Functional Servicing and Stormwater Management Design Report – Northern Lands (6581 Highway 6)

Township of Centre Wellington (Fergus), Ontario

Submitted to:
Polocorp Inc.
379 Queen Street South
Kitchener, ON N2G 1W6

Submitted by:
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March 12, 2025
Project No. 2401807

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Certification

PREPARED BY:
GEI Consultants Canada Ltd.

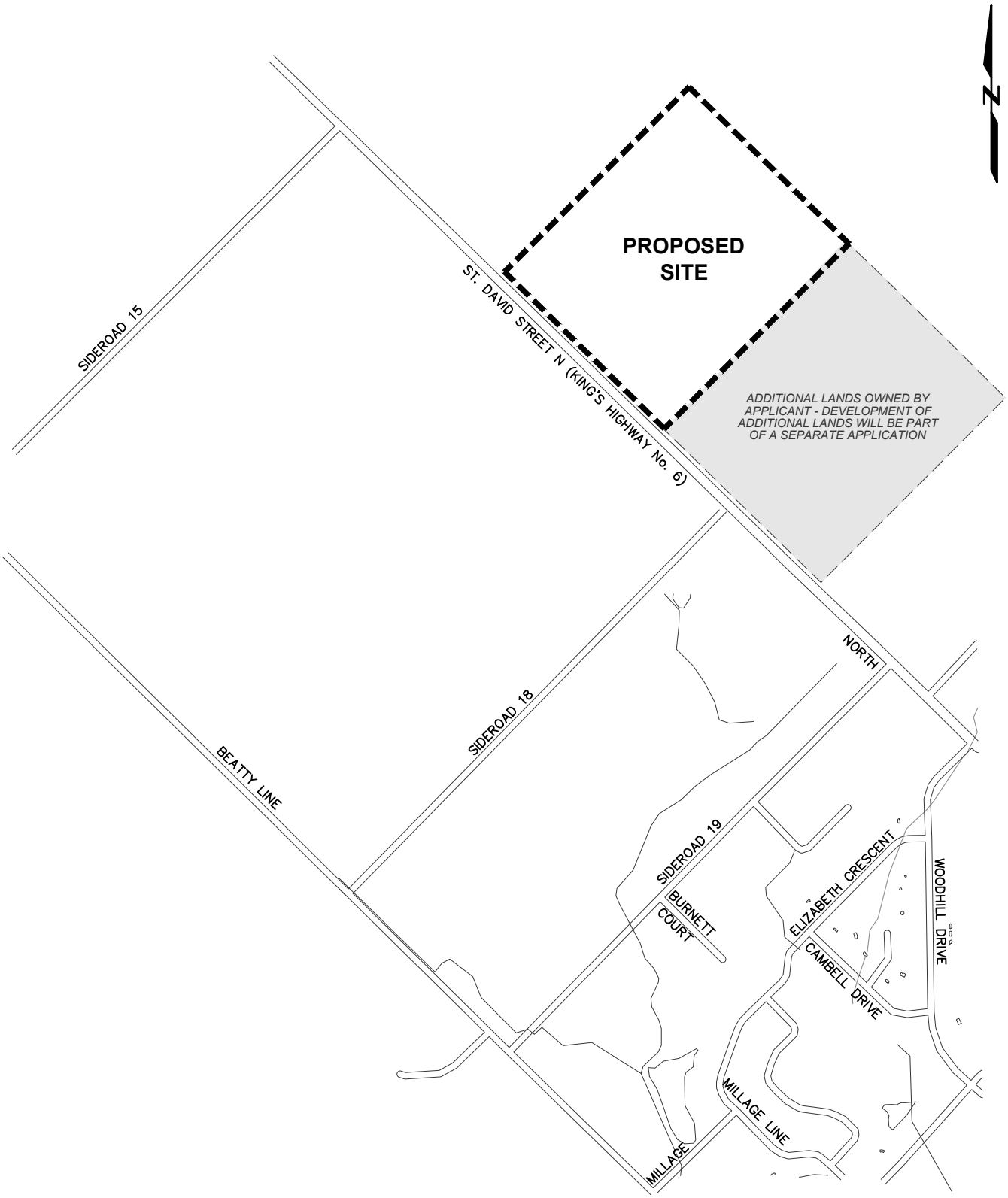
Patricia Wiebe, P.Eng.
Project Engineer

Patrick Grier, P.Eng.
Senior Project Engineer

1. Introduction

GEI Consultants Canada Ltd. have prepared this Functional Servicing Report to address the site servicing and stormwater management requirements for the proposed development in support of the Draft Plan approval. The Draft Plan of Subdivision has been prepared by Polocorp Inc. (dated December 10, 2024).

The proposed 20.03 ha development (site) is located north of St. David Street N (Highway No. 6), east and south of existing agricultural lands in Fergus. There are external lands east of the proposed development that are also owned by the applicant and are currently used for agriculture. The adjacent additional lands owned by the applicant will be part of a separate application for development. Figure 1 shows the location of the proposed development and the surrounding area. The wetland area in the northeast limits of the site is regulated by the Grand River Conservation Authority (GRCA).



FERGUS SUBDIVISION - NORTH LANDS
TOWNSHIP OF CENTRE WELLINGTON (FERGUS)

POLOCORP

GEI Consultants

LOCATION PLAN

Project 2401807

FEBRUARY 2025 Figure No. 1

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2. Existing Conditions

2.1. Land Use

The site is currently a vacant agricultural field. One (1) existing dwelling is located along the southwest limits of the site. This dwelling is to remain under post-development conditions.

2.2. Topography

The majority of the site drains by sheetflow in an easterly direction towards the adjacent property owned by the applicant, ultimately contributing to a wetland northeast of the site. A portion of the site along the south limits sheetflows south to the roadside ditch along the Highway 6 right-of-way. The roadside ditch along Highway 6 ultimately discharges to a regulated watercourse downstream of the northeast wetland. A portion of the site along the west limits sheetflows north and west, ultimately contributing to a second wetland off-site.

2.3. Soils

A Geotechnical Investigation has been completed by Chung & Vander Doelen Engineering Ltd. in 2025. The preliminary geotechnical investigation consisted of three (3) boreholes across the site to depths ranging from 5.2 m to 8.25 m below the ground surface (bgs) and five (5) additional boreholes on the adjacent property owned by the applicant. Based on the geotechnical investigation, the site soils generally consist of approximately 180 mm to 300 mm thick topsoil followed by clayey sand silt and sandy silt.

A copy of the Geotechnical Investigation is included in Appendix A.

2.4. Groundwater

A Preliminary Hydrogeological Investigation has been completed by Chung & Vander Doelen Engineering Ltd. in 2025. As part of the hydrogeological study, three (3) monitoring wells were installed between December 2023 and March 2024, as well as five (5) additional monitoring wells and four (4) shallow piezometers on the adjacent property owned by the applicant.

Groundwater monitoring results indicate that the seasonal high groundwater levels on site vary from 0.25 m below ground surface at the northeast limits of the site (BH/MW 8) to approximately 3.61 m below ground surface towards the southwest limits of the site (BH / MW 4). A copy of the Preliminary Hydrogeological Investigation is included in Appendix A.

3. Proposed Development

The proposed 20.03 ha residential development generally consists of 87-129 single-detached units, 179-266 on-street townhouse units, 93-125 medium density residential units, 8-14 mixed use residential units, a park block, and internal roadways. Figure 2 illustrates the proposed Draft Plan of Subdivision prepared by Polocorp Inc.. Connection to the site will be via the Street B connection to St. David Street N (Highway No. 6) and Streets A, D, E, and F to the adjacent property owned by the same applicant. A future connection is included to the north of the property via Street J.

3.1. Site Grading

The site grading for the proposed residential lots, internal roads and stormwater management facility is shown on the Grading Plans. The site has been graded to match the Street B entrance elevations at Highway 6, and the property boundaries along the north, south, east and west portions of the site.

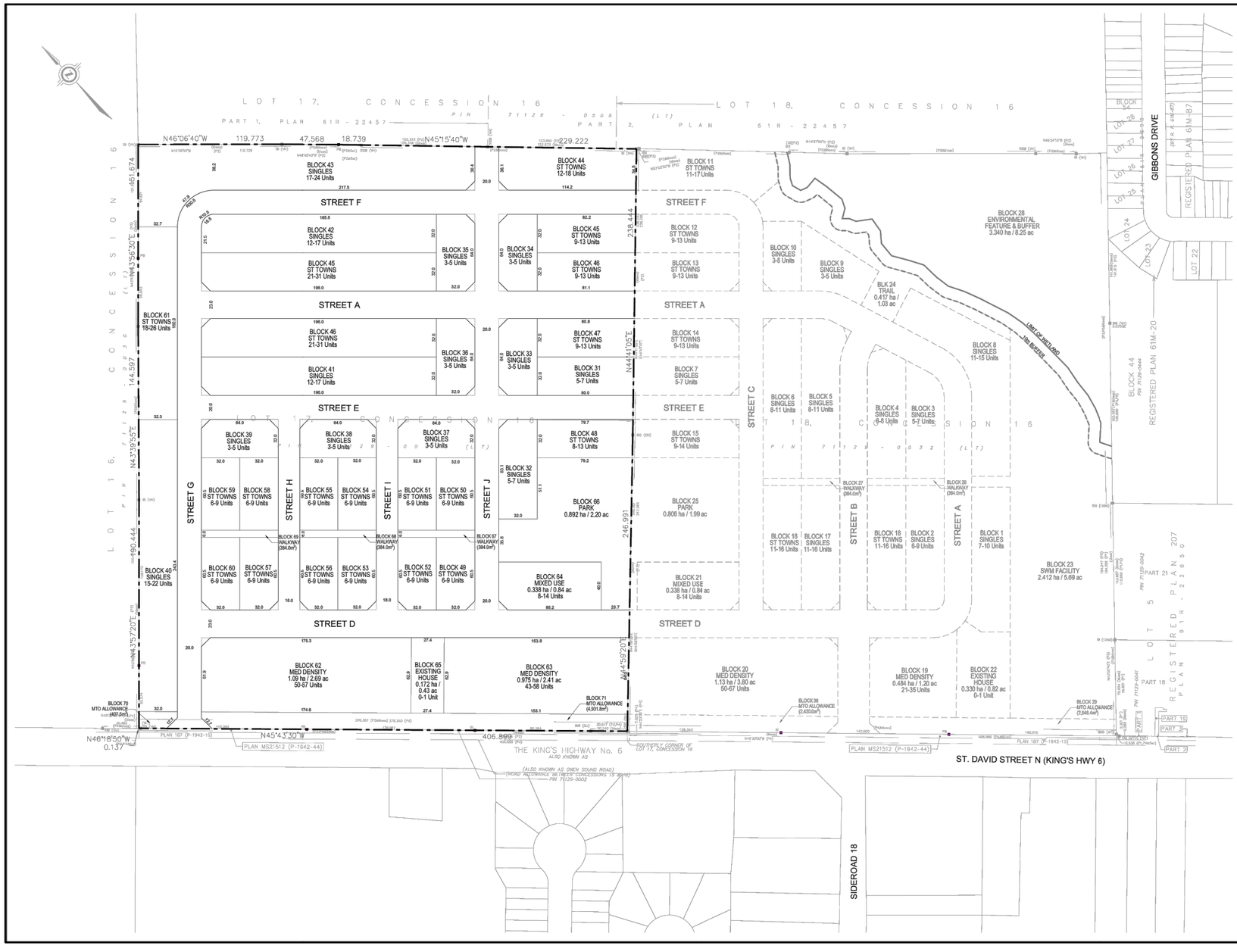
Internal roadways are graded with slopes ranging from 0.6% to 1.5%, while lots are generally graded with slopes ranging from 2% to 4%. The proposed lot grading patterns generally consists of split-drainage lots and back to front draining lots. 3:1 transition slopes are proposed in rear yard areas of select lots to accommodate the grade relief across the site.

3.2. Streets

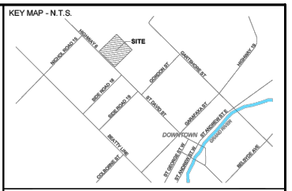
The internal local roadways will be constructed as 18-23 m wide urban cross sections complete with concrete curb and gutter per Township of Centre Wellington Standards. The Street G right-of-way connection at St. David Street N (Highway No. 6) will be 20 m in width.

3.3. Water Supply

The proposed development will be serviced by extending a watermain along St. David Street N (Highway No. 7) in the westerly direction to the site entrance followed by which a local watermain will be extended throughout the site via the internal road network. The proposed watermain sizing will be completed as part of the detail design of the site once Draft Plan approval has been received.



KEY MAP - N.T.S.



DRAFT PLAN OF SUBDIVISION

PT OF LOT 18, CONCESSION 16
IN THE FORMER GEOGRAPHIC TWP OF NICHOL
CENTRE WELLINGTON

POLOCORP INC.

20 0 20 40 60 80 100
SCALE = 1:1400 (metric)

LAND USE SCHEDULE

DESCRIPTION	LOTS/BLKS.	UNITS	AREA (ha.)
Single Detached	31-43	87-129	4.863
Street Townhouses	44-61	179-266	5.512
Medium Density	62, 63	93-125	2.065
Mixed Use	64	8-14	0.338
Existing House	65	0-1	0.172
Stormwater Management Facility	-	-	-
Trail	-	-	-
Parkland	66	-	0.892 (4.6%)
Pedestrian Walkway	67-69	-	0.115
Environmental Feature & Buffer	-	-	-
MTO Allowance	70, 71	-	0.534
Roads	-	-	5.279
TOTAL		367-535	20.027

SALEABLE FRONTAGE	LENGTH	UNIT SMALL	UNIT LARGE
Single Detached	1,466.3m	36' (11.0m)	50' (15.2m)
Street Townhouses	1,773.2m	18' (5.5m)	27' (8.3m)
TOTAL	3,239.5m		

DENSITY	
Gross Area (ha)	20.027 ha (49.49 ac)
Developable Area (ha)	19.457 ha (48.08 ac)
Net Density (uph)	18.9 - 27.5 upha
Net People-Jobs (3.05 per unit)	57.7 - 83.9 PrJ pha

INFORMATION REQUIRED

UNDER SECTION 51 (17) OF THE PLANNING ACT, R.S.O. 1990, c.P.13 AS AMENDED
INFORMATION REQUIRED BY CLAUSES a,b,c,d,e,f,g,) AND I ARE AS SHOWN ON THE DRAFT PLAN.
(h) Municipal Water Supply
(i) Sandy Loam
(k) Municipal Sanitary and Storm Sewers

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

_____ XX XX, 2024
O.L.S. DATE
Surveying Inc.

OWNER'S CERTIFICATE

I HEREBY CONSENT TO THE FILING OF THIS PLAN BY POLOCORP INC., IN DRAFT FORM

_____ _____
MIKE PUOPOLO DATE
Polocorp Inc.

APPROVALS

REGIONAL MUNICIPALITY OF
WATERLOO APPROVAL BLOCK

DRAFT
FOR DISCUSSION
PURPOSES ONLY

APPROVED: DATE:

REVISIONS

DATE	BY	DESCRIPTION

POLOCORP
379 Queen Street South, Kitchener | N2T 1W8 | 519-745-3249 | polocorpinc.com

DATE: December 10, 2024	SCALE 1:4000 (metric)
PROJECT: 1012 (Fergus)	DRAWN BY: GFE

LEGEND

FERGUS SUBDIVISION - NORTH LANDS
TOWNSHIP OF CENTRE WELLINGTON (FERGUS)

POLOCORP

GEI Consultants

Project 2401807

DRAFT PLAN OF SUBDIVISION

FEBRUARY 2025 FIGURE No. 2

Domestic water demands for the proposed development are calculated in Table 1 below.

Table No. 1: Domestic Water Demand Requirements

Unit Type	Population	Average Day (350 L/p/d)	Min Hour (Factor = 0.40)	Max Day (Factor = 2.75)	Max Hour (Factor = 4.13)
129 Single Family Lots (at 2.8 persons/lot)	361	1.46 L/s	0.58 L/s	4.02 L/s	6.03 L/s
266 On-Street Townhome Units (at 2.5 persons per lot)	665	2.69 L/s	1.08 L/s	7.40 L/s	11.11 L/s
139 Mixed Use / Medium Density Units – (at 2.5 persons per unit)	348	1.41 L/s	0.56 L/s	3.87 L/s	5.81 L/s
1 Existing Singe Family Lot (at 2.8 persons/lot)	3	0.01 L/s	0.004 L/s	0.03 L/s	0.04 L/s
Total On-site Domestic Demands	1,377	5.57 L/s	2.22 L/s	15.32 L/s	22.99 L/s

Note: Population has been rounded to the nearest whole number.

A 25mm diameter water service lateral will be provided for each dwelling. Fire hydrants will be installed at a minimum radius of 150m in accordance with Township of Centre Wellington Development Manual.

Watermain servicing is proposed to be connected to the adjacent property owned by the same applicant. The proposed watermain network layout is shown on the Servicing Plans.

Through discussions with the Township of Centre Wellington and Triton Engineering Services Limited, the existing 300mm diameter watermain has sufficient capacity to service these lands. The Township of Centre Wellington also confirmed that they are currently undertaking a Municipal Class Environmental Assessment (EA) to identify potential supply well location(s), to ensure that sufficient water supply is available to accommodate the additional demand resulting from the lands to be included within the Township's municipal boundary as part of the MCR (Municipal Comprehensive Review) process. Therefore, from a water supply and watermain servicing perspective, there are minimal works required to support the development of this property lands.

3.4. Sanitary Sewer

Each dwelling will be serviced via a proposed 100 mm diameter sanitary service lateral per Township of Centre Wellington Development Manual. Sanitary sewer design calculations have been attached as Appendix B. Sanitary servicing is proposed to be connected to the adjacent property owned by the same applicant. The sanitary sewer layout is shown on the Servicing Plans.

Per our correspondence with the Township of Centre Wellington and Triton Engineering Services Limited, there is sufficient capacity in the existing downstream sanitary sewer system and the downstream wastewater treatment plan (WWTP) to service these lands. This is based on our understanding that the planned upgrades to the WWTP, which are scheduled to occur in 2029, will ensure that sufficient treatment capacity exists for the lands to be included within the Township's municipal boundary as part

of the MCR (Municipal Comprehensive Review) process. Therefore, from a sanitary sewer servicing perspective, there are minimal works required to support the development of this property lands and the lands can be efficiently and cost effectively serviced via a gravity connection to an existing sanitary sewer.

3.5. Storm Sewer

The storm sewer system on the internal roads will be sized to convey the 5-year design storm to the existing stormwater management facility (designed as part of the 968 St. David Street North Subdivision application) per the Township of Centre Wellington Development Manual. Major storm events will be conveyed overland through the municipal rights-of-way to the adjacent property owned by the same applicant, ultimately draining to the stormwater management facility. Storm sewer design calculations have been attached as Appendix B. The stormwater management facility will outlet to the wetland along the northeast limits of the site to maintain existing drainage patterns.

Each lot will have a proposed 100 mm diameter storm service lateral connected to the proposed storm sewer system in the municipal right-of-way. Foundation drainage will be provided via sump pump discharge to the storm service lateral.

4. Stormwater Management Criteria

The studies, policies and guidelines used to develop the stormwater management plan are as follows:

1) The Stormwater Management Practices Planning and Design Manual, 1994
2) Stormwater Management Planning and Design Manual, 2003
3) The Interim Stormwater Quality Control Guidelines, 1991
4) The Stormwater Quality Best Management Practices Manual, 1991
5) The MTO Drainage Management Technical Guidelines, 1989
6) The Ontario Urban Drainage Design Guidelines, 1987
7) Low Impact Development Stormwater Management Planning and Design Guide, 2010

The stormwater management criteria are as follows:

1) Post-development flow rates for the site must be controlled to pre-development conditions rates for the 2 to 100 year design storm events.
2) Provide Enhanced level of quality control (80% Total Suspended Solids (TSS) removal) from all runoff discharging from the site.
3) Volume control performance should be evaluated for the 25mm storm event or through continuous modelling.
4) All efforts should be made to maximize infiltration wherever soil conditions allow.
5) Provide extended detention storage for the 25mm storm event.

The method used to evaluate and design the stormwater management plan is as follows:

The Fergus Shand Dam rainfall parameters presented in the Stormwater Management Master Plan for Centre Wellington (Elora, Salem and Fergus) (wsp Group, dated April 9, 2024) were used to generate the mass rainfall data for a 4-hour duration rainfall event for the full range of design storms (2 to 100-year). The 25mm storm for a 2-hour duration is also included within the table below. The Chicago storm parameters and the total depth of rainfall for each storm are as follows:

Table No. 2: Fergus Shand Dam - Chicago Storm Parameters

Parameter	25mm	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
a =	367.000	414.876	544.711	627.308	746.059	820.361	901.088
b =	5.000	0.0268	0.0206	0.0136	0.0851	0.0100	0.0426
c =	0.700	0.682	0.686	0.687	0.692	0.691	0.692
r =	0.394	0.375	0.375	0.375	0.375	0.375	0.375
td =	120.00	240.00	240.00	240.00	240.00	240.00	240.00
Rainfall depth (mm)	24.995	39.504	50.743	58.119	67.239	74.358	81.221

The Regional Storm (Hurricane Hazel) was also modelled.

The Horton infiltration method was used in the runoff calculations.

Table No. 3: MIDUSS – Horton Infiltration Parameters

Parameter	Impervious Areas	Pervious Areas
Maximum Infiltration (mm/hr)	0.0	30.0
Minimum Infiltration (mm/hr)	0.0	5.0
Lag Constant (hr)	0.0	0.25
Depression Storage (mm)	1.5	5.0

The hydrologic model MIDUSS was used to create the runoff hydrographs and to route the flows through the storage structures.

5. Stormwater Management Plan

The stormwater management design for the proposed development has been included in the adjacent lands owned by the applicant in order to size the stormwater management facility for buildout of both properties. Pre-development conditions refers to both lands as agricultural before development. Existing conditions refers to the full buildout of the adjacent lands, analyzed as part of the Functional Servicing and Stormwater Management Report – Southern Lands, 968 St. David Street North (GEI Consultants Canada Ltd., March 2025), with the built stormwater management facility, and Post-Development Conditions will refer to the proposed development of the Northern Lands (6581 Highway 6).

5.1. Existing Conditions

For analysis of existing conditions, the site was modelled as eight (8) drainage catchments. The existing condition drainage catchments are shown on Figure 3 and described below. The existing conditions MIDUSS computer modelling is attached in Appendix C.

Catchment 100 (13.09 hectares, 80% impervious) represents the majority of the adjacent lands owned by the same applicant. Runoff generated from Catchment 100 is captured and conveyed to the proposed stormwater management facility via on-site storm sewers.

Catchment 200 (2.02 hectares, 15% impervious) represents the stormwater management facility on the adjacent lands owned by the same applicant. The stormwater management facility is designed to provide the required Enhanced level of protection prior to discharging to the wetland along the northeast limits of the site.

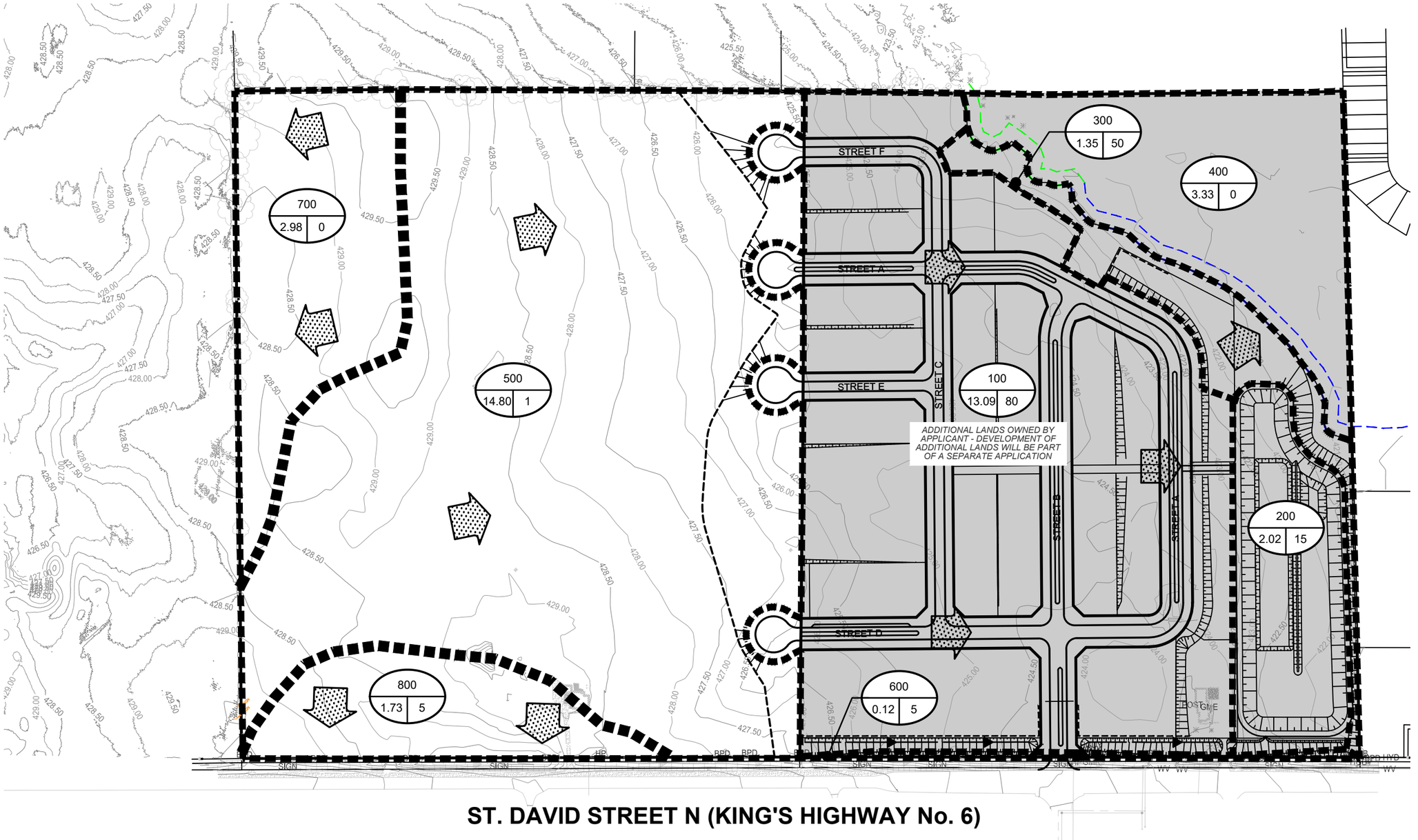
Catchment 300 (1.35 hectares, 50% impervious) represents a portion of the adjacent lands owned by the same applicant near the northeast wetland. Runoff generated from Catchment 300 will sheetflow overland, uncontrolled, to the northeast wetland.

Catchment 400 (3.33 hectares, 0% impervious) represents the northeast portion of the adjacent lands owned by the same applicant consisting of an existing wetland. Runoff generated from Catchment 400 contributes to the wetland extending north and east past the limits of the site.

Catchment 500 (14.80, 1% impervious) represents the majority of the proposed development. Runoff generated from Catchment 500 will sheetflow overland east to the adjacent property owned by the same applicant, ultimately discharging to the stormwater management facility.

Catchment 600 (0.12 hectares, 5% impervious) represents a portion of the adjacent lands owned by the same applicant, adjacent to the Highway 6 right-of-way. Runoff generated from Catchment 600 will sheetflow overland to the roadside ditch on Highway 6 right-of-way, ultimately discharging to a regulated watercourse.

Catchment 700 (2.98, 0% impervious) represents a westerly portion of the site. Runoff generated from Catchment 700 sheetflows overland in the westerly direction to the adjacent farm field and an offsite wetland.



NOTE:
EXISTING EXTERNAL CONTOUR INFORMATION RETRIEVED FROM THE ONTARIO GEOHUB DIGITAL TERRAIN MODEL (LIDAR-DERIVED) ON 2024-08-19

40 20 0 50 100 150
1:3000(m)

LEGEND

CATCHMENT BOUNDARY

MAJOR OVERLAND FLOW

200
1.331 | 100
- CATCHMENT NUMBER
- % IMPERVIOUS
- CATCHMENT AREA IN HECTARES

FERGUS SUBDIVISION - NORTH LANDS
TOWNSHIP OF CENTRE WELLINGTON (FERGUS)

POLOCORP

GEI Consultants

EXISTING CONDITIONS
DRAINAGE AREAS

Project 2401807

FEBRUARY 2025 FIGURE No. 3

LAMBIER, BRADLEY B:\Working\POLOCORP INC\2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Drawings\Figures\422079-SWM Figures_North.dwg - 2/21/2025

Catchment 800 (**1.73, 5% impervious)** represents a southwesterly portion of the site. Runoff generated from Catchment 800 sheetflows overland to the roadside ditch in the Highway 6 right-of-way which then continues to sheetflow to and offsite regulated watercourse.

5.1.1. Routing – Existing Conditions

Table No. 4 compares the routing results through the stormwater management facility with the available stage/storage/ discharge capacities.

Table No. 4: Stormwater Management Facility – Stage/Storage/Discharge Comparison

	Available Capacity			**Actual Capacity Used**		
	Peak Flow m^3/s	**Storage Volume m^3**	**Storage Elevation m**	**Peak Flow m^3/s**	**Storage Volume m^3**	**Storage Elevation m**
Invert of Outlet Structure No. 2	0.000	0	421.50	--	--	--
25 mm Storm	--	--	--	0.019	3,398	421.81
T/G DICB.1	0.026	5,717	422.00	--	--	--
2 Year Storm	--	--	--	0.046	6,286	422.05
5 Year Storm	--	--	--	0.197	8,304	422.20
10 Year Storm	--	--	--	0.323	9,355	422.28
T/G DICB.2	0.352	9,602	422.30	--	--	--
25 Year Storm	--	--	--	0.398	10,987	422.40
50 Year Storm	--	--	--	0.501	12,188	422.49
100 Year Storm	--	--	--	0.681	13,175	422.56
Weir	0.958	15,198	422.70	--	--	--
Regional Storm	--	--	--	2.741	18,043	422.89
Top of Bank	8.746	22,853	423.20	--	--	--

Table No. 5: Existing Condition Controlled Flow Rates

	25 mm (m^3/s)	2-Year (m^3/s)	5-Year (m^3/s)	10-Year (m^3/s)	25-Year (m^3/s)	50-Year (m^3/s)	100-Year (m^3/s)	Regional Storm (m^3/s)
Catchment 600 (uncontrolled)	0.007	0.022	0.035	0.043	0.052	0.058	0.063	0.014
Catchment 800 (uncontrolled)	0.050	0.163	0.287	0.378	0.496	0.580	0.664	0.182
To Highway 6 Roadside Ditch	*0.052*	*0.167*	*0.305*	*0.398*	*0.519*	*0.604*	*0.691*	*0.196*
Catchment 100, 200 and 500 (controlled)	0.019	0.046	0.197	0.323	0.398	0.501	0.681	2.741
Catchment 300 (uncontrolled)	0.121	0.228	0.347	0.424	0.525	0.597	0.665	0.165
Catchment 400 (uncontrolled)	0.056	0.193	0.356	0.455	0.607	0.720	0.835	0.366
To Northeast Wetland	*0.127*	*0.266*	*0.442*	*0.560*	*0.756*	*0.893*	*1.033*	*3.222*
Catchment 700 (uncontrolled)	0.044	0.152	0.271	0.386	0.500	0.575	0.652	0.327
To West Farm Field	*0.044*	*0.152*	*0.271*	*0.386*	*0.500*	*0.575*	*0.652*	*0.327*
Total Flow Rate	**0.169**	**0.518**	**0.892**	**1.160**	**1.575**	**1.860**	**2.153**	**3.726**

5.2. Stormwater Management Overview

In line with current practices and guidelines, the stormwater management approach for the North Lands Subdivision is designed as a “treatment train” to remove sediments and any absorbed contaminants prior to the discharge of runoff from the development to the receiving outlets. The “treatment train” approach will include a combination of lot level, conveyance and end-of-pipe best management practices and is proposed to filter and remove sediments from stormwater runoff prior to discharging off-site.

Lot Level Controls

Stormwater management practices recommended for providing lot level controls on this site are as follows:

a) Rooftop Infiltration

Each lot will have a rear yard infiltration gallery designed to infiltrate the 25 mm storm runoff from the proposed rooftop. The gallery connection to the roof downspout will include a splash pad and overflow for storm events greater than the 25 mm storm to discharge to ground surface followed by which the roof runoff will be directed to the grassed areas of the lot. The runoff for any event large enough to generate flow to the sewer system will be adequately filtered by the grass.

Design considerations that will be implemented in the infiltration galleries’ designs include:

- Located beneath frost penetration depth and minimum of 4 metres away from building foundations
- A 100-150mm diameter perforated vertical standpipe for inspection and flushing
- Leaf screens on downspouts
- 50mm clear stone with 30 to 40% void space
- Geotextile installed around the reservoir which considers their percent open area, load bearing ratio, and the texture and permeability of native soils

b) Rear Yard Swales

The grading of the lots will be to current Township of Centre Wellington Design Standards. Where practical, the length of the rear lot swales between catchbasins will be increased to extend the contact time with the grassed surfaces.

To promote more infiltration on the lots and in the swales, it is recommended that the average depth of graded topsoil be 300 mm.

c) Foundation Drainage

Foundation drainage will be provided for each lot via sump pumps discharging to storm service laterals.

Conveyance Controls

Conveyance controls will be achieved through municipal maintenance of the storm sewer system. The regular cleanout of the manholes and catchbasin sumps will remove the heavier sediments deposited from the runoff during storm events.

End of Pipe Facilities

The end-of-pipe component for Catchments 1000 and 2000 consists of the proposed stormwater management facility located near the south-easterly edge of the adjacent property, adjacent to the existing wetland and Highway 6 (St. David Street N).

Water Quality

The stormwater management facility proposed on the adjacent property has been designed to function as a wetland. From Table 3.2, Stormwater Management Planning and Design Manual, 2003, in order to provide Enhanced water quality treatment, a wetland facility requires 128 m^3/ha of storage volume for a contributing drainage area that is 76% impervious. 40 m^3/ha of the required storage volume is extended detention volume, while the remaining 88 m^3/ha is permanent pool.

Based on a contributing site area of 33.57 hectares (Catchments 1000 and 2000 in ultimate post-development conditions) and a requirement for 88 m^3/ha of permanent pool storage volume to achieve Enhanced treatment, the required permanent pool storage is 2,954 m^3.

The stormwater management facility has been designed with a 0.3-metre-deep permanent pool, which provides 3,003 m^3 of permanent pool volume. An additional permanent pool volume of 875 m^3 will be provided in the sediment forebay.

Further details of the stormwater management facility can be found in the Functional Servicing and Stormwater Management Report for the South Lands Subdivision (GEI Consultants Canada Ltd., dated February 2025).

5.3. Allowable Release Rates

The pre-development conditions for this site and the adjacent property were analyzed as part of the South Lands Subdivision Functional Servicing and Stormwater Management Design Report (dated February 2025). The allowable release rate has been established based on the pre-development flow rates to each outlet from the two properties. These are as follows:

Table No. 6: Allowable Release Rates

	25 mm (m^3/s)	**2-Year (m^3/s)**	**5-Year (m^3/s)**	**10-Year (m^3/s)**	**25-Year (m^3/s)**	**50-Year (m^3/s)**	**100-Year (m^3/s)**	**Regional Storm (m^3/s)**
To Northeast Wetland	0.489	1.700	2.963	3.974	5.416	6.448	7.319	3.762
To Farm Field West of Site	0.049	0.169	0.317	0.405	0.532	0.633	0.734	0.327
To Highway 6	0.058	0.188	0.332	0.437	0.574	0.670	0.768	0.211
Total Flow Rate	**0.561**	**1.947**	**3.346**	**4.608**	**6.178**	**7.296**	**8.263**	**4.283**

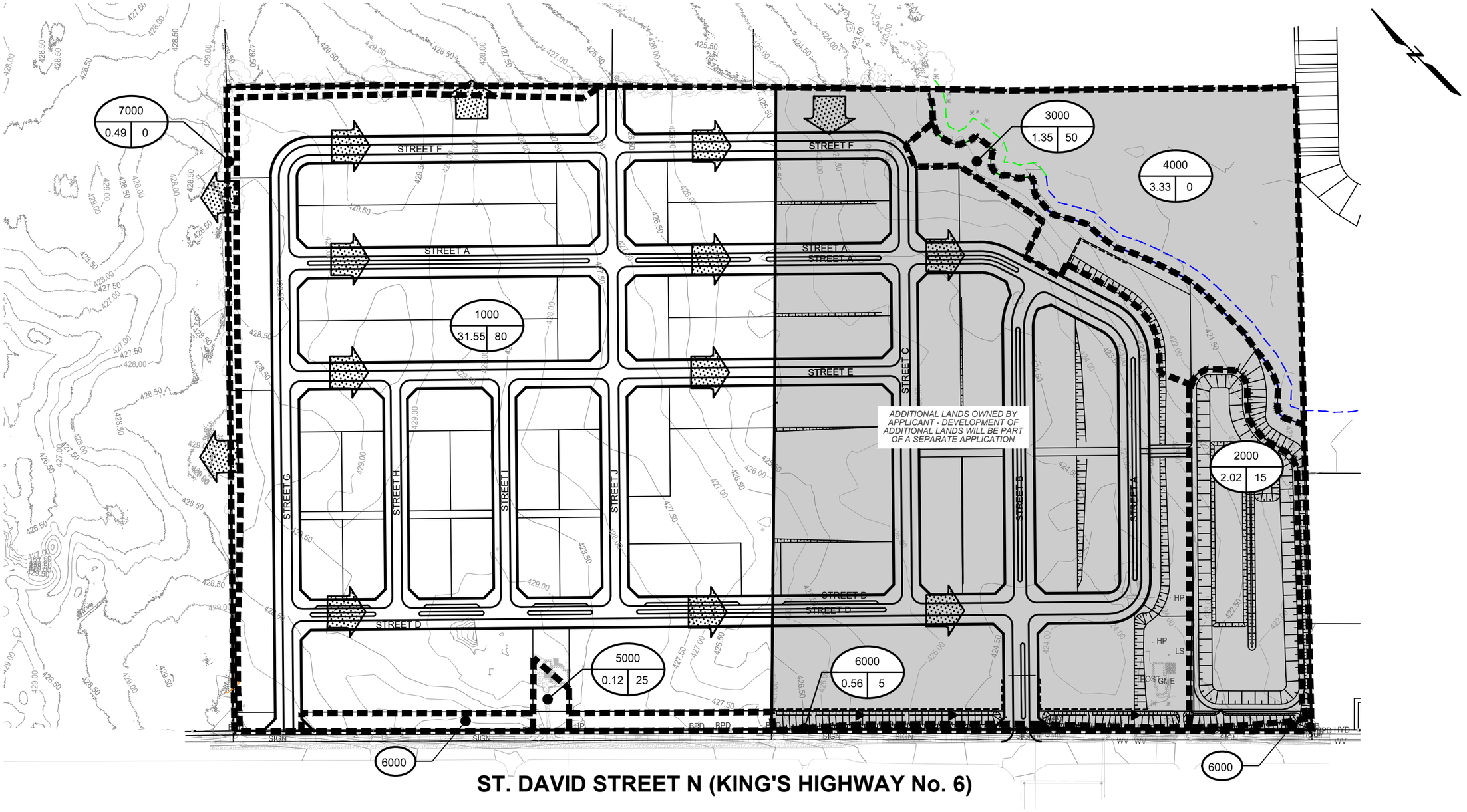
5.4. Post-Development Conditions

For post-development analysis purposes, the site was modelled as seven (7) drainage catchments. The post-development drainage catchments are shown on Figure 4 and described below. The post-development MIDUSS computer modelling is attached in Appendix C.

Catchment 1000 (31.55 hectares, 80% impervious) represents the majority of the development. Runoff generated from Catchment 1000 will be captured and conveyed to the proposed stormwater management facility via on-site storm sewers.

Catchment 2000 (2.02 hectares, 15% impervious) represents the proposed stormwater management facility. The proposed stormwater management facility is designed to provide the required Enhanced level of protection prior to discharging to the wetland along the northeast limits of the site.

Catchment 3000 (1.35 hectares, 50% impervious) represents a portion of the proposed development adjacent to the northeast wetland. Runoff generated from Catchment 3000 will sheetflow overland, uncontrolled, to the northeast wetland.



NOTE:
EXISTING EXTERNAL CONTOUR INFORMATION RETRIEVED FROM THE ONTARIO GEOHUB DIGITAL TERRAIN MODEL (LIDAR-DERIVED) ON 2024-08-19

40 20 0 50 100 150
1:3000(m)

LEGEND

CATCHMENT BOUNDARY

MAJOR OVERLAND FLOW

200
1.331 | 100
CATCHMENT NUMBER
% IMPERVIOUS
CATCHMENT AREA IN HECTARES

FERGUS SUBDIVISION - NORTH LANDS
TOWNSHIP OF CENTRE WELLINGTON (FERGUS)

POLOCORP

GEI Consultants

Project 2401807

POST-DEVELOPMENT DRAINAGE AREAS

FEBRUARY 2025 FIGURE No. 4

LAMBIER, BRADLEY B:\Working\POLOCORP INC\2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Drawings\Figures\422079-SWM Figures_North.dwg - 2/21/2025

Catchment 4000 (3.33 hectares, 0% impervious) represents the northeast portion of the site consisting of an existing wetland. Runoff generated from Catchment 4000 contributes to the wetland extending north and east past the limits of the site.

Catchment 5000 (0.12 hectares, 25% impervious) represents the front yard of the existing houses on site. Runoff generated from Catchment 5000 will sheetflow overland to the roadside ditch on Highway 6 right-of-way, ultimately discharging to a regulated watercourse.

Catchment 6000 (0.56 hectares, 5% impervious) represents a portion of the proposed development adjacent to the Highway 6 right-of-way. Runoff generated from Catchment 6000 will sheetflow overland to the roadside ditch on Highway 6 right-of-way, ultimately discharging to a regulated watercourse.

Catchment 7000 (0.49 hectares, 0% impervious) represents a northwest portion of the proposed development consisting of rooftops and rear yards. Runoff generated from Catchment 7000 will sheetflow overland west to the adjacent farm field, ultimately discharging to an offsite wetland.

5.4.1. Routing – Post-Development Conditions

Table No. 7 lists the post-development uncontrolled flow rates for each catchment under the 2 to 100-year design storms and Regional Storm.

Table No. 7: Post-Development Uncontrolled Flow Rates

	25 mm (m^3/s)	2-Year (m^3/s)	5-Year (m^3/s)	10-Year (m^3/s)	25-Year (m^3/s)	50-Year (m^3/s)	100-Year (m^3/s)	Regional Storm (m^3/s)
Catchment 1000	3.692	6.428	8.626	10.093	12.028	13.467	14.844	3.800
Catchment 2000	0.056	0.170	0.279	0.383	0.509	0.595	0.686	0.210
Catchment 3000	0.121	0.228	0.347	0.424	0.525	0.597	0.665	0.165
Catchment 4000	0.056	0.193	0.356	0.455	0.607	0.720	0.835	0.366
Catchment 5000	0.005	0.009	0.016	0.022	0.029	0.034	0.039	0.013
Catchment 6000	0.032	0.105	0.163	0.198	0.242	0.272	0.296	0.065
Catchment 7000	0.025	0.082	0.136	0.169	0.210	0.239	0.261	0.056
Total Flow Rate	**3.901**	**6.995**	**9.548**	**11.267**	**13.566**	**15.259**	**16.873**	**4.594**

Table No. 8 compares the routing results through the stormwater management facility with the available stage/storage/ discharge capacities.

Table No. 8: Stormwater Management Facility – Stage/Storage/Discharge Comparison

	Available Capacity			**Actual Capacity Used**		
	Peak Flow m^3/s	**Storage Volume m^3**	**Storage Elevation m**	**Peak Flow m^3/s**	**Storage Volume m^3**	**Storage Elevation m**
Invert of Outlet Structure No. 2	0.000	0	421.50	--	--	--
T/G DICB.1	0.026	5,717	422.00	--	--	--
25 mm Storm	--	--	--	0.043	6,205	422.04
2 Year Storm	--	--	--	0.260	8,828	422.24
T/G DICB.2	0.352	9,602	422.3	--	--	--
5 Year Storm	--	--	--	0.407	11,095	422.41
10 Year Storm	--	--	--	0.562	12,581	422.52
25 Year Storm	--	--	--	0.835	14,092	422.62
Weir	0.958	15,198	422.70	--	--	--
50 Year Storm	--	--	--	1.045	15,395	422.71
100 Year Storm	--	--	--	1.445	16,290	422.77
Regional Storm	--	--	--	3.326	18,929	422.95
Top of Bank	8.746	22,853	423.20	--	--	--

Table No. 9: Post-Development Controlled Flow Rates

	25 mm (m^3/s)	2-Year (m^3/s)	5-Year (m^3/s)	10-Year (m^3/s)	25-Year (m^3/s)	50-Year (m^3/s)	100-Year (m^3/s)	Regional Storm (m^3/s)
Catchment 5000 (uncontrolled)	0.005	0.009	0.016	0.022	0.029	0.034	0.039	0.013
Catchment 6000 (uncontrolled)	0.032	0.105	0.163	0.198	0.242	0.272	0.296	0.065
To Highway 6 Roadside Ditch	*0.037*	*0.114*	*0.177*	*0.216*	*0.265*	*0.300*	*0.328*	*0.078*
Catchment 1000 and 2000 (controlled)	0.043	0.260	0.407	0.562	0.835	1.045	1.445	3.326
Catchment 4000 (uncontrolled)	0.056	0.193	0.356	0.455	0.607	0.720	0.835	0.366
Catchment 3000 (uncontrolled)	0.121	0.228	0.347	0.424	0.525	0.597	0.665	0.165
To Northeast Wetland	*0.132*	*0.296*	*0.687*	*0.907*	*1.185*	*1.561*	*1.866*	*3.807*
Catchment 7000 (uncontrolled)	0.025	0.082	0.136	0.169	0.210	0.239	0.261	0.056
To West Farm Field	*0.025*	*0.082*	*0.136*	*0.169*	*0.210*	*0.239*	*0.261*	*0.056*
Total Flow Rate	**0.173**	**0.473**	**0.755**	**0.975**	**1.292**	**1.643**	**1.932**	**3.902**

Comparison to Existing Conditions Flows

Tables No. 10-13 below compares the existing and post-development flow rates from the site to Highway 6 (St. David Street N) and to the wetland northeast of the site.

Table No. 10: Comparison of Existing and Post-Development Flows - to Highway 6 (St. David Street N)

Design Storm	Allowable Release Rate		Existing Conditions		Controlled Post-Development Conditions	
	Flow Rate (m^3/s)	Volume (m^3)	Flow Rate (m^3/s)	Volume (m^3)	Flow Rate (m^3/s)	Volume (m^3)
25 mm	0.058	138.6	0.052	127.9	0.037	49.6
2-Year	0.188	305.6	0.167	282.3	0.114	107.5
5-Year	0.332	496.7	0.305	458.8	0.177	171.9
10-Year	0.437	625.8	0.398	578.3	0.216	216.4
25-Year	0.574	799.5	0.519	738.5	0.265	273.5
50-Year	0.670	935.7	0.604	864.2	0.300	318.3
100-Year	0.768	1,066.8	0.691	985.1	0.328	361.6
Regional	0.211	3,007.4	0.196	2,761.3	0.078	951.2

Table No. 11: Comparison of Existing and Post-Development Flows - to Northeast Wetland

Design Storm	Allowable Release Rate	Existing Conditions	Controlled Post-Development Conditions
	Flow Rate (m^3/s)	Flow Rate (m^3/s)	Flow Rate (m^3/s)
25 mm	0.489	0.127	0.132
2-Year	1.700	0.266	0.296
5-Year	2.963	0.442	0.687
10-Year	3.974	0.560	0.907
25-Year	5.416	0.756	1.185
50-Year	6.448	0.893	1.561
100-Year	7.319	1.083	1.866
Regional	3.762	3.222	3.807

Table No. 12: Comparison of Existing and Post-Development Flows - to West Farm Field

Design Storm	Allowable Release Rate	Existing Conditions	Controlled Post-Development Conditions
	Flow Rate (m^3/s)	Flow Rate (m^3/s)	Flow Rate (m^3/s)
25 mm	0.049	0.044	0.025
2-Year	0.169	0.152	0.082
5-Year	0.317	0.271	0.136
10-Year	0.405	0.386	0.169
25-Year	0.532	0.500	0.210
50-Year	0.633	0.575	0.239
100-Year	0.734	0.652	0.261
Regional	0.327	0.327	0.056

Table No. 13: Comparison of Existing and Post-Development Flows - Totals from the Site

Design Storm	Allowable Release Rate	Existing Conditions	Controlled Post-Development Conditions
	Flow Rate (m^3/s)	Flow Rate (m^3/s)	Flow Rate (m^3/s)
25 mm	0.561	0.169	0.173
2-Year	1.947	0.518	0.473
5-Year	3.346	0.892	0.755
10-Year	4.608	1.160	0.975
25-Year	6.178	1.575	1.292
50-Year	7.296	1.860	1.643
100-Year	8.263	2.153	1.932
Regional	4.283	3.726	3.902

Therefore, the post-development flow rates discharging from the site during the 2 to 100-year design storm events are less than the existing conditions flow rates from the site. The flow rate during the Regional Storm has increased under post development conditions. The Regional Storm will be conveyed overland through the site at each of the outlet locations summarized in the table above.

Major Flow Conveyance

The anticipated major flows on the right-of-way are the 100-year minus the runoff that will be captured and conveyed by on-site storm sewers, which have been designed for the 5-year design storm event. The major overland flows are then approximately 3.370 m^3/s (55% of Catchment 1000 flows 14.628 m^3/s – 8.500 m^3/s) and split evenly into four rights-of-way (0.843 m^3/s) through the subdivision to the adjacent property owned by the same applicant. The proposed 20m right-of-way, with standard barrier curb and gutter and 2% crossfall has a conveyance capacity of approximately 0.944 m^3/s at a longitudinal grade of 0.6%. Therefore, the proposed right-of-way has sufficient capacity to convey major flows to the proposed stormwater management facility. The major flow conveyance modelling has been included in Appendix C.

6. Infiltration Assessment

As described in the Preliminary Hydrogeological Investigation (Chung and Vander Doelen Engineering, dated February 28, 2025), the existing conditions recharge rate for the area of proposed development is approximately 57,583 m^3/yr (see Table No. 17). An enhanced infiltration system is proposed on site to mitigate the difference between existing and post-development condition infiltration volumes. The enhanced infiltration system will consist of rear lot infiltration galleries designed to infiltrate the 25mm storm event from the proposed building rooftops. The enhanced infiltration calculations in Table Nos. 14 to 20 assume that only the back half of the roof area from a townhome unit can be captured and infiltrated while for a single detached lot, the entire roof area is captured and infiltrated. For the medium density blocks, it has been assumed that 25% of the block area is available for infiltration. Therefore, the analysis calculates the roof area and the size of each infiltration gallery based on the different lot widths proposed for the subdivision. With the enhanced infiltration system, the proposed development will meet 81% of the recharge rate from existing conditions.

Infiltration gallery drawdown time has been calculated based on an average infiltration rate of 15 mm/hr as noted in the Geotechnical Investigation prepared by Chung and Vander Doelen Engineering (dated February 28, 2025). The average drawdown time of the infiltration galleries is estimated at 22 hours. The contributing runoff was then compared to the number of times the infiltration galleries could be filled with runoff (i.e. runoff available and available capacity to infiltrate) and a safety factor of 0.85 was applied to the resulting runoff depth each month.

As part of the detail design stage, once Draft Plan approval has been granted, we will conduct the required Guelph Permeameter Testing to confirm the in-situ infiltration rates as required by the Stormwater Management Planning and Design Guide.

7. Sediment and Erosion Control Plan

Primary sediment control will be achieved with the installation of heavy duty sediment fencing around the property boundary. The silt fence will eliminate the opportunity for water borne sediments to be transported from the site.

Temporary rock check dams will be installed in rear and side yard swales after the initial grading has been completed to slow the flow rates and promote the settlement of waterborne sediments before they reach the silt fences and the stormwater management facility.

Upon completion of the grading, any area not subject to active construction within 30 days will be topsoiled and seeded as per OPSS 572.

Once catch basins have been installed, the grates will be wrapped in filter cloth. This will be maintained until all building and landscaping has been completed.

Inspection and maintenance of all silt fencing and the stormwater management facility will start after installation is complete. These features will be inspected on a weekly basis or after a rainfall event of 13 mm or greater. Maintenance will be carried out, within 48 hours, on any part of the facility found to need repair.

Once construction has been substantially completed, the silt fence will be removed, any accumulated sediment will be removed and the landscaping and planting of the stormwater management facility will be restored as needed.

After construction of the complete development, erosion will not occur and sediment transport will be minimal. The stormwater management facility will provide all sediment removal.

8. Maintenance Plan

To ensure that the stormwater management system continues to function as designed and constructed, we recommend that the following inspections and maintenance activities be completed on an annual basis:

1. Is there any indication of a spill (i.e. frothy water, oily sheen on the water)? If yes, investigate, inform the appropriate agencies and complete the necessary clean-up and restoration.
2. Inspect the outlet structures from the stormwater management facility. Remove and dispose of any accumulated sediment, trash/litter, debris (i.e. sediment, garbage, leaves, etc.).
3. Inspect all catch basins and manholes. Remove and dispose of any accumulated sediment, trash/litter, debris (i.e. sediment, garbage, leaves, etc.).
4. Inspect all swales and overflow locations. Remove and dispose of any accumulated sediment, trash/litter, debris (i.e. sediment, garbage, leaves. etc.).

Please note that any structures identified during the annual inspection to be worn, missing or damaged are to be repaired or replaced within 48 hours.

9. Conclusions

In summary, the features of the design for the proposed development are as follows:

1) Sanitary service for the site will be provided by connecting to the service stubs proposed on the adjacent property owned by the same applicant. Internal sanitary sewers will then be extended throughout the site via the municipal rights-of-way to provide sanitary servicing for the proposed development.
2) Water servicing for the site will be provided by connecting to the service stubs proposed on the adjacent property owned by the same applicant. An internal watermain will then be extended throughout the site via the municipal rights-of-way to provide water service for the proposed development. Watermain sizing is to be confirmed at the detail design stage.
3) Storm sewers will be sized at the detailed design stage to convey the 5-year design storm event to the stormwater management facility on the adjacent property owned by the same applicant. Major overland flows will be directed towards the municipal rights-of-way to the stormwater management facility on the adjacent property owned by the same applicant.
4) The post-development flow rates discharging from the site during the 2 to 100-year design storm events are less than the pre-development conditions flow rates from the site. The Regional Storm is conveyed overland through the site.
5) Infiltration galleries sized to infiltrate the 25 mm design storm event from building rooftops will be implemented in rear yard areas of the proposed lots to meet the infiltration requirements for the site.
6) The stormwater management systems meet the current Provincial and Municipal guidelines.
7) The principles of “Stormwater Management Practices”, the Ministry of Environment Stormwater Management Planning and Design Manual 2003 have been used in the design of the stormwater management system.

Appendix A Geotechnical Investigation (Chung and Vander Doelen Engineering Ltd., dated February 28, 2025) and Preliminary Hydrogeological Investigation (Chung and Vander Doelen Engineering Ltd., dated February 28, 2025)

CHUNG & VANDER DOELEN
ENGINEERING LTD.

GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL SUBDIVISION
6581 Highway 6
Fergus, Ontario

SUBMITTED TO:
PoloCorp Inc.
379 Queen Street South
Kitchener, Ontario
N2G 1W6

ATTENTION:
Mr. Mike Puopolo

FILE NO: 1495 / February 28, 2025

CHUNG & VANDER DOELEN
ENGINEERING LTD.

311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 5E1
519-742-8979

February 28, 2025
File No.: 1495

PoloCorp Inc.
379 Queen Street South
Kitchener, Ontario
N2G 1W6

Attention: Mr. Mike Puopolo

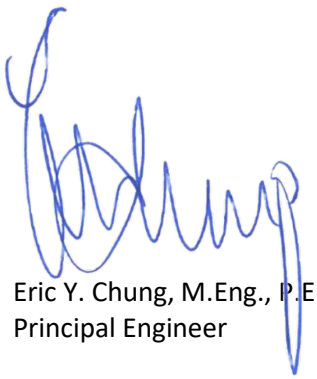
RE: Geotechnical Investigation
Proposed Residential Subdivision
6581 Highway 6, Fergus, Ontario

We take pleasure in enclosing one (1) copy of our Geotechnical Investigation Report prepared for the above-referenced site.

If you have any questions or clarifications are required, please contact the undersigned at your convenience.

We thank you for giving us this opportunity to be of service to you.

Yours truly,
CHUNG & VANDER DOELEN ENGINEERING LTD.



Eric Y. Chung, M.Eng., P.Eng.
Principal Engineer

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LIST OF APPENDICES AND ENCLOSURES

1.0 INTRODUCTION

CHUNG & VANDER DOELEN ENGINEERING LTD. has been retained by PoloCorp Inc. to conduct a geotechnical investigation for a proposed residential subdivision to be located at 6581 Highway 6 in Fergus, Ontario.

It is understood that the 20.03± ha site, currently being used for agricultural purposes, will be developed into a residential subdivision comprised of a combination of residential single units, stacked townhouses, mixed-use units, roadways, and a park. The proposed residential subdivision will be fully serviced with municipal water and sanitary sewer services.

According to the Draft Plan of Subdivision (Polocorp Inc., December 10, 2024), as provided in Appendix B, the development will include a roadway network throughout the subdivision connected to Highway 6 as well as a 0.89± ha sized park (Block 66). The existing residential dwelling located at 6581 Highway 6 will be incorporated into the proposed residential subdivision (Block 65). It is also planned that the subdivision will be connected to a 2.41± ha sized stormwater management (SWM) facility located south of the property which will be constructed as part of a separate development.

As of the writing of this report, no site grading plan has been provided. CVD will be pleased to review the final design and site grading plan once they are made available.

The purpose of this investigation was to determine the subsurface soil and groundwater conditions at the site and, based on the findings, to make geotechnical recommendations for:

- Site grading operations and engineered fill construction;
- Excavation conditions;
- Groundwater control during construction;
- Foundation bearing pressures;
- Foundation soil classification for seismic design per OBC 2024;
- Site servicing;
- Pavement design and construction; and
- Estimates of infiltration rates of encountered soil deposits.

This geotechnical report should be read in conjunction with CVD's Preliminary Hydrogeological Investigation, Proposed Residential Subdivision Report (February 2025). CVD also performed a geotechnical investigation (January 2025) for the land parcel directly south of the site, and as such, the findings in that investigation is also used in this report.

2.0 FIELD AND LABORATORY WORK

Five (5) boreholes were advanced to depths of between 6.70 and 8.25 m below existing grade, and monitoring wells were installed at each borehole location (labelled Boreholes 1 to 5), on January 16 and 17, 2024. A supplemental investigation was completed on September 11 and 12, 2024, during which five (5) additional boreholes/monitoring wells (labelled Boreholes 101 to 105) were drilled and installed to depths between 8.10 and 9.60 m below grade. The borehole/monitoring well locations are illustrated

on the Borehole Location Plan, Drawing No. 1, which is included in Appendix B.

The field investigation program was conducted under the supervision of a member of our engineering team who logged the subsurface conditions encountered at the boreholes, effected the subsurface sampling and testing, and monitored the groundwater conditions. The boreholes were advanced using a track-mounted drilling rig, supplied, and operated by a specialized contractor. The drill rig was equipped with continuous flight augers and standard soil sampling equipment. Underground utilities were located prior to commencing the field work program.

The investigation was completed using a track-mounted CME-55 drill rig, equipped with standard 83 mm inner diameter hollow stem augers (HSA) operated by Davis Drilling Ltd. of Milton, Ontario. Standard penetration tests (SPTs) in accordance with ASTM Specification D1586, were carried out at frequent intervals of depth, and the results are shown on the Borehole Logs as Penetration Resistance or "N"-values. The undrained shear strength of the cohesive soil deposits was determined on the slightly disturbed SPT samples using a field pocket penetrometer. The compactness condition or consistency of the soil strata has been inferred from the test results.

Soil samples collected during the borehole investigation program were examined in the field and subsequently brought to CVD's laboratory for tactile examination to confirm field classification. Moisture content determination on all retrieved soil samples was performed.

The borehole location, temporary benchmark, and associated ground surface elevations were surveyed by CVD for the purpose of this report using a Network RTK Global Navigation Satellite System (GNSS) Receiver. The survey data was collected using The UTM Zone 17N Projection, NAD83(CSRS)v7-2010 datum and Canada Geoid Model HT2_2010v70 (CGVD28).

The referenced temporary benchmark (TBM) is described below:

TBM: Top of fire hydrant nut, south of northern driveway entrance to 968 St. David Street North, as shown on Drawing No. 1

Elevation: 425.17 m (Geodetic)

3.0 EXISTING SITE CONDITIONS

The property is situated on the northwestern end of Fergus and is bound by Highway 6 to the west and predominantly by agricultural lands to the north, east, and south of the subject lands.

The majority of the site is comprised of a cultivated agricultural field. A residential dwelling with its related structures fronts Highway 6 at the west side of the proposed development. An existing residential subdivision is situated southwest of the southwestern corner of the Site on the opposite side of Highway 6, and another residential subdivision is found approximately 400± m southeast of the property.

Generally, there is gentle decrease in grade across the site in a southeasterly direction in which ground

elevations range from 430± to 425± m. No major undulations or notable topographical features exist. Ground surface elevations at the borehole locations ranged between 425.61 m to 429.41 m.

4.0 SUBSURFACE CONDITIONS

The detailed subsurface conditions encountered at the ten (10) boreholes are presented on the Borehole Log Sheets, Enclosures 1 to 5 & 9 to 13. The following notes are intended to amplify and comment on the subsurface data obtained. The borehole and monitoring well locations are indicated on the Borehole Location Plan, Drawing No. 1, included in Appendix B.

Enclosure A provides explanations of the various soil abbreviations and terms used on the borehole log sheets. The stratigraphic boundaries shown on the borehole logs are inferred from non-continuous sampling conducted during advancement of the borehole drilling procedures and, therefore, represent transitions between soil types rather than exact planes of geologic change. The subsurface conditions will vary between and beyond the borehole locations.

4.1 Topsoil

Topsoil was encountered at the ground surface of eight (8) boreholes (Boreholes 1 to 5, 101, 102, and 104) with measured thicknesses between 180 and 300 mm. The thickness of topsoil could vary between and beyond the borehole locations.

4.2 Fill

Dark brown to brown fill materials, typically comprised of sand and silt, were encountered beneath the topsoil or at the ground surface of Boreholes 103 to 105 and extend to depths between 0.80± and 2.15± m below existing grades. Trace amounts of gravel, clay, and topsoil as well as occasional clayey seams are found within the deposit.

The SPT “N”-values measured within the fill ranged from 3 to 8 blows per 300 mm of penetration, indicating a variable very loose to loose compactness condition. Natural moisture contents were measured between 5 and 19%, exhibiting typically a moist moisture condition. Elevated moisture contents are likely due to the presence of topsoil/organics.

4.3 Fine Granular Deposits

The topsoil/fill is underlain by a series of fine granular deposits varying between silt, sandy silt, and fine to medium sand, but predominantly composed of both laterally and vertically extensive fine to medium sand. These deposits extend to depths up to 9.60± m (below elevation 417.36 m at Borehole 5). Trace amounts of gravel and occasional clayey silt seams/layers (Boreholes 3, 4, and 101) were encountered within the deposit. Minor seams/layers of grey silt were encountered near the bottom of Boreholes 4,

5, 101, 104, and 105, which likely indicate the transition zone to the clayey silt till which underlies the area. All ten (10) boreholes were terminated within the fine granular deposits.

The results of two (2) grain size distribution analyses from the fine to medium sand in Boreholes 101 and 105 are shown graphically on Enclosures 22 and 23.

The SPT "N"-values measured within the fine granular deposits ranged from 3 to 31 blows per 300 mm of penetration, indicating a variable very loose to dense compactness condition, but typically exhibiting a loose to compact compactness condition. Natural moisture contents were measured between 2 and 27%, indicating damp to saturated moisture conditions.

4.4 Groundwater

Throughout the field investigation, groundwater conditions were monitored during advancement of boreholes, and water level readings were measured on multiple occasions following the completion of fieldwork in all of the accessible ten (10) installed monitoring wells

Groundwater levels were measured at depths ranging between 1.99 (Borehole 5) and 5.39 mbgs (Borehole 1), corresponding to elevations ranging between 425.02 and 423.56 m. The groundwater measurements for each monitoring well collected thus far for the investigation (February to October 2024) are summarized in Table 1 (Appendix D).

It is noted that the observed groundwater table will fluctuate seasonally, such as during the spring following the period of peak snow melt, and in response to major weather events. It is possible that peak water levels could be up to 0.5 m higher than those measured in this investigation.

Figure 5, also included in Appendix D, presents an interpretation of the water table configuration and shallow groundwater flow directions across the property using the groundwater elevation measurements gathered on September 18, 2024. The water table mimics the topography of the site with shallow groundwater flowing towards the south/southeastern portion of the property in the direction of a nearby wetland.

Well response tests (slug/bail tests) were completed at two (2) of the monitoring well locations (Boreholes 1 and 5) on March 11, 2024, to provide a more accurate estimate of the hydraulic conductivity (K) (or permeability) of the saturated aquifer soil strata. These tests resulted in hydraulic conductivity values ranging from 9×10^{-5} to 1×10^{-4} m/s. These results are graphically presented in Appendix C, and a summary of the data is also included in Table 1 (Appendix D).

These values are consistent with the hydraulic conductivity ranges typically associated with similar soils (Freeze & Cherry, 1979). Hydraulic conductivities calculated using the Hazen Formula from the soil grain size analyses (Enclosures 22 and 23) were similar in magnitude to those of the single well response tests.

5.0 DISCUSSION AND RECOMMENDATIONS

It is understood that the 20.03± ha site, currently being used for agricultural purposes, will be developed into a residential subdivision comprised of a combination of residential single units, stacked townhouses, mixed-use units, roadways, and a park. The proposed residential subdivision will be fully serviced with municipal water and sanitary sewer services.

According to the Draft Plan of Subdivision (Polocorp Inc., December 10, 2024), as provided in Appendix B, the development will include a roadway network throughout the subdivision connected to Highway 6 as well as a 0.89± ha sized park (Block 66). The existing residential dwelling located at 6581 Highway 6 will be incorporated into the proposed residential subdivision (Block 65). It is also planned that the subdivision will be connected to a 2.41± ha sized stormwater management (SWM) facility located south of the property which will be constructed as part of a separate development.

In general, the surficial topsoil and fill were underlain by a series of loose to compact fine granular deposits, predominantly comprised of fine to medium sand. These deposits extend to depths up to at least 9.60± mbgs (below elevation 417.36 m at Borehole 5) and are expected to extend to even deeper depths near the northern portion of the property. Based on data collected by CVD as part of an independent development for the lot directly south of the Site, it is known that the sand deposit is underlain by a clayey silt stratum which is found at progressively shallower depths towards the south.

Very loose to loose fill materials, extending to between 0.80± and 2.15± m were encountered at or near ground surface of Boreholes 103 to 105, and more extensive native loose soil conditions were occasionally encountered within the near surface soils of some boreholes (e.g. Boreholes 2, 4, 5, and 104). In their current condition, these soils not suitable to support future house foundations. Removal of such loose zones and replacement with engineered fill (where necessary) is considered to be a suitable and practical remedy to repair such areas.

Shallow groundwater conditions were encountered at all ten (10) borehole locations with the water table measured across all site visits at depths between 1.99 (Borehole 5) and 5.39 mbgs (Borehole 1), corresponding to elevations ranging between 425.02 and 423.56 m. Shallow groundwater flows towards the south/southeastern portion of the property in the direction of a nearby wetland. Based on both the single well response tests and grain size analyses, the hydraulic conductivity values for the fine to medium sand deposit were calculated at approximately 1×10^{-4} m/s.

Within the southern portion of the proposed development where groundwater is found at a shallower depth, it is recommended that a permanent groundwater management system (GWMS) be implemented for the development of the subdivision lands to control future groundwater levels and prevent future wet basement problems. Alternatively, the site can be raised to establish basement floor levels at least 0.6 m above high groundwater levels which will be determined through on-going monitoring as part of the CVD hydrogeological study.

Furthermore, it is recommended that any existing below-grade drains, drainage tiles or drainage tile networks in the agricultural fields be fully understood/investigated to establish how their presence (or removal) would impact the shallow groundwater system and the proposed development.

As of the writing of this report, no site grading plan has been provided. CVD will be pleased to review the final design and site grading plan once they are made available.

5.1 Site Grading and Engineered Fill Construction

As of the writing of this report, no site grading plans have been provided; however, it is anticipated that partial regrading of the site will be conducted using "cut-fill" procedures, and that more extensive "fill" operations will occur. It is recommended to construct engineered fill in areas to be raised in order to suitably support the proposed residential building structures, future roadways, and infrastructure servicing.

Inorganic on-site native soil deposits from "cut" areas may potentially be reused to construct engineered fill capable of supporting future house foundations, roadways, and municipal infrastructure servicing. The natural moisture content of the "cut" soils to be used as engineered fill should be within 3% below their optimum moisture contents in order to achieve the specified degree of compaction.

Topsoil was encountered at the ground surface of eight (8) of the borehole locations with measured thicknesses ranging between 180± and 300± mm. It should be noted that the thickness of the organic soil layer could vary drastically across the site from those reported at the borehole locations.

Very loose to loose fill materials, extending to between 0.80± and 2.15± m were encountered at or near ground surface of Boreholes 103 to 105, and more extensive native loose soil conditions were occasionally encountered within the near surface soils of some boreholes (e.g. Boreholes 2, 4, 5, and 104). It is likely that the site has been regraded to achieve the present condition for farming, and therefore, filling of local depressions may result in fill pockets not detected by the boreholes. Test pits should be dug prior to or during site grading operations to further establish the extent of poor soil.

Topsoil stripping operations should be conducted when the ground is not wet and will support large scale construction equipment. Over-stripping can result when the ground conditions are wet and unstable.

Fill and/or loose soil conditions were encountered at all borehole locations and extended up to depths of up to 3± m below existing grade. The following table provides the depth and elevation at each borehole location where non-suitable soil conditions were encountered:

Borehole No.	Topsoil Thickness (mm)	Existing Ground Elevation (m)	Thickness of Non-Suitable Soils (m)	Elevation of Suitable Soils (m)
1	250	429.4±	0.8±	428.6±
2	300	429.1±	3.1±	426.0±
3	230	428.9±	0.8±	428.1±
4	300	426.9±	0.8±	426.1±

Borehole No.	Topsoil Thickness (mm)	Existing Ground Elevation (m)	Thickness of Non-Suitable Soils (m)	Elevation of Suitable Soils (m)
5	180	425.6±	3.0±	422.6±
101	180	428.7±	0.8±	427.9±
102	200	429.4±	1.8±	427.6±
103	-	428.3±	1.5±	426.8±
104	250	427.4±	2.4±	425.0±
105	-	428.2±	1.5±	426.7±

It should be noted that the elevations of suitable soils shown in the above table may differ from the founding elevations provided for specific bearing capacities in section 5.3. The elevations provided in the above table are located below loose and/or organic/deleterious soils but may not necessarily be located at an elevation sufficient for higher bearing capacities

Approved on-site sand and imported coarse sand and gravel are recommended to be used to construct the engineered fill beneath the footings and floor slabs under controlled and supervised conditions. Reuse of siltier soils (e.g., sandy silt or silt) should be limited to beneath pavement and landscaped areas.

Any shortfall of fill material required for engineered fill operations may be made with similarly graded imported soils. It is recommended that any proposed borrow source materials be tested prior to importing in order to ensure that the environmental quality of the imported fill meets all environmental approval criteria and to ensure that the natural moisture content of the fill is suitable for compaction. Should similarly graded soils not be able to meet the requirements for use as engineered fill, imported Granular B may be considered for such purposes.

Due to the shallow depth of the water table in the southern portion of the site (2.0± mbgs during the spring), it is recommended that engineered fill construction be conducted during the summer and early fall months when drier warmer weather conditions typically exist as the onsite soils are sensitive to moisture and will become difficult to handle and compact to the specified degree of compaction when wet.

The on-site finer grained deposits are considered to be frost-susceptible. Constructing engineered fill, backfilling footings, foundation walls and service trenches using finer-grained soils during the winter months is not advisable, unless suitable weather conditions prevail, the soils are at suitable moisture content, and strict procedures are followed and monitored on a full-time basis by the geotechnical engineer.

The on-site soils are generally susceptible to softening and deformation when exposed to excessive moisture and construction traffic. As a result, it is imperative that the grading/filling operations are planned and maintained to direct surface water run-off to low points and then be positively drained by

suitable means. During periods of wet weather, construction traffic should be directed along the designated construction routes so as not to disturb and rut the exposed subgrade soil. Temporary construction roads consisting of clear crushed material (such as crushed stone or recycled concrete) may be required during poor weather conditions such as wet spring or fall.

The following procedures are recommended for the construction of engineered fill to support future building foundations, roadways, and municipal infrastructure servicing:

1. All topsoil, fill materials, deleterious materials and very loose to loose inorganic native soil should be stripped from building envelope and roadway areas. The inorganic native soil may be carefully segregated and salvaged for potential reuse purposes to construct engineered fill;

2. The exposed subgrade surface should be thoroughly recompacted using large heavy compaction equipment (smooth drum for granular based materials) if it can support such equipment and remaining stable. Careful review and guidance by the geotechnical engineer are recommended should the subgrade become unstable. All prepared subgrade areas are to be inspected by qualified geotechnical personnel prior to placement of fill. Any soft spots encountered during the recompaction process should be excavated to the level of competent soil;

3. The required grades can then be achieved by placing approved inorganic on-site soil or imported fill in maximum 200 to 300 mm thick loose lifts which are to be thoroughly compacted to at least 100% Standard Proctor maximum dry density (SPMDD). The moisture content of the fill materials should be within 3% below their optimum moisture contents in order to achieve the specified degree of compaction;

4. The engineered fill used to support the future building, infrastructure servicing and roadway pavements must be placed such that the fill pad extends horizontally outwards at least a distance equal to the depth of fill to be placed;

5. Inorganic onsite soils may be considered as suitable engineered fill material provided the natural moisture content of the soil is within 3% below the optimum moisture content in order to achieve the specified degree of compaction. Overly wet and organic materials may be placed in non-structural areas and beyond stormwater management areas where 90% SPMDD is considered adequate. Overly wet inorganic soil may potentially be mixed with drier soils to produce a suitable moisture content to allow appropriate compaction to occur;

6. Adequate earth cover must be provided to protect engineered fill from freezing if left over the winter months; and

7. All fill placement and compaction operations must be supervised on a full-time basis by qualified geotechnical personnel to approve fill material and ensure the specified degrees of compaction have been achieved.

Vibration could be generated from various construction equipment during construction, such as compactors and rollers which could be harmful to surrounding structures and buildings. Peak particle velocity (PPV) of ground motion is widely accepted as the best descriptor of potential for vibration

damage to structures. The safe vibration limit can be set to 8 to 25 mm/s PPV, depending on frequency of vibrations and the sensitivity of surrounding structures to vibration.

Due to the relatively isolated location of the site, it is unlikely that any critical or susceptible infrastructure will be affected by the site grading operations. However, if deemed necessary, vibration monitoring can be performed. Vibration monitoring can be carried out to measure the PPV of ground motion from vibration generated from typical compaction equipment at the beginning of the project in potentially critical areas. This will set criteria and establish the type of equipment to be used for this project. It is also recommended that a pre-construction condition survey be conducted to document the condition of the existing structures within the possible zone of influence.

5.2 Site Servicing

The subdivision will be municipally serviced with watermain and sewers. According to the Centre Wellington Development Manual (June 2024), it is anticipated that municipal servicing will generally lie 1.2± to 2.4± m below finished grades. The sanitary sewer obvert should be located a minimum of 2.4 m below final road grade, the storm sewer obvert should be located 1.2 m below final road grade and adequately compacted, and the top of the watermain pipe should be located 2.0 m below finished grade.

5.2.1 Groundwater Control and Open Cut Excavation

Excavations are expected to be in the order of 1± to 3.5± m deep for foundations and site servicing. The excavations will penetrate topsoil, very loose to loose fill, and native loose to compact fine granular deposits. Provided the groundwater is controlled/lowered below the excavation depths, these materials are considered to be Type 3 Soils in accordance with the latest Occupational Health and Safety Act.

Above the groundwater table, uncontrollable groundwater is not expected within the anticipated depths of excavation, and excavations in the Type 3 Soils are expected to remain stable during the construction period provided that side slopes are cut to 1H : 1V from the bottom of the excavation. Where seepage or perched groundwater is encountered, side slopes should be cut to more stable angles of 3H : 1V. The side slopes should be suitably protected from erosion processes. Surface run-off which inadvertently enters the excavation can be controlled by using conventional filtered sump pumping techniques, as and where required.

Even though a site grading plan has not yet been provided, it is expected that groundwater control will be required for at least some of the footing excavations, particularly in the southern portion of the site, since excavations might be carried out below the groundwater table within the higher conductive fine granular soils (hydraulic conductivity in the range of 1×10^{-4} m/s), and the fine granular soils will become “quick” and lose their integrity to support loads. The groundwater level must be lowered and controlled to at least 600 mm below the excavation level to facilitate excavation and construction of footings and floor slabs.

It is recommended that CVD be retained to review the design grades and evaluate the need for

dewatering. Depending on the depth of sewer and footing excavation below the groundwater table, well-point dewatering could be required to pre-drain the fine granular soil prior to excavation.

In wet to saturated subgrade conditions, it will be necessary to excavate below founding level and pour a 50 to 75 mm thick mud slab of lean concrete to protect the founding soil from disturbance during the installation of reinforcing steel bars and form work.

5.2.2 Pipe Bedding

Any loose, unstable and/or organic soils encountered at the pipe invert should be sub-excavated and replaced with well compacted Granular "A" which should be placed in 150 mm thick layers and compacted to at least 95% Standard Proctor Maximum Dry Density (SPMDD). The support of pipes in these areas can also be achieved with non-shrinkable fill if poor soil is encountered at the subgrade level and fully removed.

The bedding requirements for the services should be in accordance with both the Ontario Provincial Standard Drawings OPSD - 802 for flexible and rigid pipes. The bedding shall be a Class "B" and consist of at least 150 mm thick Granular "A" compacted to at least 95% SPMDD. Granular "A" should be used to backfill around the pipe to at least 150 mm above the top of the pipe.

Particular attention should be given to ensure material placed beneath the haunches of the pipe is adequately compacted. Recycled asphalt will not be allowed to be used in Granular “A” bedding material.

5.2.3 Trench Backfill

Excavated inorganic materials are considered suitable for reuse as trench backfill. If necessary, potential mixing of drier and wetter excavated soils in proper ratios can be done to produce a suitable mixture near the material’s optimum moisture content in order to achieve the required compaction specification. Conversely, judicious addition of water may be required if the soils are significantly drier than their optimum moisture content in order to facilitate suitable compaction.

The backfill should be placed in thin layers, 200 to 300 mm thick or less dependant on the demonstrated success of compaction based on in-situ density test results. Other types of materials such as organic soils, overly wet soils, boulders, and frozen materials (if work is carried out in the winter months) should not be used for backfilling. All backfill should be compacted to at least 95% SPMDD.

Backfilling operations should follow closely after excavation so that only a minimal length of trench slope is exposed at any one time so as to minimize potential problems. This will potentially minimize over-wetting of the subgrade material. Particular attention should be given to make sure frozen material is not used as backfill should construction extend into the winter season.

Frequent inspection by experienced geotechnical personnel should be carried out to examine and approve backfill material, to carefully inspect placement, and to verify that the specified degree of

compaction has been obtained by in situ density testing.

5.3 Footing Foundations

Conventional strip and spread footing foundations can be used to support the proposed buildings of the proposed residential subdivision; it should be noted that this current geotechnical investigation is insufficient and not intended for detailed building design purposes.

Depending on the final design and size of the proposed medium density blocks (Block 62 and 63) and other larger structures, it will be necessary to conduct a geotechnical investigation at those lots in order to provide a detailed, site and project specific report for the design and construction of the proposed development.

Based on the ten (10) widely spaced boreholes, footings cast on native competent fine granular deposits can be designed using net Geotechnical Reactions at SLS and Factored Geotechnical Resistances at ULS as provided in the following table which summarizes the highest founding level and elevation for the footing at the relevant borehole locations:

Borehole No.	Existing Ground Elevation (m)	Highest Founding Depth (m)	Highest Founding Elevation (m)
SLS = 100 kPa; ULS = 150 kPa			
1	429.41	0.81	428.60±
4	426.94	0.94	426.00±
5	425.61	3.01	422.60±
102	429.37	1.77	427.60±
SLS = 150 kPa; ULS = 250 kPa			
2	429.10	3.10	426.00±
3	428.87	0.77	428.10±
101	428.68	1.58	427.10±
103	428.31	1.51	426.80±
104	427.36	2.46	424.90±
105	428.15	1.55	426.60±

Higher soil bearing capacities may be available for footings founded at elevations lower than those cited above, through a site and project specific geotechnical evaluation.

Footings founded on approved engineered fill can be designed to a net Geotechnical Reaction of 150 kPa at SLS and Factored Geotechnical Resistance of 250 kPa at ULS.

These soil bearing pressures can be achieved provided that the founding subgrade is undisturbed during construction. The majority of the settlements will take place during construction and the first loading cycle of the building. In addition, the footings should be founded below any topsoil, fill, or other deleterious materials on competent undisturbed soils. Spacing between adjacent footing steps should not be steeper than 10H to 7V.

It should be noted that along the southern boundary of the property where relatively higher groundwater table elevations can be found (elevations 420.20± to 423.60± m), unless engineered fill (see Section 5.1) is used to raise the grade, the footing excavations may contact wet to saturated fine granular soils. To this end, it is recommended that a 50 to 75 mm thick protective concrete slab should be poured and allowed to set on the prepared subgrade to further protect it from disturbance by construction traffic and the elements. Basements should be suitably founded at least 0.6 m above the high groundwater table. A permanent groundwater management system (GWMS) could be utilized to control future groundwater levels and prevent future wet basement problems.

Exterior footings and footings in unheated portions of the building should be provided with a soil cover of not less than 1.2 m or equivalent synthetic thermal insulation for adequate frost protection. The founding subgrade soils must be protected from frost penetration during winter construction.

The footing excavations should be inspected by the geotechnical engineer to ensure adequate soil bearing and proper subgrade preparation.

5.4 Lateral Earth Pressure

House basement walls and other soil retaining structures should be designed to resist the lateral earth pressure acting against these walls. The following formula may be used for these calculations. The following formula may be used to calculate the unfactored earth pressure distribution. The factored resistance can be calculated by using a factor of 0.8.

$P = K (\gamma H + q)$

where:

P =	Lateral earth pressure	kPa
K =	earth pressure coefficient, 0.5 for non-yielding foundation wall earth pressure coefficient, 0.3 for yielding retaining wall	
γ =	unit weight of granular backfill, compacted to 95% SPMDD	21 kN/m^3
H =	unbalanced height of wall	m
q =	surcharge load at ground surface	kPa

The backfill for the foundation walls and retaining walls should be free-draining granular materials which should have less than 8% silt particles (OPSS Granular "B" Type I). The backfill should be placed in thin layers and compacted to 95% SPMDD. Over-compaction adjacent to the foundation/retaining walls should be avoided. Compaction should be carried out with hand operated equipment within 1 m of the foundation wall or retaining wall. Weeping tiles leading to a frost-free outlet or weep holes should be installed to effect drainage behind the retaining wall.

The sliding resistance of the retaining wall footings should be checked. The unfactored horizontal resistance against sliding between cast-in-place concrete and the various soils can be calculated using the following unit weight and friction coefficient:

Soil	Unit Weight (kN/m^3)	Friction Coefficient
Well-Compacted Granular Backfill	21	0.45
Fine to Medium Sand	20	0.35
Silt	19	0.30

It should be noted that the soils encountered during the investigation generally comprised of free-draining fine to medium grained sand; however, seams of non free-draining materials, such as clayey silt, can occasionally be found. A drainage core layer should be installed against basement walls in accordance with OBC requirements. The basement walls should be damp-proofed.

Depending upon the final grading plan, a perimeter drainage system might be required for areas of the development located where the water table is shallower (2± m depth), such as along the southern portion of the property, to ensure hydrostatic pressure does not build up in the backfill against the foundation walls. The perimeter weeping tile system is to be installed at the base of the footing to direct the collected waters to sump pump installations or the storm sewer.

5.5 Earthquake Considerations

In accordance with The Ontario Building Code 2024 (OBC), the proposed structure should be designed to resist earthquake load and effects as per OBC Subsection 4.1.8.

Based on the condition of the underlying soil encountered at the boreholes, and the fact that any loose/soft soils will be removed, and our experience with the local soil conditions up to a depth of 30 m, the site can be overall be classified as **Site Class D** as per OBC Table 4.1.8.4B.

5.6 Pavement Design

The earth subgrade soil is generally expected to primarily consist of fine granular deposits (sand, sandy silt). Cognizant of the traffic volume and the subgrade soils, the following pavement component thicknesses (per Centre Wellington Development Manual, June 2024) are considered suitable for the subdivision roads:

Pavement Component	Local Road Component Thickness (mm)	Collector Road Component Thickness (mm)
HL3 Surface Asphaltic Concrete HL4 Binder Asphaltic Concrete	40 50	50 60
Granular "A" Base Course	150	150
Granular "B" Type II Sub-base Course	450	600
Granular Base Equivalency (GBE)	**630**	**770**

Note: GBE denotes Granular Base Equivalency which is calculated using factors of 2 for asphaltic concrete, 1 for Granular "A" base and 0.67 for Granular "B" sub-base

The pavement design considers that road construction will be carried out during the drier time of the year and that the subgrade is stable, not heaving under construction equipment traffic. If the subgrade is wet or unstable, additional granular sub-base may be required.

The subgrade should be prepared in accordance with the recommendations provided in Sections 5.1 and 5.2 prior to placement of the granular base layers.

The base and sub-base materials should be produced in accordance with the current OPSS specifications and placed and uniformly compacted to at least 100% SPMDD. The asphaltic concrete should be placed and compacted in accordance with OPSS Form 310 and to a minimum of 92% of the Marshall Density (MRD). Frequent in-situ density testing by this office should be carried out to verify that the specified degree of compaction is being achieved and maintained.

SS-1 or SS-1HH tack coat should be applied to all binder course surfaces and vertical surfaces (i.e., curbs, pavement joints, etc.) prior to placement of asphalt. Refer to OPSS 310 and OPSS 1101 for additional details.

It should be noted that even well compacted trench backfill could settle for a period of time after construction. In this regard, the surface course of the asphaltic concrete should be placed at least one (1) year after trench backfill is completed so as to allow any minor settlements to occur within the trench backfill. The incomplete pavement structure may not be capable of supporting construction traffic. Consequently, minor repairs of the sub-base, base and asphaltic concrete may be required prior to paving with the base course and/or the surface course asphaltic concrete.

Near the southern portion of the site, where water level depths are shallower (i.e., 2± m around Borehole 5), longitudinal sub-drains with positive drainage outlets are recommended to be installed at the subgrade level along the edges of the roadway construction to enhance the performance of the pavement.

Positive drainage outlets should be provided at all low points of the prepared earth subgrade, such as stub drains extended from the catch-basins. Systematic drainage of the granular base materials will promote the longevity of the pavement structure. The prepared earth subgrade and final pavement surfaces should be graded to direct water runoff away from buildings, sidewalks, and other similar pertinent structures. The roadway subgrade should be free of depressions and should have a 2% slope from the crown to the edge of the pavement.

5.7 Infiltration Rates of On-Site Soils

It is understood that the proposed subdivision will be connected to a stormwater management (SWM) facility which is planned to be constructed south of the site as part of a separate development. Nonetheless, it is expected that some infiltration features will be designed on-site.

If an infiltration feature is to be included in the development of the property, it should be located below the footing drain/weeper and at least 5 m away from the proposed building footprints. Additionally, the infiltration features should have the base located at least 1.0 m above the groundwater table, and a minimum infiltration rate of 15 mm/hr is required.

Based on the results of grain size analyses and our experience, the hydraulic conductivity and infiltration rate of the native inorganic soil types encountered at the boreholes are estimated and provided in the following table and may be used for storm water management purposes:

Material	Hydraulic Conductivity (K) (cm/sec)	Infiltration Rate (mm/hr)
Fine to Medium Sand (Enclosures 22 and 23)	1×10^{-2}	75 to 150
Sandy Silt to Sand and Silt	3×10^{-5} to 1×10^{-4}	10 to 20
Silt	1×10^{-5}	3 to 5

Considering the laterally and vertically extensive sand deposits, and generally deeper depths of the water table in the area (depths of 2.0± to 5.5± mbgs, corresponding to elevations between 423.5± and 425.0± m across all seasons), the construction of on-site infiltration features is likely feasible.

5.8 Handling of Excess Soils

Excess soil may be generated and removed off-site during the construction activities associated with the proposed site works. The management of excess soil is now governed by O.Reg. 406/19, MECP document entitled "On-Site and Excess Soil Management Regulation". In accordance with the regulation, the Project Leader is responsible for the handling, storage, reuse, transportation, and removal of all soil. To support off-site removal of excess soil, the following is required:

- Planning Documentation
  - Assessment of Past Use
  - Sampling and Analysis Plan
  - Excess Soil Characterization Report
  - Excess Soil Destination Report
- Tracking
- Registry
- Record Keeping

No testing was conducted during this geotechnical investigation; however, soil sampling and analysis may be required as per the above-noted MECP document and/or as per the requirement of the receiving site owner(s), depending on the volume of excess soil generated during construction. The analytical results and environmental assessment findings must be disclosed to the receiving site owner(s) and approval by the receiving site owner(s) be obtained prior to exporting/transferring the materials.

If any impacted soils are discovered during construction, CVD should be contacted for sampling and testing to determine the limit of the impacted soils.

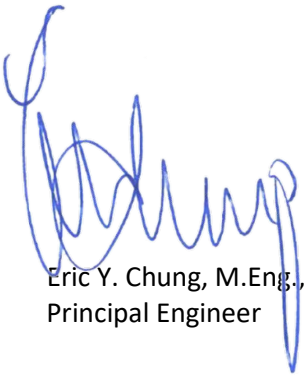
6.0 CLOSURE

The Limitations of Report, as quoted in Appendix A, is an integral part of this report.

We trust that the information presented in this report is complete within our terms of reference. If there are any further questions concerning this report, please do not hesitate to contact our office.

Yours truly,
CHUNG & VANDER DOELEN ENGINEERING LTD.

Yaroslav Chudin, E.I.T.
Geotechnical Engineering Intern



Eric Y. Chung, M.Eng., P.Eng.
Principal Engineer

APPENDIX A

LIMITATIONS OF REPORT

APPENDIX "A"

LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the testhole locations. Subsurface and groundwater conditions between and beyond the testholes may differ from those encountered at the testhole locations, and conditions may become apparent during construction which could not be detected or anticipated at the time of the site investigation. It is recommended practice that the Soils Engineer be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the testholes.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of testholes and their respective depths may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusion as to how the subsurface conditions may affect their work.

The benchmark and elevations mentioned in this report were obtained strictly for use in the geotechnical design of the project and by this office only, and should not be used by any other parties for any other purposes.

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. CHUNG & VANDER DOELEN ENGINEERING LIMITED accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

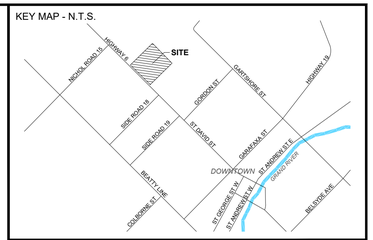
The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final design stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.

This report does not reflect the environmental issues or concerns unless otherwise stated in the report.

APPENDIX B

Draft Plan of Subdivision (Polocorp, December 10, 2024) & Drawing No. 1 – CVD Borehole Location Plan

KEY MAP - N.T.S.



DRAFT PLAN OF SUBDIVISION

PT OF LOT 18, CONCESSION 16
IN THE FORMER GEOGRAPHIC TWP OF NICHOL
CENTRE WELLINGTON

POLOCORP INC.

20 0 20 40 60 80 100
SCALE = 1:1400 (metric)

LAND USE SCHEDULE

DESCRIPTION	LOTS/BLKS.	UNITS	AREA (ha.)
Single Detached	31-43	87-129	4.863
Street Townhouses	44-61	179-266	5.512
Medium Density	62, 63	93-125	2.065
Mixed Use	64	8-14	0.338
Existing House	65	0-1	0.172
Stormwater Management Facility	-	-	-
Trail	-	-	-
Parkland	66	-	0.892 (4.6%)
Pedestrian Walkway	67-69	-	0.115
Environmental Feature & Buffer	-	-	-
MTO Allowance	70, 71	-	0.534
Roads	-	-	5.279
TOTAL		367-535	20.027

SALEABLE FRONTAGE	LENGTH	UNIT SMALL	UNIT LARGE
Single Detached	1,466.3m	36' (11.0m)	50' (15.2m)
Street Townhouses	1,773.2m	18' (5.5m)	27' (8.3m)
TOTAL	3,239.5m		

DENSITY	
Gross Area (ha)	20.027 ha (49.49 ac)
Developable Area (ha)	19.457 ha (48.08 ac)
Net Density (uph)	18.9 - 27.5 upha
Net People-Jobs (3.05 per unit)	57.7 - 83.9 PJ pha

INFORMATION REQUIRED

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

INFORMATION REQUIRED BY CLAUSES a,b,c,d,e,f,g, j AND I ARE AS SHOWN ON THE DRAFT PLAN.

(h) Municipal Water Supply
(i) Sandy Loam
(k) Municipal Sanitary and Storm Sewers

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

O.L.S.
Surveying Inc.

XX XX, 2024
DATE

OWNER'S CERTIFICATE

I HEREBY CONSENT TO THE FILING OF THIS PLAN BY POLOCORP INC., IN DRAFT FORM

MIKE PUOPOLO
Polocorp Inc.

DATE

APPROVALS

REGIONAL MUNICIPALITY OF
WATERLOO APPROVAL BLOCK

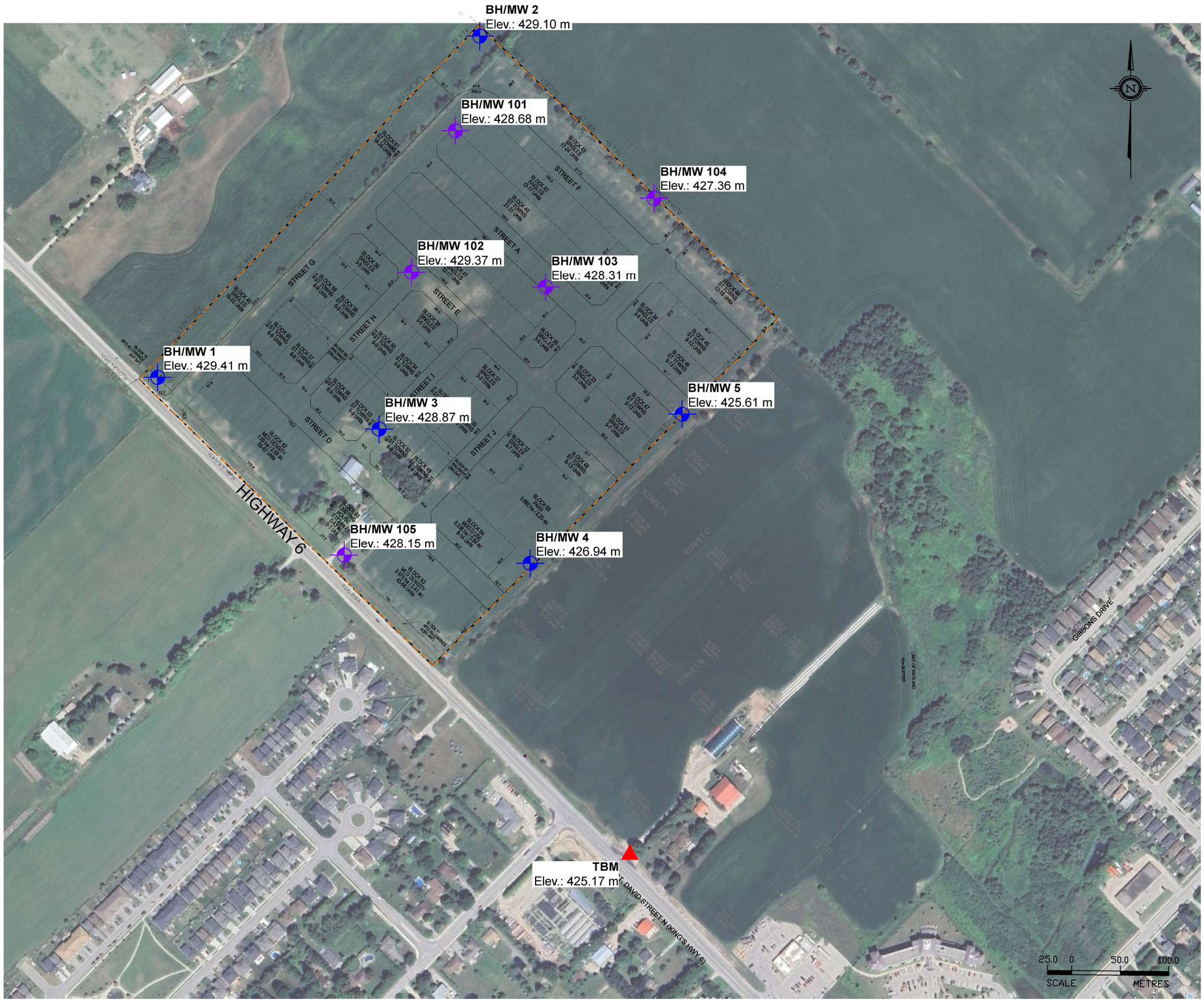
DRAFT
FOR DISCUSSION
PURPOSES ONLY

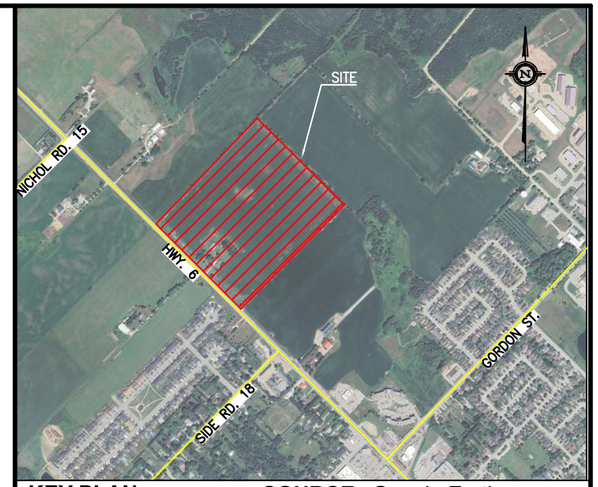
APPROVED: DATE:

REVISIONS		
DATE	BY	DESCRIPTION

POLOCORP
379 Queen Street South, Kitchener | N2T 1W6 | 519-745-3249 | polocorpinc.com

DATE: December 10, 2024	SCALE 1:4000 (metric)
PROJECT: 1012 (Fergus)	DRAWN BY: GFE





KEY PLAN **SOURCE:** Google Earth

LEGEND

- **TBM: Top of fire hydrant nut, south of northern driveway entrance to 968 St. David Street North. Elev.: 425.17 m (Geodetic)**
- **Borehole and Monitoring Well Location (January 2024)**
- **Borehole and Monitoring Well Location (September 2024)**
- **Site Boundary**

Image Ref.: Google Earth; Retrieved: May 1, 2024

Elev. Ref.: The borehole locations and associated ground surface elevations were surveyed using a Network RTK Global Navigation Satellite System (GNSS) Receiver. The survey data was collected using UTM Zone 17N Projection, NAD83(CSRS)v7-2010 datum and Canada Geoid Model HT2_2010v70 (CGVD28).

BOREHOLE LOCATION PLAN

Proposed Residential Subdivision

6581 Highway 6
Fergus, Ontario

CHUNG & VANDER DOELEN ENGINEERING LTD.

311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 5E1 / 519-742-8979

Drawn By: YC	Date: February 2025	File No.: 1495
Checked By: EYC	Scale: 1:4000	Drawing No.: 1

APPENDIX C

Single Well Response Test Analysis Charts

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 Victoria Street North
Kitchener / Ontario / N2H 5E1
519-742-8979

Project: Polocorp Fergus Subdivision

Number: 1495

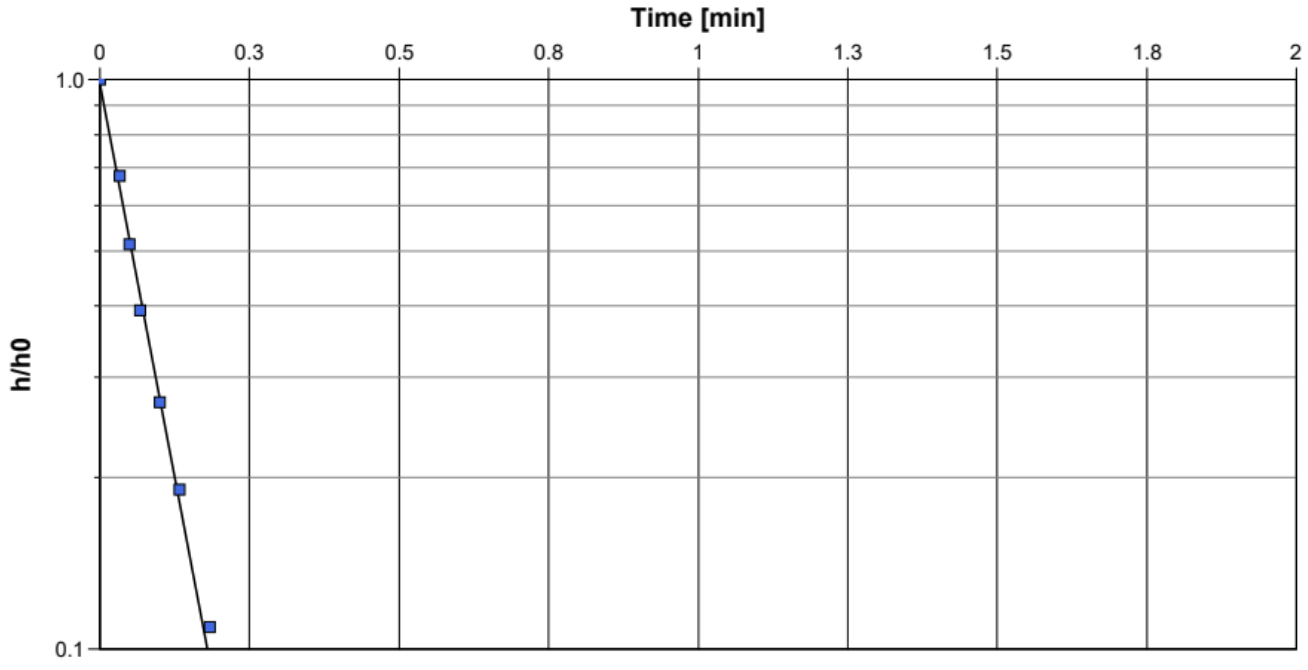
Client: Polocorp Inc.

Location: 968 St. David Street North & 6581 Highway 6, Fergus, ON | Response Test: BH 1

Test Conducted by: Y.C. | Test Date: 2024-03-11 | Aquifer Thickness: 2.90 m

Water level at t=0 [m]: 5.46 | Static Water Level [m]: 5.22 | Water level change at t=0 [m]: 0.25

	Time [min]	Water Level [m]	WL Change [m]
1	0	5.462	0.247
2	0.0333	5.382	0.167
3	0.05	5.342	0.127
4	0.0667	5.312	0.097
5	0.1	5.282	0.067
6	0.1333	5.262	0.047
7	0.1833	5.242	0.027
8	0.2333	5.232	0.017
9	0.45	5.225	0.01
10	0.6	5.222	0.007
11	0.9833	5.22	0.005
12	1.2667	5.217	0.002



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]
BH 1	1.06×10^{-4}

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 Victoria Street North
Kitchener / Ontario / N2H 5E1
519-742-8979

Project: Polocorp Fergus Subdivision

Number: 1495

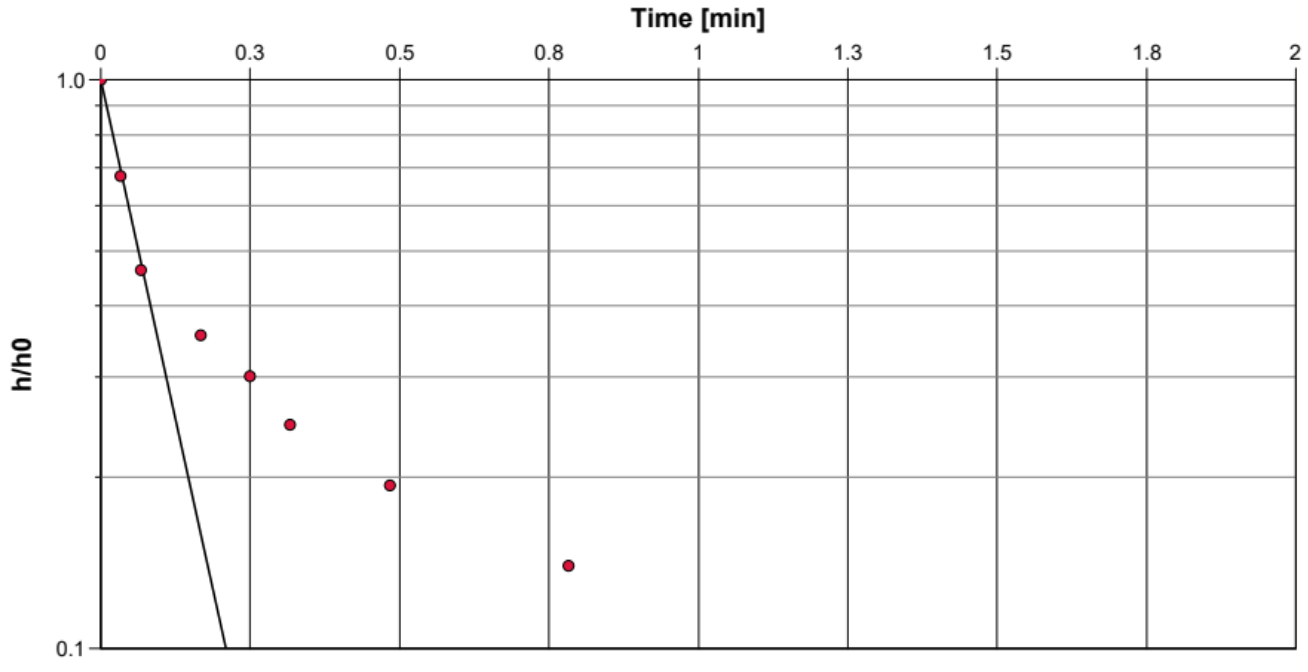
Client: Polocorp Inc.

Location: 968 St. David Street North & 6581 Highway 6, Fergus, ON | Response Test: BH 5

Test Conducted by: Y.C. | Test Date: 2024-03-11 | Aquifer Thickness: 6.20 m

Water level at t=0 [m]: 2.09 | Static Water Level [m]: 1.99 | Water level change at t=0 [m]: 0.09

	Time [min]	Water Level [m]	WL Change [m]
1	0	2.087	0.093
2	0.0333	2.057	0.063
3	0.0667	2.037	0.043
4	0.1667	2.027	0.033
5	0.25	2.022	0.028
6	0.3167	2.017	0.023
7	0.4833	2.012	0.018
8	0.7833	2.007	0.013
9	1.1167	2.002	0.008
10	1.55	2.00	0.006



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH 5	8.69×10^{-5}	

APPENDIX D

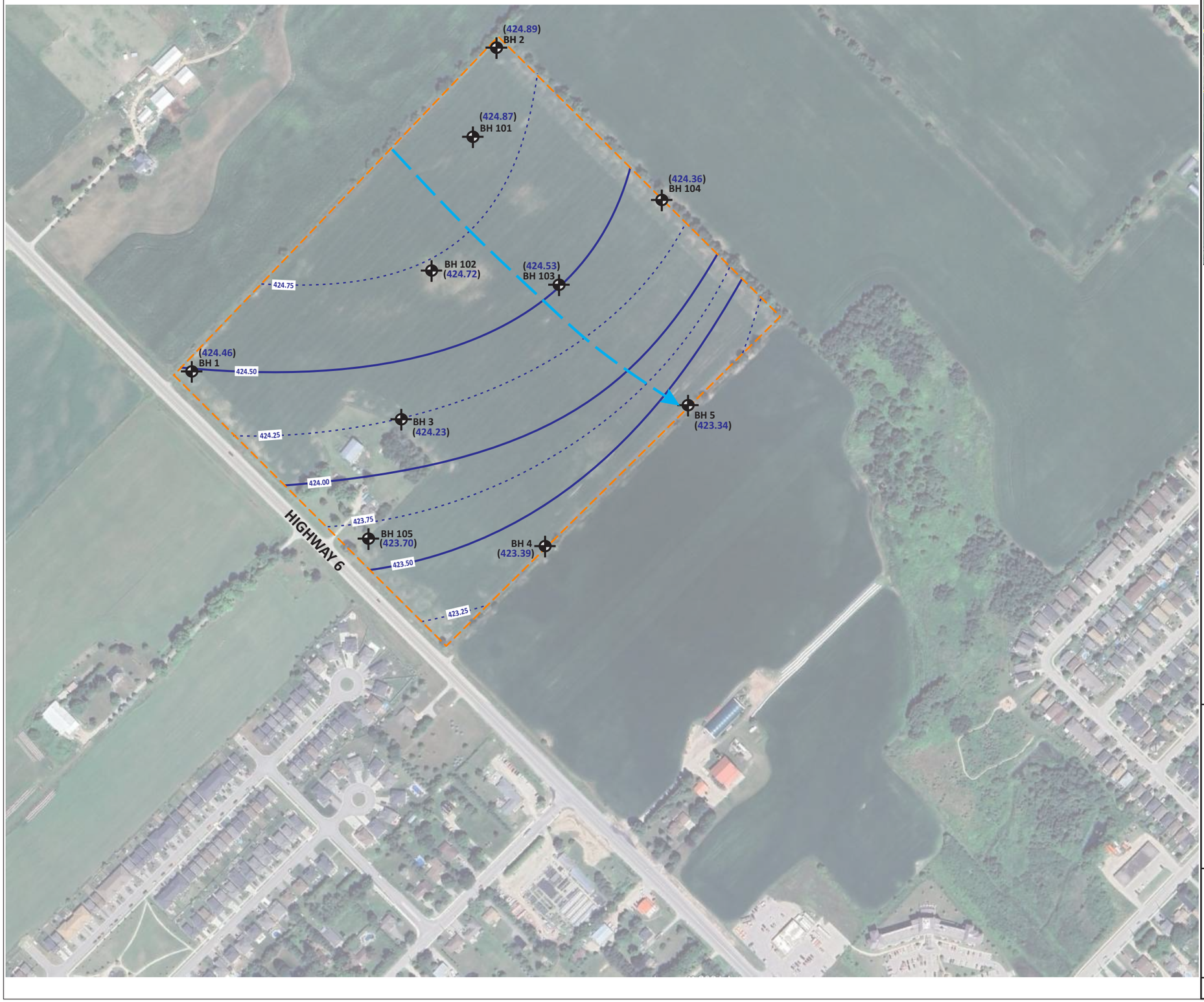
Table 1 – Summary of Groundwater Levels and Elevations & Figure 5 – Water Table Contours Interpretation (September 18, 2024)

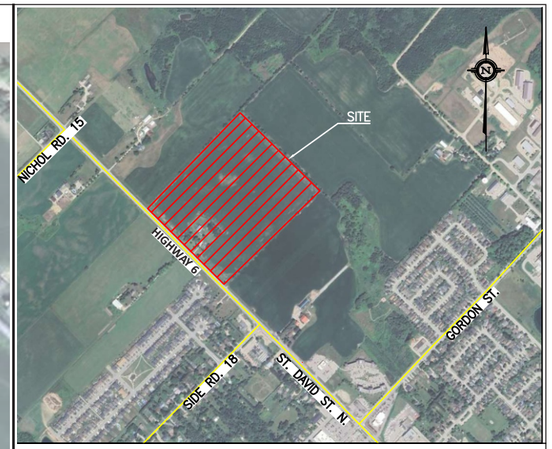
Table 1 - Summary of Water Levels, Elevations & Fluctuations

6581 Highway 6, Fergus
CVD Engineering Ltd.
Project: 1495

Well	Ground Elevation (mASL)	Top Pipe Elevation (mASL)	Pipe Length (m)	Hydraulic Conductivity (m/s)	Water Level (m Below Ground)							Water Elevation (m Above Sea Level)							Fluctuation Relative to February 6, 2024 (m)			
					10-Nov-23	12-Dec-23	06-Feb-24	11-Mar-24	22-Jul-24	12-Sep-24	18-Sep-24	10-Nov-23	12-Dec-23	06-Feb-24	11-Mar-24	22-Jul-24	12-Sep-24	18-Sep-24	11-Mar-24	22-Jul-24	12-Sep-24	18-Sep-24
BH 1	429.41	430.55	1.14	1×10^{-4}			5.39	5.22	4.83		4.94			424.02	424.19	**424.58**		424.46	0.17	0.56		0.44
BH 2	429.10	430.28	1.18	-			4.44	4.20	4.08		4.21			424.66	424.90	**425.02**		424.89	0.24	0.36		0.23
BH 3	428.87	429.89	1.02	-			5.12	4.89	4.55		4.64			423.75	423.98	**424.32**		424.23	0.23	0.57		0.49
BH 4	426.94	428.13	1.18	-			3.61	3.48	3.39		3.56			423.34	423.46	**423.56**		423.39	0.13	0.22		0.05
BH 5	425.61	426.87	1.26	9×10^{-5}			2.10	1.99	2.02		2.27			423.51	**423.62**	423.59		423.34	0.11	0.09		-0.17
BH 101	428.68	429.79	1.10	-						3.80	3.82						**424.88**	424.87				
BH 102	429.37	430.36	0.99	-						4.64	4.65						**424.73**	424.72				
BH 103	428.31	429.27	0.96	-						3.76	3.77						**424.55**	424.53				
BH 104	427.36	428.60	1.25	-						2.97	3.00						**424.39**	424.36				
BH 105	428.15	429.20	1.05	-						4.44	4.45						**423.71**	423.70				

Notes:
1) All Elevations Referenced to Geodetic Survey by CVD.
2) **Bolded** elevations represent the maximum water table aquifer elevation measured at each monitoring well throughout all seasons.
3) Negative water level indicates that water level is above ground.
4) : Monitoring well/piezometer dry
5) Negative fluctuation indicates drop in water level relative to baseline.





LEGEND

- Property Boundary
- CVD Monitoring Well Location
- (424.19) Water Table Elevation (mASL) - September 18, 2024
- 424.50 Interpreted Groundwater Contour (mASL)
- Interpreted Shallow Groundwater Flow Direction

N

0 50 100 m

Scale 1:4000

Image Reference: Google Earth; Retrieved: May 1, 2024

Figure 5:
Water Table Interpretation (September 18, 2024)

Hydrogeological Assessment
Proposed Residential Subdivision

6581 Highway 6
Fergus, ON

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979

Drawn By: YC / PD	Date: February 2025	File No.: 1495

ENCLOSURES

Soil Abbreviations and Terms Used on Record of Borehole Sheets

TERMINOLOGY DESCRIBING COMMON SOIL TYPES:

Topsoil	-	mixture of soil and humus capable of supporting vegetation
Peat	-	mixture of visible and invisible fragments of decayed organic matter
Till	-	unstratified glacial deposit which may range from clay to boulders
Fill	-	soil materials identified as being placed anthropologically

CLASSIFICATION (UNIFIED SYSTEM)

Clay	<0.002mm		
Silt	0.002 to .075mm		
Sand	0.075 to 4.75mm		
		Fine	0.075 to 0.425 mm
		Medium	0.425 to 2.0 mm
		Coarse	2.0 to 4.75 mm
Gravel	4.75 to 75mm		
		Fine	4.75 to 19 mm
		Coarse	19 to 75 mm
Cobbles	75 to 300mm		
Boulders	>300mm		

TERMINOLOGY

Soil Composition	**% by Weight**
"traces"	<10%
"some"(eg. some silt)	10-20%
Adjective (eg. sandy)	20-35%
"and"(eg. sand and gravel)	35-50%

Standard Penetration Resistance (SPT): Standard Penetration Resistance ('N' Values) refers to the number of blows required to advance a standard (ASTM D1586) 51 mm Ø (2 inch) split-spoon sampler by the use of a free falling, 63.5 Kg (140lbs) hammer. The number of blows from the drop weight is recorded for every 15 cm (6 inches). The hammer is dropped from a distance of 0.76m (30 inches) providing 474.5 Joules per blow. When the sampler is driven a total of 45 cm (18 inches) into the soil, the standard penetration index ('N' Value) is the total number of blows for the last 30 cm (12 inches).

Dynamic Cone Penetration Resistance (DCPT): Dynamic Cone Penetration Resistance is similar to a SPT with the 474.5 Joule/blow impulse provided by the free falling hammer where the split-spoon sampler is replaced by a 51 mm Ø, 60˚ conical point and the number of blows is recorded continuously for every 30 cm (12 inches).

COHESIVE SOILS CONSISTENCY

	(kPa)	**(P.S.F.)**	**Nominal 'N' Value**
Very Soft	<12	<250	0-2
Soft	12-25	250-500	2-4
Firm	25-50	500-1000	4-8
Stiff	50-100	1000-2000	8-15
Very Stiff	100-200	2000-4000	15-30
Hard	>200	>4000	>30

RELATIVE DENSITY OF COHESIONLESS SOIL

	'N' Value
Very Loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

MOISTURE CONDITIONS:

Cohesive Soil
DTPL- Drier than plastic limit
APL- About plastic limit
WTPL- Wetter than plastic limit
MWTPL- Much wetter than plastic limit

Cohesionless Soil
Damp
Moist
Wet
Saturated

SAMPLE TYPES AND ADDITIONAL FIELD TESTS

SS	Split Spoon Sample (obtained from SPT)	**GS**	Grab Sample	**PP**	Pocket Penetrometer
		BS	Bulk Sample	**VANE**	Peak & Remolded shear
AS	Auger Sample	**TW**	Thin Wall Sample or Shelby Tube	**DMT**	Flat Plate Dilatometer

LABORATORY TESTS

SG	Specific Gravity	**S**	Sieve Analysis	**W**	Water Content
H	Hydrometer	**P**	Field Permeability	**K**	Lab Permeability
W_p	Plastic Limit	**W_l**	Liquid Limit	**I_p**	Plasticity Index
GSA	Grain Size Analysis	**C**	Consolidation	**UNC**	Unconfined compression

Enclosure No.: 1
Sheet 1 of 1

FILE No: 1495

BOREHOLE No. 1

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Jan 17 - 24** TO **Jan 17 - 24**

SOIL LITHOLOGY

Ground Elevation: **429.41 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)
429.16	250 mm TOPSOIL	
0.25	loose, orangey brown SANDY SILT moist	0.5
428.66		
0.75	loose to compact, brown Fine SAND trace silt moist	1.0
		1.5
		2.0
		2.5
		3.0
		3.5
		4.0
		4.5
		5.0
	---------- saturated	5.5
		6.0
		6.5
		7.0
		7.5
		8.0
421.16		
8.25	End of Borehole	8.5
		9.0
		9.5
		10.0
		10.5

SYMBOL

SAMPLE

SAMPLE ID	TYPE	N-VALUE
1	SS	5
2	SS	9
3	SS	9
4	SS	13
5	SS	19
6	SS	27
7	SS	17
8	SS	17

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

- above-ground steel casing set in concrete
- bentonite seal/50 mm I.D. PVC riser
- 3.05 m long, 50 mm I.D. PVC screen with sandpack
- water level in monitoring well measured at 5.39 m depth on February 6, 2024, and measured at 4.94 m depth on September 18, 2024

PROJECT MANAGER: **EYC**

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

Enclosure No.: 2
Sheet 1 of 1

FILE No: 1495

BOREHOLE No. 2

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Jan 17 - 24** TO **Jan 17 - 24**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **429.10 m**					FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ (50 100 150 200) PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ (20 40 60 80)	W_P W W_L (10 20 30)			
428.80	300 mm TOPSOIL									
0.30	loose, orangey brown SANDY SILT moist	0.5	1	SS	4				0.5	above-ground steel casing set in concrete
428.05		1.0	2	SS	4				1.0	bentonite seal/50 mm I.D. PVC riser
1.05	loose to compact, brown Fine SAND trace gravel, trace silt occ. silt seam with trace clay from 2.3± to 2.6± m bgs moist	1.5	3	SS	6				1.5	
		2.0							2.0	3.05 m long, 50 mm I.D. PVC screen with sandpack
		2.5	4	SS	4				2.5	
		3.0							3.0	
		3.5	5	SS	17				3.5	
	---------- saturated	4.0							4.0	water level in monitoring well measured at 4.44 m depth on February 6, 2024, and measured at 4.21 m depth on September 18, 2024
		4.5							4.5	
		5.0	6	SS	29				5.0	
		5.5							5.5	
		6.0							6.0	
422.40		6.5	7	SS	14				6.5	
6.70	End of Borehole	7.0							7.0	
		7.5							7.5	
		8.0							8.0	
		8.5							8.5	
		9.0							9.0	
		9.5							9.5	
		10.0							10.0	
		10.5							10.5	

PROJECT MANAGER: **EYC**

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1495

BOREHOLE No. 3

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Jan 16 - 24** TO **Jan 16 - 24**

Ground Elevation: **428.87 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
428.64	230 mm TOPSOIL					
0.23	firm, brown CLAYEY SANDY SILT trace gravel, trace topsoil, DTPL	0.5	1	SS	5	above-ground steel casing set in concrete
428.12						bentonite seal/50 mm I.D. PVC riser
0.75	compact to dense, brown Fine SAND trace silt moist	1.0	2	SS	13	
		1.5				
		2.0	3	SS	11	
		2.5				
		3.0	4	SS	10	
		3.5	5	SS	11	
		4.0				3.05 m long, 50 mm I.D. PVC screen with sandpack
		4.5				water level in monitoring well measured at 5.12 m depth on February 6, 2024, and measured at 4.64 m depth on September 18, 2024
	---------- saturated	5.0	6	SS	31	
		5.5				
		6.0				
		6.5	7	SS	18	
		7.0				
		7.5				
		8.0	8	SS	15	
420.62						
8.25	End of Borehole	8.5				
		9.0				
		9.5				
		10.0				
		10.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

PROJECT MANAGER: **EYC**

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1495

BOREHOLE No. 4

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Solid Stem Auger**
Size: **152 mm O.D.**
Date: **Jan 16 - 24** TO **Jan 16 - 24**

Ground Elevation: **426.94 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE
426.64	300 mm TOPSOIL				
0.30	firm to stiff, brown CLAYEY SANDY SILT trace gravel, trace topsoil DTPL	0.5	1	SS	5
425.89		1.0	2	SS	9
1.05	loose to compact, brown Fine SAND trace gravel, trace silt moist	1.5	3	SS	14
	---------- saturated	2.0	4	SS	6
		2.5			
		3.0	5	SS	8
		3.5			
		4.0			
		4.5			
		5.0	6	SS	10
		5.5			
		6.0			
	---------- silt seam, trace clay	6.5	7	SS	21
420.24					
6.70	End of Borehole	7.0			
		7.5			
		8.0			
		8.5			
		9.0			
		9.5			
		10.0			
		10.5			

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

- above-ground steel casing set in concrete
- bentonite seal/50 mm I.D. PVC riser
- 3.05 m long, 50 mm I.D. PVC screen with sandpack
- water level in monitoring well measured at 3.61 m depth on February 6, 2024, and measured at 3.56 m depth on September 18, 2024

PROJECT MANAGER: **EYC**

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

Enclosure No.: 5
Sheet 1 of 1

FILE No: 1495

BOREHOLE No. 5

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Jan 16 - 24** TO **Jan 16 - 24**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **425.61 m**						FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ (50 100 150 200) PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ (20 40 60 80)	W_P W W_L (10 20 30)			
425.43 0.18	180 mm TOPSOIL										
	loose, orangey brown SANDY SILT trace topsoil moist to wet	0.5 1.0 1.5		1 2 3	SS SS SS	5 4 5				0.5 1.0 1.5	above-ground steel casing set in concrete bentonite seal/50 mm I.D. PVC riser 3.05 m long, 50 mm I.D. PVC screen with sandpack
423.76 1.85	loose to compact, brown Fine SAND trace silt wet to saturated	2.0 2.5 3.0 3.5 4.0 4.5		4 5 6	SS SS SS	7 9 9				2.0 2.5 3.0 3.5 4.0 4.5	water level in monitoring well measured at 2.10 m depth on February 6, 2024, and measured at 2.27 m depth on September 18, 2024
	---------- silt seam, trace clay	5.0 5.5 6.0 6.5 7.0 7.5 8.0		7 8	SS SS	12 13				5.0 5.5 6.0 6.5 7.0 7.5 8.0	
417.36 8.25	End of Borehole	8.5 9.0 9.5 10.0 10.5								8.5 9.0 9.5 10.0 10.5	

PROJECT MANAGER: **EYC**

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1495

BOREHOLE No. 101

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Sep 11 - 24** TO **Sep 11 - 24**

Ground Elevation: **428.68 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
428.50	180 mm TOPSOIL					
0.18	very loose, orangey brown SANDY SILT, moist	0.5	1	SS	2	
427.93						
0.75	stiff, brown CLAYEY SILT, some sand trace gravel, DTPL	1.0	2	SS	8	
427.33						
1.35	compact, brown Fine to Medium SAND trace gravel, trace silt moist to wet	1.5	3	SS	15	
		2.0				
		2.5	4	SS	23	
		3.0				
		3.5	5	SS	26	
	---------- saturated	4.0	6	SS	22	
		4.5				
		5.0	7	SS	13	
		5.5				
		6.0				
		6.5	8	SS	19	
		7.0				
	---------- silty	7.5				
420.88			9	SS	15	
7.80	compact, grey SILT trace to sand trace clay occ. clayey silt seams saturated	8.0				
		8.5				
		9.0				
		9.5	10	SS	18	
419.08						
9.60	End of Borehole	10.0				
		10.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

- above-ground steel casing set in concrete
- bentonite seal/50 mm I.D. PVC riser
- 3.05 m long, 50 mm I.D. PVC screen with sandpack
- water level in monitoring well measured at 3.82 m depth on September 18, 2024

PROJECT MANAGER: **EYC**

CHUNG & VANDER DOELEN ENGINEERING LTD.
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Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

Enclosure No.: 10
Sheet 1 of 1

FILE No: 1495

BOREHOLE No. 102

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Sep 12 - 24** TO **Sep 12 - 24**

Ground Elevation: **429.37 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
429.17 / 0.20	200 mm TOPSOIL					above-ground steel casing set in concrete
	loose, orangey brown SANDY SILT, moist	0.5	1	SS	4	DCPT conducted from 0 to 3.95± m depth
428.57 / 0.80	silty --- loose to compact, brown Fine to Medium SAND trace to some silt trace gravel moist to wet	1.0	2	SS	7	bentonite seal/50 mm I.D. PVC riser
		1.5	3	SS	7	
		2.0	4	SS	8	
		2.5				
		3.0	5	SS	9	
		3.5				
		4.0	6	SS	19	3.05 m long, 50 mm I.D. PVC screen with sandpack
	--- saturated	4.5	7	SS	27	water level in monitoring well measured at 4.65 m depth on September 18, 2024
		5.0				
		5.5				
		6.0	8	SS	8	
		6.5				
		7.0				
		7.5	9	SS	21	
		8.0				
		8.5				
		9.0				
419.77 / 9.60	End of Borehole	9.5	10	SS	17	
		10.0				
		10.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

PROJECT MANAGER: **EYC**

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FILE No: 1495

BOREHOLE No. 103

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Sep 11 - 24** TO **Sep 11 - 24**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **428.31 m**								
427.51	very loose, dark brown FILL, sand and silt trace gravel, trace clay trace topsoil, moist	0.5		1	SS	3		0.5	above-ground steel casing set in concrete
0.80	loose, brown SANDY SILT, trace gravel trace clay, moist	1.0		2	SS	5		1.0	bentonite seal/50 mm I.D. PVC riser
426.96		1.5		3	SS	21		1.5	
1.35	compact, brown Fine to Medium SAND trace silt moist	2.0		4	SS	13		2.0	
		2.5						2.5	
		3.0		5	SS	12		3.0	3.05 m long, 50 mm I.D. PVC screen with sandpack
	---------- saturated	3.5						3.5	water level in monitoring well measured at 3.77 m depth on September 18, 2024
		4.0		6	SS	12		4.0	
		4.5		7	SS	14		4.5	
		5.0						5.0	
		5.5						5.5	
		6.0						6.0	
		6.5		8	SS	24		6.5	
		7.0						7.0	
		7.5						7.5	
420.21		8.0		9	SS	14		8.0	
8.10	End of Borehole	8.5						8.5	
		9.0						9.0	
		9.5						9.5	
		10.0						10.0	
		10.5						10.5	

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

PROJECT MANAGER: **EYC**

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Enclosure No.: 12
Sheet 1 of 1

FILE No: 1495

BOREHOLE No. 104

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Sep 11 - 24** TO **Sep 11 - 24**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **427.36 m**						FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ (50 100 150 200) PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ (20 40 60 80)	W_P W W_L (10 20 30)			
427.11	250 mm TOPSOIL										
0.25	loose, orangey brown to brown FILL, sand and silt trace gravel, trace clay occ. clayey silt seams moist	0.5 1.0 1.5 2.0		1 2 3	SS SS SS	6 7 5				0.5 1.0 1.5 2.0	above-ground steel casing set in concrete bentonite seal/50 mm I.D. PVC riser
425.21											
2.15	moist --- loose to compact, brown Fine to Medium SAND trace to some silt occ. silty sand seams saturated	2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0		4 5 6 7	SS SS SS SS	10 15 9 10				2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0	3.05 m long, 50 mm I.D. PVC screen with sandpack water level in monitoring well measured at 3.0 m depth on September 18, 2024
421.06											
6.30	brown --- compact, grey SILT trace sand, trace clay saturated	6.5 7.0 7.5		8 9	SS SS	15 12				6.5 7.0 7.5	
419.26											
8.10	End of Borehole	8.0 8.5 9.0 9.5 10.0 10.5								8.0 8.5 9.0 9.5 10.0 10.5	

PROJECT MANAGER: **EYC**

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FILE No: 1495

BOREHOLE No. 105

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Sep 12 - 24** TO **Sep 12 - 24**

Ground Elevation: **428.15 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
	loose, dark brown FILL, sand and silt some topsoil trace clay, moist	0.5	1	SS	8	above-ground steel casing set in concrete
427.25						bentonite seal/50 mm I.D. PVC riser
0.90	orangey brown, some silt	1.0	2	SS	6	
	very loose to compact, brown	1.5				
	Fine to Medium SAND trace silt	2.0	3	SS	12	
	moist to wet	2.5	4	SS	16	
		3.0				
	saturated	3.5	5	SS	14	
		4.0	6	SS	19	
		4.5				water level in monitoring well measured at 4.45 m depth on September 18, 2024
		5.0	7	SS	17	
		5.5				3.05 m long, 50 mm I.D. PVC screen with sandpack
		6.0				
		6.5	8	SS	15	
		7.0				
		7.5				
		8.0	9	SS	11	
		8.5				
		9.0				
		9.5	10	SS	3	
418.55						
9.60	End of Borehole	10.0				
		10.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

PROJECT MANAGER: **EYC**

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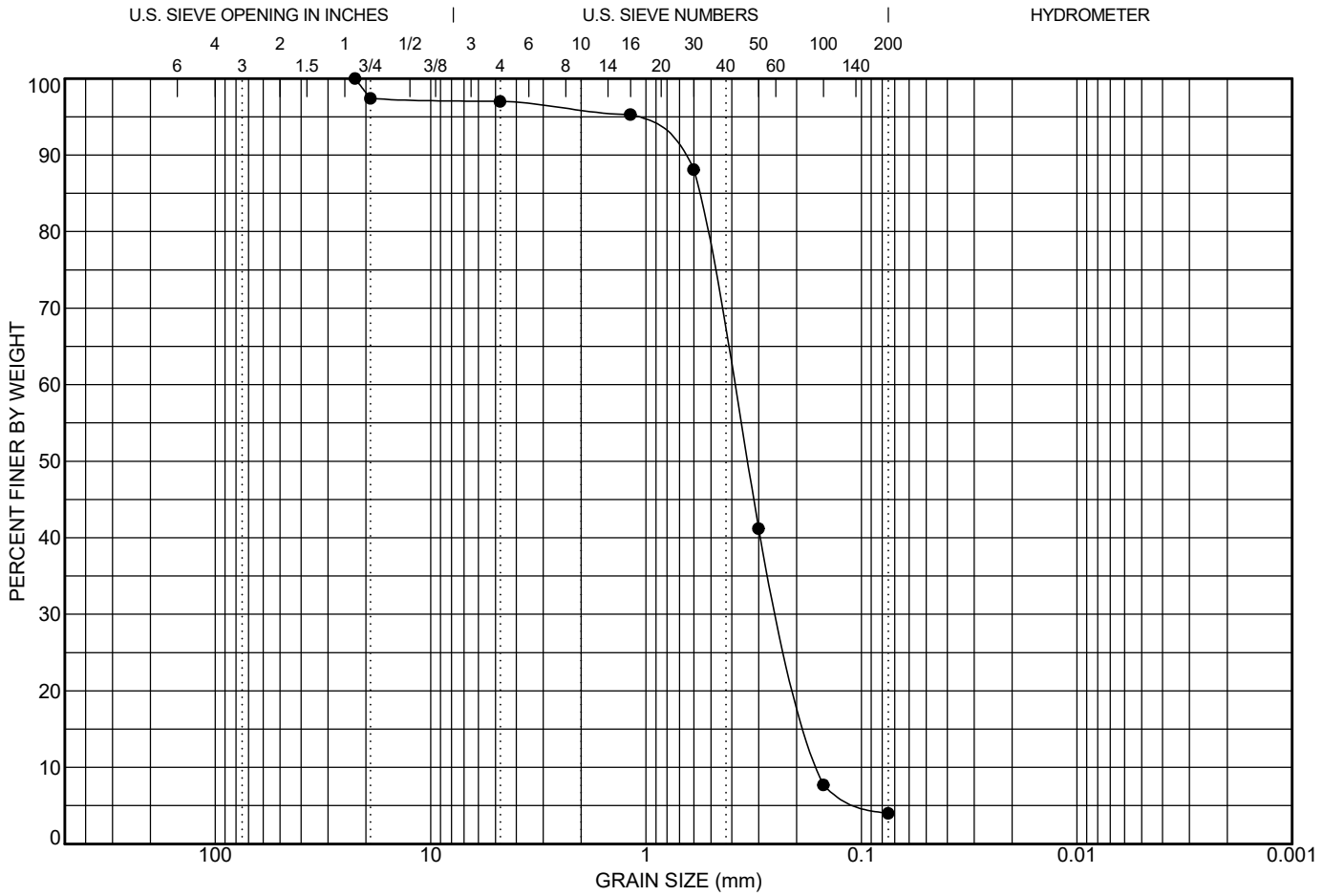

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			0.91	2.52	22.4	0.396	0.238	0.157	3.0	93.0	4.0	

Date: Sep. 25 - 2024
Client: PoloCorp Inc.
Contractor:
Source:
Sampled From: BH 101 - SA 4, 2.30 to 2.75 m depth
Sample No.: 101-4
Date Sampled: Sep. 11 - 2024
Sampled By: RS
Lab No.: 1033
Date Tested: Sep. 25 - 2024
Type of Material: Fine to Medium Sand, trace gravel, trace silt

Sieve Size (mm)	Percent Passing	No Specifications

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e-mail: info@cvdengineering.com

GRAIN SIZE DISTRIBUTION

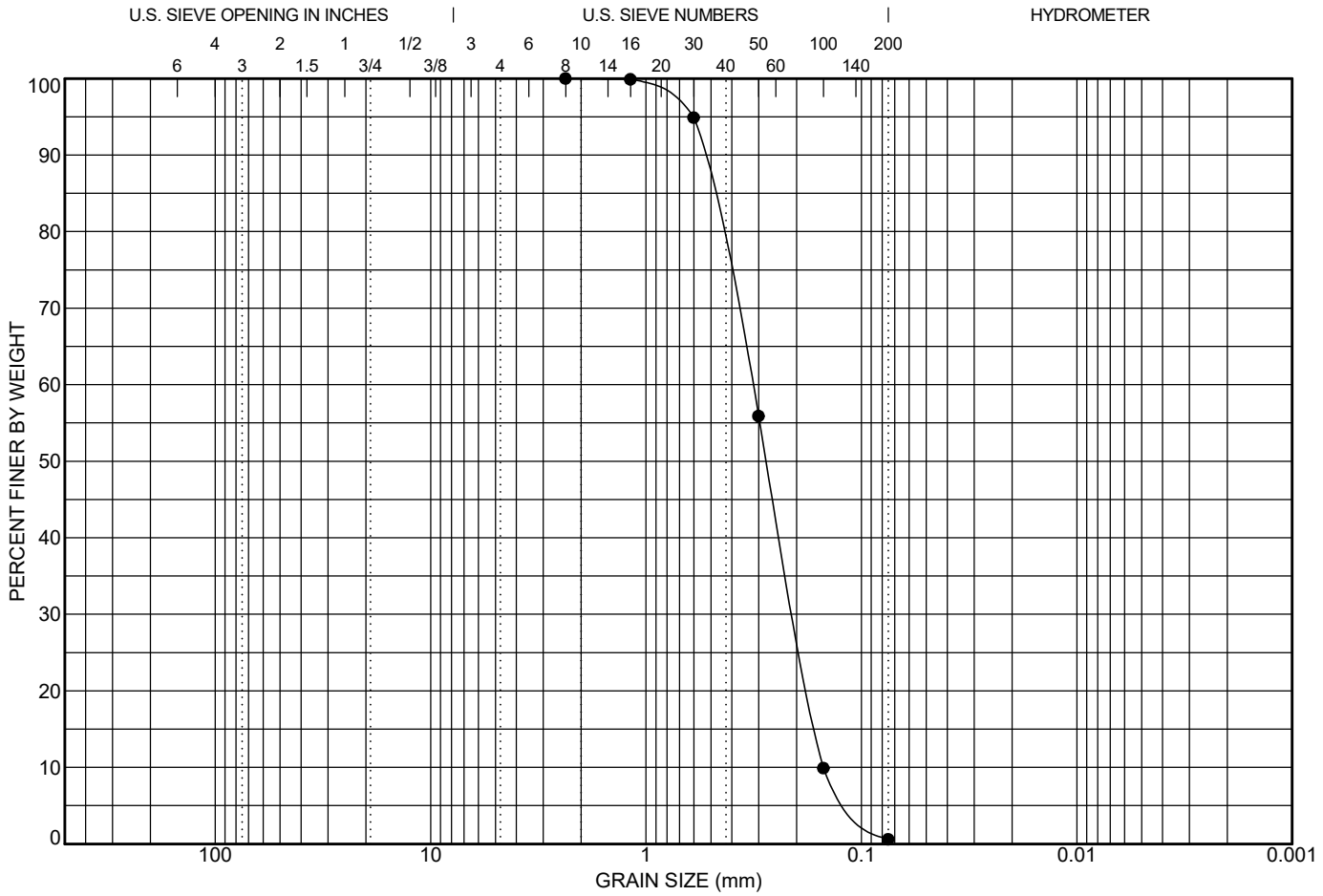
Project: Proposed Residential Subdivision

Location: 968 St. David Street North, Fergus, Ontario

File No.: 1495

Enclosure No.: 22

DM - NO SPECIFICATIONS 1495 968 ST. DAVID STREET NORTH, FERGUS (SEPTEMBER 2024).GPJ LAW LNDN.GDT 10-1-24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			0.85	2.15	2.36	0.323	0.203	0.15	0.0	99.4	0.6	

Date: Sep. 25 - 2024
Client: PoloCorp Inc.
Contractor:
Source:
Sampled From: BH 105 - SA 4, 2.30 to 2.75 m depth
Sample No.: 105-4
Date Sampled: Sep. 12 - 2024
Sampled By: RS
Lab No.: 1034
Date Tested: Sep. 25 - 2024
Type of Material: Fine to Medium Sand, trace silt

Sieve Size (mm)	Percent Passing	No Specifications

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GRAIN SIZE DISTRIBUTION

Project: Proposed Residential Subdivision

Location: 968 St. David Street North, Fergus, Ontario

File No.: 1495

Enclosure No.: 23

CHUNG & VANDER DOELEN
ENGINEERING LTD.

PRELIMINARY HYDROGEOLOGICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
6581 Highway 6
Fergus, Ontario

SUBMITTED TO:
Mr. Mike Puopolo
Polocorp Inc.
379 Queen Street South
Kitchener, ON
N2G 1W6

FILE NO: 1495 **/** February 28, 2025

CHUNG & VANDER DOELEN
ENGINEERING LTD.

311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 5E1
519-742-8979

February 28, 2025
FILE NO.: 1495

Polocorp Inc.
379 Queen Street South
Kitchener, ON
N2G 1W6

Attention: Mike Puopolo

RE: Preliminary Hydrogeological Investigation
Proposed Residential Development
6581 Highway 6, Fergus, Ontario

This report summarizes the preliminary results of a hydrogeological investigation completed in support of a proposed residential development containing a combination of residential single units, stacked townhouses, mixed-use units, roadways, and parkland, located at 6581 Highway 6 in Fergus, Ontario.

If you have any questions or concerns regarding the report, please contact the undersigned.

Yours truly,
CHUNG & VANDER DOELEN ENGINEERING LTD.

Peter Dao, M.Sc., P.Geo.
Manager, Environmental & Hydrogeology

TABLE OF CONTENTS

LIST OF APPENDICES AND ENCLOSURES

1.0 INTRODUCTION

CHUNG & VANDER DOELEN ENGINEERING LTD. (CVD) has been retained by the 'Client', Polocorp Inc., to complete a scoped hydrogeological investigation for the property located at 6581 Highway 6 in Fergus, Ontario ("Site") to support a proposed residential subdivision. The proposed development area comprises part of Lot 17, Concession 16 of the Subject Lands.

The purpose of the investigation is to evaluate existing hydrogeological conditions at the Site in support of a proposal for a residential subdivision and subsequent development, comprised of a combination of residential single units, stacked townhouses, mixed-use units, roadways, and park.

This report presents the preliminary findings of the ongoing hydrogeological investigation, conducted between February and September 2024 for the proposed subdivision. At the time of the writing of this report, only a Draft Plan of Subdivision (Polocorp Inc., December 10, 2024), as provided in Appendix A, was available for our review.

The 20.03±-hectare (ha) Site is currently comprised of a cultivated agricultural field and a residential dwelling with its related structures fronting Highway 6. The Site is bound by Highway 6 to the west and predominantly by agricultural lands to the north, east, and south. An existing residential subdivision is situated southwest of the Site on the opposite side of Highway 6, and another residential subdivision is found approximately 400± m southeast of the property. Figure 1 shows the location of the subject Site in the Town of Fergus.

It is understood that the Site is proposed to be fully municipally serviced with the water and wastewater services. Although no current plans for on-Site stormwater management (SWM) facilities are available, it is expected that the property will be connected to a 2.41± ha sized SWM facility which is proposed to be constructed in the lot directly south of the Site (968 St. David Street North). A roadway network, connected to Highway 6, is planned throughout the subdivision. This investigation characterizes the hydrogeological setting and assesses potential impacts from future servicing. Other characteristics of the future development are to include a 0.89± ha sized parkland (Block 66).

The overall objectives of the hydrogeological investigation are as follows:

1. To characterize the hydrogeologic setting, using data from the current and previous investigations, with primary emphasis on the near surface hydrogeologic setting.
2. To assess the roles (or functions) that groundwater and surface water have with respect to nearby environmental features at or adjacent to the property.
3. To identify and evaluate potential impacts and opportunities to enhance groundwater and surface water contribution to receptors from the proposed development, and to make recommendations to safeguard these features from the potential impacts associated with the development.

As this is a preliminary report, early in the investigation process, the objectives above cannot be fully addressed at this time. An updated report will be provided after the completion of the investigative scope of work.

2.0 INVESTIGATION SCOPE

2.1 BACKGROUND DATA REVIEW

The following background information (Section 8.0 lists the specific information), which has been considered and reviewed as part of this investigation:

- CVD Engineering Ltd.; Preliminary Geotechnical Investigation (May 28, 2024)
- Golder; Hydrogeological Investigation, 8243 and 8282 Wellington Road 19, Ontario (February 2022)
- Grounded Engineering; Hydrogeological Assessment, 350 Wellington Road 7, Elora, Ontario (October 2022)
- Government of Canada Environment and Natural Resources; Historical Data; Fergus Shand Dam Weather Station; 2024 Daily Data Reports
- Grand River Conservation Authority; ESRI; ArcGIS; Map Your Property Tool (2024)
- Karrow, P.F.; Pleistocene Geology of the Guelph Area, Southern Ontario; Geological Report 61; Map 22153, scale 1:63,360 (1968) (Figure 2)
- Matrix Solutions Inc.; Centre Wellington Scoped Tier Three Water Budget Assessment (December 2017)
- Polocorp; Draft Plan of Subdivision (December 10, 2024) (Appendix A)
- MECP Water Well Records near Site (Appendix G)
- Toporama Topographical Map (Ministry of Natural Resources, Retrieved June 11, 2024) (Figure 1)
- WSP Canada Inc.; Hydrogeological Investigation - Updated, 8243 and 8282 Wellington Road 19, Ontario (April 2023)

2.2 BOREHOLE DRILLING & MONITORING WELL INSTALLATION

As part of both the initial hydrogeological and preliminary geotechnical investigations completed between January 16 and 17, 2024, five (5) boreholes were advanced to depths of between 6.70 and 8.25 m below existing grade, and monitoring wells were installed at each borehole location (labelled BH 1 to 5). A supplemental investigation was completed, between September 11 and 12, 2024, in which eight (8) additional boreholes/monitoring wells (labelled BH 101 to 105) were drilled and installed to depths between 8.10 and 9.60 m below grade. These boreholes/wells were drilled/installed to investigate the shallow subsoil and shallow groundwater table conditions at the property.

The investigation was completed using a track-mounted CME-55 drill rig, equipped with standard 83 mm inner diameter hollow stem augers (HSA) operated by Davis Drilling Ltd. of Milton, Ontario. Soil samples collected during the borehole investigation program were examined in the field and subsequently brought to CVD's laboratory for tactile and textural examination. Moisture content determinations were performed on all retrieved soil samples from the drilling program.

The ground surface elevation of the boreholes, monitoring wells, and geomorphological features of the site were surveyed by CVD for the purpose of this report using a Network RTK Global Navigation Satellite

System (GNSS) Receiver. The survey data was collected using the UTM Zone 17N Projection, NAD83(CSRS)v7-2010 datum and Canada Geoid Model HT2_2010v70 (CGVD28).

2.3 WELL DEVELOPMENT, WATER LEVEL MONITORING, & RESPONSE TESTS

Each monitoring well was developed using Waterra™ polyethylene tubing and foot-valve hand pumps. As of the writing of this report, groundwater level monitoring was performed on five (5) occasions: on February 6, March 11, July 22, September 12, and September 18, 2024. Groundwater levels were obtained at all of the monitoring wells and piezometer locations during each occasion. Table 1 provides a summary of the groundwater levels and calculated elevations for the five monitoring events.

Well response tests (slug/bail tests) were completed at two (2) of the monitoring well locations (Boreholes 1 and 5) on March 11, 2024, to provide a more accurate estimate of the hydraulic conductivity (K) (or permeability) of the saturated aquifer subsoil strata, to assist in providing more accurate infiltration rates. The hydraulic conductivities were calculated through the Aquifer Test software utilizing the Bouwer and Rice method. The results of the tests are graphically presented in Appendix C, and a summary of the data is also included in Table 1.

Furthermore, two (2) grain size distribution analyses were carried out on representative subsoil samples to help identify and assist in providing estimates of hydraulic conductivities for the encountered groundwater-bearing subsoil deposits. The results of these tests are presented in Enclosures 22 and 23.

Additionally, to provide a more comprehensive summary of groundwater conditions at the Site, three (3) Van Essen DI801 10 m TD-Diver automated data loggers and one (1) Baro-Diver were installed in wells BH 1, 5, and 101. The automated monitoring of water level fluctuations at these wells using the data loggers is currently ongoing.

3.0 SITE CHARACTERIZATION

3.1 TOPOGRAPHY, DRAINAGE & WETLAND FEATURES

The Site is located within the Upper Grand River watershed and is split between the West Montrose – Grand River Sub watershed and the Irvine Creek Sub watershed. Locally, the groundwater table and any surface water runoff traverses across the Site in a generally north to south orientation, towards the southern portion of the property and towards a wetland, located southeast of the Site.

According to the Grand River Conservation Authority (GRCA), this wetland southeast of the property is GRCA-regulated and is split into two categories: marsh and swamp. Roughly the northern third of the wetland and a small section of the southeastern side of the area are designated as a swamp wetland, while the remainder of the wetland is designated as a marsh. The wetland includes multiple ponds connected by perennial streams. Occasional intermittent streams can be observed travelling along the north-south axis across the wetland, towards the southern streams/ponds. Various trees, frequent

cattails, and other marsh-related vegetation are present throughout most of the wetland. The GRCA mapping for the regulated lands abreast of the wetlands and water courses are shown on Figure 3.

Regionally, the surface topography decreases significantly towards Guelph and Kitchener/Waterloo, and generally increases north, towards The Grand Valley and Arthur. Elevations also decrease westward, towards Listowel, and significantly decrease eastward, towards Brampton. Currently, the topography in the area is formed from the most recent glacial activity (Wisconsin). The area around Fergus is full of kames associated with the Orangeville Moraine (Karrow, 1968). Figure 1 shows the topographic contours across the Site.

Local Site topography is considered 'rolling land', with ground elevations from north to south across the Site ranging from 430± to 425± mASL. There is also generally a slight increase in surface elevation from east to west, across the Site. The current terrain on-Site is relatively even, with no major undulations, or topographical features. In general, runoff will mimic topography flowing to low elevations where watercourses and wetlands are present. As a result, surface runoff from the farm fields is anticipated to be primarily controlled by topography and to drain towards the relatively lower lying south/wetland southeast of the Site.

Most of the Site consists of a farm field with occasional minor residential/grassy areas fronting Highway 6. Occasional medium to large sized trees can be found along the boundaries of the property.

3.2 GEOLOGIC SETTING

Surface geological mapping for the area (by Karrow P.F., 1968) is presented in the Quaternary Geology map of Figure 2. According to Karrow (1968), the Site is primarily underlain by lacustrine, kame deposits, comprising mainly outwash sands, with an underlying Wentworth till unit. Both deposits were laid down during the late Wisconsinan stage of the Pleistocene period. The local topography of the area has been largely influenced by the presence of The Wentworth Till. The entire area is underlain by dolostone bedrock of the Guelph Formation. This is confirmed through the MECP well record data for drinking water wells in the area surrounding the property, as included in Appendix G. According to the records, bedrock was encountered at depths between 24± and 32± m below existing grade (mbeg). Bedrock outcrops can be found in certain areas around Fergus and are notably present towards the southwest within the Elora Gorge.

The monitoring well recorded data and borehole log data (Enclosures 1 to 5 and 9 to 13) collected during the Site investigation are generally consistent with Quaternary geological mapping. Based on the drilled boreholes, the soils encountered generally consist of 180 to 300 mm of topsoil predominantly underlain by a major deposit of fine to medium sand with trace to some silt which extends to between at least 8.10 and 9.60 mbeg. Occasional silt and/or clayey silt seams were observed within the sand deposit. Minor seams/layers of grey silt were encountered near the bottom of Boreholes 4, 5, 101, 104, and 105, which likely indicate the transition zone to the clayey silt till underlying the area. This clayey silt geological unit is presumed to be the Wentworth Till deposit, referred to in Karrow (1968). It should be

noted that the deposit was not directly encountered during borehole investigation at the Site; however, it is expected that it is present, just at deeper depths.

3.3 HYDROGEOLOGIC SETTING

3.3.1 Water Table Depth and Configuration

The water table exists predominantly within the shallow fine granular deposits (fine to medium sand, silt subsoils) encountered beneath the entire Site. The encountered depth of the groundwater table greatly reduces from north to south across the property. Table 1 summarizes the groundwater level measurements collected thus far during this investigation from the period extending from February 2024 to September 2024 at all of monitoring well locations.

Figure 5 presents an interpretation of the water table configuration and shallow groundwater flow directions across the property using the groundwater elevation measurements gathered on September 18, 2024. As expected, the water table mimics the topography with shallow groundwater flowing southerly towards the south/southeastern portion of the Site in the direction of the nearby wetland.

During the monitoring period, according to the gathered data, groundwater levels were encountered at depths ranging between 4.83 (BH 1) and 2.02 mbeg (BH 5), corresponding to elevations ranging between 425.02 and 423.56 masl according to the July 22, 2024, water levels measurements. It should be noted that these high-water levels documented during the summer season are likely caused by the abnormally high amount of precipitation experienced throughout the first half of 2024. Furthermore, groundwater level monitoring is required to understand the seasonal and yearly variability in groundwater elevations across the Site. Ongoing groundwater monitoring is being conducted on a seasonal basis to provide an evaluation of the seasonal variability of the groundwater table and its fluctuations.

Appendix D includes a summary table of measured groundwater levels (Table 1) and interpreted hydrographs collected during the monitoring period. The hydrographs were plotted against monthly precipitation data sourced from the Government of Canada Environment and Natural Resources Daily Data Reports for the Fergus Shand Dam weather station, the nearest active weather station to the Site.

3.3.2 Groundwater Infiltration and Recharge

Groundwater infiltration rates are expected to be generally high across the Site due to the predominance of the sand deposit and the relatively deep depth of the water table. Infiltration and recharge areas are also heavily influenced by the topographical features of the land, which in this case promotes shallow groundwater to flow towards the south.

Based on the single well response tests and physical examination of the soil deposits, the correlating estimated infiltration rates for the various surficial soils at the property range as follows:

- Fine to Medium Sand: 75 to 150 mm/hr
- Silty Sand: 15 to 30 mm/hr
- Sandy Silt to Sand and Silt: 10 to 20 mm/hr
- Silt: 3 to 5 mm/hr
- Clayey Silt Till: <1 mm/hr

According to data layers provided from the GRCA-Web GIS application, the property has a recharge rate of 140± to 320± mm/year. Recharge/infiltration should be generally high due to the ubiquitous presence of the fine sand deposit and its overall 'dry' condition, since the water table during the peak groundwater elevation period (February to March 2024) was encountered at depths of between 2± to 5± mbeg.

3.4 SOURCE WATER PROTECTION AND GROUNDWATER USE

The entire Site is located within the Fergus Wellhead Protection Area (WHPA). Fergus currently has six (6) municipal supply wells (wells F1, F2, F4, F5, F6, F7), with the Site located in between three of these wells (F4, F6, F7). According to data provided on the GRCA-Web GIS application, most of the property is classified as WHPA-C, denoting an area in which travel time is between 2 to 5 years, and with a vulnerability score of 6. The entire eastern boundary of the Site falls with WHPA-B for the municipal well, F6, denoting an area in which the groundwater travel time to the well is 2 years or less, and having a vulnerability score of 8. Both sections are considered to have a medium vulnerability. It should also be noted that the Belwood Reservoir, where the lake levels are controlled by the Fergus Shand Dam, is located along the Grand River, upstream of Fergus.

All six (6) of the existing municipal supply wells pump groundwater from the dolostone bedrock aquifers of the Guelph, Gasport, and Goat Island Formations. They are both primarily cased and open in the Guelph Formation dolostone. One of these six wells (F2), which is now inactive, is a well with groundwater under the direct influence of surface water (GUDI). Transmissivity values of the Fergus wells range between 52 to 395 m^2/day (Matrix Solutions Inc., 2017). The wells were drilled to depths of between 76.5 mbeg (F2) and 138.7 mbeg (F7).

Regarding the water quality at the Site, two (2) groundwater samples were submitted from monitoring wells BH 1 and 5 for analysis of general chemistry, nutrients, and metals. These samples were submitted to the AGAT Laboratories of Mississauga for testing/analysis, with results being provided in Appendix F. No major concerns were identified. Elevated levels of iron were present which exceed the aesthetic drinking water objectives; however, this is naturally occurring within the shallow groundwater of the area. Minor amounts of cadmium, cobalt, copper, vanadium, and zinc were also detected. Slightly elevated amounts of sulphate were also detected in monitoring well BH 5. No chemical threats to groundwater at the Site were detected.

4.0 WATER BUDGET ASSESSMENT

Pre-Development Water Balance

Precipitation ultimately becomes split into three 'water budget' components: evapotranspiration, runoff, and recharge, with the latter two often referred to together as 'the water balance' (i.e., the remainder after evapotranspiration is removed). Groundwater recharge rates will vary at a given site based on the permeability of the surficial deposits but will also depend on topography and type of vegetative cover. Most of the subject property has been historically agricultural and has had different types of crops depending on the year, with no crop planted at all during certain portions of the year.

A pre-development water balance for the property has been estimated using the Water Balance Method (WBM) of Thornthwaite and Mather (1957), a method cited in the MECP document "Stormwater Management Planning and Design Manual" (March 2003) to estimate evapotranspiration. The calculations utilize the 1981-2010 'Climate Normals' from the closest weather station located at the Fergus Shand Dam (gives an annual precipitation rate of 946 mm/yr) and considers a combination of cultivated land use with moderately deep-rooted crops (e.g. wheat), pasture & lawns, and impervious surfaces. Using these conditions, the subject Site has an average evapotranspiration rate of about 56.5% (or 536 mm/yr) and remaining 'water balance' of about 43.5% (410 mm/yr) is estimated.
The 2003 MECP document also provides a methodology for estimating the proportions of the water balance that ultimately become runoff vs. recharge, based on applicable infiltration factors for soil, vegetative cover, and topography.

The overall water balance and water budget calculations are included in Appendix E. In summary, the pre-development average annual water budget for the 20.03± ha property is as follows:

A) Pervious Cultivated Land of 18.86 ha

Precipitation	946 mm/yr	178,349 m^3/yr
Evapotranspiration	536 mm/yr	101,010 m^3/yr
Water Balance	410 mm/yr	77,339 m^3/yr
Recharge	**287 mm/yr**	**54,137 m^3/yr**
Runoff	123 mm/yr	23,202 m^3/yr

B) Pervious Pasture & Lawns of 1.00 ha

Precipitation	946 mm/yr	9,459 m^3/yr
Evapotranspiration	536 mm/yr	5,357 m^3/yr
Water Balance	410 mm/yr	4,102 m^3/yr
Recharge	**308 mm/yr**	**3,076 m^3/yr**
Runoff	103 mm/yr	1,025 m^3/yr

C) Impervious Rooftops to Pervious Areas of 0.17 ha

Precipitation	946 mm/yr	1,627 m^3/yr
Evapotranspiration	95 mm/yr	163 m^3/yr
Water Balance	851 mm/yr	1,464 m^3/yr
Recharge	**213 mm/yr**	**366 m^3/yr**
Runoff	638 mm/yr	1,098 m^3/yr

The target recharge quantity for matching in post-development is 57,580 m^3/yr. Recharge can likely be met through a stormwater management design utilizing enhanced infiltration facilities as Low Impact Development (LID) infrastructure for the developed Site.

5.0 SITE SERVICING REQUIREMENTS & IMPACT ASSESSMENT

5.1 WASTEWATER SYSTEMS & POTENTIAL IMPACT OF EFFLUENT

The proposed subdivision will be connected to municipal sanitary sewers. No private wastewater treatment system requirements are anticipated for the proposed subdivision.

5.2 WATER SUPPLY & POTENTIAL IMPACT OF WATER TAKING

The proposed subdivision will be serviced by municipal water services. No private water supply service requirements are anticipated.

5.3 STORMWATER MANAGEMENT & POTENTIAL IMPACT TO GROUNDWATER RECHARGE

The proposed subdivision will be serviced by municipal stormwater management works; however, at the time of the writing of this report, no specific design drawings/plans were available. It is understood there are plans to connect the proposed development at the Site to the 2.41± ha SWM facility that is proposed for a separate subdivision development on the adjacent lot south of the Site. The general shallow groundwater gradient travels towards the proposed location of the SWM facility. As the realization of the project proceeds, addendums addressing stormwater management and any theoretical impacts to groundwater recharge including proposed LID infrastructure at the Site may be provided during the detailed design stage.

It is recommended that water balance and quality of water are maintained throughout the property, and any potential effects associated with erosion and sedimentation control to the topographical/environmental features are properly designed and controlled.

The Stormwater Management Planning and Design Manual (March 2003) provided by the Ministry of Environment may be used as a reference to the planning of the stormwater systems. Additionally, the

Township of Centre Wellington Sewer Use By-Law No. 2022-66 should be consulted.

Further groundwater monitoring is being performed to better understand the water table and its seasonal variations to support development design.

Due to the abundance of 'dry' and highly permeable sands throughout much of the Site, infiltration galleries, open ditches and/or swales, and or soak away pits can be constructed into the sandy soils to maintain pre-development recharge rates. Further recommendations may be provided once a more detailed plan is available.

6.0 CONCLUSIONS & RECOMMENDATIONS

Based on the results of the hydrogeological investigation described in this report, the following conclusions and recommendations are provided:

1. The subject property is predominantly underlain by fine to medium grained sand deposits of the late Wisconsin stage of the Pleistocene period, which likely reduce in thickness from north to south across the property. A clayey silt till deposit, likely the Wentworth Till, is believed to underly the fine granular deposits. During the spring to early summer 2024 period, the groundwater table depths ranged between 5.39 (BH 1) and 1.99 mbeg (BH 5) across the property, corresponding to elevations between 425.02 and 423.56 masl.

2. Topography decreases in elevation from north to south with ground surface elevations approximately ranging from between 430± to 425± mASL. Shallow groundwater generally mimics the topography of the Site and flows towards the southern portion of the property and towards the nearby wetland located southeast of the Site.

3. Due to the predominance of the underlying fine sand deposits with a high infiltration rate (100± mm/hr), and the relatively deeper lying groundwater table of the Site (2± to 5± mbeg, March 2024), infiltration/recharge opportunities throughout the Site should be abundant. Based on the calculated pre-development water balance, the Site has an average evapotranspiration rate of about 56.5% (or 536 mm/yr) and a remaining 'water balance' of about 43.5% (410 mm/yr) is estimated. The target recharge quantity for matching in post-development is 57,580 m^3/yr.

4. The property falls within the Fergus Wellhead Protection Area (WHPA) and is currently classified as WHPA-C and WHPA-B with an overall medium vulnerability rating between 6 and 8. The property is located between three (3) of the six (6) Fergus municipal supply wells. No chemical threats or concerns were identified within the property bounds.

5. Site servicing (wastewater, water supply, stormwater management) for the development is to be fully municipally supplied. At the time of the writing of this report, no specific design drawings / plans were available. It is also recommended that as design plans are updated and information becomes available, addendums be added to address the specific site servicing issues.

6. Seasonal groundwater monitoring is incomplete and is ongoing at the Site to better characterize the hydrogeological setting and groundwater/surface water interactions.

7. It is recommended that once finished floor elevations and a site grading plan are available, that CVD be retained to review the final design and provide updates to the recommendations and conclusions provided in this report. Based on the final design, additional boreholes/monitoring wells might be required to delineate the extent of the water table and provide additional information.

7.0 CLOSING

This hydrogeological investigation report has been prepared for the exclusive use of the Client and their assigns for specific application to this project property.

The assessment was conducted in accordance with the verbal and written requests from the Client, and generally accepted assessment practices. Performance of this assessment is intended to reduce, but not eliminate, uncertainty regarding the hydrogeological conditions encountered at the project site, given reasonable limits of time and cost. No other warranty, expressed or implied, is made.

We trust this report is sufficient for your immediate requirements. If you have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
CHUNG & VANDER DOELEN ENGINEERING LTD.

Yaroslav Chudin, EIT
Geotechnical Engineering Intern

Gavin R O'Brien

Gavin R. O'Brien M.Sc., P.Geo.
Senior Hydrogeologist

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1267
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Manager, Environmental & Hydrogeology

PROFESSIONAL GEOSCIENTIST
PETER DAO
PRACTISING MEMBER
2543
ONTARIO

8.0 REFERENCES

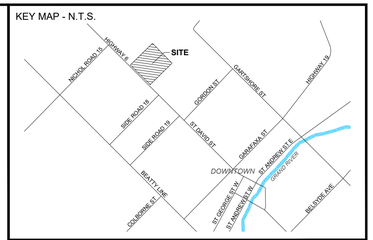
The following documents, maps, or other publications have been used in the preparation of this report.

- "Centre Wellington Scoped Tier Three Water Budget Assessment", Matrix Solutions Inc. (December 2017).
- "Draft Plan of Subdivision", Polocorp (December 10, 2024).
- "Historical Data; Fergus Shand Dam Weather Station; 2024 Daily Data Reports" Government of Canada Environment and Natural Resources; Retrieved October 1, 202
- "Preliminary Geotechnical Investigation: Proposed Residential Subdivision", Project No.: 1495, CVD Engineering Ltd. (May 28, 2024)
- "Hydrogeological Assessment, 350 Wellington Road 7, Elora, Ontario", Grounded Engineering (October 2022)
- "Hydrogeological Investigation, 8243 and 8282 Wellington Road 19, Ontario", Golder (February 2022)
- "Hydrogeological Investigation - Updated, 8243 and 8282 Wellington Road 19, Ontario", WSP Canada Inc. (April 2023)
- "Map Your Property Tool", Grand River Conservation Authority; ESRI; ArcGIS (2024)
- "Pleistocene Geology of the Guelph Area, Southern Ontario; Geological Report 61", Map 22153, scale 1:63,360, Karrow, P. F. (1968).
- Toporama Topographical Map, Ministry of Natural Resources (Retrieved June 11, 2024)

APPENDIX A

Conceptual Subdivision Plan (Polocorp, December 10, 2024)

KEY MAP - N.T.S.



DRAFT PLAN OF SUBDIVISION

PT OF LOT 18, CONCESSION 16
IN THE FORMER GEOGRAPHIC TWP OF NICHOL
CENTRE WELLINGTON

POLOCORP INC.

20 0 20 40 60 80 100
SCALE = 1:1400 (metric)

LAND USE SCHEDULE

DESCRIPTION	LOTS/BLKS.	UNITS	AREA (ha.)
Single Detached	31-43	87-129	4.863
Street Townhouses	44-61	179-266	5.512
Medium Density	62, 63	93-125	2.065
Mixed Use	64	8-14	0.338
Existing House	65	0-1	0.172
Stormwater Management Facility	-	-	-
Trail	-	-	-
Parkland	66	-	0.892 (4.6%)
Pedestrian Walkway	67-69	-	0.115
Environmental Feature & Buffer	-	-	-
MTO Allowance	70, 71	-	0.534
Roads	-	-	5.279
TOTAL		367-535	20.027

SALEABLE FRONTAGE	LENGTH	UNIT SMALL	UNIT LARGE
Single Detached	1,466.3m	36' (11.0m)	50' (15.2m)
Street Townhouses	1,773.2m	18' (5.5m)	27' (8.3m)
TOTAL	3,239.5m		

DENSITY	
Gross Area (ha)	20.027 ha (49.49 ac)
Developable Area (ha)	19.457 ha (48.08 ac)
Net Density (uph)	18.9 - 27.5 upha
Net People-Jobs (3.05 per unit)	57.7 - 83.9 PJ pha

INFORMATION REQUIRED

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

INFORMATION REQUIRED BY CLAUSES a,b,c,d,e,f,g, j AND I ARE AS SHOWN ON THE DRAFT PLAN.

(h) Municipal Water Supply
(i) Sandy Loam
(k) Municipal Sanitary and Storm Sewers

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

O.L.S.
Surveying Inc.

XX XX, 2024
DATE

OWNER'S CERTIFICATE

I HEREBY CONSENT TO THE FILING OF THIS PLAN BY POLOCORP INC., IN DRAFT FORM

MIKE PUOPOLO
Polocorp Inc.

DATE

APPROVALS

REGIONAL MUNICIPALITY OF
WATERLOO APPROVAL BLOCK

DRAFT
FOR DISCUSSION
PURPOSES ONLY

APPROVED: DATE:

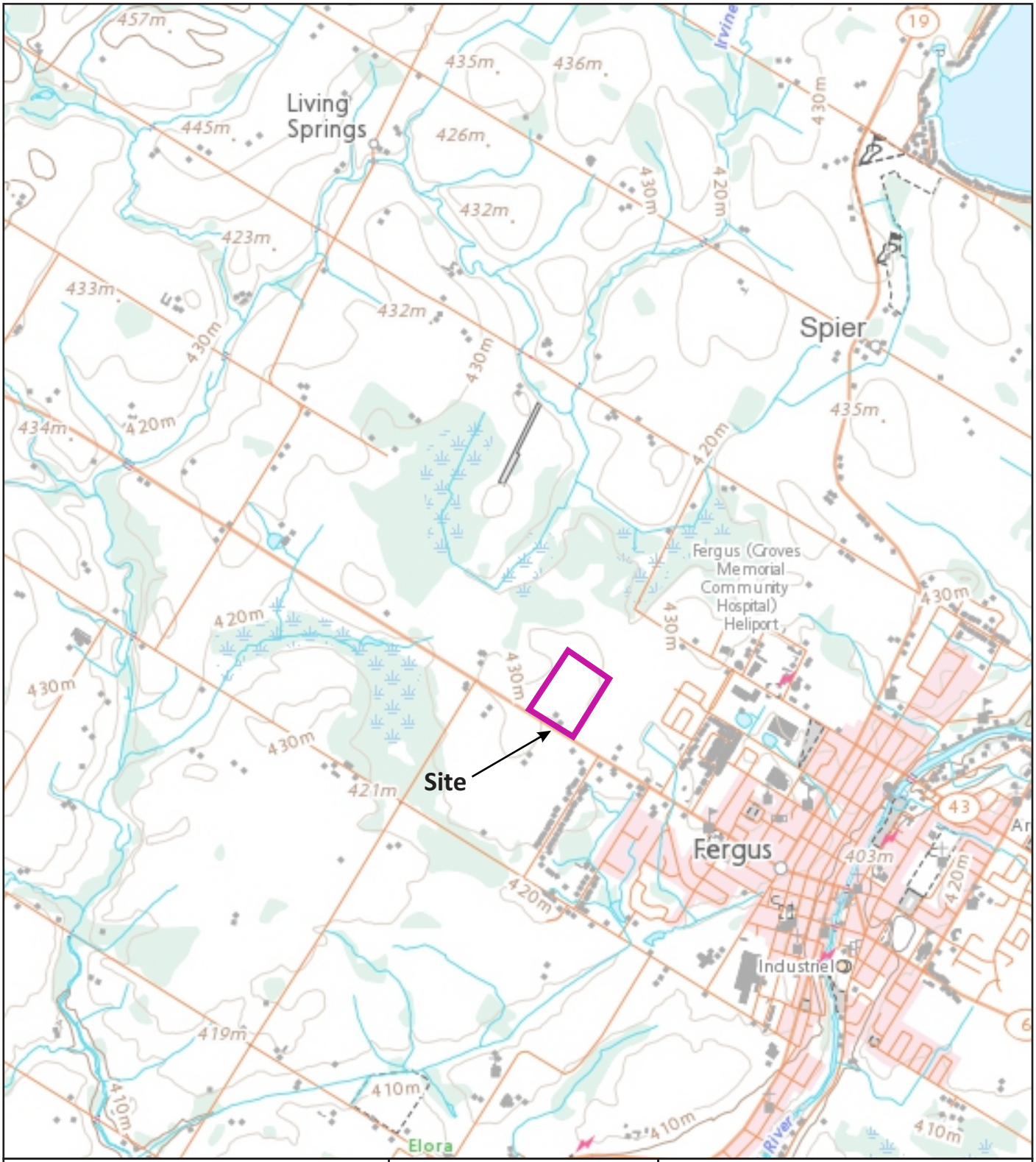
REVISIONS		
DATE	BY	DESCRIPTION

POLOCORP
379 Queen Street South, Kitchener | N2T 1W6 | 519-745-3249 | polocorpinc.com

DATE: December 10, 2024	SCALE 1:4000 (metric)
PROJECT: 1012 (Fergus)	DRAWN BY: GFE

APPENDIX B

Figures 1 to 5



LEGEND

Subject Development Property

Map Ref.: Toporama; Natural Resources Canada; GeoGratis; Retrieved June 6, 2024

0 m 500 1000

Scale 1:40,000

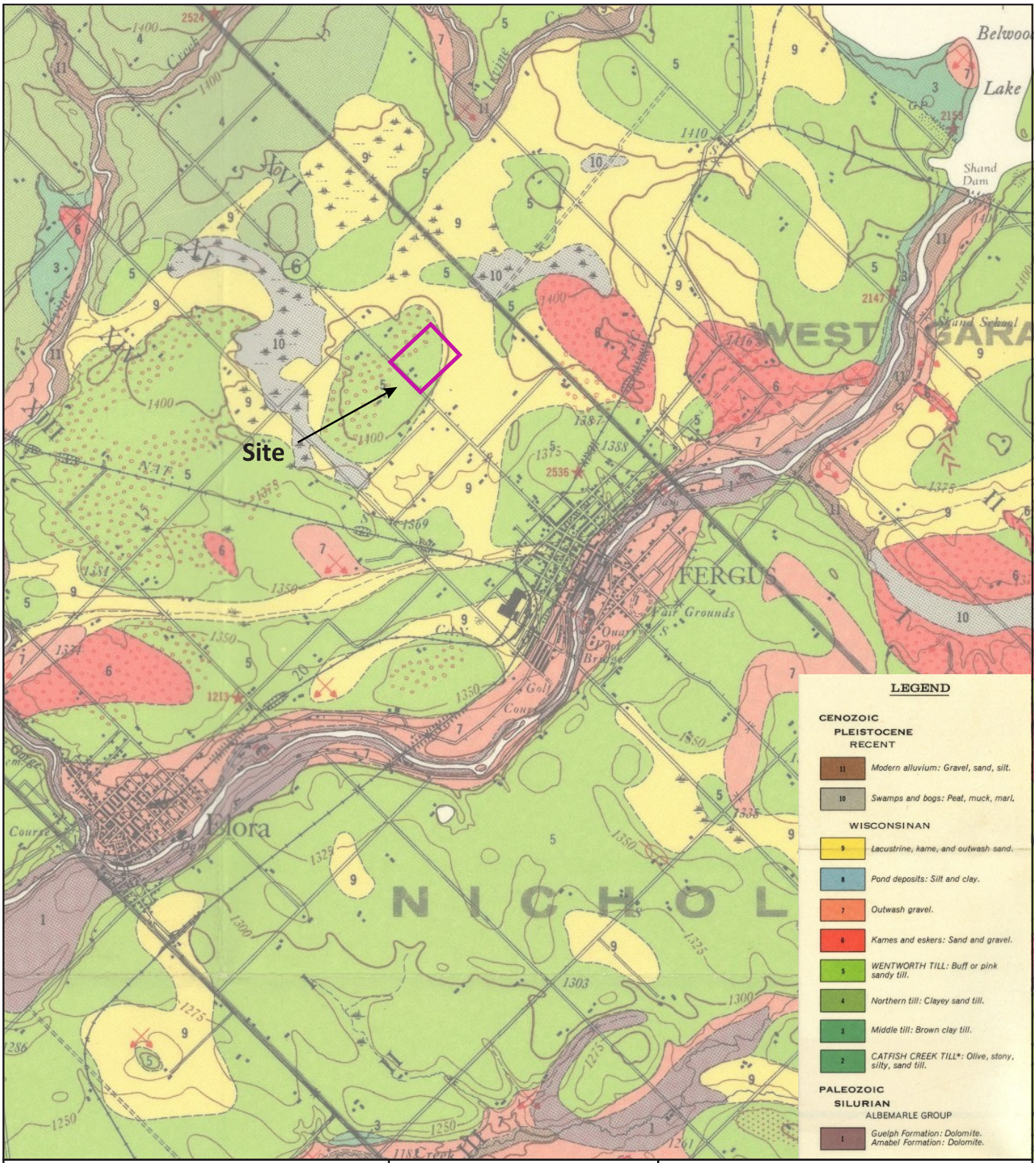
Figure 1 - Site Location

Hydrogeological Assessment

6581 Highway 6
Fergus, ON

Drawn By: YC	Date: Feb. 24/25	File No. 1495

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979



LEGEND

Subject Development Property

Map Ref.: Karrow, P.F.; Pleistocene Geology of the Guelph Area, Southern Ontario (Map 2153); 1968.

N

0 m 1000 2000

Scale 1:50,000

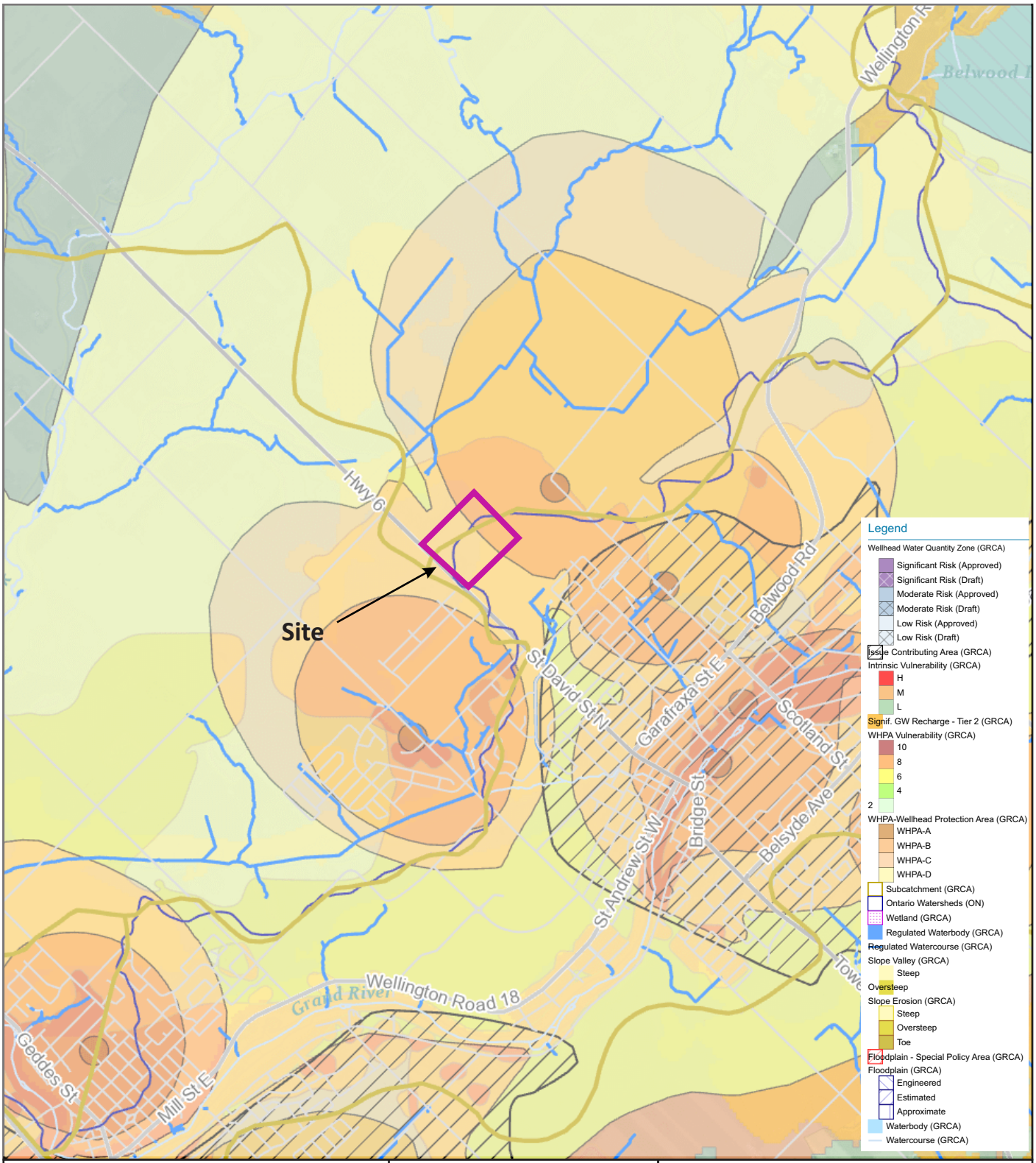
Figure 2 - Quaternary Geology

Hydrogeological Assessment

6581 Highway 6
Fergus, ON

Drawn By: YC	Date: Feb. 24/25	File No. 1495

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979



LEGEND

Subject Development Property

Map Ref.: Grand River Conservation Authority; GRCA Web-GIS; Retrieved September 30, 2024

N

0 m 500 1000

Scale 1:40,000

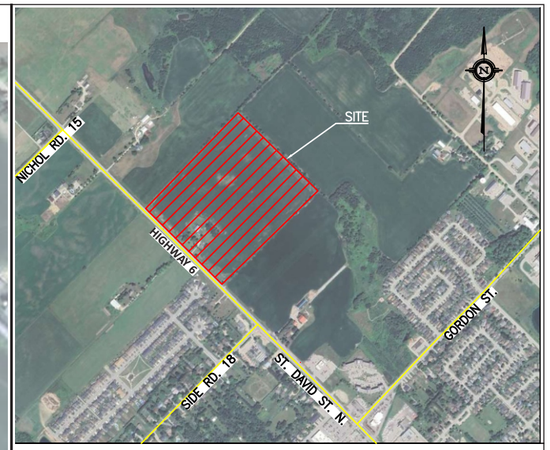
Figure 3 - Watershed Mapping

Hydrogeological Assessment

6581 Highway 6
Fergus, ON

Drawn By: YC	Date: February 24/25	File No. 1495

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979



LEGEND

- Property Boundary
- CVD Monitoring Well Location
- (422.93, *423.89*) Ground Surface, Top of Well Pipe Elevation (m)

N

0 50 100 m

Scale 1:4000

Image Reference: Google Earth; Retrieved: May 1, 2024

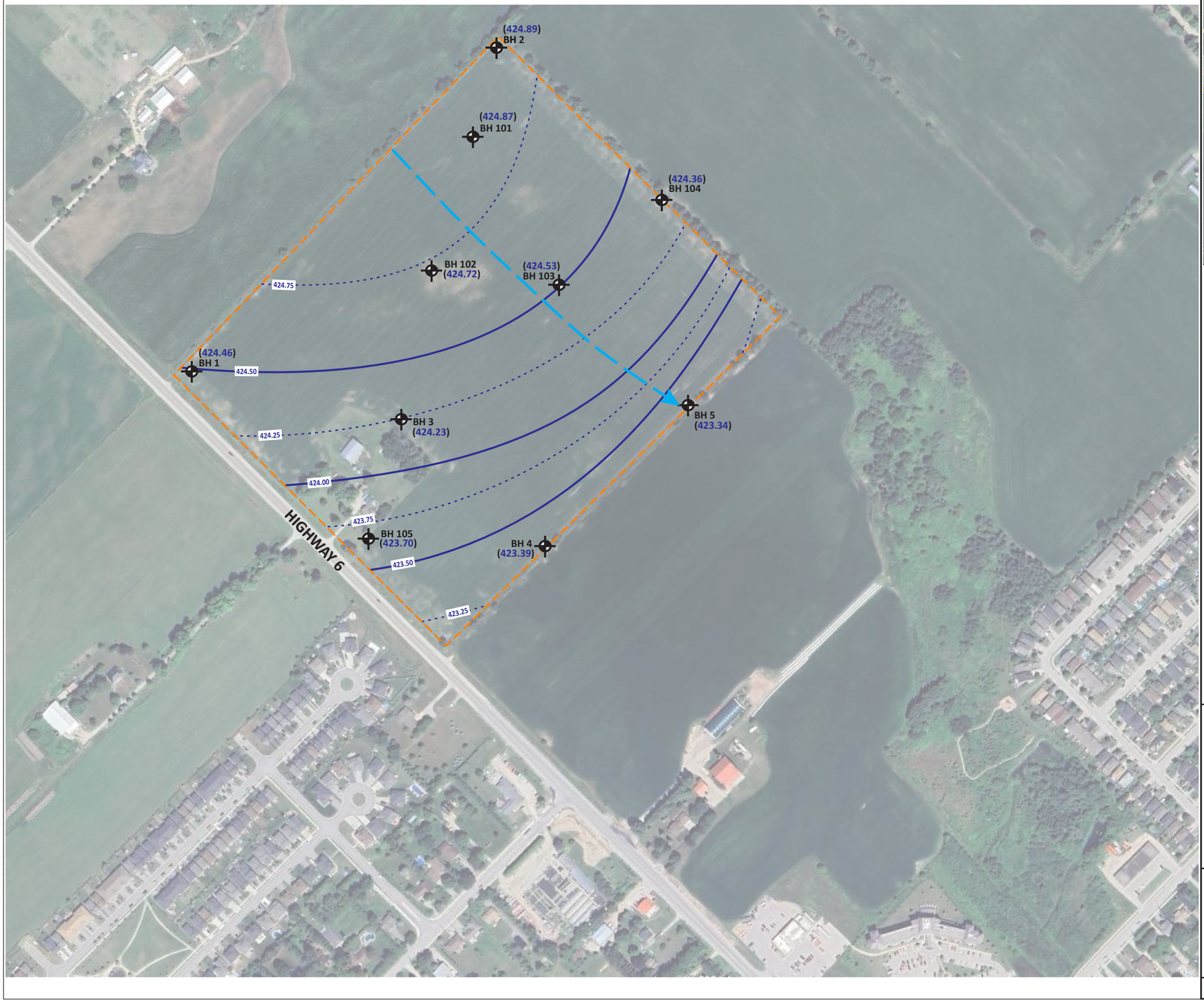
Figure 4:
Monitoring Well and Piezometer Locations

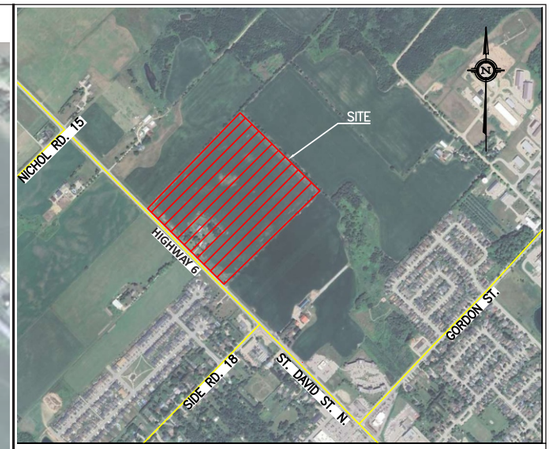
Hydrogeological Assessment
Proposed Residential Subdivision

6581 Highway 6
Fergus, ON

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979

Drawn By: YC	Date:February 2025	File No.: 1495





LEGEND

- Property Boundary
- CVD Monitoring Well Location
- (424.19) Water Table Elevation (mASL) - September 18, 2024
- 424.50 Interpreted Groundwater Contour (mASL)
- Interpreted Shallow Groundwater Flow Direction

N

0 50 100 m

Scale 1:4000

Image Reference: Google Earth; Retrieved: May 1, 2024

Figure 5:
Water Table Interpretation (September 18, 2024)

Hydrogeological Assessment
Proposed Residential Subdivision

6581 Highway 6
Fergus, ON

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979

Drawn By: YC / PD	Date: February 2025	File No.: 1495

APPENDIX C

Well Response Test Analysis Charts

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 Victoria Street North
Kitchener / Ontario / N2H 5E1
519-742-8979

Project: Polocorp Fergus Subdivision

Number: 1495

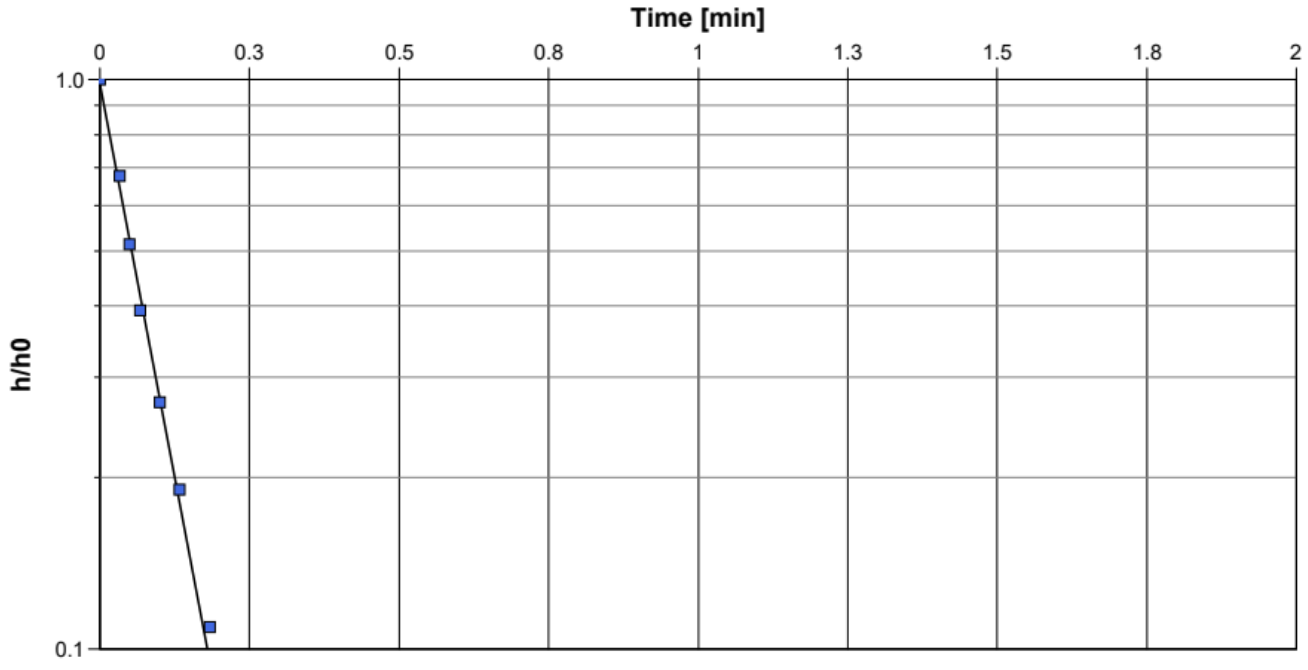
Client: Polocorp Inc.

Location: 968 St. David Street North & 6581 Highway 6, Fergus, ON | Response Test: BH 1

Test Conducted by: Y.C. | Test Date: 2024-03-11 | Aquifer Thickness: 2.90 m

Water level at t=0 [m]: 5.46 | Static Water Level [m]: 5.22 | Water level change at t=0 [m]: 0.25

	Time [min]	Water Level [m]	WL Change [m]
1	0	5.462	0.247
2	0.0333	5.382	0.167
3	0.05	5.342	0.127
4	0.0667	5.312	0.097
5	0.1	5.282	0.067
6	0.1333	5.262	0.047
7	0.1833	5.242	0.027
8	0.2333	5.232	0.017
9	0.45	5.225	0.01
10	0.6	5.222	0.007
11	0.9833	5.22	0.005
12	1.2667	5.217	0.002



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]
BH 1	1.06×10^{-4}

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 Victoria Street North
Kitchener / Ontario / N2H 5E1
519-742-8979

Project: Polocorp Fergus Subdivision

Number: 1495

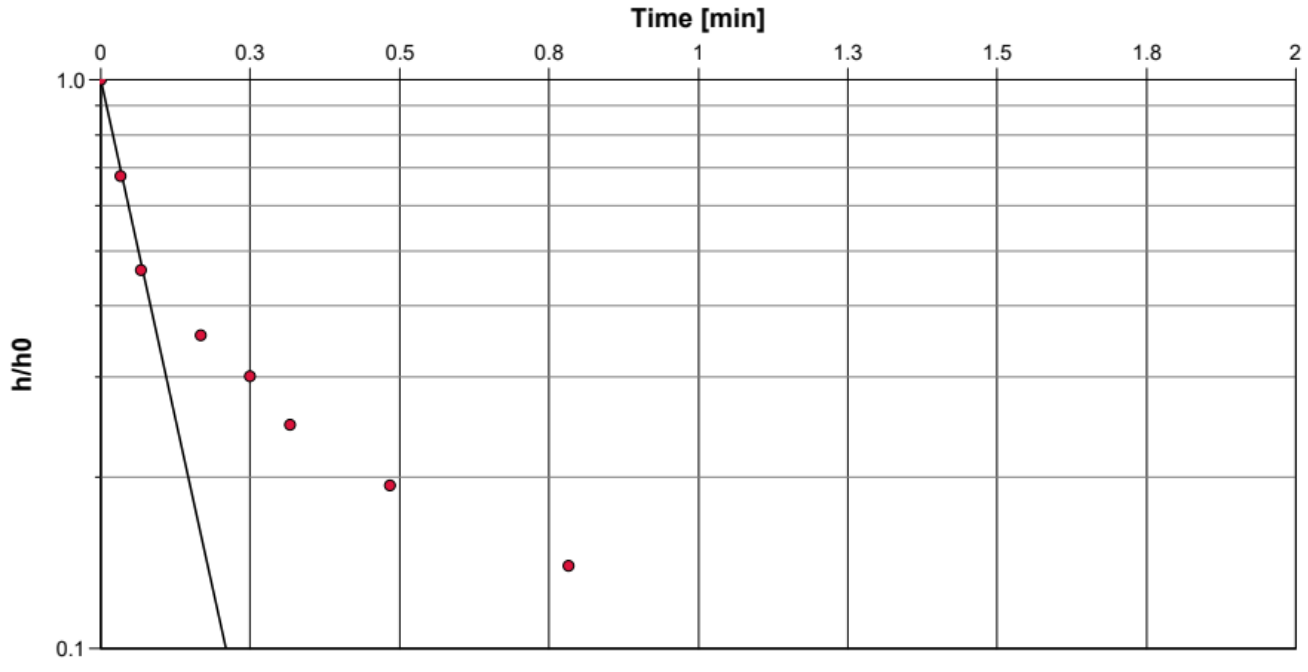
Client: Polocorp Inc.

Location: 968 St. David Street North & 6581 Highway 6, Fergus, ON | Response Test: BH 5

Test Conducted by: Y.C. | Test Date: 2024-03-11 | Aquifer Thickness: 6.20 m

Water level at t=0 [m]: 2.09 | Static Water Level [m]: 1.99 | Water level change at t=0 [m]: 0.09

	Time [min]	Water Level [m]	WL Change [m]
1	0	2.087	0.093
2	0.0333	2.057	0.063
3	0.0667	2.037	0.043
4	0.1667	2.027	0.033
5	0.25	2.022	0.028
6	0.3167	2.017	0.023
7	0.4833	2.012	0.018
8	0.7833	2.007	0.013
9	1.1167	2.002	0.008
10	1.55	2.00	0.006



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH 5	8.69×10^{-5}	

APPENDIX D

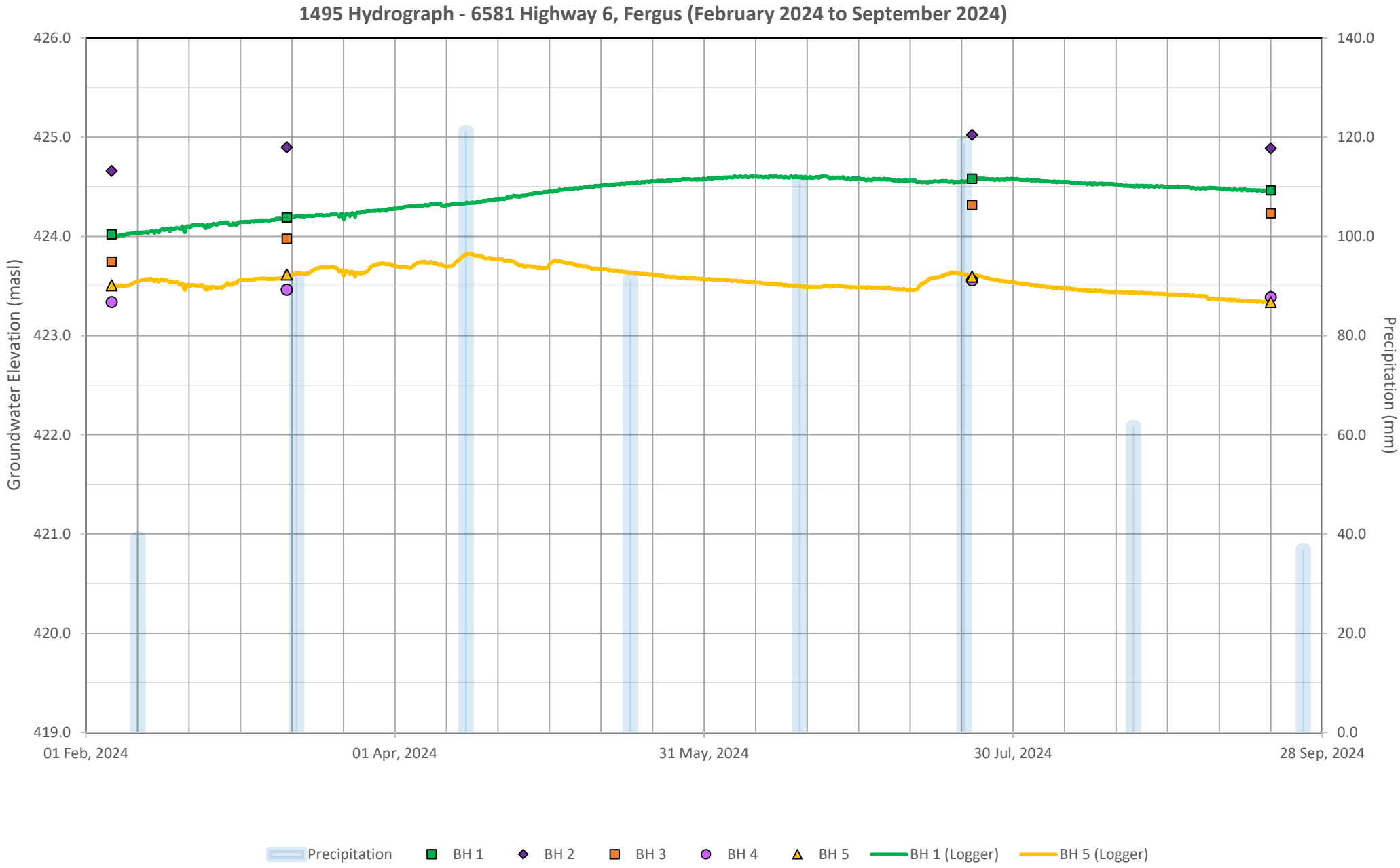
Table 1 – Water Level Measurements & Hydrograph (February 2024 to September 2024)

Table 1 - Summary of Water Levels, Elevations & Fluctuations

6581 Highway 6, Fergus
CVD Engineering Ltd.
Project: 1495

Well	Ground Elevation (mASL)	Top Pipe Elevation (mASL)	Pipe Length (m)	Hydraulic Conductivity (m/s)	Water Level (m Below Ground)							Water Elevation (m Above Sea Level)							Fluctuation Relative to February 6, 2024 (m)			
					10-Nov-23	12-Dec-23	06-Feb-24	11-Mar-24	22-Jul-24	12-Sep-24	18-Sep-24	10-Nov-23	12-Dec-23	06-Feb-24	11-Mar-24	22-Jul-24	12-Sep-24	18-Sep-24	11-Mar-24	22-Jul-24	12-Sep-24	18-Sep-24
BH 1	429.41	430.55	1.14	1×10^{-4}			5.39	5.22	4.83		4.94			424.02	424.19	**424.58**		424.46	0.17	0.56		0.44
BH 2	429.10	430.28	1.18	-			4.44	4.20	4.08		4.21			424.66	424.90	**425.02**		424.89	0.24	0.36		0.23
BH 3	428.87	429.89	1.02	-			5.12	4.89	4.55		4.64			423.75	423.98	**424.32**		424.23	0.23	0.57		0.49
BH 4	426.94	428.13	1.18	-			3.61	3.48	3.39		3.56			423.34	423.46	**423.56**		423.39	0.13	0.22		0.05
BH 5	425.61	426.87	1.26	9×10^{-5}			2.10	1.99	2.02		2.27			423.51	**423.62**	423.59		423.34	0.11	0.09		-0.17
BH 101	428.68	429.79	1.10	-						3.80	3.82						**424.88**	424.87				
BH 102	429.37	430.36	0.99	-						4.64	4.65						**424.73**	424.72				
BH 103	428.31	429.27	0.96	-						3.76	3.77						**424.55**	424.53				
BH 104	427.36	428.60	1.25	-						2.97	3.00						**424.39**	424.36				
BH 105	428.15	429.20	1.05	-						4.44	4.45						**423.71**	423.70				

Notes:
1) All Elevations Referenced to Geodetic Survey by CVD.
2) **Bolded** elevations represent the maximum water table aquifer elevation measured at each monitoring well throughout all seasons.
3) Negative water level indicates that water level is above ground.
4) : Monitoring well/piezometer dry
5) Negative fluctuation indicates drop in water level relative to baseline.


1495 Hydrograph - 6581 Highway 6, Fergus (February 2024 to September 2024)
Groundwater Elevation (masl)
Precipitation (mm)
426.0
425.0
424.0
423.0
422.0
421.0
420.0
419.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
01 Feb, 2024
01 Apr, 2024
31 May, 2024
30 Jul, 2024
28 Sep, 2024
Precipitation
BH 1
BH 2
BH 3
BH 4
BH 5
BH 1 (Logger)
BH 5 (Logger)

APPENDIX E

Water Balance Calculation

Pre-Development Water Budget Calculations - 6581 Highway 6, Fergus **Feb-25**

Pervious Areas (Cultivated Land and Grassed Pasture, with Trees and Shubs)

Determination of Evapotranspiration and Water Balance Components - by Water Balance Method (Thornthwaite & Mather, 1957)

Precipitation: Fergus Shand Dam (1981-2010), Vegetation: Moderately-Deep Crops, Mature Grasses with Trees/Shubs, Soil: Fine Sand and Clay

	Units	Annual	% Total	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Temperature	deg C	**6.68**		-7.4	-6.3	-1.9	5.7	12.2	17.5	20.0	19.0	14.9	8.3	2.1	-3.9
Heat Index (i)	-	**35.09**		0.00	0.00	0.00	1.22	3.86	6.66	8.16	7.55	5.22	2.15	0.27	0.00
Unadjusted PET (UPET)	mm/day	**1.038**		0.00	0.00	0.00	0.87	1.91	2.78	3.20	3.03	2.35	1.28	0.31	0.00
latitude correction (r)	-			24.3	24.5	30.6	33.6	37.9	38.5	38.8	36	31.2	28.5	24.2	23
Potential Evapotranspiration (PET)	mm	**559.3**		0.0	0.0	0.0	29.2	72.5	107.1	124.0	109.1	73.5	36.5	7.4	0.0
Precipitation (P)	mm	**945.9**	**100.0**	67.9	55.9	59.6	74.1	86.9	83.8	89.2	96.6	93.1	77.2	93	68.6
P - PET	mm			67.9	55.9	59.6	44.9	14.4	-23.3	-34.8	-12.5	19.6	40.7	85.6	68.6
Accum. Water Loss	mm							0.0	-23.3	-58.1	-70.6				
Soil Moisture Retention (Storage - ST)	mm			75.0	75.0	75.0	75.0	75.0	54.0	34.0	28.0	47.6	75.0	75.0	75.0
Storage Change (ΔST)	mm			75.0	0.0	0.0	0.0	0.0	-21.0	-20.0	-6.0	19.6	27.4	0.0	0.0
Actual Evapotranspiration (AE)	mm	**535.7**	**56.6**	0.0	0.0	0.0	29.2	72.5	104.8	109.2	102.6	73.5	36.5	7.4	0.0
Water Balance as Surplus/Deficit	mm	**410.2**	**43.4**	67.9	55.9	59.6	44.9	14.4	-21.0	-20.0	-6.0	19.6	40.7	85.6	68.6
Determination of Water Balance as 'Combined-Runoff' (Recharge + Direct Runoff) - (using WBM Assumptions)															
Soil Moisture Surplus (SMS)	mm	**158.2**		0.0	0.0	0.0	44.9	14.4	0.0	0.0	0.0	0.0	13.3	85.6	0.0
Water Balance from SMS (Assumption 1)	mm	**144.8**		10.8	5.4	2.7	23.8	19.1	9.6	4.8	2.4	1.2	0.6	43.1	21.5
				0.03	0.01	0.00	0.00	7.20	3.60	1.80	0.90	0.45	0.22	0.11	0.06
				0.04	0.02	0.01	22.47	11.23	5.62	2.81	1.40	0.70	0.35	0.18	0.09
				10.69	5.35	2.67	1.34	0.67	0.33	0.17	0.08	0.04	0.02	42.78	21.39
Accumulated Snow (Assumption 2)	mm	**252.0**		0.0	0.0	0.0	252.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Balance from Snow (Assumption 3)	mm	**252.0**		0.5	0.3	0.1	25.2	113.4	56.7	28.4	14.2	7.1	3.5	1.8	0.9
Water Balance as 'Combined-Runoff'	mm	**396.8**	**42.0**	11.3	5.7	2.8	49.0	132.5	66.3	33.1	16.6	8.3	4.1	44.8	22.4

Assumptions for Monthly 'Combined-Runoff' Estimations (from WBM):

1 - Combined 'Runoff' from the Soil Moisture Surplus is assumed to be 50% in the first month and then 50% of the remaining soil surplus each following month.

2 - All Snow is Accumulated and Stored throughout Winter Sub-Zero Months (i.e. No melt until first above-zero month)

3 - Combined 'Runoff' from Snowmelt is assumed to be 10% of the Accumulated Snow in the first month and then 50% of the remaining snowmelt in each following month.

Determination of Recharge + Direct Runoff Components - using MOE Infiltration Factor Method (MOE 1995, 2003)

Catchment Area (m^2)	MOE Infiltration Factors (0 to 1.00)							Annual Rates				Annual Rates			
								EvapoT	Balance	Recharge	Runoff	EvapoT	Balance	Recharge	Runoff
	Topography		Soil		Cover		Sum	(mm)	(mm)	(mm)	(mm)	(m^3/yr)	(m^3/yr)	(m^3/yr)	(m^3/yr)
Pervious, Cultivated Land	Rolling	0.2	Sand	0.4	Cultivated	0.1	0.7	535.7	410.2	287.1	123.1	101,010	77,339	54,137	23,202
188,550 m2								56.6%	43.4%	30.4%	13.0%	56.6%	43.4%	30.4%	13.0%
Pervious, Pasture & Lawns	Rolling	0.2	Sand	0.4	Pasture	0.15	0.75	535.7	410.2	307.6	102.5	5,357	4,102	3,076	1,025
10,000 m2					& Lawns			56.6%	43.4%	32.5%	10.8%	56.6%	43.4%	32.5%	10.8%
Pervious, Woodland/Wetland	Rolling	0.2	Sand	0.4	Woodland	0.2	0.8	535.7	410.2	328.1	82.0	0	0	0	0
0 m2					& Wetland			56.6%	43.4%	34.7%	8.7%	0.0%	0.0%	0.0%	0.0%
Impervious Rooftops to Pervious Areas							0.25	94.6	851.3	212.8	638.5	163	1,464	366	1,098
1,720 m2								10.0%	90.0%	22.5%	67.5%	10.0%	90.0%	22.5%	67.5%
Total Site												106,530	82,905	57,580	25,325
200,270 m2												56.2%	43.8%	30.4%	13.4%

Assumptions for Evapotranspiration/Recharge/Runoff Proportioning

1 - Pervious Areas - by MOE Infiltration Factor Method (MOE 1995, 2003)

2 - Impervious Areas Shed to Pervious Areas - Assume 10% Lost to Evapotranspiration and Balance Split 25/75% to Recharge/Runoff

APPENDIX F

Water Chemistry Results
(AGAT Laboratories of Mississauga, Ontario)

AGAT Laboratories

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CLIENT NAME: CHUNG AND VANDER DOELEN
311 VICTORIA STREET NORTH
KITCHENER, ON N2H5E1
(519) 742-8979
ATTENTION TO: Yaroslav Chudin
PROJECT: 1495
AGAT WORK ORDER: 24T129206
WATER ANALYSIS REVIEWED BY: Yris Verastegui, Inorganic Team Lead
DATE REPORTED: Mar 22, 2024
PAGES (INCLUDING COVER): 10
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
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- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*

AGAT Laboratories

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 24T129206

PROJECT: 1495

CLIENT NAME: CHUNG AND VANDER DOELEN

ATTENTION TO: Yaroslav Chudin

SAMPLING SITE:968 ST. DAVID ST. N. FERGUS

SAMPLED BY:Y.C.

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2024-03-13

DATE REPORTED: 2024-03-22

		SAMPLE DESCRIPTION:		BH1	BH5	BH6		BH7
		SAMPLE TYPE:		Water	Water	Water		Water
		DATE SAMPLED:		2024-03-11 11:30	2024-03-11 11:30	2024-03-11 11:30		2024-03-11 11:30
Parameter	Unit	G / S	RDL	5722603	5722663	5722665	RDL	5722666
Electrical Conductivity	µS/cm		2	480	497	596	2	1620
pH	pH Units	6.5-8.5	NA	7.43	7.64	7.62	NA	7.41
Saturation pH (Calculated)				6.53	6.62	6.72		6.36
Langelier Index (Calculated)				0.896	1.02	0.896		1.05
Hardness (as CaCO3) (Calculated)	mg/L		0.5	679	688	664	0.5	1260
Total Dissolved Solids	mg/L		10	224	338	412	10	706
Alkalinity (as CaCO3)	mg/L		5	291	255	206	5	271
Bicarbonate (as CaCO3)	mg/L		5	291	255	206	5	271
Carbonate (as CaCO3)	mg/L		5	<5	<5	<5	5	<5
Hydroxide (as CaCO3)	mg/L		5	<5	<5	<5	5	<5
Fluoride	mg/L		0.05	<0.05	<0.05	<0.05	0.05	<0.05
Chloride	mg/L		0.10	9.18	2.04	27.3	0.12	269
Nitrate as N	mg/L		0.05	1.48	12.8	24.9	0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05	0.05	<0.05
Bromide	mg/L		0.05	<0.05	<0.05	<0.05	0.05	<0.05
Sulphate	mg/L		0.10	1.62	30.1	6.71	0.10	31.5
Ortho Phosphate as P	mg/L		0.10	<0.10	<0.10	<0.10	0.10	<0.10
Ammonia as N	mg/L		0.02	0.05	0.06	<0.02	0.02	0.03
Ammonia-Un-ionized (Calculated)	mg/L	0.02	0.000002	0.000774	0.00151	<0.000002	0.000002	0.000453
Total Phosphorus	mg/L	*	0.02	0.73	0.74	1.22	0.06	2.03
Total Organic Carbon	mg/L		0.5	7.6	9.2	8.4	0.5	14.4
True Colour	TCU		2.50	<2.50	<2.50	<2.50	2.50	4.55
Turbidity	NTU		0.5	92.5	192	60.3	0.5	97.6
Total Calcium	mg/L		0.20	204	209	192	0.20	394
Total Magnesium	mg/L		0.10	41.1	40.4	44.9	0.10	65.9
Total Potassium	mg/L		0.50	3.04	3.57	3.32	0.50	6.64
Total Sodium	mg/L		0.10	3.94	4.32	3.03	0.10	98.5
Aluminum-dissolved	mg/L	*	0.004	0.004	0.008	<0.004	0.004	<0.004
Total Antimony	mg/L	0.020	0.003	<0.003	<0.003	<0.003	0.003	<0.003

Certified By: Iris Verástegui

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 24T129206

PROJECT: 1495

CLIENT NAME: CHUNG AND VANDER DOELEN

ATTENTION TO: Yaroslav Chudin

SAMPLING SITE:968 ST. DAVID ST. N. FERGUS

SAMPLED BY:Y.C.

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2024-03-13

DATE REPORTED: 2024-03-22

		SAMPLE DESCRIPTION:		BH1	BH5	BH6		BH7
		SAMPLE TYPE:		Water	Water	Water		Water
		DATE SAMPLED:		2024-03-11 11:30	2024-03-11 11:30	2024-03-11 11:30		2024-03-11 11:30
Parameter	Unit	G / S	RDL	5722603	5722663	5722665	RDL	5722666
Total Arsenic	mg/L	0.1	0.003	0.006	0.008	0.007	0.003	0.007
Total Barium	mg/L		0.002	0.043	0.059	0.050	0.002	0.203
Total Beryllium	mg/L	*	0.001	<0.001	<0.001	<0.001	0.001	<0.001
Total Boron	mg/L	0.2	0.010	0.026	0.031	0.017	0.010	0.031
Total Cadmium	mg/L	0.0002	0.0001	**0.0003**	**0.0003**	**0.0003**	0.0001	**0.0004**
Total Chromium	mg/L		0.003	0.011	0.018	0.011	0.003	0.042
Total Cobalt	mg/L	0.0009	0.0005	**0.0066**	**0.0096**	**0.0084**	0.0005	**0.0137**
Total Copper	mg/L	0.005	0.002	**0.021**	**0.029**	**0.030**	0.002	**0.037**
Total Iron	mg/L	0.3	0.050	**12.2**	**18.0**	**15.2**	0.050	**31.5**
Total Lead	mg/L	*	0.0005	0.0224	0.0322	0.0318	0.0005	0.0249
Total Manganese	mg/L		0.002	0.651	0.860	0.991	0.002	1.03
Total Mercury	mg/L		0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
Total Molybdenum	mg/L	0.040	0.002	<0.002	<0.002	<0.002	0.002	<0.002
Total Nickel	mg/L	0.025	0.003	0.012	0.019	0.018	0.003	**0.032**
Total Selenium	mg/L	0.1	0.002	<0.002	0.004	<0.002	0.002	0.004
Total Silver	mg/L	0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
Total Strontium	mg/L		0.005	0.298	0.281	0.304	0.005	0.670
Total Thallium	mg/L	0.0003	0.0003	<0.0003	<0.0003	<0.0003	0.0003	<0.0003
Total Tin	mg/L		0.002	0.002	0.002	0.002	0.002	<0.002
Total Titanium	mg/L		0.010	0.199	0.325	0.302	0.010	0.832
Total Tungsten	mg/L	0.030	0.010	<0.010	<0.010	<0.010	0.010	<0.010
Total Uranium	mg/L	0.005	0.0005	<0.0005	0.0006	<0.0005	0.0005	0.0023
Total Vanadium	mg/L	0.006	0.002	**0.017**	**0.022**	**0.017**	0.002	**0.052**
Total Zinc	mg/L	0.030	0.020	**0.153**	**0.185**	**0.136**	0.020	**0.498**
Total Zirconium	mg/L	0.004	0.004	<0.004	<0.004	<0.004	0.004	0.004
Lab Filtration Aluminum Dissolved				Y	Y	Y		Y

Certified By: Iris Verástegui

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Certificate of Analysis

AGAT WORK ORDER: 24T129206

PROJECT: 1495

CLIENT NAME: CHUNG AND VANDER DOELEN

ATTENTION TO: Yaroslav Chudin

SAMPLING SITE:968 ST. DAVID ST. N. FERGUS

SAMPLED BY:Y.C.

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2024-03-13

DATE REPORTED: 2024-03-22

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5722603-5722666 Dilution required, RDL has been increased accordingly.
Un-ionized Ammonia detection limit is a calculated RDL. The calculation of Un-ionized Ammonia is based on lab measured parameters (ammonia as N, pH and temperature).Values are reported as calculated.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

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Exceedance Summary

AGAT WORK ORDER: 24T129206

PROJECT: 1495

CLIENT NAME: CHUNG AND VANDER DOELEN

ATTENTION TO: Yaroslav Chudin

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
5722603	BH1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cadmium	mg/L	0.0002	0.0003
5722603	BH1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cobalt	mg/L	0.0009	0.0066
5722603	BH1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Copper	mg/L	0.005	0.021
5722603	BH1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	12.2
5722603	BH1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Vanadium	mg/L	0.006	0.017
5722603	BH1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Zinc	mg/L	0.030	0.153
5722663	BH5	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cadmium	mg/L	0.0002	0.0003
5722663	BH5	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cobalt	mg/L	0.0009	0.0096
5722663	BH5	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Copper	mg/L	0.005	0.029
5722663	BH5	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	18.0
5722663	BH5	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Vanadium	mg/L	0.006	0.022
5722663	BH5	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Zinc	mg/L	0.030	0.185
5722665	BH6	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cadmium	mg/L	0.0002	0.0003
5722665	BH6	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cobalt	mg/L	0.0009	0.0084
5722665	BH6	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Copper	mg/L	0.005	0.030
5722665	BH6	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	15.2
5722665	BH6	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Vanadium	mg/L	0.006	0.017
5722665	BH6	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Zinc	mg/L	0.030	0.136
5722666	BH7	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cadmium	mg/L	0.0002	0.0004
5722666	BH7	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cobalt	mg/L	0.0009	0.0137
5722666	BH7	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Copper	mg/L	0.005	0.037
5722666	BH7	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	31.5
5722666	BH7	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Nickel	mg/L	0.025	0.032
5722666	BH7	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Vanadium	mg/L	0.006	0.052
5722666	BH7	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Zinc	mg/L	0.030	0.498

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Quality Assurance

CLIENT NAME: CHUNG AND VANDER DOELEN

AGAT WORK ORDER: 24T129206

PROJECT: 1495

ATTENTION TO: Yaroslav Chudin

SAMPLING SITE:968 ST. DAVID ST. N. FERGUS

SAMPLED BY:Y.C.

Water Analysis

RPT Date: Mar 22, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment - PWQO (mg/L)															
Electrical Conductivity	5722603	5722603	480	477	0.6%	< 2	104%	90%	110%						
pH	5722603	5722603	7.43	7.55	1.6%	NA	99%	90%	110%						
Total Dissolved Solids	5720157		190	168	12.3%	< 10	92%	80%	120%						
Alkalinity (as CaCO3)	5722603	5722603	291	306	5.0%	< 5	95%	80%	120%						
Bicarbonate (as CaCO3)	5722603	5722603	291	306	5.0%	< 5	NA								
Carbonate (as CaCO3)	5722603	5722603	<5	<5	NA	< 5	NA								
Hydroxide (as CaCO3)	5722603	5722603	<5	<5	NA	< 5	NA								
Fluoride	5718363		<0.05	<0.05	NA	< 0.05	105%	70%	130%	91%	80%	120%	98%	70%	130%
Chloride	5718363		153	152	0.7%	< 0.10	96%	70%	130%	91%	80%	120%	NA	70%	130%
Nitrate as N	5718363		<0.05	<0.05	NA	< 0.05	100%	70%	130%	98%	80%	120%	100%	70%	130%
Nitrite as N	5718363		<0.05	<0.05	NA	< 0.05	101%	70%	130%	101%	80%	120%	109%	70%	130%
Bromide	5718363		<0.05	<0.05	NA	< 0.05	105%	70%	130%	96%	80%	120%	95%	70%	130%
Sulphate	5718363		<0.10	<0.10	NA	< 0.10	94%	70%	130%	94%	80%	120%	94%	70%	130%
Ortho Phosphate as P	5718363		<0.10	<0.10	NA	< 0.10	101%	70%	130%	104%	80%	120%	105%	70%	130%
Ammonia as N	5724966		<0.02	<0.02	NA	< 0.02	108%	70%	130%	105%	80%	120%	103%	70%	130%
Total Phosphorus	5737950		0.05	0.05	NA	< 0.02	99%	70%	130%	99%	80%	120%	105%	70%	130%
Total Organic Carbon	5720157		1.8	1.7	NA	< 0.5	98%	90%	110%	98%	90%	110%	99%	80%	120%
True Colour	5720157		<2.50	<2.50	NA	< 2.5	100%	90%	110%						
Turbidity	5722603	5722603	92.5	144	43.6%	< 0.5	90%	80%	120%						
Total Calcium	5724836		80.1	80.4	0.4%	< 0.20	113%	70%	130%	107%	80%	120%	108%	70%	130%
Total Magnesium	5724836		6.75	6.85	1.5%	< 0.10	118%	70%	130%	111%	80%	120%	94%	70%	130%
Total Potassium	5724836		5.43	5.50	1.3%	< 0.50	113%	70%	130%	106%	80%	120%	97%	70%	130%
Total Sodium	5724836		858	817	4.9%	< 0.10	114%	70%	130%	108%	80%	120%	NA	70%	130%
Aluminum-dissolved	5722603	5722603	0.004	0.005	NA	< 0.004	104%	70%	130%	110%	80%	120%	104%	70%	130%
Total Antimony	5724836		<0.003	<0.003	NA	< 0.003	105%	70%	130%	105%	80%	120%	100%	70%	130%
Total Arsenic	5724836		<0.003	<0.003	NA	< 0.003	99%	70%	130%	105%	80%	120%	102%	70%	130%
Total Barium	5724836		0.009	0.010	NA	< 0.002	100%	70%	130%	105%	80%	120%	97%	70%	130%
Total Beryllium	5724836		<0.001	<0.001	NA	< 0.001	104%	70%	130%	115%	80%	120%	94%	70%	130%
Total Boron	5724836		0.072	0.076	5.4%	< 0.010	101%	70%	130%	112%	80%	120%	93%	70%	130%
Total Cadmium	5724836		0.0002	0.0002	NA	< 0.0001	102%	70%	130%	106%	80%	120%	98%	70%	130%
Total Chromium	5724836		0.005	0.005	NA	< 0.003	100%	70%	130%	106%	80%	120%	105%	70%	130%
Total Cobalt	5724836		0.0013	0.0015	NA	< 0.0005	101%	70%	130%	104%	80%	120%	103%	70%	130%
Total Copper	5724836		0.026	0.026	0.0%	< 0.002	99%	70%	130%	106%	80%	120%	98%	70%	130%
Total Iron	5724836		1.68	1.67	0.6%	< 0.050	102%	70%	130%	112%	80%	120%	108%	70%	130%
Total Lead	5724836		0.0079	0.0081	2.5%	< 0.0005	101%	70%	130%	98%	80%	120%	89%	70%	130%
Total Manganese	5724836		0.383	0.389	1.6%	< 0.002	103%	70%	130%	109%	80%	120%	105%	70%	130%
Total Mercury	5722014		<0.0001	<0.0001	NA	< 0.0001	100%	70%	130%	97%	80%	120%	98%	70%	130%
Total Molybdenum	5724836		0.009	0.010	NA	< 0.002	106%	70%	130%	91%	80%	120%	116%	70%	130%
Total Nickel	5724836		0.030	0.028	6.9%	< 0.003	102%	70%	130%	105%	80%	120%	101%	70%	130%

AGAT Laboratories

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Quality Assurance

CLIENT NAME: CHUNG AND VANDER DOELEN

AGAT WORK ORDER: 24T129206

PROJECT: 1495

ATTENTION TO: Yaroslav Chudin

SAMPLING SITE:968 ST. DAVID ST. N. FERGUS

SAMPLED BY:Y.C.

Water Analysis (Continued)

RPT Date: Mar 22, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Selenium	5724836		0.004	0.006	NA	< 0.002	101%	70%	130%	108%	80%	120%	101%	70%	130%
Total Silver	5724836		0.0001	<0.0001	NA	< 0.0001	103%	70%	130%	110%	80%	120%	96%	70%	130%
Total Strontium	5724836		1.15	1.14	0.9%	< 0.005	104%	70%	130%	109%	80%	120%	99%	70%	130%
Total Thallium	5724836		<0.0003	<0.0003	NA	< 0.0003	92%	70%	130%	105%	80%	120%	94%	70%	130%
Total Tin	5724836		<0.002	<0.002	NA	< 0.002	100%	70%	130%	109%	80%	120%	105%	70%	130%
Total Titanium	5724836		<0.010	<0.010	NA	< 0.010	102%	70%	130%	110%	80%	120%	106%	70%	130%
Total Tungsten	5724836		<0.010	<0.010	NA	< 0.010	94%	70%	130%	100%	80%	120%	97%	70%	130%
Total Uranium	5724836		<0.0005	<0.0005	NA	< 0.0005	92%	70%	130%	109%	80%	120%	106%	70%	130%
Total Vanadium	5724836		0.003	0.002	NA	< 0.002	103%	70%	130%	110%	80%	120%	111%	70%	130%
Total Zinc	5724836		0.119	0.125	4.9%	< 0.020	100%	70%	130%	105%	80%	120%	93%	70%	130%
Total Zirconium	5724836		<0.004	<0.004	NA	< 0.004	101%	70%	130%	106%	80%	120%	109%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By: Iris Verástegui

AGAT Laboratories

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Method Summary

CLIENT NAME: CHUNG AND VANDER DOELEN

AGAT WORK ORDER: 24T129206

PROJECT: 1495

ATTENTION TO: Yaroslav Chudin

SAMPLING SITE:968 ST. DAVID ST. N. FERGUS

SAMPLED BY:Y.C.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Saturation pH (Calculated)		SM 2320 B	CALCULATION
Langelier Index (Calculated)		SM 2330B	CALCULATION
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Ammonia-Un-ionized (Calculated)		MOE REFERENCE, PWQOs Tab 2	CALCULATION
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
True Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Turbidity	INOR-93-6000	modified from SM 2130 B	PC TITRATE
Total Calcium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Magnesium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Potassium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Sodium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

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Method Summary

CLIENT NAME: CHUNG AND VANDER DOELEN

AGAT WORK ORDER: 24T129206

PROJECT: 1495

ATTENTION TO: Yaroslav Chudin

SAMPLING SITE:968 ST. DAVID ST. N. FERGUS

SAMPLED BY:Y.C.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Thallium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tungsten	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zirconium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Lab Filtration Aluminum Dissolved	SR-78-9001		FILTRATION

GAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
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webearth.agatlabs.com

Have feedback? Scan here for a quick survey!

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 24T129206

Cooler Quantity: 1 med.

Arrival Temperatures: 3.7 | 3.9 | 4.3

Depot Temperatures: | |

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: courier

Report Information:

Company: CVD Engineering Ltd.

Contact: Yaroslav Chudin

Address: 311 Victoria St. N., Kitchener, N2H 5E1

Phone: Fax:

Reports to be sent to:

1. Email: yaroslav.chudin@cvdengineering.com

2. Email:

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Regulation 406
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture

☐ Regulation 558

☐ CCME

☐ Sewer Use ☐ Sanitary ☐ Storm
Region

☑ Prov. Water Quality Objectives (PWQO)

☐ Other
Indicate One

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT

**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CSR

Project Information:

Project: 1495

Site Location: 968 St. David St. N., Fergus

Sampled By: Y.C.

AGAT Quote #: PO:

Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a **Record of Site Condition (RSC)**? ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:

Contact:

Address:

Email: ap@cvdengineering.com

Legal Sample ☐

Sample Matrix Legend

GW	Ground Water	**SD**	Sediment
O	Oil	**SW**	Surface Water
P	Paint	**R**	Rock/Shale
S	Soil		

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	BTEX, F1-F4 PHCs	VOC	PAHs	PCBs: Aroclors ☐	O. Reg 406: Regulation 406 Characterization Package pH, Metals, BTEX, F1-F4	EC, SAR	Regulation 406 SPLP Rainwater Leach mSPLP: ☐ Metals ☐ VOCs ☐ SVOCs ☐ OC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Corrosivity: ☐ Moisture ☐ Sulphide	"Routine Water Analysis" Package						Potentially Hazardous or High Concentration (Y/N)
1. RH1	March 11/24	11:30 AM PM	3	GW		N												✓						
2. RH5	"	12:30 AM PM	3	"		N												✓						
3. RH6	"	1:45 AM PM	3	"		N												✓						
4. RH7	"	3:15 AM PM	3	"		N												✓						
5.		AM PM																						
6.		AM PM																						
7.		AM PM																						
8.		AM PM																						
9.		AM PM																						
10.		AM PM																						
11.		AM PM																						

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Yaroslav Chudin	March 13/24	12:00 p.m.		Mar 13	1:46
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 1

N°: T-153484

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

APPENDIX G

MECP Well Records

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 6709834 — MUNICIP 67009 — CON. CON 16

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON BLOCK, TRACT, SURVEY, ETC	LOT
Wellington	Nichol	XVI	17

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
Fergus PUC	P.O. Box 10, Fergus, Ont. N1M 2W7	DAY 15 MO 5 YR 89

21 — ZONE — EASTING — NORTHING — 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
Brown	Clay	Fill, Gravel Silt		0	18
Brown	Clay	Gravel		18	24
Grey	Clay	Gravel		24	84
Grey	Limestone			84	165
Brown	Limestone			165	213
Grey	Limestone			213	225
Brown	Limestone			225	232
Lt.Grey	Limestone			232	315
Brown	Limestone			315	378
Grey	Limestone			378	400
White	Limestone			400	402

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
128' – 402'	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
12	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.375	109.5 +1.5	109.5
11	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC	109.5	109.5	402
	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	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
0	109.5	12" casing cemented
		in 18" dia. open hole

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	350 GPM	24 HOURS – MINS

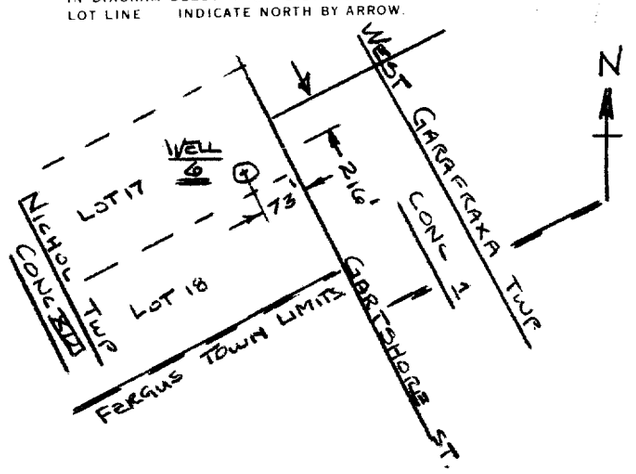
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
57.51 FEET	153.29 FEET		109.52 FEET	112.41 FEET	– FEET	115.75 FEET

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	250 FEET	300 GPM

LOCATION OF WELL 6

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



31325

DRILLERS REMARKS

FINAL STATUS OF WELL	WATER USE	METHOD OF CONSTRUCTION
1 ☒ WATER SUPPLY	1 ☐ DOMESTIC	1 ☐ CABLE TOOL
2 ☐ OBSERVATION WELL	2 ☐ STOCK	2 ☒ ROTARY (CONVENTIONAL)
3 ☐ TEST HOLE	3 ☐ IRRIGATION	3 ☐ ROTARY (REVERSE)
4 ☐ RECHARGE WELL	4 ☐ INDUSTRIAL	4 ☒ ROTARY (AIR)
5 ☐ ABANDONED, INSUFFICIENT SUPPLY	5 ☐ COMMERCIAL	5 ☐ AIR PERCUSSION
6 ☐ ABANDONED, POOR QUALITY	6 ☐ MUNICIPAL	6 ☐ BORING
7 ☐ UNFINISHED	7 ☒ PUBLIC SUPPLY	7 ☐ DIAMOND
9 ☐ DEWATERING	8 ☐ COOLING OR AIR CONDITIONING	8 ☐ JETTING
	9 ☐ NOT USED	9 ☐ DRIVING
	☐ OTHER	☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR	WELL CONTRACTOR'S LICENCE NUMBER
International Water Supply,Ltd.	2801

ADDRESS
342 Bayview Dr., Barrie, Ont. L4M 4T5

NAME OF WELL TECHNICIAN	WELL TECHNICIAN'S LICENCE NUMBER
R.C. Magee	T0117

SIGNATURE OF TECHNICIAN/CONTRACTOR	SUBMISSION DATE
[signature]	DAY 14 MO 07 YR 89

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
	2801	JUL 20 1989

DATE OF INSPECTION	INSPECTOR

REMARKS

CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

6710068 MUNICIP 67009 CON CON 15

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Wellington	Nichol	XV	20

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
W. Dixon & Sons Ltd.	745 St. David St. N., Fergus, Ont. N1M 2L1	DAY 29 MO 02 YR 89

21 ZONE | EASTING | NORTHING | 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
	Gravel	Fill		0	3
Br.	Clay	Stones		3	20
Gr.	Clay			20	30
Gr.	Clay	Stones		30	77
Br./Gr.	Limestone			77	96
Gr.	Limestone			96	125
Br.	Limestone			125	265

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
225 to 264	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
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	85
6 1/8	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		85	265
	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.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER — AIR

PUMPING RATE: 20 GPM

DURATION OF PUMPING: 1 HOURS 15 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
97 FEET	140 FEET	140 FEET	140 FEET	140 FEET	140 FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

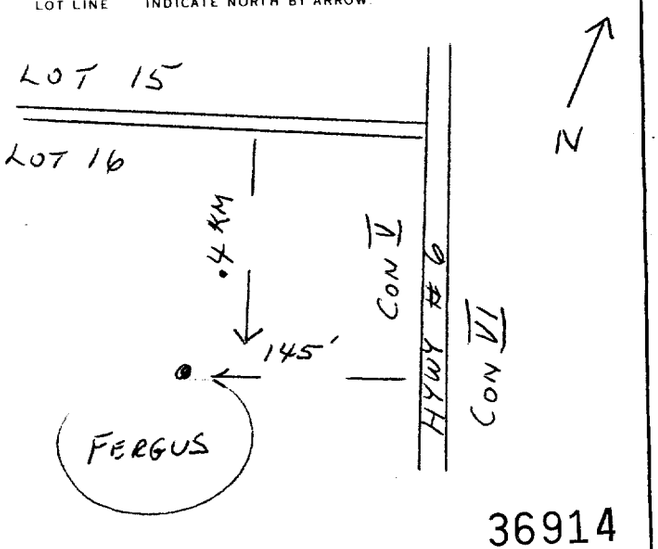
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING: 160 FEET

RECOMMENDED PUMPING RATE: 18 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



36914

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 9 ☐ DEWATERING

WATER USE

1 ☐ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☒ COOLING OR AIR CONDITIONING 9 ☐ NOT USED ☐ OTHER

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: Langdrill Drilling Ltd. — WELL CONTRACTOR'S LICENCE NUMBER: 3317

ADDRESS: R.R.1 Dillsburgh Ont.

NAME OF WELL TECHNICIAN: Roy LANG — WELL TECHNICIAN'S LICENCE NUMBER: T-0158

SIGNATURE OF TECHNICIAN/CONTRACTOR: R. Lang

SUBMISSION DATE: DAY 31 MO 10 YR 89

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 3317 | DATE RECEIVED NOV 15 1989

DATE OF INSPECTION | INSPECTOR

REMARKS

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FORM NO. 0506 (11/86) FORM 9

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

25-97

11 6712246 Municipality 67009 Con. CON 15

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
[redacted]	NICHOL TWP	15	18

Address: P.O. BOX 6 FERGUS, ONT N1M-2W7

Date completed: 21 day 05 month 97 year

Northing | 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	SAND			0	30
GREY	CLAY	SAND		30	50
GREY	CLAY	GRAVEL		50	94
BROWN	ROCK			94	115
GREY	ROCK			115	140
			TOTAL DEPTH	140'	
		6" DRIVE SHOE.			

41 WATER RECORD

Water found at – feet	Kind of water
	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	95
6"	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☒ Open hole 5 ☐ Plastic		95	140
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter	Length
	inches	feet
Material and type	Depth at top of screen	feet

61 PLUGGING & SEALING RECORD

☒ Annular space ☐ Abandonment

Depth set at – feet From	Depth set at – feet To	Material and type (Cement grout, bentonite, etc.)
0	25	BENTONITE

71 PUMPING TEST

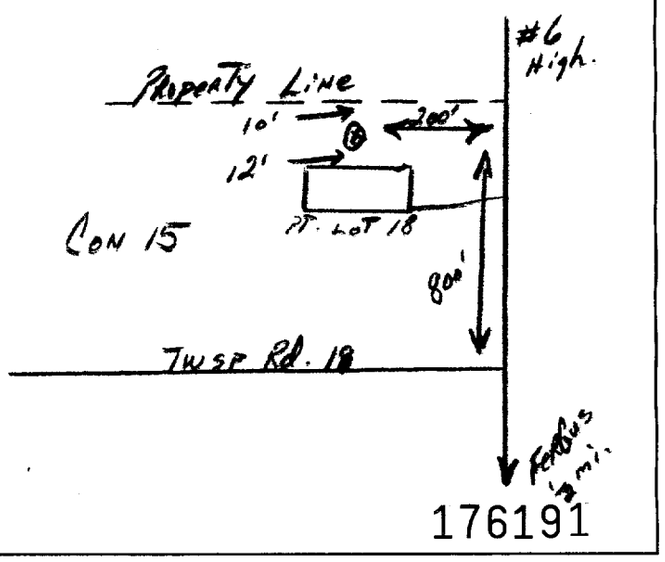
Pumping test method: 1 ☒ Pump 2 ☐ Bailer
Pumping rate: 3 GPM
Duration of pumping: ..1.. Hours ..0.. Mins

Static level	Water level end of pumping	Water levels during: 1 ☒ Pumping 2 ☐ Recovery			
		15 minutes	30 minutes	45 minutes	60 minutes
44 feet	125 feet	125 feet	125 feet	125 feet	125 feet

If flowing give rate: GPM
Pump intake set at: feet
Water at end of test: ☒ Clear ☐ Cloudy
Recommended pump type: ☐ Shallow ☒ Deep
Recommended pump setting: 135 feet
Recommended pump rate: 3 GPM

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



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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 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE

1 ☒ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not used 10 ☐ Other

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 10 ☐ Digging 11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
GRAHAM WELL DRILLING LTD	2336
Address: RR#5 ROCKWOOD, ONT. N0B-2K0	
Name of Well Technician: Jim Wilson	Well Technician's Licence No.: T-1924
Signature of Technician/Contractor: Robert W. Graham	Submission date: 030 day 05 mo 97 yr

MINISTRY USE ONLY

Data source	Contractor	Date received
	2336	JUN 27 1997
Date of inspection	Inspector	
Remarks		

CSS. S

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Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 (1 2) 6713078 Municipality 67009 (10 14) Con. CON (15 22 23 24) 16

64-99

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot (25-27)
WELLINGTON	NICHOL TWP	16	16

Owner's surname (28-47) First name	Address	Date completed (48-53)
1188521 ONTARIO LTD	142 South River Rd. ELORA, ONT.	26 day 08 month 99 year

21 (1 2) U T M Zone (10) Easting (12 17) Northing (18 24) RC (25) Elevation (26 30) RC 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	Depth – feet To
BROWN	SAND			0	25
GREY	CLAY	STONES		25	70
GREY	CLAY	GRAVEL		70	83
BROWN	ROCK			83	115
GREY-BROWN	ROCK			115	190
			TOTAL DEPTH	190'	
		6" DRIVE SHOE			

31
32 (10 14 15 21 32 43 54 65 75 80)

41 WATER RECORD

Water found at – feet	Kind of water
(10-13) 190	1 ☒ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (14)
(15-18)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (19)
(20-23)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (24)
(25-28)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (29)
(30-33)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (34) (60)

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth – feet From	Depth – feet To
(10-11) 6"	1 ☒ Steel (12) 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	+1	84 (13-16)
(17-18) 6"	1 ☐ Steel (19) 2 ☐ Galvanized 3 ☐ Concrete 4 ☒ Open hole 5 ☐ Plastic		84	190 (20-23)
(24-25)	1 ☐ Steel (26) 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			(27-30)

SCREEN

Sizes of opening (Slot No.) (31-33)	Diameter (34-38) inches	Length (39-40) feet
Material and type	Depth at top of screen (41-44) feet	(30)

61 PLUGGING & SEALING RECORD

☒ Annular space ☐ Abandonment

Depth set at – feet From	Depth set at – feet To	Material and type (Cement grout, bentonite, etc.)
(10-13) 0	(14-17) 25	BENTONITE.
(18-21)	(22-25)	
(26-29)	(30-33) (80)	

71 PUMPING TEST

Pumping test method (10)	Pumping rate (11-14)	Duration of pumping (15-16) Hours (17-18) Mins
1 ☒ Pump 2 ☐ Bailer	7 GPM	1 Hours 0 Mins

Static level	Water level end of pumping	Water levels during (25) 1 ☒ Pumping 2 ☐ Recovery			
(19-21) 80 feet	(22-24) 120 feet	15 minutes (26-28) 93 feet	30 minutes (29-31) 104 feet	45 minutes (32-34) 115 feet	60 minutes (35-37) 120 feet

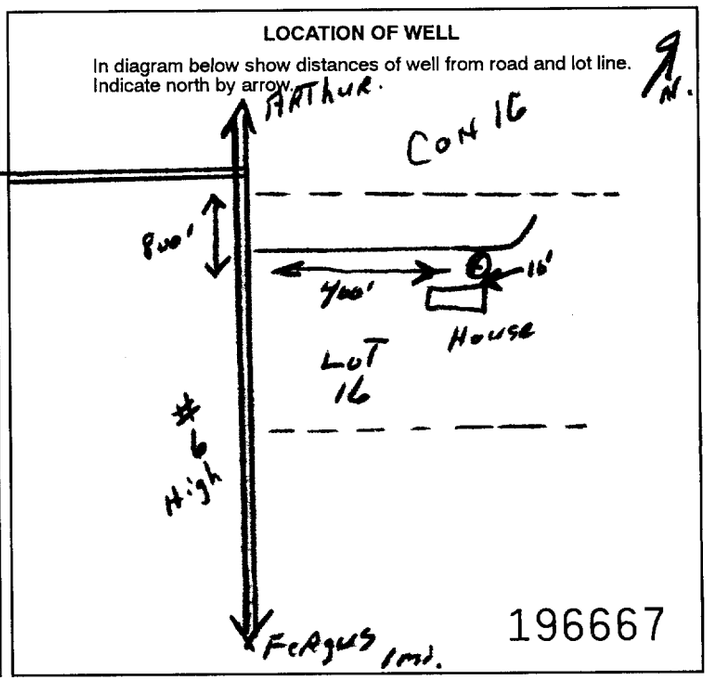
If flowing give rate (38-41)	Pump intake set at	Water at end of test (42)
GPM	feet	☒ Clear ☐ Cloudy

Recommended pump type	Recommended pump setting (43-45)	Recommended pump rate (46-49)
☐ Shallow ☒ Deep	130 feet	7 GPM

(50-53)

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



196667

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 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE (55-56)

1 ☒ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not used 10 ☐ Other

METHOD OF CONSTRUCTION (57)

1 ☐ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☒ Rotary (air) 5 ☐ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
GRAHAM WELL DRILLING LTD	2336
Address: RR#5 ROCKWOOD, ONT. N0B-2K0	
Name of Well Technician: Jim Wilson	Well Technician's Licence No. T-1924.
Signature of Technician/Contractor	Submission date: 31 day 08 mo 99 yr

MINISTRY USE ONLY

Data source (58)	Contractor (59-62)	Date received (63-68) (80)
	2336	SEP 08 1999
Date of inspection	Inspector	
Remarks		

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Ontario — Ministry of the Environment

Measurements recorded in: [x] Metric [ ] Imperial

Well Tag No. *(Place Sticker and/or Print Below)*

Tag#: A139028

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
6581 Hwy 6 N	West Garafraxa	12	1

County/District/Municipality	City/Town/Village	Province	Postal Code
Wellington	Fergus	Ontario	N1M2M3

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	548508	4840521		

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	Sand			0	10.66
Grey	Clay & stones			10.66	29.87
Grey	Clay			29.87	32.30
Brown	limestone			32.30	54.25

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	10m	Bentonite Grout	.25

Method of Construction

[ ] Cable Tool [ ] Diamond
[x] Rotary (Conventional) [ ] Jetting
[ ] Rotary (Reverse) [ ] Driving
[ ] Boring [ ] Digging
[ ] Air percussion
[ ] Other, *specify*

Well Use

[ ] Public [ ] Commercial [ ] Not used
[x] 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
15.9	steel	188	+.50	33.2

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Status of Well

[x] 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	
54.15 (m/ft)	[ ] Fresh [x] Untested	[ ] Gas [ ] Other, *specify*
(m/ft)	[ ] Fresh [ ] Untested	[ ] Gas [ ] Other, *specify*
(m/ft)	[ ] Fresh [ ] Untested	[ ] Gas [ ] Other, *specify*

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	33.2	22.8
33.2	54.25	15.6

Results of Well Yield Testing

After test of well yield, water was:
[x] Clear and sand free
[ ] Other, *specify*

If pumping discontinued, give reason:

Pump intake set at (m/ft): 175

Pumping rate (l/min / GPM): 5 IGPM

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 33.28

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 175

Recommended pump rate (l/min / GPM): 5 IGPM

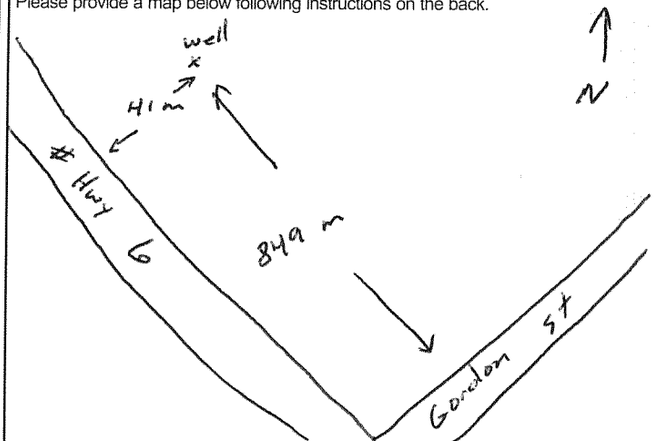
Well production (l/min / GPM):

Disinfected? [x] Yes [ ] No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	30.08		33.38
1	31.05	1	32.56
2	31.22	2	32.03
3	31.50	3	31.72
4	31.72	4	31.55
5	31.86	5	31.36
10	32.33	10	31.08
15	32.60	15	30.95
20	32.76	20	30.85
25	32.87	25	30.78
30	32.97	30	30.72
40	33.14	40	30.62
50	33.28	50	30.54
60	33.38	60	30.47

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Well Initiatives	7221

Business Address (Street Number/Name)	Municipality
15 Townline	Orangeville

Province	Postal Code	Business E-mail Address
ON	L9W3R4	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
5198468289	Losch Kim

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
T9217	Kim Losch	20130631

Well owner's information package delivered	Date Package Delivered	Date Work Completed
[ ] Yes [x] No	YYYY MM DD	20130613

Ministry Use Only

Audit No. Z159276

Receipt JUL 09 2013

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Ministry's Copy

APPENDIX H

Limitations of Report

STATEMENT OF LIMITATIONS

1. The work performed in this report was carried out in accordance with the Standard Terms of Conditions made part of our contract. The conclusions presented herein are based solely upon the scope of services and time and budgetary limitations described in our contract.

2. The report has been prepared in accordance with generally accepted hydrogeological study and/or engineering practices. No other warranties, either expressed or implied, are made as to the professional services provided under the terms of our contract and included in this report.

3. The services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the site which were unavailable for direct observation, reasonably beyond the control of CHUNG & VANDER DOELEN ENGINEERING LTD.

4. The objective of this report was to assess hydrogeological conditions at the site, within the context of our contract and hydrogeological assessment guidelines within the applicable jurisdiction. Evaluating compliance of past or future owners with applicable local, provincial and federal government laws and regulations was not included in our contract for services.

5. CHUNG & VANDER DOELEN ENGINEERING LTD. has relied in good faith on information and services provided by others while conducting the record search. We accept no responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omission, misinterpretation or fraudulent acts of the services used.

6. It should be noted that the observations and recommendations presented in this report are limited to the actual locations explored. The information presented in terms of the thickness and types of the subsoils encountered, groundwater levels, and chemical testing results, etc., are only applicable to the actual locations explored. Variations may be present between these locations. Should significant variation become apparent during later investigations, it may be necessary to reevaluate the findings of this report.

7. The conclusions of this report are based in part, on the information provided by others. The possibility remains that unexpected environmental conditions may be encountered at the site in locations not specifically investigated. Should such an event occur, CHUNG & VANDER DOELEN ENGINEERING LTD. must be notified in order that we may determine if modifications to our conclusions are necessary.

ENCLOSURES

Soil Abbreviations and Terms Used on Record of Borehole Sheets

TERMINOLOGY DESCRIBING COMMON SOIL TYPES:

Topsoil	-	mixture of soil and humus capable of supporting vegetation
Peat	-	mixture of visible and invisible fragments of decayed organic matter
Till	-	unstratified glacial deposit which may range from clay to boulders
Fill	-	soil materials identified as being placed anthropologically

CLASSIFICATION (UNIFIED SYSTEM)

Clay	<0.002mm		
Silt	0.002 to .075mm		
Sand	0.075 to 4.75mm		
		Fine	0.075 to 0.425 mm
		Medium	0.425 to 2.0 mm
		Coarse	2.0 to 4.75 mm
Gravel	4.75 to 75mm		
		Fine	4.75 to 19 mm
		Coarse	19 to 75 mm
Cobbles	75 to 300mm		
Boulders	>300mm		

TERMINOLOGY

Soil Composition	**% by Weight**
"traces"	<10%
"some"(eg. some silt)	10-20%
Adjective (eg. sandy)	20-35%
"and"(eg. sand and gravel)	35-50%

Standard Penetration Resistance (SPT): Standard Penetration Resistance ('N' Values) refers to the number of blows required to advance a standard (ASTM D1586) 51 mm Ø (2 inch) split-spoon sampler by the use of a free falling, 63.5 Kg (140lbs) hammer. The number of blows from the drop weight is recorded for every 15 cm (6 inches). The hammer is dropped from a distance of 0.76m (30 inches) providing 474.5 Joules per blow. When the sampler is driven a total of 45 cm (18 inches) into the soil, the standard penetration index ('N' Value) is the total number of blows for the last 30 cm (12 inches).

Dynamic Cone Penetration Resistance (DCPT): Dynamic Cone Penetration Resistance is similar to a SPT with the 474.5 Joule/blow impulse provided by the free falling hammer where the split-spoon sampler is replaced by a 51 mm Ø, 60˚ conical point and the number of blows is recorded continuously for every 30 cm (12 inches).

COHESIVE SOILS CONSISTENCY

	(kPa)	**(P.S.F.)**	**Nominal 'N' Value**
Very Soft	<12	<250	0-2
Soft	12-25	250-500	2-4
Firm	25-50	500-1000	4-8
Stiff	50-100	1000-2000	8-15
Very Stiff	100-200	2000-4000	15-30
Hard	>200	>4000	>30

RELATIVE DENSITY OF COHESIONLESS SOIL

	'N' Value
Very Loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

MOISTURE CONDITIONS:

Cohesive Soil
DTPL- Drier than plastic limit
APL- About plastic limit
WTPL- Wetter than plastic limit
MWTPL- Much wetter than plastic limit

Cohesionless Soil
Damp
Moist
Wet
Saturated

SAMPLE TYPES AND ADDITIONAL FIELD TESTS

SS	Split Spoon Sample (obtained from SPT)	**GS**	Grab Sample	**PP**	Pocket Penetrometer
		BS	Bulk Sample	**VANE**	Peak & Remolded shear
AS	Auger Sample	**TW**	Thin Wall Sample or Shelby Tube	**DMT**	Flat Plate Dilatometer

LABORATORY TESTS

SG	Specific Gravity	**S**	Sieve Analysis	**W**	Water Content
H	Hydrometer	**P**	Field Permeability	**K**	Lab Permeability
W_p	Plastic Limit	**W_l**	Liquid Limit	**I_p**	Plasticity Index
GSA	Grain Size Analysis	**C**	Consolidation	**UNC**	Unconfined compression

Enclosure No.: 1
Sheet 1 of 1

FILE No: 1495

BOREHOLE No. 1

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Jan 17 - 24** TO **Jan 17 - 24**

SOIL LITHOLOGY

Ground Elevation: **429.41 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)
429.16	250 mm TOPSOIL	
0.25	loose, orangey brown SANDY SILT moist	0.5
428.66		
0.75	loose to compact, brown Fine SAND trace silt moist	1.0
		1.5
		2.0
		2.5
		3.0
		3.5
		4.0
		4.5
		5.0
	---------- saturated	5.5
		6.0
		6.5
		7.0
		7.5
		8.0
421.16		
8.25	End of Borehole	8.5
		9.0
		9.5
		10.0
		10.5

SYMBOL

SAMPLE

SAMPLE ID	TYPE	N-VALUE
1	SS	5
2	SS	9
3	SS	9
4	SS	13
5	SS	19
6	SS	27
7	SS	17
8	SS	17

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

- above-ground steel casing set in concrete
- bentonite seal/50 mm I.D. PVC riser
- 3.05 m long, 50 mm I.D. PVC screen with sandpack
- water level in monitoring well measured at 5.39 m depth on February 6, 2024, and measured at 4.94 m depth on September 18, 2024

PROJECT MANAGER: **EYC**

CHUNG & VANDER DOELEN ENGINEERING LTD.
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Enclosure No.: 2
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FILE No: 1495

BOREHOLE No. 2

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Jan 17 - 24** TO **Jan 17 - 24**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **429.10 m**					FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ (50 100 150 200) PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ (20 40 60 80)	W_P W W_L (10 20 30)			
428.80	300 mm TOPSOIL									
0.30	loose, orangey brown SANDY SILT moist	0.5	1	SS	4				0.5	above-ground steel casing set in concrete
428.05		1.0	2	SS	4				1.0	bentonite seal/50 mm I.D. PVC riser
1.05	loose to compact, brown Fine SAND trace gravel, trace silt occ. silt seam with trace clay from 2.3± to 2.6± m bgs moist	1.5	3	SS	6				1.5	
		2.0							2.0	3.05 m long, 50 mm I.D. PVC screen with sandpack
		2.5	4	SS	4				2.5	
		3.0							3.0	
		3.5	5	SS	17				3.5	
	---------- saturated	4.0							4.0	water level in monitoring well measured at 4.44 m depth on February 6, 2024, and measured at 4.21 m depth on September 18, 2024
		4.5							4.5	
		5.0	6	SS	29				5.0	
		5.5							5.5	
		6.0							6.0	
422.40		6.5	7	SS	14				6.5	
6.70	End of Borehole	7.0							7.0	
		7.5							7.5	
		8.0							8.0	
		8.5							8.5	
		9.0							9.0	
		9.5							9.5	
		10.0							10.0	
		10.5							10.5	

PROJECT MANAGER: **EYC**

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FILE No: 1495

BOREHOLE No. 3

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Jan 16 - 24** TO **Jan 16 - 24**

Ground Elevation: **428.87 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
428.64	230 mm TOPSOIL					
0.23	firm, brown CLAYEY SANDY SILT trace gravel, trace topsoil, DTPL	0.5	1	SS	5	above-ground steel casing set in concrete
428.12						bentonite seal/50 mm I.D. PVC riser
0.75	compact to dense, brown Fine SAND trace silt moist	1.0	2	SS	13	
		1.5				
		2.0	3	SS	11	
		2.5				
		3.0	4	SS	10	
		3.5	5	SS	11	
		4.0				3.05 m long, 50 mm I.D. PVC screen with sandpack
		4.5				water level in monitoring well measured at 5.12 m depth on February 6, 2024, and measured at 4.64 m depth on September 18, 2024
	---------- saturated	5.0	6	SS	31	
		5.5				
		6.0				
		6.5	7	SS	18	
		7.0				
		7.5				
		8.0	8	SS	15	
420.62						
8.25	End of Borehole	8.5				
		9.0				
		9.5				
		10.0				
		10.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

PROJECT MANAGER: **EYC**

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FILE No: 1495

BOREHOLE No. 4

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Solid Stem Auger**
Size: **152 mm O.D.**
Date: **Jan 16 - 24** TO **Jan 16 - 24**

Ground Elevation: **426.94 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE
426.64	300 mm TOPSOIL				
0.30	firm to stiff, brown CLAYEY SANDY SILT trace gravel, trace topsoil DTPL	0.5	1	SS	5
425.89		1.0	2	SS	9
1.05	loose to compact, brown Fine SAND trace gravel, trace silt moist	1.5	3	SS	14
	---------- saturated	2.0	4	SS	6
		2.5			
		3.0	5	SS	8
		3.5			
		4.0			
		4.5			
		5.0	6	SS	10
		5.5			
		6.0			
	---------- silt seam, trace clay	6.5	7	SS	21
420.24					
6.70	End of Borehole	7.0			
		7.5			
		8.0			
		8.5			
		9.0			
		9.5			
		10.0			
		10.5			

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

- above-ground steel casing set in concrete
- bentonite seal/50 mm I.D. PVC riser
- 3.05 m long, 50 mm I.D. PVC screen with sandpack
- water level in monitoring well measured at 3.61 m depth on February 6, 2024, and measured at 3.56 m depth on September 18, 2024

PROJECT MANAGER: **EYC**

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FILE No: 1495

BOREHOLE No. 5

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Jan 16 - 24** TO **Jan 16 - 24**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **425.61 m**						FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ (50 100 150 200) PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ (20 40 60 80)	W_P W W_L (10 20 30)			
425.43 0.18	180 mm TOPSOIL										
	loose, orangey brown SANDY SILT trace topsoil moist to wet	0.5 1.0 1.5		1 2 3	SS SS SS	5 4 5				0.5 1.0 1.5	above-ground steel casing set in concrete bentonite seal/50 mm I.D. PVC riser 3.05 m long, 50 mm I.D. PVC screen with sandpack
423.76 1.85	loose to compact, brown Fine SAND trace silt wet to saturated	2.0 2.5 3.0 3.5 4.0 4.5		4 5 6	SS SS SS	7 9 9				2.0 2.5 3.0 3.5 4.0 4.5	water level in monitoring well measured at 2.10 m depth on February 6, 2024, and measured at 2.27 m depth on September 18, 2024
	---------- silt seam, trace clay	5.0 5.5 6.0 6.5 7.0 7.5 8.0		7 8	SS SS	12 13				5.0 5.5 6.0 6.5 7.0 7.5 8.0	
417.36 8.25	End of Borehole	8.5 9.0 9.5 10.0 10.5								8.5 9.0 9.5 10.0 10.5	

PROJECT MANAGER: **EYC**

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FILE No: 1495

BOREHOLE No. 101

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Sep 11 - 24** TO **Sep 11 - 24**

Ground Elevation: **428.68 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
428.50	180 mm TOPSOIL					
0.18	very loose, orangey brown SANDY SILT, moist	0.5	1	SS	2	
427.93						
0.75	stiff, brown CLAYEY SILT, some sand trace gravel, DTPL	1.0	2	SS	8	
427.33						
1.35	compact, brown Fine to Medium SAND trace gravel, trace silt moist to wet	1.5	3	SS	15	
		2.0				
		2.5	4	SS	23	
		3.0				
		3.5	5	SS	26	
	---------- saturated	4.0	6	SS	22	
		4.5				
		5.0	7	SS	13	
		5.5				
		6.0				
		6.5	8	SS	19	
		7.0				
	---------- silty	7.5				
420.88			9	SS	15	
7.80	compact, grey SILT trace to sand trace clay occ. clayey silt seams saturated	8.0				
		8.5				
		9.0				
		9.5	10	SS	18	
419.08						
9.60	End of Borehole	10.0				
		10.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

- above-ground steel casing set in concrete
- bentonite seal/50 mm I.D. PVC riser
- 3.05 m long, 50 mm I.D. PVC screen with sandpack
- water level in monitoring well measured at 3.82 m depth on September 18, 2024

PROJECT MANAGER: **EYC**

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FILE No: 1495

BOREHOLE No. 102

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Sep 12 - 24** TO **Sep 12 - 24**

Ground Elevation: **429.37 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
429.17 / 0.20	200 mm TOPSOIL					above-ground steel casing set in concrete
	loose, orangey brown SANDY SILT, moist	0.5	1	SS	4	DCPT conducted from 0 to 3.95± m depth
428.57 / 0.80	silty --- loose to compact, brown Fine to Medium SAND trace to some silt trace gravel moist to wet	1.0	2	SS	7	bentonite seal/50 mm I.D. PVC riser
		1.5	3	SS	7	
		2.0	4	SS	8	
		2.5				
		3.0	5	SS	9	
		3.5				
		4.0	6	SS	19	3.05 m long, 50 mm I.D. PVC screen with sandpack
	--- saturated	4.5	7	SS	27	water level in monitoring well measured at 4.65 m depth on September 18, 2024
		5.0				
		5.5				
		6.0	8	SS	8	
		6.5				
		7.0				
		7.5	9	SS	21	
		8.0				
		8.5				
		9.0				
419.77 / 9.60	End of Borehole	9.5	10	SS	17	
		10.0				
		10.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

PROJECT MANAGER: **EYC**

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FILE No: 1495

BOREHOLE No. 103

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Sep 11 - 24** TO **Sep 11 - 24**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **428.31 m**								
427.51	very loose, dark brown FILL, sand and silt trace gravel, trace clay trace topsoil, moist	0.5		1	SS	3		0.5	above-ground steel casing set in concrete
0.80	loose, brown SANDY SILT, trace gravel trace clay, moist	1.0		2	SS	5		1.0	bentonite seal/50 mm I.D. PVC riser
426.96		1.5		3	SS	21		1.5	
1.35	compact, brown Fine to Medium SAND trace silt moist	2.0		4	SS	13		2.0	
		2.5						2.5	
		3.0		5	SS	12		3.0	3.05 m long, 50 mm I.D. PVC screen with sandpack
	---------- saturated	3.5						3.5	water level in monitoring well measured at 3.77 m depth on September 18, 2024
		4.0		6	SS	12		4.0	
		4.5		7	SS	14		4.5	
		5.0						5.0	
		5.5						5.5	
		6.0						6.0	
		6.5		8	SS	24		6.5	
		7.0						7.0	
		7.5						7.5	
420.21		8.0		9	SS	14		8.0	
8.10	End of Borehole	8.5						8.5	
		9.0						9.0	
		9.5						9.5	
		10.0						10.0	
		10.5						10.5	

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

PROJECT MANAGER: **EYC**

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FILE No: 1495

BOREHOLE No. 104

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Sep 11 - 24** TO **Sep 11 - 24**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **427.36 m**						FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ (50 100 150 200) PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ (20 40 60 80)	W_P W W_L (10 20 30)			
427.11	250 mm TOPSOIL										
0.25	loose, orangey brown to brown FILL, sand and silt trace gravel, trace clay occ. clayey silt seams moist	0.5 1.0 1.5 2.0		1 2 3	SS SS SS	6 7 5				0.5 1.0 1.5 2.0	above-ground steel casing set in concrete bentonite seal/50 mm I.D. PVC riser
425.21											
2.15	moist --- loose to compact, brown Fine to Medium SAND trace to some silt occ. silty sand seams saturated	2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0		4 5 6 7	SS SS SS SS	10 15 9 10				2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0	3.05 m long, 50 mm I.D. PVC screen with sandpack water level in monitoring well measured at 3.0 m depth on September 18, 2024
421.06											
6.30	brown --- compact, grey SILT trace sand, trace clay saturated	6.5 7.0 7.5		8 9	SS SS	15 12				6.5 7.0 7.5	
419.26											
8.10	End of Borehole	8.0 8.5 9.0 9.5 10.0 10.5								8.0 8.5 9.0 9.5 10.0 10.5	

PROJECT MANAGER: **EYC**

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FILE No: 1495

BOREHOLE No. 105

Client: **PoloCorp Inc.**

Project: **Proposed Residential Subdivision**

Location: **968 St. David Street North, Fergus, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Hollow Stem Auger**
Size: **83 mm I.D.**
Date: **Sep 12 - 24** TO **Sep 12 - 24**

Ground Elevation: **428.15 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
	loose, dark brown FILL, sand and silt some topsoil trace clay, moist	0.5	1	SS	8	above-ground steel casing set in concrete
427.25						bentonite seal/50 mm I.D. PVC riser
0.90	orangey brown, some silt	1.0	2	SS	6	
	very loose to compact, brown	1.5				
	Fine to Medium SAND trace silt	2.0	3	SS	12	
	moist to wet	2.5	4	SS	16	
		3.0				
	saturated	3.5	5	SS	14	
		4.0	6	SS	19	
		4.5				water level in monitoring well measured at 4.45 m depth on September 18, 2024
		5.0	7	SS	17	
		5.5				3.05 m long, 50 mm I.D. PVC screen with sandpack
		6.0				
		6.5	8	SS	15	
		7.0				
		7.5				
		8.0	9	SS	11	
		8.5				
		9.0				
		9.5	10	SS	3	
418.55						
9.60	End of Borehole	10.0				
		10.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

PROJECT MANAGER: **EYC**

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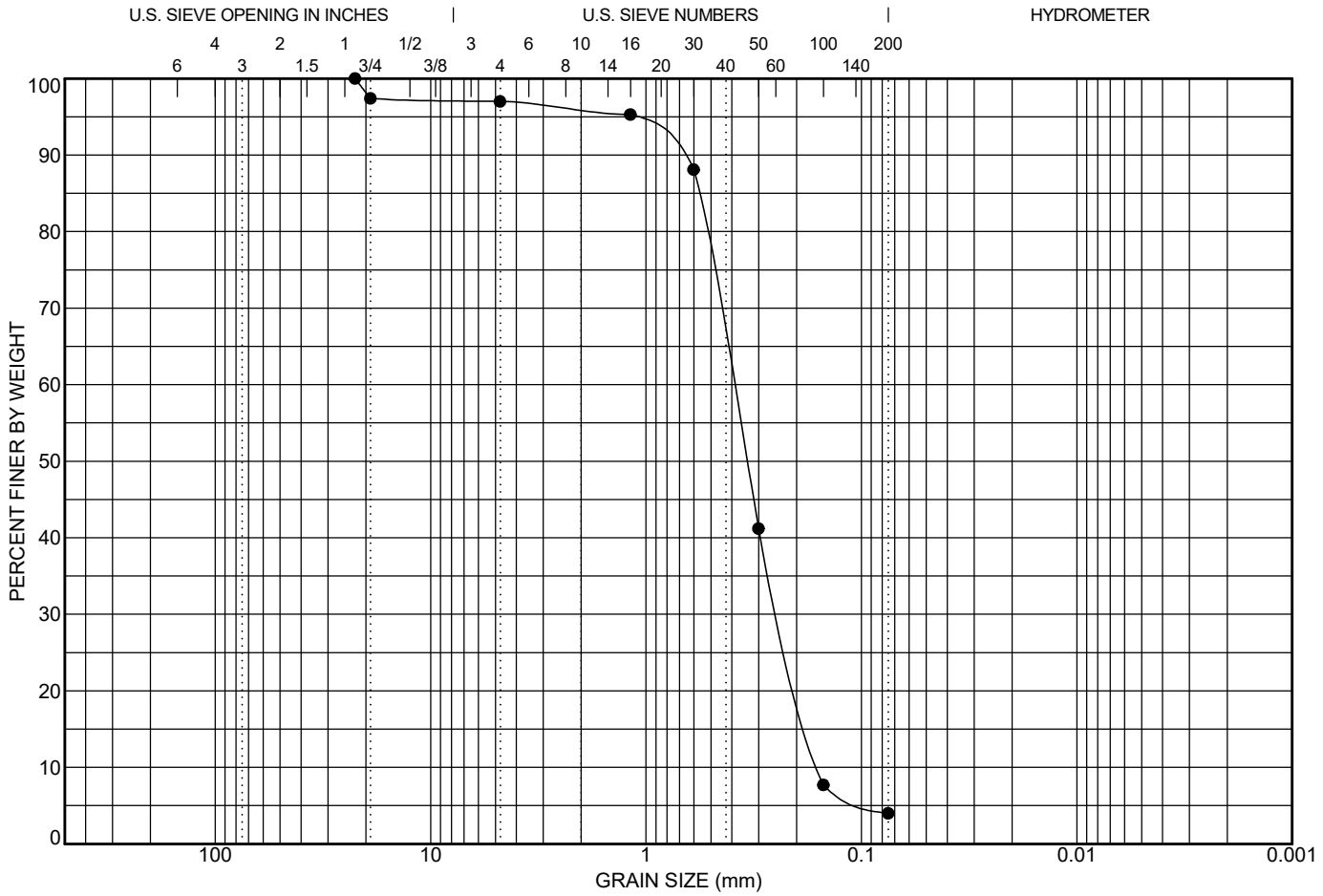


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			0.91	2.52	22.4	0.396	0.238	0.157	3.0	93.0	4.0	

Date: Sep. 25 - 2024
Client: PoloCorp Inc.
Contractor:
Source:
Sampled From: BH 101 - SA 4, 2.30 to 2.75 m depth
Sample No.: 101-4
Date Sampled: Sep. 11 - 2024
Sampled By: RS
Lab No.: 1033
Date Tested: Sep. 25 - 2024
Type of Material: Fine to Medium Sand, trace gravel, trace silt

Sieve Size (mm)	Percent Passing	No Specifications

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario N2H 5E1
Telephone: 519-742-8979
Fax: 519-742-7739
e-mail: info@cvdengineering.com

GRAIN SIZE DISTRIBUTION

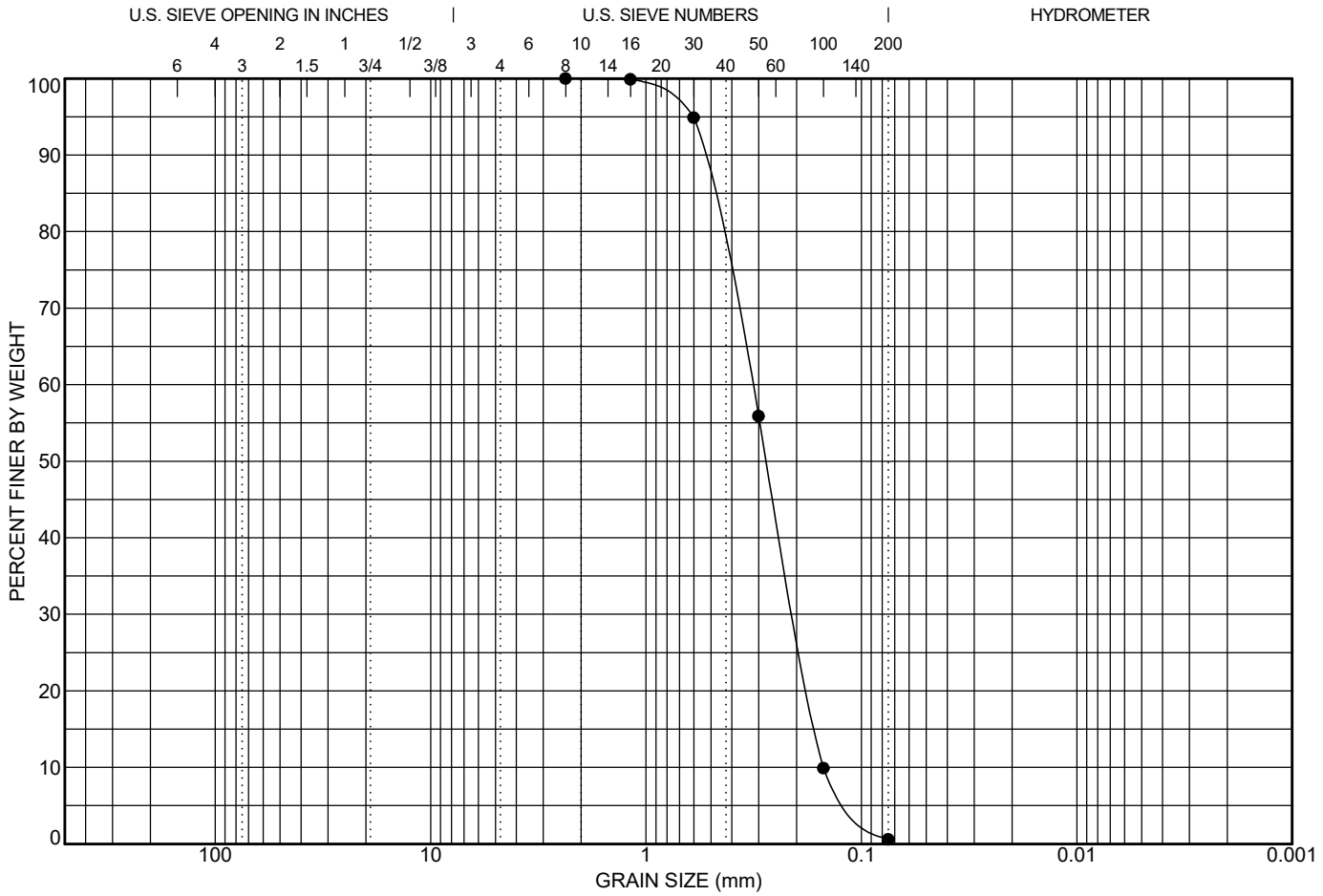
Project: Proposed Residential Subdivision

Location: 968 St. David Street North, Fergus, Ontario

File No.: 1495

Enclosure No.: 22

DM - NO SPECIFICATIONS 1495 968 ST. DAVID STREET NORTH, FERGUS (SEPTEMBER 2024).GPJ LAW LNDN.GDT 10-1-24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			0.85	2.15	2.36	0.323	0.203	0.15	0.0	99.4	0.6	

Date: Sep. 25 - 2024
Client: PoloCorp Inc.
Contractor:
Source:
Sampled From: BH 105 - SA 4, 2.30 to 2.75 m depth
Sample No.: 105-4
Date Sampled: Sep. 12 - 2024
Sampled By: RS
Lab No.: 1034
Date Tested: Sep. 25 - 2024
Type of Material: Fine to Medium Sand, trace silt

Sieve Size (mm)	Percent Passing	No Specifications

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario N2H 5E1
Telephone: 519-742-8979
Fax: 519-742-7739
e-mail: info@cvdengineering.com

GRAIN SIZE DISTRIBUTION

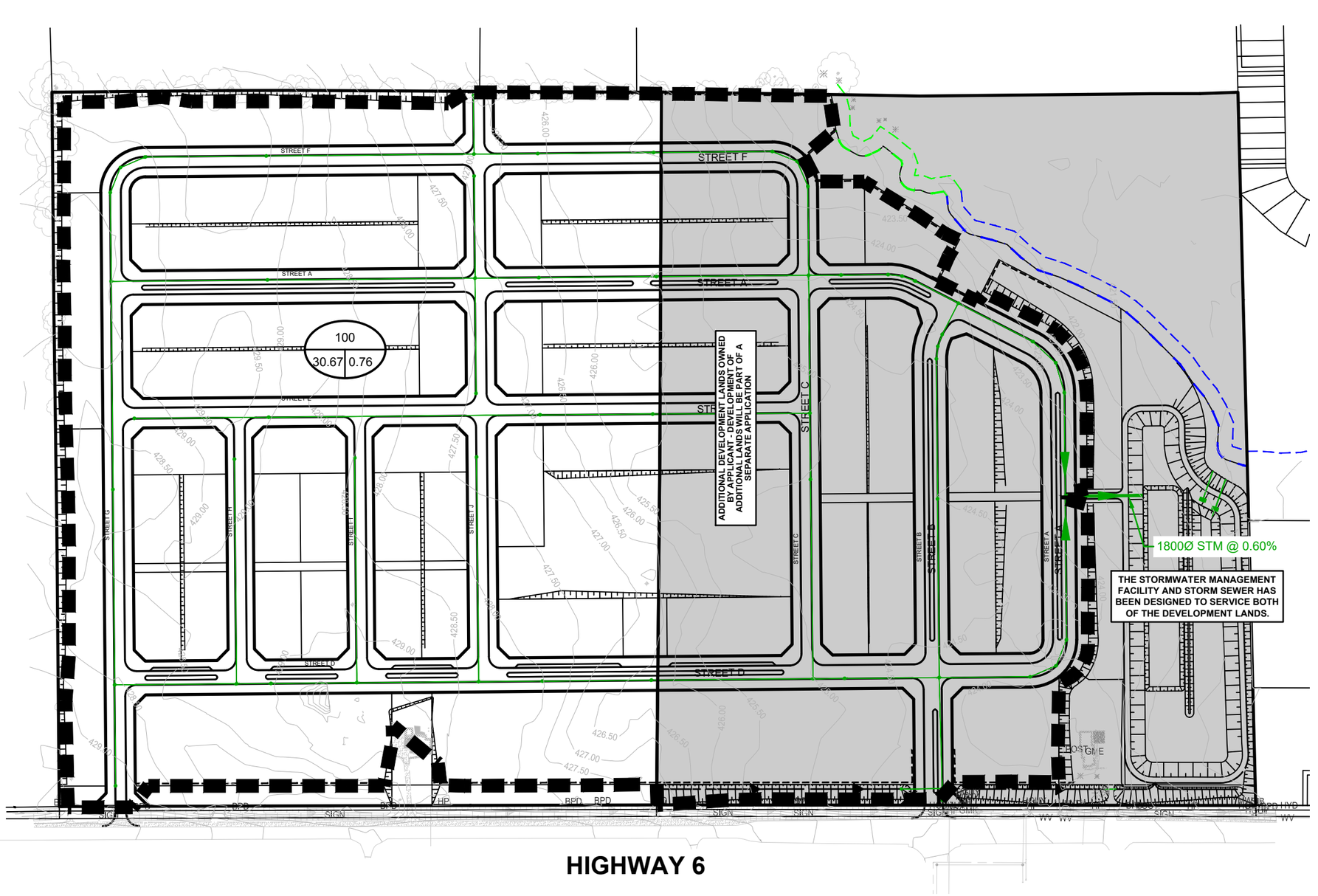
Project: Proposed Residential Subdivision

Location: 968 St. David Street North, Fergus, Ontario

File No.: 1495

Enclosure No.: 23

Appendix B Sewer Design Sheets



40 20 0 50 100 150

1:3000(m)

LEGEND

CATCHMENT BOUNDARY

200 — CATCHMENT NUMBER

0.75 | 0.45 — RUN-OFF CO-EFFICENT

CATCHMENT AREA IN HECTARES

FERGUS SUBDIVISION - NORTH LANDS
TOWNSHIP OF CENTRE WELLINGTON (FERGUS)

POLOCORP

GEI Consultants

CONCEPTUAL STORM SEWER CATCHMENT AREAS

Project 2401807

FEBRUARY 2025

PRELIMINARY STORM SEWER DESIGN

5 Year Design

TOWNSHIP OF CENTRE WELLINGTON (FERGUS)

North Lands Subdivision

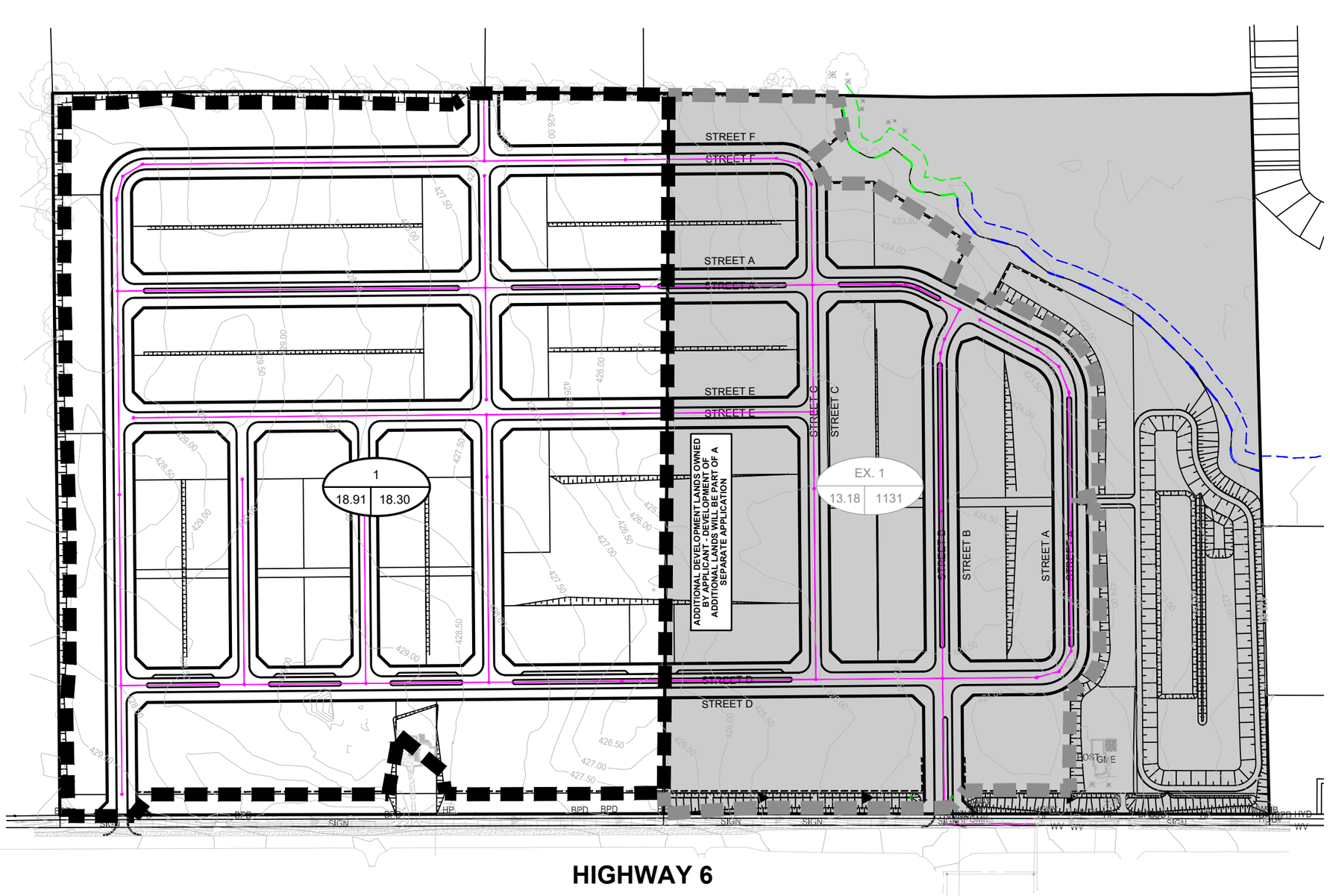
Fergus Shand Dam IDF Curves
A = 544.711
B = 0.0206
C= 0.686
Intensity = A / $(t + B)^C$

Q = CiA (m^3/s)

February 4, 2025

Designed By: BL Checked By: PW

Location	Area (ha)	Runoff Coefficient	A x C	Cumulative A x C	Time of Conc. (min.)	Intensity (mm/hr)	Flow (m^3/s)	Proposed Sewer						
Catchment Area								Length (m)	Pipe Size (mm)	Type of Pipe	Grade %	Capacity (m^3/s)	Full Flow Velocity (m/s)	Time of Flow (min.)
100 Inlet to SWM Pond	30.67	0.76	23.31	23.31	10.00	112.09	7.257	53.0	1800	0.013	0.60	8.90	3.50	0.25



LEGEND

CATCHMENT BOUNDARY

200 — CATCHMENT NUMBER
0.75 | 0.45 — RUN-OFF CO-EFFICIENT
CATCHMENT AREA IN HECTARES

FERGUS SUBDIVISION - NORTH LANDS
TOWNSHIP OF CENTRE WELLINGTON (FERGUS)

POLOCORP

GEI Consultants

Project 2401807

CONCEPTUAL SANITARY SEWER CATCHMENT AREAS

FEBRUARY 2025

LAMBIER, BRADLEY B:\Working\POLOCORP INC\2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Drawings\Figures\422079-SAN Figure_North.dwg - 2/28/2025

q = average daily per capita flow (350 L/cap.d)
I = unit of peak extraneous flow (0.15 L/ha/s)
A = Tributary area in gross hectares
M = Peaking factor
Q(p) = peak population flow (L/s)
Q(i) = peak extraneous flow (L/s)
Q(d) = peak design flow

PRELIMINARY SANITARY SEWER DESIGN

TOWNSHIP OF CENTRE WELLINGTON (FERGUS)

North Lands Subdivision

$M = 1 + \frac{14}{4 + (P)^{1/2}}$ where P is population in 1000's

$Q(p) = \frac{PqM}{86.4}$ (L/s)

Q(i) = IA

Q(d) = Q(p) + Q(i) (L/s)

February 28, 2025

Designed By: BL | Checked By:

Location		Individual Population	Cumulative Population	Individual Area (ha)	Cumulative Area	Peaking Factor (M)	Pop. Flow Q(p) (L/s)	Peak Extraneous Flow Q(i) (L/s)	Peak Design Flow Q(d) (m3/s)	Pipe Size (mm)	Type of Pipe	Grade %	Capacity (m^3/s)	Full Flow Velocity (m/s)	Actual velocity at Q(d)
From	To														
Proposed Catchment 1	Highway 6 Ex. Sanitary	1873	1873	13.81	13.81	3.608	27.37	2.072	0.0294	300	0.013	0.60	0.075	1.060	0.987
Existing Catchment 1	Highway 6 Ex. Sanitary	1131	3003	18.30	18.30	3.442	41.87	2.745	0.0446	300	0.013	0.60	0.075	1.060	1.097

Appendix C Stormwater Management Analysis

C.1. Existing Conditions Modelling

C.2. Post-Development Conditions Modelling

C.1. Existing Conditions Modelling

NORTH LANDS SUBDIVISION
TOWNSHIP OF CENTRE WELLINGTON (FERGUS)
Our File: 422079
March 4, 2025

Proposed Forebay

Forebay Length =	140.0	m	(Dist)
Forebay Top Width =	27.0	m	
Active Forebay Depth =	1.0	m	(d)
Active Forebay Bottom Width =	21.0	m	
Approximate Permanent Forebay Pool Volume =	224.9	m^3	
Length Width Ratio =	5.2	:1	(r)
25 mm Storm Pond Outlet Flowrate =	0.043	m^3/s	(Q25mm)
5 Year Storm Inflow Rate =	8.626	m^3/s	(Q5)
Desired Forebay Velocity =	0.500	m/s	(Vf)
Desired Settling Velocity (recommended) =	0.0003	m/s	(Vs)

Settling Length

Dist = ((r x Q25mm)/Vs)^.5 =	27.3	m	25mm

Forebay length (140 m) exceeds the settling length (27.3 m).

Dispersion Length

Dist = (8 x Q5)/(d x Vf) =	138.0	m	5 Year

Forebay length (140 m) exceeds the dispersion length (138.0 m).

Flow Velocity in Forebay

Cross-sectional Area (Forebay Only) =	24	m^2	
Cross-sectional Area (With Permanent Pool) =	41.85	m^2	
Cross-sectional Area (With Outlet Pool) =	57.85	m^2	(A)
Q5 =	8.626	m^3/s	
Velocity = Q5/A =	0.149	m/s	5 Year

The average flow velocity through the forebay is equal to the allowable velocity of 0.15 m/s.

NORTH LANDS SUBDIVISION
TOWNSHIP OF CENTRE WELLINGTON (FERGUS)
Our File: 422079
March 4, 2025

SWM Facility - Stage/Storage Volume Calculations

Forebay/Permanent Pool Storage Volume Calculations

Elevation (m)	Depth (m)	Forebay Surface Area (m^2)	Forebay Incremental Storage Volume (m^3)	Perm. Pool Surface Area (m^2)	Perm. Pool Incremental Storage Volume (m^3)	Accumulative Volume (m^3)	
420.20	0.00	0.0	0.0			0.0	Bottom of Forebay
420.40	0.20	817.9	81.79			81.8	
420.60	0.40	902.4	172.03			253.8	
420.80	0.60	989.3	189.17			443.0	
421.00	0.80	1,078.6	206.79			649.8	
421.20	1.00	1,170.2	224.88	9,630.00	0.00	874.7	Bottom of Permanent Pool
421.30	1.10			9,798.00	971.40	1,846.1	
421.40	1.20			10,157.40	997.77	2,843.8	
421.50	1.30			10,518.80	1,033.81	3,877.6	Top of Permanent Pool

Active Storage Volume Calculations

Elevation (m)	Depth (m)	Active Surface Area (m^2)	Active Incremental Volume (m^3)	Accumulative Active Volume (m^3)	
421.50	0.00	10,518.8	0.00	0.00	Bottom of Active Storage
421.60	0.10	10,882.4	1,070.06	1,070.06	
421.70	0.20	11,248.2	1,106.53	2,176.59	
421.80	0.30	11,616.3	1,143.23	3,319.82	
421.90	0.40	11,986.6	1,180.15	4,499.96	
422.00	0.50	12,359.0	1,217.28	5,717.24	T/G DICB.1
422.10	0.60	12,841.0	1,260.00	6,977.24	
422.20	0.70	13,125.1	1,298.31	8,275.55	
422.30	0.80	13,410.9	1,326.80	9,602.35	T/G DICB.2
422.40	0.90	13,698.3	1,355.46	10,957.81	
422.50	1.00	13,987.2	1,384.27	12,342.08	
422.60	1.10	14,277.9	1,413.26	13,755.34	
422.70	1.20	14,570.1	1,442.40	15,197.74	Weir
422.80	1.30	14,864.0	1,471.71	16,669.44	
422.90	1.40	15,159.4	1,501.17	18,170.61	
423.00	1.50	15,456.5	1,530.80	19,701.41	
423.10	1.60	15,755.3	1,560.59	21,262.00	
423.20	1.70	16,055.6	1,590.55	22,852.54	Top of Pond

1800 x1800 Structure Controls

Orifice Outlet (Extended Detention)

modelled with 50% blockage

INV	421.50	m
Q =	0.044	m^3/s
Cd =	0.600	
H =	1.100	m
2g =	19.620	
A =	0.031	m^2
D =	0.200	m

Overflow Weir

d1 =	1.500	m
h =	1.200	
H =	0.300	m
2g =	19.620	
L =	15.0	m
Q =	3.524	m^3/s

Major Control - Flow Over Grate

modelled with 50% blockage

d1 =	0.80	m
h =	0.50	
H =	0.30	m
2g =	19.62	
L =	3.66	m
Q =	0.453	m^3/s

Length of Weir

Head over Grate (m)	Length (m)
0	1.200
0.1	1.832
0.2	2.464
0.3	3.66

Pipe Outflow - Outlet 1

INV. =	421.34	m
Diameter =	525	mm
Gradient =	0.50%	
Pipe Capacity =	0.317	m^3/s
Length =	21.30	m

Pipe Outflow - Outlet 2

INV. =	421.5	m
Diameter =	600	mm
Gradient =	1%	
Pipe Capacity =	0.641	m^3/s
Length =	20.30	m

Orifice Flow = Cd A $\sqrt{2gH}$

Cd = Discharge Coefficient
A = Area of Orifice
2g = 19.62
H = Depth of Water above orifice - half of orifice diameter

Weir Flow = 0.433 $\sqrt{2g(\frac{d}{d+h})}LH^{3/2}$

L = Length of Weir
2g = 19.62
d = total depth of water
h = depth of water below weir
H = depth of water above weir

Stage-Storage-Discharge Table

			OUTLET STRUCTURE 1		OUTLET STRUCTURE 2					
Elevation (m)	Stage (m)	Storage (m^3)	Major Control Grate (m^3/s)	Major Control Pipe Outlet (m^3/s)	200mm dia. Minor Outlet (m^3/s)	Major Control Grate (m^3/s)	Major Control Pipe Outlet (m^3/s)	Weir Overflow (m^3/s)	Actual Discharge (m^3/s)	
421.50	0.00	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Bottom of Active Storage
421.60	0.10	1,070.1	0.000	0.152	0.007	0.000	0.039	0.000	0.007	
421.70	0.20	2,176.6	0.000	0.250	0.013	0.000	0.144	0.000	0.013	
421.80	0.30	3,319.8	0.000	0.317	0.019	0.000	0.307	0.000	0.019	
421.90	0.40	4,500.0	0.000	0.317	0.023	0.000	0.485	0.000	0.023	
422.00	0.50	5,717.2	0.000	0.317	0.026	0.000	0.621	0.000	0.026	T/G DICB.1
422.10	0.60	6,977.2	0.041	0.317	0.030	0.000	0.641	0.000	0.071	
422.20	0.70	8,275.5	0.161	0.317	0.032	0.000	0.641	0.000	0.194	
422.30	0.80	9,602.3	0.453	0.317	0.035	0.000	0.641	0.000	0.352	T/G DICB.2
422.40	0.90	10,957.8		0.317	0.037	0.040	0.641	0.000	0.395	
422.50	1.00	12,342.1		0.317	0.040	0.158	0.641	0.000	0.514	
422.60	1.10	13,755.3		0.317	0.042	0.439	0.641	0.000	0.798	
422.70	1.20	15,197.7		0.317	0.044	0.689	0.641	0.000	0.958	Weir
422.80	1.30	16,669.4		0.317			0.641	0.656	1.614	
422.90	1.40	18,170.6		0.317			0.641	1.888	2.846	
423.00	1.50	19,701.4		0.317			0.641	3.524	4.482	
423.10	1.60	21,262.0		0.317			0.641	5.502	6.460	
423.20	1.70	22,852.5		0.317			0.641	7.788	8.746	Top of Pond

Notes:

Major Controls - the minimum of flow over grate and pipe discharge flow rate is used in the actual discharge calculation

Knockout Controls - the knockout is assumed to contribute to discharge flow rates until the pipe discharge rate is the controlling release rate.

Major Control Pipe Flow - based on Pipe Capacity

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
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"                Licensee name:                                               "
"                Company                                                      "
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" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      367.000   Coefficient A"
"        5.000   Constant B"
"        0.700   Exponent C"
"        0.394   Fraction R"
"      120.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity            72.993    mm/hr"
"             Total depth                  24.995    mm"
"            7   0025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           10   Catchment 10"
"        2.000   % Impervious"
"       31.110   Total Area"
"      200.000   Flow length"
"        3.750   Overland Slope"
"       30.488   Pervious Area"
"      200.000   Pervious length"
"        3.750   Pervious slope"
"        0.622   Impervious Area"
"      200.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.436     0.000     0.000     0.000 c.m/sec"
"             Catchment 10           Pervious   Impervious Total Area "
"             Surface Area           30.488     0.622      31.110     hectare"
"             Time of concentration  53.937     6.504      50.503     minutes"
"             Time to Centroid       118.211    68.506     114.611    minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        7620.53    155.52     7776.05    c.m"
"             Rainfall losses        18.911     1.722      18.568     mm"
"             Runoff depth           6.084      23.273     6.428      mm"
"             Runoff volume          1854.87    144.81     1999.67    c.m"
"             Runoff coefficient     0.243      0.931      0.257      "
"             Maximum flow           0.423      0.099      0.436      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.436     0.436     0.000     0.000"
" 33          CATCHMENT 40"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           40   Catchment 40"
"         0.000   % Impervious"
"         3.330   Total Area"
"       120.000   Flow length"
"         3.000   Overland Slope"
"         3.330   Pervious Area"
"       120.000   Pervious length"
"         3.000   Pervious slope"
"         0.000   Impervious Area"
"       120.000   Impervious length"
"         3.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        30.000   Pervious Max.infiltration"
"         5.000   Pervious Min.infiltration"
"         0.250   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.001   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                     0.056     0.436     0.000     0.000 c.m/sec"
"             Catchment 40           Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  42.448     5.118      42.448     minutes"
"             Time to Centroid       105.920    66.672     105.919    minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        832.34     0.00       832.34     c.m"
"             Rainfall losses        18.910     1.665      18.910     mm"
"             Runoff depth           6.085      23.330     6.085      mm"
```

```
"             Runoff volume          202.64     0.00       202.64     c.m"
"             Runoff coefficient     0.243      0.000      0.243      "
"             Maximum flow           0.056      0.000      0.056      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.056     0.489     0.000     0.000"
" 33          CATCHMENT 30"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           30   Catchment 30"
"        5.000   % Impervious"
"        2.000   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.900   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.058     0.489     0.000     0.000 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           1.900      0.100      2.000      hectare"
"             Time of concentration  20.536     2.476      17.532     minutes"
"             Time to Centroid       82.465     63.135     79.250     minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        474.91     25.00      499.91     c.m"
"             Rainfall losses        18.914     1.941      18.065     mm"
"             Runoff depth           6.082      23.054     6.930      mm"
"             Runoff volume          115.55     23.05      138.61     c.m"
"             Runoff coefficient     0.243      0.922      0.277      "
"             Maximum flow           0.055      0.016      0.058      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.058     0.514     0.000     0.000"
" 33          CATCHMENT 20"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"           20   Catchment 20"
"        0.000   % Impervious"
"        2.980   Total Area"
"       80.000   Flow length"
"        1.250   Overland Slope"
"        2.980   Pervious Area"
"       80.000   Pervious length"
"        1.250   Pervious slope"
"        0.000   Impervious Area"
"       80.000   Impervious length"
"        1.250   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.049     0.514     0.000     0.000 c.m/sec"
"             Catchment 20           Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  43.278     5.218      43.277     minutes"
"             Time to Centroid       106.800    66.808     106.800    minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        744.86     0.00       744.86     c.m"
"             Rainfall losses        18.910     1.642      18.910     mm"
"             Runoff depth           6.085      23.353     6.085      mm"
"             Runoff volume          181.33     0.00       181.33     c.m"
"             Runoff coefficient     0.243      0.000      0.243      "
"             Maximum flow           0.049      0.000      0.049      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.049     0.561     0.000     0.000"
" 38          START/RE-START TOTALS 20"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                    0.722    hectare"
"             Total % impervious                       1.832"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                   Ex__2yr.out"
"                Licensee name:                                                "
"                Company                                                       "
"                Date & Time last used:                  2/1/2025 at 9:57:32 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      414.876   Coefficient A"
"        0.027   Constant B"
"        0.682   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           100.235    mm/hr"
"             Total depth                  39.504    mm"
"            6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           10   Catchment 10"
"        2.000   % Impervious"
"       31.110   Total Area"
"      200.000   Flow length"
"        3.750   Overland Slope"
"       30.488   Pervious Area"
"      200.000   Pervious length"
"        3.750   Pervious slope"
"        0.622   Impervious Area"
"      200.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     1.519     0.000     0.000     0.000 c.m/sec"
"             Catchment 10           Pervious   Impervious Total Area "
"             Surface Area           30.488     0.622      31.110     hectare"
"             Time of concentration  31.890     5.729      30.537     minutes"
"             Time to Centroid       144.180    120.327    142.946    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        1.2044     0.0246     1.2290     ha-m"
"             Rainfall losses        25.393     1.789      24.921     mm"
"             Runoff depth           14.111     37.715     14.583     mm"
"             Runoff volume          4302.12    234.66     4536.78    c.m"
"             Runoff coefficient     0.357      0.955      0.369      "
"             Maximum flow           1.495      0.138      1.519      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.519     1.519     0.000     0.000"
" 33          CATCHMENT 40"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           40   Catchment 40"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.193     1.519     0.000     0.000 c.m/sec"
"             Catchment 40           Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  25.097     4.509      25.096     minutes"
"             Time to Centroid       135.157    118.349    135.157    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        1315.48    0.00       1315.48    c.m"
"             Rainfall losses        25.393     1.692      25.393     mm"
"             Runoff depth           14.111     37.813     14.111     mm"
```

```
"             Runoff volume          469.88     0.00       469.89     c.m"
"             Runoff coefficient     0.357      0.000      0.357      "
"             Maximum flow           0.193      0.000      0.193      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.193     1.700     0.000     0.000"
" 33          CATCHMENT 30"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           30   Catchment 30"
"        5.000   % Impervious"
"        2.000   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.900   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.188     1.700     0.000     0.000 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           1.900      0.100      2.000      hectare"
"             Time of concentration  12.141     2.181      10.914     minutes"
"             Time to Centroid       117.971    114.662    117.563    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        750.58     39.50      790.08     c.m"
"             Rainfall losses        25.401     1.860      24.224     mm"
"             Runoff depth           14.103     37.644     15.280     mm"
"             Runoff volume          267.95     37.64      305.59     c.m"
"             Runoff coefficient     0.357      0.953      0.387      "
"             Maximum flow           0.183      0.026      0.188      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.188     1.787     0.000     0.000"
" 33          CATCHMENT 20"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"           20   Catchment 20"
"        0.000   % Impervious"
"        2.980   Total Area"
"       80.000   Flow length"
"        1.250   Overland Slope"
"        2.980   Pervious Area"
"       80.000   Pervious length"
"        1.250   Pervious slope"
"        0.000   Impervious Area"
"       80.000   Impervious length"
"        1.250   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.169     1.787     0.000     0.000 c.m/sec"
"             Catchment 20           Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  25.587     4.597      25.587     minutes"
"             Time to Centroid       135.809    118.488    135.809    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        1177.22    0.00       1177.22    c.m"
"             Rainfall losses        25.405     1.665      25.405     mm"
"             Runoff depth           14.099     37.839     14.099     mm"
"             Runoff volume          420.16     0.00       420.16     c.m"
"             Runoff coefficient     0.357      0.000      0.357      "
"             Maximum flow           0.169      0.000      0.169      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.169     1.947     0.000     0.000"
" 38          START/RE-START TOTALS 20"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                    0.722    hectare"
"             Total % impervious                       1.832"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                   Ex__5yr.out"
"                Licensee name:                                                "
"                Company                                                       "
"                Date & Time last used:                  2/1/2025 at 10:00:00 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      544.711   Coefficient A"
"        0.021   Constant B"
"        0.686   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           130.581    mm/hr"
"             Total depth                  50.743    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           10   Catchment 10"
"        2.000   % Impervious"
"       31.110   Total Area"
"      200.000   Flow length"
"        3.750   Overland Slope"
"       30.488   Pervious Area"
"      200.000   Pervious length"
"        3.750   Pervious slope"
"        0.622   Impervious Area"
"      200.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     2.658     0.000     0.000     0.000 c.m/sec"
"             Catchment 10           Pervious   Impervious Total Area "
"             Surface Area           30.488     0.622      31.110     hectare"
"             Time of concentration  28.411     5.154      27.464     minutes"
"             Time to Centroid       142.235    118.538    141.271    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        1.5470     0.0316     1.5786     ha-m"
"             Rainfall losses        27.148     1.682      26.639     mm"
"             Runoff depth           23.595     49.061     24.104     mm"
"             Runoff volume          7193.54    305.26     7498.80    c.m"
"             Runoff coefficient     0.465      0.967      0.475      "
"             Maximum flow           2.627      0.173      2.658      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     2.658     2.658     0.000     0.000"
" 33          CATCHMENT 40"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           40   Catchment 40"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.356     2.658     0.000     0.000 c.m/sec"
"             Catchment 40           Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  22.359     4.056      22.359     minutes"
"             Time to Centroid       134.036    116.866    134.036    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        1689.74    0.00       1689.74    c.m"
"             Rainfall losses        27.188     2.068      27.188     mm"
"             Runoff depth           23.555     48.675     23.555     mm"
```

```
"             Runoff volume          784.37     0.00       784.38     c.m"
"             Runoff coefficient     0.464      0.000      0.464      "
"             Maximum flow           0.356      0.000      0.356      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.356     2.963     0.000     0.000"
" 33          CATCHMENT 30"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           30   Catchment 30"
"        5.000   % Impervious"
"        2.000   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.900   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.332     2.963     0.000     0.000 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           1.900      0.100      2.000      hectare"
"             Time of concentration  10.817     1.962      9.949      minutes"
"             Time to Centroid       118.405    113.377    117.912    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        964.12     50.74      1014.86    c.m"
"             Rainfall losses        27.163     2.058      25.908     mm"
"             Runoff depth           23.580     48.685     24.835     mm"
"             Runoff volume          448.02     48.69      496.71     c.m"
"             Runoff coefficient     0.465      0.959      0.489      "
"             Maximum flow           0.314      0.033      0.332      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.332     3.061     0.000     0.000"
" 33          CATCHMENT 20"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"           20   Catchment 20"
"        0.000   % Impervious"
"        2.980   Total Area"
"       80.000   Flow length"
"        1.250   Overland Slope"
"        2.980   Pervious Area"
"       80.000   Pervious length"
"        1.250   Pervious slope"
"        0.000   Impervious Area"
"       80.000   Impervious length"
"        1.250   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.317     3.061     0.000     0.000 c.m/sec"
"             Catchment 20           Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  22.796     4.135      22.796     minutes"
"             Time to Centroid       134.645    116.951    134.645    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        1512.14    0.00       1512.14    c.m"
"             Rainfall losses        27.154     1.996      27.154     mm"
"             Runoff depth           23.589     48.747     23.589     mm"
"             Runoff volume          702.95     0.00       702.95     c.m"
"             Runoff coefficient     0.465      0.000      0.465      "
"             Maximum flow           0.317      0.000      0.317      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.317     3.346     0.000     0.000"
" 38          START/RE-START TOTALS 20"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                    0.722    hectare"
"             Total % impervious                       1.832"
" 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:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                  Ex__10yr.out"
"                Licensee name:                                               "
"                Company                                                      "
"                Date & Time last used:                 2/1/2025 at 10:01:14 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      627.308   Coefficient A"
"        0.014   Constant B"
"        0.687   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           150.159    mm/hr"
"             Total depth                  58.119    mm"
"            6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           10   Catchment 10"
"        2.000   % Impervious"
"       31.110   Total Area"
"      200.000   Flow length"
"        3.750   Overland Slope"
"       30.488   Pervious Area"
"      200.000   Pervious length"
"        3.750   Pervious slope"
"        0.622   Impervious Area"
"      200.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     3.519     0.000     0.000     0.000 c.m/sec"
"             Catchment 10           Pervious   Impervious Total Area "
"             Surface Area           30.488     0.622      31.110     hectare"
"             Time of concentration  26.776     4.874      25.973     minutes"
"             Time to Centroid       142.154    117.737    141.259    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        1.7719     0.0362     1.8081     ha-m"
"             Rainfall losses        27.874     1.726      27.351     mm"
"             Runoff depth           30.245     56.393     30.768     mm"
"             Runoff volume          9221.02    350.88     9571.89    c.m"
"             Runoff coefficient     0.520      0.970      0.529      "
"             Maximum flow           3.479      0.202      3.519      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     3.519     3.519     0.000     0.000"
" 33          CATCHMENT 40"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           40   Catchment 40"
"         0.000   % Impervious"
"         3.330   Total Area"
"       120.000   Flow length"
"         3.000   Overland Slope"
"         3.330   Pervious Area"
"       120.000   Pervious length"
"         3.000   Pervious slope"
"         0.000   Impervious Area"
"       120.000   Impervious length"
"         3.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        30.000   Pervious Max.infiltration"
"         5.000   Pervious Min.infiltration"
"         0.250   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.001   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                     0.455     3.519     0.000     0.000 c.m/sec"
"             Catchment 40           Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  21.072     3.835      21.072     minutes"
"             Time to Centroid       134.304    116.233    134.304    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        1935.36    0.00       1935.37    c.m"
"             Rainfall losses        27.871     2.469      27.871     mm"
"             Runoff depth           30.248     55.650     30.248     mm"
```

```
"             Runoff volume          1007.27    0.00       1007.27    c.m"
"             Runoff coefficient     0.520      0.000      0.520      "
"             Maximum flow           0.455      0.000      0.455      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.455     3.974     0.000     0.000"
" 33          CATCHMENT 30"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           30   Catchment 30"
"        5.000   % Impervious"
"        2.000   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.900   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.437     3.974     0.000     0.000 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           1.900      0.100      2.000      hectare"
"             Time of concentration  10.194     1.856      9.450      minutes"
"             Time to Centroid       119.342    112.794    118.757    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        1104.26    58.12      1162.38    c.m"
"             Rainfall losses        28.125     2.227      26.830     mm"
"             Runoff depth           29.994     55.893     31.289     mm"
"             Runoff volume          569.88     55.89      625.77     c.m"
"             Runoff coefficient     0.516      0.962      0.538      "
"             Maximum flow           0.417      0.038      0.437      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.437     4.203     0.000     0.000"
" 33          CATCHMENT 20"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"           20   Catchment 20"
"        0.000   % Impervious"
"        2.980   Total Area"
"       80.000   Flow length"
"        1.250   Overland Slope"
"        2.980   Pervious Area"
"       80.000   Pervious length"
"        1.250   Pervious slope"
"        0.000   Impervious Area"
"       80.000   Impervious length"
"        1.250   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.405     4.203     0.000     0.000 c.m/sec"
"             Catchment 20           Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  21.484     3.910      21.484     minutes"
"             Time to Centroid       134.868    116.328    134.868    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        1731.95    0.00       1731.95    c.m"
"             Rainfall losses        27.884     2.347      27.884     mm"
"             Runoff depth           30.235     55.772     30.235     mm"
"             Runoff volume          901.02     0.00       901.02     c.m"
"             Runoff coefficient     0.520      0.000      0.520      "
"             Maximum flow           0.405      0.000      0.405      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.405     4.608     0.000     0.000"
" 38          START/RE-START TOTALS 20"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                    0.722    hectare"
"             Total % impervious                       1.832"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                  Ex__25yr.out"
"                Licensee name:                                               "
"                Company                                                      "
"                Date & Time last used:                 2/1/2025 at 10:02:34 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      746.059   Coefficient A"
"        0.085   Constant B"
"        0.692   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           175.653    mm/hr"
"             Total depth                  67.239    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           10   Catchment 10"
"        2.000   % Impervious"
"       31.110   Total Area"
"      200.000   Flow length"
"        3.750   Overland Slope"
"       30.488   Pervious Area"
"      200.000   Pervious length"
"        3.750   Pervious slope"
"        0.622   Impervious Area"
"      200.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     4.835     0.000     0.000     0.000 c.m/sec"
"             Catchment 10           Pervious   Impervious Total Area "
"             Surface Area           30.488     0.622      31.110     hectare"
"             Time of concentration  25.077     4.577      24.395     minutes"
"             Time to Centroid       142.054    116.842    141.215    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        2.0500     0.0418     2.0918     ha-m"
"             Rainfall losses        28.420     1.790      27.888     mm"
"             Runoff depth           38.818     65.448     39.351     mm"
"             Runoff volume          1.1835     0.0407     1.2242     ha-m"
"             Runoff coefficient     0.577      0.973      0.585      "
"             Maximum flow           4.789      0.242      4.835      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     4.835     4.835     0.000     0.000"
" 33          CATCHMENT 40"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           40   Catchment 40"
"         0.000   % Impervious"
"         3.330   Total Area"
"       120.000   Flow length"
"         3.000   Overland Slope"
"         3.330   Pervious Area"
"       120.000   Pervious length"
"         3.000   Pervious slope"
"         0.000   Impervious Area"
"       120.000   Impervious length"
"         3.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        30.000   Pervious Max.infiltration"
"         5.000   Pervious Min.infiltration"
"         0.250   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.001   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                     0.607     4.835     0.000     0.000 c.m/sec"
"             Catchment 40           Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  19.735     3.602      19.735     minutes"
"             Time to Centroid       134.608    115.439    134.608    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        2239.05    0.00       2239.05    c.m"
"             Rainfall losses        28.441     2.959      28.441     mm"
"             Runoff depth           38.798     64.280     38.798     mm"
```

```
"             Runoff volume          1291.96    0.00       1291.97    c.m"
"             Runoff coefficient     0.577      0.000      0.577      "
"             Maximum flow           0.607      0.000      0.607      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.607     5.416     0.000     0.000"
" 33          CATCHMENT 30"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           30   Catchment 30"
"        5.000   % Impervious"
"        2.000   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.900   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.574     5.416     0.000     0.000 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           1.900      0.100      2.000      hectare"
"             Time of concentration  9.548      1.743      8.915      minutes"
"             Time to Centroid       120.388    112.106    119.717    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        1277.54    67.24      1344.78    c.m"
"             Rainfall losses        28.570     2.417      27.262     mm"
"             Runoff depth           38.669     64.822     39.977     mm"
"             Runoff volume          734.71     64.82      799.53     c.m"
"             Runoff coefficient     0.575      0.964      0.595      "
"             Maximum flow           0.551      0.045      0.574      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.574     5.660     0.000     0.000"
" 33          CATCHMENT 20"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"           20   Catchment 20"
"        0.000   % Impervious"
"        2.980   Total Area"
"       80.000   Flow length"
"        1.250   Overland Slope"
"        2.980   Pervious Area"
"       80.000   Pervious length"
"        1.250   Pervious slope"
"        0.000   Impervious Area"
"       80.000   Impervious length"
"        1.250   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.532     5.660     0.000     0.000 c.m/sec"
"             Catchment 20           Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  20.121     3.673      20.121     minutes"
"             Time to Centroid       135.142    115.553    135.142    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        2003.72    0.00       2003.72    c.m"
"             Rainfall losses        28.405     2.912      28.405     mm"
"             Runoff depth           38.834     64.327     38.834     mm"
"             Runoff volume          1157.25    0.00       1157.26    c.m"
"             Runoff coefficient     0.578      0.000      0.578      "
"             Maximum flow           0.532      0.000      0.532      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.532     6.178     0.000     0.000"
" 38          START/RE-START TOTALS 20"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                    0.722    hectare"
"             Total % impervious                       1.832"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                  Ex__50yr.out"
"                Licensee name:                                               "
"                Company                                                      "
"                Date & Time last used:                 2/1/2025 at 10:03:46 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      820.361   Coefficient A"
"        0.010   Constant B"
"        0.691   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           194.803    mm/hr"
"             Total depth                  74.358    mm"
"            6   050hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           10   Catchment 10"
"        2.000   % Impervious"
"       31.110   Total Area"
"      200.000   Flow length"
"        3.750   Overland Slope"
"       30.488   Pervious Area"
"      200.000   Pervious length"
"        3.750   Pervious slope"
"        0.622   Impervious Area"
"      200.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     5.783     0.000     0.000     0.000 c.m/sec"
"             Catchment 10           Pervious   Impervious Total Area "
"             Surface Area           30.488     0.622      31.110     hectare"
"             Time of concentration  24.024     4.392      23.408     minutes"
"             Time to Centroid       142.713    116.390    141.888    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        2.2670     0.0463     2.3133     ha-m"
"             Rainfall losses        28.718     1.950      28.183     mm"
"             Runoff depth           45.640     72.408     46.175     mm"
"             Runoff volume          1.3915     0.0451     1.4365     ha-m"
"             Runoff coefficient     0.614      0.974      0.621      "
"             Maximum flow           5.731      0.272      5.783      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     5.783     5.783     0.000     0.000"
" 33          CATCHMENT 40"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           40   Catchment 40"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.720     5.783     0.000     0.000 c.m/sec"
"             Catchment 40           Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  18.906     3.456      18.906     minutes"
"             Time to Centroid       135.377    115.016    135.377    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        2476.11    0.00       2476.11    c.m"
"             Rainfall losses        28.813     3.112      28.813     mm"
"             Runoff depth           45.544     71.246     45.544     mm"
```

```
"             Runoff volume          1516.63    0.00       1516.63    c.m"
"             Runoff coefficient     0.613      0.000      0.613      "
"             Maximum flow           0.720      0.000      0.720      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.720     6.448     0.000     0.000"
" 33          CATCHMENT 30"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           30   Catchment 30"
"        5.000   % Impervious"
"        2.000   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.900   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.670     6.448     0.000     0.000 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           1.900      0.100      2.000      hectare"
"             Time of concentration  9.147      1.672      8.573      minutes"
"             Time to Centroid       121.402    111.843    120.668    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        1412.80    74.36      1487.16    c.m"
"             Rainfall losses        28.890     2.541      27.572     mm"
"             Runoff depth           45.468     71.816     46.785     mm"
"             Runoff volume          863.89     71.82      935.71     c.m"
"             Runoff coefficient     0.611      0.966      0.629      "
"             Maximum flow           0.645      0.050      0.670      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.670     6.702     0.000     0.000"
" 33          CATCHMENT 20"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"           20   Catchment 20"
"        0.000   % Impervious"
"        2.980   Total Area"
"       80.000   Flow length"
"        1.250   Overland Slope"
"        2.980   Pervious Area"
"       80.000   Pervious length"
"        1.250   Pervious slope"
"        0.000   Impervious Area"
"       80.000   Impervious length"
"        1.250   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.633     6.702     0.000     0.000 c.m/sec"
"             Catchment 20           Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  19.276     3.524      19.276     minutes"
"             Time to Centroid       135.920    115.139    135.920    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        2215.86    0.00       2215.86    c.m"
"             Rainfall losses        28.877     3.109      28.877     mm"
"             Runoff depth           45.481     71.249     45.481     mm"
"             Runoff volume          1355.32    0.00       1355.32    c.m"
"             Runoff coefficient     0.612      0.000      0.612      "
"             Maximum flow           0.633      0.000      0.633      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.633     7.296     0.000     0.000"
" 38          START/RE-START TOTALS 20"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                    0.722    hectare"
"             Total % impervious                       1.832"
" 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:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                  Ex__100yr.out"
"                Licensee name:                                                 "
"                Company                                                        "
"                Date & Time last used:                 2/1/2025 at 10:05:05 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      901.088   Coefficient A"
"        0.043   Constant B"
"        0.692   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           212.928    mm/hr"
"             Total depth                  81.221    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           10   Catchment 10"
"        2.000   % Impervious"
"       31.110   Total Area"
"      200.000   Flow length"
"        3.750   Overland Slope"
"       30.488   Pervious Area"
"      200.000   Pervious length"
"        3.750   Pervious slope"
"        0.622   Impervious Area"
"      200.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     6.563     0.000     0.000     0.000 c.m/sec"
"             Catchment 10           Pervious   Impervious Total Area "
"             Surface Area           30.488     0.622      31.110     hectare"
"             Time of concentration  23.158     4.238      22.591     minutes"
"             Time to Centroid       142.372    115.974    141.581    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        2.4762     0.0505     2.5268     ha-m"
"             Rainfall losses        28.992     2.155      28.455     mm"
"             Runoff depth           52.229     79.066     52.765     mm"
"             Runoff volume          1.5923     0.0492     1.6415     ha-m"
"             Runoff coefficient     0.643      0.973      0.650      "
"             Maximum flow           6.506      0.301      6.563      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     6.563     6.563     0.000     0.000"
" 33          CATCHMENT 40"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           40   Catchment 40"
"         0.000   % Impervious"
"         3.330   Total Area"
"       120.000   Flow length"
"         3.000   Overland Slope"
"         3.330   Pervious Area"
"       120.000   Pervious length"
"         3.000   Pervious slope"
"         0.000   Impervious Area"
"       120.000   Impervious length"
"         3.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        30.000   Pervious Max.infiltration"
"         5.000   Pervious Min.infiltration"
"         0.250   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.001   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                     0.835     6.563     0.000     0.000 c.m/sec"
"             Catchment 40           Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  18.225     3.335      18.225     minutes"
"             Time to Centroid       135.263    114.631    135.263    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        2704.65    0.00       2704.66    c.m"
"             Rainfall losses        28.982     3.311      28.982     mm"
"             Runoff depth           52.239     77.910     52.239     mm"
```

```
"             Runoff volume          1739.55    0.00       1739.55    c.m"
"             Runoff coefficient     0.643      0.000      0.643      "
"             Maximum flow           0.835      0.000      0.835      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.835     7.319     0.000     0.000"
" 33          CATCHMENT 30"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           30   Catchment 30"
"        5.000   % Impervious"
"        2.000   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.900   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.768     7.319     0.000     0.000 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           1.900      0.100      2.000      hectare"
"             Time of concentration  8.817      1.614      8.287      minutes"
"             Time to Centroid       121.743    111.617    120.997    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        1543.20    81.22      1624.42    c.m"
"             Rainfall losses        29.209     2.686      27.883     mm"
"             Runoff depth           52.011     78.534     53.338     mm"
"             Runoff volume          988.22     78.53      1066.75    c.m"
"             Runoff coefficient     0.640      0.967      0.657      "
"             Maximum flow           0.742      0.054      0.768      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.768     7.588     0.000     0.000"
" 33          CATCHMENT 20"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"           20   Catchment 20"
"        0.000   % Impervious"
"        2.980   Total Area"
"       80.000   Flow length"
"        1.250   Overland Slope"
"        2.980   Pervious Area"
"       80.000   Pervious length"
"        1.250   Pervious slope"
"        0.000   Impervious Area"
"       80.000   Impervious length"
"        1.250   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.734     7.588     0.000     0.000 c.m/sec"
"             Catchment 20           Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  18.581     3.401      18.581     minutes"
"             Time to Centroid       135.779    114.745    135.779    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        2420.38    0.00       2420.38    c.m"
"             Rainfall losses        29.021     3.280      29.021     mm"
"             Runoff depth           52.200     77.941     52.200     mm"
"             Runoff volume          1555.57    0.00       1555.57    c.m"
"             Runoff coefficient     0.643      0.000      0.643      "
"             Maximum flow           0.734      0.000      0.734      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.734     8.263     0.000     0.000"
" 38          START/RE-START TOTALS 20"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                    0.722    hectare"
"             Total % impervious                       1.832"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                   Ex__REG.out"
"                Licensee name:                                                "
"                Company                                                       "
"                Date & Time last used:                 2/1/2025 at 10:06:12 AM"
" 31          TIME PARAMETERS"
"       60.000   Time Step"
"     2880.000   Max. Storm length"
"     7500.000   Max. Hydrograph"
" 32          STORM Historic"
"            5   Historic"
"     2880.000   Duration"
"       48.000   Rainfall intensity values"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.026     2.026     2.026     2.028"
"                  2.026     6.000     4.000     6.000    13.000"
"                 17.000    13.000    23.000    13.000    13.000"
"                 53.000    38.000    13.000"
"             Maximum intensity            53.000    mm/hr"
"             Total depth                 285.000    mm"
"            6   000hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           10   Catchment 10"
"        2.000   % Impervious"
"       31.110   Total Area"
"      200.000   Flow length"
"        3.750   Overland Slope"
"       30.488   Pervious Area"
"      200.000   Pervious length"
"        3.750   Pervious slope"
"        0.622   Impervious Area"
"      200.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
```

```
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    3.396     0.000     0.000     0.000 c.m/sec"
"             Catchment 10           Pervious   Impervious Total Area "
"             Surface Area           30.488     0.622      31.110     hectare"
"             Time of concentration  41.600     7.392      40.367     minutes"
"             Time to Centroid       2745.601   2247.763   2727.666   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        8.6890     0.1773     8.8664     ha-m"
"             Rainfall losses        141.365    21.980     138.978    mm"
"             Runoff depth           143.635    263.020    146.022    mm"
"             Runoff volume          4.3791     0.1637     4.5428     ha-m"
"             Runoff coefficient     0.504      0.923      0.512      "
"             Maximum flow           3.340      0.079      3.396      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    3.396     3.396     0.000     0.000"
" 33          CATCHMENT 40"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           40   Catchment 40"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.366     3.396     0.000     0.000 c.m/sec"
"             Catchment 40           Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
```

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"             Time of concentration  32.738     5.817      32.738     minutes"
"             Time to Centroid       2737.685   2233.111   2737.684   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        9490.49    0.01       9490.50    c.m"
"             Rainfall losses        139.700    29.327     139.699    mm"
"             Runoff depth           145.300    255.673    145.301    mm"
"             Runoff volume          4838.50    0.01       4838.51    c.m"
"             Runoff coefficient     0.510      0.000      0.510      "
"             Maximum flow           0.366      0.000      0.366      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.366     3.762     0.000     0.000"
" 33          CATCHMENT 30"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           30   Catchment 30"
"        5.000   % Impervious"
"        2.000   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.900   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.211     3.762     0.000     0.000 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           1.900      0.100      2.000      hectare"
"             Time of concentration  15.838     2.814      14.776     minutes"
"             Time to Centroid       2719.829   2252.474   2681.704   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        5415.00    285.00     5700.00    c.m"
"             Rainfall losses        139.630    39.672     134.632    mm"
"             Runoff depth           145.370    245.328    150.368    mm"
"             Runoff volume          2762.02    245.33     3007.35    c.m"
"             Runoff coefficient     0.510      0.861      0.528      "
"             Maximum flow           0.198      0.013      0.211      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"            4   Add Runoff "
"                     0.211     3.956     0.000     0.000"
" 33          CATCHMENT 20"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           20   Catchment 20"
"        0.000   % Impervious"
"        2.980   Total Area"
"       80.000   Flow length"
"        1.250   Overland Slope"
"        2.980   Pervious Area"
"       80.000   Pervious length"
"        1.250   Pervious slope"
"        0.000   Impervious Area"
"       80.000   Impervious length"
"        1.250   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.327     3.956     0.000     0.000 c.m/sec"
"             Catchment 20           Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  33.378     5.931      33.378     minutes"
"             Time to Centroid       2738.064   2233.739   2738.063   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        8492.99    0.01       8493.00    c.m"
"             Rainfall losses        139.842    28.841     139.842    mm"
"             Runoff depth           145.158    256.159    145.158    mm"
"             Runoff volume          4325.70    0.01       4325.71    c.m"
"             Runoff coefficient     0.509      0.000      0.509      "
"             Maximum flow           0.327      0.000      0.327      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.327     4.283     0.000     0.000"
" 38          START/RE-START TOTALS 20"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                    0.722    hectare"
"             Total % impervious                       1.832"
" 19          EXIT"
```

C.2. Post-Development Conditions Modelling

NORTH LANDS SUBDIVISION
TOWNSHIP OF CENTRE WELLINGTON (FERGUS)
Our File: 422079
March 4, 2025

Proposed Forebay

Forebay Length =	140.0	m	(Dist)
Forebay Top Width =	27.0	m	
Active Forebay Depth =	1.0	m	(d)
Active Forebay Bottom Width =	21.0	m	
Approximate Permanent Forebay Pool Volume =	224.9	m^3	
Length Width Ratio =	5.2	:1	(r)
25 mm Storm Pond Outlet Flowrate =	0.043	m^3/s	(Q25mm)
5 Year Storm Inflow Rate =	8.626	m^3/s	(Q5)
Desired Forebay Velocity =	0.500	m/s	(Vf)
Desired Settling Velocity (recommended) =	0.0003	m/s	(Vs)

Settling Length

Dist = ((r x Q25mm)/Vs)^.5 =	27.3	m	25mm

Forebay length (140 m) exceeds the settling length (27.3 m).

Dispersion Length

Dist = (8 x Q5)/(d x Vf) =	138.0	m	5 Year

Forebay length (140 m) exceeds the dispersion length (138.0 m).

Flow Velocity in Forebay

Cross-sectional Area (Forebay Only) =	24	m^2	
Cross-sectional Area (With Permanent Pool) =	41.85	m^2	
Cross-sectional Area (With Outlet Pool) =	57.85	m^2	(A)
Q5 =	8.626	m^3/s	
Velocity = Q5/A =	0.149	m/s	5 Year

The average flow velocity through the forebay is equal to the allowable velocity of 0.15 m/s.

NORTH LANDS SUBDIVISION
TOWNSHIP OF CENTRE WELLINGTON (FERGUS)
Our File: 422079
March 4, 2025

SWM Facility - Stage/Storage Volume Calculations

Forebay/Permanent Pool Storage Volume Calculations

Elevation (m)	Depth (m)	Forebay Surface Area (m^2)	Forebay Incremental Storage Volume (m^3)	Perm. Pool Surface Area (m^2)	Perm. Pool Incremental Storage Volume (m^3)	Accumulative Volume (m^3)	
420.20	0.00	0.0	0.0			0.0	Bottom of Forebay
420.40	0.20	817.9	81.79			81.8	
420.60	0.40	902.4	172.03			253.8	
420.80	0.60	989.3	189.17			443.0	
421.00	0.80	1,078.6	206.79			649.8	
421.20	1.00	1,170.2	224.88	9,630.00	0.00	874.7	Bottom of Permanent Pool
421.30	1.10			9,798.00	971.40	1,846.1	
421.40	1.20			10,157.40	997.77	2,843.8	
421.50	1.30			10,518.80	1,033.81	3,877.6	Top of Permanent Pool

Active Storage Volume Calculations

Elevation (m)	Depth (m)	Active Surface Area (m^2)	Active Incremental Volume (m^3)	Accumulative Active Volume (m^3)	
421.50	0.00	10,518.8	0.00	0.00	Bottom of Active Storage
421.60	0.10	10,882.4	1,070.06	1,070.06	
421.70	0.20	11,248.2	1,106.53	2,176.59	
421.80	0.30	11,616.3	1,143.23	3,319.82	
421.90	0.40	11,986.6	1,180.15	4,499.96	
422.00	0.50	12,359.0	1,217.28	5,717.24	T/G DICB.1
422.10	0.60	12,841.0	1,260.00	6,977.24	
422.20	0.70	13,125.1	1,298.31	8,275.55	
422.30	0.80	13,410.9	1,326.80	9,602.35	T/G DICB.2
422.40	0.90	13,698.3	1,355.46	10,957.81	
422.50	1.00	13,987.2	1,384.27	12,342.08	
422.60	1.10	14,277.9	1,413.26	13,755.34	
422.70	1.20	14,570.1	1,442.40	15,197.74	Weir
422.80	1.30	14,864.0	1,471.71	16,669.44	
422.90	1.40	15,159.4	1,501.17	18,170.61	
423.00	1.50	15,456.5	1,530.80	19,701.41	
423.10	1.60	15,755.3	1,560.59	21,262.00	
423.20	1.70	16,055.6	1,590.55	22,852.54	Top of Pond

1800 x1800 Structure Controls

Orifice Outlet (Extended Detention)

modelled with 50% blockage

INV	421.50	m
Q =	0.044	m^3/s
Cd =	0.600	
H =	1.100	m
2g =	19.620	
A =	0.031	m^2
D =	0.200	m

Overflow Weir

d1 =	1.500	m
h =	1.200	
H =	0.300	m
2g =	19.620	
L =	15.0	m
Q =	3.524	m^3/s

Major Control - Flow Over Grate

modelled with 50% blockage

d1 =	0.80	m
h =	0.50	
H =	0.30	m
2g =	19.62	
L =	3.66	m
Q =	0.453	m^3/s

Length of Weir

Head over Grate (m)	Length (m)
0	1.200
0.1	1.832
0.2	2.464
0.3	3.66

Pipe Outflow - Outlet 1

INV. =	421.34	m
Diameter =	525	mm
Gradient =	0.50%	
Pipe Capacity =	0.317	m^3/s
Length =	21.30	m

Pipe Outflow - Outlet 2

INV. =	421.5	m
Diameter =	600	mm
Gradient =	1%	
Pipe Capacity =	0.641	m^3/s
Length =	20.30	m

Orifice Flow = Cd A $\sqrt{2gH}$

Cd = Discharge Coefficient
A = Area of Orifice
2g = 19.62
H = Depth of Water above orifice - half of orifice diameter

Weir Flow = 0.433 $\sqrt{2g(\frac{d}{d+h})}LH^{3/2}$

L = Length of Weir
2g = 19.62
d = total depth of water
h = depth of water below weir
H = depth of water above weir

Stage-Storage-Discharge Table

			OUTLET STRUCTURE 1		OUTLET STRUCTURE 2					
Elevation (m)	Stage (m)	Storage (m^3)	Major Control Grate (m^3/s)	Major Control Pipe Outlet (m^3/s)	200mm dia. Minor Outlet (m^3/s)	Major Control Grate (m^3/s)	Major Control Pipe Outlet (m^3/s)	Weir Overflow (m^3/s)	Actual Discharge (m^3/s)	
421.50	0.00	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Bottom of Active Storage
421.60	0.10	1,070.1	0.000	0.152	0.007	0.000	0.039	0.000	0.007	
421.70	0.20	2,176.6	0.000	0.250	0.013	0.000	0.144	0.000	0.013	
421.80	0.30	3,319.8	0.000	0.317	0.019	0.000	0.307	0.000	0.019	
421.90	0.40	4,500.0	0.000	0.317	0.023	0.000	0.485	0.000	0.023	
422.00	0.50	5,717.2	0.000	0.317	0.026	0.000	0.621	0.000	0.026	T/G DICB.1
422.10	0.60	6,977.2	0.041	0.317	0.030	0.000	0.641	0.000	0.071	
422.20	0.70	8,275.5	0.161	0.317	0.032	0.000	0.641	0.000	0.194	
422.30	0.80	9,602.3	0.453	0.317	0.035	0.000	0.641	0.000	0.352	T/G DICB.2
422.40	0.90	10,957.8		0.317	0.037	0.040	0.641	0.000	0.395	
422.50	1.00	12,342.1		0.317	0.040	0.158	0.641	0.000	0.514	
422.60	1.10	13,755.3		0.317	0.042	0.439	0.641	0.000	0.798	
422.70	1.20	15,197.7		0.317	0.044	0.689	0.641	0.000	0.958	Weir
422.80	1.30	16,669.4		0.317			0.641	0.656	1.614	
422.90	1.40	18,170.6		0.317			0.641	1.888	2.846	
423.00	1.50	19,701.4		0.317			0.641	3.524	4.482	
423.10	1.60	21,262.0		0.317			0.641	5.502	6.460	
423.20	1.70	22,852.5		0.317			0.641	7.788	8.746	Top of Pond

Notes:

Major Controls - the minimum of flow over grate and pipe discharge flow rate is used in the actual discharge calculation

Knockout Controls - the knockout is assumed to contribute to discharge flow rates until the pipe discharge rate is the controlling release rate.

Major Control Pipe Flow - based on Pipe Capacity

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                            B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                        Uncon-Interim__25mm.out"
"                Licensee name:                                                 "
"                Company                                                        "
"                Date & Time last used:                   2/5/2025 at 2:20:21 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      367.000   Coefficient A"
"        5.000   Constant B"
"        0.700   Exponent C"
"        0.394   Fraction R"
"      120.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity            72.993    mm/hr"
"             Total depth                  24.995    mm"
"            7   0025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.007     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  3.071      0.370      2.655      minutes"
"             Time to Centroid       63.738     60.371     63.219     minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        28.49      1.50       29.99      c.m"
"             Rainfall losses        19.084     4.536      18.356     mm"
"             Runoff depth           5.912      20.459     6.639      mm"
"             Runoff volume          6.74       1.23       7.97       c.m"
"             Runoff coefficient     0.237      0.819      0.266      "
"             Maximum flow           0.006      0.001      0.007      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.007     0.007     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.050     0.007     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  20.536     2.476      17.532     minutes"
"             Time to Centroid       82.465     63.135     79.250     minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        410.80     21.62      432.42     c.m"
"             Rainfall losses        18.914     1.941      18.065     mm"
"             Runoff depth           6.082      23.054     6.930      mm"
```

```
"             Runoff volume          99.95      19.94      119.90     c.m"
"             Runoff coefficient     0.243      0.922      0.277      "
"             Maximum flow           0.047      0.013      0.050      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.050     0.052     0.000     0.000"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.129     0.052     0.000     0.000 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  90.569     10.921     87.585     minutes"
"             Time to Centroid       157.420    74.245     154.304    minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        3662.32    36.99      3699.31    c.m"
"             Rainfall losses        18.910     1.543      18.736     mm"
"             Runoff depth           6.085      23.453     6.259      mm"
"             Runoff volume          891.61     34.71      926.32     c.m"
"             Runoff coefficient     0.243      0.938      0.250      "
"             Maximum flow           0.127      0.018      0.129      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.129     0.137     0.000     0.000"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.552     0.137     0.000     0.000 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  24.798     2.990      4.336      minutes"
"             Time to Centroid       87.039     63.901     65.330     minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        654.38     2617.51    3271.89    c.m"
"             Rainfall losses        18.913     1.889      5.294      mm"
"             Runoff depth           6.082      23.106     19.701     mm"
"             Runoff volume          159.22     2419.69    2578.92    c.m"
"             Runoff coefficient     0.243      0.924      0.788      "
"             Maximum flow           0.069      1.550      1.552      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.552     1.581     0.000     0.000"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
```

```
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.056     1.581     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  24.798     2.990      16.045     minutes"
"             Time to Centroid       87.039     63.901     77.753     minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        429.17     75.74      504.91     c.m"
"             Rainfall losses        18.913     1.889      16.360     mm"
"             Runoff depth           6.082      23.106     8.636      mm"
"             Runoff volume          104.43     70.01      174.44     c.m"
"             Runoff coefficient     0.243      0.924      0.345      "
"             Maximum flow           0.045      0.045      0.056      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.056     1.628     0.000     0.000"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.056     1.628     0.000     0.000 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  42.448     5.118      42.448     minutes"
"             Time to Centroid       105.920    66.672     105.919    minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        832.34     0.00       832.34     c.m"
"             Rainfall losses        18.910     1.665      18.910     mm"
"             Runoff depth           6.085      23.330     6.085      mm"
"             Runoff volume          202.64     0.00       202.64     c.m"
"             Runoff coefficient     0.243      0.000      0.243      "
"             Maximum flow           0.056      0.000      0.056      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.056     1.629     0.000     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.121     1.629     0.000     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  8.939      1.078      2.724      minutes"
"             Time to Centroid       70.037     61.193     63.045     minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        168.72     168.72     337.44     c.m"
"             Rainfall losses        18.924     2.080      10.502     mm"
"             Runoff depth           6.071      22.916     14.493     mm"
```

```
"             Runoff volume          40.98      154.68     195.66     c.m"
"             Runoff coefficient     0.243      0.917      0.580      "
"             Maximum flow           0.031      0.118      0.121      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.121     1.750     0.000     0.000"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.044     1.750     0.000     0.000 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  49.662     5.988      49.662     minutes"
"             Time to Centroid       113.637    67.835     113.637    minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        744.86     0.00       744.86     c.m"
"             Rainfall losses        18.911     1.624      18.911     mm"
"             Runoff depth           6.084      23.371     6.084      mm"
"             Runoff volume          181.30     0.00       181.31     c.m"
"             Runoff coefficient     0.243      0.000      0.243      "
"             Maximum flow           0.044      0.000      0.044      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.044     1.751     0.000     0.000"
" 38          START/RE-START TOTALS 700"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                   11.691    hectare"
```

```
"             Total % impervious                        29.656"
" 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:                             B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                          Uncon-Interim__2yr.out"
"                Licensee name:                                                 "
"                Company                                                        "
"                Date & Time last used:                    2/5/2025 at 2:16:04 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      414.876   Coefficient A"
"        0.027   Constant B"
"        0.682   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           100.235    mm/hr"
"             Total depth                  39.504    mm"
"            6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.022     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.816      0.326      1.648      minutes"
"             Time to Centroid       104.196    112.311    105.112    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        45.03      2.37       47.40      c.m"
"             Rainfall losses        25.568     5.814      24.580     mm"
"             Runoff depth           13.936     33.690     14.924     mm"
"             Runoff volume          15.89      2.02       17.91      c.m"
"             Runoff coefficient     0.353      0.853      0.378      "
"             Maximum flow           0.021      0.001      0.022      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.022     0.022     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.163     0.022     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  12.141     2.181      10.914     minutes"
"             Time to Centroid       117.971    114.662    117.563    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        649.25     34.17      683.42     c.m"
"             Rainfall losses        25.401     1.860      24.224     mm"
"             Runoff depth           14.103     37.644     15.280     mm"
```

```
"             Runoff volume          231.78     32.56      264.34     c.m"
"             Runoff coefficient     0.357      0.953      0.387      "
"             Maximum flow           0.158      0.022      0.163      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.163     0.167     0.000     0.000"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.449     0.167     0.000     0.000 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  53.548     9.620      52.390     minutes"
"             Time to Centroid       172.894    126.382    171.669    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        5788.13    58.47      5846.59    c.m"
"             Rainfall losses        25.381     1.671      25.143     mm"
"             Runoff depth           14.123     37.833     14.361     mm"
"             Runoff volume          2069.36    55.99      2125.36    c.m"
"             Runoff coefficient     0.358      0.958      0.364      "
"             Maximum flow           0.445      0.030      0.449      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.449     0.481     0.000     0.000"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    2.700     0.481     0.000     0.000 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  14.661     2.634      3.668      minutes"
"             Time to Centroid       121.346    115.356    115.871    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        1034.22    4136.86    5171.08    c.m"
"             Rainfall losses        25.379     1.965      6.648      mm"
"             Runoff depth           14.125     37.539     32.856     mm"
"             Runoff volume          369.79     3931.05    4300.84    c.m"
"             Runoff coefficient     0.358      0.950      0.832      "
"             Maximum flow           0.236      2.644      2.700      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    2.700     2.845     0.000     0.000"
" 33          CATCHMENT 200"
"           1   Triangular SCS"
"           1   Equal length"
"           2   Horton equation"
"         200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
```

```
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.170     2.845     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  14.661     2.634      10.821     minutes"
"             Time to Centroid       121.346    115.356    119.434    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        678.28     119.70     797.98     c.m"
"             Rainfall losses        25.379     1.965      21.867     mm"
"             Runoff depth           14.125     37.539     17.637     mm"
"             Runoff volume          242.53     113.74     356.27     c.m"
"             Runoff coefficient     0.358      0.950      0.446      "
"             Maximum flow           0.155      0.077      0.170      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.170     2.958     0.000     0.000"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.193     2.958     0.000     0.000 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  25.097     4.509      25.096     minutes"
"             Time to Centroid       135.157    118.349    135.157    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        1315.48    0.00       1315.48    c.m"
"             Rainfall losses        25.393     1.692      25.393     mm"
"             Runoff depth           14.111     37.813     14.111     mm"
"             Runoff volume          469.88     0.00       469.89     c.m"
"             Runoff coefficient     0.357      0.000      0.357      "
"             Maximum flow           0.193      0.000      0.193      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.193     2.987     0.000     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.228     2.987     0.000     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  5.285      0.949      2.157      minutes"
"             Time to Centroid       108.893    112.435    111.449    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        266.65     266.65     533.30     c.m"
"             Rainfall losses        25.407     2.971      14.189     mm"
"             Runoff depth           14.097     36.533     25.315     mm"
```

```
"             Runoff volume          95.16      246.59     341.75     c.m"
"             Runoff coefficient     0.357      0.925      0.641      "
"             Maximum flow           0.106      0.170      0.228      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.228     3.215     0.000     0.000"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.152     3.215     0.000     0.000 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  29.362     5.275      29.362     minutes"
"             Time to Centroid       140.817    119.556    140.816    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        1177.22    0.00       1177.22    c.m"
"             Rainfall losses        25.383     1.653      25.383     mm"
"             Runoff depth           14.121     37.851     14.121     mm"
"             Runoff volume          420.82     0.00       420.82     c.m"
"             Runoff coefficient     0.357      0.000      0.357      "
"             Maximum flow           0.152      0.000      0.152      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.152     3.235     0.000     0.000"
" 38          START/RE-START TOTALS 700"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                   11.691    hectare"
```

```
"             Total % impervious                        29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                             B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                          Uncon-Interim__5yr.out"
"                Licensee name:                                                  "
"                Company                                                         "
"                Date & Time last used:                    2/5/2025 at 2:14:12 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      544.711   Coefficient A"
"        0.021   Constant B"
"        0.686   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           130.581    mm/hr"
"             Total depth                  50.743    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.035     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.618      0.293      1.500      minutes"
"             Time to Centroid       105.803    111.144    106.279    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        57.85      3.04       60.89      c.m"
"             Rainfall losses        27.440     7.450      26.440     mm"
"             Runoff depth           23.303     43.293     24.303     mm"
"             Runoff volume          26.57      2.60       29.16      c.m"
"             Runoff coefficient     0.459      0.853      0.479      "
"             Maximum flow           0.033      0.002      0.035      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.035     0.035     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.287     0.035     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  10.817     1.962      9.949      minutes"
"             Time to Centroid       118.405    113.377    117.912    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        833.96     43.89      877.85     c.m"
"             Rainfall losses        27.163     2.058      25.907     mm"
"             Runoff depth           23.580     48.685     24.835     mm"
```

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"             Runoff volume          387.54     42.11      429.65     c.m"
"             Runoff coefficient     0.465      0.959      0.489      "
"             Maximum flow           0.272      0.029      0.287      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.287     0.305     0.000     0.000"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.818     0.305     0.000     0.000 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  47.706     8.654      46.903     minutes"
"             Time to Centroid       168.372    124.102    167.462    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        7434.86    75.10      7509.96    c.m"
"             Rainfall losses        27.127     1.696      26.873     mm"
"             Runoff depth           23.616     49.047     23.870     mm"
"             Runoff volume          3460.21    72.59      3532.80    c.m"
"             Runoff coefficient     0.465      0.967      0.470      "
"             Maximum flow           0.812      0.040      0.818      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.818     0.868     0.000     0.000"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     3.616     0.868     0.000     0.000 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  13.062     2.369      3.518      minutes"
"             Time to Centroid       121.452    114.097    114.887    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        1328.45    5313.80    6642.25    c.m"
"             Rainfall losses        27.259     1.941      7.004      mm"
"             Runoff depth           23.484     48.802     43.739     mm"
"             Runoff volume          614.82     5110.59    5725.39    c.m"
"             Runoff coefficient     0.463      0.962      0.862      "
"             Maximum flow           0.395      3.479      3.616      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     3.616     3.901     0.000     0.000"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
```

```
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.279     3.901     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  13.062     2.369      10.193     minutes"
"             Time to Centroid       121.452    114.097    119.479    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        871.26     153.75     1025.01    c.m"
"             Rainfall losses        27.259     1.941      23.461     mm"
"             Runoff depth           23.484     48.802     27.282     mm"
"             Runoff volume          403.22     147.87     551.10     c.m"
"             Runoff coefficient     0.463      0.962      0.538      "
"             Maximum flow           0.259      0.101      0.279      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.279     4.092     0.000     0.000"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.356     4.092     0.000     0.000 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  22.359     4.056      22.359     minutes"
"             Time to Centroid       134.036    116.866    134.036    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        1689.74    0.00       1689.74    c.m"
"             Rainfall losses        27.188     2.068      27.188     mm"
"             Runoff depth           23.555     48.675     23.555     mm"
"             Runoff volume          784.37     0.00       784.38     c.m"
"             Runoff coefficient     0.464      0.000      0.464      "
"             Maximum flow           0.356      0.000      0.356      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.356     4.163     0.000     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.347     4.163     0.000     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  4.708      0.854      2.132      minutes"
"             Time to Centroid       110.182    111.691    111.191    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        342.51     342.51     685.03     c.m"
"             Rainfall losses        27.326     3.537      15.432     mm"
"             Runoff depth           23.417     47.206     35.311     mm"
```

```
"             Runoff volume          158.07     318.64     476.70     c.m"
"             Runoff coefficient     0.461      0.930      0.696      "
"             Maximum flow           0.157      0.219      0.347      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.347     4.510     0.000     0.000"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.271     4.510     0.000     0.000 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  26.159     4.745      26.159     minutes"
"             Time to Centroid       139.192    117.881    139.192    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        1512.14    0.00       1512.14    c.m"
"             Rainfall losses        27.134     1.694      27.134     mm"
"             Runoff depth           23.609     49.049     23.609     mm"
"             Runoff volume          703.54     0.00       703.54     c.m"
"             Runoff coefficient     0.465      0.000      0.465      "
"             Maximum flow           0.271      0.000      0.271      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.271     4.559     0.000     0.000"
" 38          START/RE-START TOTALS 700"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                   11.691    hectare"
```

```
"             Total % impervious                        29.656"
" 19          EXIT"
```

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"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                       Uncon-Interim__10yr.out"
"                Licensee name:                                               "
"                Company                                                      "
"                Date & Time last used:                  2/5/2025 at 2:11:51 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      627.308   Coefficient A"
"        0.014   Constant B"
"        0.687   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           150.154    mm/hr"
"             Total depth                  58.119    mm"
"            6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.043     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.525      0.278      1.424      minutes"
"             Time to Centroid       107.285    110.607    107.552    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        66.26      3.49       69.74      c.m"
"             Rainfall losses        28.307     8.539      27.318     mm"
"             Runoff depth           29.812     49.580     30.801     mm"
"             Runoff volume          33.99      2.97       36.96      c.m"
"             Runoff coefficient     0.513      0.853      0.530      "
"             Maximum flow           0.040      0.002      0.043      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.043     0.043     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.378     0.043     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  10.195     1.856      9.450      minutes"
"             Time to Centroid       119.343    112.794    118.758    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        955.19     50.27      1005.46    c.m"
"             Rainfall losses        28.125     2.227      26.830     mm"
"             Runoff depth           29.994     55.892     31.289     mm"
```

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"             Runoff volume          492.95     48.35      541.29     c.m"
"             Runoff coefficient     0.516      0.962      0.538      "
"             Maximum flow           0.361      0.033      0.378      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.378     0.398     0.000     0.000"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.110     0.398     0.000     0.000 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  44.961     8.184      44.281     minutes"
"             Time to Centroid       167.191    123.105    166.375    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        8515.60    86.02      8601.62    c.m"
"             Rainfall losses        27.876     1.659      27.613     mm"
"             Runoff depth           30.243     56.460     30.506     mm"
"             Runoff volume          4431.28    83.56      4514.84    c.m"
"             Runoff coefficient     0.520      0.971      0.525      "
"             Maximum flow           1.104      0.051      1.110      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.110     1.172     0.000     0.000"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     4.219     1.172     0.000     0.000 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  12.310     2.241      3.433      minutes"
"             Time to Centroid       122.261    113.547    114.579    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        1521.56    6086.22    7607.78    c.m"
"             Rainfall losses        27.960     1.991      7.185      mm"
"             Runoff depth           30.159     56.128     50.934     mm"
"             Runoff volume          789.57     5877.72    6667.29    c.m"
"             Runoff coefficient     0.519      0.966      0.876      "
"             Maximum flow           0.493      4.013      4.219      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     4.219     4.634     0.000     0.000"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
```

```
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.383     4.634     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  12.310     2.241      9.821      minutes"
"             Time to Centroid       122.261    113.547    120.106    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        997.90     176.10     1174.00    c.m"
"             Rainfall losses        27.960     1.991      24.065     mm"
"             Runoff depth           30.159     56.128     34.054     mm"
"             Runoff volume          517.83     170.07     687.90     c.m"
"             Runoff coefficient     0.519      0.966      0.586      "
"             Maximum flow           0.323      0.116      0.383      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.383     4.885     0.000     0.000"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.455     4.885     0.000     0.000 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  21.072     3.836      21.072     minutes"
"             Time to Centroid       134.305    116.233    134.305    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        1935.36    0.00       1935.36    c.m"
"             Rainfall losses        27.871     2.469      27.871     mm"
"             Runoff depth           30.248     55.650     30.248     mm"
"             Runoff volume          1007.27    0.00       1007.27    c.m"
"             Runoff coefficient     0.520      0.000      0.520      "
"             Maximum flow           0.455      0.000      0.455      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.455     4.999     0.000     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.424     4.999     0.000     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  4.437      0.808      2.102      minutes"
"             Time to Centroid       111.465    111.382    111.412    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        392.30     392.30     784.61     c.m"
"             Rainfall losses        28.094     3.950      16.022     mm"
"             Runoff depth           30.025     54.169     42.097     mm"
```

```
"             Runoff volume          202.67     365.64     568.30     c.m"
"             Runoff coefficient     0.517      0.932      0.724      "
"             Maximum flow           0.180      0.250      0.424      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.424     5.423     0.000     0.000"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.386     5.423     0.000     0.000 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  24.654     4.487      24.654     minutes"
"             Time to Centroid       139.257    117.159    139.257    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        1731.95    0.00       1731.95    c.m"
"             Rainfall losses        27.890     1.793      27.890     mm"
"             Runoff depth           30.229     56.326     30.229     mm"
"             Runoff volume          900.82     0.00       900.82     c.m"
"             Runoff coefficient     0.520      0.000      0.520      "
"             Maximum flow           0.386      0.000      0.386      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.386     5.501     0.000     0.000"
" 38          START/RE-START TOTALS 700"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                   11.691    hectare"
```

```
"             Total % impervious                        29.656"
" 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"
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"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                       Uncon-Interim__25yr.out"
"                Licensee name:                                               "
"                Company                                                      "
"                Date & Time last used:                  2/5/2025 at 2:03:30 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      746.059   Coefficient A"
"        0.085   Constant B"
"        0.692   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           175.654    mm/hr"
"             Total depth                  67.239    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.052     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.428      0.261      1.342      minutes"
"             Time to Centroid       108.971    109.975    109.045    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        76.65      4.03       80.69      c.m"
"             Rainfall losses        29.074     9.934      28.117     mm"
"             Runoff depth           38.165     57.305     39.122     mm"
"             Runoff volume          43.51      3.44       46.95      c.m"
"             Runoff coefficient     0.568      0.852      0.582      "
"             Maximum flow           0.049      0.003      0.052      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.052     0.052     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.496     0.052     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  9.548      1.743      8.915      minutes"
"             Time to Centroid       120.388    112.106    119.717    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        1105.07    58.16      1163.23    c.m"
"             Rainfall losses        28.570     2.417      27.262     mm"
"             Runoff depth           38.669     64.822     39.977     mm"
```

```
"             Runoff volume          635.52     56.07      691.59     c.m"
"             Runoff coefficient     0.575      0.964      0.595      "
"             Maximum flow           0.477      0.039      0.496      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.496     0.519     0.000     0.000"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.530     0.519     0.000     0.000 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  42.108     7.686      41.531     minutes"
"             Time to Centroid       165.819    121.852    165.082    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        9851.84    99.51      9951.36    c.m"
"             Rainfall losses        28.384     1.687      28.117     mm"
"             Runoff depth           38.855     65.552     39.122     mm"
"             Runoff volume          5692.98    97.02      5789.99    c.m"
"             Runoff coefficient     0.578      0.975      0.582      "
"             Maximum flow           1.521      0.060      1.530      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.530     1.611     0.000     0.000"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    5.040     1.611     0.000     0.000 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  11.529     2.104      3.326      minutes"
"             Time to Centroid       123.146    112.845    114.181    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        1760.31    7041.26    8801.57    c.m"
"             Rainfall losses        28.447     2.145      7.405      mm"
"             Runoff depth           38.792     65.094     59.834     mm"
"             Runoff volume          1015.58    6816.63    7832.21    c.m"
"             Runoff coefficient     0.577      0.968      0.890      "
"             Maximum flow           0.662      4.705      5.040      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    5.040     5.657     0.000     0.000"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
```

```
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.509     5.657     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  11.529     2.104      9.376      minutes"
"             Time to Centroid       123.146    112.845    120.792    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        1154.49    203.73     1358.23    c.m"
"             Rainfall losses        28.447     2.145      24.501     mm"
"             Runoff depth           38.792     65.094     42.738     mm"
"             Runoff volume          666.07     197.23     863.30     c.m"
"             Runoff coefficient     0.577      0.968      0.636      "
"             Maximum flow           0.434      0.136      0.509      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.509     6.013     0.000     0.000"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.607     6.013     0.000     0.000 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  19.735     3.602      19.735     minutes"
"             Time to Centroid       134.608    115.438    134.608    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        2239.05    0.00       2239.06    c.m"
"             Rainfall losses        28.441     2.959      28.441     mm"
"             Runoff depth           38.798     64.280     38.798     mm"
"             Runoff volume          1291.97    0.00       1291.97    c.m"
"             Runoff coefficient     0.577      0.000      0.577      "
"             Maximum flow           0.607      0.000      0.607      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.607     6.195     0.000     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.525     6.195     0.000     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  4.156      0.759      2.050      minutes"
"             Time to Centroid       112.936    110.977    111.722    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        453.86     453.86     907.73     c.m"
"             Rainfall losses        28.833     4.588      16.711     mm"
"             Runoff depth           38.406     62.651     50.528     mm"
```

```
"             Runoff volume          259.24     422.89     682.13     c.m"
"             Runoff coefficient     0.571      0.932      0.751      "
"             Maximum flow           0.234      0.291      0.525      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.525     6.720     0.000     0.000"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.500     6.720     0.000     0.000 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  23.089     4.215      23.089     minutes"
"             Time to Centroid       139.283    116.269    139.283    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        2003.72    0.00       2003.72    c.m"
"             Rainfall losses        28.407     2.068      28.407     mm"
"             Runoff depth           38.832     65.171     38.832     mm"
"             Runoff volume          1157.20    0.00       1157.21    c.m"
"             Runoff coefficient     0.578      0.000      0.578      "
"             Maximum flow           0.500      0.000      0.500      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.500     6.845     0.000     0.000"
" 38          START/RE-START TOTALS 700"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                   11.691    hectare"
```

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"             Total % impervious                        29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                       Uncon-Interim__50yr.out"
"                Licensee name:                                               "
"                Company                                                      "
"                Date & Time last used:                  2/5/2025 at 2:00:47 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      820.361   Coefficient A"
"        0.010   Constant B"
"        0.691   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           194.803    mm/hr"
"             Total depth                  74.358    mm"
"            6   050hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.058     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.368      0.250      1.290      minutes"
"             Time to Centroid       110.205    109.690    110.169    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        84.77      4.46       89.23      c.m"
"             Rainfall losses        29.637     11.032     28.707     mm"
"             Runoff depth           44.721     63.326     45.651     mm"
"             Runoff volume          50.98      3.80       54.78      c.m"
"             Runoff coefficient     0.601      0.852      0.614      "
"             Maximum flow           0.055      0.003      0.058      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.058     0.058     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.580     0.058     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  9.147      1.672      8.573      minutes"
"             Time to Centroid       121.402    111.843    120.668    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        1222.07    64.32      1286.39    c.m"
"             Rainfall losses        28.890     2.541      27.572     mm"
"             Runoff depth           45.468     71.816     46.785     mm"
```

```
"             Runoff volume          747.27     62.12      809.39     c.m"
"             Runoff coefficient     0.611      0.966      0.629      "
"             Maximum flow           0.558      0.043      0.580      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.580     0.604     0.000     0.000"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.817     0.604     0.000     0.000 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  40.339     7.374      39.818     minutes"
"             Time to Centroid       166.075    121.211    165.366    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        1.0895     0.0110     1.1005     ha-m"
"             Rainfall losses        28.716     1.802      28.447     mm"
"             Runoff depth           45.642     72.556     45.911     mm"
"             Runoff volume          6687.42    107.38     6794.80    c.m"
"             Runoff coefficient     0.614      0.976      0.617      "
"             Maximum flow           1.807      0.066      1.817      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.817     1.914     0.000     0.000"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    5.638     1.914     0.000     0.000 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  11.045     2.019      3.250      minutes"
"             Time to Centroid       124.131    112.509    114.093    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        1946.69    7786.75    9733.44    c.m"
"             Rainfall losses        28.840     2.269      7.583      mm"
"             Runoff depth           45.518     72.088     66.774     mm"
"             Runoff volume          1191.65    7549.11    8740.76    c.m"
"             Runoff coefficient     0.612      0.969      0.898      "
"             Maximum flow           0.783      5.218      5.638      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    5.638     6.392     0.000     0.000"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
```

```
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.595     6.392     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  11.045     2.019      9.073      minutes"
"             Time to Centroid       124.131    112.509    121.592    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        1276.72    225.30     1502.03    c.m"
"             Rainfall losses        28.840     2.269      24.855     mm"
"             Runoff depth           45.518     72.088     49.503     mm"
"             Runoff volume          781.54     218.43     999.97     c.m"
"             Runoff coefficient     0.612      0.969      0.666      "
"             Maximum flow           0.514      0.151      0.595      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.595     6.819     0.000     0.000"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.720     6.819     0.000     0.000 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  18.906     3.456      18.906     minutes"
"             Time to Centroid       135.377    115.016    135.377    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        2476.11    0.00       2476.11    c.m"
"             Rainfall losses        28.813     3.112      28.813     mm"
"             Runoff depth           45.544     71.246     45.544     mm"
"             Runoff volume          1516.63    0.00       1516.63    c.m"
"             Runoff coefficient     0.613      0.000      0.613      "
"             Maximum flow           0.720      0.000      0.720      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.720     7.048     0.000     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.597     7.048     0.000     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  3.981      0.728      2.007      minutes"
"             Time to Centroid       114.123    110.827    112.123    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        501.92     501.92     1003.83    c.m"
"             Rainfall losses        29.474     5.085      17.279     mm"
"             Runoff depth           44.884     69.273     57.079     mm"
```

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"             Runoff volume          302.97     467.59     770.56     c.m"
"             Runoff coefficient     0.604      0.932      0.768      "
"             Maximum flow           0.276      0.321      0.597      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.597     7.645     0.000     0.000"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.575     7.645     0.000     0.000 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  22.119     4.044      22.119     minutes"
"             Time to Centroid       139.988    115.872    139.988    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        2215.86    0.00       2215.86    c.m"
"             Rainfall losses        28.813     2.354      28.812     mm"
"             Runoff depth           45.545     72.004     45.545     mm"
"             Runoff volume          1357.25    0.00       1357.25    c.m"
"             Runoff coefficient     0.613      0.000      0.613      "
"             Maximum flow           0.575      0.000      0.575      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.575     7.802     0.000     0.000"
" 38          START/RE-START TOTALS 700"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                   11.691    hectare"
```

```
"             Total % impervious                        29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                             B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                        Uncon-Interim__100yr.out"
"                Licensee name:                                                 "
"                Company                                                        "
"                Date & Time last used:                    2/5/2025 at 1:58:41 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      901.088   Coefficient A"
"        0.043   Constant B"
"        0.692   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           212.921    mm/hr"
"             Total depth                  81.221    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

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"        1.500   Impervious Depression storage"
"                     0.063     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.319      0.241      1.247      minutes"
"             Time to Centroid       110.908    109.390    110.807    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        92.59      4.87       97.46      c.m"
"             Rainfall losses        30.156     12.072     29.251     mm"
"             Runoff depth           51.065     69.148     51.969     mm"
"             Runoff volume          58.21      4.15       62.36      c.m"
"             Runoff coefficient     0.629      0.851      0.640      "
"             Maximum flow           0.060      0.003      0.063      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.063     0.063     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.664     0.063     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  8.817      1.614      8.287      minutes"
"             Time to Centroid       121.743    111.617    120.997    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        1334.86    70.26      1405.12    c.m"
"             Rainfall losses        29.209     2.686      27.883     mm"
"             Runoff depth           52.011     78.534     53.337     mm"
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"             Runoff volume          854.81     67.93      922.74     c.m"
"             Runoff coefficient     0.640      0.967      0.657      "
"             Maximum flow           0.641      0.047      0.664      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.664     0.691     0.000     0.000"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     2.059     0.691     0.000     0.000 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  38.886     7.117      38.407     minutes"
"             Time to Centroid       165.000    120.685    164.331    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        1.1900     0.0120     1.2021     ha-m"
"             Rainfall losses        28.976     1.949      28.706     mm"
"             Runoff depth           52.245     79.272     52.515     mm"
"             Runoff volume          7654.90    117.32     7772.23    c.m"
"             Runoff coefficient     0.643      0.976      0.647      "
"             Maximum flow           2.048      0.072      2.059      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     2.059     2.166     0.000     0.000"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     6.208     2.166     0.000     0.000 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  10.647     1.949      3.182      minutes"
"             Time to Centroid       124.365    112.180    113.907    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        0.2126     0.8505     1.0632     ha-m"
"             Rainfall losses        29.139     2.392      7.742      mm"
"             Runoff depth           52.082     78.828     73.479     mm"
"             Runoff volume          1363.51    8254.90    9618.41    c.m"
"             Runoff coefficient     0.641      0.971      0.905      "
"             Maximum flow           0.912      5.702      6.208      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     6.208     7.107     0.000     0.000"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
```

```
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.686     7.107     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  10.647     1.949      8.813      minutes"
"             Time to Centroid       124.365    112.180    121.796    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        1394.56    246.10     1640.66    c.m"
"             Rainfall losses        29.139     2.392      25.127     mm"
"             Runoff depth           52.082     78.828     56.094     mm"
"             Runoff volume          894.25     238.85     1133.10    c.m"
"             Runoff coefficient     0.641      0.971      0.691      "
"             Maximum flow           0.598      0.165      0.686      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.686     7.604     0.000     0.000"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.835     7.604     0.000     0.000 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  18.225     3.335      18.225     minutes"
"             Time to Centroid       135.263    114.631    135.263    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        2704.65    0.00       2704.65    c.m"
"             Rainfall losses        28.982     3.311      28.982     mm"
"             Runoff depth           52.239     77.910     52.239     mm"
"             Runoff volume          1739.55    0.00       1739.55    c.m"
"             Runoff coefficient     0.643      0.000      0.643      "
"             Maximum flow           0.835      0.000      0.835      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.835     7.881     0.000     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.665     7.881     0.000     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  3.838      0.702      1.967      minutes"
"             Time to Centroid       114.744    110.663    112.310    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        548.24     548.24     1096.48    c.m"
"             Rainfall losses        30.089     5.611      17.850     mm"
"             Runoff depth           51.132     75.610     63.371     mm"
```

```
"             Runoff volume          345.14     510.37     855.51     c.m"
"             Runoff coefficient     0.630      0.931      0.780      "
"             Maximum flow           0.315      0.350      0.665      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.665     8.546     0.000     0.000"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.652     8.546     0.000     0.000 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  21.323     3.902      21.323     minutes"
"             Time to Centroid       139.735    115.505    139.735    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        2420.38    0.00       2420.38    c.m"
"             Rainfall losses        28.988     2.703      28.988     mm"
"             Runoff depth           52.233     78.518     52.233     mm"
"             Runoff volume          1556.54    0.00       1556.55    c.m"
"             Runoff coefficient     0.643      0.000      0.643      "
"             Maximum flow           0.652      0.000      0.652      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.652     8.737     0.000     0.000"
" 38          START/RE-START TOTALS 700"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                   11.691    hectare"
```

```
"             Total % impervious                        29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                            B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                        Uuncon-Interim__REG.out"
"                Licensee name:                                                 "
"                Company                                                        "
"                Date & Time last used:                   2/5/2025 at 1:53:57 PM"
" 31          TIME PARAMETERS"
"       60.000   Time Step"
"     2880.000   Max. Storm length"
"     7500.000   Max. Hydrograph"
" 32          STORM Historic"
"            5   Historic"
"     2880.000   Duration"
"       48.000   Rainfall intensity values"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.026     2.026     2.026     2.028"
"                  2.026     6.000     4.000     6.000    13.000"
"                 17.000    13.000    23.000    13.000    13.000"
"                 53.000    38.000    13.000"
"             Maximum intensity            53.000    mm/hr"
"             Total depth                 285.000    mm"
"            6   000hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
```

```
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.014     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  2.369      0.421      2.184      minutes"
"             Time to Centroid       2699.991   2271.478   2659.445   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        324.90     17.10      342.00     c.m"
"             Rainfall losses        157.980    32.780     151.720    mm"
"             Runoff depth           127.020    252.220    133.280    mm"
"             Runoff volume          144.80     15.13      159.94     c.m"
"             Runoff coefficient     0.446      0.885      0.468      "
"             Maximum flow           0.013      0.001      0.014      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.014     0.014     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.182     0.014     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
```

```
"             Time of concentration  15.838     2.814      14.776     minutes"
"             Time to Centroid       2719.829   2252.474   2681.705   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        4683.98    246.53     4930.50    c.m"
"             Rainfall losses        139.630    39.672     134.632    mm"
"             Runoff depth           145.370    245.328    150.368    mm"
"             Runoff volume          2389.15    212.21     2601.36    c.m"
"             Runoff coefficient     0.510      0.861      0.528      "
"             Maximum flow           0.171      0.011      0.182      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.182     0.196     0.000     0.000"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.470     0.196     0.000     0.000 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  69.853     12.412     68.788     minutes"
"             Time to Centroid       2777.725   2293.749   2768.751   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        4.1758     0.0422     4.2180     ha-m"
"             Rainfall losses        138.578    11.153     137.304    mm"
"             Runoff depth           146.422    273.847    147.696    mm"
"             Runoff volume          2.1454     0.0405     2.1859     ha-m"
"             Runoff coefficient     0.514      0.961      0.518      "
"             Maximum flow           1.454      0.018      1.470      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"            4   Add Runoff "
"                    1.470     1.647     0.000     0.000"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    1.584     1.647     0.000     0.000 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  19.125     3.398      5.426      minutes"
"             Time to Centroid       2724.073   2240.650   2302.975   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        0.7461     2.9845     3.7307     ha-m"
"             Rainfall losses        139.363    39.000     59.073     mm"
"             Runoff depth           145.637    246.000    225.927    mm"
"             Runoff volume          0.3813     2.5761     2.9574     ha-m"
"             Runoff coefficient     0.511      0.863      0.793      "
"             Maximum flow           0.264      1.323      1.584      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.584     2.853     0.000     0.000"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
```

```
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.210     2.853     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  19.125     3.398      15.514     minutes"
"             Time to Centroid       2724.073   2240.650   2613.063   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        4893.45    863.55     5757.00    c.m"
"             Rainfall losses        139.363    39.000     124.309    mm"
"             Runoff depth           145.637    246.000    160.691    mm"
"             Runoff volume          2500.58    745.38     3245.96    c.m"
"             Runoff coefficient     0.511      0.863      0.564      "
"             Maximum flow           0.173      0.038      0.210      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.210     3.053     0.000     0.000"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
```

```
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.366     3.053     0.000     0.000 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  32.738     5.817      32.738     minutes"
"             Time to Centroid       2737.685   2233.111   2737.684   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        9490.49    0.01       9490.50    c.m"
"             Rainfall losses        139.700    29.327     139.699    mm"
"             Runoff depth           145.300    255.673    145.301    mm"
"             Runoff volume          4838.50    0.01       4838.51    c.m"
"             Runoff coefficient     0.510      0.000      0.510      "
"             Maximum flow           0.366      0.000      0.366      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.366     3.419     0.000     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.165     3.419     0.000     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
```

```
"             Time of concentration  6.894      1.225      3.197      minutes"
"             Time to Centroid       2702.037   2279.380   2426.416   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        1923.75    1923.75    3847.50    c.m"
"             Rainfall losses        153.479    38.462     95.970     mm"
"             Runoff depth           131.521    246.538    189.030    mm"
"             Runoff volume          887.77     1664.13    2551.90    c.m"
"             Runoff coefficient     0.461      0.865      0.663      "
"             Maximum flow           0.077      0.088      0.165      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.165     3.533     0.000     0.000"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.327     3.533     0.000     0.000 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  38.303     6.806      38.303     minutes"
"             Time to Centroid       2741.219   2241.541   2741.218   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        8492.99    0.01       8493.00    c.m"
"             Rainfall losses        141.568    24.635     141.568    mm"
"             Runoff depth           143.432    260.365    143.432    mm"
"             Runoff volume          4274.27    0.01       4274.27    c.m"
"             Runoff coefficient     0.503      0.000      0.503      "
"             Maximum flow           0.327      0.000      0.327      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"            4   Add Runoff "
"                     0.327     3.860     0.000     0.000"
" 38          START/RE-START TOTALS 700"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                   11.691    hectare"
"             Total % impervious                      29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                Interim__25mm.out"
"                Licensee name:                                                  "
"                Company                                                         "
"                Date & Time last used:                  2/5/2025 at 11:29:30 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      367.000   Coefficient A"
"        5.000   Constant B"
"        0.700   Exponent C"
"        0.394   Fraction R"
"      120.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity            72.993    mm/hr"
"             Total depth                  24.995    mm"
"            7   0025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.007     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  3.071      0.370      2.655      minutes"
"             Time to Centroid       63.738     60.371     63.219     minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        28.49      1.50       29.99      c.m"
"             Rainfall losses        19.084     4.536      18.356     mm"
"             Runoff depth           5.912      20.459     6.639      mm"
"             Runoff volume          6.74       1.23       7.97       c.m"
"             Runoff coefficient     0.237      0.819      0.266      "
"             Maximum flow           0.006      0.001      0.007      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.007     0.007     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.050     0.007     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  20.536     2.476      17.532     minutes"
"             Time to Centroid       82.465     63.135     79.250     minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        410.80     21.62      432.42     c.m"
"             Rainfall losses        18.914     1.941      18.065     mm"
"             Runoff depth           6.082      23.054     6.930      mm"
```

```
"             Runoff volume          99.95      19.94      119.90     c.m"
"             Runoff coefficient     0.243      0.922      0.277      "
"             Maximum flow           0.047      0.013      0.050      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.050     0.052     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.050     0.052     0.052     0.000"
" 40          HYDROGRAPH   Combine    100"
"            6   Combine "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"             Maximum flow                 0.052    c.m/sec"
"             Hydrograph volume          127.862    c.m"
"                     0.050     0.052     0.052     0.052"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.050     0.000     0.052     0.052"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.129     0.000     0.052     0.052 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  90.569     10.921     87.585     minutes"
"             Time to Centroid       157.420    74.245     154.304    minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
```

```
"             Rainfall volume        3662.32    36.99      3699.31    c.m"
"             Rainfall losses        18.910     1.543      18.736     mm"
"             Runoff depth           6.085      23.453     6.259      mm"
"             Runoff volume          891.61     34.71      926.32     c.m"
"             Runoff coefficient     0.243      0.938      0.250      "
"             Maximum flow           0.127      0.018      0.129      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.129     0.129     0.052     0.052"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.552     0.129     0.052     0.052 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  24.798     2.990      4.336      minutes"
"             Time to Centroid       87.039     63.901     65.330     minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        654.38     2617.51    3271.89    c.m"
"             Rainfall losses        18.913     1.889      5.294      mm"
"             Runoff depth           6.082      23.106     19.701     mm"
"             Runoff volume          159.22     2419.69    2578.92    c.m"
"             Runoff coefficient     0.243      0.924      0.788      "
"             Maximum flow           0.069      1.550      1.552      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.552     1.562     0.052     0.052"
" 33          CATCHMENT 200"
```

```
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.056     1.562     0.052     0.052 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  24.798     2.990      16.045     minutes"
"             Time to Centroid       87.039     63.901     77.753     minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        429.17     75.74      504.91     c.m"
"             Rainfall losses        18.913     1.889      16.360     mm"
"             Runoff depth           6.082      23.106     8.636      mm"
"             Runoff volume          104.43     70.01      174.44     c.m"
"             Runoff coefficient     0.243      0.924      0.345      "
"             Maximum flow           0.045      0.045      0.056      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.056     1.609     0.052     0.052"
" 54          POND DESIGN"
"        1.609   Current peak flow    c.m/sec"
"        3.341   Target outflow    c.m/sec"
"       3679.7   Hydrograph volume    c.m"
"          18.   Number of stages"
"      421.500   Minimum water level    metre"
"      423.200   Maximum water level    metre"
"      421.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                421.500     0.000     0.000"
```

```
"                421.600   0.00700  1070.100"
"                421.700   0.01300  2176.600"
"                421.800   0.01900  3319.800"
"                421.900   0.02300  4500.000"
"                422.000   0.02600  5717.200"
"                422.100   0.07100  6977.200"
"                422.200    0.1940  8275.500"
"                422.300    0.3520  9602.300"
"                422.400    0.3950  10957.80"
"                422.500    0.5140  12342.10"
"                422.600    0.7980  13755.30"
"                422.700    0.9580  15197.70"
"                422.800     1.614  16669.40"
"                422.900     2.846  18170.60"
"                423.000     4.482  19701.40"
"                423.100     6.460  21262.00"
"                423.200     8.746  22852.50"
"             Peak outflow                  0.019    c.m/sec"
"             Maximum level               421.807    metre"
"             Maximum storage            3397.904    c.m"
"             Centroidal lag               40.318   hours"
"                  0.056     1.609     0.019     0.052 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.056     0.019     0.019     0.052"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.056     0.019     0.019     0.052 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  42.448     5.118      42.448     minutes"
"             Time to Centroid       105.920    66.672     105.919    minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        832.34     0.00       832.34     c.m"
"             Rainfall losses        18.910     1.665      18.910     mm"
"             Runoff depth           6.085      23.330     6.085      mm"
"             Runoff volume          202.64     0.00       202.64     c.m"
"             Runoff coefficient     0.243      0.000      0.243      "
"             Maximum flow           0.056      0.000      0.056      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.056     0.069     0.019     0.052"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.121     0.069     0.019     0.052 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  8.939      1.078      2.724      minutes"
"             Time to Centroid       70.037     61.193     63.045     minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        168.72     168.72     337.44     c.m"
"             Rainfall losses        18.924     2.080      10.502     mm"
"             Runoff depth           6.071      22.916     14.493     mm"
"             Runoff volume          40.98      154.68     195.66     c.m"
```

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"             Runoff coefficient     0.243      0.917      0.580      "
"             Maximum flow           0.031      0.118      0.121      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.121     0.127     0.019     0.052"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.121     0.127     0.127     0.052"
" 40          HYDROGRAPH   Combine    200"
"            6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"             Maximum flow                  0.127    c.m/sec"
"             Hydrograph volume          2200.568    c.m"
"                     0.121     0.127     0.127     0.127"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.121     0.000     0.127     0.127"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.044     0.000     0.127     0.127 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  49.662     5.988      49.662     minutes"
"             Time to Centroid       113.637    67.835     113.637    minutes"
"             Rainfall depth         24.995     24.995     24.995     mm"
"             Rainfall volume        744.86     0.00       744.86     c.m"
```

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"            Rainfall losses        18.911     1.624      18.911     mm"
"            Runoff depth           6.084      23.371     6.084      mm"
"            Runoff volume          181.30     0.00       181.31     c.m"
"            Runoff coefficient     0.243      0.000      0.243      "
"            Maximum flow           0.044      0.000      0.044      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.044     0.044     0.127     0.127"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.044     0.044     0.044     0.127"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  0.044    c.m/sec"
"            Hydrograph volume           181.305    c.m"
"                    0.044     0.044     0.044     0.044"
" 40         HYDROGRAPH   Confluence    100"
"           7   Confluence "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"            Maximum flow                  0.052    c.m/sec"
"            Hydrograph volume           127.863    c.m"
"                    0.044     0.052     0.044     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.044     0.052     0.052     0.000"
" 40         HYDROGRAPH   Combine    200"
"           6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  0.145    c.m/sec"
"            Hydrograph volume          2328.431    c.m"
"                    0.044     0.052     0.052     0.145"
" 40         HYDROGRAPH   Confluence    200"
"           7   Confluence "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  0.145    c.m/sec"
"            Hydrograph volume          2328.431    c.m"
"                    0.044     0.145     0.052     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.044     0.145     0.145     0.000"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  0.169    c.m/sec"
```

```
"             Hydrograph volume          2509.736    c.m"
"                     0.044     0.145     0.145     0.169"
" 38          START/RE-START TOTALS 200"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    39.420    hectare"
"             Total Impervious area                   11.691    hectare"
"             Total % impervious                      29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                 Interim__2yr.out"
"                Licensee name:                                                   "
"                Company                                                          "
"                Date & Time last used:                  2/5/2025 at 11:39:23 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      414.876   Coefficient A"
"        0.027   Constant B"
"        0.682   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           100.235    mm/hr"
"             Total depth                  39.504    mm"
"            6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.022     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.816      0.326      1.648      minutes"
"             Time to Centroid       104.196    112.311    105.112    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        45.03      2.37       47.40      c.m"
"             Rainfall losses        25.568     5.814      24.580     mm"
"             Runoff depth           13.936     33.690     14.924     mm"
"             Runoff volume          15.89      2.02       17.91      c.m"
"             Runoff coefficient     0.353      0.853      0.378      "
"             Maximum flow           0.021      0.001      0.022      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.022     0.022     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.163     0.022     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  12.141     2.181      10.914     minutes"
"             Time to Centroid       117.971    114.662    117.563    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        649.25     34.17      683.42     c.m"
"             Rainfall losses        25.401     1.860      24.224     mm"
"             Runoff depth           14.103     37.644     15.280     mm"
```

```
"             Runoff volume          231.78     32.56      264.34     c.m"
"             Runoff coefficient     0.357      0.953      0.387      "
"             Maximum flow           0.158      0.022      0.163      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.163     0.167     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.163     0.167     0.167     0.000"
" 40          HYDROGRAPH   Combine    100"
"            6   Combine "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"             Maximum flow                  0.167    c.m/sec"
"             Hydrograph volume           282.246    c.m"
"                     0.163     0.167     0.167     0.167"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.163     0.000     0.167     0.167"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.449     0.000     0.167     0.167 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  53.548     9.620      52.390     minutes"
"             Time to Centroid       172.894    126.382    171.669    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
```

```
"             Rainfall volume        5788.13    58.47      5846.59    c.m"
"             Rainfall losses        25.381     1.671      25.143     mm"
"             Runoff depth           14.123     37.833     14.361     mm"
"             Runoff volume          2069.36    55.99      2125.36    c.m"
"             Runoff coefficient     0.358      0.958      0.364      "
"             Maximum flow           0.445      0.030      0.449      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.449     0.449     0.167     0.167"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     2.700     0.449     0.167     0.167 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  14.661     2.634      3.668      minutes"
"             Time to Centroid       121.346    115.356    115.871    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        1034.22    4136.86    5171.08    c.m"
"             Rainfall losses        25.379     1.965      6.648      mm"
"             Runoff depth           14.125     37.539     32.856     mm"
"             Runoff volume          369.79     3931.05    4300.84    c.m"
"             Runoff coefficient     0.358      0.950      0.832      "
"             Maximum flow           0.236      2.644      2.700      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     2.700     2.753     0.167     0.167"
" 33          CATCHMENT 200"
```

```
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.170     2.753     0.167     0.167 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  14.661     2.634      10.821     minutes"
"             Time to Centroid       121.346    115.356    119.434    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        678.28     119.70     797.98     c.m"
"             Rainfall losses        25.379     1.965      21.867     mm"
"             Runoff depth           14.125     37.539     17.637     mm"
"             Runoff volume          242.53     113.74     356.27     c.m"
"             Runoff coefficient     0.358      0.950      0.446      "
"             Maximum flow           0.155      0.077      0.170      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.170     2.866     0.167     0.167"
" 54          POND DESIGN"
"        2.866   Current peak flow    c.m/sec"
"        3.341   Target outflow    c.m/sec"
"       6782.5   Hydrograph volume    c.m"
"          18.   Number of stages"
"      421.500   Minimum water level    metre"
"      423.200   Maximum water level    metre"
"      421.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                421.500     0.000     0.000"
```

```
"               421.600   0.00700  1070.100"
"               421.700   0.01300  2176.600"
"               421.800   0.01900  3319.800"
"               421.900   0.02300  4500.000"
"               422.000   0.02600  5717.200"
"               422.100   0.07100  6977.200"
"               422.200    0.1940  8275.500"
"               422.300    0.3520  9602.300"
"               422.400    0.3950  10957.80"
"               422.500    0.5140  12342.10"
"               422.600    0.7980  13755.30"
"               422.700    0.9580  15197.70"
"               422.800     1.614  16669.40"
"               422.900     2.846  18170.60"
"               423.000     4.482  19701.40"
"               423.100     6.460  21262.00"
"               423.200     8.746  22852.50"
"             Peak outflow                  0.046    c.m/sec"
"             Maximum level               422.045    metre"
"             Maximum storage            6285.971    c.m"
"             Centroidal lag               44.437   hours"
"                  0.170     2.866     0.046     0.167 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.170     0.046     0.046     0.167"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.193     0.046     0.046     0.167 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  25.097     4.509      25.096     minutes"
"             Time to Centroid       135.157    118.349    135.157    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        1315.48    0.00       1315.48    c.m"
"             Rainfall losses        25.393     1.692      25.393     mm"
"             Runoff depth           14.111     37.813     14.111     mm"
"             Runoff volume          469.88     0.00       469.89     c.m"
"             Runoff coefficient     0.357      0.000      0.357      "
"             Maximum flow           0.193      0.000      0.193      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.193     0.211     0.046     0.167"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.228     0.211     0.046     0.167 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  5.285      0.949      2.157      minutes"
"             Time to Centroid       108.893    112.435    111.449    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        266.65     266.65     533.30     c.m"
"             Rainfall losses        25.407     2.971      14.189     mm"
"             Runoff depth           14.097     36.533     25.315     mm"
"             Runoff volume          95.16      246.59     341.75     c.m"
```

```
"             Runoff coefficient     0.357      0.925      0.641      "
"             Maximum flow           0.106      0.170      0.228      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.228     0.266     0.046     0.167"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.228     0.266     0.266     0.167"
" 40          HYDROGRAPH   Combine    200"
"            6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"             Maximum flow                  0.266    c.m/sec"
"             Hydrograph volume          3828.538    c.m"
"                     0.228     0.266     0.266     0.266"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.228     0.000     0.266     0.266"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.152     0.000     0.266     0.266 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  29.362     5.275      29.362     minutes"
"             Time to Centroid       140.817    119.556    140.816    minutes"
"             Rainfall depth         39.504     39.504     39.504     mm"
"             Rainfall volume        1177.22    0.00       1177.22    c.m"
```

```
"            Rainfall losses        25.383     1.653      25.383     mm"
"            Runoff depth           14.121     37.851     14.121     mm"
"            Runoff volume          420.82     0.00       420.82     c.m"
"            Runoff coefficient     0.357      0.000      0.357      "
"            Maximum flow           0.152      0.000      0.152      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.152     0.152     0.266     0.266"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.152     0.152     0.152     0.266"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  0.152    c.m/sec"
"            Hydrograph volume           420.819    c.m"
"                    0.152     0.152     0.152     0.152"
" 40         HYDROGRAPH   Confluence    100"
"           7   Confluence "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"            Maximum flow                  0.167    c.m/sec"
"            Hydrograph volume           282.246    c.m"
"                    0.152     0.167     0.152     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.152     0.167     0.167     0.000"
" 40         HYDROGRAPH   Combine    200"
"           6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  0.429    c.m/sec"
"            Hydrograph volume          4110.784    c.m"
"                    0.152     0.167     0.167     0.429"
" 40         HYDROGRAPH   Confluence    200"
"           7   Confluence "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  0.429    c.m/sec"
"            Hydrograph volume          4110.784    c.m"
"                    0.152     0.429     0.167     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.152     0.429     0.429     0.000"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  0.518    c.m/sec"
```

```
"             Hydrograph volume          4531.603    c.m"
"                     0.152     0.429     0.429     0.518"
" 38          START/RE-START TOTALS 200"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     39.420    hectare"
"             Total Impervious area                    11.691    hectare"
"             Total % impervious                       29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                 Interim__5yr.out"
"                Licensee name:                                                  "
"                Company                                                         "
"                Date & Time last used:                  2/5/2025 at 11:42:37 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      544.711   Coefficient A"
"        0.021   Constant B"
"        0.686   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           130.581    mm/hr"
"             Total depth                  50.743    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.035     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.618      0.293      1.500      minutes"
"             Time to Centroid       105.803    111.144    106.279    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        57.85      3.04       60.89      c.m"
"             Rainfall losses        27.440     7.450      26.440     mm"
"             Runoff depth           23.303     43.293     24.303     mm"
"             Runoff volume          26.57      2.60       29.16      c.m"
"             Runoff coefficient     0.459      0.853      0.479      "
"             Maximum flow           0.033      0.002      0.035      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.035     0.035     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.287     0.035     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  10.817     1.962      9.949      minutes"
"             Time to Centroid       118.405    113.377    117.912    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        833.96     43.89      877.85     c.m"
"             Rainfall losses        27.163     2.058      25.907     mm"
"             Runoff depth           23.580     48.685     24.835     mm"
```

```
"             Runoff volume          387.54     42.11      429.65     c.m"
"             Runoff coefficient     0.465      0.959      0.489      "
"             Maximum flow           0.272      0.029      0.287      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.287     0.305     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.287     0.305     0.305     0.000"
" 40          HYDROGRAPH   Combine    100"
"            6   Combine "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"             Maximum flow                  0.305    c.m/sec"
"             Hydrograph volume           458.817    c.m"
"                     0.287     0.305     0.305     0.305"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.287     0.000     0.305     0.305"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.818     0.000     0.305     0.305 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  47.706     8.654      46.903     minutes"
"             Time to Centroid       168.372    124.102    167.462    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
```

```
"             Rainfall volume        7434.86    75.10      7509.96    c.m"
"             Rainfall losses        27.127     1.696      26.873     mm"
"             Runoff depth           23.616     49.047     23.870     mm"
"             Runoff volume          3460.21    72.59      3532.80    c.m"
"             Runoff coefficient     0.465      0.967      0.470      "
"             Maximum flow           0.812      0.040      0.818      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.818     0.818     0.305     0.305"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     3.616     0.818     0.305     0.305 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  13.062     2.369      3.518      minutes"
"             Time to Centroid       121.452    114.097    114.887    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        1328.45    5313.80    6642.25    c.m"
"             Rainfall losses        27.259     1.941      7.004      mm"
"             Runoff depth           23.484     48.802     43.739     mm"
"             Runoff volume          614.82     5110.59    5725.39    c.m"
"             Runoff coefficient     0.463      0.962      0.862      "
"             Maximum flow           0.395      3.479      3.616      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     3.616     3.726     0.305     0.305"
" 33          CATCHMENT 200"
```

```
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.279     3.726     0.305     0.305 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  13.062     2.369      10.193     minutes"
"             Time to Centroid       121.452    114.097    119.479    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        871.26     153.75     1025.01    c.m"
"             Rainfall losses        27.259     1.941      23.461     mm"
"             Runoff depth           23.484     48.802     27.282     mm"
"             Runoff volume          403.22     147.87     551.10     c.m"
"             Runoff coefficient     0.463      0.962      0.538      "
"             Maximum flow           0.259      0.101      0.279      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.279     3.916     0.305     0.305"
" 54          POND DESIGN"
"        3.916   Current peak flow    c.m/sec"
"        3.341   Target outflow    c.m/sec"
"       9809.3   Hydrograph volume    c.m"
"          18.   Number of stages"
"      421.500   Minimum water level    metre"
"      423.200   Maximum water level    metre"
"      421.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                421.500     0.000     0.000"
```

```
"               421.600   0.00700  1070.100"
"               421.700   0.01300  2176.600"
"               421.800   0.01900  3319.800"
"               421.900   0.02300  4500.000"
"               422.000   0.02600  5717.200"
"               422.100   0.07100  6977.200"
"               422.200    0.1940  8275.500"
"               422.300    0.3520  9602.300"
"               422.400    0.3950  10957.80"
"               422.500    0.5140  12342.10"
"               422.600    0.7980  13755.30"
"               422.700    0.9580  15197.70"
"               422.800     1.614  16669.40"
"               422.900     2.846  18170.60"
"               423.000     4.482  19701.40"
"               423.100     6.460  21262.00"
"               423.200     8.746  22852.50"
"             Peak outflow                  0.197    c.m/sec"
"             Maximum level               422.202    metre"
"             Maximum storage            8304.400    c.m"
"             Centroidal lag               35.961   hours"
"                  0.279     3.916     0.197     0.305 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.279     0.197     0.197     0.305"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.356     0.197     0.197     0.305 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  22.359     4.056      22.359     minutes"
"             Time to Centroid       134.036    116.866    134.036    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        1689.74    0.00       1689.74    c.m"
"             Rainfall losses        27.188     2.068      27.188     mm"
"             Runoff depth           23.555     48.675     23.555     mm"
"             Runoff volume          784.37     0.00       784.38     c.m"
"             Runoff coefficient     0.464      0.000      0.464      "
"             Maximum flow           0.356      0.000      0.356      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.356     0.379     0.197     0.305"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.347     0.379     0.197     0.305 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  4.708      0.854      2.132      minutes"
"             Time to Centroid       110.182    111.691    111.191    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        342.51     342.51     685.03     c.m"
"             Rainfall losses        27.326     3.537      15.432     mm"
"             Runoff depth           23.417     47.206     35.311     mm"
"             Runoff volume          158.07     318.64     476.70     c.m"
```

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"             Runoff coefficient     0.461      0.930      0.696      "
"             Maximum flow           0.157      0.219      0.347      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.347     0.442     0.197     0.305"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.347     0.442     0.442     0.305"
" 40          HYDROGRAPH   Combine    200"
"            6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"             Maximum flow                  0.442    c.m/sec"
"             Hydrograph volume          6876.024    c.m"
"                    0.347     0.442     0.442     0.442"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.347     0.000     0.442     0.442"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.271     0.000     0.442     0.442 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  26.159     4.745      26.159     minutes"
"             Time to Centroid       139.192    117.881    139.192    minutes"
"             Rainfall depth         50.743     50.743     50.743     mm"
"             Rainfall volume        1512.14    0.00       1512.14    c.m"
```

```
"            Rainfall losses        27.134     1.694      27.134     mm"
"            Runoff depth           23.609     49.049     23.609     mm"
"            Runoff volume          703.54     0.00       703.54     c.m"
"            Runoff coefficient     0.465      0.000      0.465      "
"            Maximum flow           0.271      0.000      0.271      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.271     0.271     0.442     0.442"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.271     0.271     0.271     0.442"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  0.271    c.m/sec"
"            Hydrograph volume           703.538    c.m"
"                    0.271     0.271     0.271     0.271"
" 40         HYDROGRAPH   Confluence    100"
"           7   Confluence "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"            Maximum flow                  0.305    c.m/sec"
"            Hydrograph volume           458.817    c.m"
"                    0.271     0.305     0.271     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.271     0.305     0.305     0.000"
" 40         HYDROGRAPH   Combine    200"
"           6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  0.732    c.m/sec"
"            Hydrograph volume          7334.836    c.m"
"                    0.271     0.305     0.305     0.732"
" 40         HYDROGRAPH   Confluence    200"
"           7   Confluence "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  0.732    c.m/sec"
"            Hydrograph volume          7334.837    c.m"
"                    0.271     0.732     0.305     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.271     0.732     0.732     0.000"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  0.892    c.m/sec"
```

```
"             Hydrograph volume          8038.375    c.m"
"                     0.271     0.732     0.732     0.892"
" 38          START/RE-START TOTALS 200"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     39.420    hectare"
"             Total Impervious area                    11.691    hectare"
"             Total % impervious                       29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                Interim__10yr.out"
"                Licensee name:                                                  "
"                Company                                                         "
"                Date & Time last used:                  2/5/2025 at 11:44:41 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      627.308   Coefficient A"
"        0.014   Constant B"
"        0.687   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           150.159    mm/hr"
"             Total depth                  58.119    mm"
"            6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.043     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.525      0.278      1.424      minutes"
"             Time to Centroid       107.285    110.607    107.552    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        66.26      3.49       69.74      c.m"
"             Rainfall losses        28.307     8.539      27.318     mm"
"             Runoff depth           29.812     49.580     30.801     mm"
"             Runoff volume          33.99      2.97       36.96      c.m"
"             Runoff coefficient     0.513      0.853      0.530      "
"             Maximum flow           0.040      0.002      0.043      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.043     0.043     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.378     0.043     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  10.194     1.856      9.450      minutes"
"             Time to Centroid       119.342    112.794    118.757    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        955.19     50.27      1005.46    c.m"
"             Rainfall losses        28.125     2.227      26.830     mm"
"             Runoff depth           29.994     55.893     31.289     mm"
```

```
"             Runoff volume          492.95     48.35      541.29     c.m"
"             Runoff coefficient     0.516      0.962      0.538      "
"             Maximum flow           0.361      0.033      0.378      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.378     0.398     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.378     0.398     0.398     0.000"
" 40          HYDROGRAPH   Combine    100"
"            6   Combine "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"             Maximum flow                 0.398    c.m/sec"
"             Hydrograph volume          578.255    c.m"
"                     0.378     0.398     0.398     0.398"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.378     0.000     0.398     0.398"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.110     0.000     0.398     0.398 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  44.961     8.184      44.280     minutes"
"             Time to Centroid       167.190    123.105    166.374    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
```

```
"             Rainfall volume        8515.61    86.02      8601.63    c.m"
"             Rainfall losses        27.876     1.659      27.613     mm"
"             Runoff depth           30.244     56.460     30.506     mm"
"             Runoff volume          4431.29    83.56      4514.85    c.m"
"             Runoff coefficient     0.520      0.971      0.525      "
"             Maximum flow           1.104      0.051      1.110      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.110     1.110     0.398     0.398"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     4.219     1.110     0.398     0.398 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  12.310     2.241      3.433      minutes"
"             Time to Centroid       122.260    113.547    114.579    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        1521.56    6086.23    7607.79    c.m"
"             Rainfall losses        27.960     1.991      7.185      mm"
"             Runoff depth           30.159     56.128     50.934     mm"
"             Runoff volume          789.57     5877.73    6667.30    c.m"
"             Runoff coefficient     0.519      0.966      0.876      "
"             Maximum flow           0.493      4.013      4.219      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     4.219     4.380     0.398     0.398"
" 33          CATCHMENT 200"
```

```
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.383     4.380     0.398     0.398 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  12.310     2.241      9.821      minutes"
"             Time to Centroid       122.260    113.547    120.106    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        997.91     176.10     1174.01    c.m"
"             Rainfall losses        27.960     1.991      24.064     mm"
"             Runoff depth           30.159     56.128     34.055     mm"
"             Runoff volume          517.84     170.07     687.90     c.m"
"             Runoff coefficient     0.519      0.966      0.586      "
"             Maximum flow           0.323      0.116      0.383      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.383     4.631     0.398     0.398"
" 54          POND DESIGN"
"        4.631   Current peak flow    c.m/sec"
"        3.341   Target outflow    c.m/sec"
"      11870.1   Hydrograph volume    c.m"
"         18.   Number of stages"
"      421.500   Minimum water level    metre"
"      423.200   Maximum water level    metre"
"      421.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                421.500     0.000     0.000"
```

```
"               421.600   0.00700  1070.100"
"               421.700   0.01300  2176.600"
"               421.800   0.01900  3319.800"
"               421.900   0.02300  4500.000"
"               422.000   0.02600  5717.200"
"               422.100   0.07100  6977.200"
"               422.200    0.1940  8275.500"
"               422.300    0.3520  9602.300"
"               422.400    0.3950  10957.80"
"               422.500    0.5140  12342.10"
"               422.600    0.7980  13755.30"
"               422.700    0.9580  15197.70"
"               422.800     1.614  16669.40"
"               422.900     2.846  18170.60"
"               423.000     4.482  19701.40"
"               423.100     6.460  21262.00"
"               423.200     8.746  22852.50"
"             Peak outflow                  0.323    c.m/sec"
"             Maximum level               422.281    metre"
"             Maximum storage            9354.942    c.m"
"             Centroidal lag               31.136   hours"
"                  0.383     4.631     0.323     0.398 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.383     0.323     0.323     0.398"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.455     0.323     0.323     0.398 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  21.072     3.835      21.072     minutes"
"             Time to Centroid       134.304    116.233    134.304    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        1935.36    0.00       1935.37    c.m"
"             Rainfall losses        27.871     2.469      27.871     mm"
"             Runoff depth           30.248     55.650     30.248     mm"
"             Runoff volume          1007.27    0.00       1007.27    c.m"
"             Runoff coefficient     0.520      0.000      0.520      "
"             Maximum flow           0.455      0.000      0.455      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.455     0.480     0.323     0.398"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.424     0.480     0.323     0.398 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  4.437      0.808      2.102      minutes"
"             Time to Centroid       111.465    111.382    111.412    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        392.30     392.30     784.61     c.m"
"             Rainfall losses        28.095     3.951      16.023     mm"
"             Runoff depth           30.025     54.169     42.097     mm"
"             Runoff volume          202.67     365.64     568.30     c.m"
```

```
"             Runoff coefficient     0.517      0.932      0.724      "
"             Maximum flow           0.180      0.250      0.424      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.424     0.560     0.323     0.398"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.424     0.560     0.560     0.398"
" 40          HYDROGRAPH   Combine    200"
"            6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"             Maximum flow                  0.560    c.m/sec"
"             Hydrograph volume          9168.893    c.m"
"                     0.424     0.560     0.560     0.560"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.424     0.000     0.560     0.560"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.386     0.000     0.560     0.560 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  24.654     4.487      24.654     minutes"
"             Time to Centroid       139.257    117.159    139.257    minutes"
"             Rainfall depth         58.119     58.119     58.119     mm"
"             Rainfall volume        1731.95    0.00       1731.95    c.m"
```

```
"            Rainfall losses        27.890     1.793      27.890     mm"
"            Runoff depth           30.229     56.326     30.229     mm"
"            Runoff volume          900.82     0.00       900.82     c.m"
"            Runoff coefficient     0.520      0.000      0.520      "
"            Maximum flow           0.386      0.000      0.386      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.386     0.386     0.560     0.560"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.386     0.386     0.386     0.560"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  0.386    c.m/sec"
"            Hydrograph volume           900.821    c.m"
"                    0.386     0.386     0.386     0.386"
" 40         HYDROGRAPH   Confluence    100"
"           7   Confluence "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"            Maximum flow                  0.398    c.m/sec"
"            Hydrograph volume           578.255    c.m"
"                    0.386     0.398     0.386     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.386     0.398     0.398     0.000"
" 40         HYDROGRAPH   Combine    200"
"           6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  0.944    c.m/sec"
"            Hydrograph volume          9747.152    c.m"
"                    0.386     0.398     0.398     0.944"
" 40         HYDROGRAPH   Confluence    200"
"           7   Confluence "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  0.944    c.m/sec"
"            Hydrograph volume          9747.152    c.m"
"                    0.386     0.944     0.398     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.386     0.944     0.944     0.000"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  1.160    c.m/sec"
```

```
"             Hydrograph volume         10647.971    c.m"
"                     0.386     0.944     0.944     1.160"
" 38          START/RE-START TOTALS 200"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     39.420    hectare"
"             Total Impervious area                    11.691    hectare"
"             Total % impervious                       29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                Interim__25yr.out"
"                Licensee name:                                                  "
"                Company                                                         "
"                Date & Time last used:                  2/5/2025 at 11:46:32 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      746.059   Coefficient A"
"        0.085   Constant B"
"        0.692   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           175.653    mm/hr"
"             Total depth                  67.239    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.052     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.428      0.261      1.342      minutes"
"             Time to Centroid       108.971    109.975    109.045    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        76.65      4.03       80.69      c.m"
"             Rainfall losses        29.074     9.934      28.117     mm"
"             Runoff depth           38.165     57.305     39.122     mm"
"             Runoff volume          43.51      3.44       46.95      c.m"
"             Runoff coefficient     0.568      0.852      0.582      "
"             Maximum flow           0.049      0.003      0.052      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.052     0.052     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.496     0.052     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  9.548      1.743      8.915      minutes"
"             Time to Centroid       120.388    112.106    119.717    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        1105.07    58.16      1163.23    c.m"
"             Rainfall losses        28.570     2.417      27.262     mm"
"             Runoff depth           38.669     64.822     39.977     mm"
```

```
"             Runoff volume          635.52     56.07      691.59     c.m"
"             Runoff coefficient     0.575      0.964      0.595      "
"             Maximum flow           0.477      0.039      0.496      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.496     0.519     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.496     0.519     0.519     0.000"
" 40          HYDROGRAPH   Combine    100"
"            6   Combine "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"             Maximum flow                 0.519    c.m/sec"
"             Hydrograph volume          738.540    c.m"
"                     0.496     0.519     0.519     0.519"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.496     0.000     0.519     0.519"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.530     0.000     0.519     0.519 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  42.108     7.686      41.532     minutes"
"             Time to Centroid       165.819    121.852    165.083    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
```

```
"             Rainfall volume        9851.84    99.51      9951.36    c.m"
"             Rainfall losses        28.384     1.687      28.117     mm"
"             Runoff depth           38.855     65.552     39.122     mm"
"             Runoff volume          5692.97    97.02      5789.99    c.m"
"             Runoff coefficient     0.578      0.975      0.582      "
"             Maximum flow           1.521      0.060      1.530      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.530     1.530     0.519     0.519"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     5.040     1.530     0.519     0.519 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  11.529     2.104      3.327      minutes"
"             Time to Centroid       123.146    112.845    114.181    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        1760.31    7041.26    8801.57    c.m"
"             Rainfall losses        28.447     2.145      7.405      mm"
"             Runoff depth           38.792     65.094     59.834     mm"
"             Runoff volume          1015.58    6816.62    7832.21    c.m"
"             Runoff coefficient     0.577      0.968      0.890      "
"             Maximum flow           0.662      4.705      5.040      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     5.040     5.289     0.519     0.519"
" 33          CATCHMENT 200"
```

```
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.509     5.289     0.519     0.519 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  11.529     2.104      9.376      minutes"
"             Time to Centroid       123.146    112.845    120.792    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        1154.49    203.73     1358.23    c.m"
"             Rainfall losses        28.447     2.145      24.501     mm"
"             Runoff depth           38.792     65.094     42.738     mm"
"             Runoff volume          666.06     197.23     863.30     c.m"
"             Runoff coefficient     0.577      0.968      0.636      "
"             Maximum flow           0.434      0.136      0.509      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.509     5.646     0.519     0.519"
" 54          POND DESIGN"
"        5.646   Current peak flow    c.m/sec"
"        3.341   Target outflow    c.m/sec"
"      14485.5   Hydrograph volume    c.m"
"         18.    Number of stages"
"      421.500   Minimum water level    metre"
"      423.200   Maximum water level    metre"
"      421.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                421.500     0.000     0.000"
```

```
"               421.600   0.00700  1070.100"
"               421.700   0.01300  2176.600"
"               421.800   0.01900  3319.800"
"               421.900   0.02300  4500.000"
"               422.000   0.02600  5717.200"
"               422.100   0.07100  6977.200"
"               422.200    0.1940  8275.500"
"               422.300    0.3520  9602.300"
"               422.400    0.3950  10957.80"
"               422.500    0.5140  12342.10"
"               422.600    0.7980  13755.30"
"               422.700    0.9580  15197.70"
"               422.800     1.614  16669.40"
"               422.900     2.846  18170.60"
"               423.000     4.482  19701.40"
"               423.100     6.460  21262.00"
"               423.200     8.746  22852.50"
"             Peak outflow                  0.398    c.m/sec"
"             Maximum level               422.402    metre"
"             Maximum storage           10987.398    c.m"
"             Centroidal lag               27.034   hours"
"                  0.509     5.646     0.398     0.519 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.509     0.398     0.398     0.519"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.607     0.398     0.398     0.519 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  19.735     3.602      19.735     minutes"
"             Time to Centroid       134.608    115.439    134.608    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        2239.05    0.00       2239.05    c.m"
"             Rainfall losses        28.441     2.959      28.441     mm"
"             Runoff depth           38.798     64.280     38.798     mm"
"             Runoff volume          1291.96    0.00       1291.97    c.m"
"             Runoff coefficient     0.577      0.000      0.577      "
"             Maximum flow           0.607      0.000      0.607      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.607     0.632     0.398     0.519"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.525     0.632     0.398     0.519 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  4.156      0.759      2.050      minutes"
"             Time to Centroid       112.936    110.977    111.722    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        453.86     453.86     907.72     c.m"
"             Rainfall losses        28.833     4.588      16.711     mm"
"             Runoff depth           38.406     62.651     50.528     mm"
"             Runoff volume          259.24     422.89     682.13     c.m"
```

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"             Runoff coefficient     0.571      0.932      0.751      "
"             Maximum flow           0.234      0.291      0.525      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.525     0.756     0.398     0.519"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.525     0.756     0.756     0.519"
" 40          HYDROGRAPH   Combine    200"
"            6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"             Maximum flow                  0.756    c.m/sec"
"             Hydrograph volume         12088.804    c.m"
"                    0.525     0.756     0.756     0.756"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.525     0.000     0.756     0.756"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.500     0.000     0.756     0.756 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  23.089     4.215      23.089     minutes"
"             Time to Centroid       139.283    116.269    139.283    minutes"
"             Rainfall depth         67.239     67.239     67.239     mm"
"             Rainfall volume        2003.72    0.00       2003.72    c.m"
```

```
"            Rainfall losses        28.407     2.068      28.407     mm"
"            Runoff depth           38.832     65.171     38.832     mm"
"            Runoff volume          1157.20    0.00       1157.20    c.m"
"            Runoff coefficient     0.578      0.000      0.578      "
"            Maximum flow           0.500      0.000      0.500      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.500     0.500     0.756     0.756"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.500     0.500     0.500     0.756"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  0.500    c.m/sec"
"            Hydrograph volume          1157.205    c.m"
"                    0.500     0.500     0.500     0.500"
" 40         HYDROGRAPH   Confluence    100"
"           7   Confluence "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"            Maximum flow                  0.519    c.m/sec"
"            Hydrograph volume           738.540    c.m"
"                    0.500     0.519     0.500     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.500     0.519     0.519     0.000"
" 40         HYDROGRAPH   Combine    200"
"           6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  1.239    c.m/sec"
"            Hydrograph volume         12827.345    c.m"
"                    0.500     0.519     0.519     1.239"
" 40         HYDROGRAPH   Confluence    200"
"           7   Confluence "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  1.239    c.m/sec"
"            Hydrograph volume         12827.345    c.m"
"                    0.500     1.239     0.519     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.500     1.239     1.239     0.000"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  1.575    c.m/sec"
```

```
"             Hydrograph volume         13984.553    c.m"
"                     0.500     1.239     1.239     1.575"
" 38          START/RE-START TOTALS 200"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     39.420    hectare"
"             Total Impervious area                    11.691    hectare"
"             Total % impervious                       29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                Interim__50yr.out"
"                Licensee name:                                                  "
"                Company                                                         "
"                Date & Time last used:                  2/5/2025 at 11:49:00 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      820.361   Coefficient A"
"        0.010   Constant B"
"        0.691   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           194.803    mm/hr"
"             Total depth                  74.358    mm"
"            6   050hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.058     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.368      0.250      1.290      minutes"
"             Time to Centroid       110.205    109.690    110.169    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        84.77      4.46       89.23      c.m"
"             Rainfall losses        29.637     11.032     28.707     mm"
"             Runoff depth           44.721     63.326     45.651     mm"
"             Runoff volume          50.98      3.80       54.78      c.m"
"             Runoff coefficient     0.601      0.852      0.614      "
"             Maximum flow           0.055      0.003      0.058      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.058     0.058     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.580     0.058     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  9.147      1.672      8.573      minutes"
"             Time to Centroid       121.402    111.843    120.668    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        1222.07    64.32      1286.39    c.m"
"             Rainfall losses        28.890     2.541      27.572     mm"
"             Runoff depth           45.468     71.816     46.785     mm"
```

```
"             Runoff volume          747.27     62.12      809.39     c.m"
"             Runoff coefficient     0.611      0.966      0.629      "
"             Maximum flow           0.558      0.043      0.580      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.580     0.604     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.580     0.604     0.604     0.000"
" 40          HYDROGRAPH   Combine    100"
"            6   Combine "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"             Maximum flow                 0.604    c.m/sec"
"             Hydrograph volume          864.169    c.m"
"                     0.580     0.604     0.604     0.604"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.580     0.000     0.604     0.604"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.817     0.000     0.604     0.604 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  40.339     7.374      39.818     minutes"
"             Time to Centroid       166.075    121.211    165.366    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
```

```
"             Rainfall volume        1.0895     0.0110     1.1005     ha-m"
"             Rainfall losses        28.716     1.802      28.447     mm"
"             Runoff depth           45.642     72.556     45.911     mm"
"             Runoff volume          6687.42    107.38     6794.80    c.m"
"             Runoff coefficient     0.614      0.976      0.617      "
"             Maximum flow           1.807      0.066      1.817      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.817     1.817     0.604     0.604"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     5.638     1.817     0.604     0.604 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  11.045     2.019      3.250      minutes"
"             Time to Centroid       124.131    112.509    114.093    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        1946.69    7786.75    9733.44    c.m"
"             Rainfall losses        28.840     2.269      7.583      mm"
"             Runoff depth           45.518     72.088     66.774     mm"
"             Runoff volume          1191.65    7549.11    8740.76    c.m"
"             Runoff coefficient     0.612      0.969      0.898      "
"             Maximum flow           0.783      5.218      5.638      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     5.638     5.949     0.604     0.604"
" 33          CATCHMENT 200"
```

```
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.595     5.949     0.604     0.604 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  11.045     2.019      9.073      minutes"
"             Time to Centroid       124.131    112.509    121.592    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        1276.72    225.30     1502.03    c.m"
"             Rainfall losses        28.840     2.269      24.855     mm"
"             Runoff depth           45.518     72.088     49.503     mm"
"             Runoff volume          781.54     218.43     999.97     c.m"
"             Runoff coefficient     0.612      0.969      0.666      "
"             Maximum flow           0.514      0.151      0.595      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.595     6.376     0.604     0.604"
" 54          POND DESIGN"
"        6.376   Current peak flow    c.m/sec"
"        3.341   Target outflow    c.m/sec"
"      16535.5   Hydrograph volume    c.m"
"         18.    Number of stages"
"      421.500   Minimum water level    metre"
"      423.200   Maximum water level    metre"
"      421.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                421.500     0.000     0.000"
```

```
"               421.600   0.00700  1070.100"
"               421.700   0.01300  2176.600"
"               421.800   0.01900  3319.800"
"               421.900   0.02300  4500.000"
"               422.000   0.02600  5717.200"
"               422.100   0.07100  6977.200"
"               422.200    0.1940  8275.500"
"               422.300    0.3520  9602.300"
"               422.400    0.3950  10957.80"
"               422.500    0.5140  12342.10"
"               422.600    0.7980  13755.30"
"               422.700    0.9580  15197.70"
"               422.800     1.614  16669.40"
"               422.900     2.846  18170.60"
"               423.000     4.482  19701.40"
"               423.100     6.460  21262.00"
"               423.200     8.746  22852.50"
"             Peak outflow                  0.501    c.m/sec"
"             Maximum level               422.489    metre"
"             Maximum storage           12187.462    c.m"
"             Centroidal lag               24.653   hours"
"                  0.595     6.376     0.501     0.604 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.595     0.501     0.501     0.604"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.720     0.501     0.501     0.604 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  18.906     3.456      18.906     minutes"
"             Time to Centroid       135.377    115.016    135.377    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        2476.11    0.00       2476.11    c.m"
"             Rainfall losses        28.813     3.112      28.813     mm"
"             Runoff depth           45.544     71.246     45.544     mm"
"             Runoff volume          1516.63    0.00       1516.63    c.m"
"             Runoff coefficient     0.613      0.000      0.613      "
"             Maximum flow           0.720      0.000      0.720      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.720     0.762     0.501     0.604"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.597     0.762     0.501     0.604 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  3.981      0.728      2.007      minutes"
"             Time to Centroid       114.123    110.827    112.123    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        501.92     501.92     1003.83    c.m"
"             Rainfall losses        29.474     5.085      17.279     mm"
"             Runoff depth           44.884     69.273     57.079     mm"
"             Runoff volume          302.97     467.59     770.56     c.m"
```

```
"             Runoff coefficient     0.604      0.932      0.768      "
"             Maximum flow           0.276      0.321      0.597      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.597     0.893     0.501     0.604"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.597     0.893     0.893     0.604"
" 40          HYDROGRAPH   Combine    200"
"            6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"             Maximum flow                  0.893    c.m/sec"
"             Hydrograph volume         14396.146    c.m"
"                    0.597     0.893     0.893     0.893"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.597     0.000     0.893     0.893"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.575     0.000     0.893     0.893 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  22.119     4.044      22.119     minutes"
"             Time to Centroid       139.988    115.872    139.988    minutes"
"             Rainfall depth         74.358     74.358     74.358     mm"
"             Rainfall volume        2215.86    0.00       2215.86    c.m"
```

```
"            Rainfall losses        28.813     2.354      28.812     mm"
"            Runoff depth           45.545     72.004     45.545     mm"
"            Runoff volume          1357.25    0.00       1357.25    c.m"
"            Runoff coefficient     0.613      0.000      0.613      "
"            Maximum flow           0.575      0.000      0.575      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.575     0.575     0.893     0.893"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.575     0.575     0.575     0.893"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"         300   Node #"
"               To West Farm Field"
"            Maximum flow                  0.575    c.m/sec"
"            Hydrograph volume          1357.251    c.m"
"                    0.575     0.575     0.575     0.575"
" 40         HYDROGRAPH   Confluence    100"
"           7   Confluence "
"         100   Node #"
"               To Highway 6 Roadside Ditch"
"            Maximum flow                  0.604    c.m/sec"
"            Hydrograph volume           864.169    c.m"
"                    0.575     0.604     0.575     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.575     0.604     0.604     0.000"
" 40         HYDROGRAPH   Combine    200"
"           6   Combine "
"         200   Node #"
"               To Northeast Wetland"
"            Maximum flow                  1.453    c.m/sec"
"            Hydrograph volume         15260.317    c.m"
"                    0.575     0.604     0.604     1.453"
" 40         HYDROGRAPH   Confluence    200"
"           7   Confluence "
"         200   Node #"
"               To Northeast Wetland"
"            Maximum flow                  1.453    c.m/sec"
"            Hydrograph volume         15260.318    c.m"
"                    0.575     1.453     0.604     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.575     1.453     1.453     0.000"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"         300   Node #"
"               To West Farm Field"
"            Maximum flow                  1.860    c.m/sec"
```

```
"             Hydrograph volume         16617.568    c.m"
"                     0.575     1.453     1.453     1.860"
" 38          START/RE-START TOTALS 200"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     39.420    hectare"
"             Total Impervious area                    11.691    hectare"
"             Total % impervious                       29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                              Interim__100yr.out"
"                Licensee name:                                                  "
"                Company                                                         "
"                Date & Time last used:                  2/5/2025 at 11:52:52 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     2000.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      901.088   Coefficient A"
"        0.043   Constant B"
"        0.692   Exponent C"
"        0.375   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           212.928    mm/hr"
"             Total depth                  81.221    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
```

```
"        1.500   Impervious Depression storage"
"                     0.063     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  1.319      0.241      1.247      minutes"
"             Time to Centroid       110.907    109.390    110.806    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        92.59      4.87       97.47      c.m"
"             Rainfall losses        30.156     12.072     29.251     mm"
"             Runoff depth           51.065     69.149     51.969     mm"
"             Runoff volume          58.21      4.15       62.36      c.m"
"             Runoff coefficient     0.629      0.851      0.640      "
"             Maximum flow           0.060      0.003      0.063      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.063     0.063     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.664     0.063     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
"             Time of concentration  8.817      1.614      8.287      minutes"
"             Time to Centroid       121.743    111.617    120.997    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        1334.87    70.26      1405.12    c.m"
"             Rainfall losses        29.209     2.686      27.883     mm"
"             Runoff depth           52.011     78.534     53.338     mm"
```

```
"             Runoff volume          854.81     67.93      922.74     c.m"
"             Runoff coefficient     0.640      0.967      0.657      "
"             Maximum flow           0.641      0.047      0.664      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.664     0.691     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.664     0.691     0.691     0.000"
" 40          HYDROGRAPH   Combine    100"
"            6   Combine "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"             Maximum flow                 0.691    c.m/sec"
"             Hydrograph volume          985.103    c.m"
"                     0.664     0.691     0.691     0.691"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.664     0.000     0.691     0.691"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     2.059     0.000     0.691     0.691 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  38.886     7.117      38.406     minutes"
"             Time to Centroid       164.999    120.685    164.330    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
```

```
"             Rainfall volume        1.1900     0.0120     1.2021     ha-m"
"             Rainfall losses        28.976     1.949      28.706     mm"
"             Runoff depth           52.245     79.272     52.515     mm"
"             Runoff volume          7654.92    117.32     7772.24    c.m"
"             Runoff coefficient     0.643      0.976      0.647      "
"             Maximum flow           2.049      0.072      2.059      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     2.059     2.059     0.691     0.691"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     6.209     2.059     0.691     0.691 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  10.647     1.949      3.182      minutes"
"             Time to Centroid       124.364    112.180    113.907    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        0.2126     0.8505     1.0632     ha-m"
"             Rainfall losses        29.139     2.392      7.742      mm"
"             Runoff depth           52.082     78.828     73.479     mm"
"             Runoff volume          1363.51    8254.91    9618.42    c.m"
"             Runoff coefficient     0.641      0.971      0.905      "
"             Maximum flow           0.913      5.702      6.209      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     6.209     6.587     0.691     0.691"
" 33          CATCHMENT 200"
```

```
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.686     6.587     0.691     0.691 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  10.647     1.949      8.813      minutes"
"             Time to Centroid       124.365    112.180    121.796    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        1394.56    246.10     1640.66    c.m"
"             Rainfall losses        29.139     2.392      25.127     mm"
"             Runoff depth           52.082     78.828     56.094     mm"
"             Runoff volume          894.25     238.85     1133.10    c.m"
"             Runoff coefficient     0.641      0.971      0.691      "
"             Maximum flow           0.598      0.165      0.686      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.686     7.084     0.691     0.691"
" 54          POND DESIGN"
"        7.084   Current peak flow    c.m/sec"
"        3.341   Target outflow    c.m/sec"
"      18523.8   Hydrograph volume    c.m"
"         18.   Number of stages"
"      421.500   Minimum water level    metre"
"      423.200   Maximum water level    metre"
"      421.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                421.500     0.000     0.000"
```

```
"               421.600   0.00700  1070.100"
"               421.700   0.01300  2176.600"
"               421.800   0.01900  3319.800"
"               421.900   0.02300  4500.000"
"               422.000   0.02600  5717.200"
"               422.100   0.07100  6977.200"
"               422.200    0.1940  8275.500"
"               422.300    0.3520  9602.300"
"               422.400    0.3950  10957.80"
"               422.500    0.5140  12342.10"
"               422.600    0.7980  13755.30"
"               422.700    0.9580  15197.70"
"               422.800     1.614  16669.40"
"               422.900     2.846  18170.60"
"               423.000     4.482  19701.40"
"               423.100     6.460  21262.00"
"               423.200     8.746  22852.50"
"             Peak outflow                  0.681    c.m/sec"
"             Maximum level               422.559    metre"
"             Maximum storage           13175.188    c.m"
"             Centroidal lag               22.647   hours"
"                  0.686     7.084     0.681     0.691 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.686     0.681     0.681     0.691"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.835     0.681     0.681     0.691 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  18.225     3.335      18.225     minutes"
"             Time to Centroid       135.263    114.631    135.263    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        2704.65    0.00       2704.66    c.m"
"             Rainfall losses        28.982     3.311      28.982     mm"
"             Runoff depth           52.239     77.910     52.239     mm"
"             Runoff volume          1739.55    0.00       1739.55    c.m"
"             Runoff coefficient     0.643      0.000      0.643      "
"             Maximum flow           0.835      0.000      0.835      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.835     0.909     0.681     0.691"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.665     0.909     0.681     0.691 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  3.838      0.702      1.967      minutes"
"             Time to Centroid       114.744    110.663    112.309    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        548.24     548.24     1096.48    c.m"
"             Rainfall losses        30.089     5.611      17.850     mm"
"             Runoff depth           51.132     75.610     63.371     mm"
"             Runoff volume          345.14     510.37     855.51     c.m"
```

```
"             Runoff coefficient     0.630      0.931      0.780      "
"             Maximum flow           0.315      0.350      0.665      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.665     1.033     0.681     0.691"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.665     1.033     1.033     0.691"
" 40          HYDROGRAPH   Combine    200"
"            6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"             Maximum flow                  1.033    c.m/sec"
"             Hydrograph volume         16661.775    c.m"
"                     0.665     1.033     1.033     1.033"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.665     0.000     1.033     1.033"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.652     0.000     1.033     1.033 c.m/sec"
"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  21.322     3.902      21.322     minutes"
"             Time to Centroid       139.734    115.505    139.734    minutes"
"             Rainfall depth         81.221     81.221     81.221     mm"
"             Rainfall volume        2420.38    0.00       2420.38    c.m"
```

```
"            Rainfall losses        28.988     2.703      28.988     mm"
"            Runoff depth           52.233     78.518     52.233     mm"
"            Runoff volume          1556.55    0.00       1556.55    c.m"
"            Runoff coefficient     0.643      0.000      0.643      "
"            Maximum flow           0.652      0.000      0.652      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.652     0.652     1.033     1.033"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.652     0.652     0.652     1.033"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  0.652    c.m/sec"
"            Hydrograph volume          1556.551    c.m"
"                    0.652     0.652     0.652     0.652"
" 40         HYDROGRAPH   Confluence    100"
"           7   Confluence "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"            Maximum flow                  0.691    c.m/sec"
"            Hydrograph volume           985.103    c.m"
"                    0.652     0.691     0.652     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.652     0.691     0.691     0.000"
" 40         HYDROGRAPH   Combine    200"
"           6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  1.665    c.m/sec"
"            Hydrograph volume         17646.877    c.m"
"                    0.652     0.691     0.691     1.665"
" 40         HYDROGRAPH   Confluence    200"
"           7   Confluence "
"          200   Node #"
"                To Northeast Wetland"
"            Maximum flow                  1.665    c.m/sec"
"            Hydrograph volume         17646.877    c.m"
"                    0.652     1.665     0.691     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.652     1.665     1.665     0.000"
" 40         HYDROGRAPH   Combine    300"
"           6   Combine "
"          300   Node #"
"                To West Farm Field"
"            Maximum flow                  2.153    c.m/sec"
```

```
"             Hydrograph volume         19203.426    c.m"
"                     0.652     1.665     1.665     2.153"
" 38          START/RE-START TOTALS 200"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     39.420    hectare"
"             Total Impervious area                    11.691    hectare"
"             Total % impervious                       29.656"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                           B:\Working\POLOCORP INC\"
"                2401807 - 422079 North Lands Hwy 6 Fergus\Design Phase\Design
Data\Modelling Files\Jan10_2025 - Copy"
"                Output filename:                                 Interim__REG.out"
"                Licensee name:                                                  "
"                Company                                                         "
"                Date & Time last used:                  2/5/2025 at 11:56:08 AM"
" 31          TIME PARAMETERS"
"       60.000   Time Step"
"     2880.000   Max. Storm length"
"     7500.000   Max. Hydrograph"
" 32          STORM Historic"
"            5   Historic"
"     2880.000   Duration"
"       48.000   Rainfall intensity values"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.026     2.026     2.026     2.028"
"                  2.026     6.000     4.000     6.000    13.000"
"                 17.000    13.000    23.000    13.000    13.000"
"                 53.000    38.000    13.000"
"             Maximum intensity            53.000    mm/hr"
"             Total depth                 285.000    mm"
"            6   000hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 600"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          600   Catchment 600"
"        5.000   % Impervious"
"        0.120   Total Area"
"        5.000   Flow length"
"       33.000   Overland Slope"
"        0.114   Pervious Area"
"        5.000   Pervious length"
"       33.000   Pervious slope"
"        0.006   Impervious Area"
"        5.000   Impervious length"
"       33.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
```

```
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.014     0.000     0.000     0.000 c.m/sec"
"             Catchment 600          Pervious   Impervious Total Area "
"             Surface Area           0.114      0.006      0.120      hectare"
"             Time of concentration  2.369      0.421      2.184      minutes"
"             Time to Centroid       2699.991   2271.477   2659.445   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        324.90     17.10      342.00     c.m"
"             Rainfall losses        157.980    32.780     151.720    mm"
"             Runoff depth           127.020    252.220    133.280    mm"
"             Runoff volume          144.80     15.13      159.94     c.m"
"             Runoff coefficient     0.446      0.885      0.468      "
"             Maximum flow           0.013      0.001      0.014      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.014     0.014     0.000     0.000"
" 33          CATCHMENT 800"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          800   Catchment 800"
"        5.000   % Impervious"
"        1.730   Total Area"
"       40.000   Flow length"
"        3.750   Overland Slope"
"        1.643   Pervious Area"
"       40.000   Pervious length"
"        3.750   Pervious slope"
"        0.087   Impervious Area"
"       40.000   Impervious length"
"        3.750   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.182     0.014     0.000     0.000 c.m/sec"
"             Catchment 800          Pervious   Impervious Total Area "
"             Surface Area           1.643      0.087      1.730      hectare"
```

```
"             Time of concentration  15.838     2.814      14.776     minutes"
"             Time to Centroid       2719.829   2252.473   2681.704   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        4683.98    246.53     4930.50    c.m"
"             Rainfall losses        139.631    39.672     134.633    mm"
"             Runoff depth           145.370    245.328    150.368    mm"
"             Runoff volume          2389.15    212.21     2601.36    c.m"
"             Runoff coefficient     0.510      0.861      0.528      "
"             Maximum flow           0.171      0.011      0.182      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.182     0.196     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.182     0.196     0.196     0.000"
" 40          HYDROGRAPH   Combine    100"
"            6   Combine "
"          100   Node #"
"                To Highway 6 Roadside Ditch"
"             Maximum flow                  0.196    c.m/sec"
"             Hydrograph volume          2761.294    c.m"
"                     0.182     0.196     0.196     0.196"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.182     0.000     0.196     0.196"
" 33          CATCHMENT 500"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          500   Catchment 500"
"        1.000   % Impervious"
"       14.800   Total Area"
"      245.000   Flow length"
"        1.000   Overland Slope"
"       14.652   Pervious Area"
"      245.000   Pervious length"
"        1.000   Pervious slope"
"        0.148   Impervious Area"
"      245.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

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"                    1.470     0.000     0.196     0.196 c.m/sec"
"             Catchment 500          Pervious   Impervious Total Area "
"             Surface Area           14.652     0.148      14.800     hectare"
"             Time of concentration  69.853     12.412     68.788     minutes"
"             Time to Centroid       2777.725   2293.748   2768.751   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        4.1758     0.0422     4.2180     ha-m"
"             Rainfall losses        138.578    11.153     137.304    mm"
"             Runoff depth           146.422    273.848    147.696    mm"
"             Runoff volume          2.1454     0.0405     2.1859     ha-m"
"             Runoff coefficient     0.514      0.961      0.518      "
"             Maximum flow           1.454      0.018      1.470      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.470     1.470     0.196     0.196"
" 33          CATCHMENT 100"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          100   Catchment 100"
"       80.000   % Impervious"
"       13.090   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        2.618   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"       10.472   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    1.584     1.470     0.196     0.196 c.m/sec"
"             Catchment 100          Pervious   Impervious Total Area "
"             Surface Area           2.618      10.472     13.090     hectare"
"             Time of concentration  19.125     3.398      5.426      minutes"
"             Time to Centroid       2724.073   2240.649   2302.974   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        0.7461     2.9845     3.7307     ha-m"
"             Rainfall losses        139.363    39.000     59.073     mm"
"             Runoff depth           145.637    246.000    225.928    mm"
"             Runoff volume          0.3813     2.5761     2.9574     ha-m"
```

```
"             Runoff coefficient     0.511      0.863      0.793      "
"             Maximum flow           0.264      1.323      1.584      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.584     2.676     0.196     0.196"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          200   Catchment 200"
"       15.000   % Impervious"
"        2.020   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        1.717   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.303   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.210     2.676     0.196     0.196 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           1.717      0.303      2.020      hectare"
"             Time of concentration  19.125     3.398      15.514     minutes"
"             Time to Centroid       2724.073   2240.649   2613.063   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        4893.45    863.55     5757.00    c.m"
"             Rainfall losses        139.363    39.000     124.309    mm"
"             Runoff depth           145.637    246.000    160.691    mm"
"             Runoff volume          2500.58    745.38     3245.96    c.m"
"             Runoff coefficient     0.511      0.863      0.564      "
"             Maximum flow           0.173      0.038      0.210      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.210     2.876     0.196     0.196"
" 54          POND DESIGN"
"        2.876   Current peak flow    c.m/sec"
"        3.341   Target outflow    c.m/sec"
"      54678.9   Hydrograph volume    c.m"
"           18.   Number of stages"
```

```
"      421.500   Minimum water level    metre"
"      423.200   Maximum water level    metre"
"      421.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                421.500     0.000     0.000"
"                421.600   0.00700  1070.100"
"                421.700   0.01300  2176.600"
"                421.800   0.01900  3319.800"
"                421.900   0.02300  4500.000"
"                422.000   0.02600  5717.200"
"                422.100   0.07100  6977.200"
"                422.200    0.1940  8275.500"
"                422.300    0.3520  9602.300"
"                422.400    0.3950  10957.80"
"                422.500    0.5140  12342.10"
"                422.600    0.7980  13755.30"
"                422.700    0.9580  15197.70"
"                422.800     1.614  16669.40"
"                422.900     2.846  18170.60"
"                423.000     4.482  19701.40"
"                423.100     6.460  21262.00"
"                423.200     8.746  22852.50"
"             Peak outflow                  2.741    c.m/sec"
"             Maximum level               422.892    metre"
"             Maximum storage           18043.141    c.m"
"             Centroidal lag               53.312   hours"
"                  0.210     2.876     2.741     0.196 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.210     2.741     2.741     0.196"
" 33          CATCHMENT 400"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          400   Catchment 400"
"        0.000   % Impervious"
"        3.330   Total Area"
"      120.000   Flow length"
"        3.000   Overland Slope"
"        3.330   Pervious Area"
"      120.000   Pervious length"
"        3.000   Pervious slope"
"        0.000   Impervious Area"
"      120.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
```

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"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.366     2.741     2.741     0.196 c.m/sec"
"             Catchment 400          Pervious   Impervious Total Area "
"             Surface Area           3.330      0.000      3.330      hectare"
"             Time of concentration  32.738     5.817      32.738     minutes"
"             Time to Centroid       2737.685   2233.110   2737.684   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        9490.50    0.01       9490.51    c.m"
"             Rainfall losses        139.700    29.327     139.700    mm"
"             Runoff depth           145.300    255.674    145.301    mm"
"             Runoff volume          4838.50    0.01       4838.51    c.m"
"             Runoff coefficient     0.510      0.000      0.510      "
"             Maximum flow           0.366      0.000      0.366      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.366     3.107     2.741     0.196"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300"
"       50.000   % Impervious"
"        1.350   Total Area"
"       20.000   Flow length"
"       15.000   Overland Slope"
"        0.675   Pervious Area"
"       20.000   Pervious length"
"       15.000   Pervious slope"
"        0.675   Impervious Area"
"       20.000   Impervious length"
"       15.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.165     3.107     2.741     0.196 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           0.675      0.675      1.350      hectare"
"             Time of concentration  6.894      1.225      3.197      minutes"
```

```
"             Time to Centroid       2702.037   2279.379   2426.416   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        1923.75    1923.75    3847.50    c.m"
"             Rainfall losses        153.479    38.462     95.971     mm"
"             Runoff depth           131.521    246.538    189.030    mm"
"             Runoff volume          887.77     1664.13    2551.90    c.m"
"             Runoff coefficient     0.461      0.865      0.663      "
"             Maximum flow           0.077      0.088      0.165      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.165     3.222     2.741     0.196"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.165     3.222     3.222     0.196"
" 40          HYDROGRAPH   Combine    200"
"            6   Combine "
"          200   Node #"
"                To Northeast Wetland"
"             Maximum flow                  3.222    c.m/sec"
"             Hydrograph volume         60356.441    c.m"
"                     0.165     3.222     3.222     3.222"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.165     0.000     3.222     3.222"
" 33          CATCHMENT 700"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          700   Catchment 700"
"        0.000   % Impervious"
"        2.980   Total Area"
"       90.000   Flow length"
"        1.000   Overland Slope"
"        2.980   Pervious Area"
"       90.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       30.000   Pervious Max.infiltration"
"        5.000   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.010   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.327     0.000     3.222     3.222 c.m/sec"
```

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"             Catchment 700          Pervious   Impervious Total Area "
"             Surface Area           2.980      0.000      2.980      hectare"
"             Time of concentration  38.303     6.806      38.303     minutes"
"             Time to Centroid       2741.219   2241.540   2741.218   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        8493.00    0.01       8493.01    c.m"
"             Rainfall losses        141.568    24.635     141.568    mm"
"             Runoff depth           143.432    260.365    143.432    mm"
"             Runoff volume          4274.27    0.01       4274.27    c.m"
"             Runoff coefficient     0.503      0.000      0.503      "
"             Maximum flow           0.327      0.000      0.327      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.327     0.327     3.222     3.222"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.327     0.327     0.327     3.222"
" 40          HYDROGRAPH   Combine    300"
"           6   Combine "
"         300   Node #"
"               To West Farm Field"
"             Maximum flow                  0.327    c.m/sec"
"             Hydrograph volume          4274.274    c.m"
"                    0.327     0.327     0.327     0.327"
" 40          HYDROGRAPH   Confluence    100"
"           7   Confluence "
"         100   Node #"
"               To Highway 6 Roadside Ditch"
"             Maximum flow                  0.196    c.m/sec"
"             Hydrograph volume          2761.294    c.m"
"                    0.327     0.196     0.327     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    0.327     0.196     0.196     0.000"
" 40          HYDROGRAPH   Combine    200"
"           6   Combine "
"         200   Node #"
"               To Northeast Wetland"
"             Maximum flow                  3.399    c.m/sec"
"             Hydrograph volume         63117.754    c.m"
"                    0.327     0.196     0.196     3.399"
" 40          HYDROGRAPH   Confluence    200"
"           7   Confluence "
"         200   Node #"
"               To Northeast Wetland"
"             Maximum flow                  3.399    c.m/sec"
"             Hydrograph volume         63117.754    c.m"
"                    0.327     3.399     0.196     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
```

```
"                    0.327     3.399     3.399     0.000"
" 40          HYDROGRAPH   Combine    300"
"            6   Combine "
"          300   Node #"
"                To West Farm Field"
"             Maximum flow                  3.726    c.m/sec"
"             Hydrograph volume         67392.039    c.m"
"                    0.327     3.399     3.399     3.726"
" 38          START/RE-START TOTALS 200"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      39.420    hectare"
"             Total Impervious area                     11.691    hectare"
"             Total % impervious                        29.656"
" 19          EXIT"
```

Appendix D Water Balance Analysis

Table No. 14: Pre-Development Recharge Volume Summary

Catchment	Area	Imperv. (%)	Recharge Depth (mm/yr)	Recharge Volume (m^3/yr)
800	1.73	5	308	5061.98
Catchment 500, 700	18.3	0	287	52521
				57,582.98

North Lands Subdivision
Township of Centre Wellington (Fergus)
Monthly Water Balance (Thornthwaite and Mather Method)
Date: February 2025

Table No. 15: Recharge Volume Summary

Catchment	Area	Imperv. (%)	Recharge Depth	Recharge Volume
1000	18.98 ha	80	287 mm/yr	10,895 m3/yr
5000	0.12 ha	25	308 mm/yr	277 m3/yr
6000	0.44 ha	5	308 mm/yr	1,287 m3/yr
7000	0.49 ha	0	287 mm/yr	1,406 m3/yr
				13,865 m3/yr
			Enhanced Infiltration from Infiltration Galleries	32,903 m3/yr
				46,768 m3/yr

81% of 57,583 m^3/yr required as per Hydrogeological Investigation

Table 16: Rooftop (100% Impervious)

Contributing Catchments: Rooftops
Contributing Area = 0.15 ha
Percent Impervious = 100%

Soil Type: Fine Sand
Vegetation: Shallow-rooted crops
Root Zone Depth = 0.50m
Soil Moisture Retention Capacity = 75mm

			Percent of Total Area
Impervous Area =	0.15	ha	100%
Pervious Area =	0.00	ha	0%
Total Area =	0.15	ha	100%

Runoff Factor = 1.00

Evapotranspiration Factor for Impervious Surfaces = 0.34

Month	Daily Average Temperature	Monthly Heat Index	Unadjusted Daily Potential Evapotranspiration	Correction Factors	Adjusted Potential Evapotranspiration	Average Precipitation	P-PE	Accum. Pot. Water Loss	Storage	ΔS	Pervious ET	Actual Evapotrans-piration	Pervious ET - Actual ET	Moisture Deficit	Moisture Surplus	Water Runoff	Snow Melt Runoff	Total Recharge & Runoff	Actual Runoff
	(°C)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
Jan	-7.4	0.0	0.0	24.3	0.0	67.9	67.9		211.5	0.0	0.0	0.0	0.0	0.0	0.0	18.2	0.0	18.2	18.2
Feb	-6.3	0.0	0.0	24.5	0.0	55.9	55.9		267.4	0.0	0.0	0.0	0.0	0.0	0.0	9.1	0.0	9.1	9.1
Mar	-1.9	0.0	0.0	30.6	0.0	59.6	59.6		327.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	4.5	4.5
Apr	5.7	1.2	0.9	33.6	29.2	74.1	44.9		75.0	0.0	29.2	9.8	19.4	19.4	64.3	34.4	25.2	59.6	59.6
May	12.2	3.9	1.9	37.9	72.4	86.9	14.5		75.0	0.0	72.4	24.4	48.0	48.0	62.5	48.5	113.4	161.9	161.9
Jun	17.5	6.7	2.8	38.5	107.0	83.8	-23.2	-23.2	54.0	-21.0	104.8	35.3	69.5	71.7	69.5	59.0	56.7	115.7	115.7
Jul	20.0	8.2	3.2	38.8	124.2	89.2	-35.0	-58.2	46.0	-8.0	97.2	32.7	64.5	91.4	64.5	61.7	28.4	90.1	90.1
Aug	19.0	7.6	3.0	36.0	109.1	96.6	-12.5	-70.7	28.0	-18.0	114.6	38.6	76.0	70.5	76.0	68.9	14.2	83.0	83.0
Sep	14.9	5.2	2.4	31.2	73.3	93.1	19.8		47.8	19.8	73.3	24.7	48.6	48.6	48.6	58.8	7.5	66.3	66.3
Oct	8.3	2.2	1.3	28.5	36.5	77.2	40.7		88.5	40.7	36.5	12.3	24.2	24.2	24.2	41.5	3.9	45.4	45.4
Nov	2.1	0.3	0.3	24.2	7.5	93.0	85.5		75.0	-13.5	7.5	2.5	5.0	5.0	104.0	72.7	2.0	74.7	74.7
Dec	-3.9	0.0	0.0	23.0	0.0	68.6	68.6		143.6	0.0	0.0	0.0	0.0	0.0	0.0	36.4	0.8	37.2	37.2
Total		**35.1**				**945.9**	**386.7**				**535.5**	**180.3**	**355.2**	**378.9**	**513.6**	**513.6**	**252.0**	**765.5**	**765.5**

Notes: Precipitation and Temperature data from Environment Canada Climate Normals 1981-2010 for the Orangeville Weather Station
Monthly water balance strategy as outlined in the document *Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance (Thornthwaite and Mather, 1957)*
Evaporation Factor for Impervious Surfaces = Average Annual Evapotranspiration for Impervious Surfaces (180.3mm/year) / Average Annual Evapotranspiration for Pervious Surfaces (535.5mm/year) = 0.34
Runoff Factor = [(Impervious Percentage of Site x Average Annual Runoff for Impervious Surfaces (765.6mm/year)) + (Pervious Percentage of Site x Average Annual Runoff for Pervious Surfaces (123 mm/year))] / Total Annual Recharge & Runoff

North Lands Subdivision
Township of Centre Wellington (Fergus)
File No: 422079

Table 17: Infiltration Gallery Sizing Calculation

Runoff Depth = 25 mm

Type of Lot	Number of Units	Building Width (m)	Building Length (m)	Rooftop Area (m^2)	Required Storage Volume Per Lot (m^3)	Total Storage Volume Required (m^3)	Infiltration Gallery					
							Length (m)	Width (m)	Depth (m)	Stone Volume (m^3)	Storage Volume (m^3)	Total Storage Volume Provided (m^3)
Single Detached (11m - 15.2m lots)	129	9.20	17.00	156.40	3.91	504.39	7.50	1.6	1	12.00	4.00	516.00
Street Townhouse (5.5m - 7m units)	266	5.00	17.00	42.50	1.06	282.63	3.25	1	1	3.25	1.08	288.17
Mixed Use and Medium Density Blocks				1,275.00		31.88	125.00	1	1	125.00	41.67	41.67
Total	**395**			**1,473.90**		**818.89**						**845.83**

Notes:
1.0 Assumes the following lot setbacks:
2.0 Assumes stone void ratio of 1/3
3.0 Infiltration Galleries sized to infiltrate 25mm design storm event from building rooftops.
4.0 For townhome units, it is assumed that only half of the rooftop area can be infiltrated.
5.0 Assumes Multiple Residential Block rooftop area to be infiltrated is 25% of block area

Table 18: Enhanced Recharge Calculation - Single Detached Houses

Structure Length =	7.50	m	Gallery Footprint =	12.00	m^2
Structure Width =	1.60	m			
Structure Depth =	1.00	m			

Volume of Stone =	12.00	m^3	
Stone Porosity =	0.33		
Storage Volume of Stone =		**4.00**	**m^3**

Draindown time calculated using the BMP Sizing equation from the Low Impact Development Stormwater Management Planning and Design Guide

$d_{rmax} = i * t_s / V_r$

d_{rmax} = depth of stone =	1000.00	mm
i = infiltration fate for native soils =	15.00	mm/hr
V_r = void space ratio for aggregate used =	0.33	
t_s = time to drain, solve for t_s		

$t_s = d_{rmax} * V_r / i$ =	22.00	hours or	0.92	day draindown period

Building Rooftops

Number of Lots =	207				
Rooftop Area (per lot)=	156.40	m^2	0.0156	ha	
Total Rooftop Area	3.237	ha	Rooftop Area (ha) x Number of Lots		
Recharge Time	22.00	hours	/	0.92	days
Recharge Volume Potential =	4.00	m^3	(per lot)		
Total Recharge Volume Potential =	828.00	m^3	(Recharge Volume Potential x Number of Lots)		

Month	Total Runoff (mm)	No. of days	Max Potential Recharge (m^3)	Total Available Recharge (m^3)	Total Enhanced Recharge (m^3)	Available Recharge per Lot (m^3)	Enhanced Recharge per Lot (m^3)
Jan	18.2	31	28,001	589	500	2.8	2.4
Feb	9.1	28	25,292	294	250	1.4	1.2
Mar	4.5	31	28,001	147	125	0.7	0.6
Apr	59.6	30	27,098	1,929	1,640	9.3	7.9
May	161.9	31	28,001	5,240	4,454	25.3	21.5
Jun	115.7	30	27,098	3,745	3,183	18.1	15.4
Jul	90.1	31	28,001	2,916	2,479	14.1	12.0
Aug	83.0	31	28,001	2,689	2,285	13.0	11.0
Sep	66.3	30	27,098	2,145	1,823	10.4	8.8
Oct	45.4	31	28,001	1,469	1,249	7.1	6.0
Nov	74.7	30	27,098	2,418	2,055	11.7	9.9
Dec	37.2	31	28,001	1,203	1,023	5.8	4.9
Total	**765.5**	**365**	**329,695**	**24,784**	**21,066**	**119.7**	**101.8**

Note: Infiltration Galleries are sized for the 25mm design storm event. It is assumed that 85% of storm events are 25mm or less. Enhanced recharge is taken as 85% of the available recharge to represent the 25mm storm infiltration.

Table 19: Enhanced Recharge Calculation - Townhome Blocks

Structure Length =	3.00	m	Gallery Footprint =	3.00	m^2
Structure Width =	1.00	m			
Structure Depth =	1.00	m			

Volume of Stone =	3.00	m^3
Stone Porosity =	0.33	
Storage Volume of Stone =	**1.00**	**m^3**

Draindown time calculated using the BMP Sizing equation from the Low Impact Development Stormwater Management Planning and Design Guide

$d_{rmax} = i * t_s / V_r$

d_{rmax} = depth of stone =	1000.00	mm
i = infiltration fate for native soils =	15.00	mm/hr
V_r = void space ratio for aggregate used =	0.33	
t_s = time to drain, solve for t_s		

$t_s = d_{rmax} * V_r / i$ = 22.00 hours or 0.92 day draindown period

Building Rooftops

Number of Lots =	398			
Rooftop Area (per lot)=	42.50	m^2	0.0043	ha
Total Rooftop Area	1.692	ha	Rooftop Area (ha) x Number of Lots	
Recharge Time	22.00	hours	/ 0.92	days
Recharge Volume Potential =	1.00	m^3	(per lot)	
Total Recharge Volume Potential =	398.00	m^3	(Recharge Volume Potential x Number of Lots)	

Month	Total Runoff (mm)	No. of days	Max Potential Recharge (m^3)	Available Recharge (m^3)	Enhanced Recharge (m^3)
Jan	18.2	31	13,460	308	261
Feb	9.1	28	12,157	154	131
Mar	4.5	31	13,460	77	65
Apr	59.6	30	13,025	1,008	857
May	161.9	31	13,460	2,738	2,327
Jun	115.7	30	13,025	1,957	1,663
Jul	90.1	31	13,460	1,524	1,295
Aug	83.0	31	13,460	1,405	1,194
Sep	66.3	30	13,025	1,121	953
Oct	45.4	31	13,460	768	652
Nov	74.7	30	13,025	1,263	1,074
Dec	37.2	31	13,460	629	534
Total	**765.5**	**365**	**158,476**	**12,949**	**11,007**

Notes:

1.0 Rooftop area for townhome units is taken as half of the building roof area (assumes only rear half of roof is infiltrated)
2.0 Note: Infiltration Galleries are sized for the 25mm design storm event. It is assumed that 85% of storm events are 25mm or less. Enhanced recharge is taken as 85% of the available recharge to represent the 25mm storm infiltration.

Table 20: Enhanced Recharge Calculation - Medium Density/ Mixed Use Blocks

Structure Length =	125.00	m	Gallery Footprint =	125.00	m^2
Structure Width =	1.00	m			
Structure Depth =	1.00	m			

Volume of Stone =	125.00	m^3
Stone Porosity =	0.33	
Storage Volume of Stone =	**41.67**	**m^3**

Draindown time calculated using the BMP Sizing equation from the Low Impact Development Stormwater Management Planning and Design Guide

$d_{rmax} = i * t_s / V_r$

d_{rmax} = depth of stone =	1000.00	mm
i = infiltration fate for native soils =	15.00	mm/hr
V_r = void space ratio for aggregate used =	0.33	
t_s = time to drain, solve for t_s		

$t_s = d_{rmax} * V_r / i$ = 22.00 hours or 0.92 day draindown period

Building Rooftops

Total Rooftop Area	0.128	ha		Rooftop Area (ha) x Number of Lots	
Recharge Time	22.00	hours	/	0.92	days
Recharge Volume Potential =	41.67	m^3	(per lot)		

Month	Total Runoff (mm)	No. of days	Max Potential Recharge (m^3)	Available Recharge (m^3)	Enhanced Recharge (m^3)
Jan	18.2	31	1,409	23	20
Feb	9.1	28	1,273	12	10
Mar	4.5	31	1,409	6	5
Apr	59.6	30	1,364	76	65
May	161.9	31	1,409	206	175
Jun	115.7	30	1,364	147	125
Jul	90.1	31	1,409	115	98
Aug	83.0	31	1,409	106	90
Sep	66.3	30	1,364	84	72
Oct	45.4	31	1,409	58	49
Nov	74.7	30	1,364	95	81
Dec	37.2	31	1,409	47	40
Total	**765.5**	**365**	**16,591**	**976**	**830**

Notes:
1.0 Assumes Multiple Residential Block rooftop area to be infiltrated is 25% of block area
2.0 Infiltration Galleries are sized for the 25mm design storm event. It is assumed that 85% of storm events are 25mm or less. Enhanced recharge is taken as 85% of the available recharge to represent the 25mm storm infiltration.