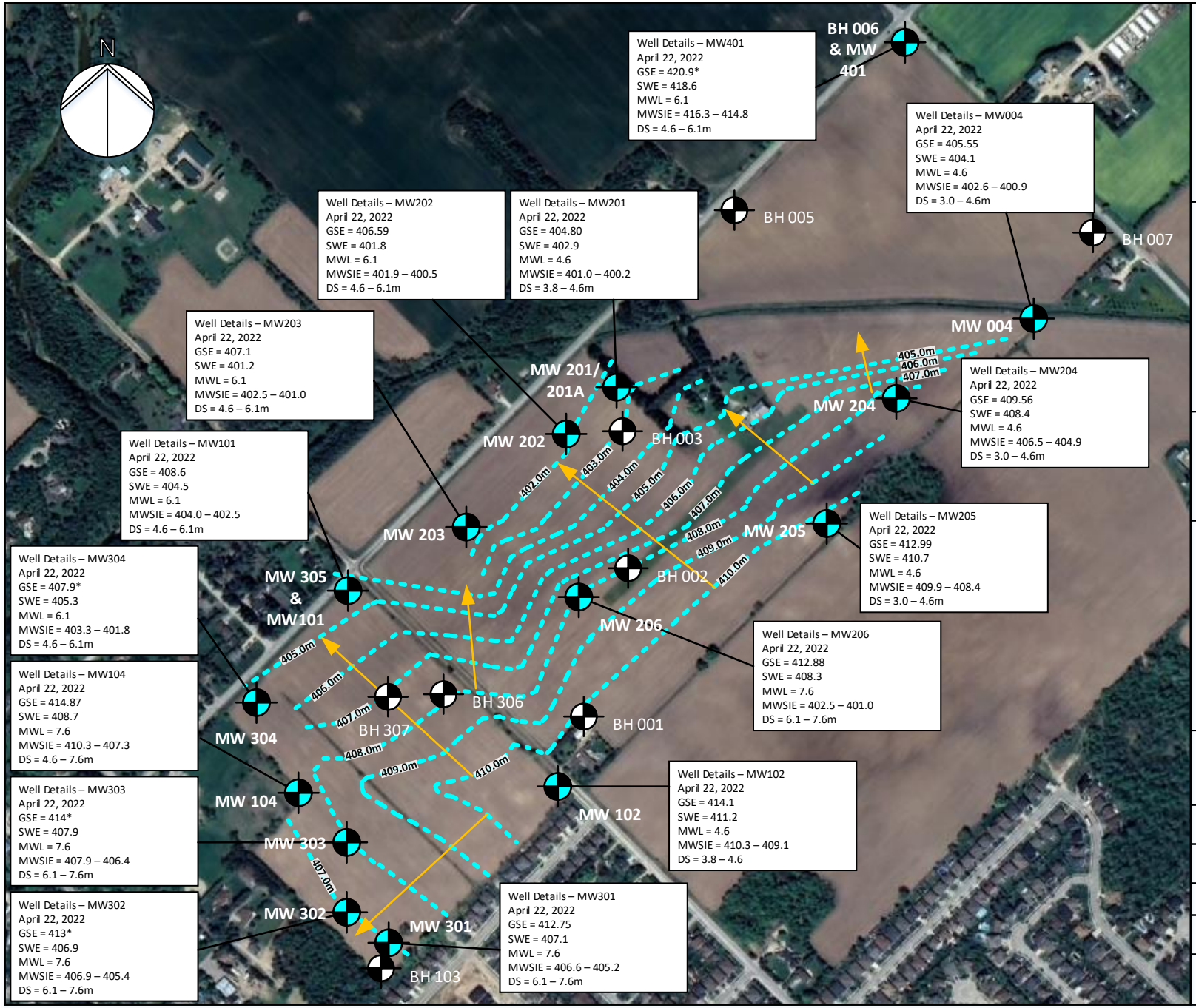
Project No. SM 301591-G

Date: June 2022

Drawn: SW | Checked: IS

SM 301591-G Borehole Location Plan

Drawing No. 1



LEGEND

Monitoring Well Location

MW#

GSE = Monitoring Well Ground Surface Elevation
SWE = Static Water Elevation [taken on April 22, 2022]
MWL = Monitoring Well Length
MWSIE = Monitoring Well Screen Interval Elevation
DS = Depth of Screen

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301591-G.

2. Borehole and monitoring well locations are approximate.

*GSE interpolated between contour lines from topographic survey

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
Proposed Residential Development
7581 Nichol Road 15
Elora, Ontario

Groundwater Contour Map

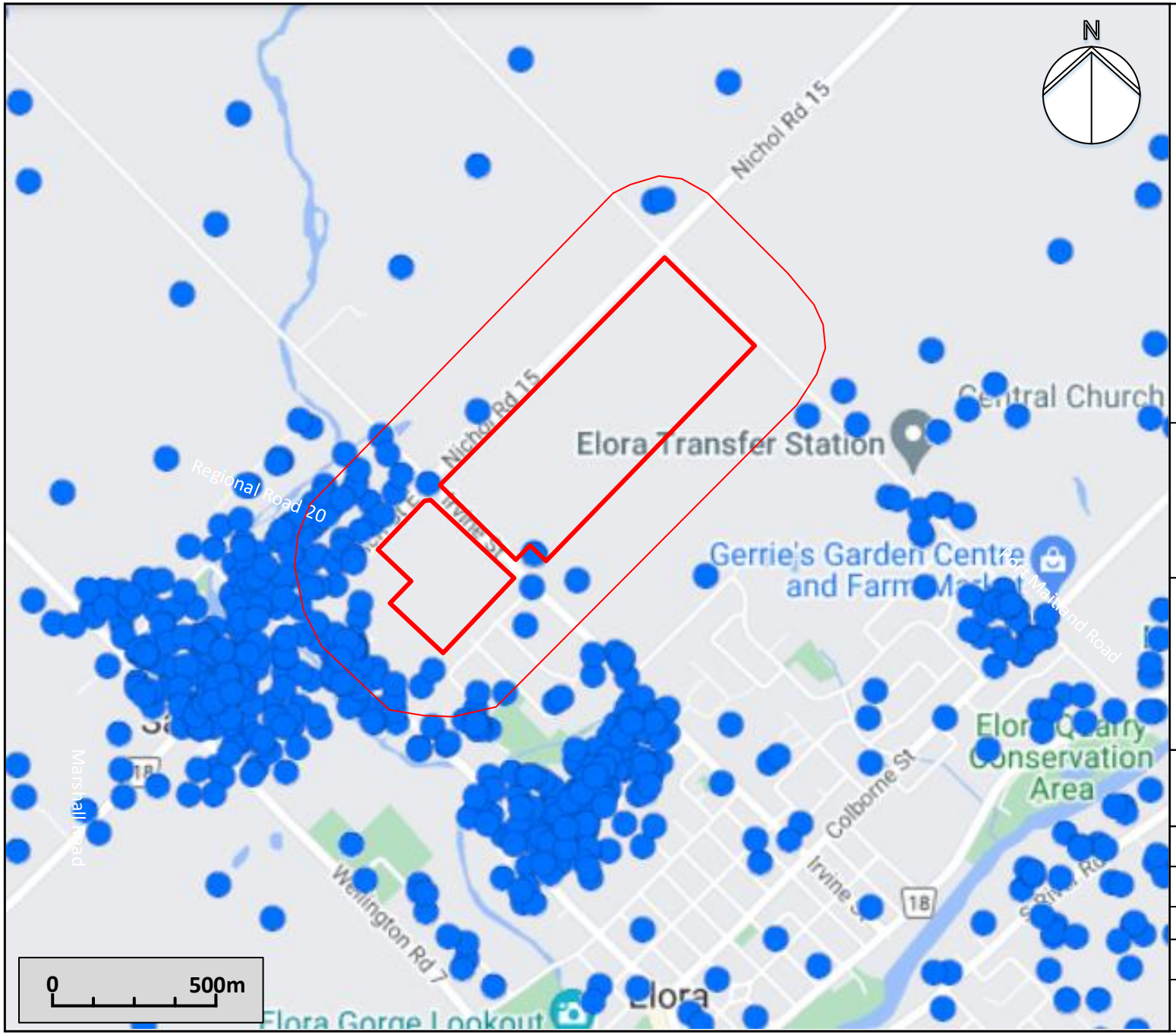
Project No. SM 301591-G

Date: June 2022

Drawn: SW | Checked: IS

SM 301591-G Groundwater Contour Map

Drawing No. 2



LEGEND

= Site

= Well Record

= Study Area

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Groundwater Well Survey
Proposed Residential Development
Nichol & Clayton Lands
Elora, Ontario

Ministry of the Environment
Water Well Records Plots

Project No. SM 302951-E

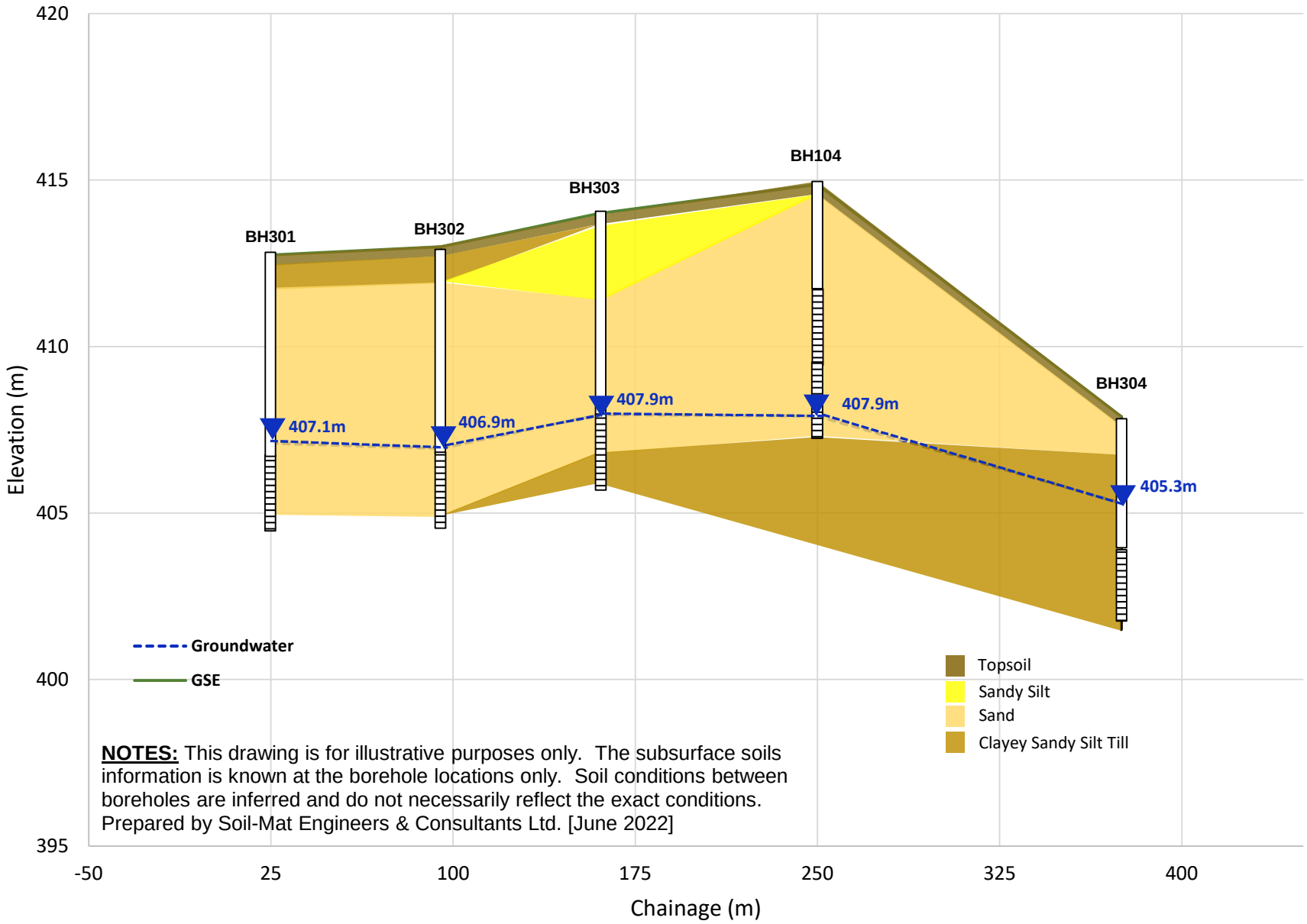
Date: July 2022

Drawn: PM | Checked: IS

SM 302951-E Water Well Records

Drawing No. 3

Geological Cross Section A-A

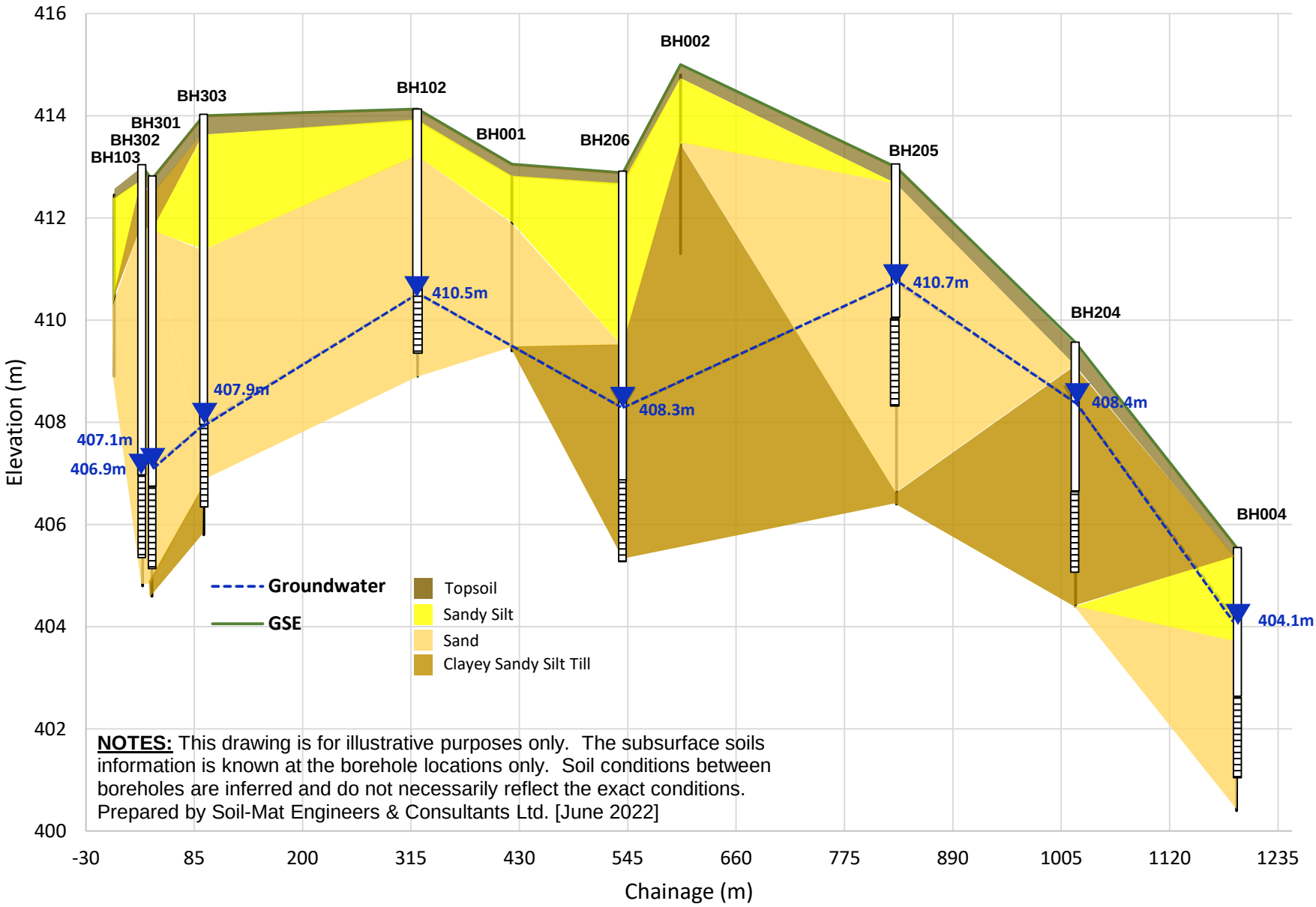


NOTES: This drawing is for illustrative purposes only. The subsurface soils information is known at the borehole locations only. Soil conditions between boreholes are inferred and do not necessarily reflect the exact conditions.
Prepared by Soil-Mat Engineers & Consultants Ltd. [June 2022]

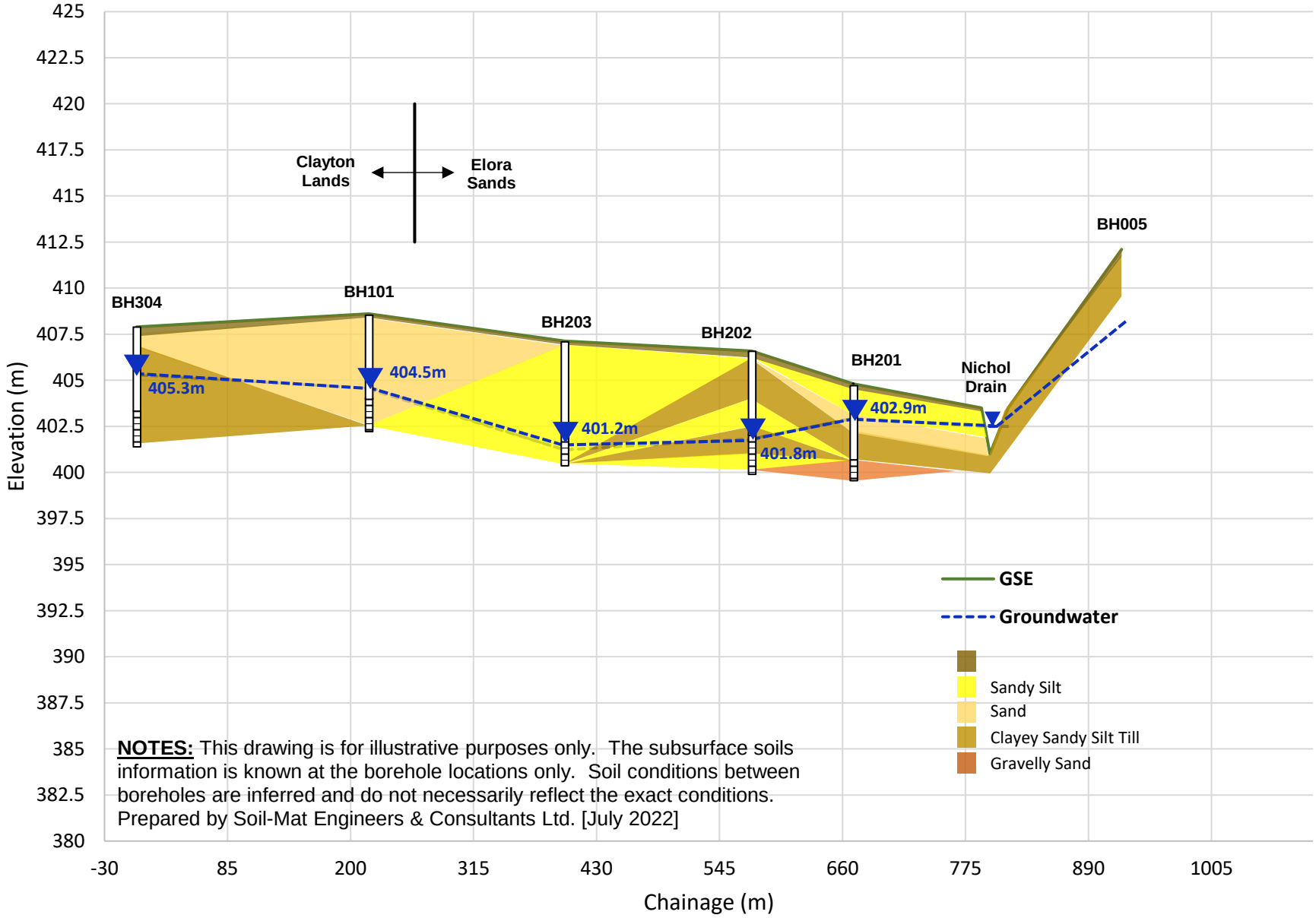
Drawing No. 4

Project No. SM 301951-G

Geological Cross Section B-B



Geological Cross Section C-C



NOTES: This drawing is for illustrative purposes only. The subsurface soils information is known at the borehole locations only. Soil conditions between boreholes are inferred and do not necessarily reflect the exact conditions.
Prepared by Soil-Mat Engineers & Consultants Ltd. [July 2022]

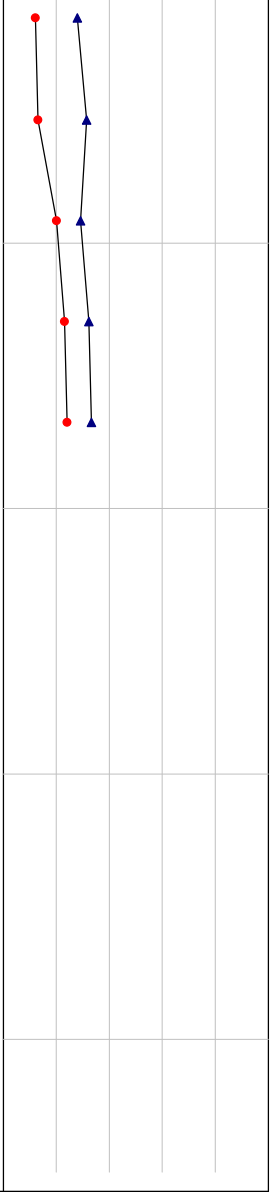
Log of Borehole No. 001

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838268
E: 545454

Depth (ft / m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
	413.05		Ground Surface								
0 / 0	412.80		**Topsoil** Approximately 250 millimetres of topsoil.		SS	1	4 5 7 6	12			
3 / 1	411.90		**Sandy Silt** Brown, trace clay, trace gravel, reworked in upper levels, compact.		SS	2	6 7 6 6	13			
			Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, compact.		SS	3	5 8 12 14	20			
					SS	4	12 10 13 10	23			
11 / 3	409.40				SS	5	6 11 13 15	24			
12 / 4			End of Borehole								

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.

2. Borehole was recorded as dry and caved to a depth of 1.5 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 6, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 002

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838469
E: 545516

Depth (ft)	Depth (m)	Elevation (m)	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		415.00	Ground Surface								
0	0	414.80	**Topsoil** Approximately 250 millimetres of topsoil.		SS	1	2 4 4 5	8			
3	1	413.50	**Sandy Silt** Brown, reworked in upper levels, trace clay, silt, and gravel, loose.		SS	2	4 3 6 8	9			
6	2	412.50	**Clayey Sandy Silt Till** Brown, trace to some gravel, stiff to very stiff.		SS	3	6 6 6 7	12		3.5	
9	3	411.30	Transition to grey.		SS	4	3 7 6 7	13		4.0	
12	4		End of Borehole		SS	5	9 7 15 18	22		>4.5	

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.7 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: EC
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 003

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838652
E: 545505

Depth (ft / m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)	Moisture Content w% (10 20 30 40) / Standard Penetration Test blows/300mm (20 40 60 80)
0 ft / 0 m	409.93		Ground Surface									
0	409.93		**Topsoil** Approximately 150 millimetres of topsoil.		SS	1	4 6 10 8	16				
1			**Sand** Brown, reworked in upper levels, trace clay, silt, and gravel, compact.		SS	2	6 10 10 7	20				
2	408.10				SS	3	6 8 10 11	18				
2	407.80		**Clayey Sandy Silt Till** Brown, trace to some gravel, compact.									
			End of Borehole									

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 2.1 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 6, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 004

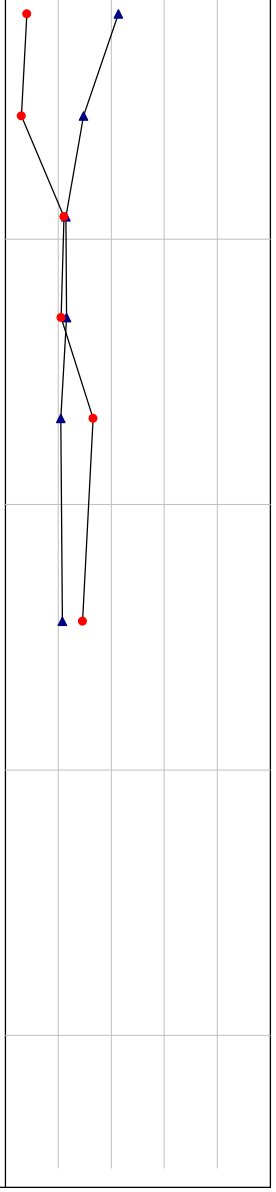
Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838792
E: 546044

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		405.55	Ground Surface							
0	0	405.35	**Topsoil** Approximatelty 200 millimetres of topsoil.							
1			**Sandy Silt** Brown, trace to some clay, trace gravel, reworked in upper levels, loose.	SS	1	2 3 5 6	8			
2										
3	1			SS	2	4 3 3 5	6			
4										
5										
6		403.70	**Sand** Brown, trace clay, silt, and gravel, medium to coarse gradation, wet, compact to dense.	SS	3	8 10 12 15	22			
7	2									
8				SS	4	8 10 11 10	21			
9										
10	3			SS	5	8 10 23 30	33			
11										
12										
13	4									
14										
15		400.70								
16	5	400.40	Transition to grey.	SS	6	3 11 18 23	29			
17			End of Borehole							
18										
19										
20	6									
21										
22										
23	7									
24										
25										
26	8									
27										
28										
29	9									

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 5, 2021 to termination at a depth of 5.2 metres.

2. Borehole was recorded as open and 'wet' at a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

August 6, 2021 - 2.74 metres below ground surface.

August 27, 2021 - 1.75 metres below ground surface.

February 23, 2021 - 1.33 metres below ground surface.

April 22, 2022 - 1.47 metres below ground surface.

June 1, 2022 - 1.78 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 5, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 005

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838939
E: 545636

Depth (ft / m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)	Moisture Content w% (10 20 30 40) / Standard Penetration Test blows/300mm (20 40 60 80)
0 / 0	412.10		Ground Surface									
0 / 0	411.90		**Topsoil** Approximately 200 millimetres of topsoil.		SS	1	2 4 5 7	9				
3 / 1			**Clayey Sandy Silt Till** Brown, reworked in upper levels, trace to some gravel, increasing clay content with depth, loose to compact.		SS	2	1 3 3 5	6				
6 / 2	410.00				SS	3	3 5 7 9	12				
7 / 2			End of Borehole									

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 2.1 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

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Sheet: 1 of 1

Log of Borehole No. 006

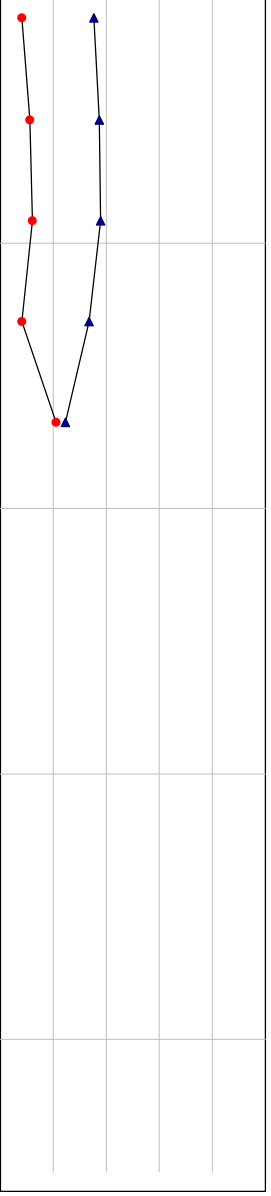
Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4839162
E: 545871

Depth (ft)	Depth (m)	Elevation (m)	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		420.91	Ground Surface								
0	0	420.70	**Topsoil** Approximately 200 millimetres of topsoil.		SS	1	4 4 4 4	8			
1			**Sand** Brown, reworked in upper levels, trace rootlets, loose to compact.		SS	2	3 5 6 6	11			
2	1	419.40	**Clayey Sandy Silt Till** Brown, trace gravel, increasing clay content with depth, loose to compact.		SS	3	5 6 6 7	12			
3					SS	4	3 4 4 4	8			
4	2	417.30			SS	5	5 11 10 15	21			
5			End of Borehole								
6	3										
7											
8	4										
9											
10	5										
11											
12	6										
13											
14	7										
15											
16	8										
17											
18	9										
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											

Moisture Content w%
10 20 30 40

Standard Penetration Test blows/300mm
20 40 60 80



NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.6 metres.

2. Borehole was recorded as wet at depth of 2.0 metres, and caved to a depth of 2.4 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

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Sheet: 1 of 1

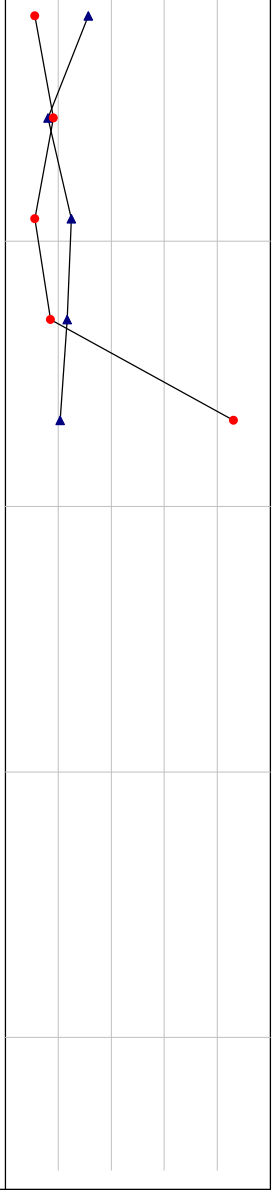
Log of Borehole No. 007

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838910
E: 546126

Depth (ft / m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	408.39		Ground Surface								
0–1 / 0	408.10		**Topsoil** Approximately 250 millimetres of topsoil.		SS	1	3 5 6 7	11			
1–3 / 1			**Sandy Silt** Brown, trace rootlets, trace clay, reworked in upper levels, increasing clay content with depth, compact.		SS	2	10 8 10 10	18			
3–5 / 1–2	406.90		**Clayey Sandy Silt Till** Brown, trace to some gravel, stiff to hard.		SS	3	3 5 6 6	11		2.0	
5–8 / 2–3					SS	4	5 7 10 18	17		2.5	
8–12 / 3					SS	5	24 36 50/5"	100		>4.5	
12 / 4	404.70		End of Borehole								
13–29 / 4–9											

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.0 metres.

2. Borehole was recorded as open and dry upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 5, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 101

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838437
E: 545149

Depth (ft / m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE: Type	SAMPLE: Number	SAMPLE: Blow Counts	SAMPLE: Blows/300mm	SAMPLE: Recovery	SAMPLE: PP (kgf/cm2)	SAMPLE: U.Wt.(kN/m3)	Moisture Content w% (10 20 30 40) / Standard Penetration Test blows/300mm (20 40 60 80)
0 ft / 0 m	408.60		Ground Surface									
0	408.30		**Topsoil** Approximately 250 millimetres of topsoil.									
1 – 3 / 1			**Sand** Brown, trace gravel.									
2 – 7 / 2												
3 – 10 / 3												
4 – 13 / 4												
5 – 17 / 5	403.10		Transition to grey in colour									
6 – 20 / 6	402.50		End of Borehole									
7 – 23 / 7												
8 – 26 / 8												
9 – 30 / 9												
33												

NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 6.10 metres.
2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.
4. A monitoring well was installed. No soil samples were retrieved. The following free groundwater level readings have been measured:

August 6, 2021 - 4.78 metres below ground surface.

August 27, 2021 - 4.71 metres below ground surface.

October 14, 2021 - 4.33 metres below ground surface.

February 23, 2022 - 4.31 metres below ground surface.

April 22, 2022 - 4.07 metres below ground surface.

June 1, 2022 - 4.15 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 6, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 102

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838180
E: 545422

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	414.13	Ground Surface								
0 / 0	413.90	**Topsoil** 250 millimetres of topsoil.								
3 / 1	413.20	**Sandy Silt** Brown, trace clay, trace gravel, reworked in upper levels, loose to compact.		SS	1	4 5 7 8	12			
				SS	2	2 3 6 5	9			
		Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, loose to compact.		SS	3	3 9 12 14	21			
				SS	4	7 8 11 10	19			
				SS	5	6 9 11 17	20			
16 / 5	408.90	End of Borehole		SS	6	7 5 4 9	9			

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 5.2 metres.
2. Borehole was recorded as caved to a depth of 3.8 metres and 'wet' at a depth of 3.6 metres upon completion and backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.
4. A monitoring well was installed. The following free groundwater level readings have been measured:

August 6, 2021 - 3.58 metres below ground surface.

August 27, 2021 - 3.61 metres below ground surface.

October 14, 2021 - 3.62 metres below ground surface.

February 23, 2021 - 3.5 metres below ground surface.

April 22, 2022 - 2.89 metres below ground surface.

June 1, 2022 - 3.05 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 6, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 103

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4837942
E: 545194

Depth (ft)	Depth (m)	Elevation (m)	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		412.55	Ground Surface								
0	0		**Topsoil** Approximately 100 millimetres of topsoil.		SS	1	5 5 7 8	12			
3	1		**Sandy Silt** Brown, trace to some gravel and clay, reworked in upper levels, compact.		AS	2	6 5 3 3	8			
6	2				SS	3	5 6 6 6	12			
7		410.30									
8			**Sand** Brown, trace clay, silt, and gravel, medium gradation, loose.		SS	4	2 3 3 2	6			
11	3				SS	5	2 1 1 2	2			
12		408.90									
13	4		End of Borehole								
29	9										

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.

2. Borehole was recorded dry and caved to a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers
Drill Date: August 6, 2021
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
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Datum: Geodetic
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Log of Borehole No. 104

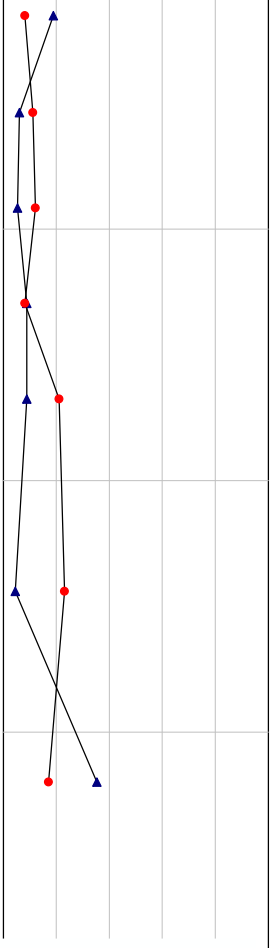
Project No: SM 301951-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838174
E: 545084

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
	414.87	Ground Surface								
0 / 0	414.60	**Topsoil** Approximately 250 millimetres of topsoil.		SS	1	5 5 6 7	11			
1 /		**Sand** Brown, reworked in upper levels, trace clay, silt, and gravel, fine to medium gradation, compact.		SS	2	8 9 9 7	18			
2 / 1				SS	3	2 5 8 7	13			
3 /				SS	4	6 11 16 13	27			
4 / 2				SS	5	10 12 11 13	23			
5 /										
6 / 3				SS	6	5 10 13 15	23			
7 /										
8 / 4	408.80	Wet spoon		SS	7	9 9 8 6	17			
9 /										
10 / 5										
11 /										
12 / 6	407.30	End of Borehole								
13 /										
14 / 7										
15 /										
16 / 8										
17 /										
18 / 9										
19 /										
20 / 10										
21 /										
22 / 11										
23 /										
24 / 12										
25 /										
26 / 13										
27 /										
28 / 14										
29 /										
30 / 15										
31 /										

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 7.6 metres.

2. Borehole was recorded as open and 'wet' at depth of 7.0 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

August 6, 2021 - 6.78 metres below ground surface.

August 27, 2021 - 6.96 metres below ground surface.

October 14, 2021 - 7.09 metres below ground surface.

February 23, 2022 - 6.83 metres below ground surface.

April 22, 2022 - 6.13 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: August 6, 2021
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 201

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838708
E: 545501

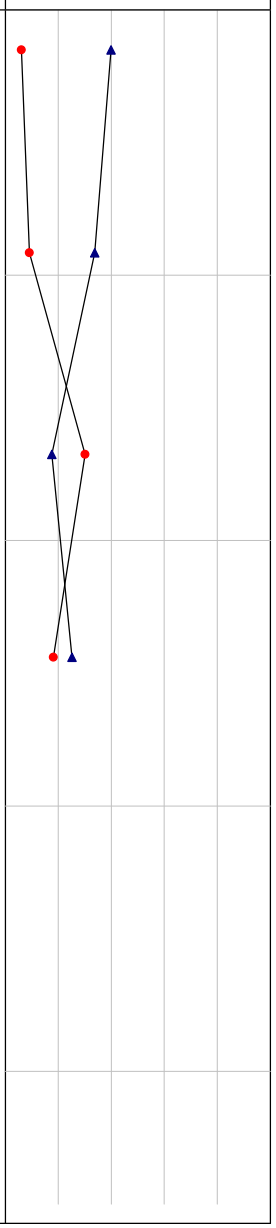
Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		404.80	Ground Surface							
0	0	404.35	**Topsoil** Approximately 450 millimetres of topsoil.	SS	1	5,3,3,3	6			
1			**Sandy Silt/Silty Sand** Brown, trace to some clay and gravel, loose.							
2										
3	1									
4										
5		403.10								
6			**Sand** Brown, loose.	SS	2	2,4,5,6	9			
7	2									
8		402.20								
9			**Clayey Sandy Silt Till** Brown, some gravel, ocasional cobbles, compact to dense							
10	3			SS	3	6,12,18,20	30			
11										
12										
13	4	400.70								
14			**Gravely Sand** Brown, trace silt, compact.							
15										
16				SS	4	10,9,9,13	18			
17	5	399.60								
18			End of Borehole							
19										
20	6									
21										
22										
23	7									
24										
25										
26	8									
27										
28										
29	9									

Well Data

SAMPLE

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 16, 2022 to termination at a depth of 5.2 metres.

2. Borehole was recorded as caved to a depth of 3.0 metres and 'wet' at a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

February 17, 2022 - 2.69 metres below ground surface.

April 22, 2022 - 1.88 metres below ground surface.

June 1, 2022 - 2.44 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: February 16, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Sheet: 1 of 1

Log of Borehole No. 201A

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838708
E: 545501

Depth ft	Depth m	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	SAMPLE PP (kgf/cm2)	SAMPLE U.Wt.(kN/m3)	Moisture Content w% (10 20 30 40) / Standard Penetration Test blows/300mm (20 40 60 80)
0	0	404.75		Ground Surface									
10	3	401.70		End of Borehole									

NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 16, 2026 to termination at a depth of 3.1 metres.

2. Soil samples will be discarded after 3 months unless otherwise directed by our client.

3. A monitoring well was installed. The following free groundwater level readings have been measured:

February 17, 2022 - dry

April 22, 2022 - 2.05 metres below ground surface.

June 1, 2022 - 2.43 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: February 16, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
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Datum: Geodetic
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Log of Borehole No. 202

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838647
E: 545436

Depth (ft / m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	406.59	Ground Surface							
	406.14	**Topsoil** Approximately 450 millimetres of topsoil.							
		Clayey Sandy Silt Till Brown, some gravel, compact.	SS	1	2,2,3,2	5			
			SS	2	4,7,9,12	16			
	404.00	**Sandy Silt** Brown, dense.	SS	3	21,19,18,24	37			
	402.50	**Clayey Sandy Silt Till** Brown, some gravel and sand, very dense dense	SS	4	10,24,50/4	100			
	401.00	**Sandy Silt** Brown, very dense.	SS	5	34,50/4	100			
	400.20	End of Borehole							

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 17, 2022 to termination at a depth of 6.4 metres.

2. Borehole was recorded as open and 'wet' at a depth of 0 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

February 17, 2022 - 5.5 metres below ground surface.

April 22, 2022 - 4.76 meters below ground surface.

June 1, 2022 - 5.43 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: February 17, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 203

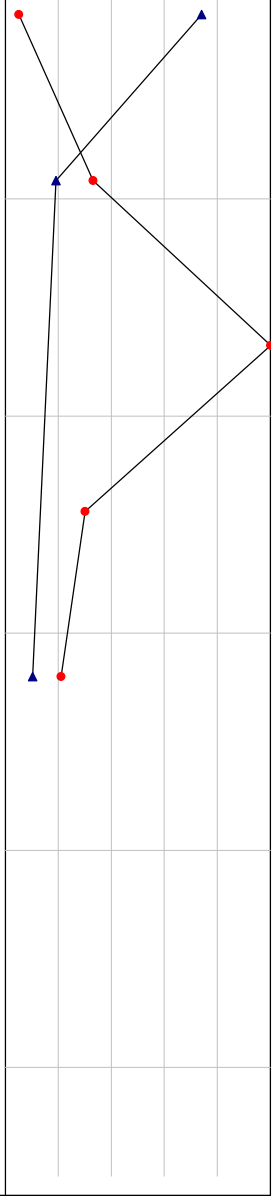
Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838523
E: 545307

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		407.13	Ground Surface							
0	0	406.88	**Topsoil** Approximately 250 millimetres of topsoil.							
1			**Sandy Silt** Brown, trace to some gravel, frequent cobbles, loose to very dense.	SS	1	9,3,2,1	5			
2										
3	1									
4				SS	2	8,16,17,27	33			
5										
6										
7	2									
8										
9				SS	3	50/6	100			
10	3									
11										
12										
13	4									
14										
15				SS	4	36,15,15,8	30			
16										
17	5									
18										
19										
20	6									
21				SS	5	7,9,12,14	21			
22		400.40								
23	7		End of Borehole							
24										
25										
26	8									
27										
28										
29	9									
30										
31										
32										
33	10									
34										
35										
36	11									

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 17, 2022 to termination at a depth of 6.7 metres.

2. Borehole was recorded as open and 'wet' at a depth of 0 metres upon completion and backfilled as per Ontario Regulation 903.

3 Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

February 17, 2022 - dry

April 22, 2022 - 5.9 metres below ground surface.

June 1, 2022 - 5.91 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: February 16, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

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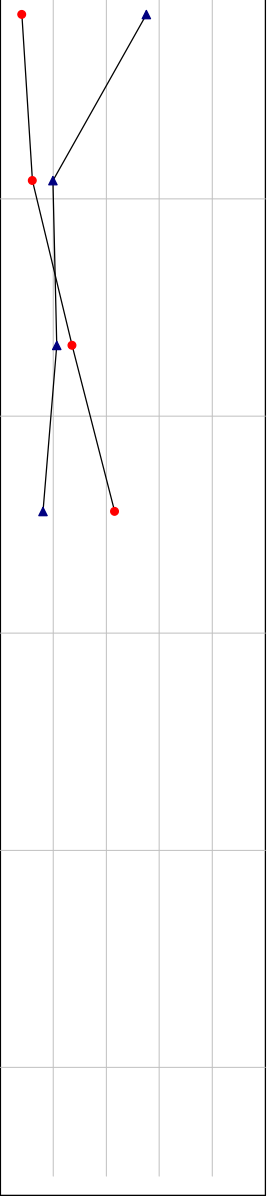
Log of Borehole No. 204

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838693
E: 545861

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	409.56	Ground Surface								
0 / 0	409.16	**Topsoil** Approximately 400 millimetres of topsoil.								
1 / 0		**Clayey Sandy Silt Till** Brown, trace to some gravel, compact to dense.		SS	1	9,4,4,4	8			
2 / 1										
3 / 1				SS	2	4,5,7,17	12			
4 / 1										
5 / 2				SS	3	5,7,20,29	27			
6 / 2										
7 / 3				SS	4	15,21,22,36	43			
8 / 3	404.40	End of Borehole								
9 / 4		NOTES: 1. Borehole was advanced using hollow stem auger equipment on February 18, 2022 to termination at a depth of 5.2 metres. 2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client. 4. A monitoring well was installed. The following free groundwater level readings have been measured: February 17, 2022 - 2.81 metres below ground surface. April 22, 2022 - 1.16 metres below ground surface. June 1, 2022 - 1.53 metres below ground surface.								
10 / 5										
11 / 6										
12 / 7										
13 / 8										
14 / 9										
15 / 10										
16 / 11										
17 / 12										
18 / 13										
19 / 14										
20 / 15										
21 / 16										
22 / 17										
23 / 18										
24 / 19										
25 / 20										
26 / 21										
27 / 22										
28 / 23										
29 / 24										
30 / 25										
31 / 26										
32 / 27										
33 / 28										
34 / 29										
35 / 30										
36 / 31										

Moisture Content w%: 10 20 30 40
Standard Penetration Test blows/300mm: 20 40 60 80



Drill Method: Hollow Stem Augers
Drill Date: February 18, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 205

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838523
E: 545777

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		412.99	Ground Surface							
0	0	412.74	**Topsoil** Approximately 250 millimetres of topsoil.							
			Sand Brown, loose.	SS	1	6,5,3,2	8			
				SS	2	4,4,4,4	8			
				SS	3	4,4,5,6	9			
				SS	4	3,3,4,6	7			
		406.60		SS	5	5,4,50/5	100			
6	2	406.40	**Clayey Sandy Silt Till** Brown, trace to some gravel, very dense.							
			End of Borehole							

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 18, 2022 to termination at a depth of 6.6 metres.

2. Borehole was recorded as 'dry' and caved to a depth of 4.8 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

February 17, 2022 - 2.56 metres below ground surface.

April 22, 2022 - 2.25 metres below ground surface.

June 1, 2022 - 2.39 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: February 18, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

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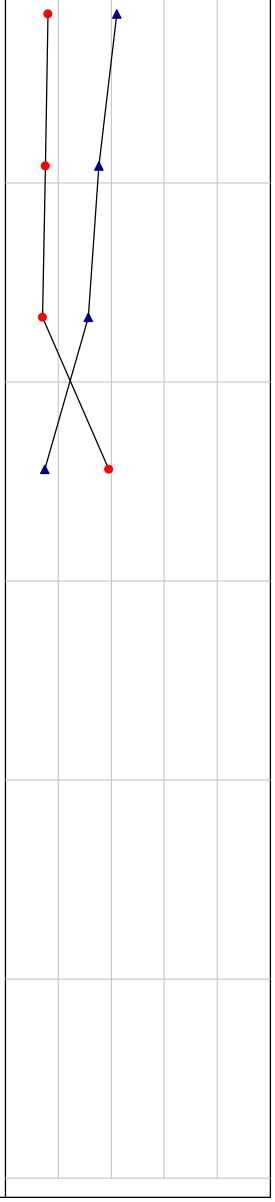
Log of Borehole No. 206

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Road, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838460
E: 545394

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		412.88	Ground Surface							
0	0	412.58	**Topsoil** Approximately 300 millimetres of topsoil.							
1			**Sandy Silt** Brown, trace to some clay and gravel, compact.	SS	1	11,11,5,2	16			
2										
3	1			SS	2	7,7,8,9	15			
4										
5										
6	2			SS	3	3,4,10,12	14			
7										
8										
9	3			SS	4	10,15,24,30	39			
10		409.50	**Clayey Sandy Silt Till** Brown, trace to some gravel, compact to dense.							
11										
12										
13	4									
14										
15										
16										
17	5									
18										
19										
20	6									
21										
22										
23	7									
24		405.30								
25			End of Borehole							
26	8									
27										
28										
29										
30	9									
31										
32										
33	10									
34										
35										
36	11									
37										
38										
39										



NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 18, 2022 to termination at a depth of 7.6 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

February 17, 2022 - 6.83 metres below ground surface.

April 22, 2022 - 4.6 metres below ground surface.

June 1, 2022 - 4.66 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: February 18, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 301

Project No: SM 301951B-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4837975
E: 545199

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		412.75	Ground Surface							
0	0	412.50	**Topsoil** Approximately 250 millimetres of topsoil.							
3	1	411.70	**Clayey Sandy Silt Till** Brown, trace gravel, loose .	SS	1	2,1,3,4	4			
			Sand Brown, loose to compact.	SS	2	1,3,6,9	9			
	3			SS	3	7,7,6,9	13			
	4			SS	4	8,9,13,15	22			
	6			SS	5	6,7,10,13	17			
25	7	404.90								
26	8	404.60	**Clayey Sandy Silt Till** Brown, trace gravel, dense to very dense.	SS	6	3,13,32,42	45			

Well Data

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 22, 2022 to termination at a depth of 8.2 metres.
2. Borehole was recorded as open and 'wet' at a depth of 6.3 metres upon completion and backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.
4. A monitoring well was installed. The following free groundwater level readings have been measured:

February 23, 2022 - 6.29 metres below ground surface.

April 22, 2022 - 5.65 metres below ground surface.

June 1, 2022 - 5.71 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: February 22, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 302

Project No: SM 301951B-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838015
E: 545142

Depth (ft / m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	413.00	Ground Surface							
0 / 0	412.75	**Topsoil** Approximately 250 millimetres of topsoil.							
3 / 1	411.90	**Clayey Sandy Silt Till** Brown, trace gravel, loose .							
		Sand Brown, loose to compact.	SS	1	2,2,4,9	6			
			SS	2	2,4,6,8	10			
			SS	3	5,7,8,15	15			
			SS	4	5,8,9,11	17			
			SS	5	10,10,11,15	21			
26 / 8	404.80		SS	6	5,8,10,8	18			
		End of Borehole							

Well Data: Monitoring well installed

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 22, 2022 to termination at a depth of 8.2 metres.
2. Borehole was recorded as open and 'wet' at a depth of 6.6 metres upon completion and backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.
4. A monitoring well was installed. The following free groundwater level readings have been measured:

February 23, 2022 - 6.62 metres below ground surface.

April 22, 2022 - 6.06 metres below ground surface.

June 1, 2022 - 6.12 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: February 22, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Field Logged by: KJR
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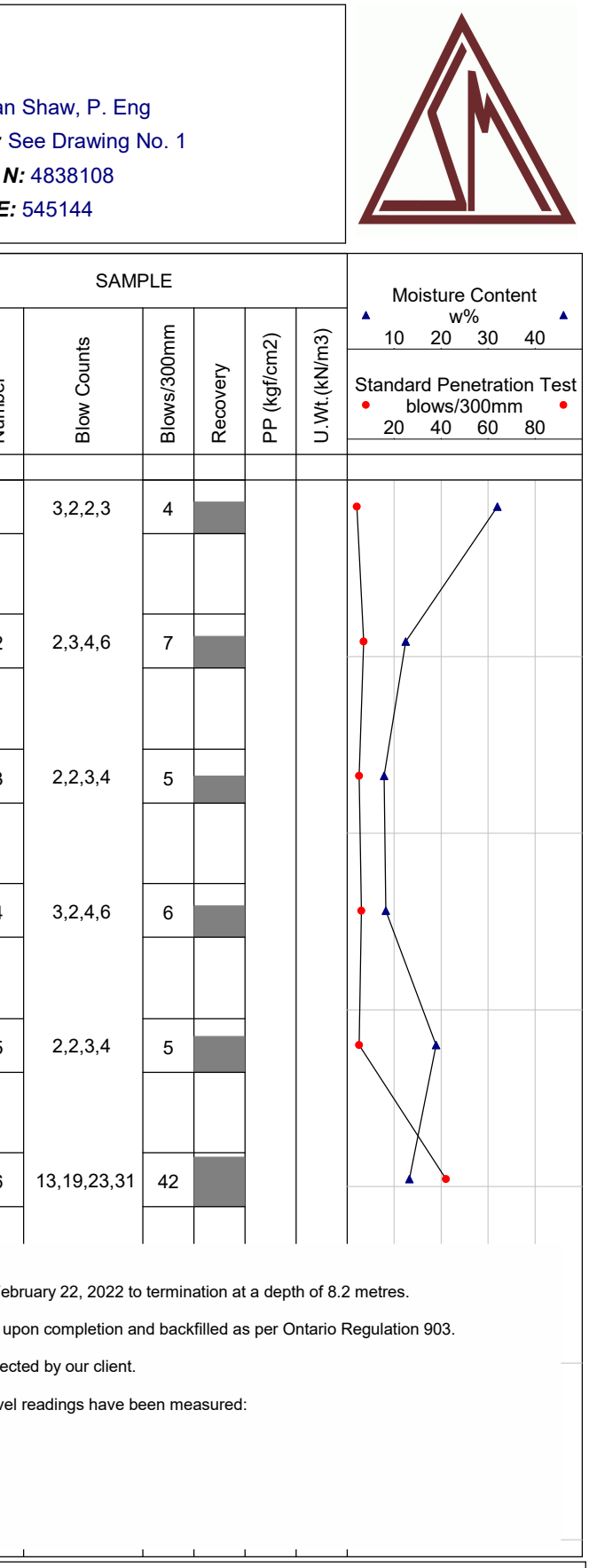
Log of Borehole No. 303

Project No: SM 301951B-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838108
E: 545144



NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 22, 2022 to termination at a depth of 8.2 metres.
2. Borehole was recorded as open and 'wet' at a depth of 5.4 metres upon completion and backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.
4. A monitoring well was installed. The following free groundwater level readings have been measured:

February 23, 2022 - 5.4 metres below ground surface.

April 22, 2022 - 6.04 metres below ground surface.

June 1, 2022 - 6.11 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: February 22, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

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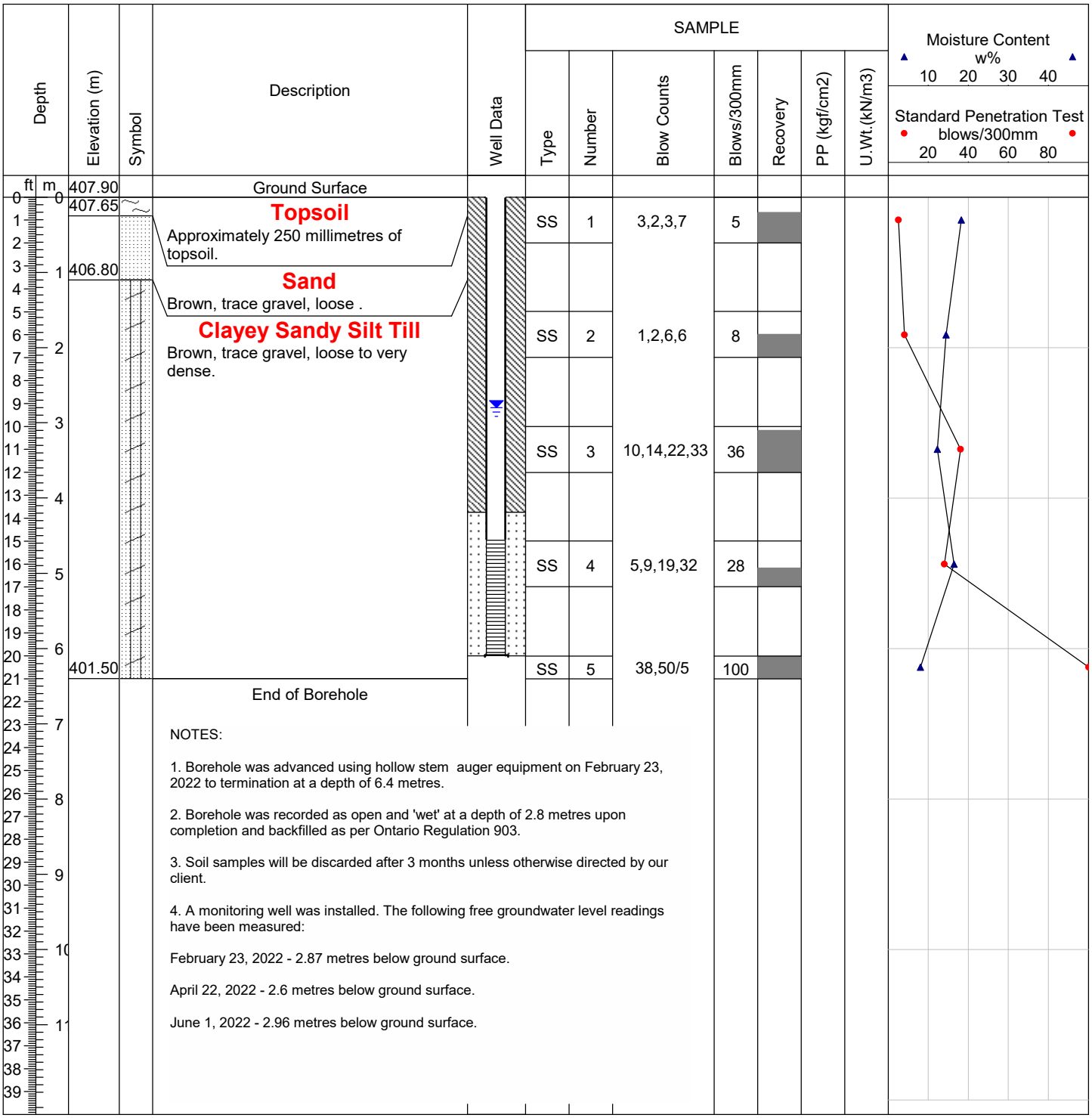
Log of Borehole No. 304

Project No: SM 301951B-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4538292
E: 545023



NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 23, 2022 to termination at a depth of 6.4 metres.

2. Borehole was recorded as open and 'wet' at a depth of 2.8 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

February 23, 2022 - 2.87 metres below ground surface.

April 22, 2022 - 2.6 metres below ground surface.

June 1, 2022 - 2.96 metres below ground surface.

Drill Method: Hollow Stem Augers
Drill Date: February 23, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 305

Project No: SM 301951B-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838438
E: 545144

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	408.60	Ground Surface								
0 / 0	408.35	**Topsoil** Approximately 250 millimetres of topsoil.		AS	1					
1 / 0		**Sand** Brown, trace gravel, loose to very loose.								
5 / 1				SS	2	2,3,4,4	7			
10 / 3				SS	3	2,1,1,5	2			
12 / 4	404.90	End of Borehole								

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 23, 2022 to termination at a depth of 3.6 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

February 23, 2022 - dry

April 22, 2022 - dry

June 1, 2022 - dry

Drill Method: Hollow Stem Augers
Drill Date: February 23, 2022
Hole Size: 200 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 306

Project No: SM 301951B-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4838305
E: 545271

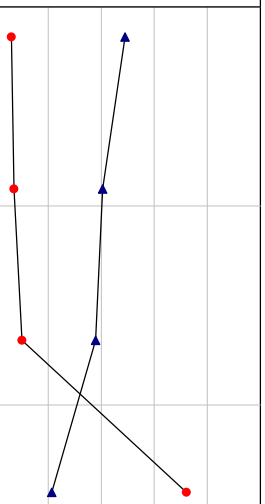
Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		412.85	Ground Surface							
0	0	412.60	**Topsoil** Approximately 250 millimetres of topsoil.							
1			**Sand** Brown, trace gravel, loose.	SS	1	2,2,4,5	6			
2										
3	1									
4										
5				SS	2	3,2,5,6	7			
6										
7	2									
8										
9										
10	3			SS	3	3,3,7,15	10			
11		409.40								
12			**Clayey Sandy Silt Till** Brown, some gravel, very dense							
13	4									
14										
15										
16				SS	4	20,34,38,50/4	72			
17	5	407.70								
18			End of Borehole							
19			NOTES:							
20	6		1. Borehole was advanced using solid stem auger equipment on February 23, 2022 to termination at a depth of 5.2 metres.							
21										
22			2. Borehole was recorded as caved to a depth of 2.4 metres and dry upon completion and backfilled as per Ontario Regulation 903							
23	7									
24										
25			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.							
26										
27	8									
28										
29										
30	9									
31										
32										
33	10									
34										
35										
36	11									
37										
38										
39										

Well Data

SAMPLE

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



Drill Method: Solid Stem Augers
Drill Date: February 23, 2022
Hole Size: 150 millimetres
Drilling Contractor: Altech

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Log of Borehole No. 307

Project No: SM 301951B-G
Project: Proposed Residential Development
Location: 75 Woolwich Street East, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 3838296
E: 545199

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	411.12	Ground Surface								
0 / 0	410.87	**Topsoil** Approximately 250 millimetres of topsoil.		SS	1	1,2,2,3	4			
		Clayey Sandy Silt Till Brown, some gravel, compact.								
6 / 2				SS	2	5,7,10,12	17			
10 / 3				SS	3	9,10,15,19	25			
16 / 5	405.90			SS	4	6,11,12,41	23			
		End of Borehole								

NOTES:

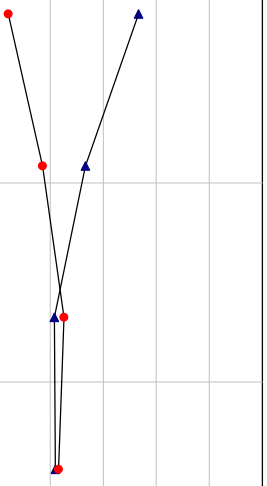
1. Borehole was advanced using solid stem auger equipment on February 23, 2022 to termination at a depth of 5.2 metres.

2. Borehole was recorded as open and 'wet' at a depth of 4.3 metres below the existing grade upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



Drill Method: Solid Stem Augers
Drill Date: February 23, 2022
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: KJR
Checked by: SW
Sheet: 1 of 1

Log of Borehole No. 401

Project No: SM 301951-G
Project: Proposed Residential Development
Location: 7581 Nichol Rd, Elora
Client: Cachet Development

Project Manager: Ian Shaw, P. Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4839146
E: 545881

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		420.91	Ground Surface							
0	0	420.66	**Topsoil** Approximately 250 millimetres of topsoil.							
1			**Silty Sand** Brown, trace to some gravel and clay, loose to compact.	SS	1	2,2,4,4	6			
2	1			SS	2	1,2,3,5	5			
3		419.10	**Clayey Sandy Silt Till** Brown, trace to some sand and gravel, compact to very dense	SS	3	1,4,9,7	13			
6	2			SS	4	6,15,50/4	100			
9	3			SS	5	6,17,16,24	33			
12	4									
15				SS	6	10,35,50/5	100			
16	5									
19										
20	6			SS	7	27,46,43, 50/3	89			
22		414.20	End of Borehole							
23	7									
26	8									
29	9									
33	10									
36	11									
39										

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using solid stem auger equipment on April 18, 2022 to termination at a depth of 6.7 metres.

2. Borehole was recorded as open and 'wet' at a depth of 4.7 metres below the existing grade upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

April 22, 2022 - 2.29 metres below ground surface.

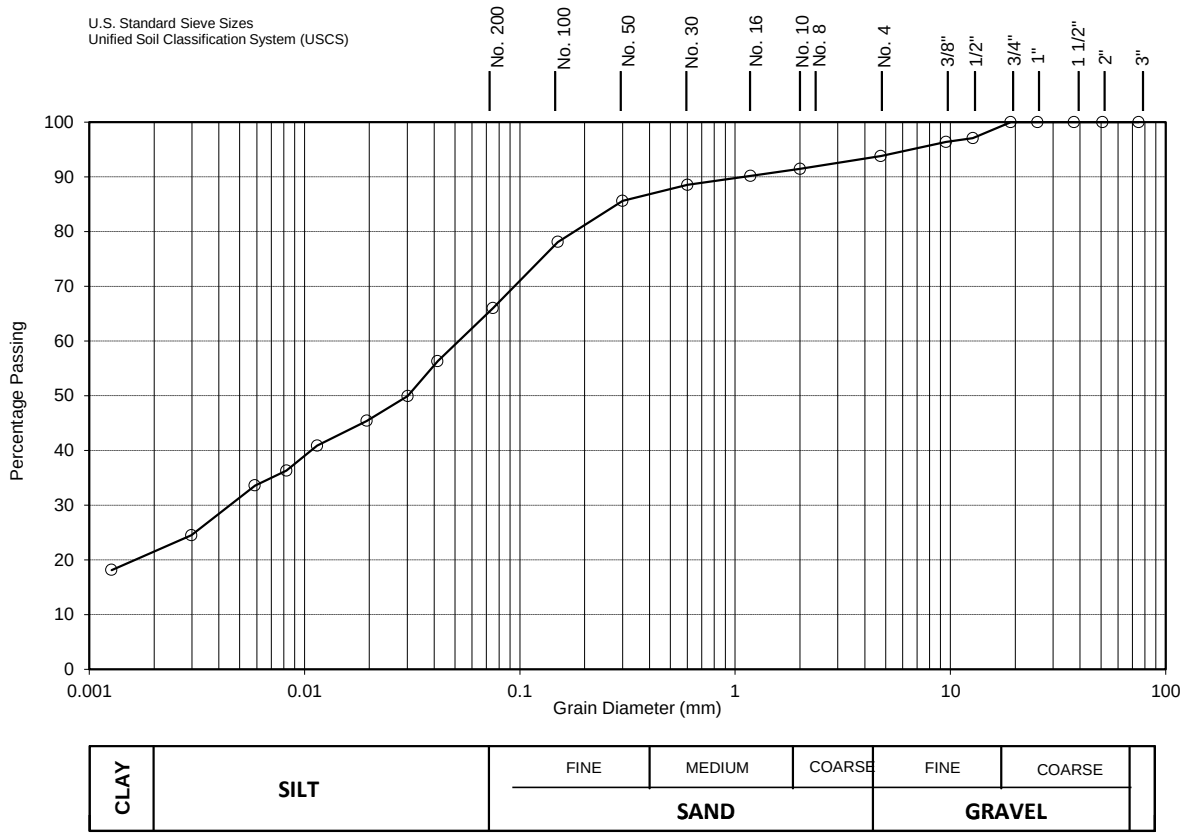
June 1, 2022 - 2.39 metres below ground surface.

Drill Method: Solid Stem Augers
Drill Date: April 18, 2022
Hole Size: 150 millimetres
Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Geodetic
Field Logged by: KJR
Checked by: SW
Sheet: 1 of 1

Mechanical & Hydrometer Analyses



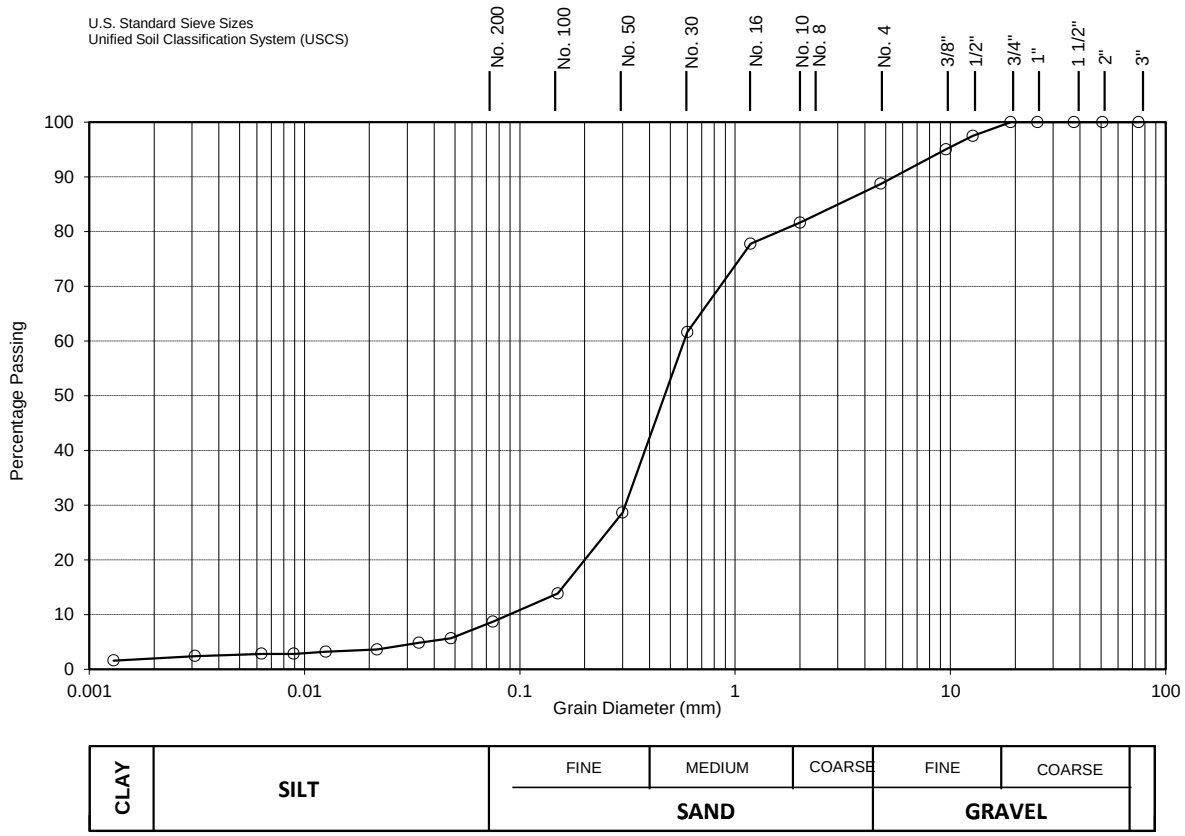
Lab No.:	**21-335**	Notes: Depth: 5'			
Borehole No.:	**003**				
Sample No.:	**3**				
CLAY [%]:	**22**	Soil Description:	**Brown Sandy Silt w/ some Clay and trace Gravel**		
SILT [%]:	**44**		**M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity**		
SAND [%]:	**28**				
GRAVEL [%]:	**6**	Estimated Infiltration Rate [mm/hr] :	**< 10**	Estimated Permeability, k [cm/s]	**10^{-7}**
D_{10} (Effective Diam. in mm):	**0.0005**	Coefficient of Uniformity C_U:	**102.0**	Coefficient of Curvature C_C:	**0.8**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Sideroad 15, Elora ON

August 2021	**Grain Size Analysis No. 1**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



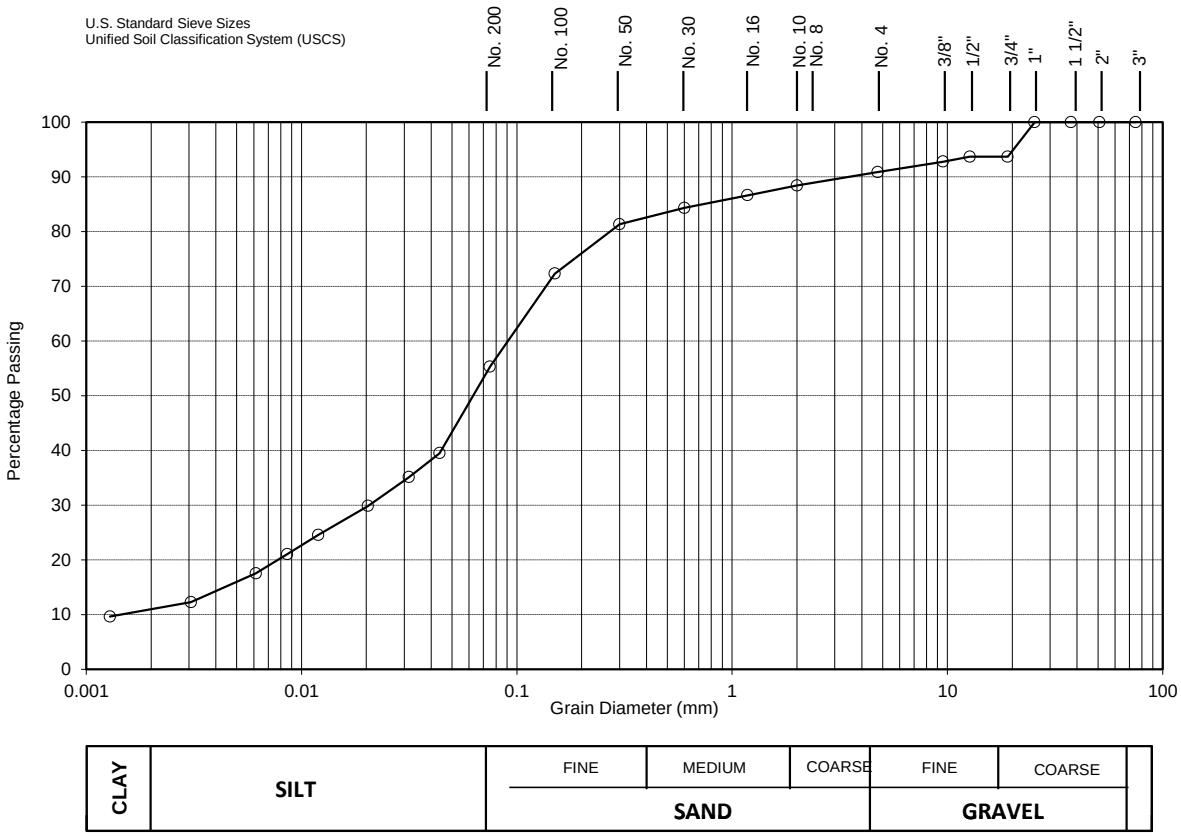
Lab No.:	**21-340**	Notes: Depth: 10'	
Borehole No.:	**004**		
Sample No.:	**5**		
CLAY [%]:	**2**	Soil Description: **Brown Sand w/ some Gravel and traces of Silt and Clay**	
SILT [%]:	**7**	**S.P. - Poorly graded sands, little or no fines**	
SAND [%]:	**80**		
GRAVEL [%]:	**11**	Estimated Infiltration Rate [mm/hr] : **150 to 300**	Estimated Permeability, k [cm/s] **10^{-2}**
D_{10} (Effective Diam. in mm):	**0.090**	Coefficient of Uniformity C_U: **6.6**	Coefficient of Curvature C_C: **1.8**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Sideroad 15, Elora ON

August 2021	**Grain Size Analysis No. 2**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



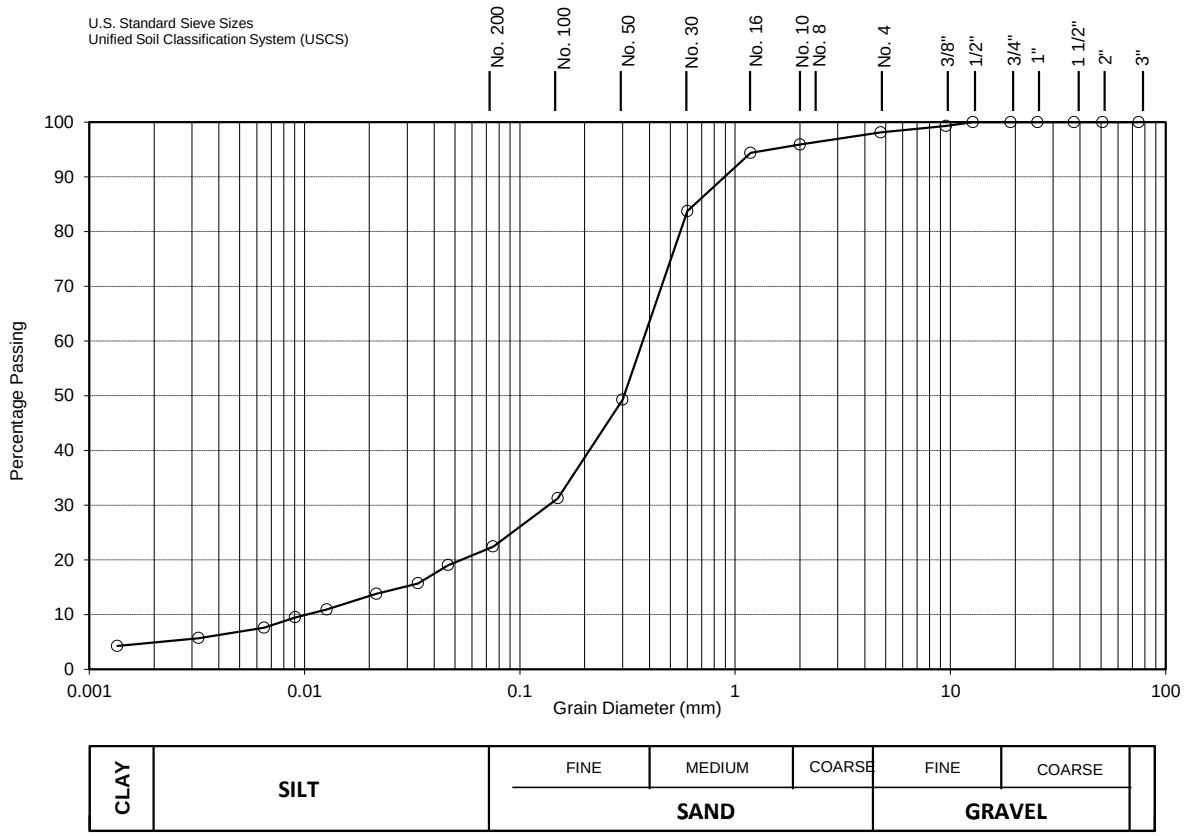
Lab No.:	**21-336**	Notes: Depth: 10'	
Borehole No.:	**006**		
Sample No.:	**5**		
CLAY [%]:	**11**	Soil Description: **Brown Sandy Silt w/ some Clay and trace Gravel**	
SILT [%]:	**44**	**M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity**	
SAND [%]:	**36**		
GRAVEL [%]:	**9**	Estimated Infiltration Rate [mm/hr] : **10 to 15**	Estimated Permeability, k [cm/s] **10^{-6}**
D_{10} (Effective Diam. in mm):	**0.0015**	Coefficient of Uniformity C_U: **60.0**	Coefficient of Curvature C_C: **3.3**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Sideroad 15, Elora ON

August 2021	**Grain Size Analysis No. 3**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



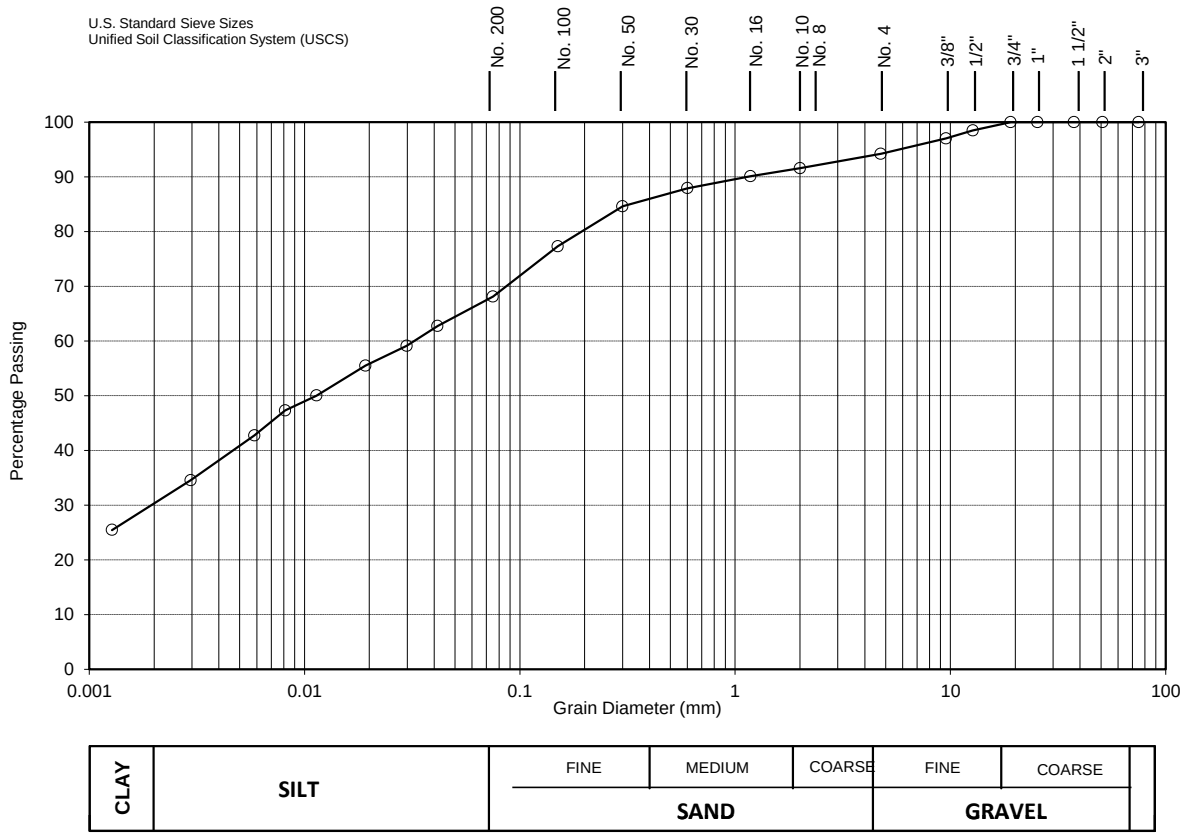
Lab No.:	**22-088**	Notes: Depth: 5'	
Borehole No.:	**201**		
Sample No.:	**2**		
CLAY [%]:	**5**	Soil Description:	**Brown Sand w/ Some Silt and traces of Clay and Gravel**
SILT [%]:	**17**		**S.M. - Silty sands, sand-silt mixtures**
SAND [%]:	**76**		
GRAVEL [%]:	**2**	Estimated Infiltration Rate [mm/hr] : **50**	Estimated Permeability, k [cm/s] **10^{-4}**
D_{10} (Effective Diam. in mm):	**0.0001**	Coefficient of Uniformity C_U: **40.0**	Coefficient of Curvature C_C: **5.4**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Nichol Road 15, Elora ON

March 2022	**Grain Size Analysis No. 4**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



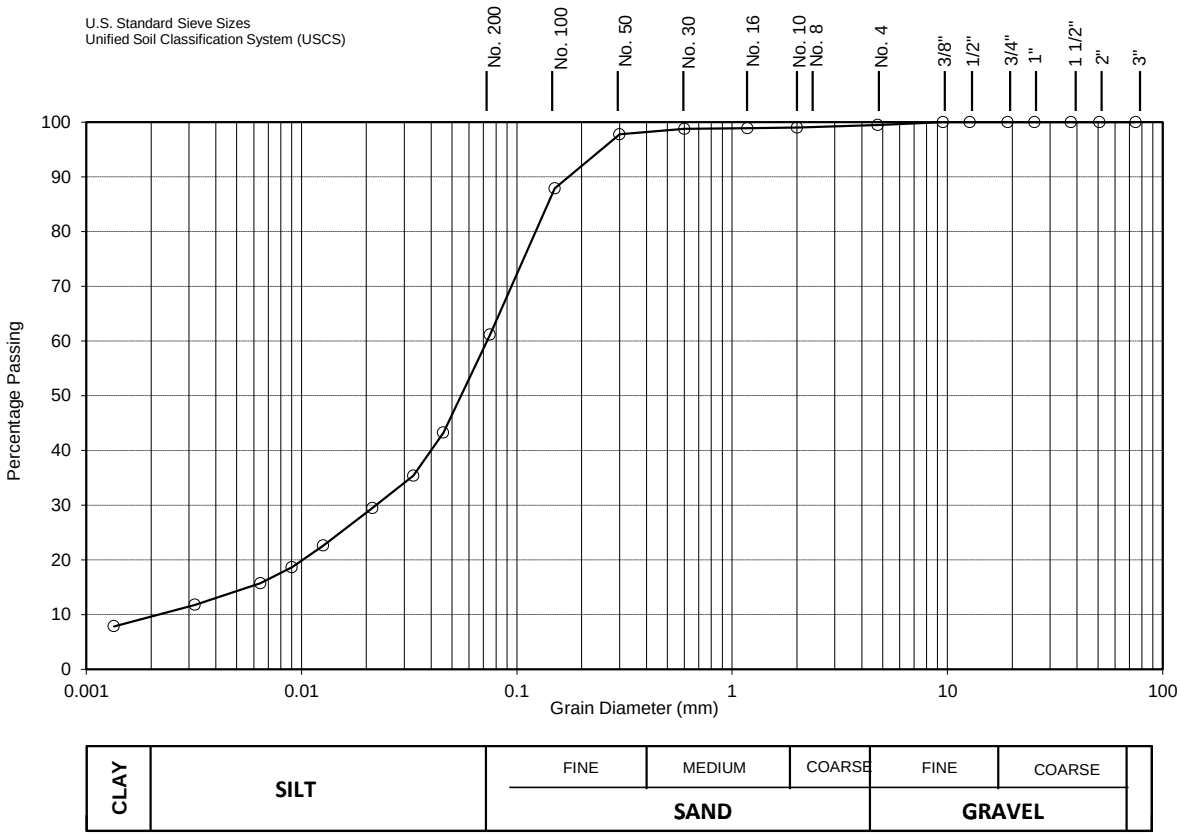
Lab No.:	**22-089**	Notes: Depth: 5'			
Borehole No.:	**202**				
Sample No.:	**2**				
CLAY [%]:	**30**	Soil Description:	**Brown Clayey Sandy Silt w/ a trace of Gravel**		
SILT [%]:	**38**		**M.L - Clayey silts with slight plasticity, silty or clayey fine sands,**		
SAND [%]:	**26**		**inorganic silts and very fine sands**		
GRAVEL [%]:	**6**	Estimated Infiltration Rate [mm/hr] :	**< 10**	Estimated Permeability, k [cm/s]	**10^{-8}**
D_{10} (Effective Diam. in mm):	**0.0004**	Coefficient of Uniformity C_U:	**80.0**	Coefficient of Curvature C_C:	**0.3**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Nichol Road 15, Elora ON

March 2022	**Grain Size Analysis No. 5**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



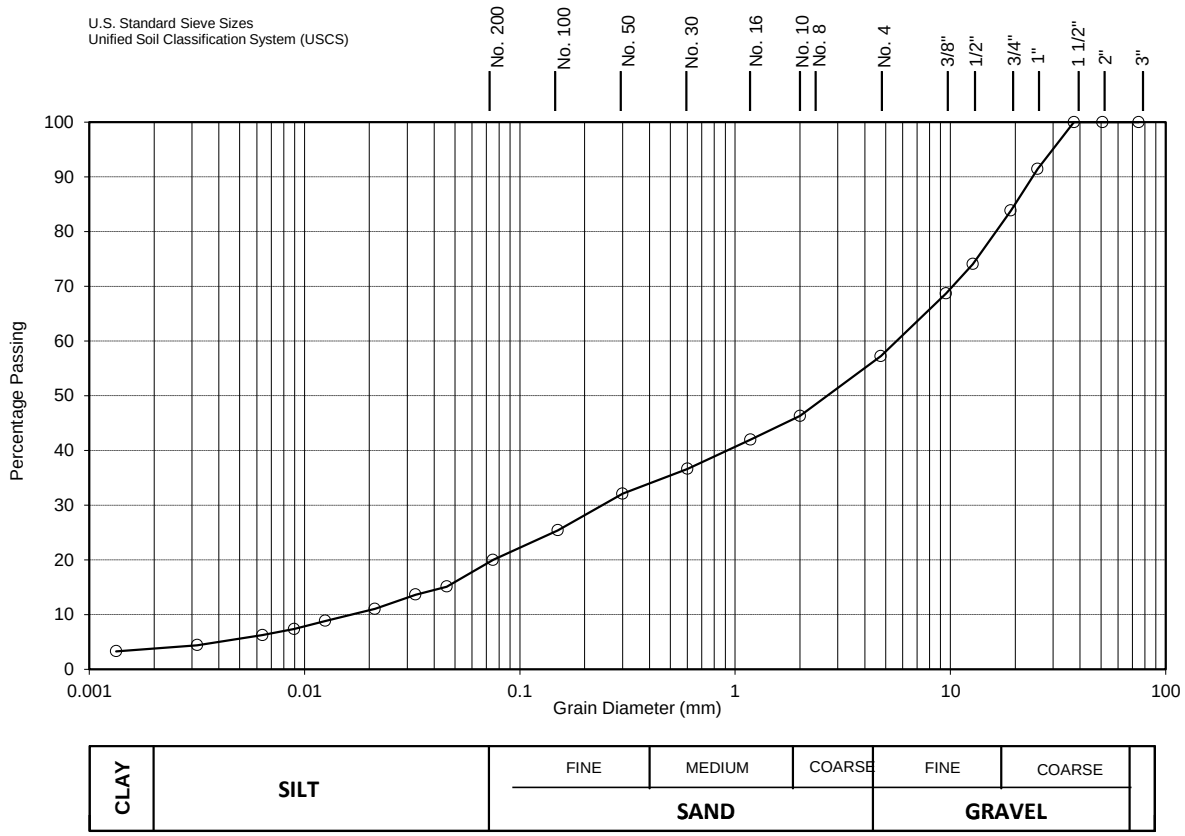
Lab No.:	**22-090**	Notes: Depth: 20'	
Borehole No.:	**202**		
Sample No.:	**5**		
CLAY [%]:	**10**	Soil Description: **Light Brown Silt and Sand w/ some Clay**	
SILT [%]:	**51**	**M.L. - Inorganic silts and very fine sands**	
SAND [%]:	**39**		
GRAVEL [%]:	**0**	Estimated Infiltration Rate [mm/hr] : **10 to 15**	Estimated Permeability, k [cm/s] **10^{-6}**
D_{10} (Effective Diam. in mm):	**0.0022**	Coefficient of Uniformity C_U: **33.2**	Coefficient of Curvature C_C: **3.0**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Nichol Road 15, Elora ON

March 2022	**Grain Size Analysis No. 6**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



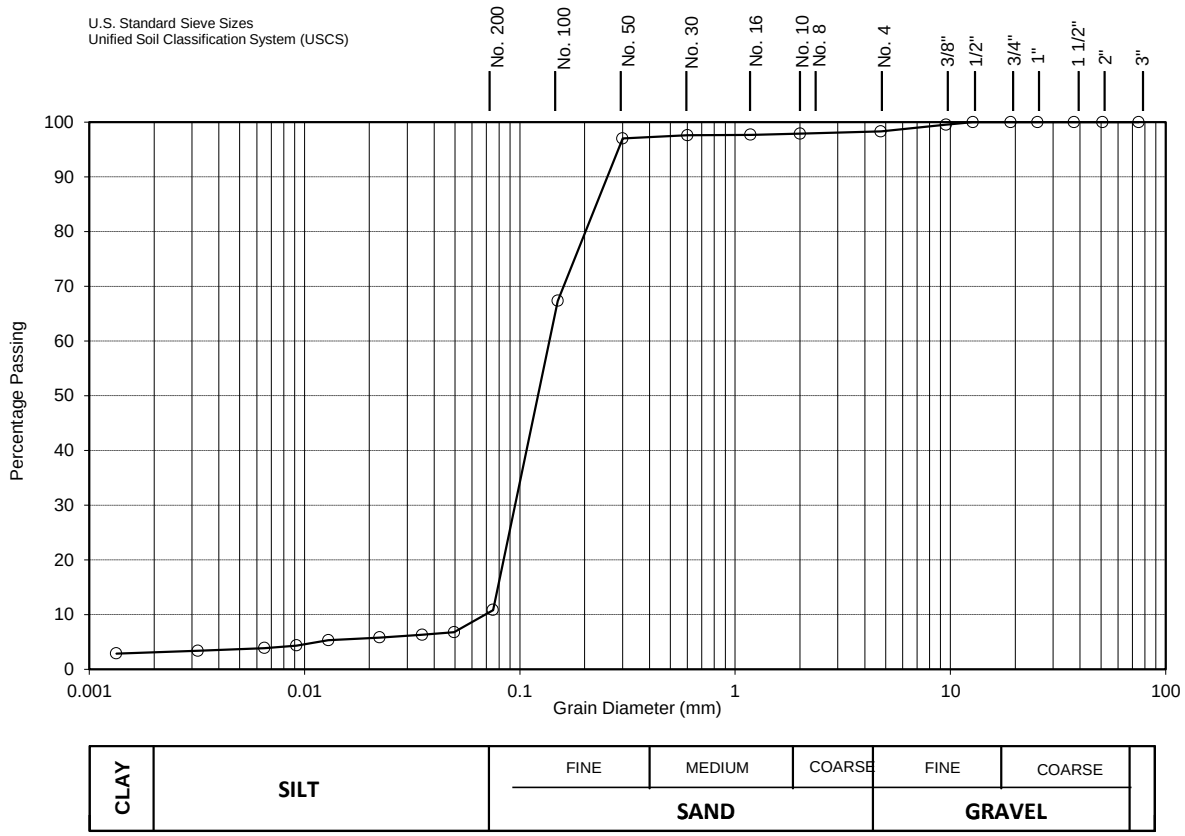
Lab No.:	**22-091**	Notes: Depth: 5'	
Borehole No.:	**203**		
Sample No.:	**2**		
CLAY [%]:	**3**	Soil Description:	**Brown Gravel and Sand w/ some Silt and a trace of Clay**
SILT [%]:	**17**		**G.M. - Gravel-sand-silt mixtures, silty gravels**
SAND [%]:	**37**		
GRAVEL [%]:	**43**	Estimated Infiltration Rate [mm/hr] : **50 to 60**	Estimated Permeability, k [cm/s] **10^{-4}**
D_{10} (Effective Diam. in mm):	**0.017**	Coefficient of Uniformity C_U: **335.3**	Coefficient of Curvature C_C: **0.6**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Nichol Road 15, Elora ON

March 2022	**Grain Size Analysis No. 7**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



Lab No.:	**22-092**	Notes: Depth: 20'	
Borehole No.:	**203**		
Sample No.:	**5**		
CLAY [%]:	**3**	Soil Description: **Brown Sand w/ traces of Silt, Clay and Gravel**	
SILT [%]:	**8**	**S.P. - Poorly graded sands**	
SAND [%]:	**87**		
GRAVEL [%]:	**2**	Estimated Infiltration Rate [mm/hr] : **125 to 150**	Estimated Permeability, k [cm/s] **10^{-3}**
D_{10} (Effective Diam. in mm):	**0.07**	Coefficient of Uniformity C_U: **2.1**	Coefficient of Curvature C_C: **0.9**

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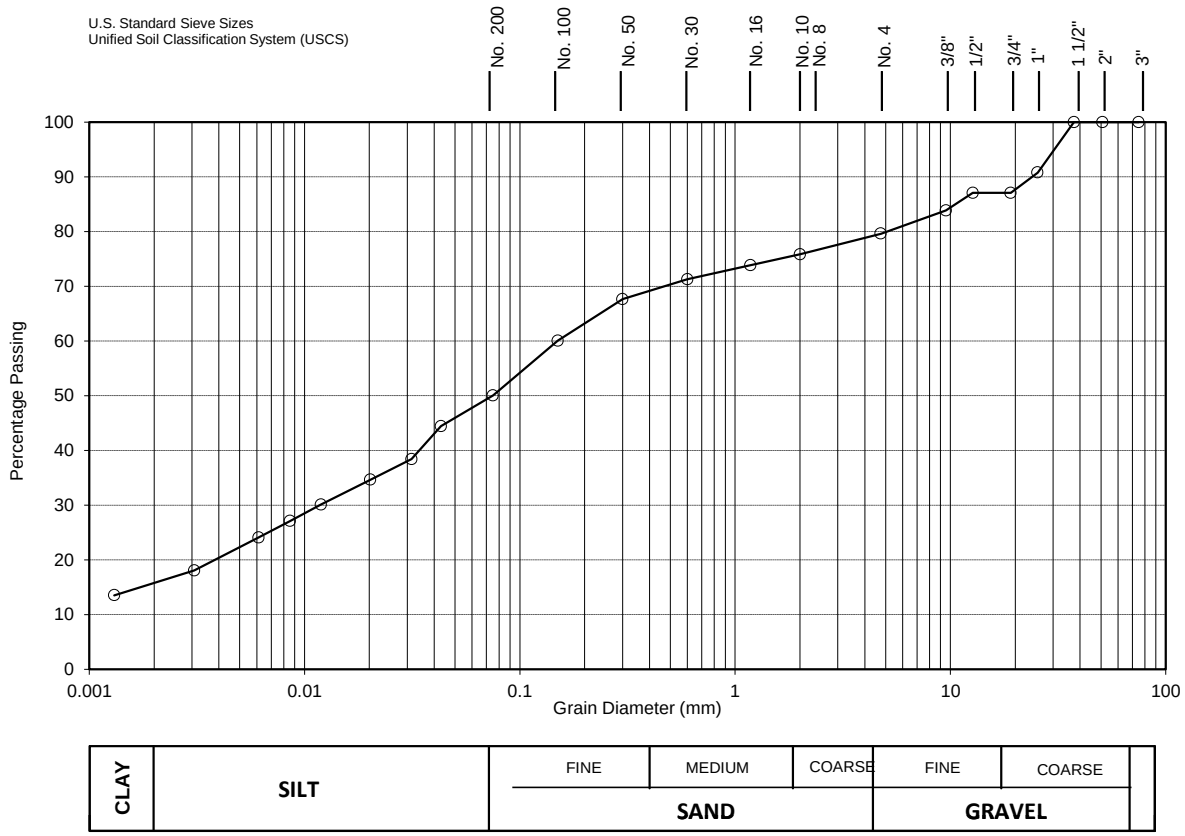
7581 Nichol Road 15, Elora ON

March 2022	**Grain Size Analysis No. 8**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



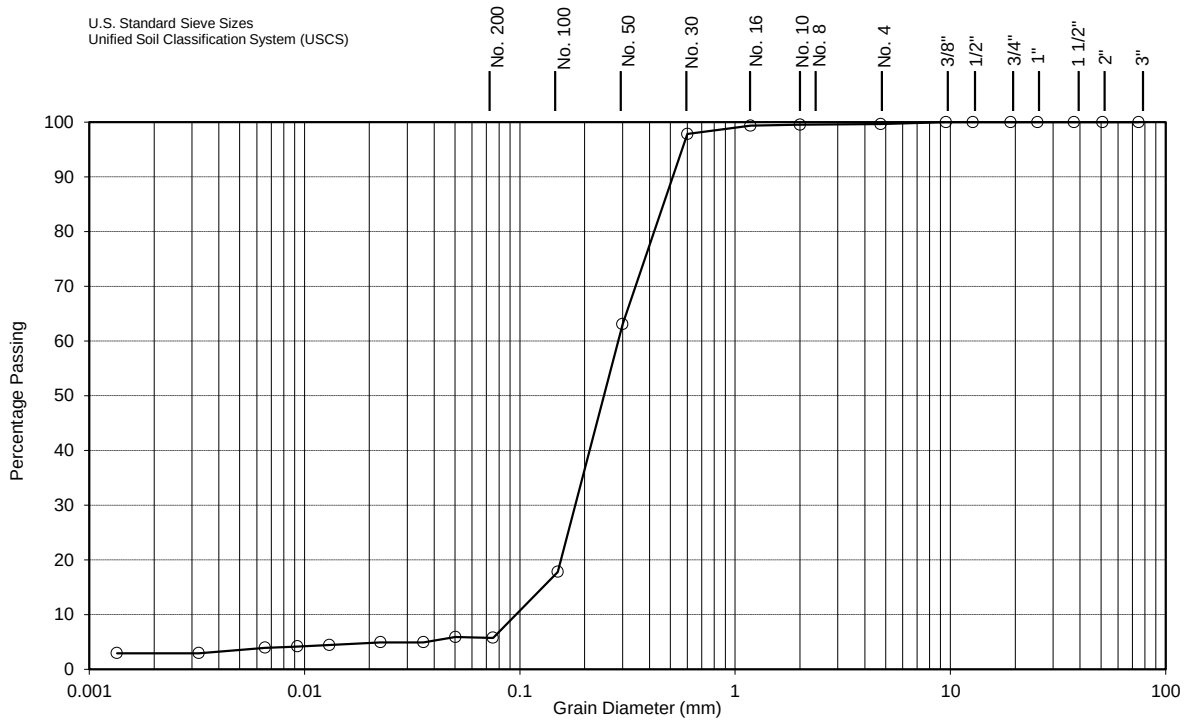
Lab No.:	**22-094**	Notes: Depth: 5'	
Borehole No.:	**204**		
Sample No.:	**2**		
CLAY [%]:	**16**	Soil Description: **Brown Sandy Gravelly Silt w/ some Clay**	
SILT [%]:	**34**	**M.L. - Silty or clayey fine sands**	
SAND [%]:	**30**		
GRAVEL [%]:	**20**	Estimated Infiltration Rate [mm/hr] : **10**	Estimated Permeability, k [cm/s] **10^{-7}**
D_{10} (Effective Diam. in mm):	**0.00085**	Coefficient of Uniformity C_U: **188.2**	Coefficient of Curvature C_C: **1.2**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Nichol Road 15, Elora ON

March 2022	**Grain Size Analysis No. 9**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE

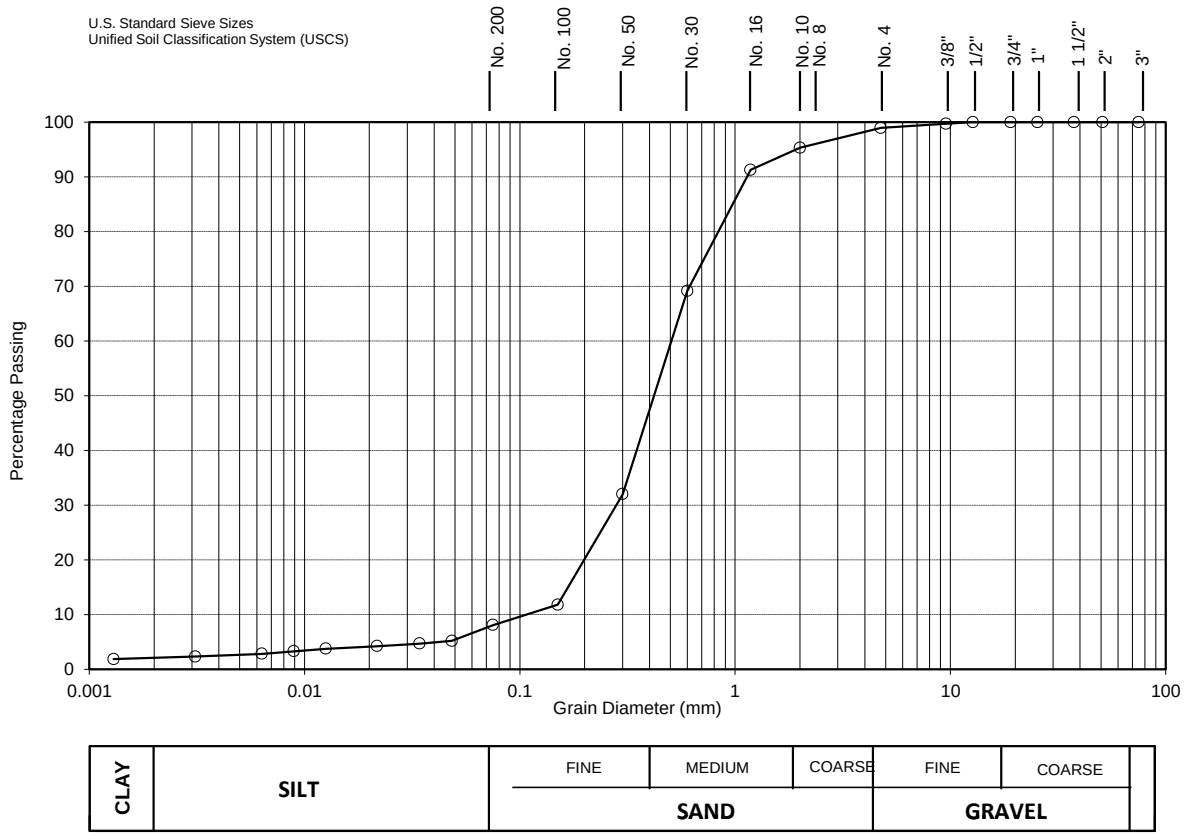
Lab No.:	**22-093**	Notes: Depth: 10'			
Borehole No.:	**205**				
Sample No.:	**3**				
CLAY [%]:	**2**	Soil Description:	**Brown Sand w/ traces of Silt and Clay**		
SILT [%]:	**4**		**S.P. - Poorly graded sands**		
SAND [%]:	**94**				
GRAVEL [%]:	**0**	Estimated Infiltration Rate [mm/hr] :	**150 to 300**	Estimated Permeability, k [cm/s]	**10^{-3}**
D_{10} (Effective Diam. in mm):	**0.095**	Coefficient of Uniformity C_U:	**3.1**	Coefficient of Curvature C_C:	**1.2**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Nichol Road 15, Elora ON

March 2022	**Grain Size Analysis No. 10**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



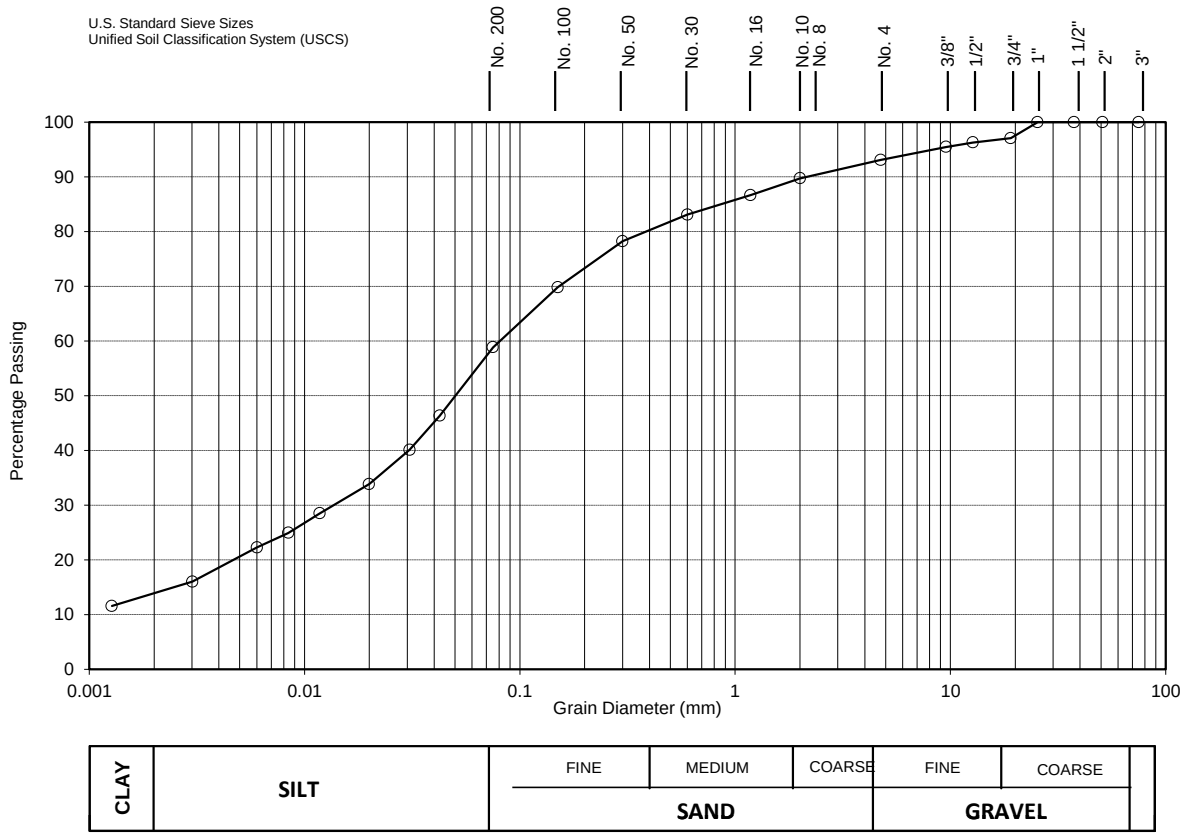
Lab No.:	**21-339**	Notes: Depth: 15'	
Borehole No.:	**102**		
Sample No.:	**6**		
CLAY [%]:	**2**	Soil Description: **Brown Sand w/ traces of Silt, Clay and Gravel**	
SILT [%]:	**6**	**S.P. - Poorly graded sands, little or no fines**	
SAND [%]:	**91**		
GRAVEL [%]:	**1**	Estimated Infiltration Rate [mm/hr] : **150 to 300**	Estimated Permeability, k [cm/s] **10^{-2}**
D_{10} (Effective Diam. in mm):	**0.10**	Coefficient of Uniformity C_U: **5.1**	Coefficient of Curvature C_C: **1.5**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

August 2021	**Grain Size Analysis No. 11**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



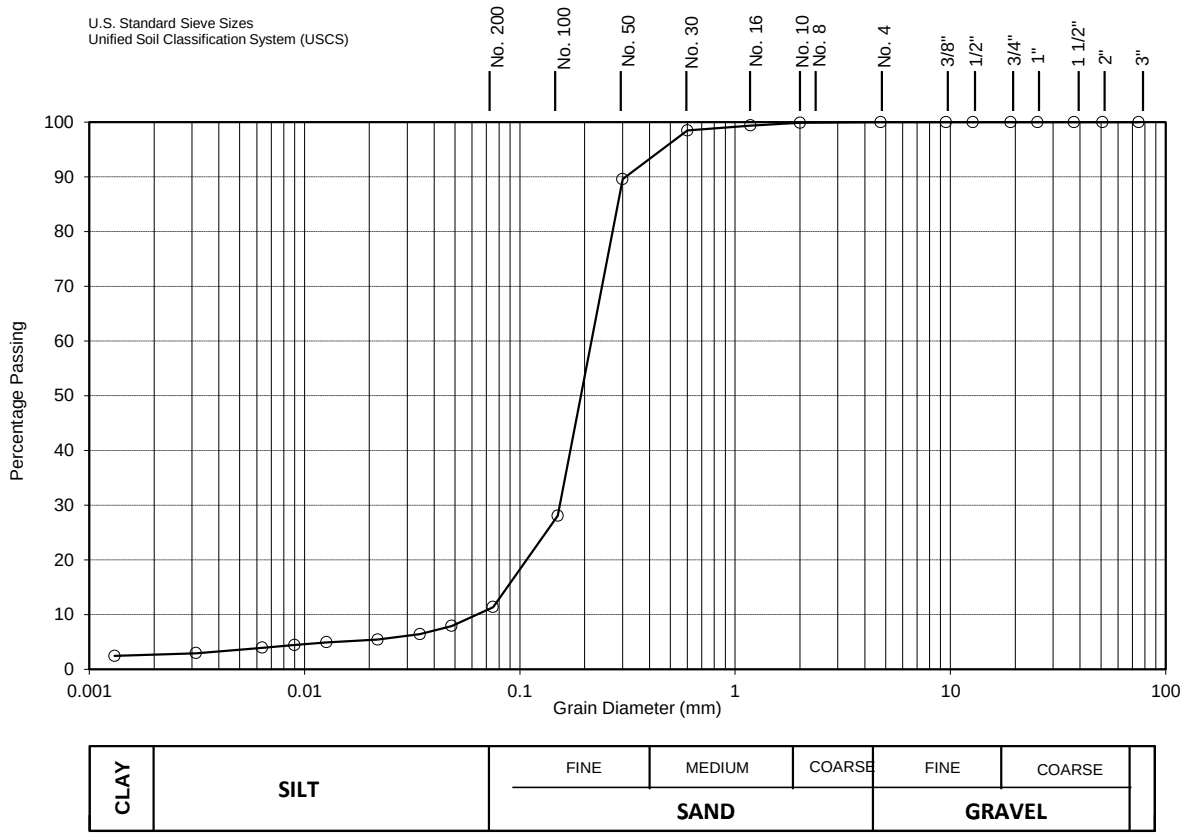
Lab No.:	**21-338**	Notes: Depth: 5'	
Borehole No.:	**103**		
Sample No.:	**3**		
CLAY [%]:	**14**	Soil Description: **Brown Sandy Silt w/ some Clay and trace Gravel**	
SILT [%]:	**45**	**M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity**	
SAND [%]:	**34**		
GRAVEL [%]:	**7**	Estimated Infiltration Rate [mm/hr] : **10**	Estimated Permeability, k [cm/s] **10^{-6}**
D_{10} (Effective Diam. in mm):	**0.00100**	Coefficient of Uniformity C_U: **80.0**	Coefficient of Curvature C_C: **2.1**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

August 2021	**Grain Size Analysis No. 12**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



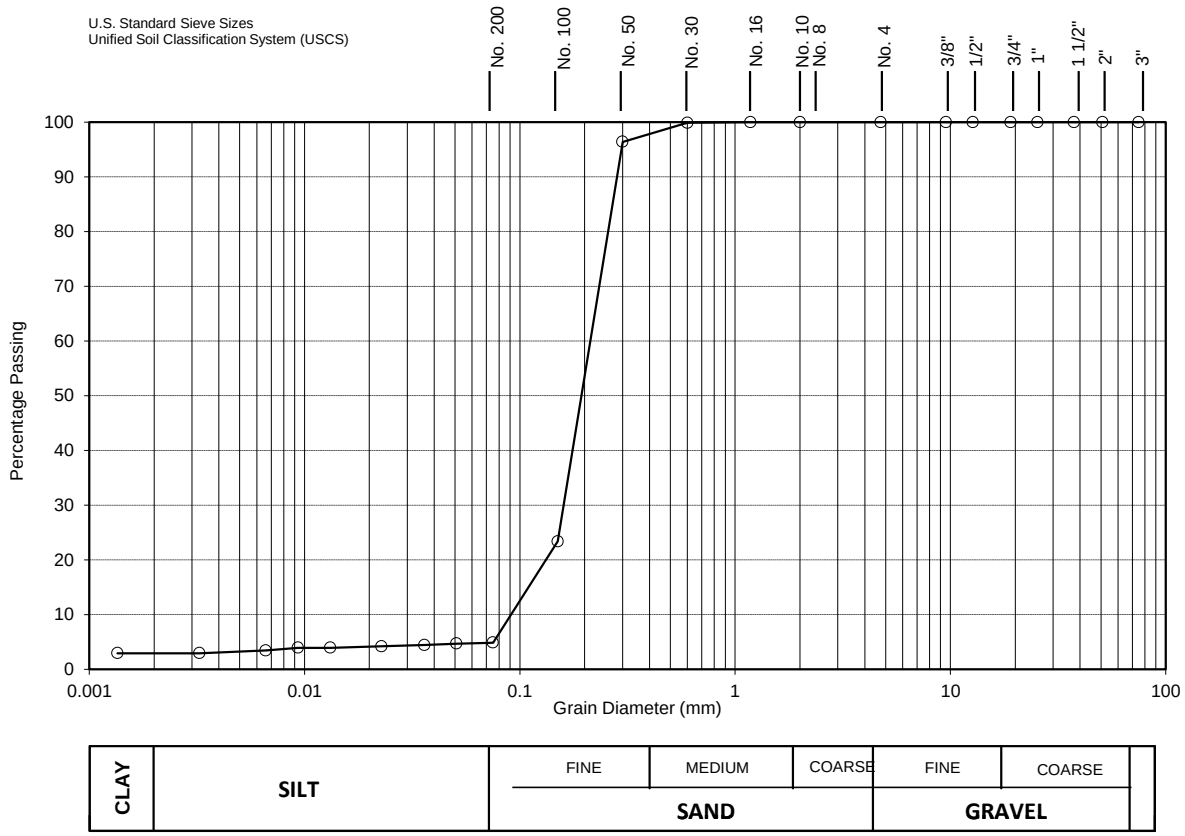
Lab No.:	**21-337**	Notes: Depth: 7.5'	
Borehole No.:	**104**		
Sample No.:	**4**		
CLAY [%]:	**2**	Soil Description: **Brown Sand w/ traces of Silt and Clay**	
SILT [%]:	**9**	**S.P. - Poorly graded sands, little or no fines**	
SAND [%]:	**89**		
GRAVEL [%]:	**0**	Estimated Infiltration Rate [mm/hr] : **100 to 150**	Estimated Permeability, k [cm/s] **10^{-3} to 10^{-2}**
D_{10} (Effective Diam. in mm):	**0.0600**	Coefficient of Uniformity C_U: **3.7**	Coefficient of Curvature C_C: **1.9**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

August 2021	**Grain Size Analysis No. 13**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



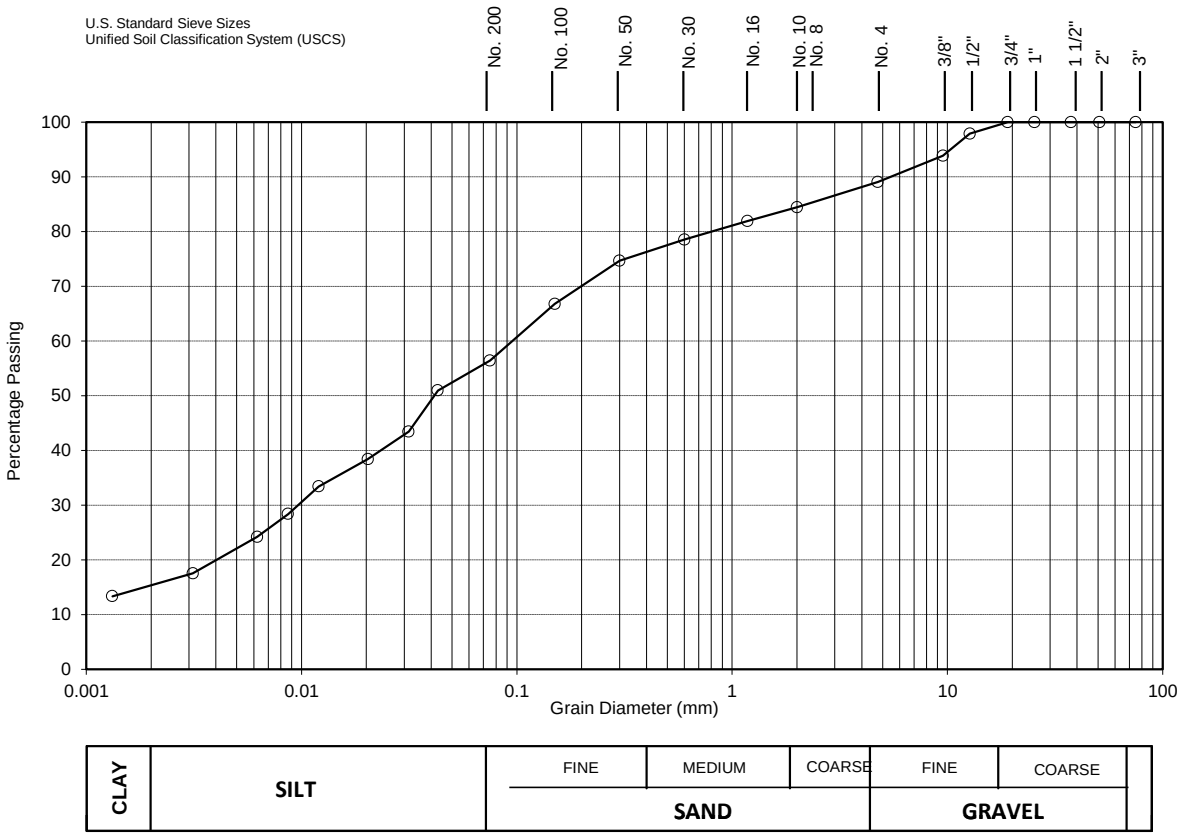
Lab No.:	**22-096**	Notes: Depth: 5'	
Borehole No.:	**302**		
Sample No.:	**2**		
CLAY [%]:	**2**	Soil Description: **Brown Sand w/ traces of Silt and Clay**	
SILT [%]:	**3**	**S.P. - Poorly graded sands, little or no fines**	
SAND [%]:	**95**		
GRAVEL [%]:	**0**	Estimated Infiltration Rate [mm/hr] : **150 to 300**	Estimated Permeability, k [cm/s] **10^{-2}**
D_{10} (Effective Diam. in mm):	**0.09**	Coefficient of Uniformity C_U: **2.3**	Coefficient of Curvature C_C: **1.5**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

March 2022	**Grain Size Analysis No. 14**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



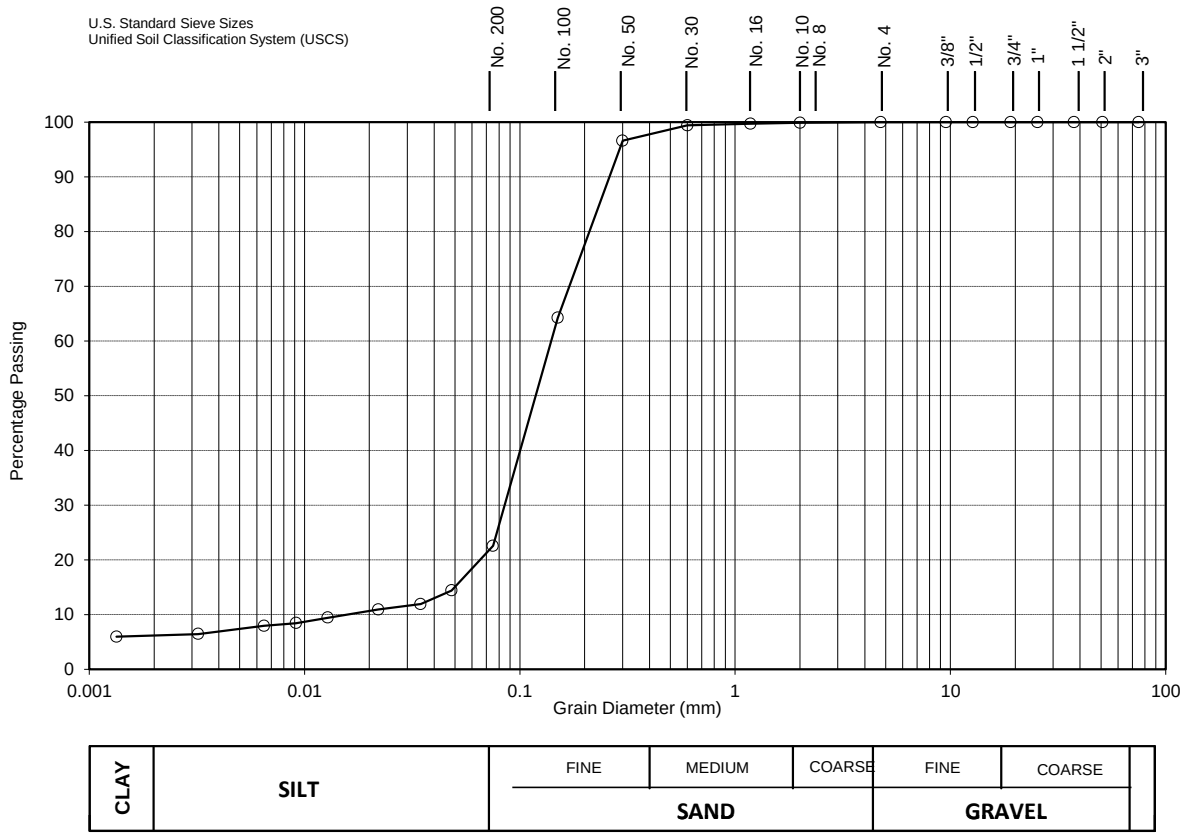
Lab No.:	**22-097**	Notes: Depth: 5'	
Borehole No.:	**304**		
Sample No.:	**2**		
CLAY [%]:	**16**	Soil Description: **Brown Sandy Silt w/ some Clay and Gravel**	
SILT [%]:	**40**	**M.L. - Inorganic silts and very fine sands, silty or clayey fine sands, clayey silts with slight plasticity to S.M. - Sand-silt mixtures**	
SAND [%]:	**33**		
GRAVEL [%]:	**11**	Estimated Infiltration Rate [mm/hr] : **10**	Estimated Permeability, k [cm/s] **10^{-7}**
D_{10} (Effective Diam. in mm):	**0.0009**	Coefficient of Uniformity C_U: **103.3**	Coefficient of Curvature C_C: **1.1**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

March 2022	**Grain Size Analysis No. 15**	**Project No.: SM 301951-T**

Mechanical & Hydrometer Analyses



Lab No.:	**22-098**	Notes: Depth: 5'	
Borehole No.:	**305**		
Sample No.:	**2**		
CLAY [%]:	**7**	Soil Description: **Brown Sand w/ some Silt and a trace of Clay**	
SILT [%]:	**16**	**S.M. - Sand-silt mixtures, silty sands**	
SAND [%]:	**77**		
GRAVEL [%]:	**0**	Estimated Infiltration Rate [mm/hr] : **50 to 60**	Estimated Permeability, k [cm/s] **10^{-4}**
D_{10} (Effective Diam. in mm):	**0.015**	Coefficient of Uniformity C_U: **10.0**	Coefficient of Curvature C_C: **3.3**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

March 2022	**Grain Size Analysis No. 16**	**Project No.: SM 301951-T**

Appendix F

Clayton Subdivision, Elora Sands and Keating Lands – Comprehensive Stormwater Management Strategy Assessment

Technical Memorandum

Project Name:	Clayton Subdivision (75 Woolwich Street East) & Elora Sands (7581 Sideroad 15)	**MTE File No.:**	C50250-100D& C49878-100D
To:	Brett Salmon, Township of Centre Wellington Colin Baker, Township of Centre Wellington	**Date:**	July 20, 2022
		From:	Michael Felinczak, E.I.T. Jeff Martens, P.Eng.
cc:	Curtis Marshall, County of Wellington Meagan Ferris, County of Wellington Michael DeBiasio, The Milo Group Marcus Gagliardi, Cachet Developments Steve Peterson, MTE Consultants Inc.		

RE: Clayton Subdivision, Elora Sands and Keating Lands
Comprehensive Stormwater Management Strategy Assessment

1.0 INTRODUCTION

1.1 Background Information

MTE Consultants (MTE) has been retained by Cachet Developments to complete the preliminary engineering in support of a Draft Plan of Subdivision application for the Clayton Lands in the Village of Elora located at 75 Woolwich Street East (know as the Clayton Subdivision). The Clayton Subdivision comprises an area of about 12.5 ha and is bounded to the northwest by Woolwich Street East, to the northeast by Irvine Street, to the south by existing residential, and to the west by the Salem Public School.

Cachet Developments also owns the adjacent property on the opposite side of Irvine Street located at 7581 Sideroad 15 (SR15) known as the Elora Sands. The Elora Sands (39.2 ha) are currently outside of the settlement area boundary as outlined in the Township of Centre Wellington Official Plan (OP) and are under consideration to be brought into the settlement area during the County of Wellington's Comprehensive Review process in 2022. The Elora Sands are located within the Community Planning Study Area in accordance with the County of Wellington Official Plan.

The Keating Lands are south of the Elora Sands. The Keating Lands are approximately 40.4 ha, currently outside of the settlement area boundary as outlined in the Township of Centre Wellington OP and are under consideration to be brought into the settlement area during the County of Wellington's Comprehensive Review process in 2022. Similar to Elora Sands, the Keating Lands are located within the Community Planning Study Area of the County of Wellington Official Plan.

The Elora Sands and Keating Lands are bound to the northwest by SR15, to the northeast by Gerrie Road, to the southeast by existing residential and a future development (Ainley Farm Subdivision), and to the southwest by Irvine Street. The Elora Sands and Keating Lands are also bisected by the Nichol Drain No. 1 (ND1) which will be discussed in further detail later in this memo.

Figure 1.1 illustrates the Primary Study Area (PSA) which presents the three described parcels of land. The entire PSA is currently row cropped as an agricultural land use.

This technical memo was prepared to review Stormwater Management (SWM) strategies comprehensively for the Clayton Subdivision in the context of ultimate development which may occur within the ND1 subwatershed boundary within the Town of Elora.

For the purposes of this technical memo and in order to review SWM measures comprehensively, the authors of this technical memo have made an assumption that the Elora Sands and the Keating Lands will be developed in the near future. This memo will present three SWM strategies whereby Alternative 1 maintains SWM infrastructure for Clayton within the settlement area, Alternative 3 proposes SWM infrastructure for Clayton outside the settlement area and Alternative 2 is a hybrid alternative with the SWMF within and the outfall to ND1 being outside of the settlement area.

Infrastructure such as storm sewers, Stormwater Management Facilities (SWMF) and surface water outfalls may be located within and external to the current settlement area. It should be noted that the Clayton Subdivision is within the settlement area and primarily drains to ND1 which is outside the settlement area. The Clayton subdivision is upstream of the Elora Sands and Keating lands which are immediately adjacent to ND1 and outside the current settlement area.

2.0 PLANNING AND WATERSHED PLANNING CONTEXT

2.1 Provincial Policy Statement (PPS)

Infrastructure is defined in both the PPS and Growth Plan as: physical structures (facilities and corridors) that form the foundation for development. Infrastructure includes: sewage and water systems, septage treatment systems, stormwater management systems, waste management systems, electricity generation facilities, electricity transmission and distribution systems, communications / telecommunications, transit and transportation corridors and facilities, oil and gas pipelines and associated facilities. Based on this definition above, storm sewers, SWMFs and storm sewer outfalls are infrastructure in the context of the Ontario Provincial Policy Statement excerpts outlined below.

2.1.1 Excerpts from the Ontario Provincial Policy Statement

The Ontario Provincial Policy Statement (PPS) outlines province-wide direction and regulation on land use planning and development within Ontario. This section outlines key statements and excerpts from the PPS that provide the basis for the SWM strategies to be developed comprehensively at a watershed scale and contemplating all potential development.

Part I: Preamble

The Provincial Policy Statement provides for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment. The Provincial Policy Statement supports improved land use planning and management, which contributes to a more effective and efficient land use planning system.

Part IV: Vision for Ontario's Land Use Planning System

The Provincial Policy Statement focuses growth and development within urban and rural settlement areas while supporting the viability of rural areas. It recognizes that the wise management of land use change may involve directing, promoting or sustaining development. Land use must be carefully managed to accommodate appropriate development to meet the full range of current and future needs, while achieving efficient development patterns and avoiding significant or sensitive resources and areas which may pose a risk to public health and safety.

Part V: Policies
Section 1.0: Building Strong Healthy Communities

Section 1.1.2:
Nothing in policy 1.1.2 limits the planning for infrastructure, public service facilities and employment areas beyond a 25-year time horizon.

Section 1.6: Infrastructure and Public Service Facilities
Section 1.6.1:
Infrastructure and public service facilities shall be provided in an efficient manner that prepares for the impacts of a changing climate while accommodating projected needs.

Planning for infrastructure and public service facilities shall be coordinated and integrated with land use planning and growth management so that they are:

a) financially viable over their life cycle, which may be demonstrated through asset management planning; and

b) available to meet current and projected needs.

Section 1.6.6: Sewage, Water and Stormwater
Section 1.6.6.7:
Planning for stormwater management shall:

a) be integrated with planning for sewage and water services and ensure that systems are optimized, feasible and financially viable over the long term;

b) minimize, or, where possible, prevent increases in contaminant loads;

c) minimize erosion and changes in water balance, and prepare for the impacts of a changing climate through the effective management of stormwater, including the use of green infrastructure;

d) mitigate risks to human health, safety, property and the environment;

e) maximize the extent and function of vegetative and pervious surfaces; and

f) promote stormwater management best practices, including stormwater attenuation and re-use, water conservation and efficiency, and low impact development.

Section 2.0: Wise Use and Management of Resources
Section 2.2: Water
Section 2.2.1:
Planning authorities shall protect, improve or restore the quality and quantity of water by:

> *a) using the watershed as the ecologically meaningful scale for integrated and long-term planning, which can be a foundation for considering cumulative impacts of development;*
>
> *d) identifying water resource systems consisting of ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas, which are necessary for the ecological and hydrological integrity of the watershed;*
>
> *e) maintaining linkages and related functions among ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas;*
>
> *g) planning for efficient and sustainable use of water resources, through practices for water conservation and sustaining water quality;*
>
> *i) ensuring stormwater management practices minimize stormwater volumes and contaminant loads, and maintain or increase the extent of vegetative and pervious surfaces."*

Section 2.2.2:
Development and site alteration shall be restricted in or near sensitive surface water features and sensitive ground water features such that these features and their related hydrologic functions will be protected, improved or restored.

Mitigative measures and/or alternative development approaches may be required in order to protect, improve or restore sensitive surface water features, sensitive ground water features, and their hydrologic functions.

The proposed SWM facility is considered 'infrastructure' and not 'development' as defined by the Provincial Policy Statement ('PPS', 2020) and A Place to Grow - Growth Plan ('Growth Plan' 2020).

2.2 Excerpts from the County of Wellington Official Plan and the Township of Centre Wellington Zoning By-Law

This section provides additional statements and excerpts from the County of Wellington Official Plan (May 6, 1999 - last updated July 20, 2021) and the Township of Centre Wellington Zoning By-law which provide the basis for the SWM strategies whereby infrastructure including storm sewers, SWMF and surface water outfalls may be proposed outside the settlement area.

2.2.1 County of Wellington Official Plan

The County of Wellington Official Plan and the Township of Centre Wellington Zoning By-law permit stormwater management facilities in any designation or zone with the exception of,

Section 9.9.9.3:
Stormwater Management In addition to the above general infrastructure policies and the settlement area policies of Section 9.9.7, the following policies shall apply to stormwater management infrastructure proposals:

a) Stormwater management ponds are prohibited in key natural heritage features and key hydrologic features or their vegetation protection zones.

Section 12.6.1: Utilities Allowed
Except as provided for in Section 4.13, the following uses may be permitted in any land use designation, subject to the provisions of the Zoning By-law.
b) utilities and services necessary for the transmission of municipal water, sewage, public roads, parking facilities and facilities for the detention, retention, discharge and treatment of storm water.

2.2.2 Township of Centre Wellington Zoning By-law

Section 4.39: Uses Permitted in All Zones
Nothing in this By-Law shall apply to prevent or otherwise restrict in any way any of the following:

Section 4.39.2:
The installation or maintenance of a watermain, well, sanitary sewer main, storm sewer main, pumping station, gas main, pipeline, storm water management facility, lighting fixture, overhead or underground electrical services, cable television, telegraph or telephone line or associated tower or transformer, together with any installations or structures appurtenant thereto.

3.0 EXISTING CONDITIONS

3.1 Physical Setting & Topography

A topographical survey has been prepared for the Clayton Subdivision by JD Barnes (formerly Black, Shoemaker, Robinson & Donaldson Limited (BSR&D)) in the Fall of 2021. The majority of the Clayton Subdivision slopes from south to north spilling onto the roadside ditch on Woolwich Street East and flowing northeast towards ND1. A topographical ridge is present near the south end of the property starting at Irvine Street and curving northwestward to Woolwich Street East. The area south of the ridge generally slopes from north to south with drainage flowing towards Irvine Creek (IC) (refer to **Section 3.4**) via the surrounding streets and existing residential lots. The southwest corner experiences a localized steep change in elevation towards the existing residential lots to the west. **Figure 3.1** illustrates the existing conditions for the Clayton Subdivision based on the topographical survey.

The balance of the PSA (Elora Sands and Keating Lands) have been assessed utilizing the Grand River Conservation Authority (GRCA) topographical information. These lands have significant topographic relief from the ridge near Irvine Street curving eastward towards the Ainley Farm Subdivision which is generally parallel with ND1. The lands north of this ridge slope northwards discharging directly to ND1. The lands south of the ridge slope gently from north to south outletting to the existing wetland in the south corner and eventually to the Queen Street tributary and then onto Irvine Creek. The remaining lands north of ND1 slope steeply from north to south discharging directly to ND1. **Figure 3.2** shows the existing conditions for the Elora Sands and Keating Lands utilizing the GRCA contour mapping.

3.2 Geotechnical and Hydrogeological Characterization

The PSA comprises of topsoil underlain with silty sand and sand deposits. **Figure 3.3** shows the quaternary geology. Groundwater generally flows from south to north toward ND1 and Irvine Creek. There is an existing municipal drinking water supply well (E1) located on Aqua Street located approximately 850m south of the Clayton Subdivision. Geotechnical and hydrogeological investigations were prepared for the PSA by Soil-Mat Engineers & Consultants and are attached in **Appendix A**.

Figures 3.4 and **3.5** show conceptualized hydrogeological cross-sections based on the geotechnical and hydrogeological investigations as well as Ontario Well Records (**Appendix B**) for domestic wells located around the PSA.

Intrinsic Vulnerability is representative of the Quaternary Geology and is shown in **Figure 3.6.**
WHPA vulnerability scoring is shown in **Figure 3.7.**
SGRA vulnerability scoring is shown in **Figure 3.8.**

3.3 The Nichol Drain No. 1 (ND1)

ND1 is a municipal drain which bisects the Elora Sands and Keating Lands from east to west where it crosses SR15 to the west and eventually outlets to Irvine Creek. Irvine Creek flows southerly and is a tributary of the Grand River.

Previous Studies Completed for ND1

The Nichol Drain Subwatershed Study Phase 1 Existing Conditions Final Report (NDSS1) was prepared by Aquafor Beech Limited dated February 2008.

The Nichol Drain Subwatershed Study Phase 2 (NDSS2) was prepared by Burnside Engineering dated September 2013.

Based on the NDSS1 and NDSS2, ND1 subwatershed encompasses an area of roughly 750 ha made up of mostly agricultural lands, the majority of which are north of ND1. ND1 starts around Beatty Line at its most upstream point flowing west and discharges to Irvine Creek immediately west of Irvine Street. ND1 is considered a coldwater stream discharging to Irvine Creek, which is a coldwater tributary of the Grand River which is also a coldwater fisheries habitat.

NDSS1 outlines several existing catchment areas as shown in **Figure 3.9** – (NDSS1 Figure 3).

The majority of the Elora Sands and Keating Lands are shown within Catchment Area C6b and only a portion of the Clayton Subdivision is shown to be within Catchment Area C6c.

MTE generally agrees with the Catchment Area C6b boundary, however, based on a detailed review of the existing conditions of the Clayton Subdivision as well as a site walk on February 9, 2022, MTE delineated a larger catchment area to ND1 as compared to the **Figure 3.9** presented in the NDSS1.

See **Figures 3.10 and 3.11** outlining our detailed catchment areas for the Clayton Subdivision and for the overall PSA. **Figure 3.11** also outlines the subcatchment areas downstream of the PSA.

NDSS1 completed a floodplain analysis for ND1 (see NDSS1 Figure 4 in **Appendix C**). This floodplain analysis will be updated to include envisioned development for upstream areas for both Elora and Fergus.

As stated in the NDSS1, ND1 has been historically maintained as a straightened ditch-like watercourse. However, recently, in the absence of maintenance, has started to show signs of natural channel morphology. NDSS1 split up ND1 into multiple reaches of similar cross-section (refer to NDSS1 Figure 5 in **Appendix C**). ND1 within the PSA is represented by Reach 2a and 2b. These two reaches were classified as Type 2 channels which are relatively straight with high sediment fluxes following maintenance activities.

A few wetland features were identified in NDSS1 within the PSA, including ND1 watercourse (see NDSS1 Figure 12 in **Appendix C**). One existing wetland (SWM4-1) is located in the centre of the Elora Sands and Keating Lands.

3.4 Irvine Creek

Irvine Creek is a coldwater tributary of the Grand River. Irvine Creek generally flows from north to south passing west of the PSA discharging to the Grand River near the western boundary of Elora. No subwatershed study for Irvine Creek has been completed recently. Since both Irvine Creek and ND1 are coldwater tributaries of the Grand River, both watercourses would implement similar SWM objectives.

Some of the Clayton Subdivision drains to the Irvine Creek. Catchment I-101 directs drainage to the Woolwich Street east roadside ditch flowing past the Salem Public School and down Millford Crescent and through residential side lot swales into Irvine Creek. This storm outlet is a poor municipal outlet and cannot be utilized for the development of the Clayton subdivision. Catchment I-105 drains through private property as well and should not be used as a significant outlet for the development.

Currently there are no suitable outlets readily available to Irvine Creek within the settlement area.

3.5 Natural Heritage as identified in NDSS1

This section presents general information that was included within the NDSS1 for the entire subwatershed as it relates to the natural environment. The NDSS1 was completed with specific focus on the secondary plan area in Fergus. The information presented in this section is for information only and detailed studies and seasonal surveys completed by a qualified consultant are required to confirm any natural features and associated development limits in the context of applicable natural heritage policies and regulations.

3.5.1 Natural Heritage Features as identified in the NDSS1

There are two identified natural heritage features located within the PSA, including the Nichol Drain and an unevaluated wetland at the south corner of the Keating Lands. These natural areas are designated as Core Greenlands within the County of Wellington Official Plan.

The unevaluated natural feature in the centre of Elora Sands and Keating Lands identified in the NDSS1 is not identified as a Core Greenland within the County of Wellington Official Plan.

The presence of these features and applicable development limits in proximity to these features will need to be confirmed through more detailed site-specific environmental studies.

3.5.2 Aquatic Ecosystems as identified in the NDSS1

ND1, Irvine Creek and the Grand River in and near Elora are coldwater fish habitats. The MECP requires the highest level of Stormwater management control with respect to TSS and temperature mitigation to protect this coldwater fish habitat.

3.6 Objectives/SWM Criteria

Several key objectives have been established within the NDSS1 as development proceeds within the subwatershed in order to provide long term health to the subwatershed. The following summarize the specific SWM criteria for ND1 which is generally applicable for the Irvine Creek:

- Channel Health:
  - ND1-Reach 2a and 2b be re-established with a wider corridor 30m wide setback on each side from streambank) to encourage a more a natural channel form including riparian vegetation planting
  - Terracing of ND1 to improve floodplain connection to the channel
- Water Quality:
  - Enhanced level of protection for TSS removal
  - Maintain water temperature to promote coldwater fish habitat
  - SWMF adjacent to the Reaches 2a and 2b should be wetpond type SWMF with end of pipe infiltration
- Water Quantity and Erosion:
  - Maintain post-development to pre-development flows of existing catchment areas up to the 100-year storm event
  - Volume flow control for frequent storm events to reduce erosion stress on ND1
- Water Balance – Surface Water and Groundwater:
  - Maintain surface and groundwater - water balances for small wetland features
  - Maintain water balance overall as there is evidence of local groundwater discharge via interflow and baseflow into ND1 and IC
  - Groundwater interflow connections to the ND1 should be pursued further
- Infiltration and Flow Volume Reduction:
  - Implement clean water (roofwater) lot level infiltration.
  - Promote End of Pipe Infiltration to provide volume reduction and reduce erosion impact
  - Promote End of Pipe infiltration to mitigate thermal impacts and promote interflow and baseflow to ND1
- Thermal Impact:
  - Implement Wetpond SWMF with End of Pipe infiltration to mitigate thermal impacts to ND1 through infiltrated water discharging as baseflow to ND1
  - Implement LIDs where appropriate
- Mitigate Phosphorus and Nitrates Loading

4.0 DEVELOPMENT OF COMPREHENSIVE SWM STRATEGY ALTERNATIVES

Three SWM Strategy Alternatives were developed for full development of the overall PSA. Alternative 1 represents a strategy which would retain stormwater infrastructure for Clayton within the settlement area. Alternative 2 maintains the SWMF for Clayton within the settlement area while the storm sewer outlet and outfall are directed to ND1 outside the settlement area. Alternative 3 locates the SWMF for Clayton near ND1. SWMF have been numbered from 1 to 5 for ease of reference in the attached figures.

4.1 Alternative 1 — Clayton Subdivision SWMF4 to Irvine Creek; Elora Sands & Keating Directed to SWMF1, 2 & 5 to ND1; A Small Portion of Keating Lands Directed to SWMF3

Refer to Figure 4.1 which illustrates Alternative 1.

Alternative 1 is a strategy which maintains all infrastructure within the settlement area. Alternative 1 is a strategy which proposes one SWMF4 for the entire Clayton Subdivision located near the northwest corner of the property adjacent to Woolwich Street East and the Salem Public School. The storm outlet and overland flow route is directed along Woolwich Street East and northwest to Irvine Creek along James Street. Some open space and rear yards near the southwest and southeast corners of the property unable to drain to the SWMF4 will discharge clean stormwater towards the existing residential properties.

This alternative represents a standalone SWM strategy for the Clayton Subdivision where drainage would be retained and treated within the Clayton Subdivision and outlet directly to Irvine Creek, bypassing ND1. A SWM strategy for the Elora Sands and Keating Lands is presented with this Alternative 1. A reduced drainage area of the southwest portion of Keating Lands will be directed to the Queen Street Tributary. Wetlands recommended to be retained through detailed studies (to be completed at a later date) may require a surface water balance which could reduce the drainage area in this location as well as reduce flows and erosive stress on the Queen Street Creek.

Alternative 1 will have a total of 5 SWMF and 5 Storm Sewer Outfalls.

4.2 Alternative 2 — SWMF4 for Clayton Subdivision to the ND1; Elora Sands & Keating Lands Directed to SWMF1, 2 & 5 to ND1; A Small Portion of Keating Lands Directed to SWMF3

Refer to Figure 4.2 which illustrates Alternative 2.

Alternative 2 proposes one SWMF4 for the entire Clayton Subdivision located near the northeast corner adjacent to Woolwich Street East and Irvine Street. Some open space and rear yards near the southwest and southeast corners of the property unable to drain to the SWMF4 will discharge clean stormwater towards the existing residential properties. Alternative 2 proposes to discharge the treated stormwater northeastward to ND1 via a storm sewer on SR15 and a storm outfall on the upstream side of SR15 at ND1.

This alternative represents a standalone SWM strategy for the Clayton Subdivision, however, it may be beneficial to coordinate SWM strategies for the Elora Sands and Keating Lands to identify the ultimate outfall discharge configurations. The SWM strategy for the Elora Sands and Keating Lands is the same as Alternative 1.

Alternative 2 has 5 SWMF and 4 storm sewer outfalls as SWMF4 and SWMF1 share an outfall to ND1.

4.3 Alternative 3 — Comprehensive SWM Strategy
Clayton Subdivision to SWMF1 to ND1
Elora Sands & Keating Lands Directed to SWMF1, 2 to ND1
A Small Portion of Keating Lands Directed to SWMF3

Refer to Figure 4.3 which illustrates Alternative 3.

Alternative 3 proposes to merge the Clayton Subdivision and the Elora Sands and Keating Lands into one comprehensive SWM strategy discharging to the Nichol Drain. This alternative proposes one SWMF1 at the southwest crossing of SR15 over ND1 which collects and treats drainage from the Clayton Subdivision and a majority of the Elora Sands and Keating Lands on the south side of ND1. The balance of the lands on the south side of ND1 will be treated by SWMF3 located adjacent the existing wetland at the south corner of the site, as described for Alternative 1. The remaining lands on the north side of ND1 will be treated by SWMF2.

SWMF1 would be constructed in stages with the Stage 1 collecting runoff from the Clayton Subdivision. When the Elora Sands and Keating Lands are brought into the settlement area, SWMF1 will be expanded (Stage 2) for the ultimate development of the PSA. Under Stage 1, minor storm drainage from the Clayton Subdivision will be collected and conveyed to SWMF1 via a new storm sewer on SR15. Major storm drainage will be conveyed via SR15. Alternative 3 also provides stormwater management for the municipal roads being Woolwich Street East, SR15 and Irvine Street under ultimate development (Stage 2).

Alternative 3 has 3 SWMF and 3 storm sewer outfalls.

5.0 COMPARATIVE ANALYSIS AND EVALUATION CRITERIA

All three alternatives were scored with a 1 to 5 scoring system, with 5 being the best and 1 being the poorest. This preliminary assessment should not be considered a complete or comprehensive EA analysis and was developed as a screening tool used identify the preliminary preferred SWM Strategy.

The evaluation criteria consist of five factor categories which are further subdivided into groups with the groups being described by individual factors (Factor Category - Group / Individual Factor):

1. Natural Environment

1.A Terrestrial Ecosystems

- Vegetation Communities, Flora and Wildlife Habitat
- Maintains natural features as identified in NDSS1

1.B Wetland Ecosystems

- Wetlands - Impact on feature and function of wetlands (e.g., area, classification and quality, relative extent, function in broader wetland complex ecosystem).

1.C Aquatic Ecosystems

- Aquatic Habitat - Number of water bodies and watercourse crossings. Sensitivity of fish/fish habitat and thermal regime (warm, cool or cold water). Extent (area) and function of riparian habitat removed.

1.D Surface Water (Quality - Impact to Water Quality / Thermal / Chlorides)

- Water Quality (TSS, Phosphorous, Nitrates) – Impact on water quality of surface water features.
- Thermal Regime – Impact on the thermal regime of surface water features.

1.E Groundwater Resources

- Groundwater Municipal Water Supply – Potential for impacts on municipal groundwater quantity and quality.
- Groundwater Quality – Potential for impacts to WHPA and SGRA vulnerable areas as defined in the Clean Water Act.
- Shallow Groundwater Movement – Potential for interference with existing flow patterns (baseflow) relative to proximity to significant surface water feature and significant groundwater feature discharge areas.
- Shallow Groundwater Quality – Potential for impacting groundwater quality relative to proximity to significant surface water feature and significant groundwater feature discharge areas.
- Shallow Groundwater Quantity – Water balance to Groundwater features

1.F Surface Drainage (Quantity - Water Balance and Erosion)

- Quantity (flows) – Quantity control and flow regime in watercourse
- Flood Plain Function – Impact to regulatory floodplain and changes to floodplain hydrologic function.
- Surface Water Balance – Impact on surface water features.
- Erosion Assessment – Impact on erosion in stream.

2. Socio-Cultural Environment

2.A Land Use Policy

- Land Use Designations and Policies - Degree of consistency with Provincial Policy Statement; conformity with the Growth Plan and County and township long term growth and development goals, objectives and policies. Comprehensive Planning, efficient use of land and infrastructure, options promoting Green Infrastructure, appropriately consider cumulative environmental impact (watercourse health, water balance, temperature).

3. Transportation/Municipal Services and Utilities

3.A Transportation Network (Roads and Pedestrians)

- SWM Strategies support Roads and Intersections Improvements
- Potential impacts to Woolwich Street East, Sideroad 15 and Irvine Street

3.B Municipal Services and Utilities

- Municipal Services – Opportunities for connections/logical extension to services, opportunity to improve major/minor storm outlets

4. Financial

- Capital Cost – Estimated capital cost, including restoration/enhancement cost of Nichol Drain
- Operational Cost – Extraordinary operations and maintenance requirements/costs

5. Technical

- SWM Design Requirements – Conformance to Township of Centre Wellington/County of Wellington standards, MECP and GRCA
- Facilitate Development, Grading and Servicing
- Potential for grading flexibility (cut/fill), ability to maintain positive drainage and establish strategy for runoff distribution
- Constructability – Physical constructability, potential conflicts with existing infrastructure, current staging of development for full implementation of the storm network, water table and groundwater dewatering

6.0 EVALUATION OF ALTERNATIVES

Outlined in this Technical Memorandum is a brief comparative analysis of three alternatives, utilizing typical evaluation criteria. We have completed a preliminary assessment of these three alternatives using a 5 to 1 Scoring system. The best alternative will score a 5, whereas the least preferred will score a 1 and the remaining alternative will have a relative score somewhere between 1 and 5, based on professional judgement. The evaluation presented in this section was intended as a screening process prior to the completion of future more detailed studies. A summary matrix of the scoring is attached in **Appendix D**.

6.1 Natural Environment

Terrestrial Ecosystems (Vegetation/Wildlife)
Wetland Ecosystems
Aquatic Ecosystems

All alternatives locate SWMF outside woodlands, wetlands, watercourses (as identified by the NDSS1). SWMF outfalls and minor grading may be within buffers, which are to be determined through detailed environmental studies.

Alternative 3, through detailed design could provide enhancements to ND1 as proposed in the NDSS1 including the required land designation as well as the terracing within the buffers thereby encouraging natural channel form thus improving the overall function of the Nichol Drain. This would provide an immediate net environmental benefit and habitat to ND1 and its outlet into Irvine Creek. Alternative 3 also maximizes the interflow and baseflow to ND1 and supports the adjacent wetland functions. Alternative 3 scored a 5.

Alternative 2 would not complete any significant upgrades to ND1 in the near term. Runoff from the Clayton Subdivision that naturally flows to ND1 would continue to outlet into ND1 therefore matching post-development conditions to pre-development conditions and surface water balance. Alternative 2 scored a 3.

Contrary to the previous two alternatives, Alternative 1 would eliminate drainage that naturally flows towards ND1 and thereby creating a water balance shortage to the watercourse and wetland natural functions which may have impacts on vegetation and wildlife without mitigation. Alternative 1 scored a 1.

Surface Water (Quality)

Alternative 3 aligns the SWMFs closest to the outlet point and therefore has the greatest ability at controlling the discharge or runoff into the natural environment. Alternative 3 allows for the greatest water quality benefits as the treated water would outlet directly into ND1 rather than being conveyed within a storm sewer whereby treated and untreated runoff water may mix. Alternative 3 provides the best opportunities to capture and treat runoff from the existing municipal right-of-ways (ROW) since they are upstream of the proposed SWMF1. Alternative 3 scored a 5.

Alternative 2 is similar to Alternative 3, however, the outlet from the Clayton Subdivision SWMF would require some form of conveyance mechanism to transport the treated runoff to ND1. Alternative 2 will not have the same opportunities to control the runoff from the existing ROWs as they do not currently drain onto the Clayton Subdivision. This alternative scored a 2.

Alternative 1 does not conform to the natural drainage patterns for the Clayton Subdivision and thus would be eliminating the natural runoff water balance contribution to ND1. Alternative 1 scored a 1. All SWMF will provide an enhanced level of water quality, however SWMF(s) oriented towards ND1 should be designed as wet pond SWMF with end of pipe infiltration to provide additional enhancements with respect to thermal, phosphorous and nitrate. The NDSS1 describes ND1 as a coldwater stream and therefore thermal mitigation practices such as wet pond facilities with end of pipe infiltration, deep pools, bottom draw pipes, cooling trenches are more easily implemented adjacent to ND1.

Groundwater Resources

Alternative 3 provides the most opportunity to locate the SWMFs near ND1 with end of pipe infiltration in soils conducive for infiltration which enhances baseflow and interflow to the watercourse and perimeter wetlands. Alternative 3 locates end of pipe infiltration in areas of lowest groundwater vulnerability and hence provides the greatest protection for the municipal water wells and long term water supply. Refer to the Intrinsic Vulnerability, WHPA vulnerability and SGRA Vulnerability figures attached. Alternative 3 scored a 5.

Alternative 1 and 2 scores 1 and 2 respectfully for this category locating SWMF near WHPA vulnerability areas with score of 8.

Surface Drainage (Quantity – Water Balance and Erosion)

Alternatives 2 and 3 provide quantity control, water balance and erosion control for the development lands. Alternative 1 provides quantity control and erosion control only. Alternative 3 provides management for the municipal roads during the development of Clayton, whereby the other alternatives implement water management for municipal roadways through the development and SWM implementation for the Elora Sands.

Alternative 3 scores a 5. Alternative 2 and 1 scored a 3 and 1 respectively based primarily on surface water balance and erosion and the timing of management for roadway improvements.

6.2 Socio-Cultural Environment

Land Use Policy

Alternative 3 represents the most efficient use of land and infrastructure resulting from the comprehensive planning approach. It is recognized that the SWMF and the outfall are outside the settlement limit for the Clayton subdivision and it is also recognized that ND1 is the primary outlet for Clayton and is also outside of the settlement area. Despite the infrastructure being outside the settlement area, Alternative 3 implements an efficient use of land, minimizes volumes of storage, maximizes water management and mitigates impacts most effectively. All lands within the PSA are within the Community Planning Study Area as outlined in **Section 1.1**. Alternative 3 scored a 5.

Alternative 2 essentially disconnects the east and west parcels along Irvine Street and eliminates the opportunity of shared or communal services for these future development lands. This causes development to provide unnecessary infrastructure and land requirements resulting in inefficient land use planning. Additionally, this alternative would not follow the most appropriate staging of development because the first SWMF in the PSA is located in the most upstream catchment of ND1. Alternative 2 scored a 3.

Alternative 1 would also be an inefficient plan for development from the additional infrastructure and facilities creating the most socio and environmental impact. Alternative 1 scored a 1.

Communities

Alternative 1 would have the most impact to the local community as a result of the infrastructure requirements along Woolwich Street East and James Street. Alternative 1 will be most disruptive to the school and the nearby community. The SWMF in close proximity to the school is not preferred. Alternative 1 scored a 1.

Alternative 3 will have minor disruption to the local community typical of any construction project. Alternative 3 scored 5.

Alternative 2 will have minor disruption to local residents as a result of the construction. This alternative may require construction and dewatering in close proximity to ND1 on two separate occasions. This alternative score a 4.

6.3 Transportation/Municipal Services

6.3.1 Transportation Network (Roads and Pedestrians)

Roads and Intersections (Grading)

This factor group is based on the potential impact of the alternatives on local roads and intersections, specifically the impact to the Woolwich Street East, SR15 and Irvine Street intersection and the improvements to these existing streets. The alternatives with the most opportunities to plan the long term design for these streets are preferred.

Alternative 3 provides for the opportunity to plan and design the surrounding streets and associated infrastructure and outfalls to accommodate the ultimate buildout of the PSA when the additional lands are brought into the settlement area. Alternative 3 provides the best storm outfalls for roads and provides the best stormwater treatment of road runoff. Alternative 3 received a score of 5.

Alternative 2 provides some opportunities for controlling road runoff for Irvine Street and SR15 at some point in the future. Alternative 2 scored a 3.

Alternative 1 scored 1.

6.3.2 Municipal Services and Utilities

Municipal Services

This factor group is assessing opportunities for connection to or logical extension of services, provision of standard cross-section locations for services and opportunity to improve minor and major storm outlets. With regards to the opportunities for connection to or logical extension of existing services and improvement of minor and major storm outlets, the alternatives which propose new services within rural streets that are to be urbanized will be favoured in the scoring.

Alternative 3 places the SWMFs closest to their respective outlets and thus reduces the need for lengthy external storm infrastructure. This alternative also presents a logical extension for new and future infrastructure within external streets that are to be ultimately urbanized. Drainage from external

roads would be collected and treated within the proposed SWMFs thereby improving the storm outlet for Woolwich Street East, Irvine Street and SR15 and creating a net benefit to development of the area. Alternative 3 received the maximum score of 5.

Alternative 2 similar to Alternative 3, the SWMFs are closest to their respective outlets presenting a logical addition of new infrastructure within Irvine Street and SR15. This alternative score lower than the previous option because of the additional SWMF1 on the Clayton Lands and associated infrastructure. Alternative 2 received a score of 3.

Alternative 1 received a score of 1.

6.4 Financial (Capital and Operation and Maintenance Costs)

Capital Costs and Land Costs

Alternative 3 would have the lowest capital cost overall as a result of having less total SWMFs and less land requirements. The storm sewer from Clayton will convey uncontrolled flows from the Clayton Subdivision across Irvine Street to SWMF1 where flows are managed prior to discharge to ND1. Alternative 3 scored a 5.

Alternative 2 would have significantly more costs than the previous option as a result of an additional SWMF required, and additional lands. The storm sewer to ND1 may be slightly smaller with controlled flow however this alternative would mix treated with untreated water if the storm sewer also collected road drainage. Alternative 2 scored a 3.

Alternative 1 would have substantially more capital costs compared to the other two alternatives as result of the additional SWMF and the extensive existing infrastructure upgrades required to provide an adequate SWM outlet. Alternative 1 scored a 1.

Operation and Maintenance Costs

Similar to the Capital Cost category, Alternative 3 would have the least amount of operation and maintenance costs as result of minimizing the number of SWMFs the Township would have to maintain long term. Alternative 3 scored a 5.

Conversely, the introduction of additional SWMFs (Alternative 2) will have increased long term operation and maintenance costs and requirements. Alternative 2 scored a 2.

In addition to the extra SWMFs, Alternative 1 will add a significant amount of new infrastructure onto the Township's storm sewer system that would otherwise not be required. Alternative 1 scored a 1.

6.5 Technical (SWM Requirements, Topographic, Constructability)

All alternatives will meet the SWM requirements for the development lands however Alternative 3 provides management for the existing roads and future road way improvements in stage 1 (Clayton) as opposed to water management being provided many years later under Alternative 2 and 1.

Alternative 3 provides the most flexibility for the grading and servicing of the imminent and future development lands and would generally facilitate the staging of development. The lands necessary for the implementation of SWMF1 is readily available as it is owned by Cachet. Alternative 3 scored a 5.

The construction of SWMF1 in the initial stages of development provides flexibility in road improvements and development staging. SWMF1 is located in an area where soils are most suitable for infiltration and the groundwater inputs provide interflow and baseflow to ND1. The infiltration of treated water for SWMF1 is located in an area of lowest groundwater vulnerability and mitigates risk to the municipal water supply. Alternative 2 would score a 3 and Alternative 1 would score a 1 respectfully.

7.0 CONCLUSIONS

As a result of the evaluation of the alternatives outlined in this memorandum, Alternative 3, being a comprehensive community SWM strategy for the three properties proves to be the preferred stormwater management strategy for the PSA.

Alternative 3 minimizes and centralizes SWMFs that can be designed and constructed in phases to facilitate current and potential future development.

The current uncontrolled drainage from adjacent municipal right-of-ways (Woolwich Street East, SR15 and Irvine Street) would be collected and treated by the communal SWMF1, providing a net environmental benefit to the surrounding area and allowing for full urbanization of the surrounding streets in conformance with both current and future development needs. Alternative 3 provides storm outfall for future road improvements.

Alternative 3 provides the most benefit to water quality discharging into ND1 since the SWMF1 will directly outlet into ND1, by management of flows, whereas the other alternatives require a conveyance system (eg. storm sewers) to transport the treated water to their respective outlet point.

Alternative 3 is most preferred as it maintains features as presented in background studies and provides the greatest opportunity for restoration and enhancement of the natural system. Further, this alternative enhances interflow and baseflow to ND1.

Alternative 3 is best with respect to protecting groundwater features and municipal water supply.

Alternative 3 requires the least land area, minimizes volumes and provides the highest level of protection to the environment.

Alternative 3 is the most efficient SWM strategy and best aligns with the PPS, the county and township municipal planning policies.

WOOLWICH STREET EAST

IRVINE STREET

SIDEROAD 15

GERRIE ROAD

SIDEROAD 15

CLAYTON SUBDIVISION
(LANDS OWNED BY
CACHET
DEVELOPMETS)

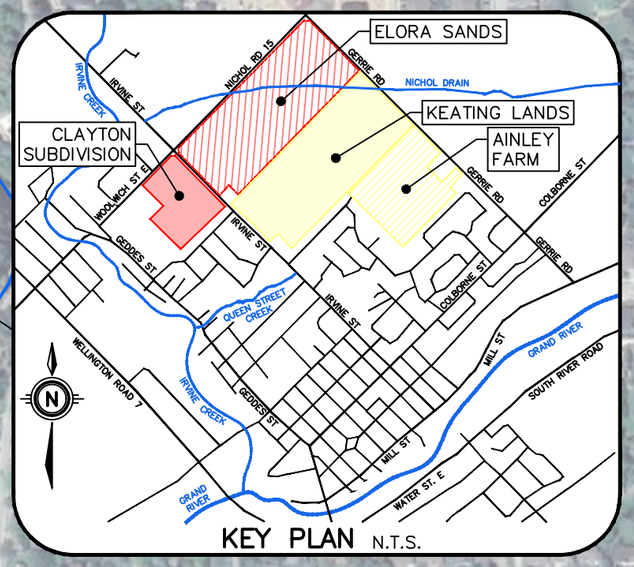
ELORA SANDS
(ADDITIONAL LANDS
OWNED BY CACHET
DEVELOPMENTS)

GERRIE ROAD

IRVINE STREET

KEATING
LANDS

AINLEY FARM SUBDIVISION
(ADDITIONAL LANDS
OWNED BY KEATING)



KEY PLAN N.T.S.

FIGURE 1.1

Date: FEB.03/22
Scale: 1:5000

PROPERTY OWNERSHIP MAP

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100
49878-100

March 2, 2022 — 11:18 a.m. — Plotted By: RChen

P:\P\50250\100\50250-100-F1 ownership.dwg

WOOLWICH STREET EAST

SIDEROAD 15

SALEM PUBLIC SCHOOL

CLAYTON SUBDIVISION

IRVINE STREET

ELORA SANDS

(405.95)
(406.33)
(407.21)
(407.00)
(407.00)
(407.00)
(406.07)

LOCALLY KNOWN AS WOOLWICH STREET ROAD ALLOWANCE BETWEEN LOTS 15 AND 16

PART 1, PLAN 61R-3728

PART 3 61R-21784

PART 2 61R-7043

CON 12

LOT 16

BLOCK 129

BLOCK 128

LOT 59 LOT 60 LOT 61 LOT 62 LOT 63 LOT 64 LOT 65 LOT 66 LOT 67 LOT 68 LOT 69 LOT 70 LOT 71 LOT 72 LOT 73 LOT 74 LOT 75

CLEGG ROAD

FARR DRIVE

FIGURE 3.1

Date: FEB.03/22
Scale: 1:2500

CLAYTON SUBDIVISION EXISTING CONDITIONS

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100
49878-100

March 8, 2022 — 2:52 p.m. — Plotted By: RChen

P:\P\50250\100\50250-100-F2 clayton ex.dwg

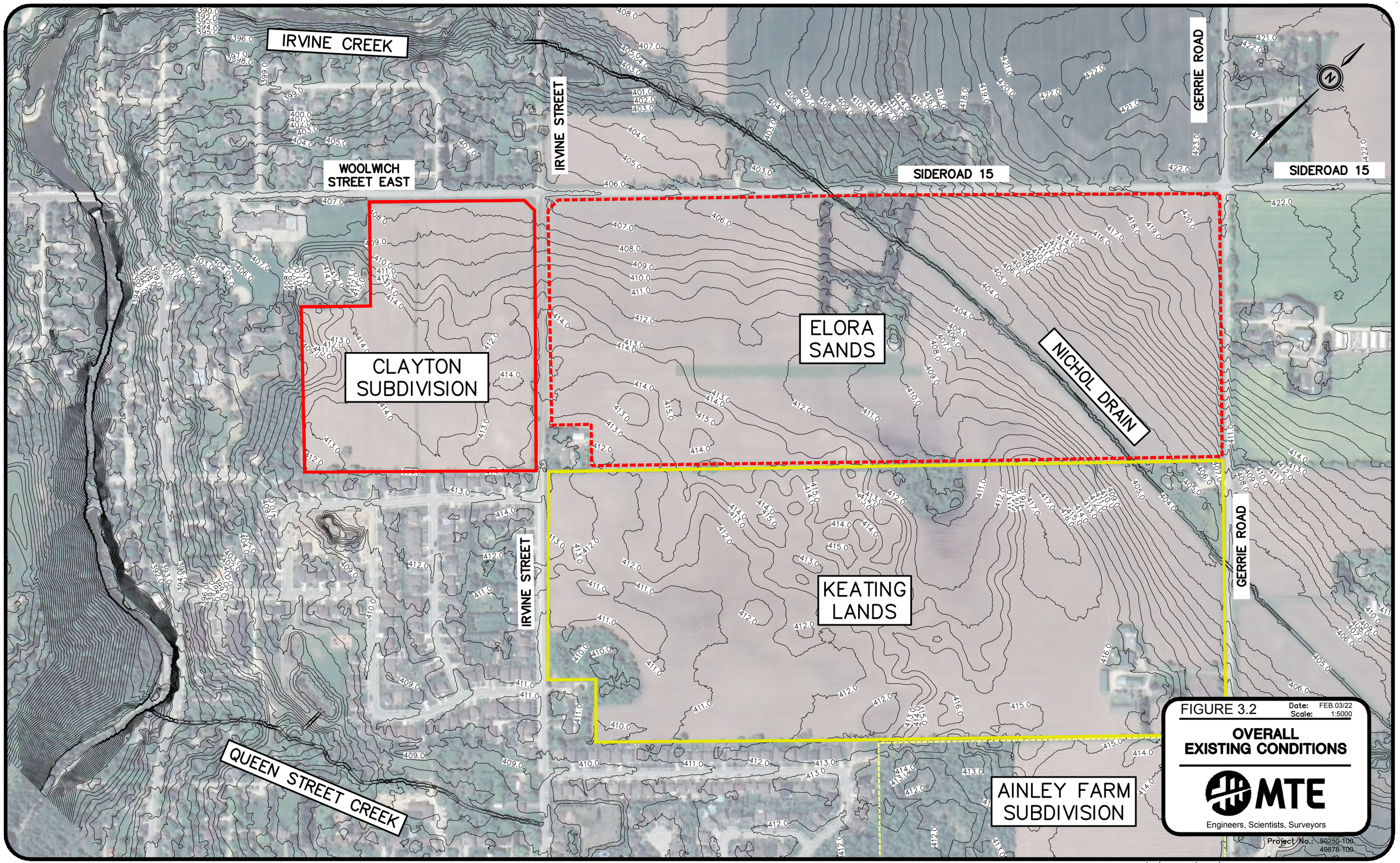


FIGURE 3.2

OVERALL EXISTING CONDITIONS

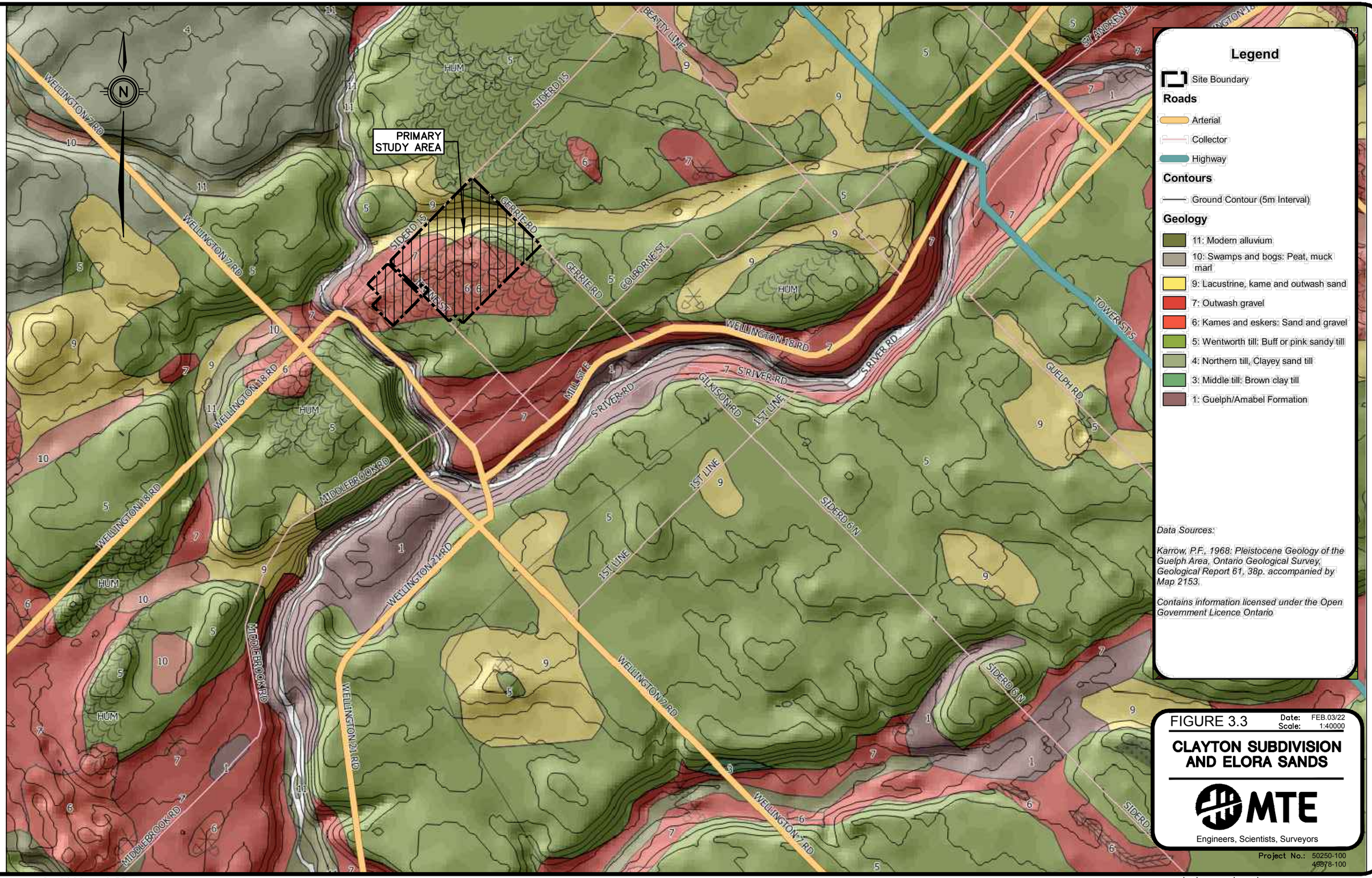
Date: FEB.03/22
Scale: 1:5000

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100
49878-100

March 2, 2022 — 11:26 a.m. — Plotted By: RChen

P:\P\50250\100\50250-100-F3 overall ex.dwg



Legend

- Site Boundary

Roads

- Arterial
- Collector
- Highway

Contours

- Ground Contour (5m Interval)

Geology

- 11: Modern alluvium
- 10: Swamps and bogs: Peat, muck marl
- 9: Lacustrine, kame and outwash sand
- 7: Outwash gravel
- 6: Kames and eskers: Sand and gravel
- 5: Wentworth till: Buff or pink sandy till
- 4: Northern till, Clayey sand till
- 3: Middle till: Brown clay till
- 1: Guelph/Amabel Formation

Data Sources:

Karrow, P.F., 1968: Pleistocene Geology of the Guelph Area, Ontario Geological Survey, Geological Report 61, 38p. accompanied by Map 2153.

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FIGURE 3.3

Date: FEB.03/22
Scale: 1:40000

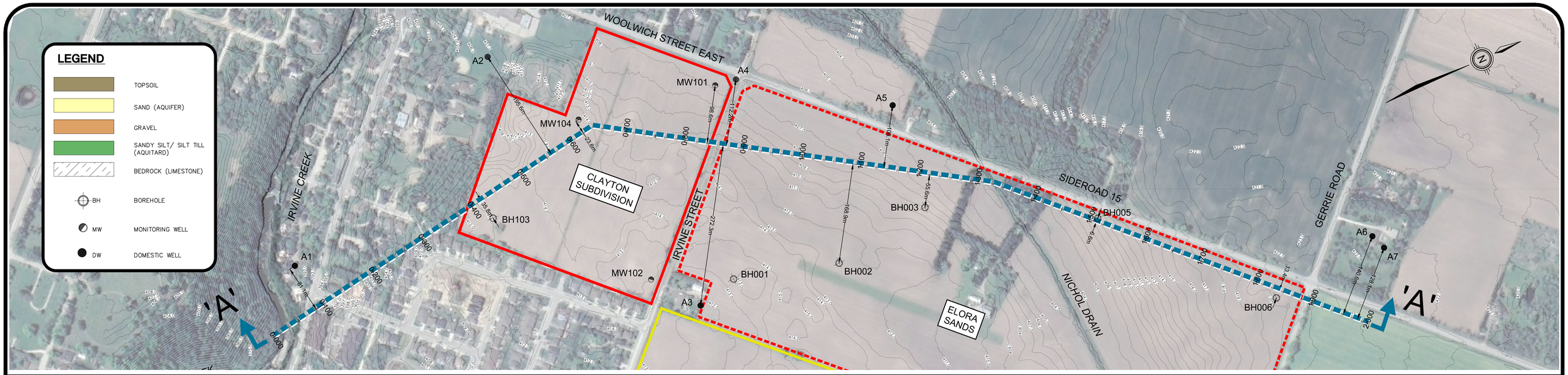
CLAYTON SUBDIVISION AND ELORA SANDS

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100
49878-100

March 8, 2022 — 2:55 p.m. — Plotted By: RChen

P:\P\50250\100\50250-100-F14.dwg



SECTION A-A

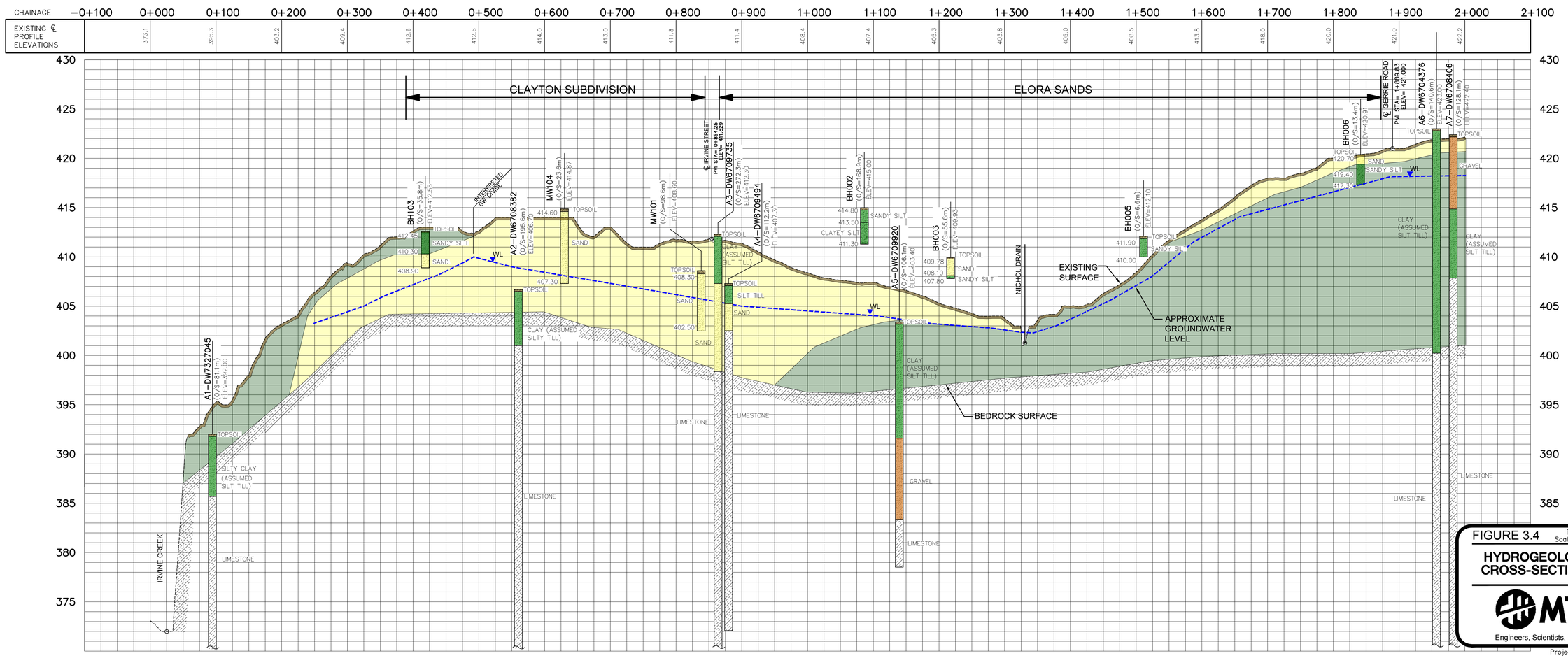
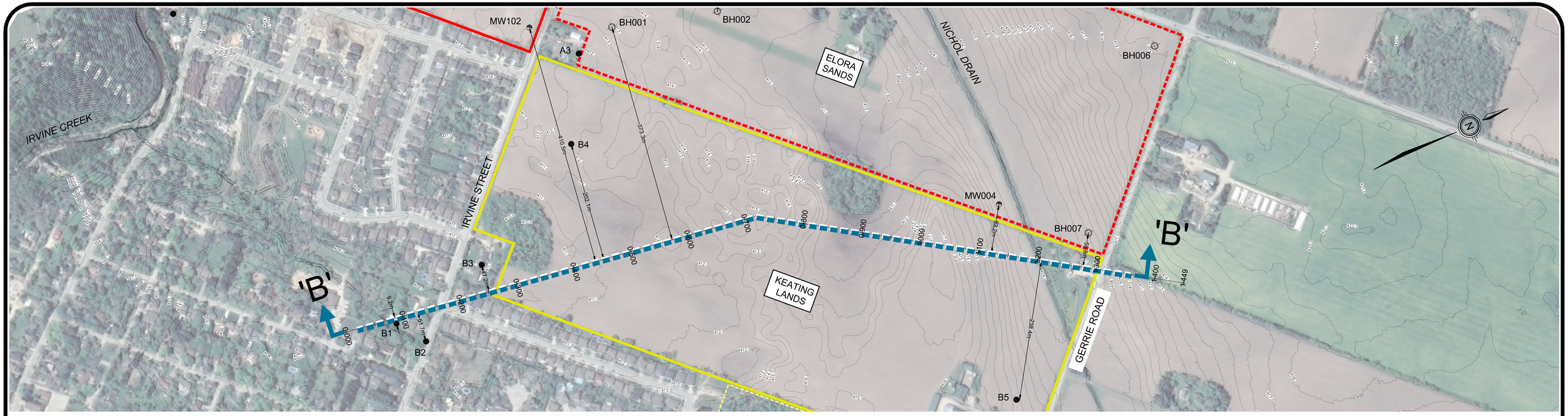


FIGURE 3.4 Date: MAR 25/22 Scale: V 1:200 H 1:3000

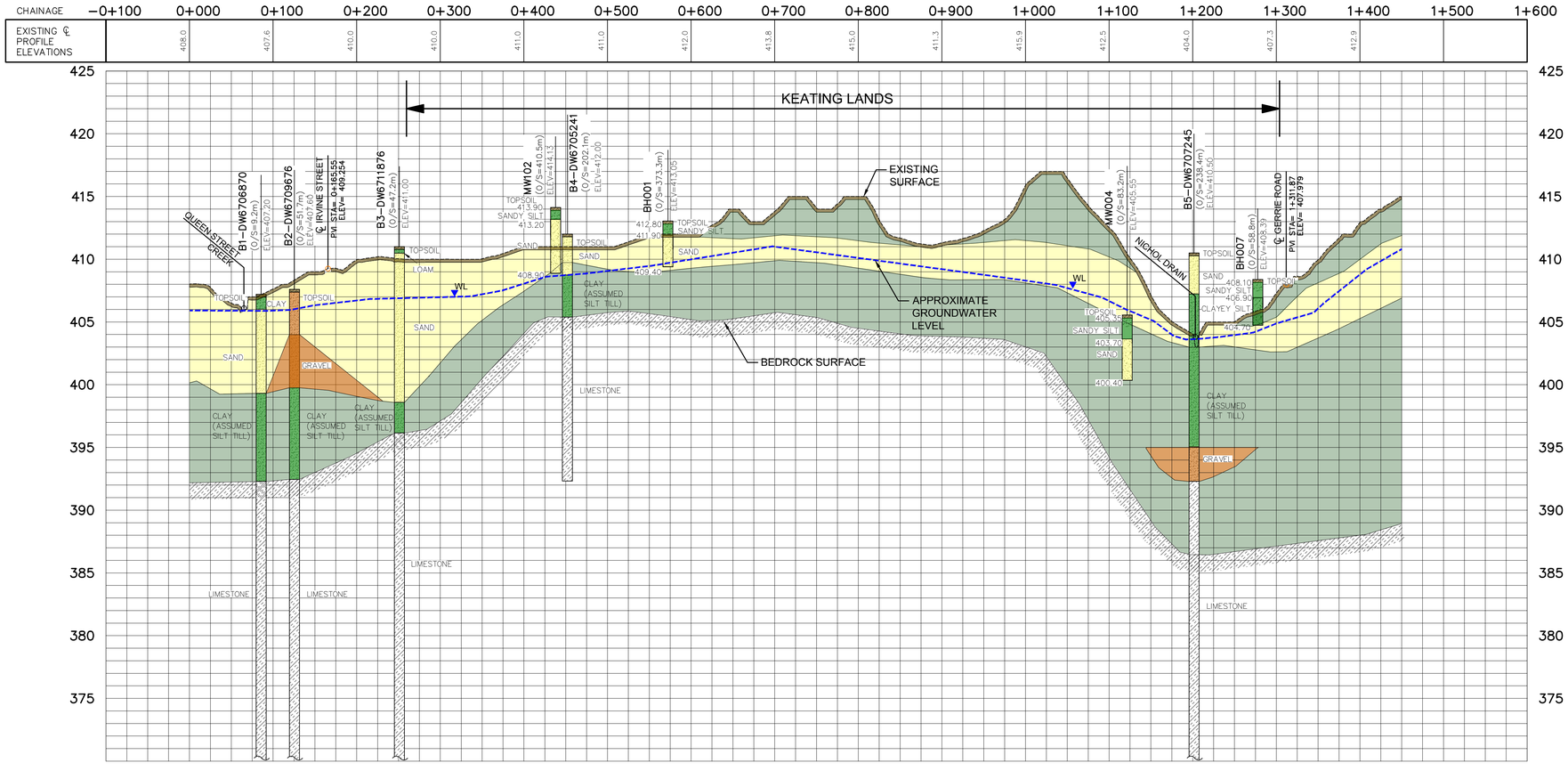
HYDROGEOLOGICAL CROSS-SECTION A-A

MTE Engineers, Scientists, Surveyors

Project No.: 49878-100



SECTION B-B



LEGEND

- TOPSOIL
- SAND (AQUIFER)
- GRAVEL
- SANDY SILT/ SILT TILL (AQUITARD)
- BEDROCK (LIMESTONE)
- BH — BOREHOLE
- MW — MONITORING WELL
- DW — DOMESTIC WELL

FIGURE 3.5
Date: MAR.25/22
Scale: V 1:200 H 1:3000

HYDROGEOLOGICAL CROSS-SECTION B-B

MTE
Engineers, Scientists, Surveyors

Project No.: 49878-100

Layers Legend Draw Find Print

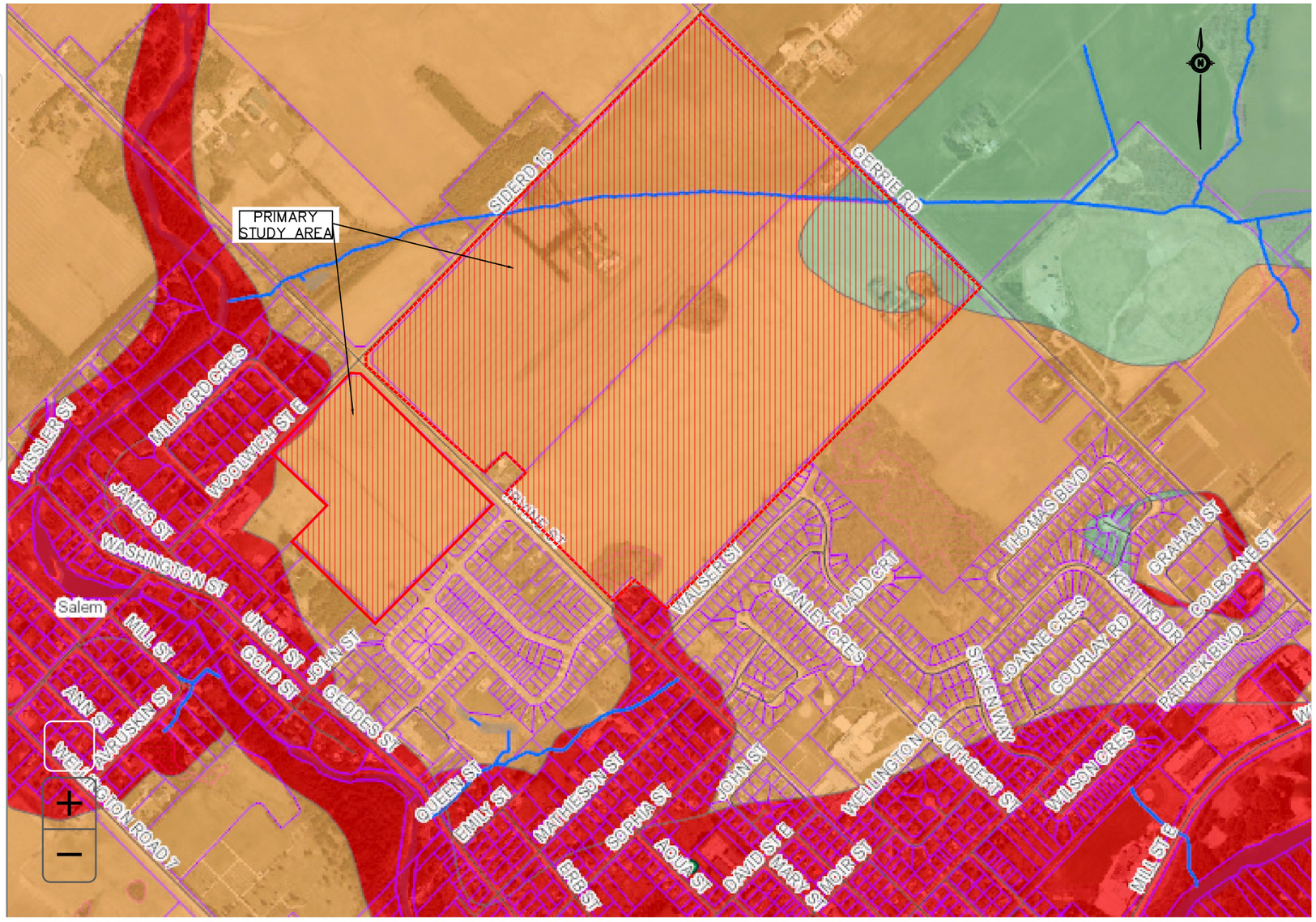
Search Address

Legend

- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Great Lakes (GRCA)
- Parcel - Assessment Public (MPAC/MNRF)
- Municipal Well (GRCA)
- Wetland (GRCA)

Intrinsic Vulnerability (GRCA)

- H
- M
- L



Scale: 13,504

FIGURE 3.6 Date: FEB.03/22 Scale: 1:10000

INTRINSIC VULNERABILITY

MTE Engineers, Scientists, Surveyors

Project No.: 50250-100 49878-100

March 2, 2022 — 11:48 a.m. — Plotted By: RChen

P:\P\50250\100\50250-100-F12 INTRINSIC vulnerability.dwg

Layers Legend Draw Find Print

Search Address

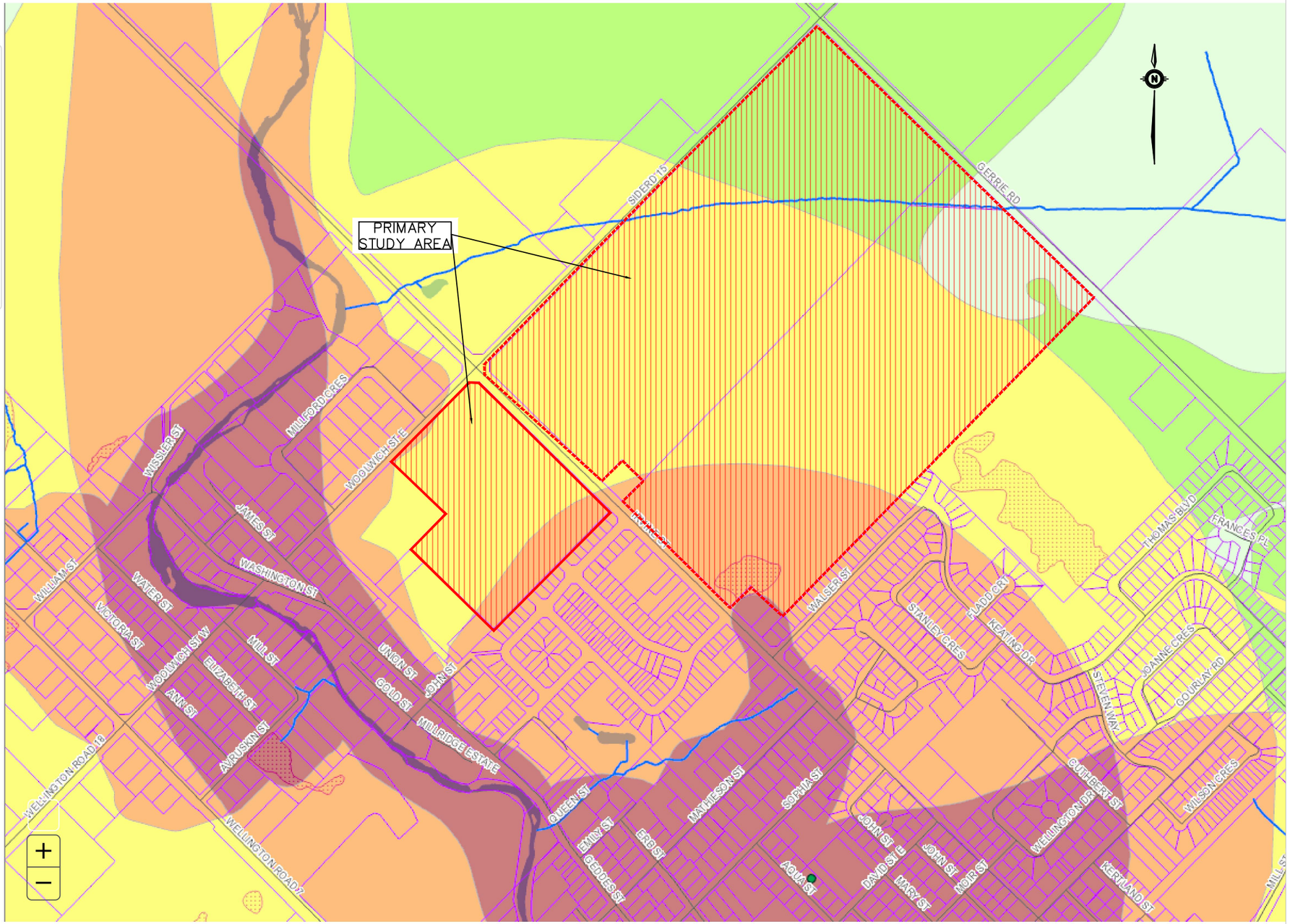
Legend

- Regulated Waterbody (GRCA)
- Wetland (GRCA)
- Parcel - Assessment Public (MPAC/MNRF)
- Regulated Watercourse (GRCA)

WHPA Vulnerability (GRCA)

- 10
- 8
- 6
- 4
- 2

- Municipal Well (GRCA)



Scale: 8,366

FIGURE 3.7 Date: FEB.03/22 Scale: 1:9000

WHPA VULNERABILITY

MTE Engineers, Scientists, Surveyors

Project No.: 50250-100
49878-100

March 2, 2022 — 11:29 a.m. — Plotted By: RChen

P:\P\50250\100\50250-100-F11 figure B1 WHPA vulnerability.dwg

Layers Legend Draw Find Print

Search Address

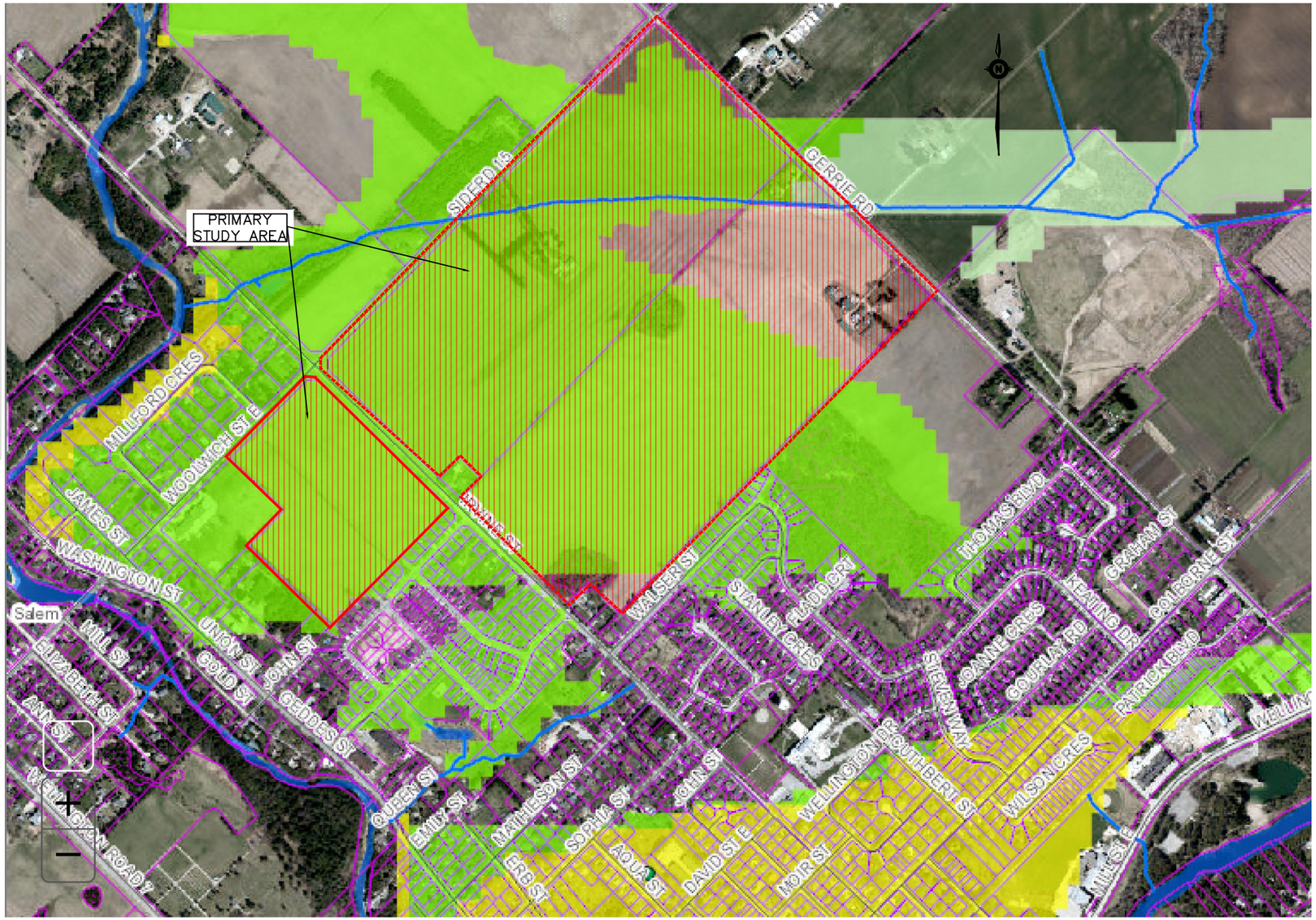
Legend

- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Great Lakes (GRCA)
- Parcel - Assessment Public (MPAC/MNRF)
- Municipal Well (GRCA)

SGRA Vulnerability (GRCA)

- 6
- 4
- 2

- Wetland (GRCA)



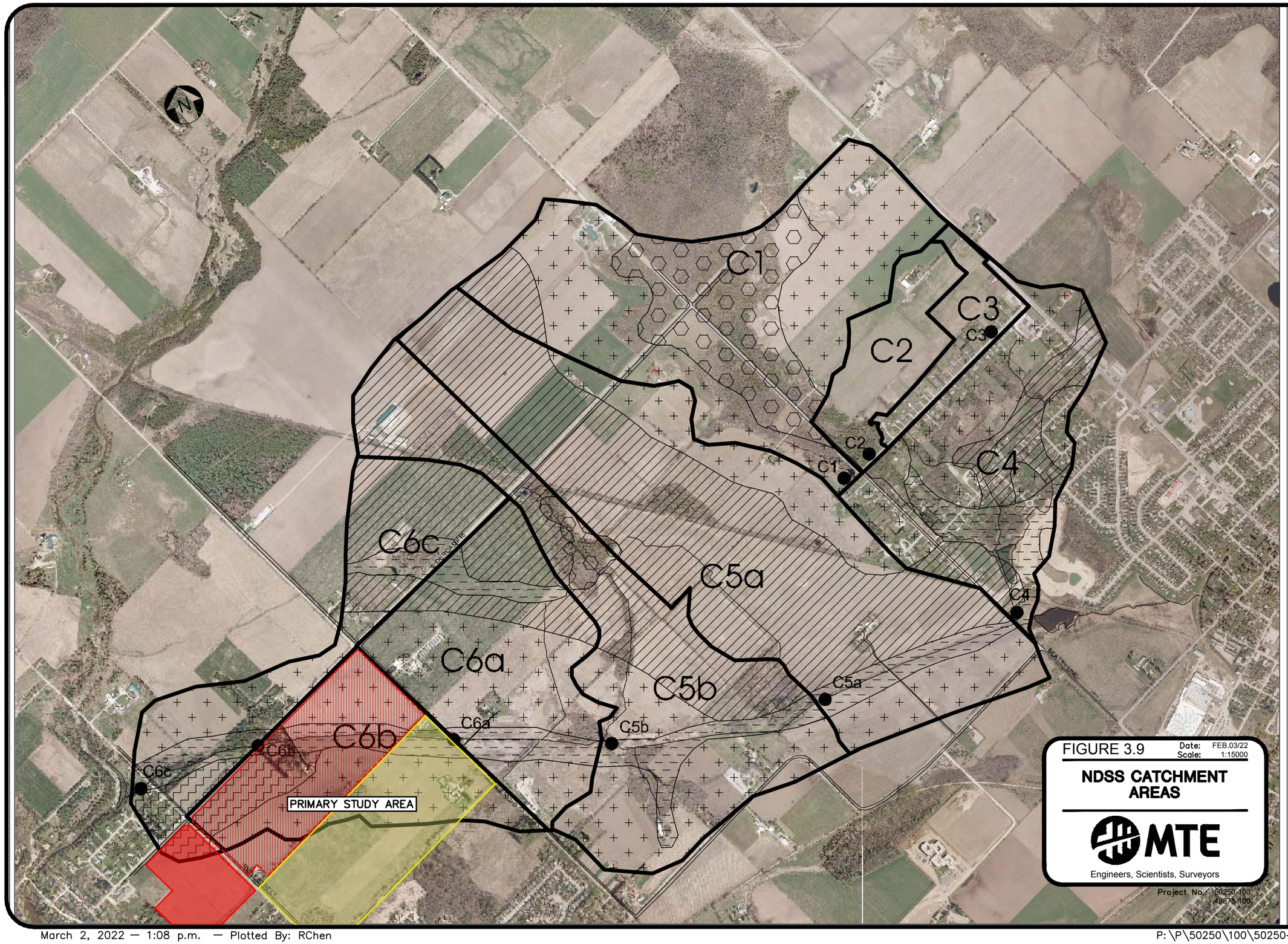
Scale: 13,504

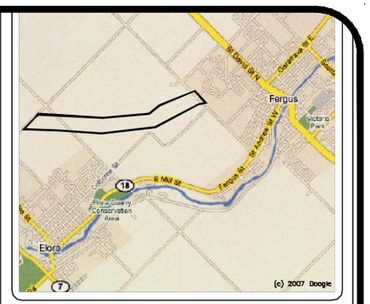
FIGURE 3.8 Date: FEB.03/22 Scale: 1:10000

SGRA VULNERABILITY

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100
49878-100





LEGEND

SUBCATCHMENT

FLOW NODE

SOIL TYPE

LISTOWEL LOAM

HARRISTON LOAM

MUCK

PARKHILL LOAM

BRANT

No.	By	Date	Revison	Chk'd

Aquafor Beech limited

ENGINEER

FLUVIAL GEOMORPHOLOGIST

CLIENT:
TOWNSHIP OF CENTRE WELLINGTON

PROJECT:
NICHOL DRAIN SUB WATERSHED STUDY

TITLE:
FIGURE 3
SOIL MAP

Scale: 1:15,000
Date: FEB. 2008

File: L:\62645

FIGURE 3.9 Date: FEB.03/22 Scale: 1:15000

NDSS CATCHMENT AREAS

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100
49878-100

March 2, 2022 — 1:08 p.m. — Plotted By: RChen

P:\P\50250\100\50250-100-F10-ndss catchment area.dwg

FARM ACCESS

WOOLWICH STREET EAST

SIDEROAD 15

(405.95)

(406.33)

(407.21)

(407.00)

(407.00)

(407.00)

(406.07)

LOCALLY KNOWN AS WOOLWICH STREET
ROAD ALLOWANCE BETWEEN LOTS 15 AND 16

SALEM PUBLIC SCHOOL

I-101
0.54ha

N-105
6.67ha

CLAYTON SUBDIVISION

I-105
3.60ha

I-107
1.68ha

ELORA SANDS

IRVINE STREET

LOT 16

CON 12

LOT 59 LOT 60 LOT 61 LOT 62 LOT 63 LOT 64 ASSIGNMENT DRIVE LOT 65 LOT 66 LOT 67 LOT 68 LOT 69 LOT 70 LOT 71 LOT 72 LOT 73 LOT 74 LOT 75 BLOCK 125

BH103 SOIL-MAT (OCT. 2021)

LEGEND

- CLAYTON SUBDIVISION BOUNDARY
- PRE-DEVELOPMENT CATCHMENT
- EXISTING DRAINAGE DIRECTION
- 1 / 6.76ha — CATCHMENT NUMBER / CATCHMENT AREA (ha)
- EXISTING DITCH DRAINAGE DIRECTION

FIGURE 3.10

Date: FEB.03/22
Scale: 1:2500

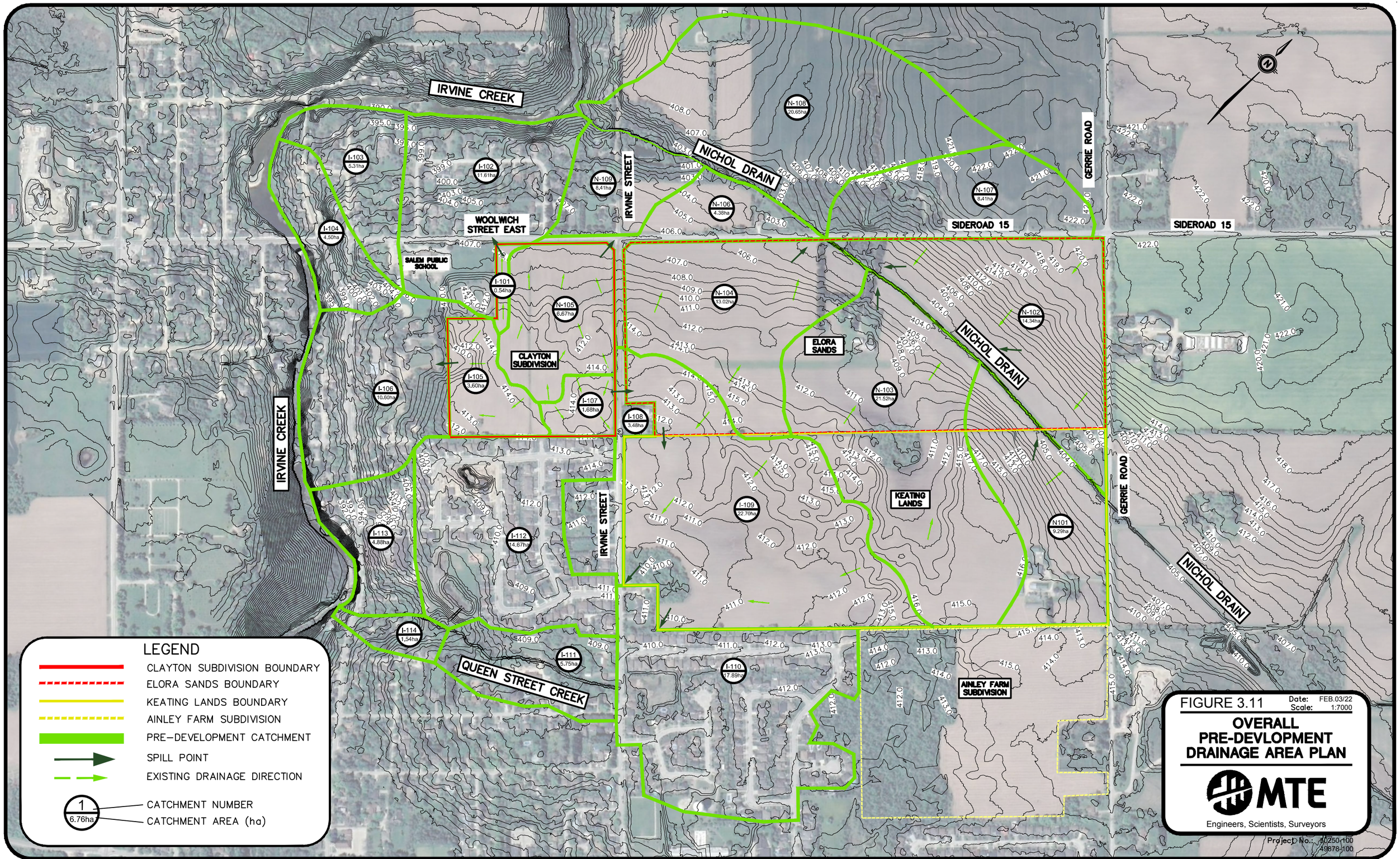
CLAYTON SUBDIVISION PRE-DEVELOPMENT DRAINAGE AREA PLAN

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100
49878-100

July 6, 2022 — 11:18 a.m. — Plotted By: MFelinczak

P:\P\50250\100\50250-100-F4 clayton pre storm.dwg



July 6, 2022 — 11:41 a.m. — Plotted By: MFelinczak

P:\P\50250\100\50250-100-F5 overall pre storm.dwg

IRVINE CREEK

MILLFORD CRESCENT

JAMES STREET

I-103
5.31ha

I-102
11.61ha

N-109
8.41ha

IRVINE STREET

EXTERNAL ROW DRAINAGE TO FOLLOW EXISTING UNCONTROLLED DRAINAGE PATTERNS TO NICHOL DRAIN

N-108
20.65ha

NICHOL DRAIN

N-106
4.38ha

N-107
8.41ha

GERRIE ROAD

SIDEROAD 15

STORM OUTLET

I-104
4.50ha

WOOLWICH STREET EAST

SWMF4
(WET POND WITH INFILTRATION FACILITY)

SWMF2
(WET POND WITH INFILTRATION FACILITY)

SWMF1
(WET POND WITH INFILTRATION FACILITY)

SALEM PUBLIC SCHOOL

N-206
11.41ha

N-205
9.62ha

N-204
23.47ha

IRVINE CREEK

UNION STREET

I-106
10.60ha

I-202
0.84ha

I-203
0.21ha

I-108
3.48ha

NICHOL DRAIN

FLOODPLAIN BASED ON NDSS1 (TO BE CONFIRMED THROUGH FURTHER STUDY)

SWMF5
(WET POND WITH INFILTRATION FACILITY)

GERRIE ROAD

N-202
9.05ha

I-113
4.88ha

OPEN SPACE BLOCK/REAR YARD DRAINAGE

IRVINE STREET

N-201
19.98ha

EXTERNAL DRAINAGE FROM ENTIRE ROW TO BE COLLECTED BY EX.STORM SEWER ON IRVINE STREET

I-112
14.67ha

I-204
8.18ha

PART OF AINLEY FARM SUBDIVISION DRAINAGE

SWMF3
(WET POND WITH INFILTRATION FACILITY)

STORM OUTLET

I-114
1.54ha

I-111
5.75ha

QUEEN STREET CREEK

I-110
17.89ha

AINLEY FARM SUBDIVISION

LEGEND

- CLAYTON BOUNDARY
- ELORA SANDS BOUNDARY
- KEATING LANDS BOUNDARY
- PRE-DEVELOPMENT CATCHMENT
- EXISTING DRAINAGE DIRECTION
- POST-DEVELOPMENT CATCHMENT
- STORM SEWER/OUTLET
- PROPOSED DRAINAGE DIRECTION
- 1 / 6.76ha — CATCHMENT NUMBER / CATCHMENT AREA (ha)

FIGURE 4.1

Date: FEB.03/22
Scale: 1:5000

ALTERNATIVE #1

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100
49878-100

March 29, 2022 — 4:31 p.m. — Plotted By: AHewson

P:\P\50250\100\50250-100-F7 alternative 2.dwg

IRVINE CREEK
JAMES STREET
MILLFORD CRESCENT
WOOLWICH STREET EAST
IRVINE STREET
NICHOL DRAIN
GERRIE ROAD
SIDEROAD 15
SALEM PUBLIC SCHOOL
UNION STREET
IRVINE CREEK
QUEEN STREET CREEK
NICHOL DRAIN
GERRIE ROAD
IRVINE STREET

EXTERNAL ROW DRAINAGE TO FOLLOW EXISTING UNCONTROLLED DRAINAGE PATTERNS TO NICHOL DRAIN

I-103 5.31ha
I-102 11.61ha
I-104 4.50ha
I-201 0.31ha
I-202 0.84ha
I-106 10.60ha
I-203 0.21ha
I-113 4.88ha
I-112 14.67ha
I-114 1.54ha
I-111 5.75ha
I-108 3.48ha
I-204 8.18ha
I-110 17.89ha

N-109 8.41ha
N-106 4.38ha
N-108 20.65ha
N-107 8.41ha
N-205 9.62ha
N-206 11.11ha
N-204 23.47ha
N-202 9.05ha
N-201 19.98ha

SWMF4 (WET POND WITH INFILTRATION FACILITY)
SWMF1 (WET POND WITH INFILTRATION FACILITY)
SWMF2 (WET POND WITH INFILTRATION FACILITY)
SWMF5 (WET POND WITH INFILTRATION FACILITY)
SWMF3 (WET POND WITH INFILTRATION FACILITY)

OPEN SPACE BLOCK/REAR YARD DRAINAGE

EXTERNAL DRAINAGE FROM ENTIRE ROW TO BE COLLECTED BY EX.STORM SEWER ON IRVINE STREET

STORM OUTLET

FLOODPLAIN BASED ON NDSS1 (TO BE CONFIRMED THROUGH FURTHER STUDY)

PART OF AINLEY FARM SUBDIVISION DRAINAGE

AINLEY FARM SUBDIVISION

LEGEND

- CLAYTON BOUNDARY
- ELORA SANDS BOUNDARY
- KEATING LANDS BOUNDARY
- PRE-DEVELOPMENT CATCHMENT
- EXISTING DRAINAGE DIRECTION
- POST-DEVELOPMENT CATCHMENT
- STORM SEWER/OUTLET
- PROPOSED DRAINAGE DIRECTION
- 1 / 6.76ha — CATCHMENT NUMBER / CATCHMENT AREA (ha)

FIGURE 4.2
Date: FEB.03/22
Scale: 1:5000

ALTERNATIVE #2

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100
49878-100

March 29, 2022 — 4:23 p.m. — Plotted By: AHewson

P:\P\50250\100\50250-100-F8 alternative 3.dwg

IRVINE CREEK

MILLFORD CRESCENT

JAMES STREET

I-103
5.31ha

EXTERNAL ROW DRAINAGE TO BE CONTROLLED AND TREATED BY SWMF1

I-102
11.61ha

I-104
4.50ha

WOOLWICH STREET EAST

SALEM PUBLIC SCHOOL

IRVINE STREET

MINOR AND MAJOR CONVEYANCE SYSTEM TO SWMF1 FOR CLAYTON SUBDIVISION

NICHOL DRAIN

N-109
8.41ha

N-106
4.38ha

N-108
20.65ha

N-107
8.41ha

GERRIE ROAD

SIDEROAD 15

STAGE 1

SWMF2
(WET POND WITH INFILTRATION FACILITY)

SWMF1
(WET POND WITH INFILTRATION FACILITY)

STAGE 2

I-201
0.31ha

N-206
11.11ha

I-202
0.84ha

N-205
9.62ha

N-204
23.47ha

NICHOL DRAIN

FLOODPLAIN BASED ON NDSS1 (TO BE CONFIRMED THROUGH FURTHER STUDY)

UNION STREET

IRVINE CREEK

I-106
10.60ha

I-108
3.48ha

I-203
0.21ha

OPEN SPACE BLOCK/REAR YARD DRAINAGE

N-202
9.05ha

I-113
4.88ha

IRVINE STREET

N-201
19.98ha

PART OF AINLEY FARM SUBDIVISION DRAINAGE

EXTERNAL DRAINAGE FROM ENTIRE ROW TO BE COLLECTED BY EX.STORM SEWER ON IRVINE STREET

I-112
14.67ha

I-204
8.18ha

SWMF3
(WET POND WITH INFILTRATION FACILITY)

STORM OUTLET

I-114
1.54ha

I-111
5.75ha

QUEEN STREET CREEK

I-110
17.89ha

AINLEY FARM SUBDIVISION

GERRIE R

LEGEND

- CLAYTON BOUNDARY
- ELORA SANDS BOUNDARY
- KEATING LANDS BOUNDARY
- PRE-DEVELOPMENT CATCHMENT
- EXISTING DRAINAGE DIRECTION
- POST-DEVELOPMENT CATCHMENT
- STORM SEWER/OUTLET
- PROPOSED DRAINAGE DIRECTION
- 1 / 6.76ha — CATCHMENT NUMBER / CATCHMENT AREA (ha)

FIGURE 4.3

Date: FEB.03/22
Scale: 1:5000

ALTERNATIVE #3

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100
49878-100

March 29, 2022 — 4:24 p.m. — Plotted By: AHewson

P:\P\50250\100\50250-100-F9 alternative 4.dwg

Appendix A

Hydrogeological and Geotechnical Information Prepared by Soil-Mat Engineers & Consultants

Refer to Clayton Subdivision – Preliminary Stormwater Management Report - Appendix E

Appendix B

Ontario Domestic Well Records

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* 235: Tag#: A 235579

A1

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 3

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
WELLINGTON CONDO	CORP		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
2 MILL RIDGE	ELORA	ONT		

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
	NICHOL	16	11

County/District/Municipality	City/Town/Village	Province	Postal Code
WELLINGTON		Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	545132	4837646		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	SILTY CLAY & STONES			0	20ft
BROWN	LIMESTONE SOFT			20ft	31ft
BROWN	LIMESTONE			31ft	112ft
GRAY	LIMESTONE			112ft	287ft
BROWN	LIMESTONE			287ft	364ft

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	35ft	BENTONITE SLURRY	50gal

Method of Construction

☐ Cable Tool ☐ Diamond
☒ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☒ Public ☐ Commercial ☐ Not used
☒ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6 1/4	steel	.188	0	35ft
6in	open hole		35ft	364ft

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Status of Well

☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Water Details

Water found at Depth	Kind of Water	
238ft (m/ft) ☐ Gas	☒ Fresh ☐ Untested	☐ Other, *specify*
342ft (m/ft) ☐ Gas	☒ Fresh ☐ Untested	☐ Other, *specify*
354ft (m/ft) ☐ Gas	☒ Fresh ☐ Untested	☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	35ft	9.75in
35ft	364ft	6in

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason:

Pump intake set at (m/ft): 120ft

Pumping rate (l/min / GPM): 17gpm

Duration of pumping: 3 hrs + 0 min

Final water level end of pumping (m/ft): 71ft

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 120ft

Recommended pump rate (l/min / GPM): 20gpm

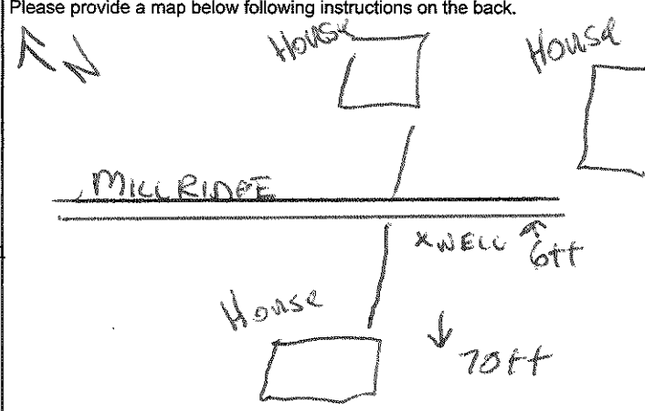
Well production (l/min / GPM):

Disinfected? ☒ Yes ☐ No 120ppm

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	40ft		
1	46ft	1	62ft
2	51ft	2	54ft
3	55ft	3	50ft
4	58ft	4	48ft
5	60ft	5	46ft
10	62ft	10	44ft
15	63ft	15	43ft
20	66ft	20	42ft
25	67ft	25	41ft
30	68ft	30	40ft
40	68ft	40	
50	69ft	50	
60	69ft	60	40ft

Map of Well Location

Please provide a map below following instructions on the back.



Comments: River

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
KEITH LANG WELL DRILLING INC	7154

Business Address (Street Number/Name)	Municipality
251 ELDON ST GODERICH	

Province	Postal Code	Business E-mail Address
ONT	N7A3R9	

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
519-524-8159	KEITH LANG

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
T446		2019 Y 1 M 25 D

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☒ Yes ☐ No	2019 Y 1 M 15 D	2019 Y 1 M 11 D

Ministry Use Only

Audit No. Z305962

Received JAN 2 9 2019

0506E (2014/11)

Ministry's Copy

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Ontario

A2

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 6708382

PLAN 75

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC	LOT
[redacted]	Nichol	UNION ST.	22 & 23
	SALEM, ONT.	DATE COMPLETED DAY 30 MO Sep YR 85	

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BLACK	TOP	SOIL		0	2
BROWN	CLAY			2	10
BROWN	CLAY	& STONE		10	18
WHITE	LIMESTONE			18	227

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
227	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
48	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	31
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	5 GPM	6 HOURS — MINS

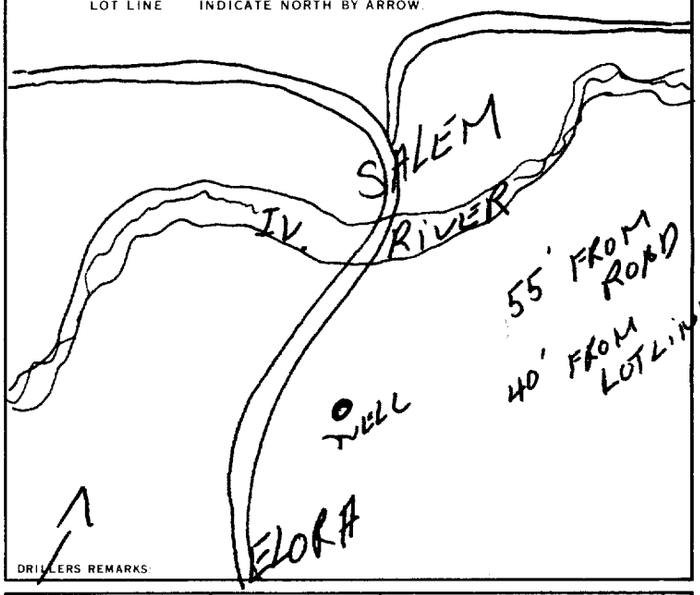
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
50 FEET	80 FEET		50 FEET	55 FEET	65 FEET	80 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	120 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	130 FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR	LICENCE NUMBER
CUDNEY WELL DRILLING	
ADDRESS B.O. BOX 903 ELORA, ONT.	
NAME OF DRILLER OR BORER HERBERT CUDNEY	LICENCE NUMBER 1669
SIGNATURE OF CONTRACTOR Herbert Cudney	SUBMISSION DATE DAY 30 MO Sep YR 85

MINISTRY OF THE ENVIRONMENT COPY

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED 19 0386

DATE OF INSPECTION | INSPECTOR

REMARKS

CSS.ES

FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

A3

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 6709735 — MUNICIP 6,7,0,0,9 — CON. CON 12

COUNTY OR DISTRICT: Wellington
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Nichol
CON, BLOCK, TRACT, SURVEY, ETC: CON 12
LOT: 16

[redacted]
SAME AS ABOVE

DATE COMPLETED: DAY 27 MO 04 YR 89

RING | RC. | ELEVATION | RC. | BASIN CODE | II | III | IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	CLAY	STONES		0	30
	SAND		Coarse	30	42
	Sand	Gravel	Coarse	42	45
Grey	LIMESTONE	Sand Packets		45	60
Grey	Limestone			60	100
~~White~~ Be	Limstone			100	125
White	Linestone		Soft	125	138

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
130	1 ☒ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	188	0	60
4	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		60	138
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER (INCHES)	LENGTH (FEET)

MATERIAL AND TYPE: | DEPTH TO TOP OF SCREEN (FEET):

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

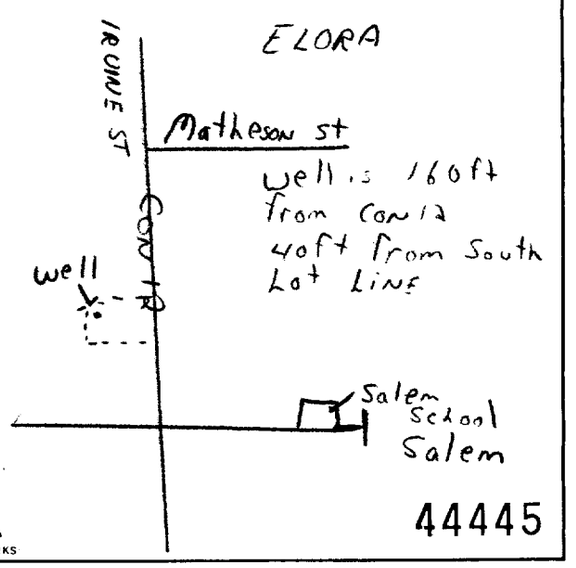
PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER
PUMPING RATE: 3½ GPM
DURATION OF PUMPING: 2 HOURS ___ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
20 FEET	130 FEET	75 FEET	75 FEET	130 FEET	130 FEET

IF FLOWING, GIVE RATE: ___ GPM
PUMP INTAKE SET AT: ___ FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 130 FEET
RECOMMENDED PUMPING RATE: 3 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY — 2 ☐ OBSERVATION WELL — 3 ☐ TEST HOLE — 4 ☐ RECHARGE WELL — 5 ☐ ABANDONED, INSUFFICIENT SUPPLY — 6 ☐ ABANDONED, POOR QUALITY — 7 ☐ UNFINISHED — ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC — 2 ☐ STOCK — 3 ☐ IRRIGATION — 4 ☐ INDUSTRIAL — ☐ OTHER — 5 ☐ COMMERCIAL — 6 ☐ MUNICIPAL — 7 ☐ PUBLIC SUPPLY — 8 ☐ COOLING OR AIR CONDITIONING — 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☒ CABLE TOOL — 2 ☐ ROTARY (CONVENTIONAL) — 3 ☐ ROTARY (REVERSE) — 4 ☐ ROTARY (AIR) — 5 ☐ AIR PERCUSSION — 6 ☐ BORING — 7 ☐ DIAMOND — 8 ☐ JETTING — 9 ☐ DRIVING — ☐ DIGGING — ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: DONALD HILL
WELL CONTRACTOR'S LICENCE NUMBER: 2665
ADDRESS: 16 HANATI RD UNIT 55 Guelph
NAME OF WELL TECHNICIAN: TIM HILL ASSISTANT
WELL TECHNICIAN'S LICENCE NUMBER:
SIGNATURE OF TECHNICIAN/CONTRACTOR: Don Hill
SUBMISSION DATE: DAY ___ MO ___ YR ___

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR: 2665
DATE RECEIVED: MAY 12 1989
DATE OF INSPECTION
INSPECTOR
REMARKS: CSS.ES

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Ministry of the Environment
Ontario

A4

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 6709494 MUNICIP. 6,7,0,0,9 CON. C,O,N

COUNTY OR DISTRICT: [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Nichol Twp.
CON, BLOCK, TRACT, SURVEY, ETC: Con. 11
LOT: Pt.16
c/o Barenco Inc. M3J 3G5
10 Kodiak Crescent, Downsview, Ontario
DATE COMPLETED: DAY 16 MO 12 YR 88

RC ELEVATION RC BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
	Topsoil			0	1
Brown	Clay	Silt	Soft	1	6
Brown	Sand		Soft	6	15
Brown	Broken Limestone		Soft	15	17
Brown	Limestone		Hard	17	115

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
91	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	+ 1	30-2
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		30-2	115
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

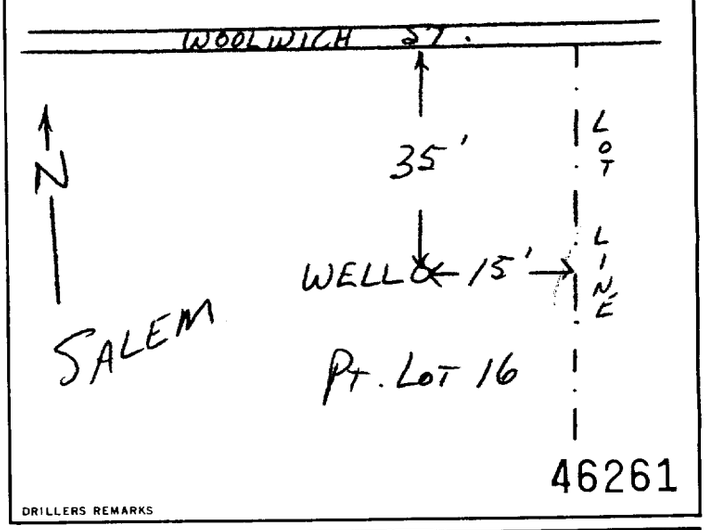
PUMPING TEST METHOD: 1 ☒ PUMP 2 ☒ BAILER — air
PUMPING RATE: 1 GPM
DURATION OF PUMPING: 1 HOURS ___ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
14 FEET	46 FEET		34 FEET	42 FEET	45 FEET	46 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: 115 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 80 FEET
RECOMMENDED PUMPING RATE: 1 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☒ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Davidson WEll Drilling Limited
WELL CONTRACTOR'S LICENCE NUMBER: 1737
ADDRESS: Box 486, Wingham, Ontario. N0G 2W0
NAME OF WELL TECHNICIAN: G. Reavie
WELL TECHNICIAN'S LICENCE NUMBER: T0156
SIGNATURE OF TECHNICIAN/CONTRACTOR
SUBMISSION DATE: DAY 28 MO Dec. YR 88.

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR: 1737
DATE RECEIVED: JAN 11 1989
DATE OF INSPECTION
INSPECTOR
REMARKS: WDE

CSS.ES

FORM NO. 0506 (11/86) FORM 9

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The Ontario Water Resources Act

WATER WELL RECORD

6709920

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

MUNICIP 6,7,0,09 CON. CON 12

COUNTY OR DISTRICT: Wellington
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Nichol
CON: CON
BLOCK, TRACT, SURVEY, ETC: 12
LOT: 15
[redacted] Matheson St Salem
DATE COMPLETED: DAY 20 MO 07 YR 89
NG | RC. | ELEVATION | RC. | BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
Br	Clay	Stones		0	38
	Gravel			38	65
Br	limestone			65	81

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
81	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
5"	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	68
5"	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE 5 ☐ PLASTIC		68	81
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☑ PUMP 2 ☐ BAILER
PUMPING RATE: 15 GPM
DURATION OF PUMPING: 20 HOURS ____ MINS
STATIC LEVEL: 35 FEET
WATER LEVEL END OF PUMPING: 50 FEET
WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY

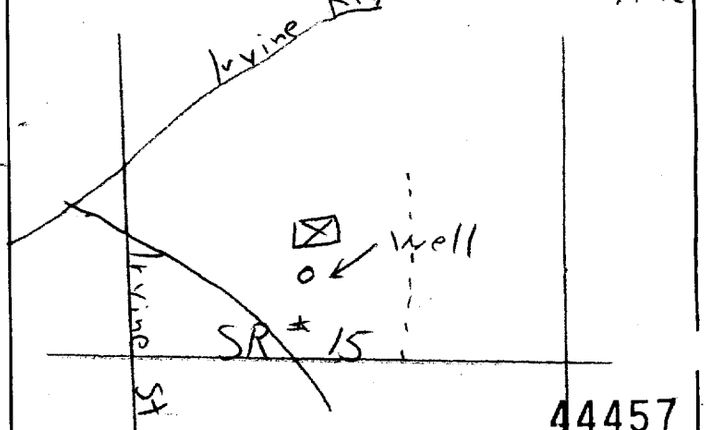
15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
40 FEET	50 FEET	50 FEET	50 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING: 75 FEET
RECOMMENDED PUMPING RATE: 15 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.

Well is 175' from Road
Well is 250' from East Lot line



44457

DRILLERS REMARKS

FINAL STATUS OF WELL
1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE
1 ☑ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION
1 ☑ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☑ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Don Hill
WELL CONTRACTOR'S LICENCE NUMBER: 2665
ADDRESS: 16 Hadati Rd Unit 55
NAME OF WELL TECHNICIAN: Tim Hill (Assistant)
WELL TECHNICIAN'S LICENCE NUMBER:
SIGNATURE OF TECHNICIAN/CONTRACTOR: Don Hill
SUBMISSION DATE: DAY 15 MO 9 YR 89

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR: 2665
DATE RECEIVED: SEP 19 1989
DATE OF INSPECTION
INSPECTOR
REMARKS: CSS.ES

FORM NO. 0506 (11/86) FORM 9

MINISTRY OF THE ENVIRONMENT COPY

The Ontario Water Resources Commission Act

WATER WELL RECORD

A6

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 6704376 | MUNICIP. 67009 | CON. GON | 13

COUNTY OR DISTRICT: Wellington

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Nichol twsp.

CON., BLOCK, TRACT, SURVEY, ETC.: 13 con

LOT: 015

DATE COMPLETED: DAY 20th MO. Sept YR 72

[redacted] # 1 Elora Ont

39/06 | RC. 4 | ELEVATION 1380 | RC. 5 | BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
brown	clay	and sand		0	18
brown	clay	stones		18	25
brown	clay	sand and gravel		25	60
brown	cl ay	sand and stones		60	64
brown	clay	sand and gravel		64	74
lt brown	rock			74	85
dk brown	rock			85	105
lt brown	rock			105	150
white	rock			150	185
			total depth – 185 ft.		

31: 00/18 00/25 00/64 00/74 00/85 00/105 00/150 01/85 1

32: 01/85/26

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
090	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
184	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	075
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		75 – ~~085~~ 180	085
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE: 0006 GPM. | DURATION OF PUMPING: 01 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
065 FEET	115 FEET		FEET	FEET	FEET	065 FEET

IF FLOWING, GIVE RATE: GPM.

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

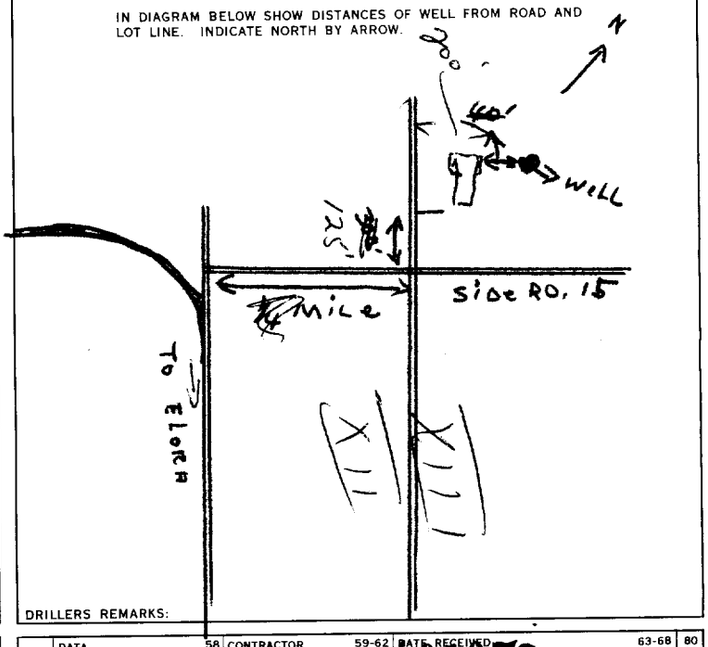
RECOMMENDED PUMP SETTING: 160 FEET

RECOMMENDED PUMPING RATE: 0006 GPM.

0001 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL (54)
☒ 1 WATER SUPPLY ☐ 2 OBSERVATION WELL ☐ 3 TEST HOLE ☐ 4 RECHARGE WELL ☐ 5 ABANDONED, INSUFFICIENT SUPPLY ☐ 6 ABANDONED, POOR QUALITY ☐ 7 UNFINISHED

WATER USE (55-56) 01
☒ 1 DOMESTIC ☐ 2 STOCK ☐ 3 IRRIGATION ☐ 4 INDUSTRIAL ☐ 5 COMMERCIAL ☐ 6 MUNICIPAL ☐ 7 PUBLIC SUPPLY ☐ 8 COOLING OR AIR CONDITIONING ☐ OTHER ☐ 9 NOT USED

METHOD OF DRILLING (57)
☒ 1 CABLE TOOL ☐ 2 ROTARY (CONVENTIONAL) ☐ 3 ROTARY (REVERSE) ☐ 4 ROTARY (AIR) ☐ 5 AIR PERCUSSION ☐ 6 BORING ☐ 7 DIAMOND ☐ 8 JETTING ☐ 9 DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: GRAHAM WELL DRILLING | LICENCE NUMBER: 2406

ADDRESS: R R # 2 Guelph Ont.

NAME OF DRILLER OR BORER: James Hawkins | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: J L Graham per WEG. | SUBMISSION DATE: DAY 25 MO. Sept YR 72

OFFICE USE ONLY

DATA SOURCE (58): 1 | CONTRACTOR (59-62): 2406 | DATE RECEIVED (63-68): 101072

DATE OF INSPECTION: | INSPECTOR:

REMARKS: CSS.S8

P WI

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Ontario

A7

The Ontario Water Resources Act

WATER WELL RECORD

6708406

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11

MUNICIP 10-14 | CON. 15-22 23 24

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC	LOT 25-27
[redacted]	Nichol	XIII T	15

DATE COMPLETED 48-53: DAY 03 MO 04 YR 86

1 2 | M 10 | 12 17 | 18 24 | RC 25 | ELEVATION 26 | RC 30 | BASIN CODE 31 | II | III | IV 47

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
	Gravel	Boulders		0	24
Grey	Clay	Stones		24	47
LT. BR.	Limestone			47	104
LT. GR. & BR.	Limestone			104	130
LT. BR.	Limestone			130	155
GR.	Limestone			155	160
BR. & GR.	Limestone			160	208
WHITE & GR	Limestone			208	260

31

32 10 14 15 21 32 43 54 65 75 80

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
259 (10-13)	1 ☒ FRESH 3 ☐ SULPHUR 14; 2 ☐ SALTY 4 ☐ MINERAL
(15-18)	1 ☐ FRESH 3 ☐ SULPHUR 19; 2 ☐ SALTY 4 ☐ MINERAL
(20-23)	1 ☐ FRESH 3 ☐ SULPHUR 24; 2 ☐ SALTY 4 ☐ MINERAL
(25-28)	1 ☐ FRESH 3 ☐ SULPHUR 29; 2 ☐ SALTY 4 ☐ MINERAL
(30-33)	1 ☐ FRESH 3 ☐ SULPHUR 34; 2 ☐ SALTY 4 ☐ MINERAL 40

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
6¼ (10-11)	1 ☒ STEEL 12; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	.188	0	55 (13-16)
6⅛ (17-18)	1 ☐ STEEL 19; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE		55	260 (20-23)
(24-25)	1 ☐ STEEL 26; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.) 31-33	DIAMETER 34-38 INCHES	LENGTH 39-40 FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN 41-44 FEET	30

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
0 (10-13)	67 (14-17)	Bentonite Slurry
(18-21)	(22-25)	
(26-29)	(30-33) 80	

71 PUMPING TEST

PUMPING TEST METHOD 10: 1 ☐ PUMP 2 ☐ BAILER — AIR

PUMPING RATE 11-14: 25 GPM

DURATION OF PUMPING 15-16 HOURS 2 — 17-18 MINS 15

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING 25: 1 ☐ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
26 (19-21) FEET	45 (22-24) FEET		45 (26-28) FEET	45 (29-31) FEET	45 (32-34) FEET	45 (35-37) FEET

IF FLOWING, GIVE RATE 38-41 GPM	PUMP INTAKE SET AT	WATER AT END OF TEST 42	RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING 43-45	RECOMMENDED PUMPING RATE 46-49
	45 FEET	1 ☐ CLEAR 2 ☒ CLOUDY	☐ SHALLOW ☒ DEEP	90 FEET	25 GPM

50-53

FINAL STATUS OF WELL (54)

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE (55-56)

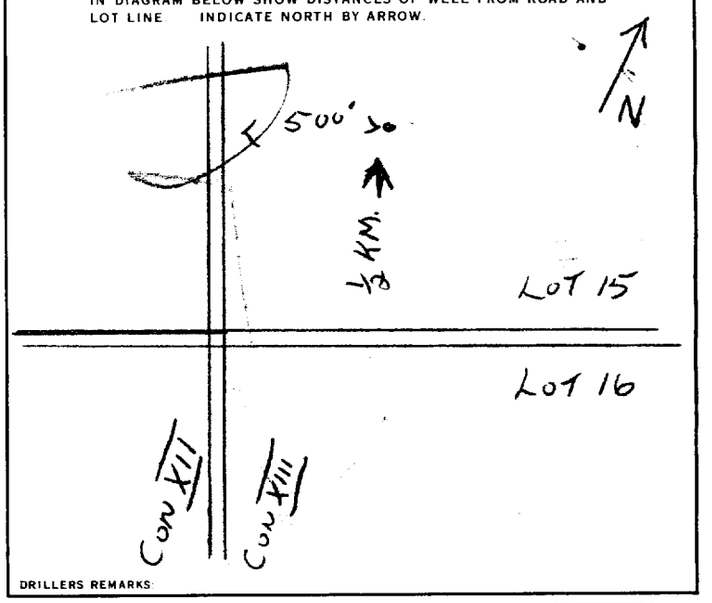
1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING (57)

1 ☐ CABLE TOOL; 2 ☒ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: Lang Well Drilling Ltd. — LICENCE NUMBER: 3317

ADDRESS: R.R.1 Hillsburgh Ont.

NAME OF DRILLER OR BORER: Roy Lang — LICENCE NUMBER: 3317

SIGNATURE OF CONTRACTOR: R. Lang — SUBMISSION DATE: DAY 15 MO 04 YR 86

OFFICE USE ONLY

DATA SOURCE 58 | CONTRACTOR 59-62 | DATE RECEIVED 63-68: 230486 | 80

DATE OF INSPECTION | INSPECTOR | REMARKS

CSS.ES

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FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

B1

1. PRINT ONLY IN SPACES PROVIDED
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11 6706870 MUNICIP 67 009 CON. CON 11

COUNTY OR DISTRICT [redacted] Co. | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE MICHOL Twp | CON., BLOCK, TRACT, SURVEY, ETC Con 11 | LOT 018

[redacted] RR5 GUELPH | DATE COMPLETED DAY 22 MO 09 YR 78

21 | 37550 | RC 5 | ELEVATION 1340 | RC 5 | BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
	CLAY			0	3
	SAND			3	25
	CLAY			25	48
GRAY	LIMESTONE			48	240

31 0003 05 | 0025 28 | 0048 05 | 0240 15

32

WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
10-13	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
15-18	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
20-23	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
25-28	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
30-33	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
04	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	188	0	0055
04	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE		55	0240
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

PUMPING TEST

71 PUMPING TEST METHOD 1 ☐ PUMP 2 ☒ BAILER | PUMPING RATE 0003 GPM | DURATION OF PUMPING 02 HOURS 00 MINS

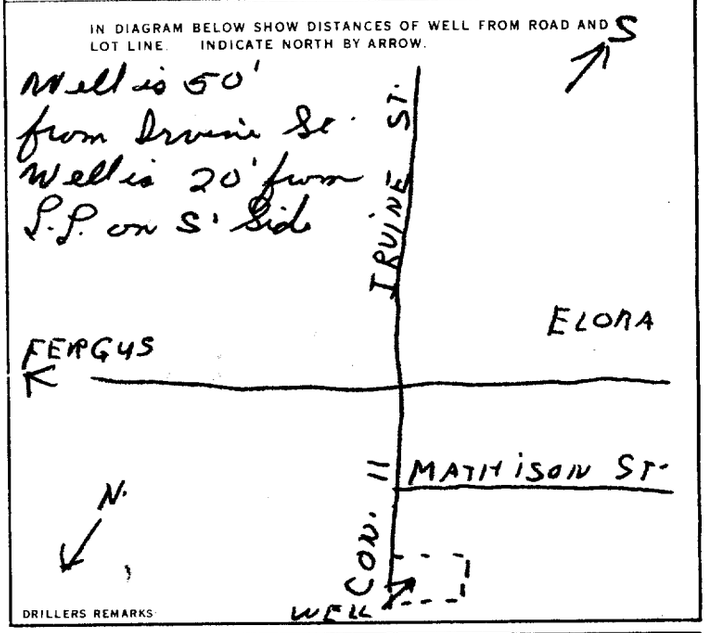
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
040 FEET	220 FEET		FEET	FEET	FEET	FEET

IF FLOWING GIVE RATE GPM | PUMP INTAKE SET AT FEET | WATER AT END OF TEST 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING 160 FEET | RECOMMENDED PUMPING RATE 0003 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING

1 ☒ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR HARVEY HILL WELL DRILLING | LICENCE NUMBER 2564

ADDRESS RR1 ELORA ONT.

NAME OF DRILLER OR BORER HARVEY HILL | LICENCE NUMBER 2562

SIGNATURE OF CONTRACTOR Harvey Hill | SUBMISSION DATE DAY ____ MO ____ YR ____

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 2564 | DATE RECEIVED 21128

DATE OF INSPECTION | INSPECTOR

REMARKS CSS.88

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Ministry of the Environment
Ontario

B2

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
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11 6709676 MUNICIP. 6,7,0,0,9 CON. CON

COUNTY OR DISTRICT: [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: ELORA
CON. BLOCK, TRACT, SURVEY ETC.: CON 11
LOT: 17
DATE COMPLETED: DAY 23 MO 09 YR 88
[redacted] IRUINE ST ELORA NOB 1S0

RC | ELEVATION | RC | BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
Brown	Gravel + sand			0	25
	Clay			25	49
Grey	Limstone			49	150
WHITE	Limstone			150	192

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
192	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	188	0	54
4	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		54	192
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	4 GPM	1 HOURS ___ MINS

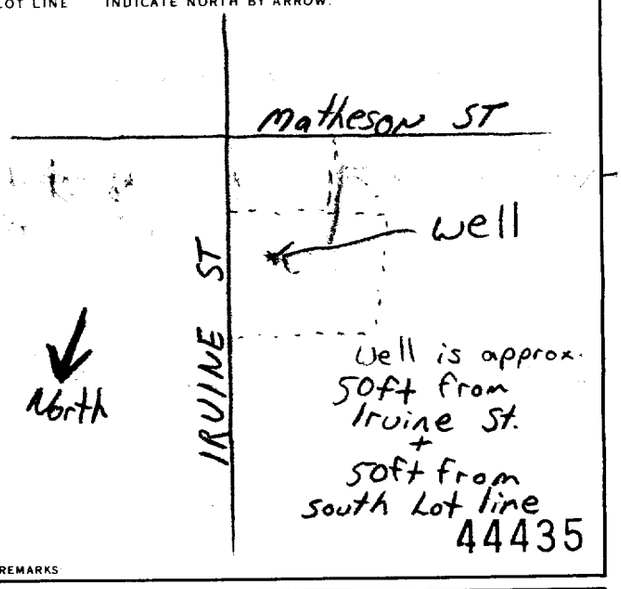
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING 1 ☐ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
50 FEET	185 FEET	FEET	FEET	FEET	FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	FEET	1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	188 FEET	4 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Harvey Hill
WELL CONTRACTOR'S LICENCE NUMBER: 2564
ADDRESS: RR# 1 ELORA
NAME OF WELL TECHNICIAN: DONALD HILL
WELL TECHNICIAN'S LICENCE NUMBER:
SIGNATURE OF TECHNICIAN/CONTRACTOR: Harry Hill
SUBMISSION DATE: DAY 08 MO. 03 YR. 89

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 2564 | DATE RECEIVED MAR 13 1989
DATE OF INSPECTION | INSPECTOR
REMARKS: CSS.ES

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Ministry of the Environment
Ontario

B3

The Ontario Water Resources Act

WATER WELL RECORD

6711876

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11

MUNICIP. 67009 CON. CON. 12

COUNTY OR DISTRICT [redacted] | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE [redacted] ICHOL | CON. BLOCK, TRACT, SURVEY, ETC. 12 | LOT 17

[redacted] 07 IRVINE ST. FLORA NOS 150 | DATE COMPLETED DAY 05 MO 12 YR 95

RC ELEVATION RC BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
	TOP SOIL			0	1
	SAND			1	40
GREY	CLAY			40	48.5
MED. BROWN	LIMESTONE		SOFT / BROKEN	48.5	50
MED BROWN	LIMESTONE		HARD	50	100
LIGHT GRE/+BROWN	LIMESTONE			100	180
			TOTAL =		180'
		6" CASING DRIVE SHOE			

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
180	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	+2	50
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		50	180
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
	INCHES	FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
0	20	BENSEAL

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☐ BAILER	10 GPM	1 HOURS ___ MINS

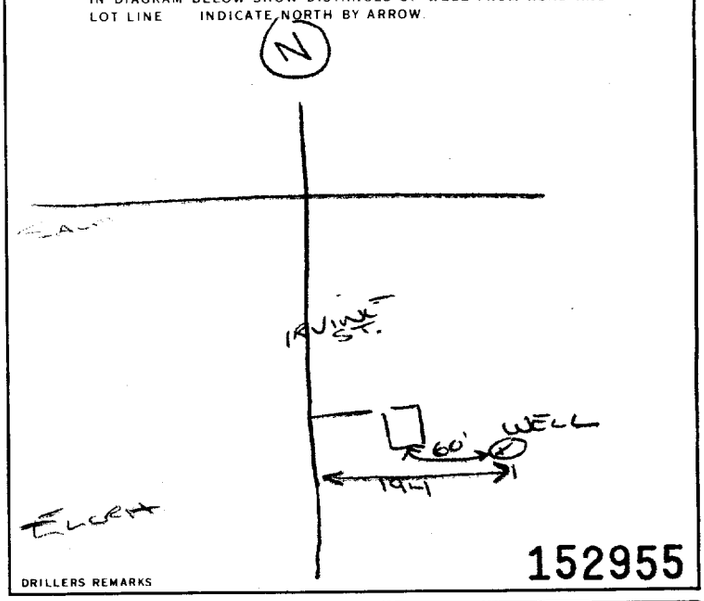
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
88 FEET	140 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	90 FEET	110 FEET	140 FEET	140 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	FEET	1 ☐ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☐ DEEP	170 FEET	10 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

152955

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☒ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Hawkin Well Drilling LTD | WELL CONTRACTOR'S LICENCE NUMBER: 2663

ADDRESS: R.R.#5 GUELPH ONT N1H 6J2

NAME OF WELL TECHNICIAN: Henry R. Hawkin | WELL TECHNICIAN'S LICENCE NUMBER: 26540

SIGNATURE OF TECHNICIAN/CONTRACTOR: [signature] | SUBMISSION DATE DAY 01 MO. 01 YR. 96

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 2663 | DATE RECEIVED DEC 15 1995

DATE OF INSPECTION | INSPECTOR

REMARKS

CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

40 P/C/W B4

Ontario

1. PRINT ONLY IN SPACES PROVIDED
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11 6705241 MUNICIP. 67009 CON. CON 12

COUNTY OR DISTRICT: Hallibt. Cty | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Nichol Twsp | CON., BLOCK, TRACT, SURVEY, ETC.: Con 12 XII | LOT: 017

[redacted] RR 1 Elora | DATE COMPLETED: DAY 23 MO 07 YR 74

	THING	RC.	ELEVATION	RC.	BASIN CODE		
	4837944	5	1355	5	23	AUG 05, 1977	323

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
			Sand	0	10
			Clay	10	21
			grey limestone	21	64

31 0010 28 0021 05 0064 26

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0064	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
04	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	0027
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		27	0064
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0006 GPM | DURATION OF PUMPING: 02 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY			
005 FEET	060 FEET	15 MINUTES FEET	30 MINUTES FEET	45 MINUTES FEET	60 MINUTES FEET

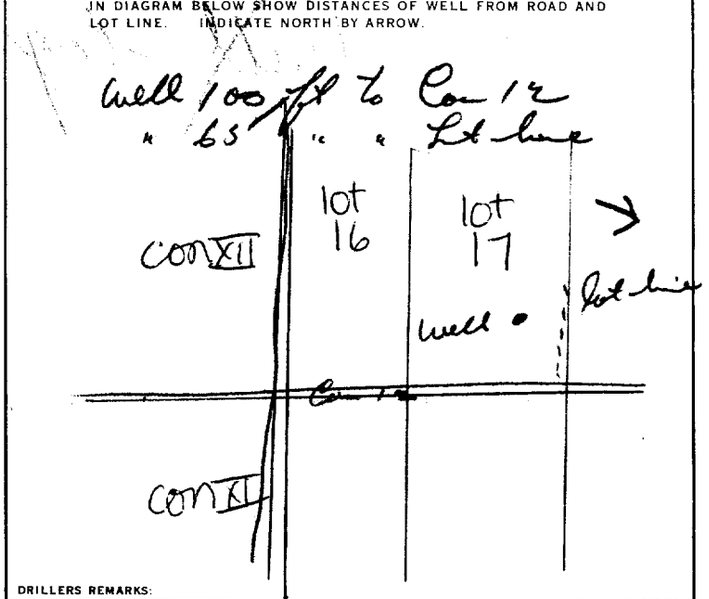
IF FLOWING GIVE RATE: GPM | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING: 060 FEET | RECOMMENDED PUMPING RATE: 0006 GPM

GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 4538

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 54: 1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 55-56: 01 — 1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING 57: 1 ☒ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Charles Hall | LICENCE NUMBER: 2521

ADDRESS: 251 Speedvale Ave E Guelph

NAME OF DRILLER OR BORER: Charles Hall | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Charles Hall | SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE 58: 1 | CONTRACTOR 59-62: 2521 | DATE RECEIVED 63-68: 040974 80

DATE OF INSPECTION | INSPECTOR

REMARKS: CSS.S8 PKP WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

40P/9

B5

1. PRINT ONLY IN SPACES PROVIDED
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11 6707245 MUNICIP. 67009 CON. CON 1/2

COUNTY OR DISTRICT: WELLINGTON CO.
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: NICHOL TWP.
CON., BLOCK, TRACT, SURVEY, ETC.: CON. 12
LOT: 017
RR1 ELORA ONT.
DATE COMPLETED: DAY 31 MO 10 YR 79
UTM: 538450 RC 5 ELEVATION 1350 RC 5 BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
	SAND			0	10
	CLAY			10	50
	GRAVEL			50	59
GRAY	LIMESTONE			59	160
WHITE	LIMESTONE			160	219

31 0110 28 | 0050 05 | 0059 11 | 0160215 | 0219115

32

41 WATER RECORD

WATER FOUND	KIND OF WATER
0150 ~~150~~ ~~210~~	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
15-18	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
20-23	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
25-28	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
30-33	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
04 ~~7~~	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	0065 ~~65~~
04 4	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		65	0219 ~~219~~
24-25	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.) 31-33	DIAMETER 34-38 INCHES	LENGTH 39-40 FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN 41-44 FEET	80

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33 80	

71 PUMPING TEST

PUMPING TEST METHOD 10	PUMPING RATE 11-14 GPM	DURATION OF PUMPING 15-16 HOURS 17-18 MINS
1 ☐ PUMP 2 ☒ BAILER	0007	02 HOURS 00 MINS

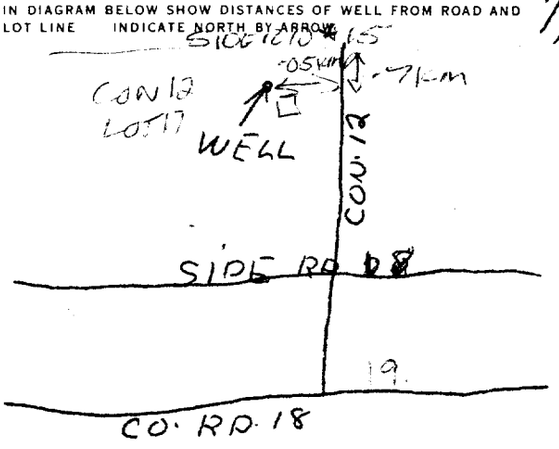
STATIC LEVEL 19-21 FEET	WATER LEVEL END OF PUMPING 22-24 FEET	25 WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES 26-28 FEET	30 MINUTES 29-31 FEET	45 MINUTES 32-34 FEET	60 MINUTES 35-37 FEET
050	140					140

IF FLOWING, GIVE RATE 38-41 GPM	PUMP INTAKE SET AT FEET	WATER AT END OF TEST 42	RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING 43-45 FEET	RECOMMENDED PUMPING RATE 46-49 GPM
		1 ☒ CLEAR 2 ☐ CLOUDY	☐ SHALLOW ☒ DEEP	160	0007

50-53

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



Well is 250' from L.L. on S. Side

DRILLERS REMARKS:

54 FINAL STATUS OF WELL 1	1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED
55-56 WATER USE 12	1 ☒ DOMESTIC 2 ☒ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
57 METHOD OF DRILLING 1	1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: HARVEY HILL — LICENCE NUMBER: 2564
ADDRESS: RR1 ELORA ONT.
NAME OF DRILLER OR BORER: SAME — LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: Harvey Hill — SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE 58: 1 — CONTRACTOR 59-62: 2564 — DATE RECEIVED 63-68: 160480 — 80
DATE OF INSPECTION: August 24/1980 — INSPECTOR:
REMARKS: CSS.S8

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77 FORM 7

Appendix C

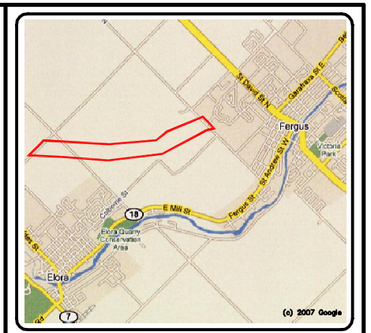
NDSS1 Figures
Prepared by Aquafor Beech Limited

SIDEROAD # 15

BEATTY LINE

GERRIE ROAD

IRVINE STREET



CROSS-SECTION STATION NO.
EXISTING REGIONAL ELEV.

CROSS-SECTION LABEL

NICHOL DRAIN

CONTOUR

EXISTING REGIONAL FLOODLINE

SORBARA FERGUS SECONDARY PLAN AREA – 0.25m CONTOURS PROVIDED BY R.J.BURNSIDE & ASSOCIATES LTD.

NOTE THAT 5m OBM CONTOURS WERE USED TO GENERATE FLOODLINES OUTSIDE THE SORBARA FERGUS PLAN AREA

No.	By	Date	Revision	Chk'd

ENGINEER

FLUVIAL GEOMORPHOLOGIST

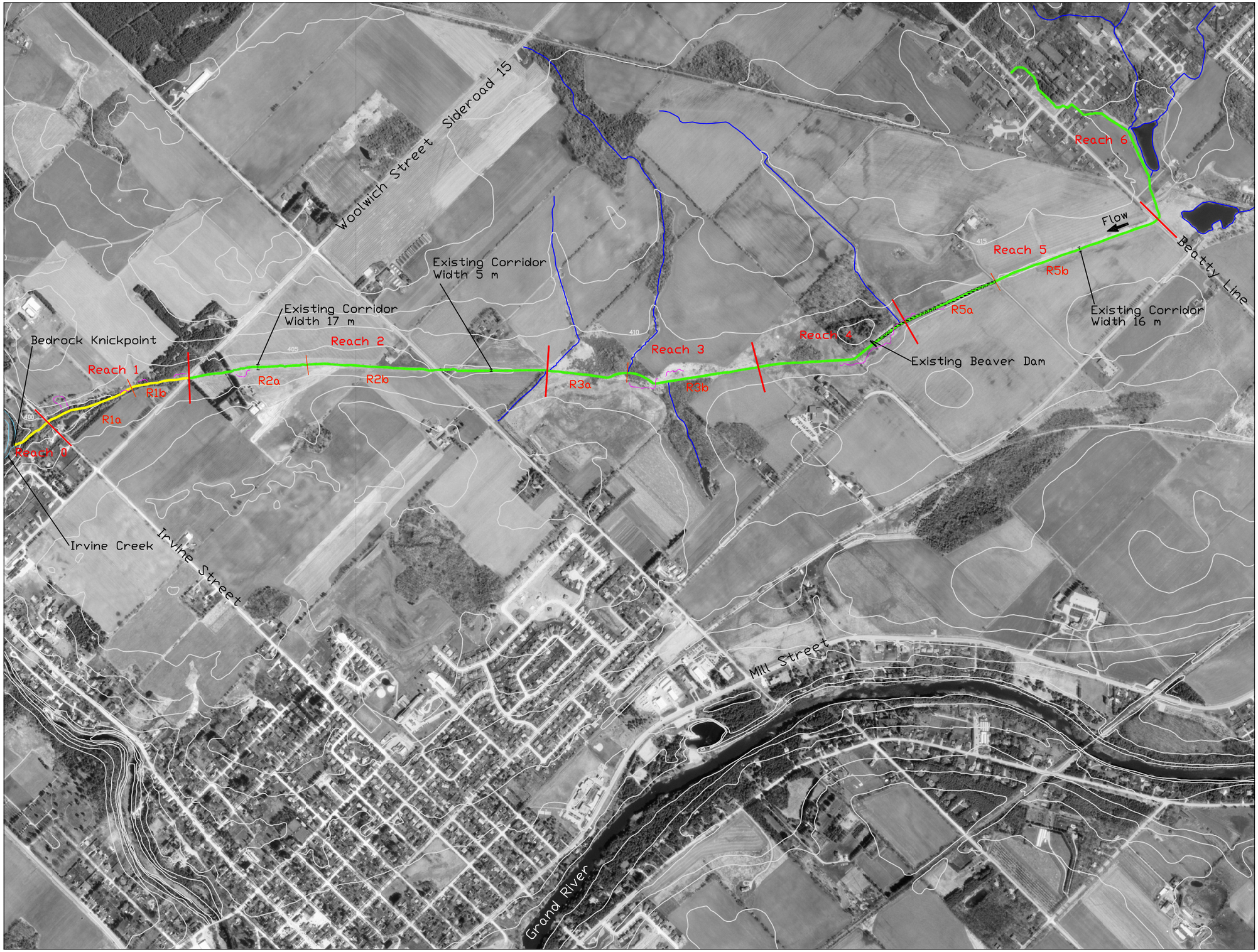
CLIENT:
TOWNSHIP OF CENTRE WELLINGTON

PROJECT:
NICHOL DRAIN SUB WATERSHED STUDY

TITLE:
FIGURE 4
REGULATORY FLOODLINE MAPPING FOR EXISTING LANDUSE

Scale: 1:12,000
Date: FEB 2008

File: L:\62645



LEGEND:

- Nichol Drain Tributaries
- Geomorphic Reaches
- Points of Interest
- Historic Alignment from Floodplain Scaring in 1930 Aerial Photographs

Reach Stability

- Stable
- Moderately Stable

SCALE 1:12,000

2000 AERIAL PHOTOGRAPHY
Contour Interval 5 m

Aquafor Beech Limited

Township of Centre Wellington

NICHOL DRAIN GEOMORPHIC REACHES

Figure 5

MAM2-2 Reed-canary Grass Mineral Meadow Marsh
MAM3-9 Forb Organic Meadow Marsh
OAO Open Aquatic
SAM1 Submerged Aquatic Marsh
SWC1-1 White Cedar Mineral Coniferous Swamp
SWC3-1 White Cedar organic Coniferous Swamp
SWD3-2 Silver Maple Mineral Deciduous Swamp
SWD4 Mineral Deciduous Swamp
SWD4-4 Yellow Birch Mineral Deciduous Swamp
SWD7 Birch-Poplar Organic Deciduous Swamp
SWD7-1 White Birch-Poplar Organic Deciduous Swamp
SWM3-2 Poplar-Conifer Mineral Mixed Swamp
SWM4-1 White Cedar-Hardwood Organic Mixed Swamp
SWT2-2 Willow Mineral Thicket Swamp
SWT2-5 Red-osier Mineral thicket Swamp
SWT3-2 Willow Organic Thicket Swamp

SWM4-1
SWM4-1
SWC3-1
SWD7-1
SWM3-2
MAM3-9
SWM4-1
SWM4-1
SWC3-1
SWC3-1
SWC1-1
SWD4
SWD7
SWC1-1
MAM2-2
SWM3-2
OAO
SWC1-1
SWD4-4
SWT2-5
SWD3-2
OAO
Beatty Line
MAM2-2
SWT3-2
MAM2-2
SWT2-5
SWT2-5
SWT2-2
Woolwich Street
Side Road 15
Gerrie Road
MAM2-2
SWM4-1
OAO
SWM4-1
SAM1
Irvine Street
Colbourne Street

KEY MAP

LEGEND:

- Locally Significant Plant Species
- Locally Significnat Wildlife Species
- Amphibian Breeding Locations
- Study Area
- Intensive Study Area / Proposed Secondary Plan
- Environmental Land Classification

NOTES:

8177 Torbram Road
Brampton, ON L6T 5C5
Phone: 905-790-3885
Fax: 905-790-4090

Aquafor Beech Limited

TOWNSHIP OF CENTRE WELLINGTON

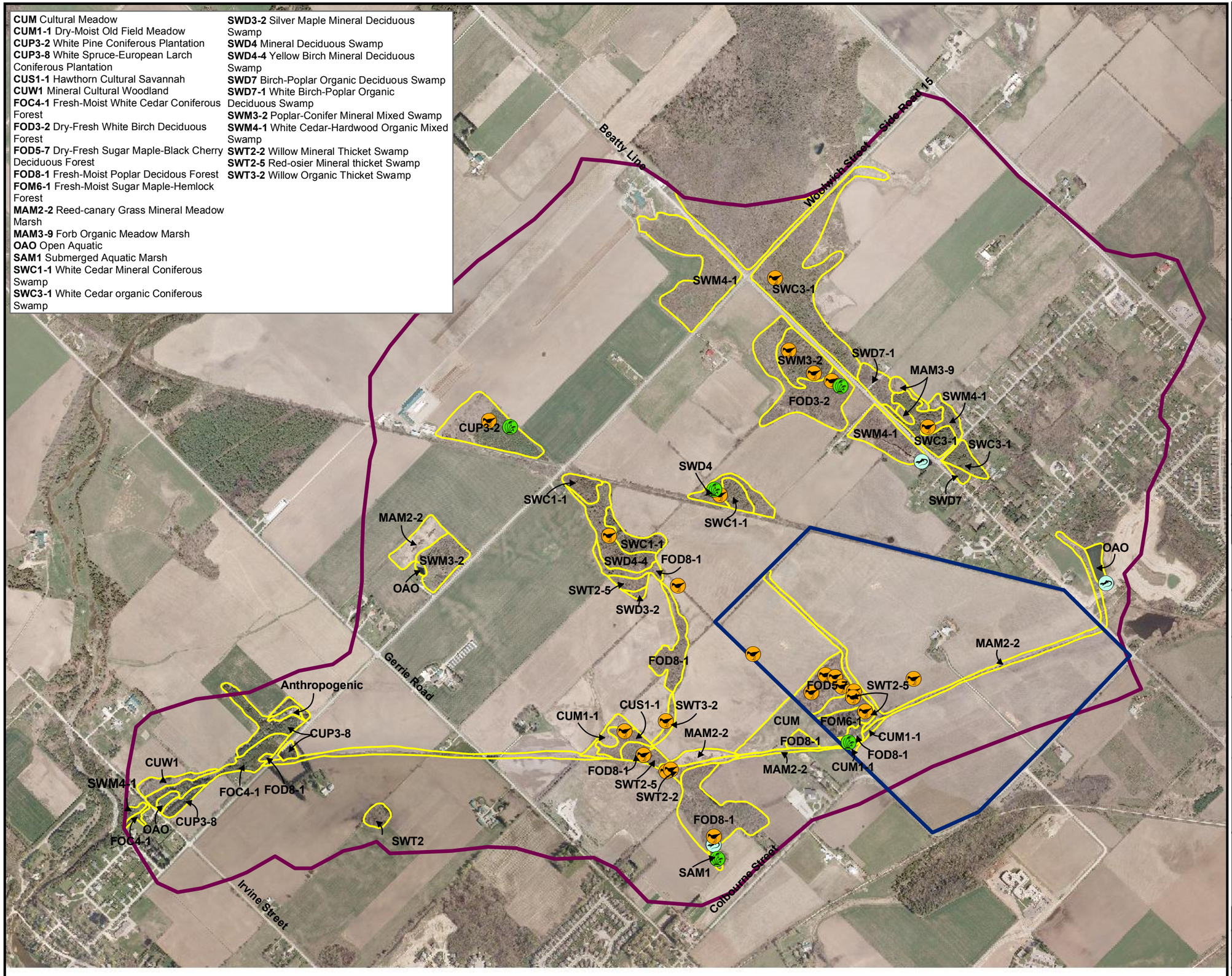
1 MacDonald Square
Elora, ON N0B 1S0
Phone: 519-846-9691
Fax: 519-846-2190

NICHOL DRAIN SUBWATERSHED STUDY

Wetlands and Significant Features

FIGURE No.: 12

CUM Cultural Meadow
CUM1-1 Dry-Moist Old Field Meadow
CUP3-2 White Pine Coniferous Plantation
CUP3-8 White Spruce-European Larch Coniferous Plantation
CUS1-1 Hawthorn Cultural Savannah
CUW1 Mineral Cultural Woodland
FOC4-1 Fresh-Moist White Cedar Coniferous Forest
FOD3-2 Dry-Fresh White Birch Deciduous Forest
FOD5-7 Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest
FOD8-1 Fresh-Moist Poplar Decidous Forest
FOM6-1 Fresh-Moist Sugar Maple-Hemlock Forest
MAM2-2 Reed-canary Grass Mineral Meadow Marsh
MAM3-9 Forb Organic Meadow Marsh
OAO Open Aquatic
SAM1 Submerged Aquatic Marsh
SWC1-1 White Cedar Mineral Coniferous Swamp
SWC3-1 White Cedar organic Coniferous Swamp
SWD3-2 Silver Maple Mineral Deciduous Swamp
SWD4 Mineral Deciduous Swamp
SWD4-4 Yellow Birch Mineral Deciduous Swamp
SWD7 Birch-Poplar Organic Deciduous Swamp
SWD7-1 White Birch-Poplar Organic Deciduous Swamp
SWM3-2 Poplar-Conifer Mineral Mixed Swamp
SWM4-1 White Cedar-Hardwood Organic Mixed Swamp
SWT2-2 Willow Mineral Thicket Swamp
SWT2-5 Red-osier Mineral thicket Swamp
SWT3-2 Willow Organic Thicket Swamp



KEY MAP

LEGEND:

- Locally Significant Plant Species
- Locally Significnat Wildlife Species
- Amphibian Breeding Locations
- Study Area
- Intensive Study Area / Proposed Secondary Plan
- Environmental Land Classification

NOTES:

8177 Torbram Road
Brampton, ON L6T 5C5
Phone: 905-790-3885
Fax: 905-790-4090

Aquafor Beech Limited

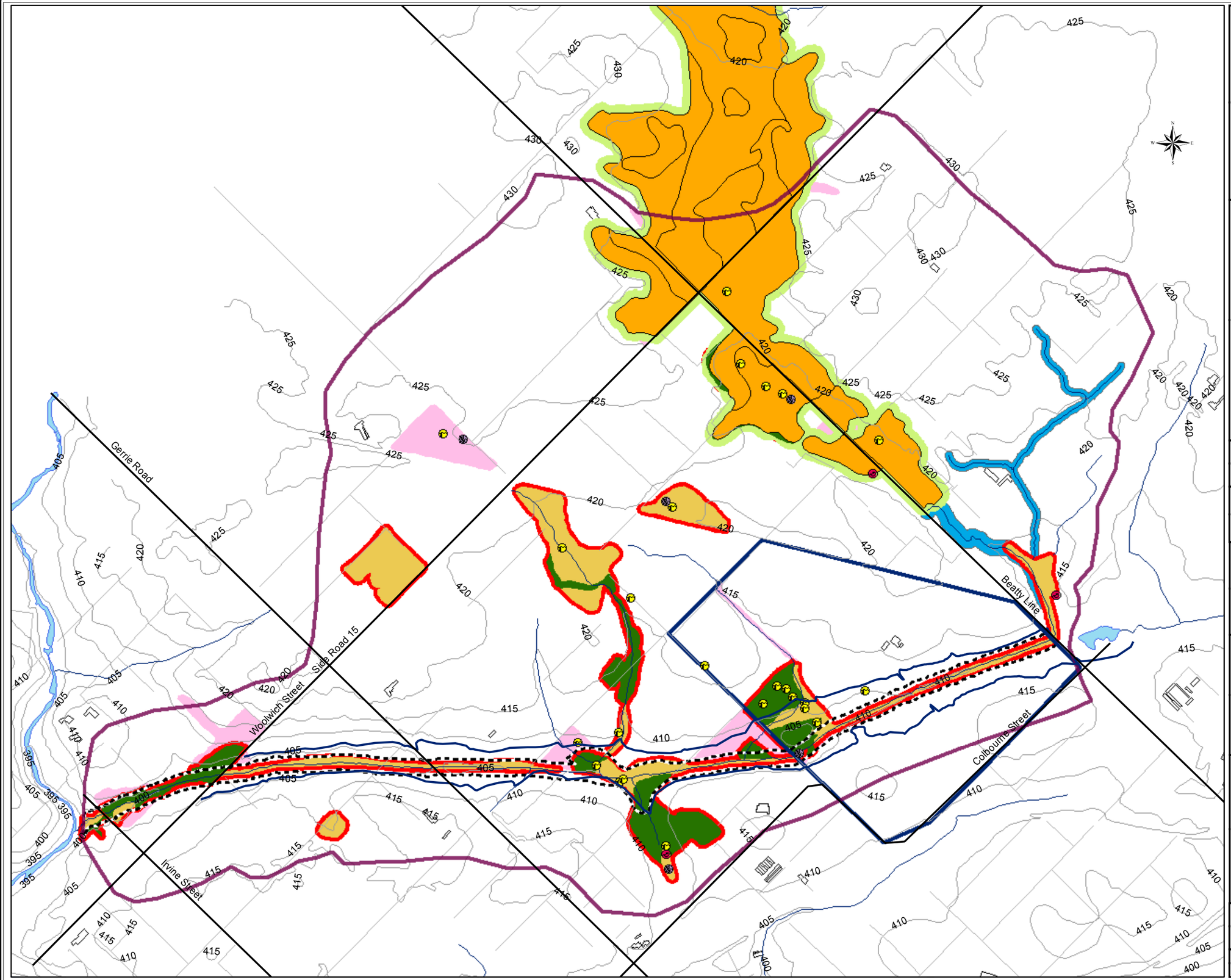
TOWNSHIP OF CENTRE WELLINGTON

1 MacDonald Square
Elora, ON N0B 1S0
Phone: 519-846-9691
Fax: 519-846-2190

NICHOL DRAIN SUBWATERSHED STUDY

Terrestrial Resourses

FIGURE No.: 11



KEY MAP

LEGEND:

- Existing Regional Floodline
- Study Area / Nichol Drain Subwatershed
- Amphibian Breeding Locations
- Locally Significant Plants
- Locally Significant Wildlife
- Intensive Study Area / Proposed Secondary Plan
- Riparian Corridor/Aquatic Buffer
- Irvine Creek Wetland Complex
- Protected Forests
- Nichol Drain Wetland Complex
- Other Natural Features
- 30 Metre Buffer
- 15 Metre Buffer
- Aquatic Buffer

NOTES:

0 0.5 1

8177 Torbram Road
Brampton, ON L6T 5C5
Phone: 905-790-3885
Fax: 905-790-4090

Aquafor Beech Limited

TOWNSHIP OF CENTRE WELLINGTON
UNITY IS STRENGTH

TOWNSHIP OF CENTRE WELLINGTON

1 MacDonald Square
Elora, ON N0B 1S0
Phone: 519-846-9691
Fax: 519-846-2190

NICHOL DRAIN SUBWATERSHED STUDY

Opportunities and Constraints

FIGURE No.: 13

Appendix D

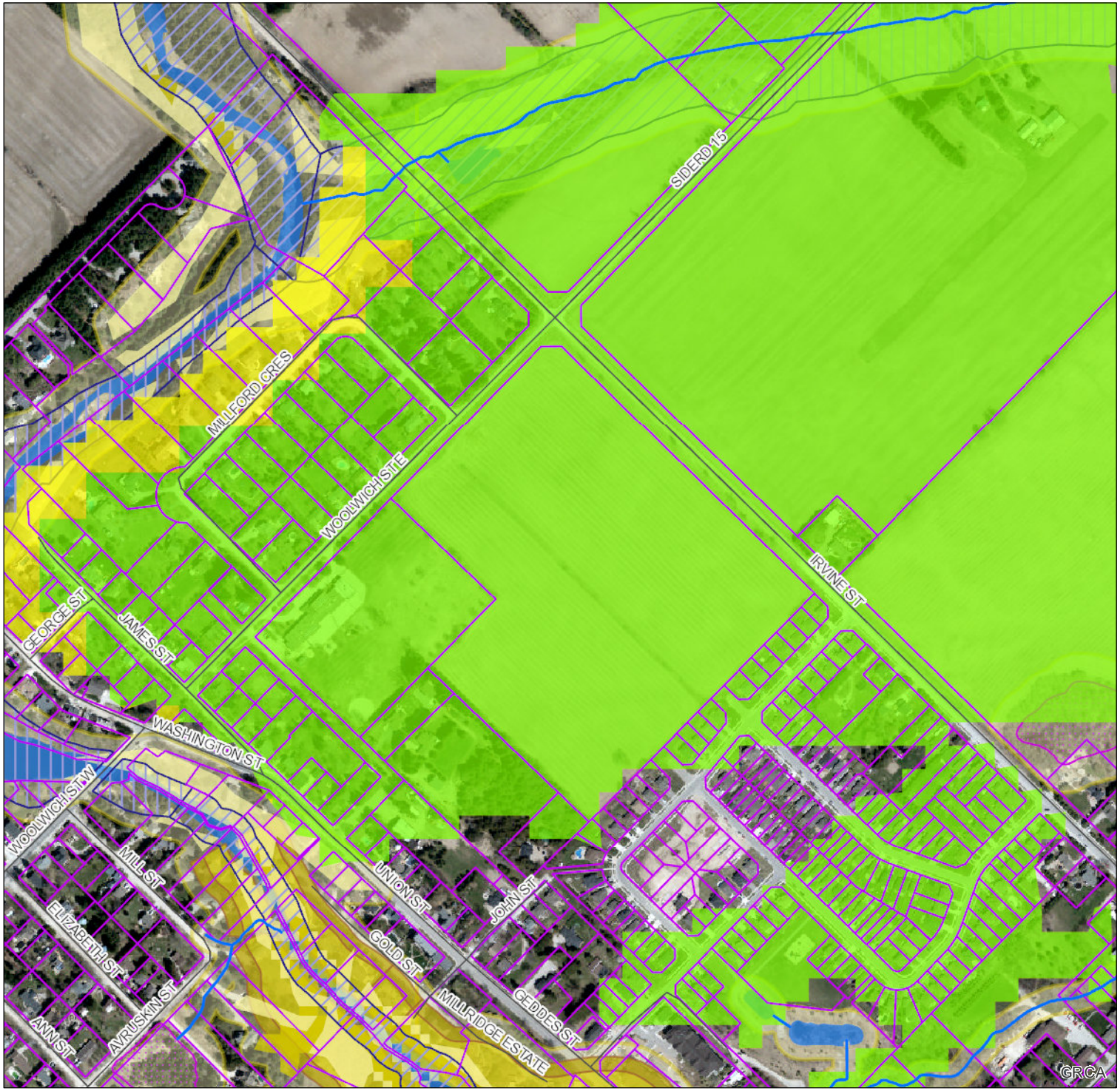
SWM Strategy Alternatives Evaluation Criteria

SWM STRATEGY ALTERNATIVES - EVALUATION CRITERIA

February 9, 2022	MTE Project No.: 50250-100 & 49878-100	Alternative #1	Alternative #2	Alternative #3
Factor Category / Factor Group / Factor		**Clayton Lands Single Solution Discharging Southwestward to Irvine Creek (Figure 4.1)**	**Indivudal Property SWM Solutions Discharging to Nichol Drain (Figure 4.2)**	**Master Planned SWM Solution for all Three Properties (Figure 4.3)**
1. NATURAL ENVIRONMENT				
1.A Terrestrial Ecosystems				
Vegetation Communities, Flora and Wildlife Habitat	Maintains natural features as identified in NDSS1	1	3	5
	Normalized Factor Group Score	1.00	3.00	5.00
1.B Wetland Ecosystems				
Wetlands	Impact on feature and function of wetlands (e.g., area, classification and quality, relative extent, function in broader wetland complex ecosystem).	1	3	5
	Normalized Factor Group Score	1.00	3.00	5.00
1.C Aquatic Ecosystems				
Aquatic habitat	Number of water bodies and watercourse crossings. Sensitivity of fish/fish habitat and thermal regime (warm, cool or cold water). Extent (area) and function of riparian habitat removed.	1	3	5
	Normalized Factor Group Score	1.00	3.00	5.00
1.D Surface Water (Quality - Impact to Water Quality / Thermal / Chlorides)				
Water Quality (TSS, Phosphorus, Nitrates)	Impact on water quality of surface water features.	1	3	5
Thermal Regime	Impact in the thermal regime of surface water features.	1	3	5
	Normalized Factor Group Score	1.00	3.00	5.00
1.E Groundwater Resources				
Groundwater Recharge Areas	Encroachment on significant groundwater recharge areas (Regional Recharge Area) (removal/disruption of function – area; depth).	1	2	5
Groundwater Quality - Source Protection Plan (WHPA, SGRA)	Potential for impacts to vulnerable areas (Area) as defined in Clean Water Act.	1	2	5
Shallow Groundwater Movement	Potential for interference with existing flow patterns (baseflow) relative to proximity to significant surface water feature and significant groundwater feature discharge areas. Consider Long Term Impact.	1	3	5
Shallow Groundwater Quality	Potential for impacting groundwater quality relative to proximity to significant surface water feature and significant groundwater feature discharge areas. Consider Long Term Impact.	1	3	5
	Normalized Factor Group Score	1.00	2.50	5.00
1.F Surface Drainage (Quantity - Water Balance and Erosion)				
Quantity (flows)	Quantity Control and Flow Regime	2	1	5
Flood Plain Function	Impacts to Regulatory Floodplain and changes to floodplain hydrologic function.	5	5	5
Water Balance	Impact on surface water	1	3	5
Erosion Assessment	impact on erosion in stream (ND1)	5	1	4
	Normalized Factor Group Score	3.25	2.50	4.75
	TOTAL CATEGORY SCORE	8.25	17.00	29.75
	NORMALIZED CATEGORY SCORE	1.38	2.83	4.96
	CATEGORY RANKING	3	2	1
2. SOCIO-CULTURAL ENVIRONMENT				
2.A Land Use Policy				
Land Use Designations and Policies	Degree of consistency with Provincial Policy Statement; conformity with the Growth Plan and Regional and City growth and development goals, objectives and policies. Comprehensive Planning, Efficient use of Land and Infrastructure Options promoting Green Infrastructure Appropriately consider cumulative environmental impact (water balance, temperature, chlorides).	1	3	5
	Normalized Factor Group Score	1.00	3.00	5.00
	TOTAL CATEGORY SCORE	1.00	3.00	5.00
	NORMALIZED CATEGORY SCORE	1.00	3.00	5.00
	CATEGORY RANKING	3	2	1
3. TRANSPORTATION / MUNICIPAL SERVICES				
3.A Transportation Network (Roads and Pedestrians)				
Roads and Intersections (Grading)	Potential impacts, storm outfalls and treatment to the Woolwich Street East, SR15 and Irvine Street	1	3	5
3.B Municipal Services & Utilities				
Municipal Services	Opportunities for connections to services. Opportunities for logical extension of services. Provision of standard cross-section locations for services. Opportunity to improve minor and major storm outlets	1	3	5
	TOTAL CATEGORY SCORE	1.00	3.00	5.00
	CATEGORY RANKING	3	2	1
4. FINANCIAL				
Capital Cost	Estimated Capital Cost, including restoration/enhancement cost of Nichol Drain	1	3	5
Operational Cost	Extraordinary operations and maintenance requirements/costs (e.g., road and SWM facility maintenance)	1	3	5
	TOTAL CATEGORY SCORE	1.00	3.00	5.00
	NORMALIZED CATEGORY SCORE	1.00	3.00	5.00
	CATEGORY RANKING	3	2	1
5. TECHNICAL				
SWM Design Requirements	Conformance to Township of Centre Wellington/County of Wellington standards, MECP and GRCA	1	4	5
Topographic; extent of cut/fill	Potential for excessive cut/fill (volume). Requirements for excessive (steep) grades (length). Ability to maintain positive drainage and establish strategy for runoff distribution.	1	4	5
Constructability	Physical constructability (adequate access to construction area). Potential conflicts with existing infrastructure (other than utilities). Current staging of development for full implementation of the storm network. Water table and groundwater dewatering (short term impact)	1	4	5
Ease of Implementation / Property Acquisition	Impact to development of entire Project Study Area	1	4	5
	Normalized Factor Group Score	1.00	4.00	5.00
	TOTAL CATEGORY SCORE	1.00	4.00	5.00
	NORMALIZED CATEGORY SCORE	1.00	4.00	5.00
	CATEGORY RANKING	3	2	1
TOTAL COMPILED SCORING				
	TOTAL NORMALIZED SCORE [x out of 25]	**7.38**	**14.83**	**20.96**
	PREFERRED OVERALL RANKING	**3**	**2**	**1**

Appendix G

Source Water Protection Plan Mapping



Grand River Conservation Authority

Date: May 19, 2022

Author: SGRA

Clayton

Legend

- Lake Erie Shoreline Reach (GRCA)
- Lake Erie Flood (GRCA)
- Regulated Watercourse (GRCA)
- Parcel - Assessment Public (MPAC/MNRF)

SGRA Vulnerability (GRCA)

- 6
- 4
- 2
- Floodplain - Special Policy Area (GRCA)

Floodplain (GRCA)

- Engineered
- Estimated
- Approximate
- Lake Erie Erosion (GRCA)
- Lake Erie Dynamic Beach (GRCA)
- Wetland (GRCA)

Slope Valley (GRCA)

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Disclaimer: This map is for illustrative purposes only. Information contained herein is not a substitute for professional review or a site survey and is subject to change without notice. The Grand River Conservation Authority takes no responsibility for, nor guarantees, the accuracy of the information contained on this map. Any interpretations or conclusions drawn from this map are the sole responsibility of the user.
The source for each data layer is shown in parentheses in the map legend. For a complete listing of sources and citations go to: https://maps.grandriver.ca/Sources-and-Citations.pdf

0 35 70 140 210 Metres

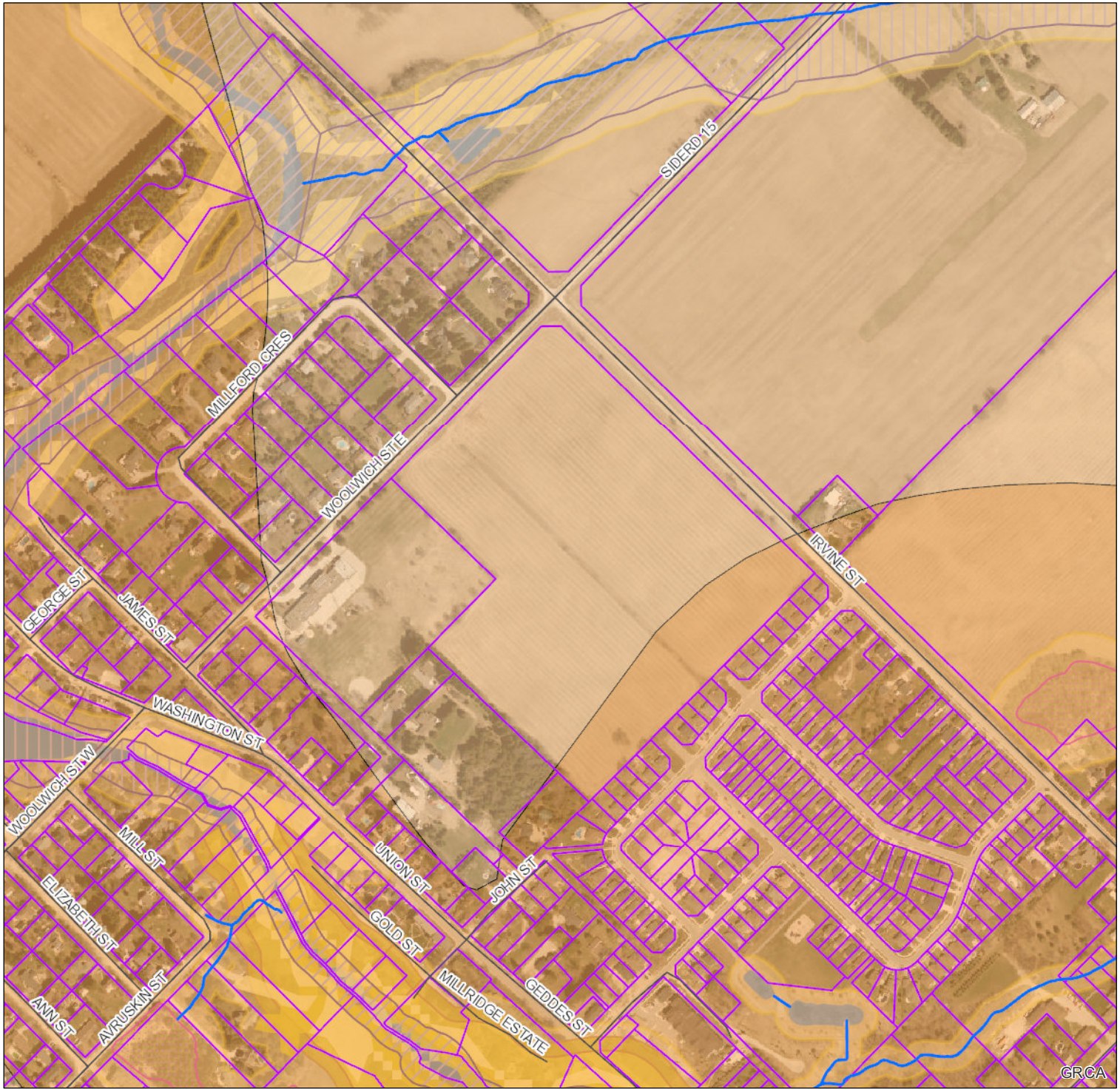
N

Map Centre (UTM NAD83 z17): 545,158.78 4,838,222.15

This map is not to be used for navigation | 2020 Ortho (ON)

NAD 1983 UTM Zone 17N

Scale: 6,003



Grand River Conservation Authority

Date: May 19, 2022

Author: WHPA

Clayton

Legend

- Lake Erie Shoreline Reach (GRCA)
- Lake Erie Flood (GRCA)
- Regulated Watercourse (GRCA)
- Parcel - Assessment Public (MPAC/MNRF)

WHPA-Wellhead Protection Area (GRCA)

- WHPA-A
- WHPA-B
- WHPA-C
- WHPA-D
- Floodplain - Special Policy Area (GRCA)

Floodplain (GRCA)

- Engineered
- Estimated
- Approximate
- Lake Erie Erosion (GRCA)
- Lake Erie Dynamic Beach (GRCA)

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Disclaimer: This map is for illustrative purposes only. Information contained herein is not a substitute for professional review or a site survey and is subject to change without notice. The Grand River Conservation Authority takes no responsibility for, nor guarantees, the accuracy of the information contained on this map. Any interpretations or conclusions drawn from this map are the sole responsibility of the user.
The source for each data layer is shown in parentheses in the map legend. For a complete listing of sources and citations go to: https://maps.grandriver.ca/Sources-and-Citations.pdf

0 35 70 140 210 Metres

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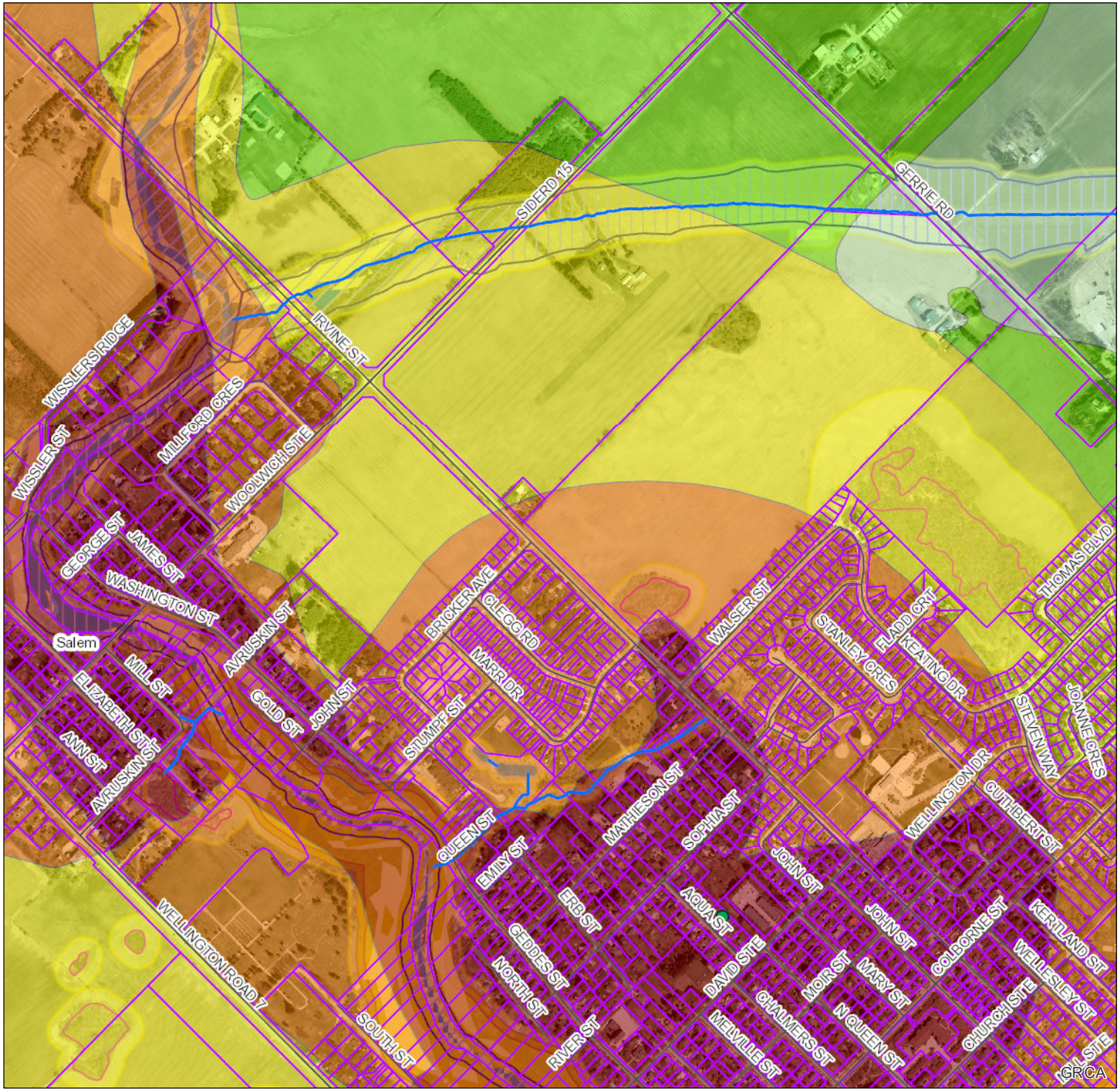
Map Centre (UTM NAD83 z17): 545,158.78 4,838,200.47

This map is not to be used for navigation | 2020 Ortho (ON)

NAD 1983 UTM Zone 17N

Scale: 6,003



Grand River Conservation Authority

Date: Jul 18, 2022

Clayton - WHPA Vulnerability

Legend

- Municipal Well (GRCA)
- Regulated Watercourse (GRCA)
- Parcel - Assessment Public (MPAC/MNRF)

WHPA Vulnerability (GRCA)

- 10
- 8
- 6
- 4
- 2
- Floodplain - Special Policy Area (GRCA)

Floodplain (GRCA)

- Engineered
- Estimated
- Approximate
- Wetland (GRCA)

Slope Valley (GRCA)

- Steep

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Disclaimer: This map is for illustrative purposes only. Information contained herein is not a substitute for professional review or a site survey and is subject to change without notice. The Grand River Conservation Authority takes no responsibility for, nor guarantees, the accuracy of the information contained on this map. Any interpretations or conclusions drawn from this map are the sole responsibility of the user.
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0 65 130 260 390 Metres

N

Map Centre (UTM NAD83 z17): 545,529.84 4,838,141.44

This map is not to be used for navigation | 2020 Ortho (ON)

NAD 1983 UTM Zone 17N

Scale: 11,064

Appendix H

Water Balance Figures and Calculations

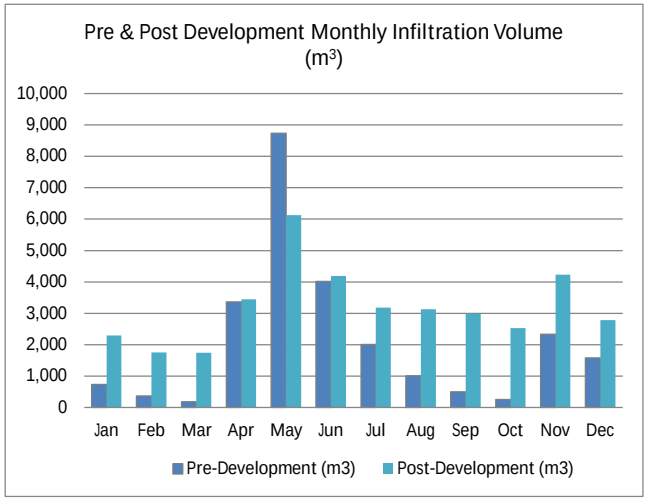
Clayton Subdivision
SITE WATER BUDGET (INFILTRATION) ANALYSIS
Centre Wellington, Ontario

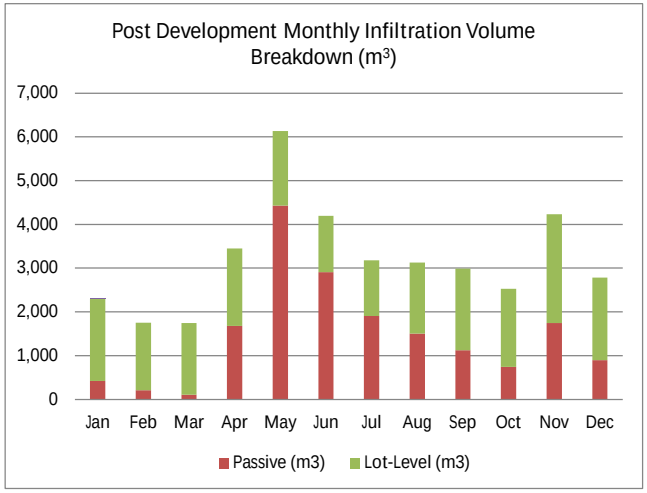
INFILTRATION SUMMARY - CLAYTON SUBDIVISION ONLY

Project Number: 50250-100
Date: 2023/07/11
Design By: MXF
File: Q:\50250\100\SWM\Water Balance\50250-100 Water Balance (Thornthwaite-Mather) June 2023 V6.xlsx

Month	Total Infiltration Volume (m^3)					
	Pre-development	Post- Development			Difference	Change %
		Passive	Lot-Level	Total		
Jan	734	423	1,867	2,290	1,556	212.1
Feb	367	211	1,537	1,749	1,382	376.7
Mar	183	106	1,639	1,745	1,561	851.2
Apr	3,366	1,681	1,766	3,447	81	2.4
May	8,742	4,427	1,705	6,132	-2,610	-29.9
Jun	4,013	2,905	1,286	4,191	178	4.4
Jul	2,007	1,904	1,271	3,175	1,169	58.2
Aug	1,003	1,505	1,620	3,125	2,122	211.5
Sep	502	1,123	1,866	2,989	2,487	495.8
Oct	251	744	1,781	2,525	2,274	906.7
Nov	2,335	1,745	2,489	4,234	1,899	81.3
Dec	1,584	899	1,887	2,786	1,201	75.8
Total	25,087	17,673	20,714	38,387	13,300	53.0

Note: Negative sign indicate a decrease under post-development conditions.





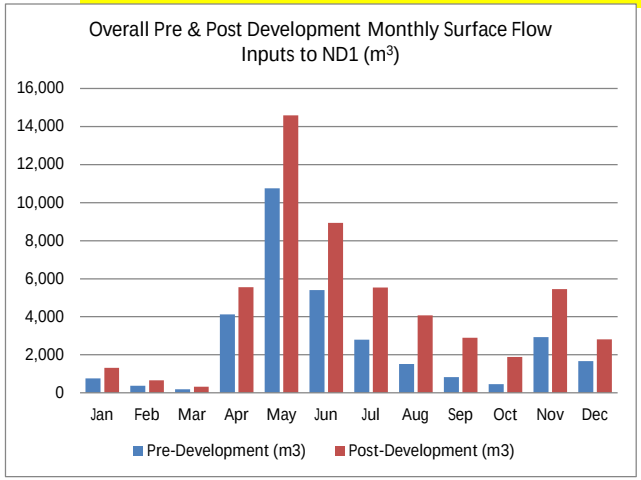
Clayton Subdivision
SITE WATER BUDGET (INFILTRATION) ANALYSIS
Centre Wellington, Ontario

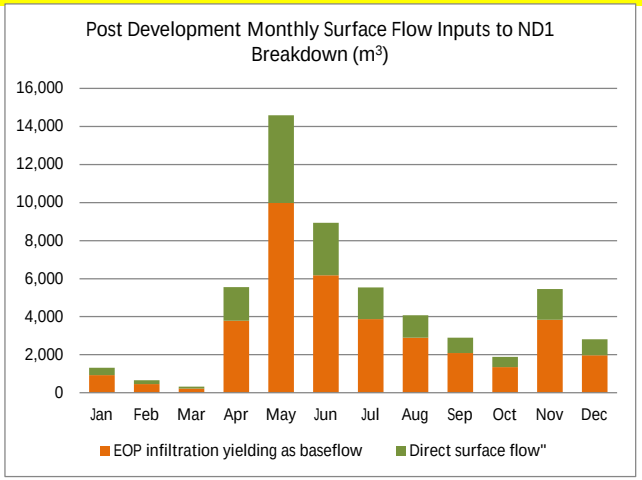
WATER INPUTS TO ND1 SUMMARY - OVERALL

Project Number: 50250-100
Date: 2023/07/11
Design By: MXF
File: Q:\50250\100\SWM\Water Balance\50250-100 Water Balance (Thornthwaite-Mather) June 2023 V6.xlsx

Month	Total Runoff Volume (m^3)							
	Pre-development	Post-development					Difference	Change %
		EOP Infiltration yeilding as ND1 baseflow		Runoff		Total		
		Total EOP SWM Gallery Infiltration	Horizontal GW flow component yeilding as baseflow*	Discharge from SMWF	d/s of SWMF			
Jan	763	1,159	927	290	100	1,317	554	72.7
Feb	381	580	464	145	50	659	277	72.7
Mar	191	290	232	72	25	329	139	72.7
Apr	4,122	4,746	3,796	1,186	567	5,550	1,429	34.7
May	10,752	12,476	9,981	3,119	1,485	14,585	3,833	35.7
Jun	5,408	7,731	6,185	1,933	812	8,930	3,522	65.1
Jul	2,801	4,840	3,872	1,210	448	5,529	2,729	97.4
Aug	1,514	3,613	2,891	903	273	4,067	2,553	168.6
Sep	833	2,607	2,086	652	169	2,906	2,073	248.8
Oct	454	1,698	1,358	424	101	1,883	1,429	314.7
Nov	2,932	4,791	3,833	1,198	419	5,450	2,518	85.9
Dec	1,668	2,473	1,978	618	219	2,816	1,148	68.8
Total	31,818	47,004	37,603	11,751	4,668	54,022	22,203	69.8

Note: Assumed 80% of Total End-of-Pipe Infiltration ultimately yields as baseflow to the Nichol Drain to exceed runoff over existing





Clayton Subdivision
SITE WATER BUDGET (INFILTRATION) ANALYSIS - Clayton
Centre Wellington, Ontario

Project Number: 50250-100
Date: 2023/07/11
Design By: MXF
File: Q:\50250\100\SWM\Water Balance\50250-100 Water Balance (Thornthwaite-Mather) June 2023 V6.xlsx

PRE-DEVELOPMENT CONDITION (INFILTRATION TO ND1) - CLAYTON SUBDIVISION ONLY

Contributing Catchments: 101/104,106,107
Contributing Areas: 12.49 ha
Percent Impervious 0.0 %
Weather Station: Fergus Shand Dam

Soil Type: Silty Sand, Sandy Loam
Vegetation: Majority Crops
Topography: Flat Land to Hilly
Soil Moisture Retention Capacity: 150 mm

Runoff Factor: 0.42
Evapotranspiration Factor for Impervious Surfaces: 0.33

Month	Daily Average Temperature (C°)	Monthly Heat Index	Unadjusted Daily PE (mm)	Correction Factor	Adjusted PE (mm)	Average Precipitation (mm)	P-PE (mm)	Accum. Pot. Water Loss (mm)	Storage (mm)	ΔS (mm)	Pervious ET (mm)	Actual ET (mm)	Moisture Surplus (mm)	Water Runoff (mm)	Snow Melt Runoff (mm)	Total Recharge & Runoff (mm)	Total Recharge & Runoff (m^3)	**Total Infiltration Depth (mm)**	**Total Infiltration Volume (m^3)**	Actual Runoff (mm)	Runoff Volume (m^3)
Jan	-7.4	0.00	0.0	24.3	0.0	67.9	67.9	0.0	286.5	0.0	0.0	0.0	0.0	10.0	0.0	10.0	1,255	**5.9**	**734**	4.2	521
Feb	-6.3	0.00	0.0	24.5	0.0	55.9	55.9	0.0	342.4	0.0	0.0	0.0	0.0	5.0	0.0	5.0	628	**2.9**	**367**	2.1	261
Mar	-1.9	0.00	0.0	30.6	0.0	59.6	59.6	0.0	402.0	0.0	0.0	0.0	0.0	2.5	0.0	2.5	314	**1.5**	**183**	1.0	130
Apr	5.7	1.22	0.9	33.6	29.9	74.1	44.2	0.0	150.0	0.0	29.9	29.9	44.2	23.4	22.7	46.1	5,758	**27.0**	**3,366**	19.1	2,392
May	12.2	3.86	2.0	38.0	75.5	86.9	11.4	0.0	150.0	0.0	75.5	75.5	11.4	17.4	102.3	119.7	14,954	**70.0**	**8,742**	49.7	6,211
Jun	17.5	6.66	2.9	38.6	112.2	83.8	-28.4	-28.4	70.0	-80.0	163.8	163.8	0.0	3.8	51.2	55.0	6,864	**32.1**	**4,013**	22.8	2,851
Jul	20	8.16	3.3	38.9	130.2	89.2	-41.0	-69.5	62.0	-8.0	97.2	97.2	0.0	1.9	25.6	27.5	3,432	**16.1**	**2,007**	11.4	1,426
Aug	19	7.55	3.2	36.0	114.2	96.6	-17.6	-87.0	69.0	7.0	114.2	114.2	0.0	0.9	12.8	13.7	1,716	**8.0**	**1,003**	5.7	713
Sep	14.9	5.22	2.5	31.2	76.6	93.1	16.5	0.0	85.5	16.5	76.6	76.6	0.0	0.5	6.4	6.9	858	**4.0**	**502**	2.9	356
Oct	8.3	2.15	1.3	28.5	37.7	77.2	39.5	0.0	125.0	39.5	37.7	37.7	0.0	0.2	3.2	3.4	429	**2.0**	**251**	1.4	178
Nov	2.1	0.27	0.3	24.2	7.5	93	85.5	0.0	150.0	25.0	7.5	7.5	60.5	30.4	1.6	32.0	3,995	**18.7**	**2,335**	13.3	1,659
Dec	-3.9	0.00	0.0	23.0	0.0	68.6	68.6	0.0	218.6	0.0	0.0	0.0	0.0	20.1	1.6	21.7	2,710	**12.7**	**1,584**	9.0	1,126
Total		35.1	16.4		583.8	**945.9**	**362.1**					**602.3**	**116.1**	**116.1**	**227.4**	**343.6**	**42,912**	**200.9**	**25,087**	**142.7**	**17,824**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration

Clayton Subdivision
SITE WATER BUDGET (INFILTRATION) ANALYSIS
Centre Wellington, Ontario

Project Number: 50250-100
Date: 2023/07/11
Design By: MXF
File: Q:\50250\100\SWM\Water Balance\50250-100 Water Balance (Thornthwaite-Mather) June 2023 V6.xlsx

PRE-DEVELOPMENT CONDITION (RUNOFF TO ND1) - CLAYTON SUBDIVISION ONLY

Contributing Catchments:	101	Soil Type:	Silty Sand, Sandy Loam	Runoff Factor:	0.40
Contributing Areas:	6.67 ha	Vegetation:	Majority Crops	Evapotranspiration	
Percent Impervious	0.0 %	Topography:	Rolling	Factor for Impervious	
Weather Station:	Fergus Shand Dam	Soil Moisture Retention Capacity:	150 mm	Surfaces:	0.33

Month	Daily Average Temperature (C°)	Monthly Heat Index	Unadjusted Daily PE (mm)	Correction Factor	Adjusted PE (mm)	Average Precipitation (mm)	P-PE (mm)	Accum. Pot. Water Loss (mm)	Storage (mm)	ΔS (mm)	Pervious ET (mm)	Actual ET (mm)	Moisture Surplus (mm)	Water Runoff (mm)	Snow Melt Runoff (mm)	Total Recharge & Runoff (mm)	Total Recharge & Runoff (m^3)	Total Infiltration Depth (mm)	Total Infiltration Volume (m^3)	**Actual Runoff (mm)**	**Runoff Volume (m^3)**
Jan	-7.4	0.00	0.0	24.3	0.0	67.9	67.9	0.0	286.5	0.0	0.0	0.0	0.0	10.0	0.0	10.0	670	6.0	402	**4.0**	**268**
Feb	-6.3	0.00	0.0	24.5	0.0	55.9	55.9	0.0	342.4	0.0	0.0	0.0	0.0	5.0	0.0	5.0	335	3.0	201	**2.0**	**134**
Mar	-1.9	0.00	0.0	30.6	0.0	59.6	59.6	0.0	402.0	0.0	0.0	0.0	0.0	2.5	0.0	2.5	168	1.5	101	**1.0**	**67**
Apr	5.7	1.22	0.9	33.6	29.9	74.1	44.2	0.0	150.0	0.0	29.9	29.9	44.2	23.4	22.7	46.1	3,075	27.7	1,845	**18.4**	**1,230**
May	12.2	3.86	2.0	38.0	75.5	86.9	11.4	0.0	150.0	0.0	75.5	75.5	11.4	17.4	102.3	119.7	7,986	71.8	4,791	**47.9**	**3,194**
Jun	17.5	6.66	2.9	38.6	112.2	83.8	-28.4	-28.4	70.0	-80.0	163.8	163.8	0.0	3.8	51.2	55.0	3,666	33.0	2,199	**22.0**	**1,466**
Jul	20	8.16	3.3	38.9	130.2	89.2	-41.0	-69.5	62.0	-8.0	97.2	97.2	0.0	1.9	25.6	27.5	1,833	16.5	1,100	**11.0**	**733**
Aug	19	7.55	3.2	36.0	114.2	96.6	-17.6	-87.0	69.0	7.0	114.2	114.2	0.0	0.9	12.8	13.7	916	8.2	550	**5.5**	**367**
Sep	14.9	5.22	2.5	31.2	76.6	93.1	16.5	0.0	85.5	16.5	76.6	76.6	0.0	0.5	6.4	6.9	458	4.1	275	**2.7**	**183**
Oct	8.3	2.15	1.3	28.5	37.7	77.2	39.5	0.0	125.0	39.5	37.7	37.7	0.0	0.2	3.2	3.4	229	2.1	137	**1.4**	**92**
Nov	2.1	0.27	0.3	24.2	7.5	93	85.5	0.0	150.0	25.0	7.5	7.5	60.5	30.4	1.6	32.0	2,133	19.2	1,280	**12.8**	**853**
Dec	-3.9	0.00	0.0	23.0	0.0	68.6	68.6	0.0	218.6	0.0	0.0	0.0	0.0	20.1	1.6	21.7	1,447	13.0	868	**8.7**	**579**
Total		35.1	16.4		583.8	**945.9**	**362.1**					**602.3**	**116.1**	**116.1**	**227.4**	**343.6**	**22,916**	**206.1**	**13,750**	**137.4**	**9,166**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration

Clayton Subdivision

SITE WATER BUDGET (INFILTRATION) ANALYSIS

Centre Wellington, Ontario

Project Number: 50250-100
Date: 2023/07/11
Design By: MXF
File: Q:\50250\100\SWM\Water Balance\50250-100 Water Balance (Thornthwaite-Mather) June 2023 V6.xlsx

POST-DEVELOPMENT CONDITION (LOT LEVEL) - CLAYTON SUBDIVISION ONLY

Contributing Catchments: 201
Contributing Areas: 2.75 ha
Percent Impervious 100.0 %
Weather Station: Fergus Shand Dam

Runoff Factor 1.00
Evapotranspiration Factor for Impervious Surfaces 0.33

Month	Daily Average Temperature (C°)	Monthly Heat Index	Unadjusted Daily PE (mm)	Correction Factor	Adjusted PE (mm)	Impervious ET (mm)	Average Precipitation (mm)	P-PE (mm)	Actual ET (mm)	Moisture Surplus (mm)	Water Runoff (mm)	Total Recharge & Runoff (mm)	Total Recharge & Runoff (m^3)	Total Lot Level Enhanced Recharge* (m^3)	Total Lot Level Enhanced Recharge (mm)
Jan	-7.4	0.00	0.0	24.3	0.0	0.0	67.9	67.9	0.0	67.9	67.9	67.9	1,867	1,867	68
Feb	-6.3	0.00	0.0	24.5	0.0	0.0	55.9	55.9	0.0	55.9	55.9	55.9	1,537	1,537	56
Mar	-1.9	0.00	0.0	30.6	0.0	0.0	59.6	59.6	0.0	59.6	59.6	59.6	1,639	1,639	60
Apr	5.7	1.22	0.9	33.6	29.9	9.9	74.1	64.2	9.9	64.2	64.2	64.2	1,766	1,766	64
May	12.2	3.86	2.0	38.0	75.5	24.9	86.9	62.0	24.9	62.0	62.0	62.0	1,705	1,705	62
Jun	17.5	6.66	2.9	38.6	112.2	37.0	83.8	46.8	37.0	46.8	46.8	46.8	1,286	1,286	47
Jul	20	8.16	3.3	38.9	130.2	43.0	89.2	46.2	43.0	46.2	46.2	46.2	1,271	1,271	46
Aug	19	7.55	3.2	36.0	114.2	37.7	96.6	58.9	37.7	58.9	58.9	58.9	1,620	1,620	59
Sep	14.9	5.22	2.5	31.2	76.6	25.3	93.1	67.8	25.3	67.8	67.8	67.8	1,866	1,866	68
Oct	8.3	2.15	1.3	28.5	37.7	12.4	77.2	64.8	12.4	64.8	64.8	64.8	1,781	1,781	65
Nov	2.1	0.27	0.3	24.2	7.5	2.5	93	90.5	2.5	90.5	90.5	90.5	2,489	2,489	91
Dec	-3.9	0.00	0.0	23.0	0.0	0.0	68.6	68.6	0.0	68.6	68.6	68.6	1,887	1,887	69
Total		35.1	16.4		583.8	192.6	**945.9**	**753.3**	**192.6**	**753.3**	**753.3**	**753.3**	**20,714**	**20,714**	**753**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration
* Lot-level recharge volume was estimated as on average 100% of runoff volume from roof areas

Clayton Subdivision
SITE WATER BUDGET (INFILTRATION) ANALYSIS
Centre Wellington, Ontario

Project Number: 50250-100
Date: 2023/07/11
Design By: MXF
File: Q:\50250\100\SWM\Water Balance\50250-100 Water Balance (Thornthwaite-Mather) June 2023 V6.xlsx

POST-DEVELOPMENT CONDITION (LOT LEVEL + PASSIVE INFIL + RUNOFF TO SWMF) - CLAYTON SUBDIVISION ONLY

Contributing Catchments: 202,203,209,210,212
Contributing Areas: 8.82 ha
Percent Impervious 52.8 %
Weather Station: Fergus Shand Dam

Soil Type: Silty Sand, Sandy Loam
Vegetation: Urban Lawn
Topography: Flat Land
Soil Moisture Retention Capacity 75 mm

Runoff Factor 0.69
Evapotranspiration
Factor for Impervious
Surfaces 0.33

																						Sumamry including Area 201 (roof areas)								
Month	Daily Average Temperature	Monthly Heat Index	Unadjusted Daily PE	Correction Factor	Adjusted PE	Average Precipitation	P-PE	Accum. Pot. Water Loss	Storage	ΔS	Pervious ET	Actual ET	Moisture Surplus	Water Runoff	Snow Melt Runoff	Total Recharge & Runoff	Total Recharge & Runoff	Recharge Pervious (Passive INF)	Recharge Pervious (Passive INF)	Runoff before Enhanced Infiltration	Runoff before Enhanced Infiltration	Total Lot Level Enhanced Recharge*	Total Lot Level Enhanced Recharge	Total At-source Recharge	Total At-source Recharge	Actual Runoff Volume To SWMF	Acutal Runoff to SWMF	Total Enhanced EOP Recharge*	Total Enhanced EOP Recharge	**Overall ND1 Recharge from Clayton**	**Overall ND1 Recharge from Clayton**	**Overall ND1 Runoff from Clayton**	**Overall ND1 Runoff from Clayton**
	(C°)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(m^3)	(m^3)	(mm)	(mm)	(m^3)		(m^3)	(mm)	(m^3)	(mm)	(m^3)	(mm)	(m^3)	(mm)	**(m^3)**	**(mm)**	**(m^3)**	**(mm)**
Jan	-7.4	0.00	0.0	24.3	0.0	67.9	67.9	0.0	211.5	0.0	0.0	0.0	0.0	13.4	0.0	13.4	1,184	363	4	9.3	821	1,867	68	2,230	19	821	7	657	6	**2,887**	**25**	**164**	**1**
Feb	-6.3	0.00	0.0	24.5	0.0	55.9	55.9	0.0	267.4	0.0	0.0	0.0	0.0	6.7	0.0	6.7	592	181	2	4.7	410	1,537	56	1,719	15	410	4	328	3	**2,047**	**18**	**82**	**1**
Mar	-1.9	0.00	0.0	30.6	0.0	59.6	59.6	0.0	327.0	0.0	0.0	0.0	0.0	3.4	0.0	3.4	296	91	1	2.3	205	1,639	60	1,730	15	205	2	164	1	**1,894**	**16**	**41**	**0**
Apr	5.7	1.22	0.9	33.6	29.9	74.1	44.2	0.0	75.0	0.0	29.9	19.3	54.8	29.1	23.1	52.2	4,605	1,412	16	36.2	3,194	1,766	64	3,178	27	3,194	28	2,555	22	**5,733**	**50**	**639**	**6**
May	12.2	3.86	2.0	38.0	75.5	86.9	11.4	0.0	75.0	0.0	75.5	48.8	38.1	33.6	104.1	137.7	12,149	3,724	42	95.5	8,425	1,705	62	5,429	47	8,425	73	6,740	58	**12,169**	**105**	**1,685**	**15**
Jun	17.5	6.66	2.9	38.6	112.2	83.8	-28.4	-28.4	16.0	-59.0	142.8	92.2	50.6	42.1	52.1	94.1	8,304	2,546	29	65.3	5,758	1,286	47	3,832	33	5,758	50	4,607	40	**8,438**	**73**	**1,152**	**10**
Jul	20	8.16	3.3	38.9	130.2	89.2	-41.0	-69.5	12.0	-4.0	93.2	60.2	33.0	37.5	26.0	63.6	5,607	1,719	19	44.1	3,888	1,271	46	2,990	26	3,888	34	3,111	27	**6,101**	**53**	**778**	**7**
Aug	19	7.55	3.2	36.0	114.2	96.6	-17.6	-87.0	15.0	3.0	114.2	73.7	40.4	39.0	13.0	52.0	4,586	1,406	16	36.1	3,180	1,620	59	3,026	26	3,180	27	2,544	22	**5,570**	**48**	**636**	**5**
Sep	14.9	5.22	2.5	31.2	76.6	93.1	16.5	0.0	31.5	16.5	76.6	49.5	27.1	33.0	6.5	39.5	3,488	1,069	12	27.4	2,419	1,866	68	2,935	25	2,419	21	1,935	17	**4,870**	**42**	**484**	**4**
Oct	8.3	2.15	1.3	28.5	37.7	77.2	39.5	0.0	71.0	39.5	37.7	24.4	13.3	23.2	3.3	26.4	2,333	715	8	18.3	1,618	1,781	65	2,496	22	1,618	14	1,294	11	**3,790**	**33**	**324**	**3**
Nov	2.1	0.27	0.3	24.2	7.5	93	85.5	0.0	75.0	4.0	7.5	4.8	84.2	53.7	1.6	55.3	4,879	1,496	17	38.4	3,383	2,489	91	3,985	34	3,383	29	2,707	23	**6,692**	**58**	**677**	**6**
Dec	-3.9	0.00	0.0	23.0	0.0	68.6	68.6	0.0	143.6	0.0	0.0	0.0	0.0	26.8	1.6	28.5	2,511	770	9	19.7	1,741	1,887	69	2,656	23	1,741	15	1,393	12	**4,050**	**35**	**348**	**3**
Total		35.1	16.4		583.8	**945.9**	**362.1**					**372.9**	**341.5**	**341.5**	**231.4**	**573.0**	**50,534**	**15,491**	**176**	**397.3**	**35,043**	**20,714**	**753**	**36,206**	**313**	**35,043**	**303**	**28,034**	**242**	**64,240**	**555**	**7,009**	**61**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration
* Enhanced recharge volume was estimated as 80% of runoff volume to SWMF

Clayton Subdivision
SITE WATER BUDGET (INFILTRATION) ANALYSIS
Centre Wellington, Ontario

Project Number: 50250-100
Date: 2023/07/11
Design By: MXF
File: Q:\50250\100\SWM\Water Balance\50250-100 Water Balance (Thornthwaite-Mather) June 2023 V6.xlsx

POST-DEVELOPMENT CONDITION (PASSIVE INFIL TO ND1) - CLAYTON SUBDIVISION ONLY

Contributing Catchments:	214,215,216,217	Soil Type:	Silty Sand, Sandy Loam	Runoff Factor:	0.37
Contributing Areas:	0.91 ha	Vegetation:	Urban Lawn	Evapotranspiration	
Percent Impervious	2.9 %	Topography:	Flat Land	Factor for Impervious	
Weather Station:	Fergus Shand Dam	Soil Moisture Retention Capacity:	75 mm	Surfaces:	0.33

Month	Daily Average Temperature (C°)	Monthly Heat Index	Unadjusted Daily PE (mm)	Correction Factor	Adjusted PE (mm)	Average Precipitation (mm)	P-PE (mm)	Accum. Pot. Water Loss (mm)	Storage (mm)	ΔS (mm)	Pervious ET (mm)	Actual ET (mm)	Moisture Surplus (mm)	Water Runoff (mm)	Snow Melt Runoff (mm)	Total Recharge & Runoff (mm)	Total Recharge & Runoff (m^3)	**Total Infiltration Depth (mm)**	**Total Infiltration Volume (m^3)**	Actual Runoff (mm)	Runoff Volume (m^3)
Jan	-7.4	0.00	0.0	24.3	0.0	67.9	67.9	0.0	211.5	0.0	0.0	0.0	0.0	10.4	0.0	10.4	95	**6.6**	**60**	3.9	35
Feb	-6.3	0.00	0.0	24.5	0.0	55.9	55.9	0.0	267.4	0.0	0.0	0.0	0.0	5.2	0.0	5.2	47	**3.3**	**30**	1.9	18
Mar	-1.9	0.00	0.0	30.6	0.0	59.6	59.6	0.0	327.0	0.0	0.0	0.0	0.0	2.6	0.0	2.6	24	**1.6**	**15**	1.0	9
Apr	5.7	1.22	0.9	33.6	29.9	74.1	44.2	0.0	75.0	0.0	29.9	29.3	44.8	23.7	23.1	46.8	426	**29.6**	**269**	17.3	157
May	12.2	3.86	2.0	38.0	75.5	86.9	11.4	0.0	75.0	0.0	75.5	74.0	12.9	18.3	104.1	122.4	1,114	**77.2**	**703**	45.2	411
Jun	17.5	6.66	2.9	38.6	112.2	83.8	-28.4	-28.4	16.0	-59.0	142.8	140.0	2.8	10.5	52.1	62.6	570	**39.5**	**360**	23.1	210
Jul	20	8.16	3.3	38.9	130.2	89.2	-41.0	-69.5	12.0	-4.0	93.2	91.4	1.8	6.2	26.0	32.2	293	**20.3**	**185**	11.9	108
Aug	19	7.55	3.2	36.0	114.2	96.6	-17.6	-87.0	15.0	3.0	114.2	111.9	2.2	4.2	13.0	17.2	157	**10.9**	**99**	6.4	58
Sep	14.9	5.22	2.5	31.2	76.6	93.1	16.5	0.0	31.5	16.5	76.6	75.0	1.5	2.9	6.5	9.4	85	**5.9**	**54**	3.5	31
Oct	8.3	2.15	1.3	28.5	37.7	77.2	39.5	0.0	71.0	39.5	37.7	37.0	0.7	1.8	3.3	5.1	46	**3.2**	**29**	1.9	17
Nov	2.1	0.27	0.3	24.2	7.5	93	85.5	0.0	75.0	4.0	7.5	7.4	81.7	41.7	1.6	43.4	395	**27.4**	**249**	16.0	146
Dec	-3.9	0.00	0.0	23.0	0.0	68.6	68.6	0.0	143.6	0.0	0.0	0.0	0.0	20.9	1.6	22.5	205	**14.2**	**129**	8.3	76
Total		35.1	16.4		583.8	**945.9**	**362.1**					**566.0**	**148.5**	**148.5**	**231.4**	**379.9**	**3,457**	**239.7**	**2,181**	**140.2**	**1,276**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration

Clayton Subdivision
SITE WATER BUDGET (INFILTRATION) ANALYSIS
Centre Wellington, Ontario

Project Number: 50250-100
Date: 2023/07/11
Design By: MXF
File: Q:\50250\100\SWM\Water Balance\50250-100 Water Balance (Thornthwaite-Mather) June 2023 V6.xlsx

PRE-DEVELOPMENT CONDITION (RUNOFF TO ND1) - EXTERNAL (ELORA SANDS/ROADS)

Contributing Catchments: 102/103
Contributing Areas: 14.48 ha
Percent Impervious 4.8 %
Weather Station: Fergus Shand Dam

Soil Type: Silty Sand, Sandy Loam
Vegetation: Majority Crops
Topography: Rolling
Soil Moisture Retention Capacity: 150 mm

Runoff Factor: 0.43
Evapotranspiration Factor for Impervious Surfaces: 0.33

Month	Daily Average Temperature (C°)	Monthly Heat Index	Unadjusted Daily PE (mm)	Correction Factor	Adjusted PE (mm)	Average Precipitation (mm)	P-PE (mm)	Accum. Pot. Water Loss (mm)	Storage (mm)	ΔS (mm)	Pervious ET (mm)	Actual ET (mm)	Moisture Surplus (mm)	Water Runoff (mm)	Snow Melt Runoff (mm)	Total Recharge & Runoff (mm)	Total Recharge & Runoff (m^3)	Total Infiltration Depth (mm)	Total Infiltration Volume (m^3)	**Actual Runoff (mm)**	**Runoff Volume (m^3)**
Jan	-7.4	0.00	0.0	24.3	0.0	67.9	67.9	0.0	286.5	0.0	0.0	0.0	0.0	7.9	0.0	7.9	1,147	4.5	652	**3.4**	**495**
Feb	-6.3	0.00	0.0	24.5	0.0	55.9	55.9	0.0	342.4	0.0	0.0	0.0	0.0	4.0	0.0	4.0	574	2.3	326	**1.7**	**247**
Mar	-1.9	0.00	0.0	30.6	0.0	59.6	59.6	0.0	402.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	287	1.1	163	**0.9**	**124**
Apr	5.7	1.22	0.9	33.6	29.9	74.1	44.2	0.0	150.0	0.0	29.9	28.9	45.2	23.6	22.7	46.3	6,706	26.3	3,814	**20.0**	**2,892**
May	12.2	3.86	2.0	38.0	75.5	86.9	11.4	0.0	150.0	0.0	75.5	73.1	13.8	18.7	102.3	121.0	17,526	68.8	9,968	**52.2**	**7,557**
Jun	17.5	6.66	2.9	38.6	112.2	83.8	-28.4	-28.4	70.0	-80.0	163.8	158.6	5.2	12.0	51.2	63.1	9,141	35.9	5,199	**27.2**	**3,942**
Jul	20	8.16	3.3	38.9	130.2	89.2	-41.0	-69.5	62.0	-8.0	97.2	94.1	3.1	7.5	25.6	33.1	4,795	18.8	2,727	**14.3**	**2,068**
Aug	19	7.55	3.2	36.0	114.2	96.6	-17.6	-87.0	69.0	7.0	114.2	110.5	3.6	5.6	12.8	18.4	2,661	10.5	1,514	**7.9**	**1,147**
Sep	14.9	5.22	2.5	31.2	76.6	93.1	16.5	0.0	85.5	16.5	76.6	74.1	2.4	4.0	6.4	10.4	1,507	5.9	857	**4.5**	**650**
Oct	8.3	2.15	1.3	28.5	37.7	77.2	39.5	0.0	125.0	39.5	37.7	36.5	1.2	2.6	3.2	5.8	841	3.3	478	**2.5**	**363**
Nov	2.1	0.27	0.3	24.2	7.5	93	85.5	0.0	150.0	25.0	7.5	7.3	60.8	31.7	1.6	33.3	4,820	18.9	2,742	**14.4**	**2,079**
Dec	-3.9	0.00	0.0	23.0	0.0	68.6	68.6	0.0	218.6	0.0	0.0	0.0	0.0	15.8	1.6	17.4	2,526	9.9	1,437	**7.5**	**1,089**
Total		35.1	16.4		583.8	**945.9**	**362.1**					**583.1**	**135.3**	**135.3**	**227.4**	**362.8**	**52,530**	**206.3**	**29,878**	**156.4**	**22,652**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration

Clayton Subdivision

SITE WATER BUDGET (INFILTRATION) ANALYSIS

Centre Wellington, Ontario

Project Number: 50250-100
Date: 2023/07/11
Design By: MXF
File: Q:\50250\100\SWM\Water Balance\50250-100 Water Balance (Thornthwaite-Mather) June 2023 V6.xlsx

POST-DEVELOPMENT CONDITION (EOP SWMF INFILTRATION + PASSIVE INFIL) - EXTERNAL (ELORA SANDS/ROADS)

Contributing Catchments: 204,205,206,211,213
Contributing Areas: 12.33 ha
Percent Impervious 11.7 %
Weather Station: Fergus Shand Dam

Soil Type: Silty Sand, Sandy Loam
Vegetation: Urban Lawn
Topography: Flat Land
Soil Moisture Retention Capacity 75 mm

Runoff Factor 0.46
Evapotranspiration
Factor for Impervious
Surfaces 0.33

Month	Daily Average Temperature	Monthly Heat Index	Unadjusted Daily PE	Correction Factor	Adjusted PE	Average Precipitation	P-PE	Accum. Pot. Water Loss	Storage	ΔS	Pervious ET	Actual ET	Moisture Surplus	Water Runoff	Snow Melt Runoff	Total Recharge & Runoff	Total Recharge & Runoff	Recharge Pervious (Passive INF)	Recharge Pervious (Passive INF)	Runoff before Enhanced Infiltration	Runoff before Enhanced Infiltration	Total At-source Recharge	Total At-source Recharge	Runoff Volume To SWMF	Acutal Runoff to SWMF	Total Enhanced EOP Recharge*	Total Enhanced EOP Recharge	**Overall ND1 Recharge from External Lands**	**Overall ND1 Recharge from External Lands**	**Overall ND1 Runoff from External Lands**	**Overall ND1 Runoff from External Lands**
	(C°)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(m^3)	(m^3)	(mm)	(mm)	(m^3)		(m^3)	(mm)	(m^3)	(mm)	(m^3)	(mm)	**(m^3)**	**(mm)**	**(m^3)**	**(mm)**
Jan	-7.4	0.00	0.0	24.3	0.0	67.9	67.9	0.0	211.5	0.0	0.0	0.0	0.0	11.0	0.0	11.0	1,351	723	6	5.1	628	723	6	628	5	502	4	**1,226**	**10**	**126**	**1**
Feb	-6.3	0.00	0.0	24.5	0.0	55.9	55.9	0.0	267.4	0.0	0.0	0.0	0.0	5.5	0.0	5.5	676	362	3	2.5	314	362	3	314	3	251	2	**613**	**5**	**63**	**1**
Mar	-1.9	0.00	0.0	30.6	0.0	59.6	59.6	0.0	327.0	0.0	0.0	0.0	0.0	2.7	0.0	2.7	338	181	1	1.3	157	181	1	157	1	126	1	**306**	**2**	**31**	**0**
Apr	5.7	1.22	0.9	33.6	29.9	74.1	44.2	0.0	75.0	0.0	29.9	27.6	46.5	24.6	23.1	47.8	5,892	3,153	26	22.2	2,739	3,153	26	2,739	22	2,191	18	**5,344**	**43**	**548**	**4**
May	12.2	3.86	2.0	38.0	75.5	86.9	11.4	0.0	75.0	0.0	75.5	69.6	17.3	21.0	104.1	125.1	15,427	8,256	67	58.2	7,171	8,256	67	7,171	58	5,737	47	**13,993**	**113**	**1,434**	**12**
Jun	17.5	6.66	2.9	38.6	112.2	83.8	-28.4	-28.4	16.0	-59.0	142.8	131.6	11.2	16.1	52.1	68.1	8,402	4,497	36	31.7	3,905	4,497	36	3,905	32	3,124	25	**7,621**	**62**	**781**	**6**
Jul	20	8.16	3.3	38.9	130.2	89.2	-41.0	-69.5	12.0	-4.0	93.2	85.9	7.3	11.7	26.0	37.7	4,651	2,489	20	17.5	2,162	2,489	20	2,162	18	1,729	14	**4,218**	**34**	**432**	**4**
Aug	19	7.55	3.2	36.0	114.2	96.6	-17.6	-87.0	15.0	3.0	114.2	105.2	8.9	10.3	13.0	23.3	2,876	1,539	12	10.8	1,337	1,539	12	1,337	11	1,069	9	**2,608**	**21**	**267**	**2**
Sep	14.9	5.22	2.5	31.2	76.6	93.1	16.5	0.0	31.5	16.5	76.6	70.6	6.0	8.1	6.5	14.7	1,807	967	8	6.8	840	967	8	840	7	672	5	**1,639**	**13**	**168**	**1**
Oct	8.3	2.15	1.3	28.5	37.7	77.2	39.5	0.0	71.0	39.5	37.7	34.8	2.9	5.5	3.3	8.8	1,085	581	5	4.1	504	581	5	504	4	404	3	**984**	**8**	**101**	**1**
Nov	2.1	0.27	0.3	24.2	7.5	93	85.5	0.0	75.0	4.0	7.5	6.9	82.1	43.8	1.6	45.5	5,605	3,000	24	21.1	2,605	3,000	24	2,605	21	2,084	17	**5,084**	**41**	**521**	**4**
Dec	-3.9	0.00	0.0	23.0	0.0	68.6	68.6	0.0	143.6	0.0	0.0	0.0	0.0	21.9	1.6	23.5	2,903	1,554	13	10.9	1,349	1,554	13	1,349	11	1,079	9	**2,633**	**21**	**270**	**2**
Total		35.1	16.4		583.8	**945.9**	**362.1**					**532.2**	**182.3**	**182.3**	**231.4**	**413.7**	**51,013**	**27,301**	**221**	**192.3**	**23,711**	**27,301**	**221**	**23,711**	**192**	**18,969**	**154**	**46,270**	**375**	**4,742**	**38**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration
* Enhanced recharge volume was estimated as 80% of runoff volume to SWMF

Clayton Subdivision

SITE WATER BUDGET (INFILTRATION) ANALYSIS

Centre Wellington, Ontario

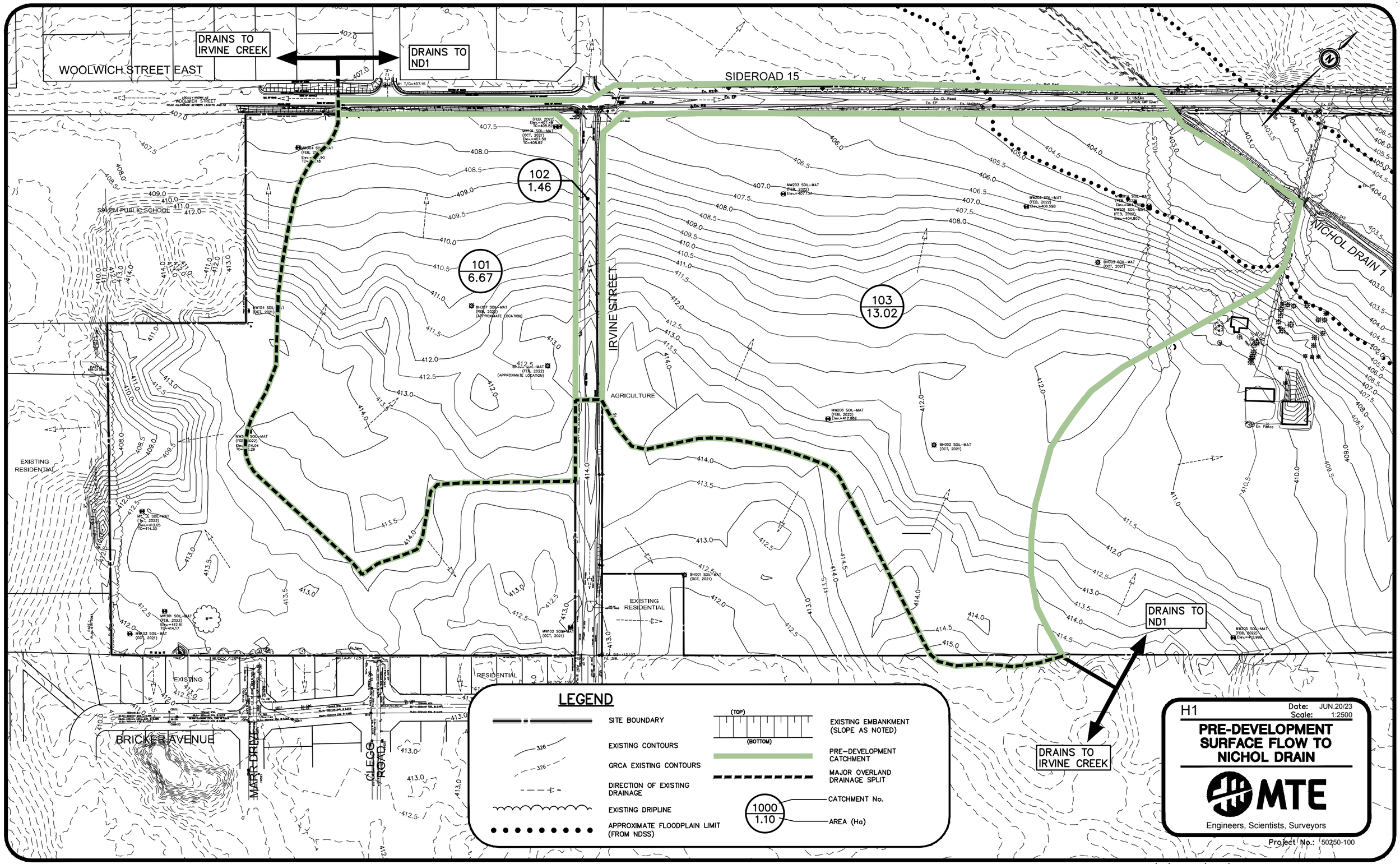
Project Number: 50250-100
Date: 2023/07/11
Design By: MXF
File: Q:\50250\100\SWM\Water Balance\50250-100 Water Balance (Thornthwaite-Mather) June 2023 V6.xlsx

POST-DEVELOPMENT CONDITION (RUNOFF + PASSIVE INFIL D/S OF SWMF TO ND1) - EXTERNAL (ELORA SANDS/ROADS)

Contributing Catchments:	207, 208	Soil Type:	Silty Sand, Sandy Loam	Runoff Factor:	0.46
Contributing Areas:	2.64 ha	Vegetation:	Crops	Evapotranspiration	
Percent Impervious	10.5 %	Topography:	Rolling	Factor for Impervious	
Weather Station:	Fergus Shand Dam	Soil Moisture Retention Capacity:	150 mm	Surfaces:	0.33

Month	Daily Average Temperature	Monthly Heat Index	Unadjusted Daily PE	Correction Factor	Adjusted PE	Average Precipitation	P-PE	Accum. Pot. Water Loss	Storage	ΔS	Pervious ET	Actual ET	Moisture Surplus	Water Runoff	Snow Melt Runoff	Total Recharge & Runoff	Total Recharge & Runoff	**Pas Infil to ND1 from Ext. Lands d/s of SWMF**	**Pas Infil to ND1 from Ext. Lands d/s of SWMF**	**Runoff to ND1 from Ext. Lands d/s of SWMF**	**Runoff to ND1 from Ext. Lands d/s of SWMF**
	(C°)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(m^3)	**(mm)**	**(m^3)**	**(mm)**	**(m^3)**
Jan	-7.4	0.00	0.0	24.3	0.0	67.9	67.9	0.0	286.5	0.0	0.0	0.0	0.0	8.3	0.0	8.3	218	**4.5**	**118**	**3.8**	**100**
Feb	-6.3	0.00	0.0	24.5	0.0	55.9	55.9	0.0	342.4	0.0	0.0	0.0	0.0	4.1	0.0	4.1	109	**2.2**	**59**	**1.9**	**50**
Mar	-1.9	0.00	0.0	30.6	0.0	59.6	59.6	0.0	402.0	0.0	0.0	0.0	0.0	2.1	0.0	2.1	55	**1.1**	**30**	**0.9**	**25**
Apr	5.7	1.22	0.9	33.6	29.9	74.1	44.2	0.0	150.0	0.0	29.9	27.8	46.3	24.2	22.7	46.9	1,239	**25.4**	**672**	**21.5**	**567**
May	12.2	3.86	2.0	38.0	75.5	86.9	11.4	0.0	150.0	0.0	75.5	70.2	16.7	20.5	102.3	122.8	3,242	**66.6**	**1,757**	**56.2**	**1,485**
Jun	17.5	6.66	2.9	38.6	112.2	83.8	-28.4	-28.4	70.0	-80.0	163.8	152.2	11.6	16.0	51.2	67.2	1,774	**36.4**	**962**	**30.8**	**812**
Jul	20	8.16	3.3	38.9	130.2	89.2	-41.0	-69.5	62.0	-8.0	97.2	90.3	6.9	11.4	25.6	37.0	978	**20.1**	**530**	**17.0**	**448**
Aug	19	7.55	3.2	36.0	114.2	96.6	-17.6	-87.0	69.0	7.0	114.2	106.1	8.1	9.8	12.8	22.5	595	**12.2**	**323**	**10.3**	**273**
Sep	14.9	5.22	2.5	31.2	76.6	93.1	16.5	0.0	85.5	16.5	76.6	71.1	5.4	7.6	6.4	14.0	369	**7.6**	**200**	**6.4**	**169**
Oct	8.3	2.15	1.3	28.5	37.7	77.2	39.5	0.0	125.0	39.5	37.7	35.0	2.7	5.1	3.2	8.3	220	**4.5**	**119**	**3.8**	**101**
Nov	2.1	0.27	0.3	24.2	7.5	93	85.5	0.0	150.0	25.0	7.5	7.0	61.1	33.1	1.6	34.7	916	**18.8**	**496**	**15.9**	**419**
Dec	-3.9	0.00	0.0	23.0	0.0	68.6	68.6	0.0	218.6	0.0	0.0	0.0	0.0	16.5	1.6	18.1	479	**9.8**	**260**	**8.3**	**219**
Total		35.1	16.4		583.8	**945.9**	**362.1**					**559.8**	**158.7**	**158.7**	**227.4**	**386.1**	**10,193**	**209.3**	**5,526**	**176.8**	**4,668**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration



H1

Date: JUN.20/23
Scale: 1:2500

PRE-DEVELOPMENT SURFACE FLOW TO NICHOL DRAIN

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100

July 13, 2023 — 4:23 p.m. — Plotted By: MFelinczak

P:\P\50250\100\50250-100-F20-PRE D.dwg

WOOLWICH STREET EAST

SIDEROAD 15

IRVINE STREET

NICHOL DRAIN 1

SALEM PUBLIC SCHOOL

AGRICULTURE

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

RESIDENTIAL

BRICKER AVENUE

MARR DRIVE

CLEGG ROAD

104
0.54

101
6.67

106
3.60

107
1.68

LOT 16

LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS
- GRCA EXISTING CONTOURS
- DIRECTION OF EXISTING DRAINAGE
- EXISTING DRIPLINE
- APPROXIMATE FLOODPLAIN LIMIT (FROM NDSS)
- EXISTING EMBANKMENT (SLOPE AS NOTED) (TOP) (BOTTOM)
- PRE-DEVELOPMENT CATCHMENT
- MAJOR OVERLAND DRAINAGE SPLIT
- 1000 / 1.10 — CATCHMENT No. / AREA (Ha)

H2

Date: APR.07/22
Scale: 1:2500

PRE-DEVELOPMENT INFILTRATION ON CLAYTON SUBDIVISION

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100

July 13, 2023 — 4:24 p.m. — Plotted By: MFelinczak

P:\P\50250\100\50250-100-F20-PRE D.dwg

DRAINS TO IRVINE CREEK

DRAINS TO ND1

211
0.23

WOOLWICH STREET EAST

210
0.20

203
0.44

STREET C

SALEM PUBLIC SCHOOL

STREET C

201
ROOF
2.75

202
NON-ROOF
8.06

STREET B

LANE A

STREET A

212
0.05

BLOCK 185
PARK
0.64 ha

EXISTING
RESIDENTIAL

STREET D

STREET B

LANE A

213
0.19

209
0.07

EXISTING
RESIDENTIAL

EXISTING
RESIDENTIAL

BLOCK 126

BRICKER AVENUE

MARR DRIVE

CLEGG ROAD

SIDEROAD 15

208
0.56

AREAS 207/208
RUNOFF DIRECTLY
TO NICHOL DRAIN

APPROXIMATELY 80m

207
2.08

206
1.34

204
0.97

EVENTS UP TO THE 25mm
TO INFILTRATE IN EOP INFILTRATION
GALLERY. EXCESS FLOWS TO
DISCHARGE TO NICHOL DRAIN

205
9.60

IRVINE STREET

AGRICULTURE

NICHOL DRAIN 1

DRAINS TO
ND1

DRAINS TO
IRVINE CREEK

LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS (GRCA)
- EXISTING CONTOURS
- PROPOSED FINISHED GRADE CONTOURS
- POST-DEVELOPMENT CATCHMENT
- APPROXIMATE FLOODPLAIN LIMIT (FROM NDSS)
- OVERLAND FLOW ROUTE
- 1000 / 1.10 — CATCHMENT No. / AREA (Ha)

H3

Date: JUN.14/22
Scale: 1:2500

POST-DEVELOPMENT SURFACE FLOW TO NICHOL DRAIN

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100

July 13, 2023 — 4:32 p.m. — Plotted By: MFelinczak

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WOOLWICH STREET EAST

SIDEROAD 15

IRVINE STREET

NICHOL DRAIN 1

APPROXIMATELY 80m

210
0.20

214
0.10

203
0.44

215
0.50

201
ROOF
2.75

202
NON-ROOF
8.06

212
0.05

217
0.07

209
0.07

216
0.24

STREET C

STREET A

STREET B

STREET D

LANE A

BLOCK 185
PARK
0.64 ha

SALEM PUBLIC SCHOOL

EXISTING
RESIDENTIAL

AGRICULTURE

EXISTING
RESIDENTIAL

RESIDENTIAL

BLOCK 126

BRICKER AVENUE

MARR DRIVE

CLEGG
ROAD

LOT 16

CON 12

LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS (GRCA)
- EXISTING CONTOURS
- PROPOSED FINISHED GRADE CONTOURS
- POST-DEVELOPMENT CATCHMENT
- APPROXIMATE FLOODPLAIN LIMIT (FROM NDSS)
- OVERLAND FLOW ROUTE
- 1000 / 1.10 — CATCHMENT No. / AREA (Ha)

H4

Date: JUN.14/22
Scale: 1:2500

POST-DEVELOPMENT INFILTRATION ON CLAYTON SUBDIVISION

MTE
Engineers, Scientists, Surveyors

Project No.: 50250-100

July 13, 2023 — 4:35 p.m. — Plotted By: MFelinczak

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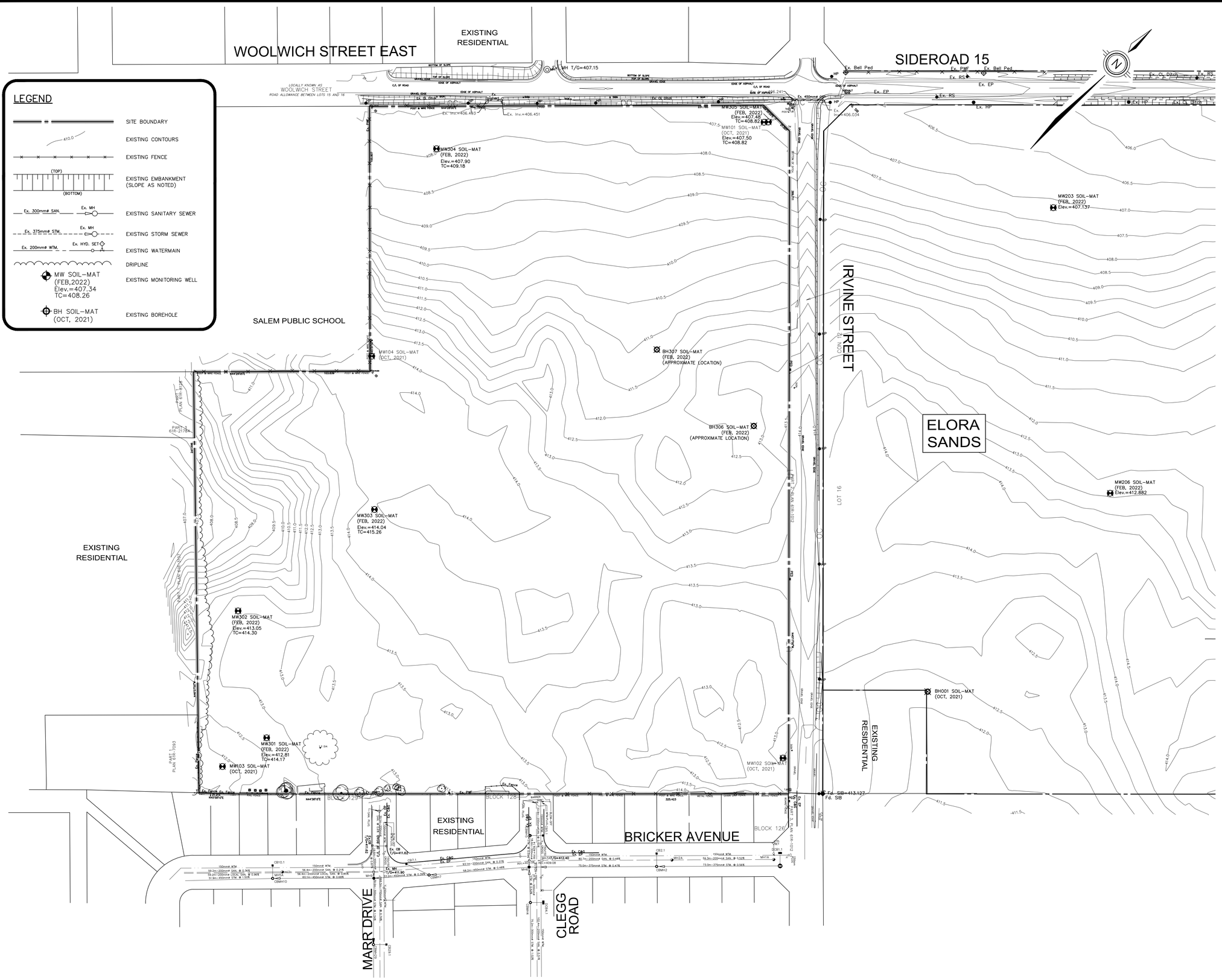

WOOLWICH STREET EAST
EXISTING RESIDENTIAL
SIDEROAD 15
IRVINE STREET
CON 2
LOT 16
ELORA SANDS
SALEM PUBLIC SCHOOL
EXISTING RESIDENTIAL
EXISTING RESIDENTIAL
EXISTING RESIDENTIAL
BRICKER AVENUE
MARR DRIVE
CLEGG ROAD
BLOCK 129
BLOCK 128
BLOCK 126
LOCALLY KNOWN AS WOOLWICH STREET
ROAD ALLOWANCE BETWEEN LOTS 15 AND 16
Ex. MH T/G=407.15
Ex. Bell Ped
Ex. PWF
Ex. RS
Ex. EP
Ex. HP
Ex. Cl. Ditch
Ex. 450mmø CSP
Ex. Inv.=406.493
Ex. Inv.=406.451
Ex. Inv.=406.034
MW304 SOIL-MAT (FEB, 2022) Elev.=407.90 TC=409.18
MW305 SOIL-MAT (FEB, 2022) Elev.=407.48 TC=408.82
MW101 SOIL-MAT (OCT, 2021) Elev.=407.50 TC=408.82
MW203 SOIL-MAT (FEB, 2022) Elev.=407.137
MW206 SOIL-MAT (FEB, 2022) Elev.=412.882
BH307 SOIL-MAT (FEB, 2022) (APPROXIMATE LOCATION)
BH306 SOIL-MAT (FEB, 2022) (APPROXIMATE LOCATION)
MW104 SOIL-MAT (OCT, 2021)
MW303 SOIL-MAT (FEB, 2022) Elev.=414.04 TC=415.26
MW302 SOIL-MAT (FEB, 2022) Elev.=413.05 TC=414.30
MW301 SOIL-MAT (FEB, 2022) Elev.=412.81 TC=414.17
MW103 SOIL-MAT (OCT, 2021)
MW102 SOIL-MAT (OCT, 2021)
BH001 SOIL-MAT (OCT, 2021)
Fd. SIB 413.127
Fd. SIB
PART 1 PLAN 61R-10102
PART 1 PLAN 61R-7093
PART 1 61R-21784
PART 1 PLAN 61R-8138
Ex. 300mmø SAN
Ex. 375mmø STM
Ex. 200mmø WTM
Ex. 150mmø WTM
Ex. 200mmø SAN
Ex. 450mmø STM
Ex. 600mmø STM
Ex. 1200mmø STM
Ex. CB
Ex. MH
Ex. Fence
Ex. Tree
Ex. Wire Fence
Ex. Post & Wire Fence
Ex. Post & Rail Fence
Ex. Hedge
Ex. Shed
Ex. Gazebo
Ex. Deck
Ex. Pool
Ex. Asphalt Path
Ex. Gravel Path
Ex. Concrete Path
Ex. Asphalt Driveway
Ex. Gravel Driveway
Ex. Concrete Driveway
Ex. Interlock Driveway
Ex. Gravel Shoulder
Ex. Asphalt Shoulder
Ex. Concrete Shoulder
Ex. Interlock Shoulder
Ex. Gravel Edge
Ex. Asphalt Edge
Ex. Concrete Edge
Ex. Interlock Edge
Ex. Top of Bank
Ex. Bottom of Bank
Ex. Top of Slope
Ex. Bottom of Slope
Ex. Centre of Road
Ex. Edge of Road
Ex. Edge of Asphalt
Ex. Edge of Gravel
Ex. Edge of Concrete
Ex. Edge of Interlock
Ex. Edge of Water
Ex. Edge of Wetland
Ex. Edge of Woods
Ex. Edge of Hedge
Ex. Edge of Shrubs
Ex. Edge of Trees
Ex. Edge of Brush
Ex. Edge of Grass
Ex. Edge of Sand

P:\P\49878\100\49878-100-EC1
MTE FILE PATH:

SIDEROAD 15

IRVINE STREET

GERRIE ROAD

NICHOL DRAIN No. 1

APPROXIMATE FLOODPLAIN (FROM NICHOL DRAIN SUBWATERSHED STUDY PHASE 1 EXISTING CONDITIONS FINAL REPORT)

APPROXIMATE FLOODPLAIN (FROM NICHOL DRAIN SUBWATERSHED STUDY PHASE 1 EXISTING CONDITIONS FINAL REPORT)

KEATING LANDS (AGRICULTURAL)

EXISTING RESIDENTIAL

BLOCK 126

LOT 16

CON 12

UT

MW305 SOIL-MAT (FEB, 2022)
MW101 SOIL-MAT (OCT, 2021)
MW203 SOIL-MAT (FEB, 2022) Elev.=407.137
MW202 SOIL-MAT (FEB, 2022) Elev.=406.598
MW201 SOIL-MAT (FEB, 2022) Elev.=404.802
BH053 SOIL-MAT (OCT, 2021)
BH306 SOIL-MAT (FEB, 2022) (APPROXIMATE LOCATION)
MW206 SOIL-MAT (FEB, 2022) Elev.=412.582
BH002 SOIL-MAT (OCT, 2021)
BH001 SOIL-MAT (OCT, 2021)
MW102 SOIL-MAT (OCT, 2021)
MW205 SOIL-MAT (FEB, 2022) Elev.=412.999
MW204 SOIL-MAT (FEB, 2022) Elev.=409.569
BH005 SOIL-MAT (OCT, 2021)
BH006 SOIL-MAT (OCT, 2021)
MW401 SOIL-MAT (APR, 2022) Elev.=419.77 TC=420.88
MW004 SOIL-MAT (OCT, 2021) Elev.=404.879
BH007 SOIL-MAT (OCT, 2021)

LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS (410.0)
- EXISTING FENCE
- EXISTING EMBANKMENT (SLOPE AS NOTED) (TOP) (BOTTOM)
- APPROXIMATE FLOODPLAIN LIMIT (FROM NDSS)
- DRIPLINE
- MW SOIL-MAT (FEB,2022) Elev.=407.34 TC=408.26 — EXISTING MONITORING WELL
- BH SOIL-MAT (OCT, 2021) — EXISTING BOREHOLE

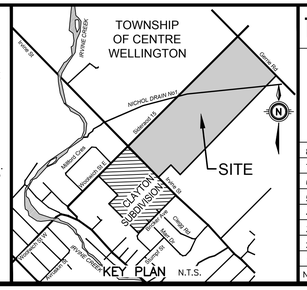
NOTE TO CONTRACTOR :

DO NOT SCALE DRAWINGS.

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT THE ENGINEER'S WRITTEN PERMISSION.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.



TOWNSHIP OF CENTRE WELLINGTON

No.	REVISION	BY	YYYY-MM-DD
8.			
7.			
6.			
5.			
4.			
3.			
2.			
1.			

GEODETIC BM ELEV. = 387.982m
ELORA POST OFFICE, BOLT IN FRONT WALL, IN LINTEL OF CENTRE BASEMENT WINDOW. (HISTORICAL NUMBER 16U117E)

SITE BENCHMARK ELEV. = m

CLIENT
CACHET DEVELOPMENTS INC.
361 Connie Crescent, Suite 200 Concord, Vaughan

PROJECT
ELORA SANDS
ELORA ONTARIO

DRAWING
EXISTING CONDITIONS PLAN

MTE
Engineers, Scientists, Surveyors
519-743-6500

Project Manager S. PETERSON	Project No. 49878-100
Design By MXF	Checked By JEM
Drawn By ACH	Checked By AJC
Surveyed By MTE	Drawing No. EC1.1
Date Apr.12/22	
Scale 1:1250	Sheet of

July 15, 2022 - 3:06:17 PM - Plotted By: Michael Felinczak