Harden Environmental Services Ltd.
4622 Nassagaweya-Puslinch Townline Road
Moffat, Ontario, L0P 1J0
Phone: (519) 826-0099 Fax: (519) 826-9099

Our File: 0004

September 13, 2024

Township of Puslinch
7404 Wellington Road 34
Guelph, ON, N1H 6H9

Attention: Courtenay Hoytfox
Acting CAO

Dear Courtenay;

Re: Mill Creek Aggregates Pit –Review of 2023 Monitoring Data
Part Lot 24, Concession 1, and
Part Lots 21, 22, 23, and 24, Concession 2

Background

This 188.4-hectare property is owned by the University of Guelph and operated by Dufferin Aggregates. Extraction at the Mill Creek Aggregates Pit ("the Site") commenced in 1995 and there are presently four large open water bodies where aggregate was extracted below the water table. The Site is adjacent to Provincially Significant Wetlands and Mill Creek flows along the northern and western extents of the property. Mill Creek is a cold-water fishery with healthy brook and brown trout populations. Brown trout spawn in the creek in sections of Mill Creek along the Site. Groundwater discharges into Mill Creek from the site providing both water temperature and water quantity conditions favourable for spawning conditions. Groundwater and surface water monitoring are conditions of the aggregate license and there are specific water level thresholds designed to ensure that groundwater quantity and quality contributions to Mill Creek are not significantly affected.

We are pleased to provide a review of the 2023 groundwater monitoring data and their relationship to threshold levels. We have reviewed the following documents.

Mill Creek Aggregates Pit Hydrogeology, Appendix B of the Coordinated Monitoring Report, WSP March 27, 2024

Mill Creek Aggregates Pit Surface Water, Appendix A of the

Coordinated Monitoring Report, WSP March 27, 2024

Mill Creek Aggregates Pit Fisheries, Appendix C of the Coordinated Monitoring Report, WSP March 27, 2024

Extractive Activity 2023

In 2023 the extractive activity that occurred was below water table extraction in Phase 2 near to the entrance of the site (see attached figure) as well as deposition of material in Silt Pond 4. Aggregate processing also occurred which involves pumping water from Phase 1 through an aggregate sorting plant and discharge of effluent into Silt Pond 4 to allow for settlement and containment of non-marketable fine-grained materials. This silt pond is located between the main Phase 1 pond and Mill Creek.

2023 Monitoring Report

Our comments on the 2023 report are as follows.

1) 2023 had 57% more precipitation than the 30-year average. This is welcome considering the low precipitation in 2021 and 2022.

2) Flowing artesian conditions occurred throughout the year from the bedrock aquifer in the southwest corner of the site adjacent to Mill Creek. The monitoring location is TW16-78. The original farmhouse well is also monitored for bedrock water levels and a recovery from historic low water levels occurred in 2023. The bedrock water levels are still lower than normal following the non-winter-recovery event of 2020/2021.

3) In 2023, all groundwater levels measured at the monitors were within their maximum and minimum historical range. There is a trend toward lower water levels in groundwater monitors adjacent to Pond 3. The water levels in monitoring wells DP12, DP16, 92-27, 92-28, 92-29, 92-32 and 92-33 declined between 2014 and 2020. In 2021 and 2022 there was a stabilization of water levels in these monitors, despite the noted lack of groundwater recharge early in the year. In 2023 there was an increase in water levels.

4) Wetland monitoring stations DP6, DP7 and DP8 are within historical range in 2023 and also indicate recovery of water levels from 2022 lows.

5) A review of the Mill Creek drive point monitors shows that there are continued significant changes in hydraulic gradients within Mill Creek occurring since 2022. These drive point monitors have been valuable in showing the potential for groundwater discharge to Mill Creek. In 2022 it is observed that historically significant downward gradients occurred in Mill Creek between the Hanlon Expressway off ramp from Hwy 401 to Concession Road 7. The 2023 report

identifies a period between June 15 and July 2022 when this significant shift occurred. There was a brief period of "normal" gradients in 203 followed by the significant shift in gradients.

6) The temperature plots of groundwater and surface water (thermographs) do not indicate changing conditions compared to the previous five years. The development of open water bodies at the site has increased groundwater temperature immediately adjacent to the ponds and temperatures have increased in groundwater between Mill Creek and the ponds. The temperature does trend toward background groundwater temperatures as distance from the ponds increases. The coordinated report states that the cold-water fishery has not been affected by observed temperature changes.

7) Groundwater discharge volume to Mill Creek is within the historical range and in 2023 is 57% greater than the long-term average.

8) There were threshold breaches between BH92-12-DP17R, DP6 to DP3and D92-29 to DP1. In each instance it was a brief occurrence due to a significant precipitation event and does not represent a trend.

Discussion

Aggregate extractive activities at this Site have had an impact on groundwater levels and temperature. The impact on groundwater levels occurs within tens of metres of the ponds as seen in groundwater monitors located close to Pond 3. As a result of changing operations at the site, the water levels in Pond 3 have stabilized.

The rate of groundwater discharge to Mill Creek remained within historical range.

Groundwater temperatures adjacent to the ponds reflect the seasonal temperature variation in the ponds. Whereas groundwater temperature is generally 8 to 12 ºC it is possible to find groundwater temperature ranges from 0 to 25 ºC adjacent to one of the pit ponds. Groundwater temperatures trend back to ambient groundwater temperatures with increasing distance from the pond. However, Mill Creek is located near enough to the ponds to have a small temperature change occur.

The vertical hydraulic gradient data available for several drive points show that groundwater discharges to Mill Creek south of Hwy 401, but at three locations north of Hwy 401 a reversal has occurred and the stream contributed to the groundwater system since 2022. We concur that this is unlikely due to activities at the Mill Creek Aggregates Site.

The fishery study has identified historically low redd counts in 2022 and 2023. This appears to be alarming from the graphs presented, however, the report states that the Mark-Recapture program in 2022 found that the Brown Trout population is healthy despite the

low redd counts. The following is a quote from the conclusions of the 2023 Fisheries Study. *The results from 2023 provide further evidence that aggregate extraction below the water table (beginning in 1995) has had no measurable impact on the level of Brown trout spawning activity. Therefore, Dufferin Aggregates continues to be in compliance with License Condition #23, which states there must be no "net loss of the productive capacity of fish habitat in Mill Creek or its tributaries."*

The 7-Day Low Flow graph in the Surface Water Report shows the low flow hovered around historical minimums between 2020 and 2023(inclusive). This is an unusual pattern in that the historical minimum was a singular event and normal low flows are 50% to 100% greater. This pattern may well have been broken in 2024 given the rainfall observed this spring and summer. This pattern is worth noting, however, and reviewed in next year.

Recommendations

We have no recommendations for 2023 other than continued monitoring at the site for groundwater, fisheries and surface water.

Sincerely,

Harden Environmental Services Ltd.

Stan Denhoed, P.Eng., M.Sc.
Senior Hydrogeologist

GROUNDWATER MONITOR LOCATIONS

FIGURE **2**

2012 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT
Township Of Puslinch
for Dufferin Aggregates

LEGEND

- T.P.3 — TEST PIT
- B.H'A' — BOREHOLE
- HYDRO/TELEPHONE LINE
- POST AND WIRE FENCE
- BUILDING
- TEST WELLS
- 9 — GROUNDWATER MONITOR INSTALLATION
- SWM4 — SURFACE WATER MONITORING STATION
- 92–1 — RESOURCE BOREHOLE (1992)
- 7 — GROUNDWATER MONITOR (2002)
- DENOTES STANDPIPE MONITOR INSTALLED
- DENOTES DATALOGGER INSTALLED
- SM5 — STREAM QUALITY AND FISHERIES MONITORING STATIONS (WATER QUALITY BIOLOGICAL/FISHERIES AS PER FAUN AQUATICS REPORT)
- DP8 — DRIVE POINT
- SWM4 — STAFF GAUGE AND DESIGNATION
- SP1 — SILT POND AND DESIGNATION
- WETLANDS
- POND
- NATURAL DRAINAGE
- 3692 — WATER WELL WITH MOE IDENTIFICATION NUMBER
- CREEK
- GATE
- WOODLANDS/FOREST (MIXED)
- BOUNDARY OF LICENCED PROPERTY
- SM2 — SEEPAGE METER DESIGNATION AND APPROXIMATE LOCATION (BY J. FITZGIBBON) (NO LONGER OPERATIVE)
- RECHARGE TRENCH
- 5b — APPROVED PHASING

SCALE 1:8000

0 100 200 metres

NOTES:

BASE MAPPING BY PLANNING INITIATIVES LTD., DATED AUGUST 1987, DRAWING NUMBERS 1A AND 1B OF 4.

PROJECT: 111-52958-00
DATE: MARCH 2013
REF. NO.: 111-52958-00 105 F2-SP

GENIVAR

Dufferin Aggregates
A division of Holcim (Canada) Inc.

Dufferin Aggregates
2300 Steeles Ave W, 4th floor
Concord, Ontario
L4K 5X6 Canada

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F. 905-761-7200
www.dufferinaggregates.com

March 28, 2024

Mr. Jayme Caron
IRM Technical Specialist, Guelph District
Ontario Ministry of Natural Resources and Forestry
1 Stone Road W.
Guelph, ON, N1G 4Y2

Attn: Mr. Jayme Caron

Re: Mill Creek Pit - Annual Monitoring Reports; Licence # 5738

Please find attached to this email an electronic copy of the Mill Creek annual Coordinated Monitoring Report for the University of Guelph Mill Creek Pit for 2023.

The monitoring report consists of four documents; the summary, called the Coordinated Monitoring Report, and the three technical appendices that describe results of the detailed monitoring programs including surface water (Hydrology), ground water (Hydrogeology) and fisheries. The report and Technical Appendices will be available by download through a dropbox. Details to access the dropbox are provided in the email.

Hard copies of the report can be provided upon request.

If you have any questions, please do not hesitate to contact the undersigned.

Yours sincerely,

[redacted]

per Martin Bradley
Site Manager
Dufferin Aggregates, Mill Creek Pit

DL: 519-820-0534
E: martin.bradley@ca.crh.com

cc: Kimberley Powell – University of Guelph
Courtenay Hoytfox, Interim Chief Administrative Officer, Municipal Clerk – Township of Puslinch
Vanessa Wismer, Planner – GRCA
Fisheries Protection Program – Department of Fisheries and Oceans Canada
Aaron Todd, District Manager – Guelph District Office MECP
Greg Siiskonen – WSP Canada Inc.

TECHNICAL MEMORANDUM

DATE March 27, 2024

Project No. CA0019938.6257

TO Martin Bradley
CRH Canada Group Inc

FROM Kim LeBrun, WSP Canada Inc.

EMAIL rachel.stephens@wsp.com; kim.lebrun@wsp.com

MILL CREEK REDD SURVEY RESULTS FOR 2023

The 41st annual Mill Creek Brown Trout spawning (redd) survey was undertaken on November 24th, 2023, at the Mill Creek Aggregates Pit site in Puslinch Township, by WSP Canada Inc. Water quality samples were also collected on November 24th, 2023, and submitted for chemical analysis at Bureau Veritas. The water quality results will be provided in the annual monitoring report due to MNRF by March 31, 2024.

A redd is a general term used to identify a trout spawning bed in a watercourse, and the following are the definitions of the assessment terms used within the survey. A *confirmed redd* is a disturbance in the substrate and a sexually mature fish (according to size) visually observed in the general vicinity; a *probable redd* has substrate disturbance but no fish visually observed; and a *scrape* is a less defined or small clearing of disturbed substrate with no fish visually observed. Brown trout redds are typically elongated scars in the streambed, characterized by a scour or hole in the substrate followed by a mound of gravel at the downstream end.

The number of redds scoured in the substrate is a measure of Brown Trout spawning activity in Mill Creek, and redds will be identified as a sum of confirmed and probable redds.

The 2023 redd spawning survey indicated a total of 26 probable redds within the Mill Creek project limits. Historically the University section has higher redd counts, with the Hanlon section having lower counts. The 2023 redd surveys followed this trend with 16 redds noted in the University stretch, and 10 in the Hanlon stretch.

The number of redds within the Mill Creek project limits has been generally trending downwards for the past 10 years, although 2023 did see a slightly higher number of redds (16) compared to 2022 (11), as noted in Figure 1 and Figure 2. The lower number of scrapes noted in the 2023 survey may indicate the declining options for desirable spawning conditions but may also be a result of the other factors impacting access to the spawning habitat (i.e., beaver damming downstream of the study limits). The lowered redd count in the past two years has similar numbers to the results from 1983 to 1987 prior to any rehabilitation efforts, suggesting that the spawning activity in the reach is cyclic, and the results from 2023 are following historic trends (Figure 3).

The highest number of redds recorded to date in this reach was 194 in 2010, and the lowest value on record was 9 total redds measured in 1984. Although redd counts are generally low for 2023, they are not below historic

records and the water quality and temperate readings do not point directly to any concerns for the trout population beyond historic fluctuations in results.

In the Hanlon section, the redd count was 10 in 2023, compared to 15 in 2022, 39 in 2021, and 30 in 2020 (Figure 2). The declining redd counts are similar to those observed from 1987 to 1995, prior to major rehabilitation works. Again, the numbers recorded in the past two years are within historic ranges for this reach. The highest number of redds recorded to date in this reach was 107 in 2016 which was also the first time that the number of redds in the Hanlon reach exceeded the number of redds in the University reach. The lowest redd count recorded for the project was 1, documented in 1988, and our recent 2023 results are still well above this historic low.

In 2018 the low numbers of Brown trout redds observed were largely attributed to the presence of beaver dams in the study reaches of Mill Creek. Although no beaver dams were observed in the reaches assessed in 2023, the area has a lot of beaver activity and there might have been dams built beyond the study limits impacting flows. Beaver damming and sedimentation as a result of the dam release was observed in 2022 during the spawning season. Since WSP's spawning surveys are only a once a year event, there may have been seasonal events like sedimentation from another dam release that also could have impacted spawning in 2023. WSP did report evidence of beaver presence in the reaches during the 2023 spawning surveys, however, full dams impacting fish migration were not observed.

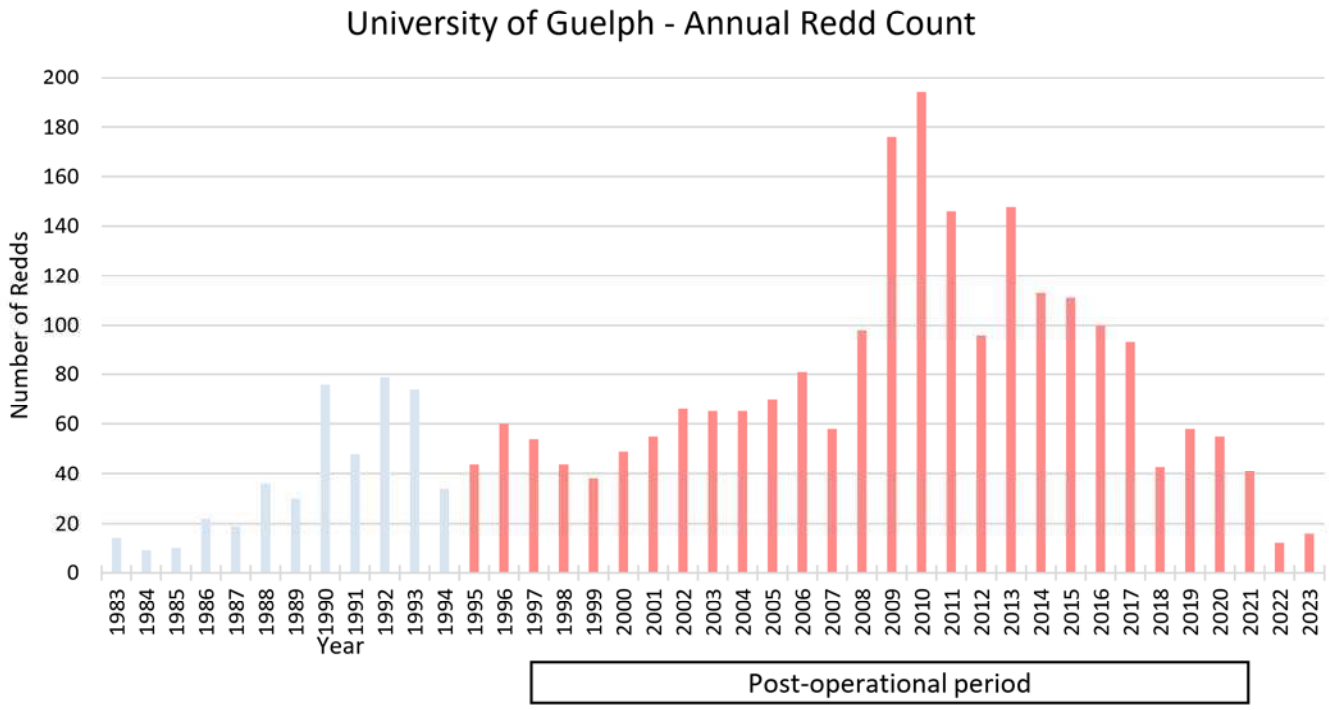


Figure 1: Redd counts in the University reach of Mill Creek. Number of redds includes both those confirmed and assessed as probable

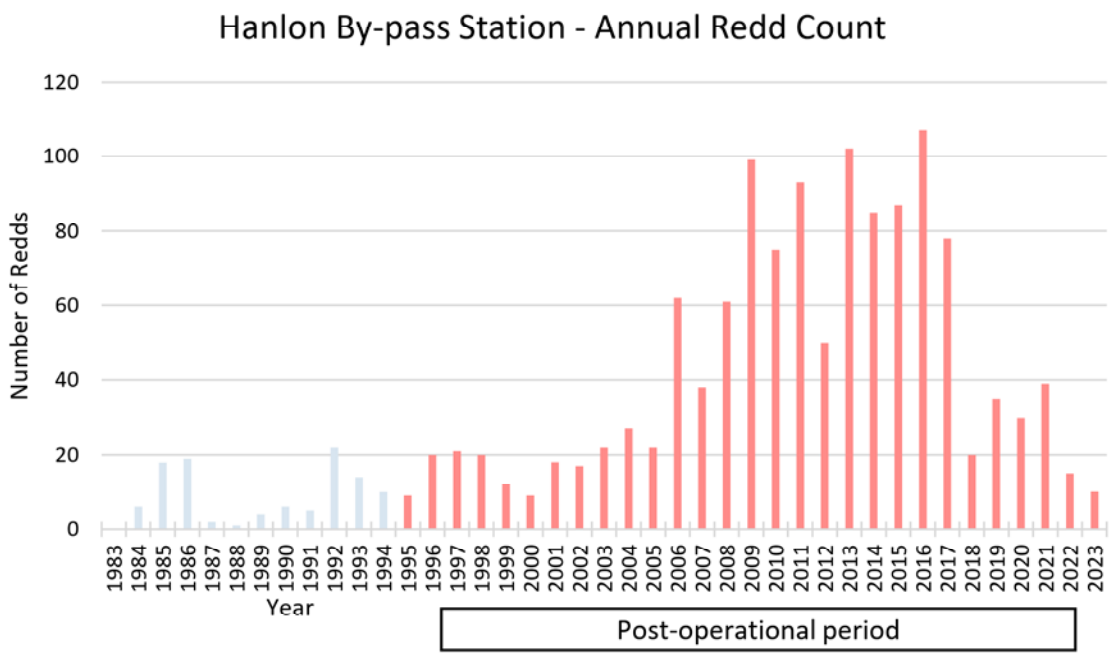


Figure 2. Redd counts in the Hanlon reach of Mill Creek. Number of redds includes both those confirmed and assessed as probable.

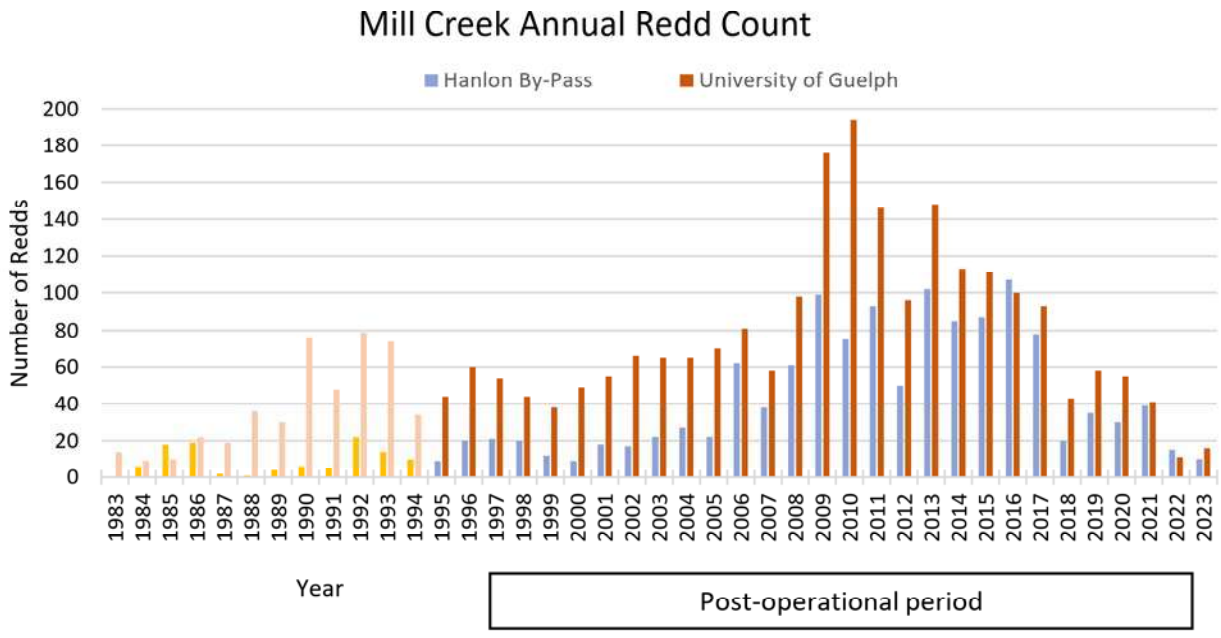


Figure 3. Historic records of spawning success and redd counts for both reaches of Mill Creek between 1983 and 2023.

In summary, spawning activity as indicated by the observed number of redds has been trending downwards for the past 10 years. Typically, the University reach has higher spawning activity due to better habitat conditions, though in recent years the spawning data were comparable and showed a general cyclic pattern to the results that is consistent with historical observations. While the redd counts are more similar to numbers prior to the aggerate extraction below the water table, the 2022 fisheries monitoring program demonstrated that the Brown trout population within Mill Creek has remined healthy with good recruitment that also suggests that spawning remains successful even if redd counts are down.

WSP Canada Inc.

Rachel Stephens
Aquatic Ecologist

Kim LeBrun, HBSc
Senior Ecologist

RS/KL/ld

https://wsponlinecan.sharepoint.com/sites/ca-ca00199386257/shared documents/05. technical/2023 ecology/spawning memo/ca0019938.6257_reddsurveymemo feb 2024 wsp format.docx

REPORT

Mill Creek Aggregates Pit

2023 Coordinated Monitoring Report

Submitted to:

Martin Bradley, Site Manager

Dufferin Aggregates, A CRH Company
3300 Steeles Avenue West
4th Floor
Concord, ON L4K 5X6

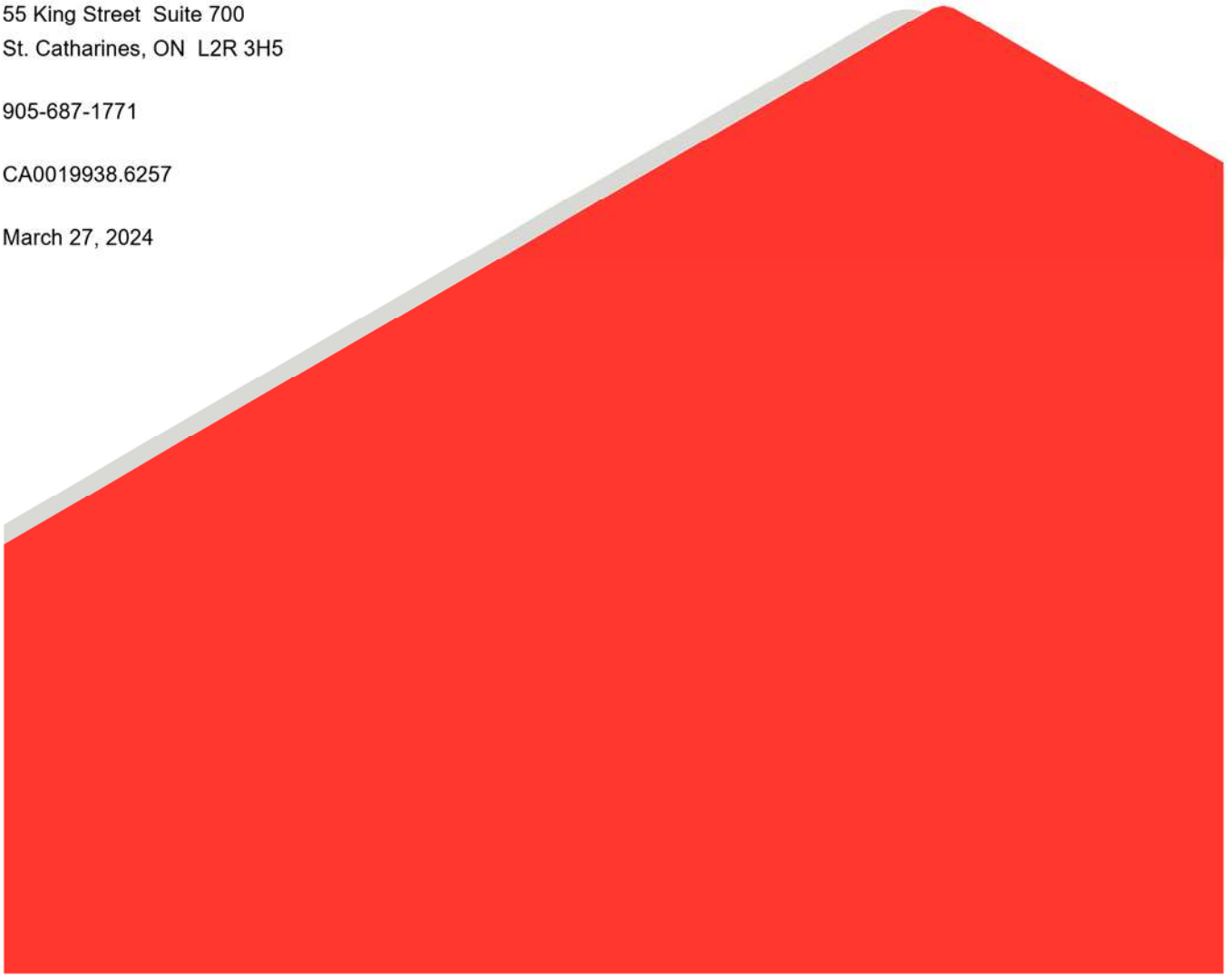
Submitted by:

WSP Canada Inc.
55 King Street Suite 700
St. Catharines, ON L2R 3H5

905-687-1771

CA0019938.6257

March 27, 2024



Distribution List

Dufferin Aggregates

Ministry of Natural Resources & Forestry

University of Guelph

Fisheries and Oceans Canada

Grand River Conservation Authority

WSP Canada Inc.

Township of Puslinch

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TABLES

FIGURES (APPENDED)

APPENDICES

EXECUTIVE SUMMARY

Site Conditions and Operations

- Extraction in 2023 occurred below the water table in Phase 2;
- Aggregate screening, crushing, washing, stockpiling and shipment occurred in Phase 5; and
- Naturally occurring fines removed by washing were deposited in Silt Pond 4.

Climate

- Mean monthly air temperature in 2023 was equal to the 30-year average of 8.3°C;
- Total precipitation in 2023 was 983 mm, which is 5% higher than the 30-year average of 935 mm; and
- In 2023, monthly precipitation was higher than the 30-year normal amount during five (5) months, while the monthly precipitation was below the 30-year normal during the remaining seven (7) months.

Hydrology

- The surface water monitoring completed in 2023 confirmed that surface water levels and temperatures were within historical ranges, and indicate that aggregate extraction has not affected stream flow in Mill Creek;
- The calculated minimum and maximum instantaneous flow rates at SWM2 were within the historical range observed since 2000;
- The 7-day low flow value at SWM2 (0.120 m^3/s) was observed in June and was within the range of the historical minimum 7 day low flow values recorded since 2000;
- Stream flow in Mill Creek responded to climatic conditions including precipitation events, periods of snow melt and periods of low precipitation; and
- Considering the extensive history of surface water monitoring data demonstrating a lack of surface water flow impacts by the pit operations, consideration should be given to reducing the surface water monitoring program.

Groundwater

- The head difference at the 92-12 to DP17R and DP6 to DP3 well pairs exceeded their respective Action Threshold Values on one occasion (July 25) in 2023. The exceedances are attributed to a notable precipitation event and are not attributed to extraction activities at the Site;
- Water levels in the Phase 1 to Phase 4 ponds were within historical ranges and are reflective of precipitation;
- The estimated groundwater contribution from the Mill Creek Aggregates Pit property located north of Township Road 2 was similar in 2023 compared to the historic average;
- In 2023, vertical gradients observed at the creek drive points located south of Highway 401 were consistent with historical results;
- The calculated net water surplus for 2023 was 381 mm, which is 77 mm (25%) higher than the 30-year average surplus of 304 mm;
- Groundwater temperatures at the monitoring stations closest to the Phase 1 and 3 Ponds were influenced by water temperatures in the ponds, which is not unexpected; however, groundwater temperatures rapidly moderate away from the ponds and do not impact water temperatures in Mill Creek;
- Groundwater patterns at the Mill Creek site have been influenced by climatic conditions and the presence of beaver dams in recent years. Groundwater quality has generally remained consistent over

the years. Some Ontario Drinking Water Quality Standards were exceeded due to natural conditions in the area, which is consistent with previous findings; and
- No changes to the groundwater monitoring program are recommended for 2024.

Mill Creek Water Quality and Temperature

- Surface water quality has remained stable over the past decade. In recent years, however, there have been signs of increasing conductivity and chloride levels which are unrelated to pit activities, and may be attributed to road salting activities;
- The maximum stream temperatures in 2023 were 23.98°C at SWM1 on July 5, 2023 and 22.04°C at SWM2 on July 5, 2023; which are within historical ranges and below historical highs; and
- During the spring, summer and fall months, stream temperatures continue to decrease across the University property due to a combination of input from two coldwater tributaries, groundwater input, and shading which continue to enhance the coldwater fish habitat attributes of the stream.

Fisheries

- The upper tolerable temperature for Brown trout (26.8°C) and Brook trout (23.9°C) was not exceeded at any of the monitoring stations during the summer of 2023;
- Brown trout spawning activity in 2023 was the same as 2022 and with higher numbers in the University reach and lower numbers in the Hanlon reach;
- The number of redds in the University section was 16 in 2023 compared with 11 in 2022; and
- In the Hanlon section, the redd count was 10 in 2023 compared to 15 in 2022.

General Conclusion and Recommendations

- The available monitoring data do not indicate that the Mill Creek aggregate operation negatively impacted the local environment in 2023.

1.0 INTRODUCTION

1.1 The Site

The Mill Creek Property is owned by the University of Guelph and encompasses approximately 185.5 ha, situated on Part Lot 24 Concession 1 and Part Lots 21-24 Concession 2, Township of Puslinch, in the County of Wellington (**Figure 1**). The land consists of active pit areas, areas that have been rehabilitated or are in the process of being reclaimed, ponds, and abutting wetlands that are part of the provincially significant Mill Creek Wetland Complex.

The northwest corner of the property is traversed by Mill Creek and by two tributaries, Galt Creek and Pond Creek. These waters support a naturally sustaining brown trout (Salmo trutta) and brook trout (Salvelinus fontinalis) population. The aggregate extraction operation is designed to limit the impacts on both Mill Creek and its tributaries, and the wetland area adjacent to the creek.

The aggregate extraction is operated by Dufferin Aggregates, a CRH Company. Extraction is occurring above and below the water table and will eventually create a number of small lakes. The operation is licensed to extract aggregate from 122.1 ha of the property.

1.2 Monitoring Requirements

Approval for aggregate extraction on this property followed an Ontario Municipal Board Hearing in 1988 and 1989, with a decision in 1990. The Ministry of Natural Resources and Forestry (MNRF) issued a licence to the University of Guelph under the Aggregate Resources Act in September 1991. The licence (#5738) has 42 conditions.

The original monitoring programs and specific licence conditions were included in the Coordinated Report on Monitoring Programs (Planning Initiatives 1993). The monitoring program was revised in 2006 as part of the Pre-Phase 3 application (C. Wren & Associates Inc. and Jagger Hims Ltd. 2006). That program was followed up to 2012 when additional program changes were recommended and implemented beginning in 2013 (see Coordinated Monitoring report for 2013 and 2014 for description of changes).

Licence conditions 19 to 23, and 25 required the development of approved monitoring plans before extraction could proceed. This included: surface water (including Mill Creek and its tributaries), groundwater, fisheries and ecology of the wetland (vegetation). The vegetation monitoring plan was approved in 1992 and the others in December 1993. Licence conditions 19 - 25 are provided in **Table 1-1**. Threshold values for groundwater were first developed in 2001 and are periodically updated or revised as discussed in detail in Section 3 of this report.

Table 1-1: Conditions of Licence

Conditions of Licence	Related Discipline (1993 Document)
19. The licensee shall, prior to the start of excavation operations, provide the District Manager, Ministry of Natural Resources, with a comprehensive groundwater monitoring report which shall include a description of monitoring equipment, monitoring locations, methods of data collection and recording, action, thresholds, calculations to be carried out (e.g. base flow calculations), frequency of data collection, a proposed reporting schedule, and any other details required by the District Manager. The reporting schedule shall include the requirement to provide a comprehensive interim monitoring report for review and District Manager	Hydrogeology – refer to Appendix B, Groundwater Monitoring Program – Jagger Hims Limited (November, 1993)

Conditions of Licence	Related Discipline (1993 Document)
approval prior to commencement of excavation in each phase of the pit operation. The licensee shall maintain the monitoring programs described above, throughout the operating life of the extraction and during the site rehabilitation period and beyond, until such time that the Ministry of Natural Resources agrees to the termination of, or reduction in, the monitoring program.	
20. The licensee shall, prior to the start of excavation operations, provide the District Manager, Ministry of Natural Resources, with a detailed wetland habitat monitoring report which will outline a program designed to measure ecological changes in those parts of the Mill Creek wetland adjacent to extraction operations carried out under this licence. The reporting schedule shall include the requirement to provide a comprehensive interim monitoring report for review and District Manager approval prior to commencement of excavation in each phase of the pit operation.	Terrestrial Ecology – refer to Appendix D, Habitat Monitoring Manual, Paul F.J. Eagles Planning Ltd. (November, 1992)
21. a) The licensee shall, prior to the start of excavation operations, provide the District Manager, Ministry of Natural Resources, with a comprehensive hydrological and biological monitoring report for Mill Creek and its tributaries, and this report shall include a description of monitoring equipment, monitoring locations, methods of data collection and reporting, action thresholds, a proposed reporting schedule, and any other details required by the District Manager. The reporting schedule shall include the requirement to provide a comprehensive interim monitoring report for review and District Manager approval prior to commencement of excavation in each phase of the pit operation.	Surface Water and Fisheries – refer to Appendices A and C, Surface Water Monitoring Program and Fish Habitat Monitoring Program. M.M. Dillon Limited and ESG International Inc. respectively, (November, 1993).
b) The licensee shall provide the District Manager, Ministry of Natural Resources, with a detailed surface water drainage plan which will describe the existing surface water in and surrounding the site and the proposed water diversion, storage, and drainage facilities on the site, and points of discharge to surface waters.	Refer to Drainage Plan prepared by Planning Initiatives Ltd. in conjunction with M.M. Dillon. (November, 1992)
c) The monitoring report described in this licence condition shall include a description of those tests and analytical methods to be used to determine whether there is or is likely to be either a net gain or a net loss in fish habitat as a consequence of pit operations.	Fisheries, Surface Water and Groundwater – refer to Appendix C, Fish Habitat Monitoring Program. (November, 1993)
22. The licensee shall, prior to the start of excavation operations obtain the written approval of the District Manager, Ministry of Natural Resources, for the reports required under licence condition nos. 19, 20, and 21 and, upon approval of the reports, the licensee shall carry out the monitoring programs as described in the monitoring reports.	
23. Pit operations shall not result in a net loss of the productive capacity of fish habitat in Mill Creek or its tributaries.	Fisheries, Surface Water and Groundwater - refer to Appendix C, Fish Habitat Monitoring Program. (November, 1993).

Conditions of Licence	Related Discipline (1993 Document)
25. Prior to the start of excavation operations, the licensee shall provide, to the satisfaction of the District Manager, Ministry of Natural Resources, a contingency plan that will describe the actions proposed to be taken by the licensee to ensure compliance to condition of 23 of this licence.	Fisheries, Surface Water and Groundwater – refer to Section 5.0 of original program.

1.3 Program Contact Names

Table 1-2: List of Personnel

List of Personnel	Names	Role
Licence Holder	Mr. Brandon Raco, Manager, Real Estate 50 Stone Road Guelph, ON N1G 2W1 Phone: (519) 760-9320	Licence Holder
Aggregate Operator	Mr. Martin Bradley Dufferin Aggregates 2300 Steeles Avenue West, 4th Floor Concord, ON L4K 5X6 Phone: (905) 761-7500 Fax: (905) 761-7505	Project Coordination
Surface Water Monitoring Program	Mr. Greg Siiskonen, P.Eng. WSP Canada Inc. 55 King Street, Suite 700 St. Catharines, ON L2R 3H5 Phone: (289) 267-0821	Surface Water (Technical Appendix A)
Groundwater Monitoring Program		Hydrogeology (Technical Appendix B)
Fisheries Monitoring Program	Ms. Kim LeBrun, H.B.Sc. WSP Canada Inc. 582 Lancaster Street West Kitchener, ON N2K 1M3 Phone: (519) 904-1767	Fisheries (Technical Appendix C)
Coordinated Report		Preparation of Annual Coordinated Report
Terrestrial Monitoring	Dr. Paul F.J. Eagles Paul F.J. Eagles Planning Ltd. 37 Hughson Street, Branchton, ON N0B 1L0 Phone: (519) 740-1590 or (519) 885-1211 ex.2716 Fax: (519) 746-6776	Terrestrial Biology Investigations

1.4 Coordinated Monitoring Report

The first coordinated monitoring report filed for the Mill Creek Property was submitted March 31, 1995 (ESP et al. 1995). That report included background information and monitoring data collected in 1994. The purpose of the Coordinated Report is to summarize and integrate monitoring data collected for the previous year from the three different, but inter-related, disciplines: hydrology, hydrogeology and fisheries. This year represents the twenty-

ninth Coordinated report and summarizes the monitoring data collected in 2023. Details of individual monitoring programs are included in the separate Technical Appendices to this report.

The specific objectives of this report are as follows:

1. Summarize 2023 data collected on hydrogeology and surface water hydrology, and integrate them with fisheries biology data;
2. Compare 2023 groundwater levels with action thresholds to evaluate compliance;
3. Review monitoring results and make recommendations to revise the monitoring program if necessary; and
4. Review monitoring results and determine if mitigation or other actions are required.

1.5 Watershed Activities

1.5.1 Mill Creek Extraction Operations

The Mill Creek Pit is surrounded by other aggregate operations (**Figure 1**). Significant aggregate extraction has occurred within the properties immediately to the north, east, and west of this site, and until 2007 at the property to the north of Highway 401. The design of the Mill Creek Aggregates pit and the associated monitoring program were developed and approved prior to other operations north and east of the site being approved and beginning extraction.

Pit Operation

Figure 1 shows the site details based on the most current (2019) approved extraction areas. In 2023, extraction occurred below the water table in Phase 2.

Silt Ponds

As part of routine operations, water is taken from the on-site pond in Phase 1 and used for aggregate washing (**Figure 1**). The wash water is directed to silt pond SP4/Phase 1 pond for settlement of the suspended silt.

The taking of water for washing aggregates, dust control, and water movement on-site is approved by Amended PTTW #5557-B93NZ5, issued on February 7, 2019 (which replaced the previously approved PTTW #8520-A48LDY through a renewal application). A Copy of the current approved PTTW is included in Appendix F of the separate Hydrogeology Technical Report.

1.5.2 Other Extraction Operations

Other aggregate operators within the Mill Creek watershed near the Dufferin Aggregates Mill Creek pit include:

- CBM (St. Marys) Main Pit (Upstream);
- CBM McNally Pit (Upstream);
- CBM (formerly Puslinch Quality Aggregates) Mast Pit;
- Lafarge McMillan Pit;
- CBM McMillan Pit (no extraction since 2007, depleted);
- CBM Lanci Pit; and
- CBM Hohle Pit.

1.5.3 Other Activities in Mill Creek

The Friends of Mill Creek (FOMC) was established in the fall of 1997 and is a working group with the primary objective of habitat rehabilitation in Mill Creek. The FOMC established a Stewardship Ranger program in 2003 which hires summer students to carry out the stream rehabilitation under the supervision of a trained fisheries biologist. The program is administered by the GRCA. The Mill Creek Stewardship Rangers were not permitted to work in this study area in 2019 due to concerns regarding the spill of Jet Fuel or between 2020 and 2022 due to COVID-19 safety measures in place.

Trout productivity and carrying capacity remains lower in the Hanlon reach compared with the University reach (also see Section 5.0) and Dufferin Aggregates and their biologists have previously recommended that fish habitat restoration again be undertaken within the Hanlon reach. In 2018, MTO expropriated a portion of the study area to secure a new Morrison By-pass route for Highway 6, therefore any potential habitat restoration plans will need to conform to MTO's construction plans for the by-pass.

Occasionally, beaver dam activity occurs within the study area. Beaver dams are a concern as they interrupt water flow and water levels, and likely also interfere with Brown trout spawning activity (migration). The Mill Creek Rangers removed a beaver dam from the study area in 2015, and in 2018 Dufferin retained trappers to remove beavers (at least five) from the adjacent lands. The Mill Creek Rangers were scheduled to remove another three beaver dams in 2019 but works were postponed due to the jet fuel spill and COVID-19 concerns. Dufferin retained trappers to remove beavers from Mill Creek, and arranged for the Trout Unlimited stewardship crew, under the supervision of the GRCA, to demolish dams present within and immediately downstream of the site in September 2021.

2.0 SURFACE WATER HYDROLOGY

2.1 Methods

Surface water hydrology is monitored to assess potential impacts of aggregate extraction on Mill Creek and involves the collection of water level, stream discharge, water temperatures and climatic data. Most of the surface water flow in Mill Creek within the Study Area originates upstream of the site. However, within the Study Area, additional water contributions include: a) groundwater discharge, b) local surface runoff and c) input from two tributaries (Galt Creek, Pond Creek).

Station SWM1 is located where Mill Creek flows onto the University Property and SWM2 is located where Mill Creek flows off the University Property (**Figure 2**). Stations SWM3 and SWM4 are in Pond Creek and Galt Creek, respectively. A summary of the 2023 monitoring methods is as follows.

- Water levels were logged hourly at stations SWM1 and SWM2, using model 3001 Solinst Leveloggers;
- Stream discharge was measured manually at stations SWM1 and SWM2 monthly, if wading conditions were safe to do so;
- Water temperatures were logged hourly at stations SWM1, SWM2, SWM3 and SWM4 using model 3001 Solinst Leveloggers;
- Air temperature and atmospheric pressure were logged hourly at Air Temperature Station 1 and Air Temperature Station 2 using Solinst Barologgers; and
- Climate data (air temperature and precipitation) were obtained from the Grand River Conservation Authority (GRCA) Climate Station at Shade's Mills Conservation Area in Cambridge, Ontario (located in the lower Mill Creek watershed, approximately 10 km southwest of the Mill Creek property).

Atmospheric pressure data were used to correct the data from the in-stream loggers for changes in atmospheric pressure. All on-site data loggers were pre-programmed to record data 'on the hour', at the same time.

To estimate a stream discharge at each station, water levels (m) were converted to flow (m^3/sec) using rating curves. The equation of the best fitting stage-discharge curve at SWM1 and SWM2 was used to convert water level data (m above logger) into stream discharge rates (m^3/s).

Greater details on monitoring methods and rating curves development are provided in **Technical Appendix A (Surface Water)**.

2.2 Surface Hydrology Results

2.2.1 Climate Data

Air Temperature

Figure 2-1 shows the monthly average air temperatures observed in 2023 compared to the 30-year average. The mean monthly air temperature in 2023 was equal to the 30-year average (8.3°C).

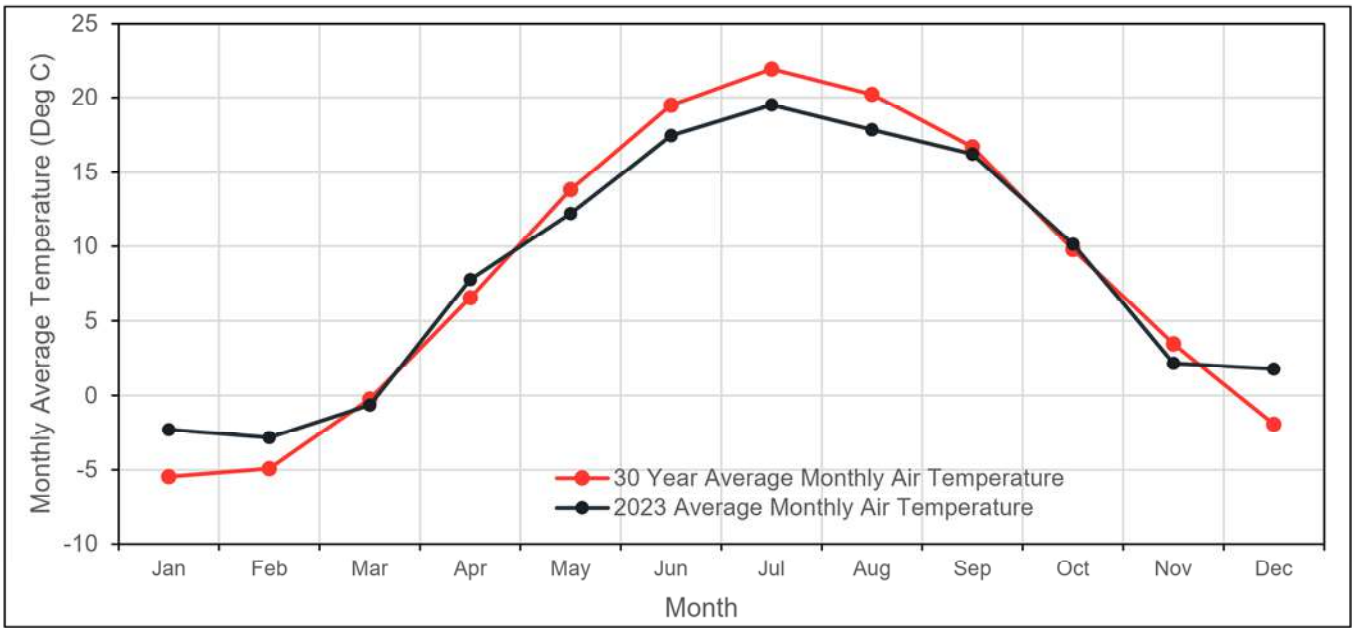

Figure 2-1: 2023 GRCA Shade's Mills Mean Monthly Air Temperatures Compared to 30-year Normal Temperatures

Precipitation

Monthly precipitation for 2023 is illustrated in **Figure 2-2** along with the 30-year average. In 2023, total monthly precipitation was considerably higher than the 30-year normal value in March, July and August, and considerably lower than the 30-year normal value in May, September, October and November. Total precipitation in 2023 was 983 mm, which is 5% higher than the 30-year average of 935 mm.

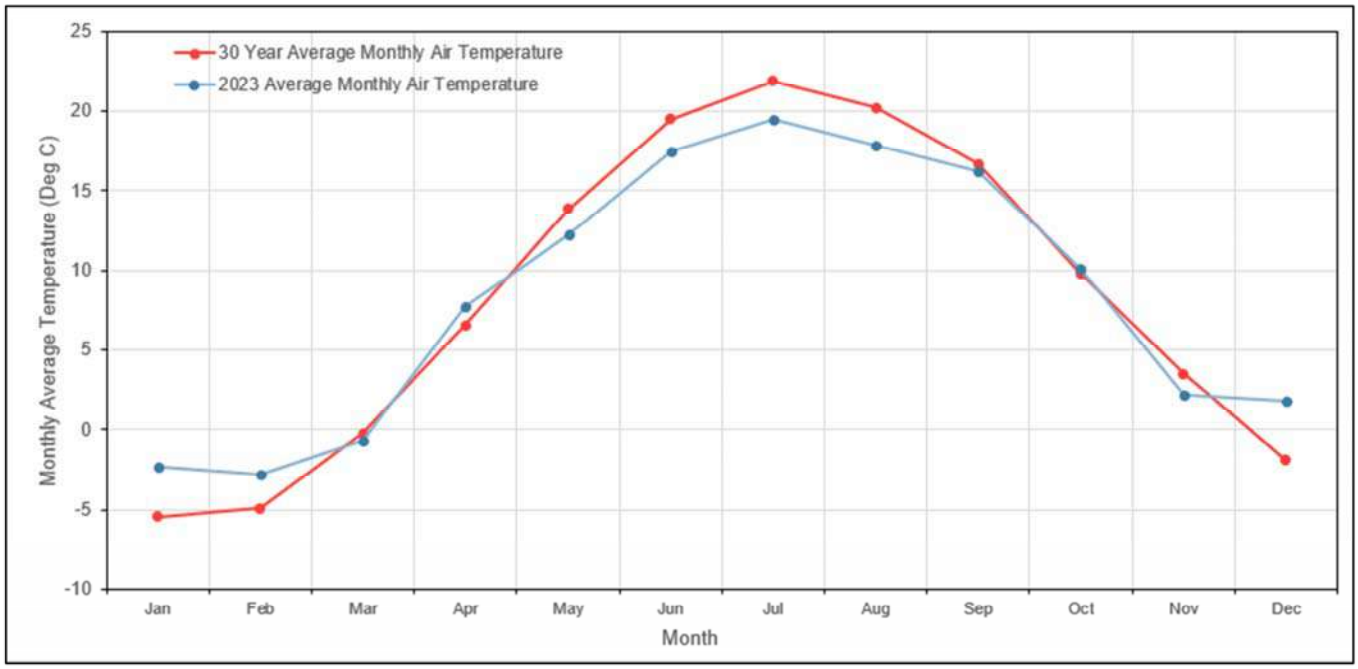

Figure 2-2: Total 2023 Monthly Precipitation (mm) at GRCA Shade's Mills Climate Station Compared to the 30-year Average

2.2.2 Annual Stream Flow Trends

Detailed stream flow data are presented in Technical Appendix A and summarized below. Calculated flows at station SWM1 and SWM2 are presented in **Figure 2-3** and **Figure 2-4**, respectively.

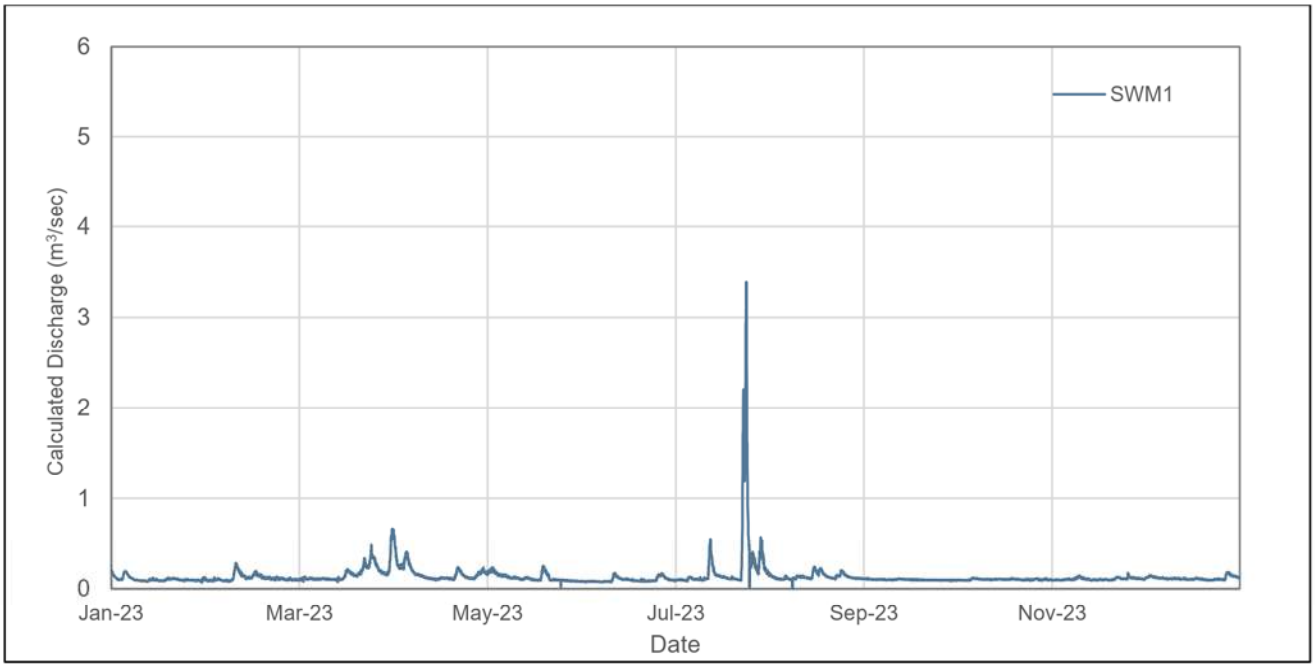

Figure 2-3: 2023 Mill Creek Hourly Discharge at Surface Water Monitoring Station SWM1

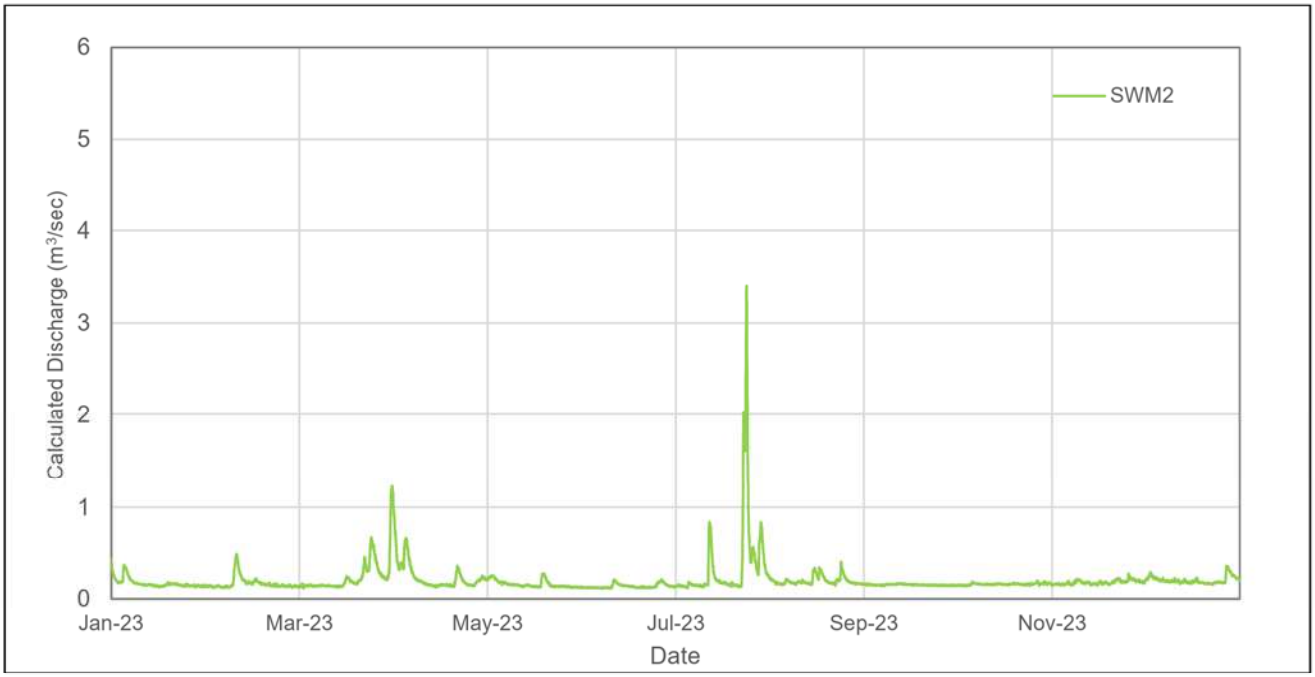

Figure 2-4: 2023 Mill Creek Hourly Discharge at Surface Water Monitoring Station SWM2

Relationship Between Precipitation and Stream Flow

Precipitation events recorded at the GRCA's Shade's Mills climate station are compared with calculated average daily stream discharge at SWM1 and SWM2 in **Figure 2-5** and **Figure 2-6**, respectively. The plot of precipitation data with the flow data shows a strong correlation, as increased flows were often observed shortly after precipitation events. In the drier months, rainfall events did not always result in increases in discharge, which is likely attributed to higher soil infiltration and vegetative cover.

The maximum daily average flow at both SWM1 and SWM2 in 2023 occurred on July 25. Only 2 mm of precipitation were recorded at the GRCA Shade's Mills Conservation Area prior to the peak in stream flow; however, localized thunderstorms were observed in the area of the Site on July 24/25. According to the climate data recorded at various GRCA climate stations, over 30 mm of precipitation were recorded on July 24/25 at the Elora, Guelph, Woolwich and Arthur climate stations. As such, it is interpreted that a notable precipitation event occurred at the Site prior to the peak flows observed on July 25, 2023. The maximum average daily flow rates measured at SWM1 and SMW2 (2.11 and 2.38 m^3/s, respectively) are interpreted to be overestimated due to the lower accuracy of the rating curve formula at higher flows. These maximum values should, therefore, be interpreted with caution.

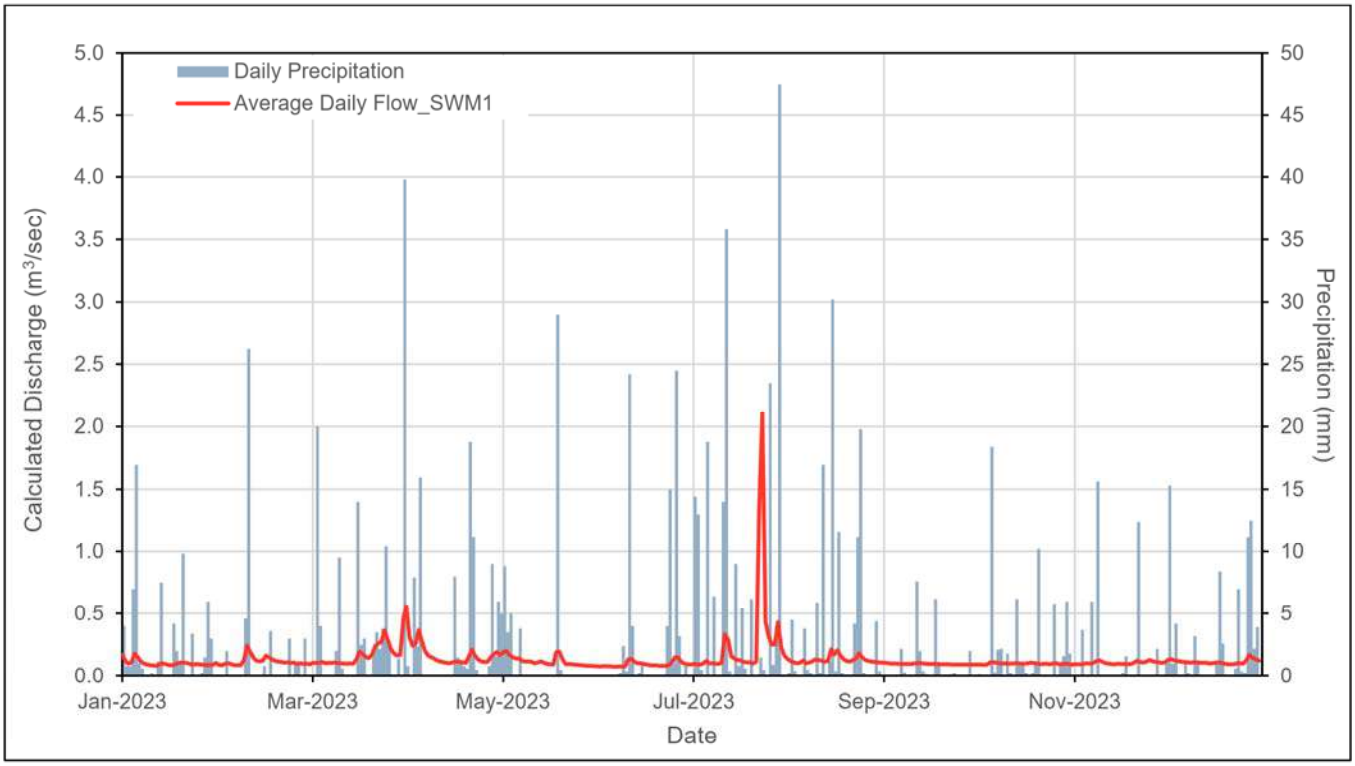

Figure 2-5: Daily Average Flow in 2023 at SWM1 Compared to Precipitation Events

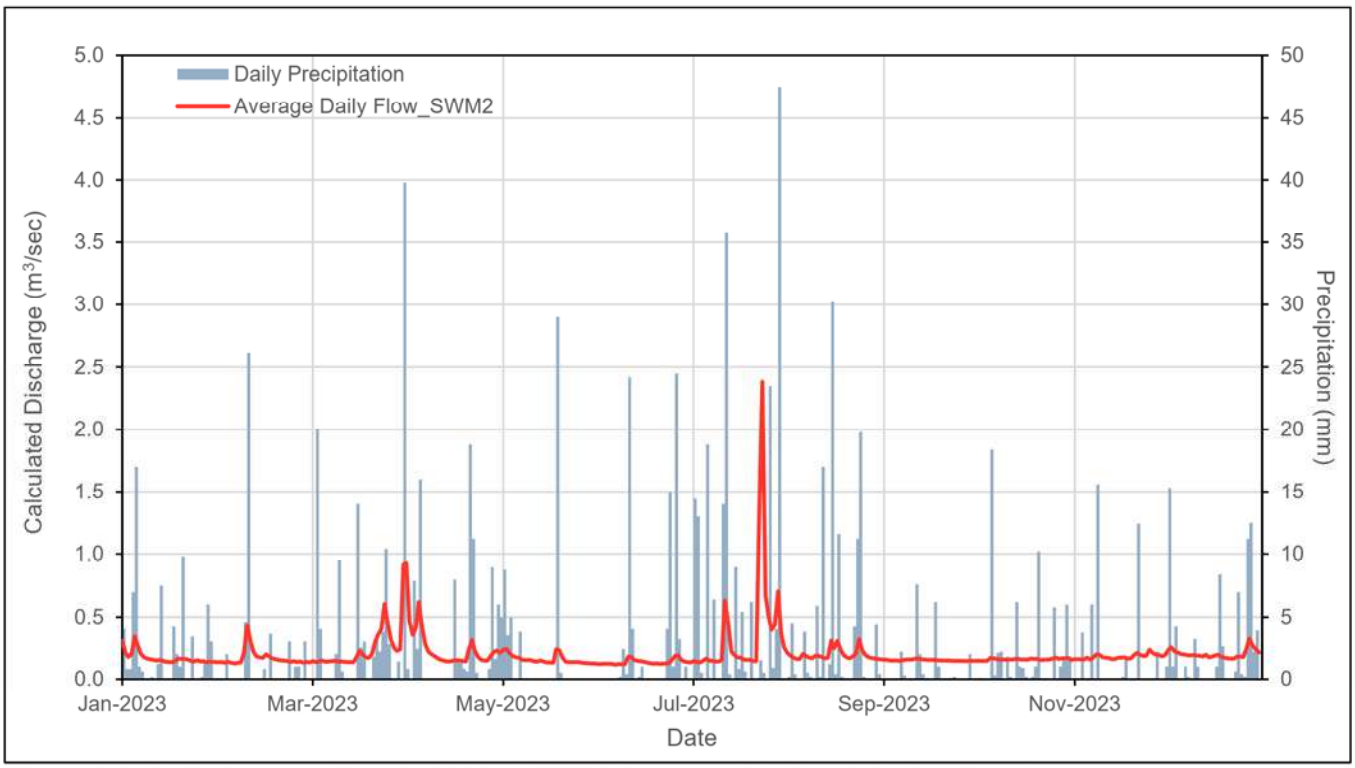

Figure 2-6: Daily Average Flow in 2023 at SWM2 Compared to Precipitation Events

Maximum and Minimum Flows

The minimum and maximum instantaneous flows recorded at stations SWM1 and SWM2, as well as corresponding dates when these flow events occurred, are provided in **Table 2-1**.

Table 2-1: 2023 Minimum and Maximum Instantaneous Discharge Flows at Station SWM1 and SWM2

	SWM1		SWM2	
	Discharge (m^3/s)	Date	Discharge (m^3/s)	Date
Minimum Stream Discharge	0.067	30-Jan-2023	0.109	11-Jun-2023
Maximum Stream Discharge	3.39	25-Jul-2023	3.40	25-Jul-2023

Minimum and maximum instantaneous flows since 2000 are shown in **Figure 2-7** and **Figure 2-8** respectively, for stations SWM1 and SWM2.

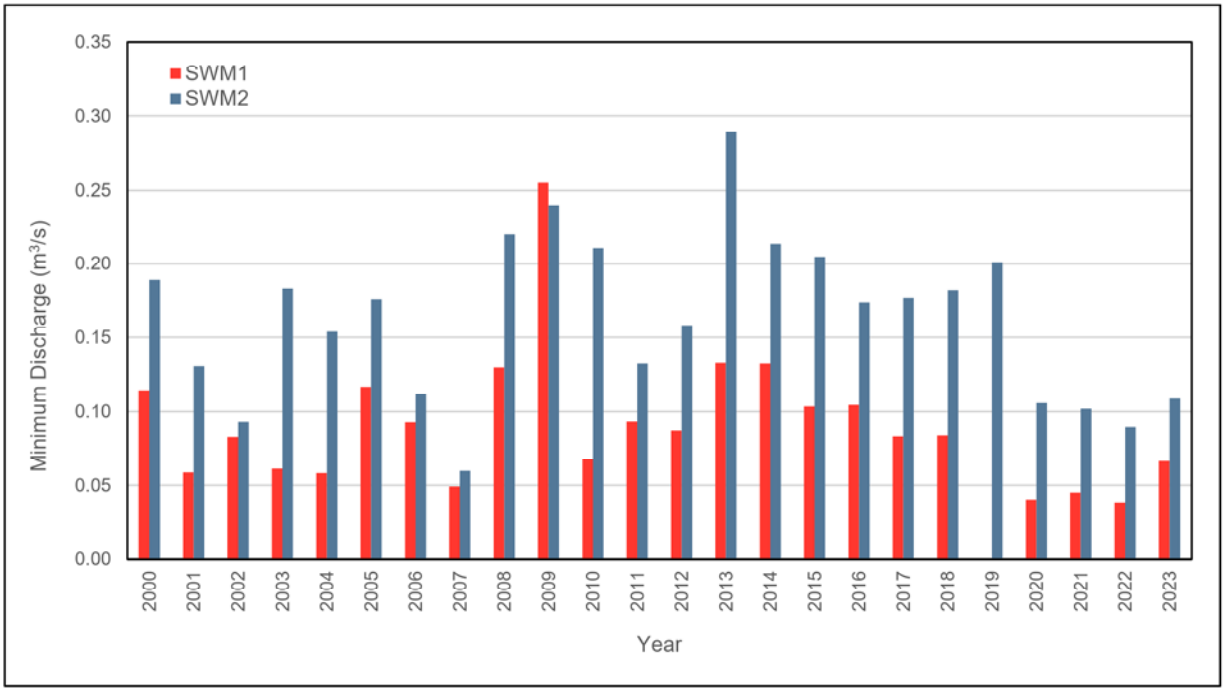

Figure 2-7: Instantaneous Minimum Stream Discharges at SWM1 and SWM2, 2000 through 2023

The 2023 minimum instantaneous stream discharge values at SWM1 and SWM2 are similar to the minimum instantaneous stream discharge values recorded since 2020. The 2023 minimum instantaneous and maximum instantaneous stream discharge values are within the historical range of values recorded since 2000.

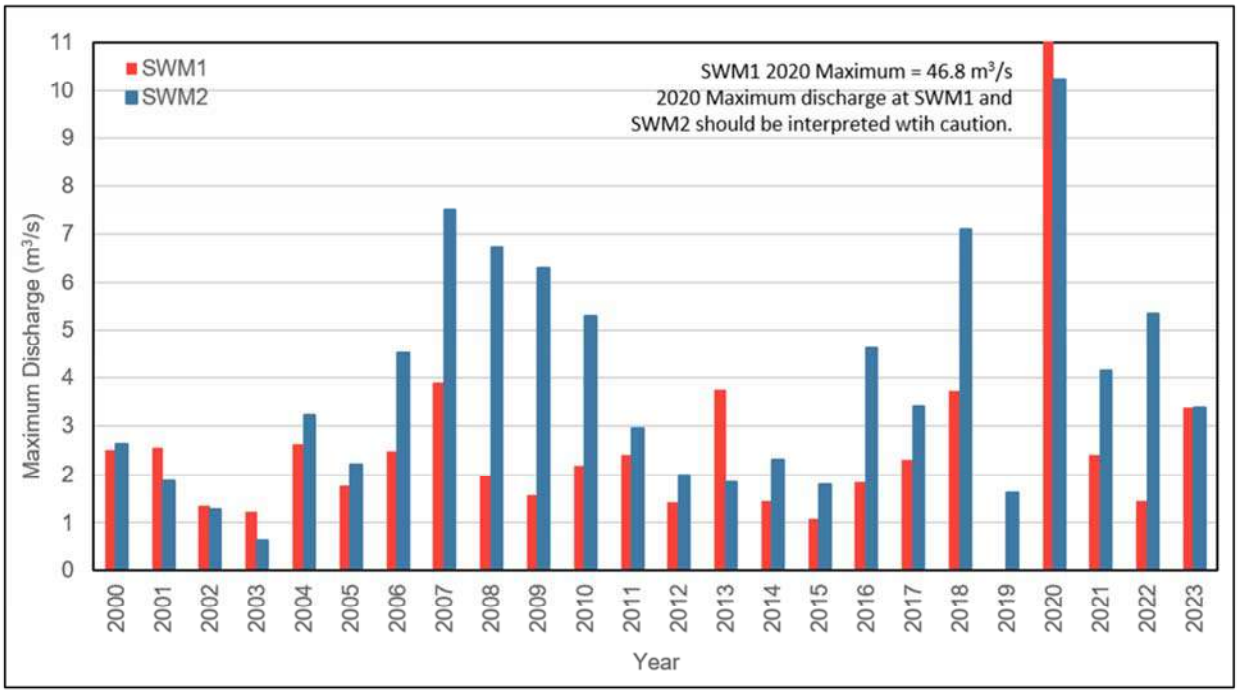

Figure 2-8: Instantaneous Maximum Stream Discharge at SWM1 and SWM2, 2000 through 2023

Estimates of peak flows may be less accurate than low flow estimates since the higher flow rates are well above manual measurements used for the rating curves. It is not safe for field staff to attempt manual flow measurements during periods of peak runoff.

2.2.3 Historical Stream Flow Trends

The 7-day low flow is a standard hydrological value which represents the average flow rate of the 7-day period of lowest flow for each year. The 7-day low flow at SWM2 is used to compare low flows over time for the Site. In 2023, the 7-day low flow at SWM2 was 0.120 m^3/s, which occurred from June 5 to 11. The daily precipitation data indicate that less than 1 mm of precipitation was recorded between May 21 and June 10, 2023. The monthly precipitation amounts recorded in April, May and June were either similar to, or lower than, the 30-year normal conditions for those months. In the absence of rainfall and runoff, the 7-day low flow likely represents baseflow conditions.

The 2023 7-day low flow at SWM2 is similar to the 7-day low flow values recorded in 2007, 2020, 2021 and 2022. The average of the SWM2 7-day low flow values from 2000 to 2022 is 0.207 m^3/s. The 2023 7-day low flow of 0.120 m^3/s is considerably lower than the historical average. The lower 7-day low flow values recorded since 2020 are attributed to the lower-than-normal amount of precipitation received in 2020, 2021, 2022 and the first half of 2023.

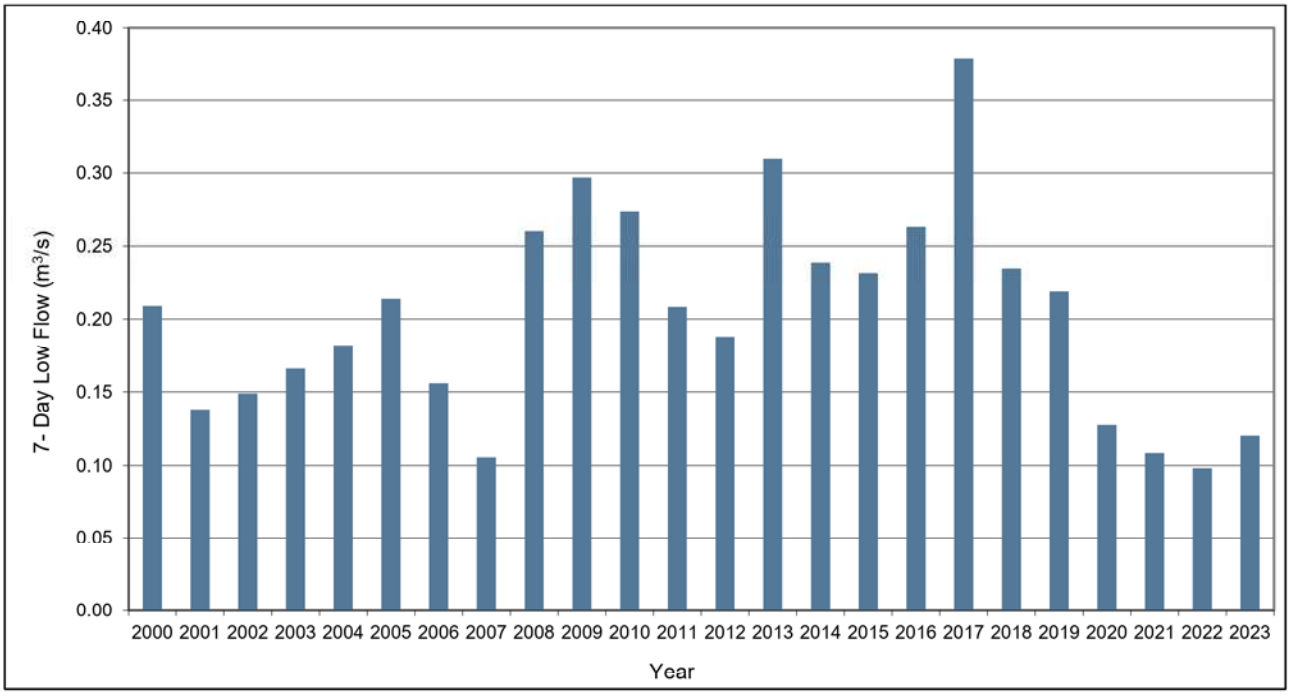

Figure 2-9: Seven Day Annual Low Flow Values at SWM2, 2000 through 2023

The daily average stream flow at SWM2 in summer months (June 21 to September 22 inclusive) is illustrated in **Figure 2-10** to further examine if there have been any changes in stream flow over time. The flow data are presented as log transformed, in a box and whisker plot (boxplot). Boxplots are useful when comparing two or more datasets and allow for the visualization of flow data between years. The data were log transformed because variability in flow is high and the data are not normally distribution. With a log transfer, the data have a greater normal distribution and therefore, flow rate differences are more readily observed.

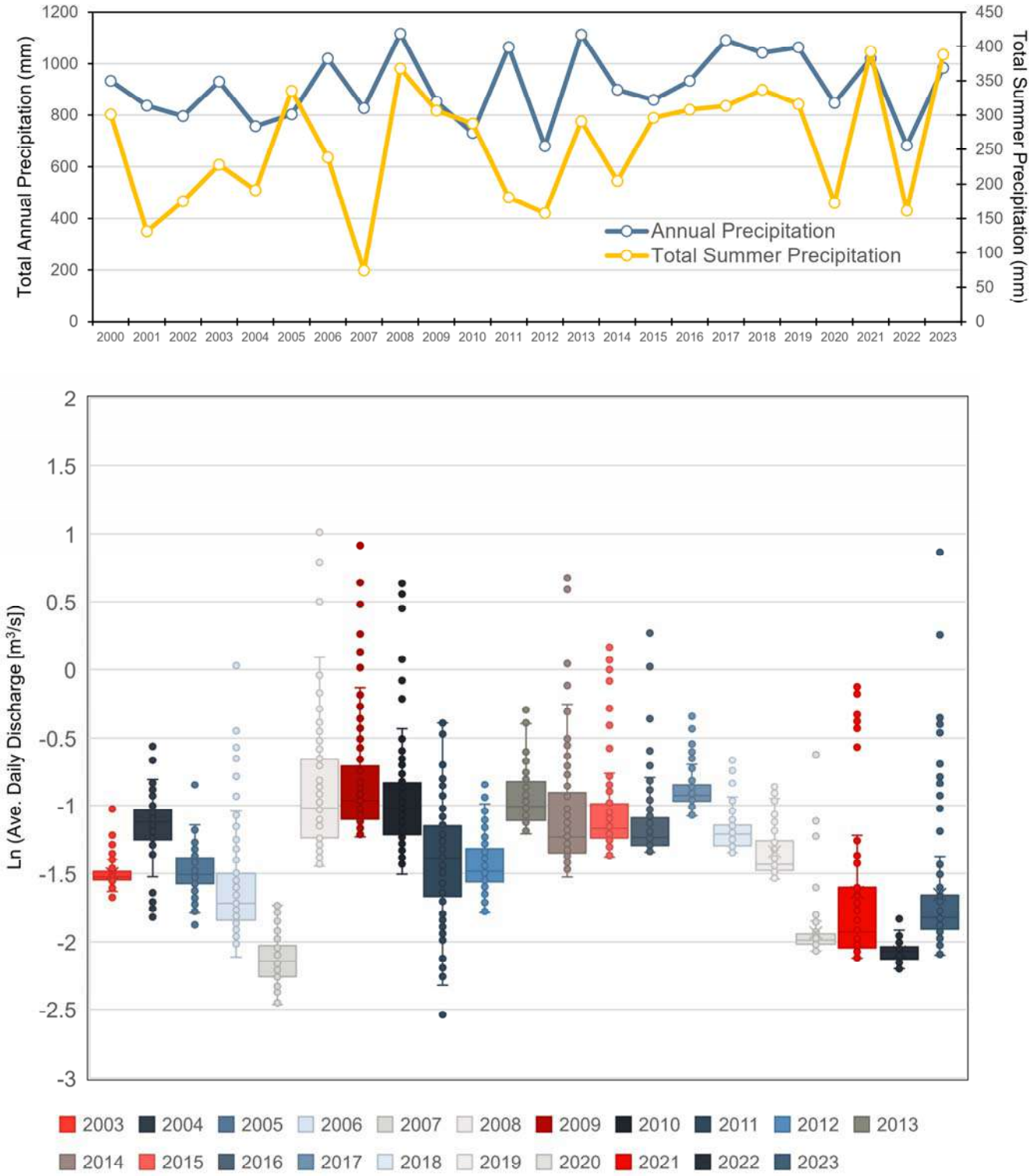

Figure 2-10: Boxplot of Mean Daily Average Summer (June-September) Stream Flows at SWM2, 2000 to 2023

For the box & whisker plot, data within the box represents 50% of the summer daily average flows and data outside the box represent those daily average flows in the upper and lower quartiles (maximum and minimum calculated flows). The horizontal line within the box represents the median flow for the summer months.

In 2023, the boxplot indicates that the daily average flow was often higher than observed in 2022 and that summer discharge fluctuated within a large range in 2023. **Figure 2-10** also shows that a long-term fluctuating trend in daily average summer flows has occurred in Mill Creek since 2003, rather than an increasing or decreasing trend.

2.3 Surface Hydrology Summary

The mean air temperature in 2023 was equal to the 30-year average. Total precipitation in 2023 was 983 mm, which is 5% higher than the 30-year average of 935 mm.

Overall, changes in discharge in Mill Creek were related to precipitation or snow melt periods. The maximum instantaneous flow calculated at SWM2 in 2023 was within the historic range. A long-term fluctuating stream flow trend is observed, rather than an increasing or decreasing trend, based on the historical summer flow data collected from the Site.

The 2023 7-day low flow at SWM2 is similar to the 7-day low flow values recorded in 2007, 2020, 2021 and 2022. The average of the SWM2 7-day low flow values from 2000 to 2022 is 0.207 m^3/s. The 2023 7-day low flow of 0.120 m^3/s is considerably lower than the historical average. The lower 7-day low flow values recorded since 2020 are attributed to the lower-than-normal amount of precipitation received in 2020, 2021, 2022 and the first half of 2023.

Based on the available data, there is no indication that aggregate extraction, or the resulting ponds, are affecting stream flow in Mill Creek on the University of Guelph property.

3.0 HYDROGEOLOGY

Groundwater monitoring has been conducted at the Mill Creek Property since late-1986. The principal objectives of the 2023 Annual Monitoring Program were as follows.

- To comply with the pertinent terms of the 2023 groundwater monitoring program;
- To provide an assessment of the effects of on-site aggregate extraction activities on the local groundwater and surface water setting;
- To determine and assess any changes in the groundwater quality;
- To document results in an annual monitoring report as part of a coordinated report; and
- To recommend any changes to the monitoring program for implementation in 2024.

Detailed results of the groundwater monitoring program are provided in **Technical Appendix B (Hydrogeology)**.

3.1 Methods

The methods and results of the hydrogeology program have been separated into a) Routine or historical procedures, and b) Groundwater thresholds, which were introduced in 2001. These are described in detail in Technical Appendix B.

The MNRF requires that Dufferin Aggregates submits a monthly summary checklist report, which is to be issued within 10 business days of the last day of the preceding month. The summary includes groundwater level data

corresponding to threshold monitoring pairs, threshold values, and pond levels. Below-water table extraction (wet tonnes extracted/day), water pumped from the Phase 1 pond, water pumped from the Phase 4 pond, and monthly precipitation totals are also reported in the summary report. In the event that a threshold value/level is exceeded for any period, this would be included in the summary with appropriate comments attached. The monthly reports are included with the correspondence (Sub Appendix F) in Technical Appendix B.

3.1.1 Routine Monitoring

There are various types of groundwater monitoring stations established on, and adjacent to, the property. Monitor types are described below and summarized in **Table 3-1**, Locations of the groundwater monitoring stations are shown in **Figure 3**.

Table 3-1: Groundwater Monitor Groupings at the Mill Creek Property

Bedrock	Sand and Gravel		Wetland	Creek
TW16-78 Well 4794	Boreholes 1* 1-R 2* 2-R 3 4 5 6 7-I* 7-II* 11 12* 13 14 CBM1* CBM2* CBM3* 92-1* 92-1R 92-5 92-8 92-12 92-26 92-27	Multi-level 92-13 92-14* 92-15* 92-28 92-29 92-32 92-33 Observation and Test Wells TW16-79 OW1-84 OW2-84 OW4-84 OW5-84 OW16A-78	Drive points DP6 DP7 DP8 DP9 DP10 DP11 DP12 DP16 DP113	Drive Points DP1 DP2 DP3 DP4* DP4R DP5A* DP5B* DP5C* DP5CR DP17* DP17R DP18 DP19 DP20 DP21 DP22

* indicates monitor was decommissioned/removed/replaced and is no longer included in monitoring program

1 Drilled stratigraphic boreholes within, or adjacent to, the property. These are instrumented with standpipes to measure the elevation of the water table in the shallow soil sequence.

Monitors (manual):

- Borehole Monitors at BH1/1R, BH2-R, BH3 to BH6, BH11, BH13, BH14;
- the OW (observation well) and TW (test well) monitors adjacent to Mill Creek near the southwest corner of the site; and

- monitors that were installed at selected locations in the 1992 resource boreholes across the property (92- series of stations).

Frequency:

- monthly; and
- more frequently at BH13, OW5-84, 92-12, 92-27, and 92-29, which are included in a threshold pair.

2 Shallow water table drive point monitors.

Monitors (manual):

- DP6 to DP12 and DP16 in the wetland areas (Mill Creek Property); and
- DP113 north of Highway 401 (Reid Heritage Property).

Frequency:

- Monthly; and
- more frequently at DP6, which is included in a threshold pair.

3 In-stream drive point monitors.

Monitors (manual):

- In-stream drive point monitors DP1 to DP4/4R, DP5CR, and DP17R to DP22. Measurements at the Mill Creek drive point monitors included groundwater levels and temperatures, and surface water levels and temperatures. In addition, surface water levels are monitored at stations SW1 and SW2, both of which are located in Mill Creek.

Frequency:

- Monthly; and
- More frequently at DP1, DP2, DP3, DP5CR, DP17R, DP21, which are included in a threshold pair.

4 Multi-level nests equipped with data loggers. These monitors have combination water level pressure transducers and temperature probes (installed in Nov. 2006).

Monitors (manual):

- 92-28, 92-29, and 92-32 – west side of property adjacent to Mill Creek – installed in November 2006 as part of extraction monitoring in Phase 3;
- 92-27 (a data logger was installed in December 2011 for the purpose of collecting groundwater level and temperature data from the shallow part of the aquifer) - west side of property adjacent to Mill Creek;
- 92-33 (a data logger was installed in March 2012 for the purpose of collecting groundwater level and temperature data from the shallow part of the aquifer. The previous permanent, non-removable multi-level pressure transducer and thermistor instrumentation malfunctioned at monitor nest 92-33 in 2010. A second shallow data logger was installed at 92-33 in October 2017 at a depth similar to the previous (i.e. pre-2012) shallow data logger.) – west side of property adjacent to Mill Creek;

- 92-12 (a data logger was installed in June 2012 for the purpose of collecting groundwater level and temperature data from the shallow part of the aquifer) – centre of property adjacent to Phase 4 operations;
- 92-13 (a data logger was installed in May 2013 for the purpose of collecting groundwater level and temperature data from the shallow part of the aquifer) – east side of property adjacent to Phase 1.
- BH4, DP7, DP8, DP9 and DP16 – centre of property adjacent to Phase 4 operations. These are single level data logger installations; and
- A data logger was installed in BH14, located between Monitor 92-12 and Mill Creek, in June 2015.

Frequency:

- Readings of water level (pressure) and temperature were recorded by data loggers once per day. The data were downloaded monthly for review.

5 Water Wells

- As in previous years, and although not part of the 1993 "official" monitoring program, water wells located on the property, and a well supplying a local resident in the vicinity of the property, were monitored monthly. Water level monitoring began in the summer of 1994 at select locations.

6 Pond Staff Gauges

- Surveyed staff gauges were maintained in the Phase 1 pond, Phase 2 pond, Phase 3 pond, and Phase 4 pond. Starting in 2013, a new staff gauge was installed at the east end of the silt pond SP3 northerly extension, which represents water levels in both silt pond SP3 and the Phase 4 pond, since they are hydraulically connected. Measurements of pond water levels were completed daily during the ice-free period through 2022. Pond temperatures were measured monthly during the ice-free period.

The results of the routine groundwater monitoring program are summarized in Section 3.2 in the following order.

- Bedrock Aquifer (Section 3.2.1)
- Sand and Gravel Aquifer (Section 3.2.2)
- Wetland Monitors (Section 3.2.3)
- Mill Creek Drive Points (Section 3.2.4)

3.1.2 Threshold Monitoring

On June 27, 2001, and following detailed negotiations with MNRF and other regulatory agencies, Dufferin Aggregates issued a document entitled Mill Creek Aggregates Interim Groundwater Threshold and Action Response Plan. Interim thresholds and early warning values were set at six locations across the site, and each location includes a pair of groundwater monitors (**Figure 4**). The thresholds are based on maintaining positive seasonal hydraulic head differences on the water table between the monitor pairs, such that a hydraulic gradient will continue to exist from the site toward Mill Creek.

The thresholds and early warning values were ld to ensure that the quantity of groundwater that discharges to Mill Creek does not decline below a minimum level, and they are based on seasonal historic low water level data. A summary of thresholds for groundwater monitoring pairs and the on-site ponds is provided in **Table 3-2**. The

monitoring program and development of threshold monitoring pairs has undergone refinement, with MNRF approval, since 2001.

Table 3-2: Summary of Thresholds for Groundwater Monitoring Pairs and the On-Site Ponds

Monitor Pair/Location	Threshold Values	Early Warning
(11) (1) BH13 to DP21$_{in}$ • East of Hanlon Interchange to Creek	Spring: 0.11 m head difference (305.60mASL) Summer: 0.10 m head difference (305.49mASL) Fall: 0.09 m head difference (305.58mASL) Winter: 0.11 m head difference (305.66mASL)	0.13 m head difference 0.12 m head difference 0.11 m head difference 0.13 m head difference
(2) BH92-12 to DP17R$_{in}$ • East of Hanlon interchange to Creek	Spring: 0.14 m head difference (305.17mASL) Summer: 0.06 head difference (305.17mASL) Fall: 0.04 m head difference (305.17mASL) Winter: 0.07 m head difference (305.17mASL)	0.19 m head difference 0.12 m head difference 0.09 m head difference 0.13 m head difference
(3) DP6 $_{in}$ to DP3 $_{in}$ • South of Hanlon Interchange to Creek	Spring: 0.73 m head difference (304.54mASL) Summer: 0.58 m head difference (304.54mASL) Fall: 0.55 m head difference (304.54mASL) Winter: 0.57 m head difference (304.54mASL)	0.84 m head difference 0.76 m head difference 0.73 m head difference 0.69 m head difference
(4) BH92-29 to DP1$_{in}$ • Northwest corner of site; west of approved Phase 3 extraction area	Spring: 0.17 m head difference (303.97mASL) Summer: 0.23 m head difference (303.91mASL) Fall: 0.19 m head difference (303.96mASL) Winter: 0.29 m head difference (303.88mASL)	0.22 m head difference 0.28 m head difference 0.24 m head difference 0.34 m head difference
(5) BH92-27 to DP2 $_{in}$ • West of approved Phase 3 extraction area	Spring: 0.34 m head difference (303.69 mASL) Summer: 0.32 m head difference (303.50 mASL) Fall: 0.34 m head difference (303.55 mASL) Winter: 0.43 m head difference (303.65 mASL)	0.39 m head difference 0.37 m head difference 0.39 m head difference 0.48 m head difference
(6) OW5-84 to DP5C $_{in}$ • Southwest corner of site downgradient from SP1 to Creek	Spring: 0.30 m head difference (302.86) *Revised: 0.18 m head difference (302.86)** Summer: 0.25 m head difference (302.79) *Revised: 0.15 m head difference (302.79)** Fall: 0.25 m head difference (302.84) *Revised: 0.15 m head difference (302.84)** Winter: 0.30 m head difference (302.88) *Revised: 0.20 m head difference (302.88)**	0.34 m head difference *0.21 m head difference** 0.28 m head difference *0.18 m head difference** 0.28 m head difference *0.18 m head difference** 0.34 m head difference *0.23 m head difference**
(7) Phase 1 Pond	305.5 mASL – All seasons	305.75 mASL – All seasons
(8) Phase 2 Pond	305.0 mASL – All seasons	305.30 mASL – All seasons
(9) Phase 3 Pond	303.85 mASL – All seasons	304.10 mASL – All seasons
(10) Phase 4 Pond	304.50 mASL – All seasons	305.10 mASL – All seasons
(11) Silt Pond SP3	Maximum: 307.1 mASL Minimum: 304.85 mASL	Maximum: 306.85 mASL Minimum: 305.10 mASL

Thresholds and action response plan came into effect on June 30, 2001.
Values in brackets refer to minimum water level elevations at monitors DP21, DP17R, DP1, DP2, DP3, DP5C/CR.
Seasons are as follows: WINTER = Jan. to Mar. inclusive, SPRING = Apr. to Jun. inclusive
SUMMER = Jul. to Sep. inclusive, FALL = Oct. to Dec. inclusive
* indicates revised thresholds approved on June 30, 2022.

3.2 Results of Groundwater Monitoring

3.2.1 Bedrock Aquifer

As noted in **Table 3-1**, there are two water wells on the property that were developed within the bedrock aquifer: TW16-78 and North Farmhouse Well 4794. Water level data for these wells are provided in Technical Appendix B.

The water levels (as far as could be monitored) recorded in the bedrock aquifer wells exhibited normal seasonal trends that reflected prevailing climatic conditions and were not affected by pit operations.

3.2.2 Sand and Gravel Aquifer

The following section describes both groundwater levels and temperature.

Groundwater Levels

The monitors that are screened in the sand and gravel aquifer are noted in **Table 3-1**.

Compared to 2022, water levels in the representative monitors were, on average, 0.02 m lower (1-R to 92-32) to 0.19 m higher (92-32) in 2023. The average water levels at 1-R and 4-I remained similar from 2022 to 2023 due to the lower water levels observed from January through June being offset by the higher water levels observed from July through December. The average water levels at 92-32 were higher than observed in 2022 during most months in 2023, contributing to the higher average annual levels in 2023. The 2023 average water levels at the individual monitors ranged from approximately 0.3 m above ground surface to 8.6 m below ground surface across the site, and fluctuations ranged from 0.2 m to 0.5 m during 2023. In 2023, the maximum and minimum water levels at the monitors were within their historical ranges, with one exception. In July 2023, the water level at BH14 was 0.04 m higher than the historic range of levels recorded since monitoring began in 2015.

The interpreted low water table configuration illustrated in **Figure 5** indicates that groundwater continues to move from east to west across the northern property. The water table contours south of Highway 401 tend to “bend back” toward the creek, indicating that the creek receives groundwater discharge from the subject property along the reach south of Highway 401. Typically, water table contours bend back further (i.e., more strongly) under high flow water table conditions, indicating an increased component of groundwater flow northwestward toward the creek near the Hanlon interchange and to the west.

Groundwater Temperature

Shallow groundwater monitoring immediately downgradient of the pit ponds show the influence of the ponds on groundwater temperatures and that temperatures quickly dissipate within a short distance from the ponds. For example, at the west side of the site, shallow groundwater temperatures at Monitor 92-29 have increased while the shallow groundwater temperatures at Monitor 92-28, located between Monitor 92-29 and Mill Creek, have remained relatively stable (**Figures 3-1 and 3-2**).

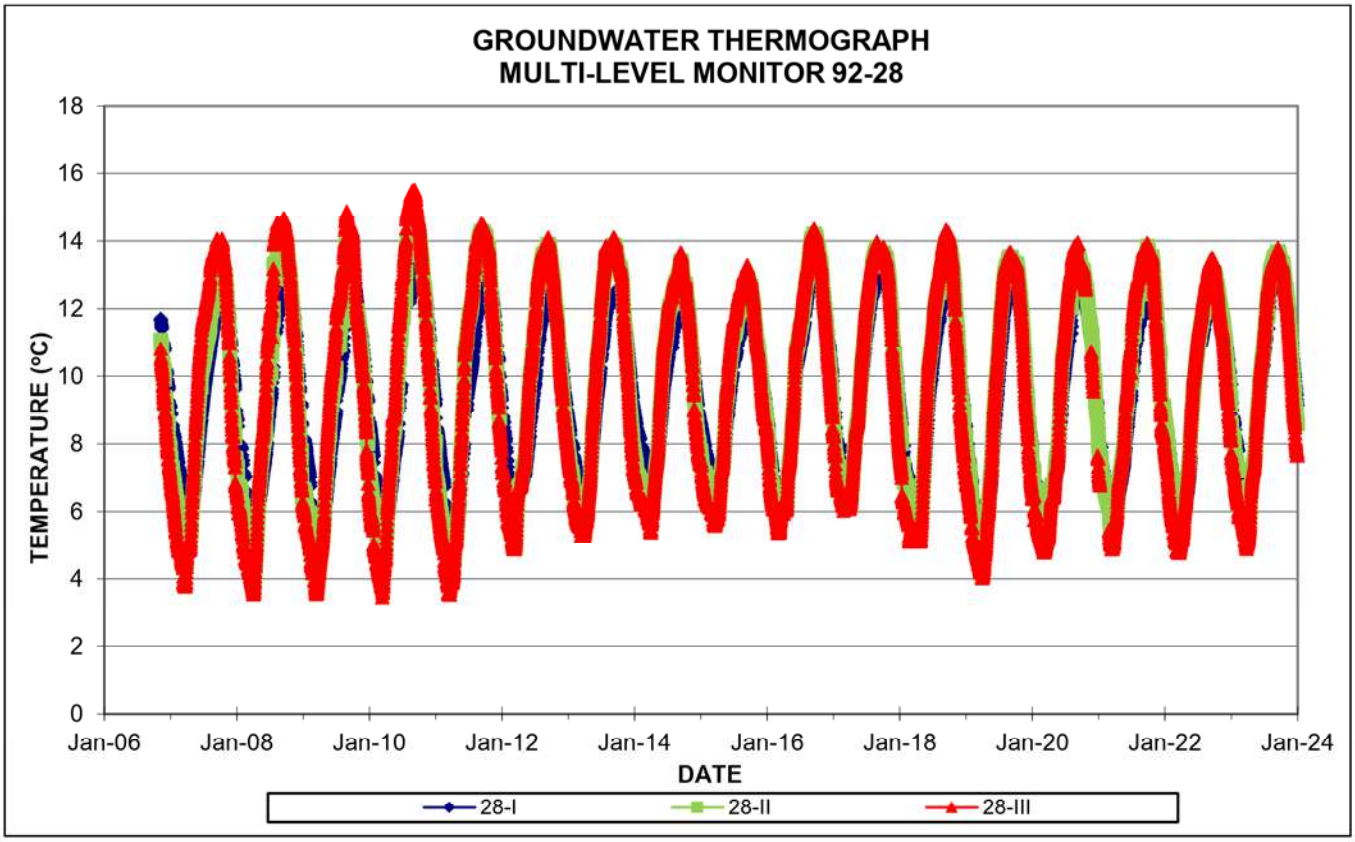

Figure 3-1: Groundwater Thermograph of Multi-level Monitor 92-28

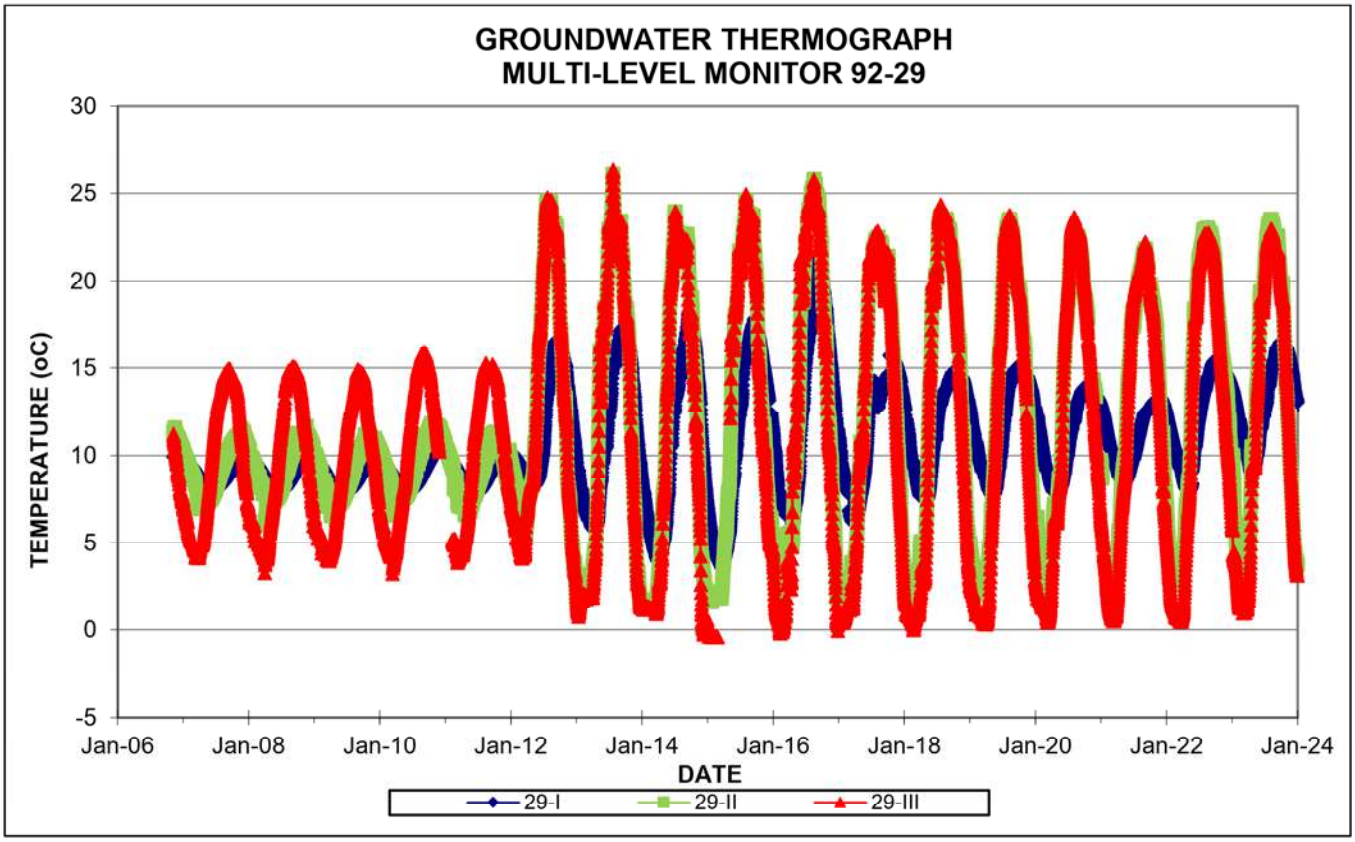

Figure 3-2: Groundwater Thermograph of Multi-level Monitor 92-29

Further downgradient of 92-29 is DP1, located in Mill Creek. 92-29 and DP1 represent a monitoring pair for Threshold pair monitoring (see Section 3.2.5). The thermograph for DP1 (**Figure 3-3**) suggests that development of the Phase 3 pond in 2012 has not influenced groundwater temperatures in Mill Creek to any notable degree.

Monitor 92-27 is also adjacent to the Phase 3 pond, and with DP2 represents a threshold monitoring pair. This threshold pair exhibits a similar groundwater temperature relationship as the 92-29 to DP1 threshold pair. Similar to DP1, the thermograph for DP2 (**Figure 3-4**) suggests that development of the Phase 3 pond in 2012 has not influenced groundwater temperatures in Mill Creek to any notable degree. However, there does appear to be a subtle almost 2^{o}C increase in groundwater temperature at DP1 and DP2 that began prior to operational activities in this area and may be a regional phenomenon, as suggested by a similar subtle increasing trend observed at upstream drive point DP20 (**Figure 3-5**).

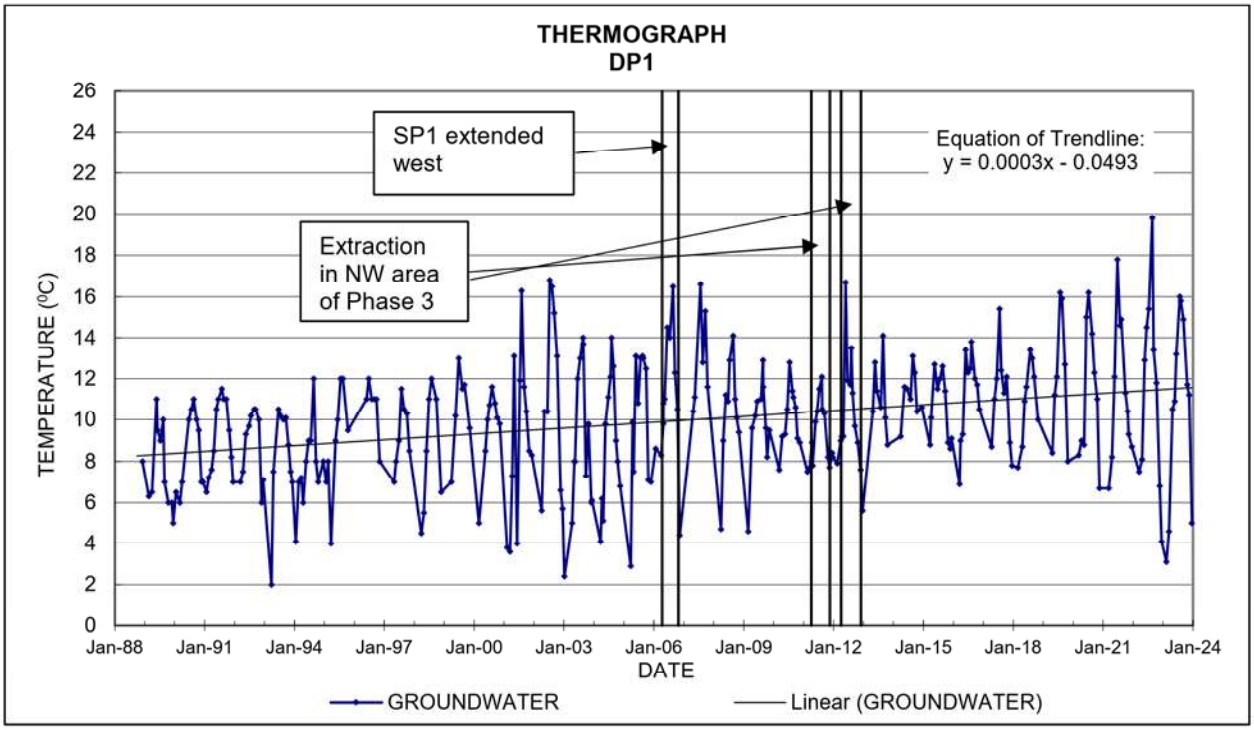

Figure 3-3: Groundwater Thermograph of Drive Point DP1

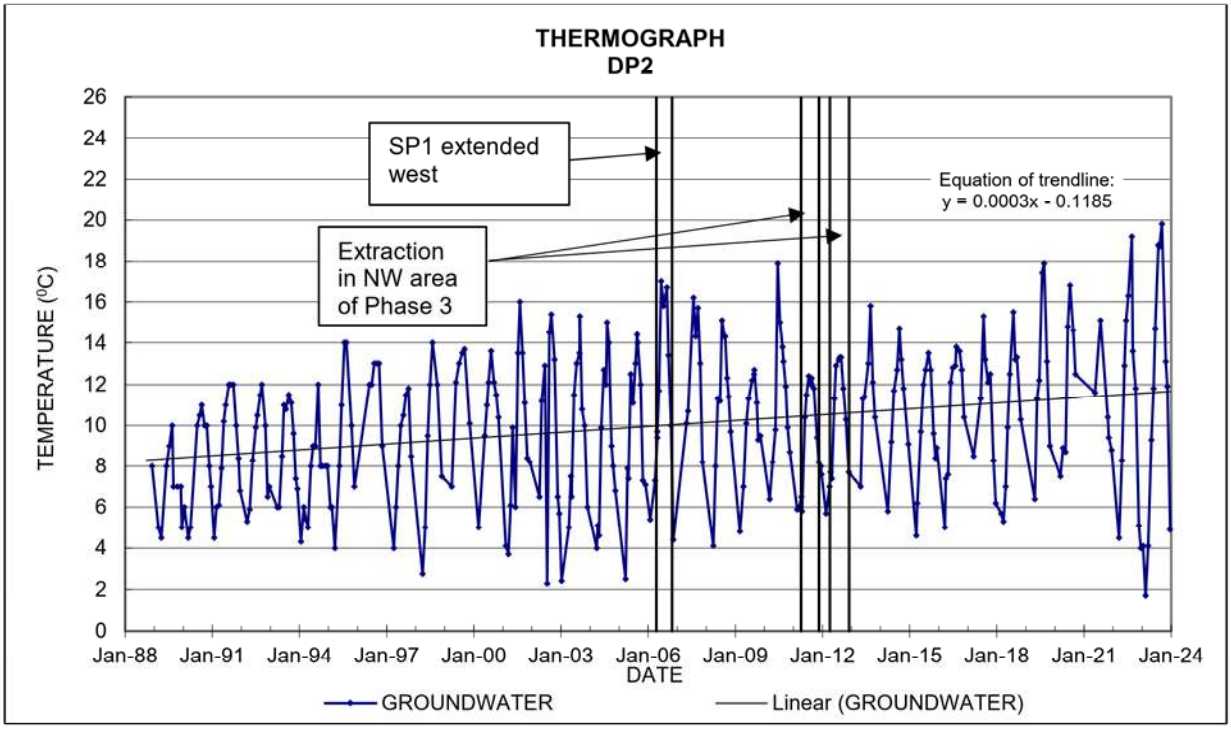

Figure 3-4: Groundwater Thermograph of Drive Point DP2

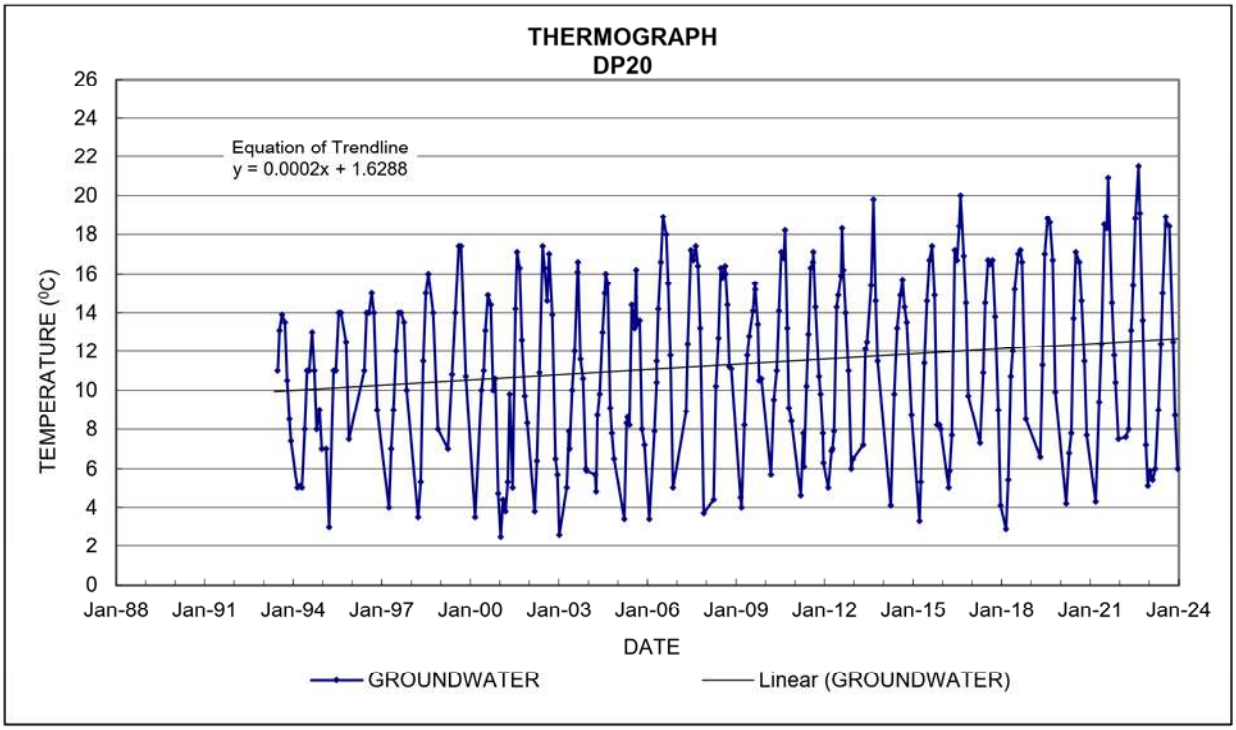

Figure 3-5: Groundwater Thermograph of Drive Point DP20

3.2.3 Wetland Water Levels

The drive point monitors that are located in the wetland are noted in **Table 3-1**. Monitors DP6 to DP12 are located in the large wetland area in the north-central part of the property. DP15 was located in a wetland pocket in the northwestern part of the property and was removed due to extraction after August 2011, and DP16 is located in the wetland along the western side of the property. A groundwater hydrograph of three representative drive points in the wetland is presented in **Figure 3-6**. As shown in the hydrograph, of the three representative drive points, the groundwater elevation at DP7 is typically highest, and the lowest elevations occur at DP11. This is expected, as DP7 is located furthest from Mill Creek and DP11 is closest, and groundwater flow is toward Mill Creek at the site. Hydrographs for all wetland drive points are provided in Technical Appendix B.

Monitoring of wetland drive points on the Reid Heritage property adjacent to Mill Creek north of Highway 401 commenced in August 2000, and those monitors were incorporated into the routine monitoring program. Each of these drive points have now been removed except for DP113, located immediately north of Hwy 401.

Historically, the groundwater levels within the wetland remained reasonably close to ground surface throughout the year. The water levels are typically nearest to ground surface, and in some instances, they are above ground surface, mostly during the spring melt. The groundwater levels then show a progressive decline to their maximum depth below ground surface during the summer to early fall months. The fluctuation between the spring high water levels to the summer low water levels usually ranges from 0.1 m to 1.0 m, depending on the location.

The groundwater level recorded within the wetland areas in 2023 averaged about 0.06 m below the historical average, and about 0.06 m above the 2022 average for the site. The higher levels compared to 2022 are attributed to the higher water surplus that occurred at the site in 2023 compared to historic results. The increase in water levels within the wetland areas generally is less than the increase experienced at other locations across

the site. This is primarily due to the proximity of the wetland areas to Mill Creek, which acts as a buffer, or hinge point, for the water table that reduces the magnitude of seasonal variations. The wetland groundwater levels recorded in 2023 were within the historical maximum and minimum groundwater levels. An aggregate extraction influence is not apparent.

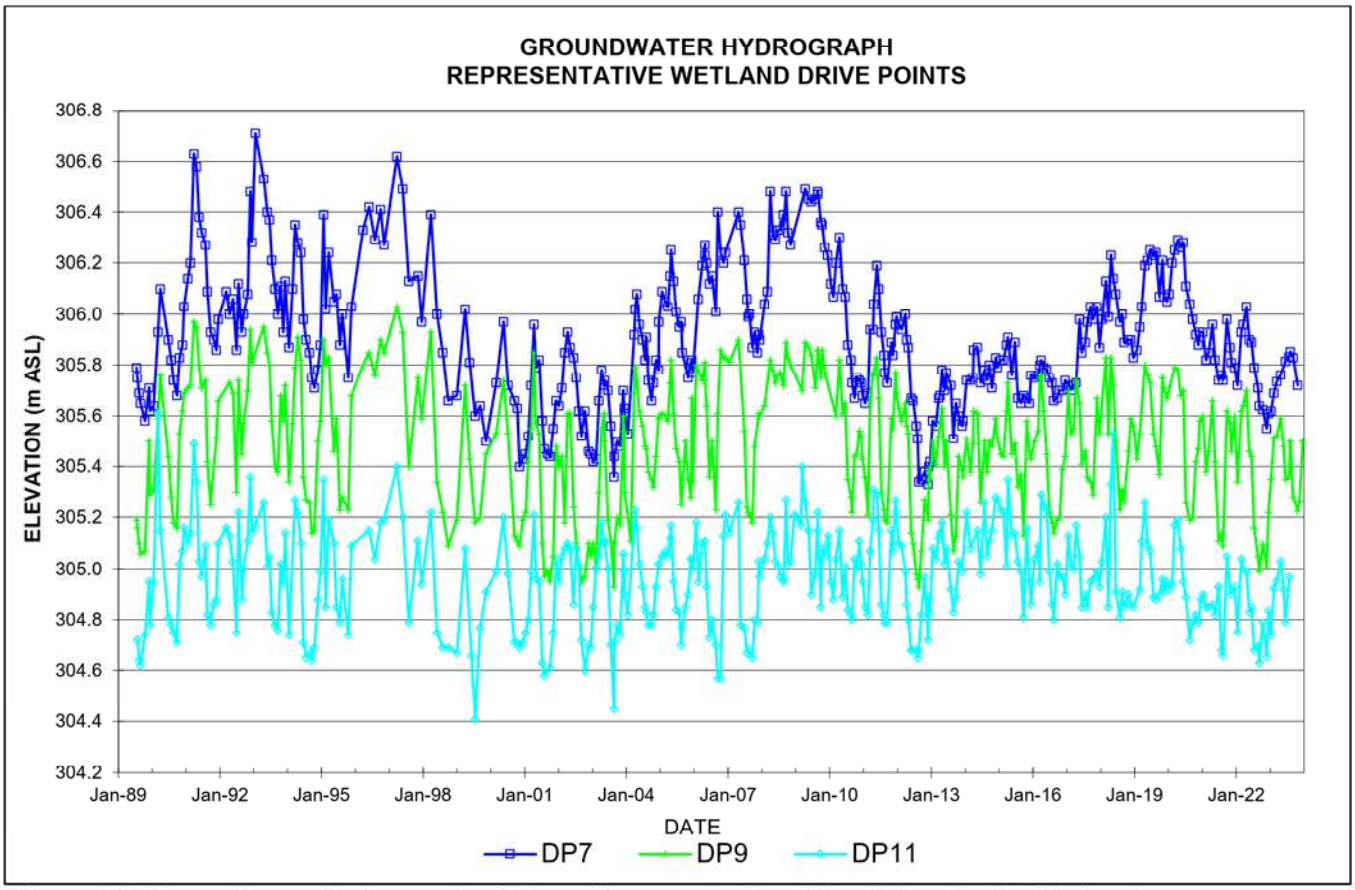

Figure 3-6: Groundwater Hydrograph of Three Representative Drive Points in the Wetland

3.2.4 Mill Creek Drive Points

Groundwater Level

The drive point monitors in the creek bed are listed in **Table 3-1** with their locations shown on **Figure 3**. Detailed data for hydraulic head and groundwater flux for the in-stream drive points are provided in Technical Appendix B.

The yearly average vertical hydraulic gradients for the in-stream drive points from 2021 to 2005, are shown in **Table 3-3** as well as the annual historic average from the start of data collection (1988 to 1993) to 2005.

Table 3-3: Average Vertical Hydraulic Gradient

DRIVE POINT	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
DP5A/B/C/CR	0.62	0.68	0.66	0.55	0.52*	0.54	0.47	0.18	0.21	0.28	0.18
DP2	0.16	0.24	0.25	0.24	0.25	0.26	0.25	0.33	0.34	0.29	0.33
DP1	0.32	0.28	0.23	0.20	0.25	0.27	0.25	0.33	0.33	0.37	0.37
DP3	0.05	0.06	0.06	0.05	0.04	0.07	0.04	0.06	0.05	0.05	0.05
DP17/R	0.08	0.04	0.04	0.06	0.05	0.07	0.06	0.04	0.05	0.03	0.03
DP22	0.04	0.04	0.04	0.06	0.07	0.07	0.08	0.05	0.05	0.08	0.05
DP4/R	0.04	0.03	0.02	0.06	0.13	0.13	0.16	0.10	0.14	0.17	0.11
DP21	0.08	0.08	0.07	0.12	0.08	0.06	0.11	0.03	0.06	0.08	0.07
DP20	-0.05	-0.07	0.08	0.11	0.13	0.08	0.14	0.10	0.12	0.12	0.14
DP19	-0.13	-0.20	0.03	0.06	0.05	0.02	0.01	-0.03	-0.01	0.06	0.03
DP18	-0.06	-0.09	0.15	0.10	0.10	0.06	0.12	0.08	0.11	0.09	0.10

DRIVE POINT	2012	2011	2010	2009	2008	2007	2006	2005	HISTORIC AVERAGE (UP TO 2005)
DP5A/B/C/CR	0.40	0.19	0.18	0.12	0.12	0.09	0.09	0.11	0.09
DP2	0.32	0.30	0.30	0.24	0.22	0.22	0.21	0.14	0.17
DP1	0.30	0.31	0.27	0.21	0.22	0.19	0.21	0.23	0.22
DP3	0.06	0.06	0.07	0.06	0.06	0.06	0.06	0.05	0.04
DP17/R	0.03	0.04	0.06	0.05	0.06	0.04	0.04	0.04	0.02
DP22	0.04	0.06	0.06	0.09	0.09	0.06	0.07	0.06	0.03
DP4/R	0.08	0.12	0.15	0.22	0.20	0.12	0.12	0.09	0.04
DP21	0.05	0.09	0.10	0.14	0.16	0.11	0.11	0.08	0.06
DP20	0.08	0.10	0.11	0.19	0.15	0.14	0.14	0.12	0.00
DP19	0.00	0.04	0.04	0.12	0.09	0.04	0.05	0.07	-0.06
DP18	0.07	0.08	0.07	0.13	0.12	0.06	0.07	0.08	0.03

NOTES:
1) (-) = downward vertical gradient
2) Because of several drive point replacements due to vandalism, DP5 data from 2012 onward are interpreted with caution.
3) * Due to the presence of a beaver dam downstream of DP5CR, DP5CR data for 2019 are interpreted with caution.

The hydrographs for the drive point monitors show the seasonal changes in elevation of the groundwater at each monitor, together with the surface water elevation data for the creek. Hydraulic gradients for select drive points (DP2, DP3, DP17, DP19 and DP21) are shown in **Figures 3-7 to 3-11**. The following patterns and trends were observed in 2023:

- Based on the average condition through 2023, upward gradients between the groundwater and the creek occurred from where Mill Creek crosses highway 401 (DP21) downstream to DP5CR. Groundwater discharge continues to provide base flow to these reaches of Mill Creek.
- As shown in the preceding table, the magnitude of the average vertical hydraulic gradient is variable from DP21 downstream to DP5A/B/C/CR, with the strongest upward gradients being observed at DP1, DP2, and DP5A/B/C/CR, and the weakest upward gradients in the creek between DP4/R, DP22 and DP3.
- Based on the average condition through 2023, downward gradients between the groundwater and the creek occurred at the drive points located north of Highway 401 (DP18, DP19 and DP20).
- Between 1998 and 2005, downward vertical gradients persisted in the reach north of Highway 401 at DP19 (**Figure B-93**). At DP18 (**Figure B-90**) and DP20 (**Figure B-96**), gradients varied from downward to upwards during the 1998 to 2005 period. From 2005 to June 2022, the vertical gradients at these drive points remained upward, with the exception of neutral and downward vertical gradient conditions on average over the course of the year at DP19 in 2012 and in 2015 and 2016, respectively (varied between downward and upward gradient conditions). Beginning in July 2022, strong downward gradients were frequently observed within the reach north of Highway 401. As shown in **Figures B-90, B-93 and B-96**, the downward gradients observed since July 2022 are stronger than observed historically at each of the three drive point locations. As shown in **Figures B-88, B-91 and B-94**, when the downward gradients are observed, they are caused by a notable decrease in groundwater level recorded at the drive point locations. These lower groundwater levels were not consistently observed in 2023. The cause of the sudden change in hydraulic gradient at DP18, DP19 and DP20 is not apparent; however, it is interpreted to be related to upgradient activities.
- In 2023, the average vertical hydraulic gradients were higher than the 2022 values at DP1, DP4/R, DP17/R, DP18, DP19 and DP20; equal to the 2022 values at DP21 and DP22; and lower than the 2022 values at the remaining in-stream drive points. The difference between the 2023 average and the 2022 average ranged between -0.08 at DP2 and 0.07 at DP19. The 2023 average vertical hydraulic gradients at the creek drive points were generally higher than, or similar to, the pre-2005 averages, with the exceptions of the locations north of Highway 401. This overall increase in hydraulic gradients likely reflects a buffering effect due to the presence of the Phase 1, Phase 3, and Phase 4 ponds, and translates into a proportional increase in the groundwater discharge to Mill Creek. This is discussed in further detail later in this section.
- Generally, the seasonal fluctuation of the surface water elevation in Mill Creek at the drive point monitors was similar to the variation of the groundwater elevation in 2023. Historically, greater seasonal groundwater fluctuations have been observed compared to surface water fluctuations.

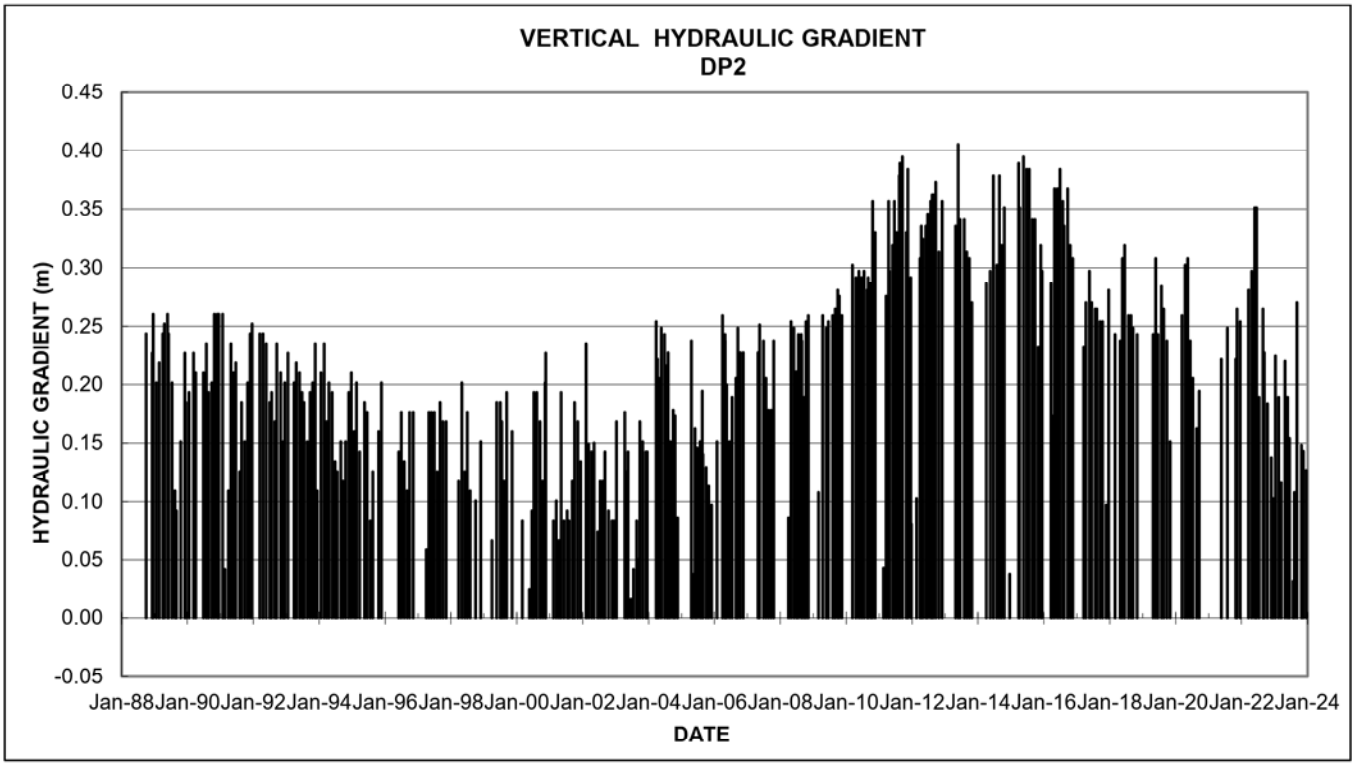

Figure 3-7: Hydraulic Gradient at Stream Drive Point Station DP2

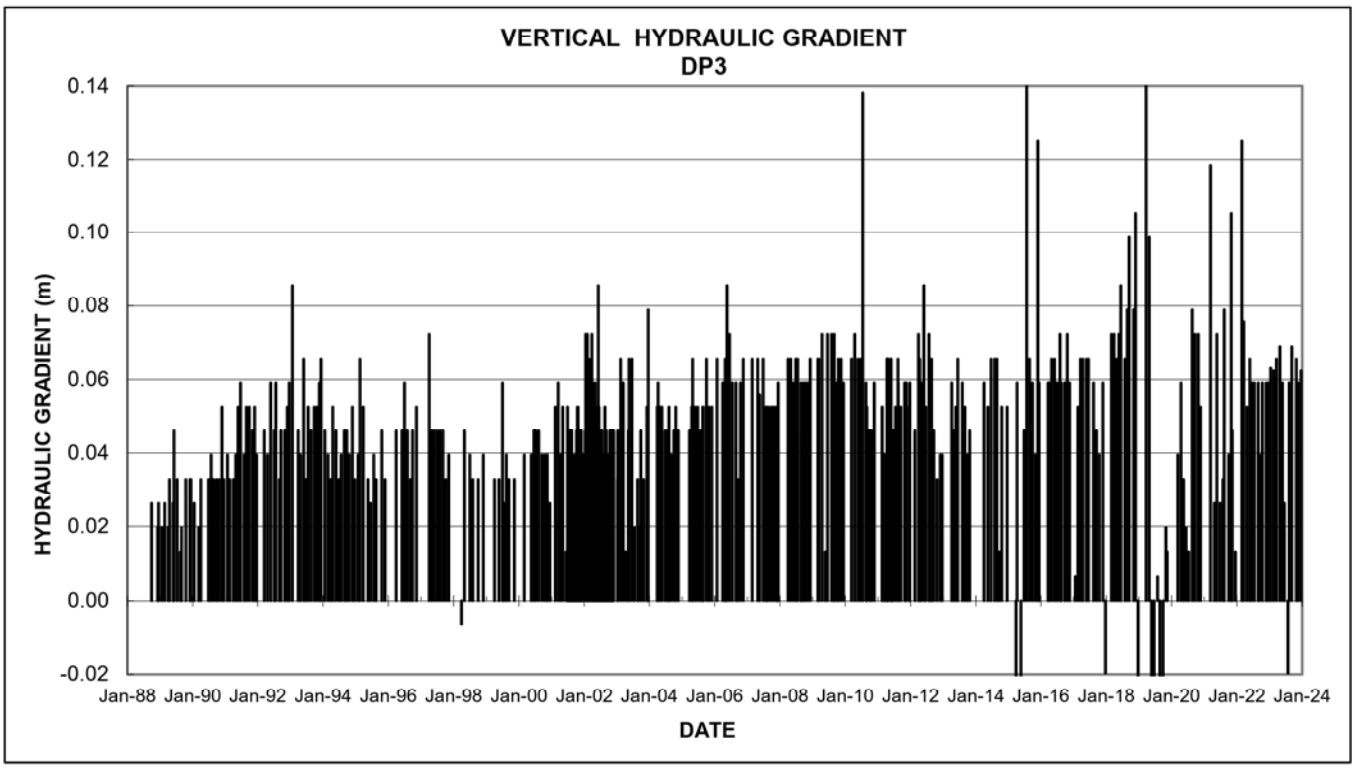

Figure 3-8: Hydraulic Gradient at Stream Drive Point Station DP3

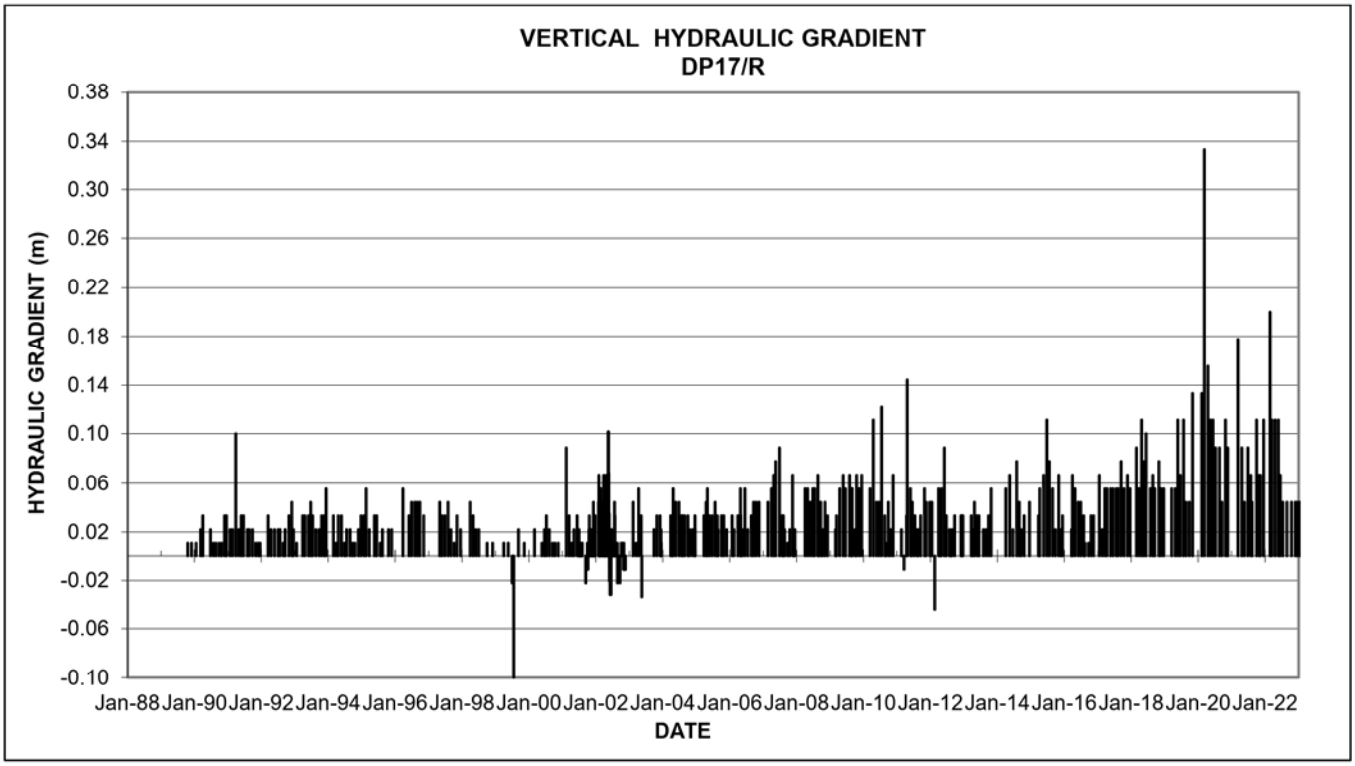

Figure 3-9: Hydraulic Gradient at Stream Drive Point Station DP17/R

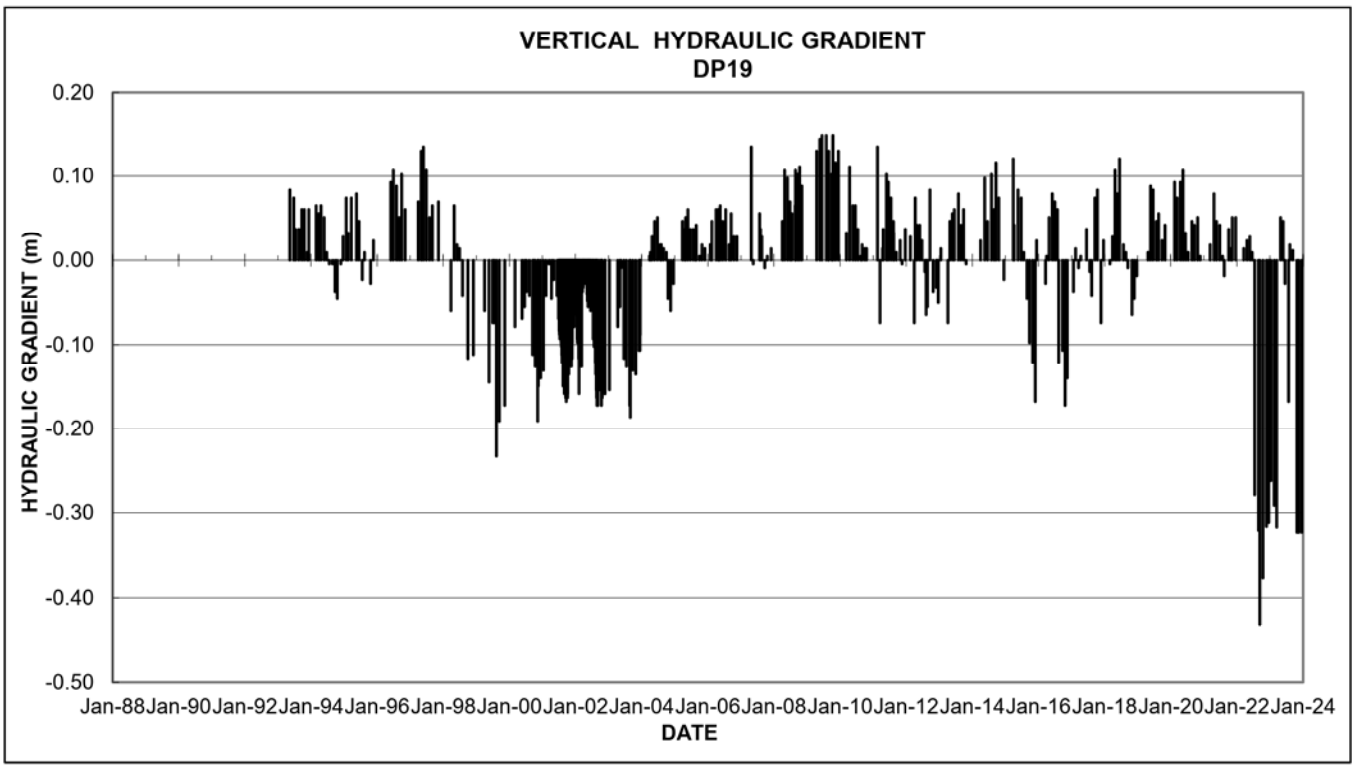

Figure 3-10: Hydraulic Gradient at Stream Drive Point Station DP19

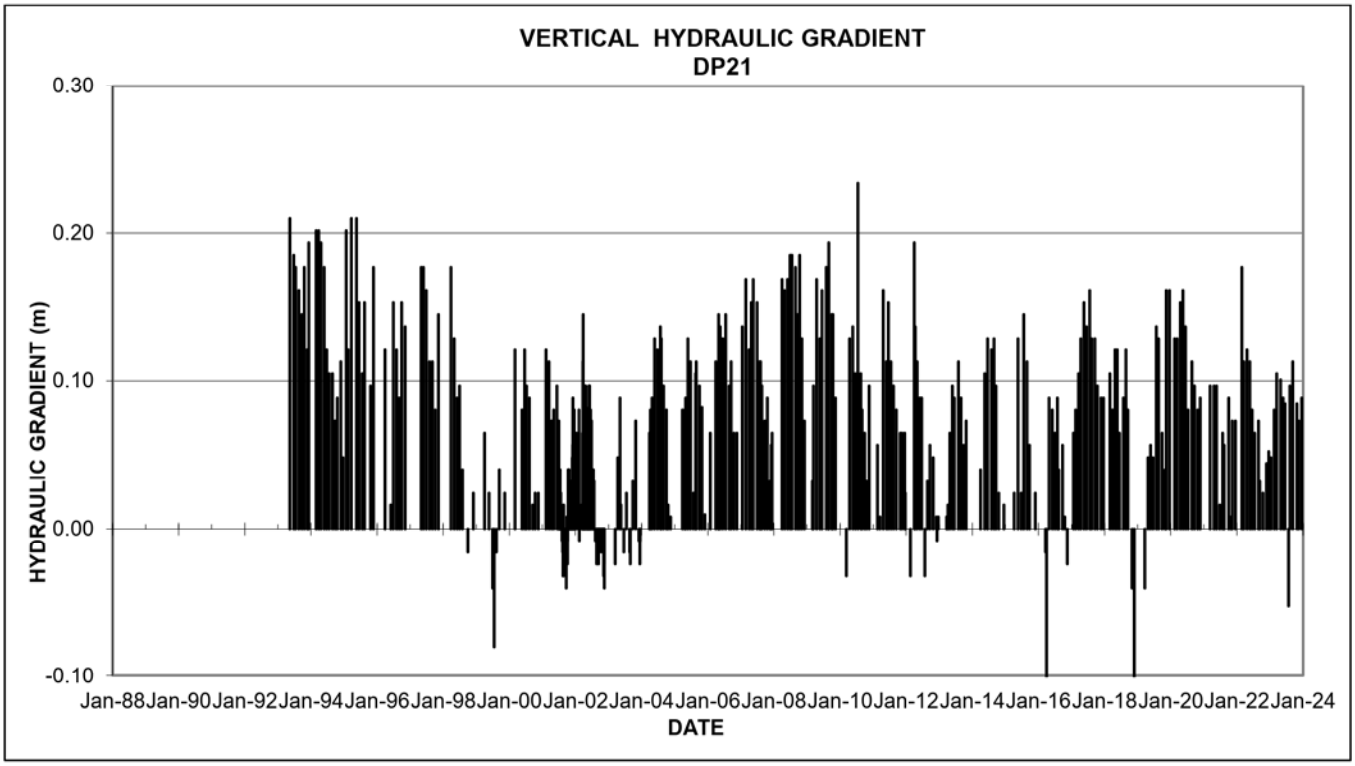

Figure 3-11: Hydraulic Gradient at Stream Drive Point Station DP21

Groundwater Temperature For In-Stream Drive Points

An example of a thermograph from one in-stream drive point (DP2) is provided in **Figure 3-12**. This figure illustrates the relationship between surface water and groundwater temperatures. The water temperatures at the Mill Creek drive points show the following general seasonal patterns:

- A wide seasonal variation in the surface water temperatures, which are low in the winter and high in the summer, is observed. In 2023, the surface water temperature ranged from 1.5°C to 21.4°C, which was within the historical range.
- Whereas there is a somewhat smaller seasonal variation in groundwater temperatures recorded (historically between 2°C and 21°C when all drive point monitors are considered), this is still considered to be a wide seasonal variation for typical groundwater. It is noted, however, that thermal transfer from the creek surface water will affect the shallow groundwater temperatures at the drive points. In addition, the amount of monitor development that is completed before a groundwater temperature reading is taken can affect the value. The groundwater temperatures at the creek drive points in 2023 ranged from 1.7°C to 19.8°C.
- Along Mill Creek downstream of Highway 401 in 2023, vertical gradients were generally upward, and groundwater discharge provided a cooling influence on creek temperatures during the warm summer months, and a warming influence during the cold winter months.
- The temperature patterns for 2023 shown on the thermographs are generally consistent with historic patterns. The average 2023 groundwater temperatures at DP1, DP2, DP3 and DP17-R were higher than the historical averages, while the average 2023 groundwater temperatures at the remaining drive points

were lower than the historical averages. The average 2023 surface water temperatures at DP1, DP2, DP5CR, DP18 and DP19 were higher than the historical averages, while the average 2023 surface water temperatures at the remaining drive points were lower than the historical averages. Compared to the historical averages (start of monitoring to 2022), the 2023 groundwater temperature averages differed by between -0.8°C and 1.1°C, and the surface water temperature averages differed by between -0.5°C and 0.7°C.

Thermographs for all creek drive points are included in Technical Appendix B.

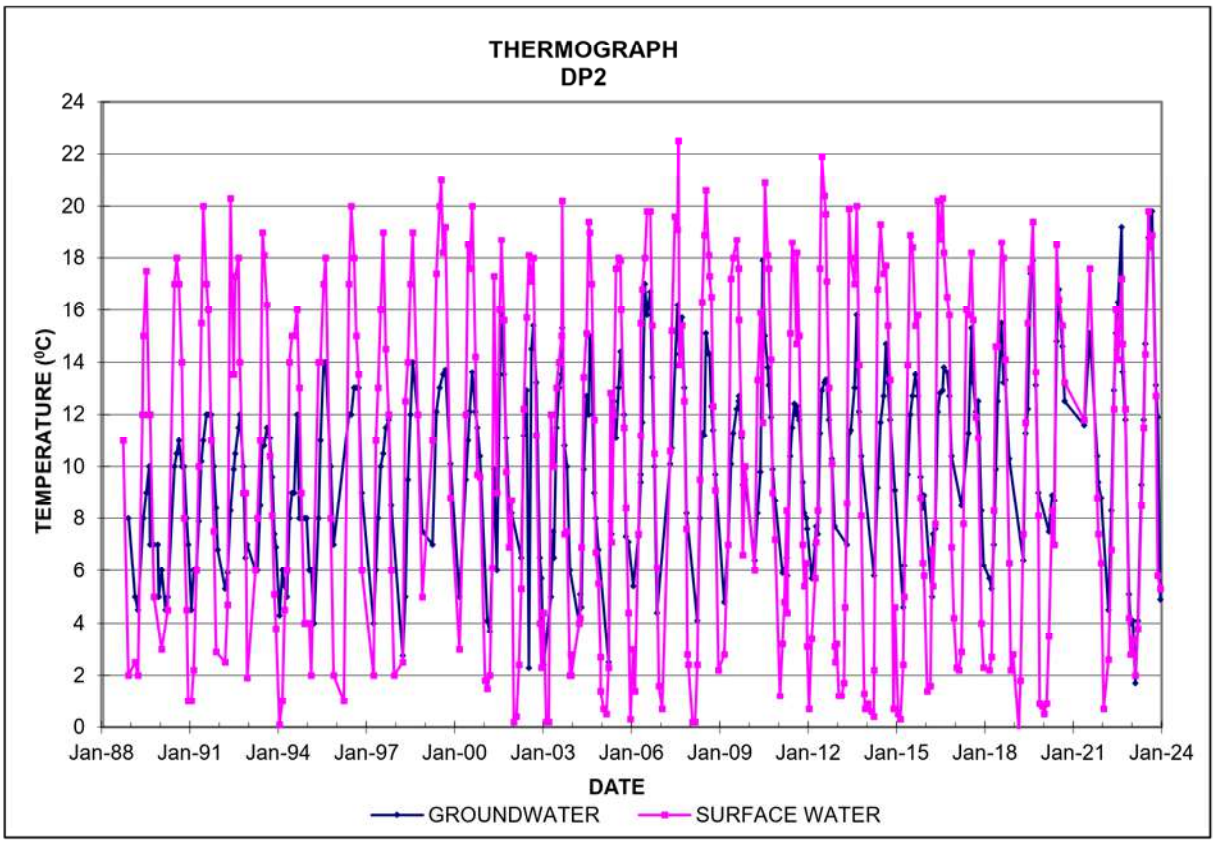

Figure 3-12: Thermograph for DP2

3.2.5 Compliance With Interim Threshold Values

The early warning and interim threshold values, which came into effect on June 30, 2001, are based on maintaining positive seasonal hydraulic head gradients across the water table between specific monitor pairs, such that a positive hydraulic gradient continues to exist from the site toward Mill Creek. In other words, the groundwater levels should be lower at locations closer to Mill Creek.

Maximum and minimum elevations with associated early warning values are defined for each pond. The interim threshold and early warning values generally are based on a review of historic pre-extraction low water level data (where available) and are defined seasonally; pond threshold water level values do not change seasonally. Where necessary, threshold pairs have been modified over time to reflect extraction conditions and the removal of individual monitor locations.

It is noted that the groundwater levels in the in-stream drive points typically respond more rapidly to precipitation and snowmelt events than the deeper groundwater monitors. As such, occasionally, early warning and threshold value exceedances can occur due to these natural events.

A summary of the head differences for the monitor pair locations and pond elevations are illustrated in the following **Figures 3-13 to 3-22**. Where available, historical data are shown in the figures for comparison purposes. The six monitor pairs and the six ponds are briefly described below.

Overall, groundwater conditions remained within threshold limits in 2023, with the exception of an exceedance at two locations (92-12 to DP17R and DP6 to DP3) in July 2023, as further discussed below.

BH92-29 to DP1 (Figure 3-13)

This monitor pair replaced the BH92-30 to BH92-28 threshold pair in May 2012, as BH92-30 was removed during extraction activities in April 2012. This pair is located in the northwest corner of the site, south of the confluence between the Pond Creek tributary and Mill Creek. DP1 is an in-creek drive point located in Mill Creek near the western property boundary. There were no exceedances of the threshold values or the early warning values at this pair in 2023, with one exception. The head difference recorded on February 10 exceeded the early warning value. A similar exceedance was observed at the DP6 to DP3 well pair on this date, as discussed below. The exceedance is attributed to the lag in groundwater level response following a sizable precipitation event.

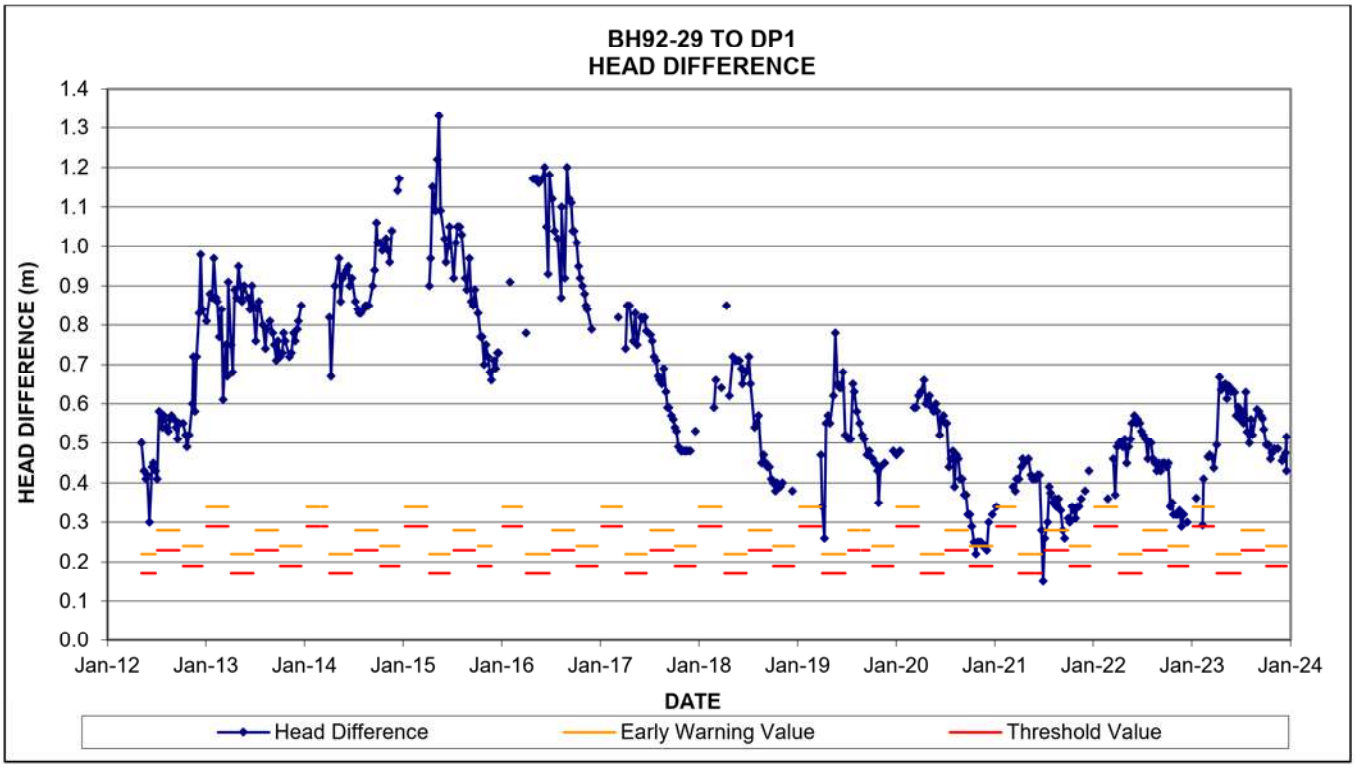

Figure 3-13: Hydraulic Head Difference for Monitoring Pair BH92-29/DP1; May 2012 to December 2023

BH92-27 to DP2 (Figure 3-14)

DP2 is an in-creek drive point located in Mill Creek at the western property boundary. There were no exceedances of the early warning or threshold values at this pair in 2023.

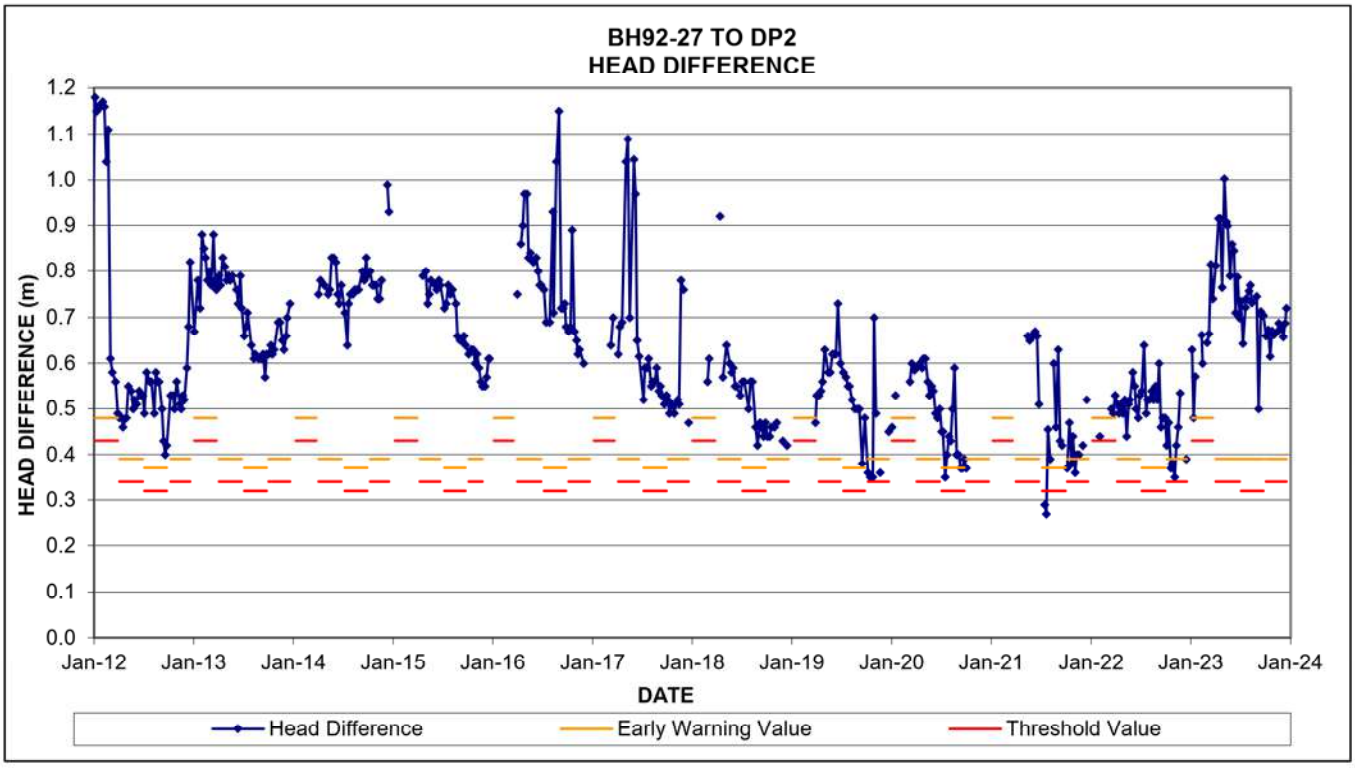

Figure 3-14: Hydraulic Head Difference for Monitoring Pair BH92-27/DP2; December 2011 to December 2023

OW5-84 to DP5C/CR (Figure 3-15)

This pair of monitors is located in the southwest corner of the site, adjacent to Mill Creek. OW5-84 is a groundwater monitor screened to about full depth in the aquifer, and is situated just inside the property line. The location of DP5 has been modified several times due to vandalism and access issues. DP5A was an in-creek drive point situated in Mill Creek just north of the bridge at Township Road 2. DP5B replaced DP5A in this threshold pair in December 2011 when DP5A became inaccessible due to landowner permission being withdrawn. DP5B, located south of the bridge, was vandalized in July 2012, and replaced with DP5C, which was installed slightly upstream from DP5B, but still south of the bridge. New (preliminary) threshold values were implemented for the OW5-84 to DP5C pair in September 2012. Based on hydraulic conductivity testing, it is interpreted that DP5C was installed in lower-conductivity soil that is not reflective of the sand/gravel aquifer in which DP5A and DP5B were developed. This condition would result in groundwater levels that do not respond to climatic conditions as quickly as nearby drive points screened in more representative soils with higher hydraulic conductivities.

DP5C was vandalised in Spring 2017 and replaced with DP5CR, which was installed at the location of DP5C. The early warning and threshold values were not exceeded at DP5C prior to the vandalism. Frequent exceedances of the early warning and threshold values at the OW5-84 to DP5CR pair occurred between the DP5CR installation in 2017 and 2021, which were considered to be “false” exceedances that were the result of the

observed hydrogeological variability at this location in Mill Creek. Revised early warning and threshold values were developed by WSP in 2021 and were approved by the MNRF in mid-2022.

There were no exceedances of the early warning values or threshold values at this pair in 2023.

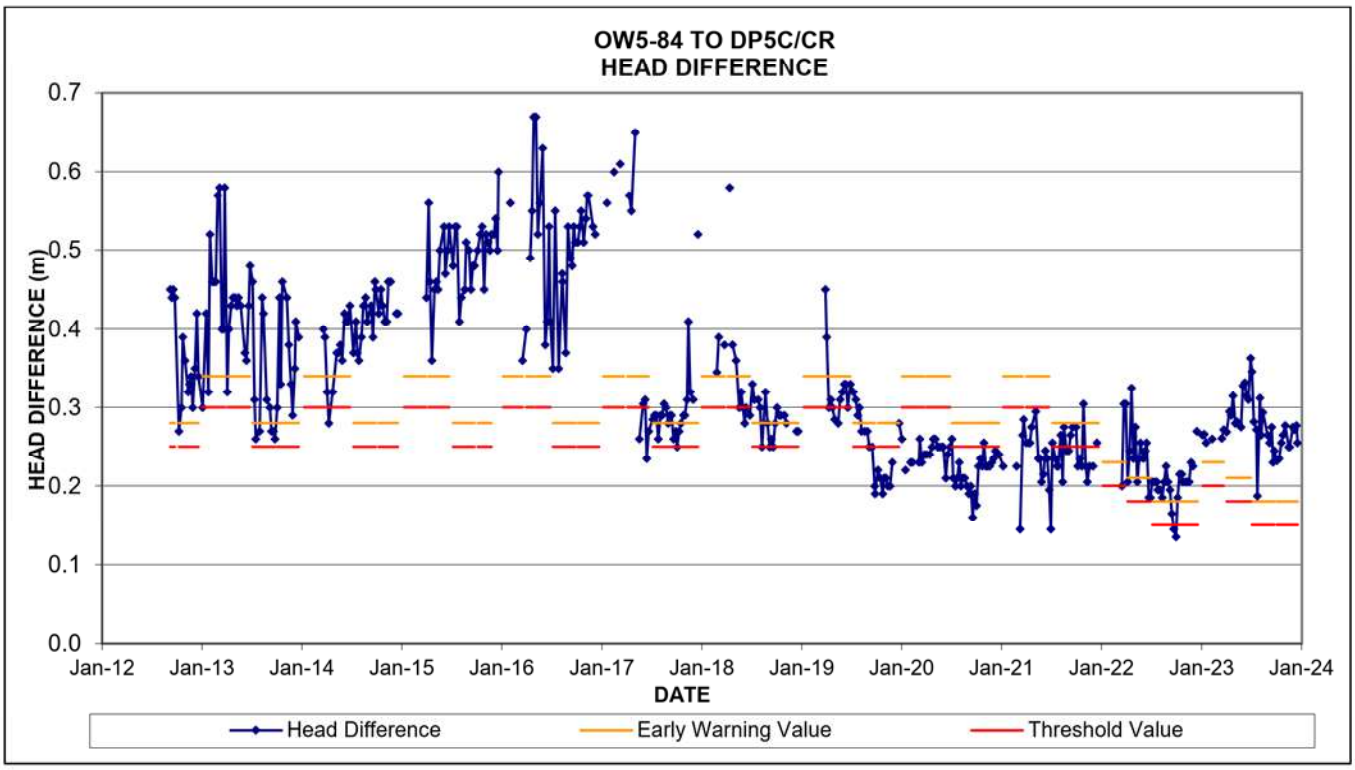

Figure 3-15: Hydraulic Head Difference for Monitoring Pair OW5-84/DP5C/CR; September 2012 to December 2023

BH92-12 to DP17/R (Figure 3-16)

BH92-12 was established in 2001 just outside the licensed area of extraction, west of Phase 5 (extraction began in the northeast corner of Phase 5 at the end of 2019). Monitor DP17 is an in-creek drive point located at the Hanlon interchange, upstream from DP3. The threshold values have not been exceeded since its implementation on June 30, 2001. The early warning and threshold values were not exceeded at this pair in 2023 with one exception. The head difference between the pair exceeded the early warning and threshold value on July 25, 2023 (0.04 m). As previously noted, it is interpreted that a notable precipitation event (>30 mm) occurred at the Site immediately prior to the July 25, 2023 monitoring event, as supported by high creek flows and flooding observed on July 25. Threshold exceedances have historically been observed at the Site as a result of the lag in groundwater level response following a large precipitation event. To confirm the threshold value exceedance, the head difference was measured again on July 26, 2023, after the storm surge had passed. The head difference on July 26 (0.36 m) satisfied the early warning and threshold values.

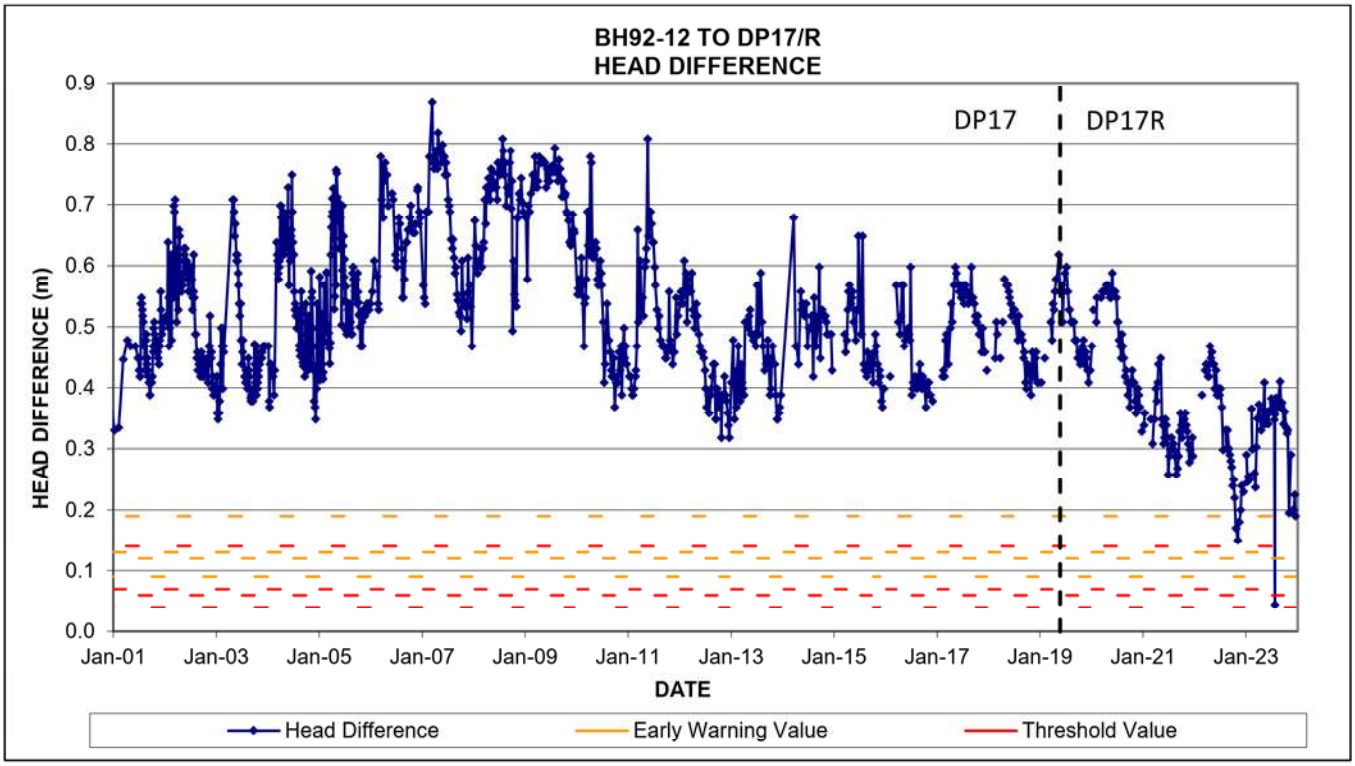

Figure 3-16: Hydraulic Head Difference for Monitoring Pair BH92-12/DP17/R; July 2000 to December 2023

DP6 to DP3 (Figure 3-17)

DP6 is located at the eastern limit of the central wetland area, adjacent to Phase 5, and DP3 is an in-creek drive point monitor located directly south of the Hanlon interchange. The head difference at the pair exceeded the early warning value on February 10, April 3, July 25 and July 26, and exceeded the threshold value on July 25. The daily climate data from the GRCA Shade's Mills climatological station indicates that large precipitation events were recorded prior to both the February 10 and April 3 monthly monitoring events. A total of 30.8 mm of precipitation was reported between February 9 and 10 and a total of 40.6 mm of precipitation was reported between April 1 and 2. As discussed above, a notable precipitation event (>30 mm) occurred immediately prior to the July 25/26 monitoring events. Therefore, the early warning/threshold exceedances are attributed to the lag in groundwater level response following notable precipitation events. To confirm the July 25 threshold value exceedance, the head difference was measured again on July 26, 2023, after the storm surge had passed. The head difference on July 26 satisfied the threshold value.

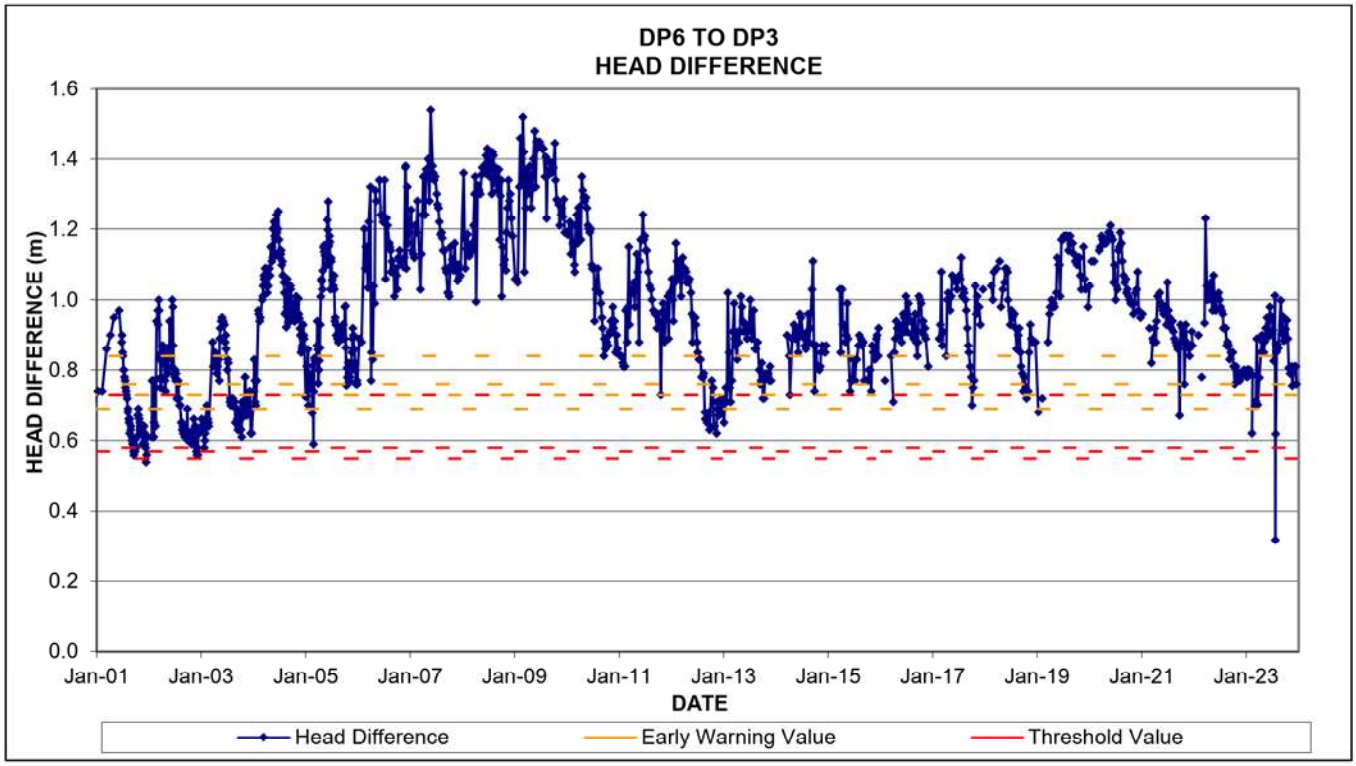

Figure 3-17: Hydraulic Head Difference for Monitoring Pair DP6/DP3; July 2000 to December 2023

BH13 to DP21 (Figure 3-18)

BH13 is located adjacent to the northern boundary of the property (north of Phase 5) and to the east of DP21. DP21 is an in-creek drive point monitor located immediately downstream of the property line, south of Highway 401. There were no exceedances of the threshold values or the early warning values at this pair in 2023.

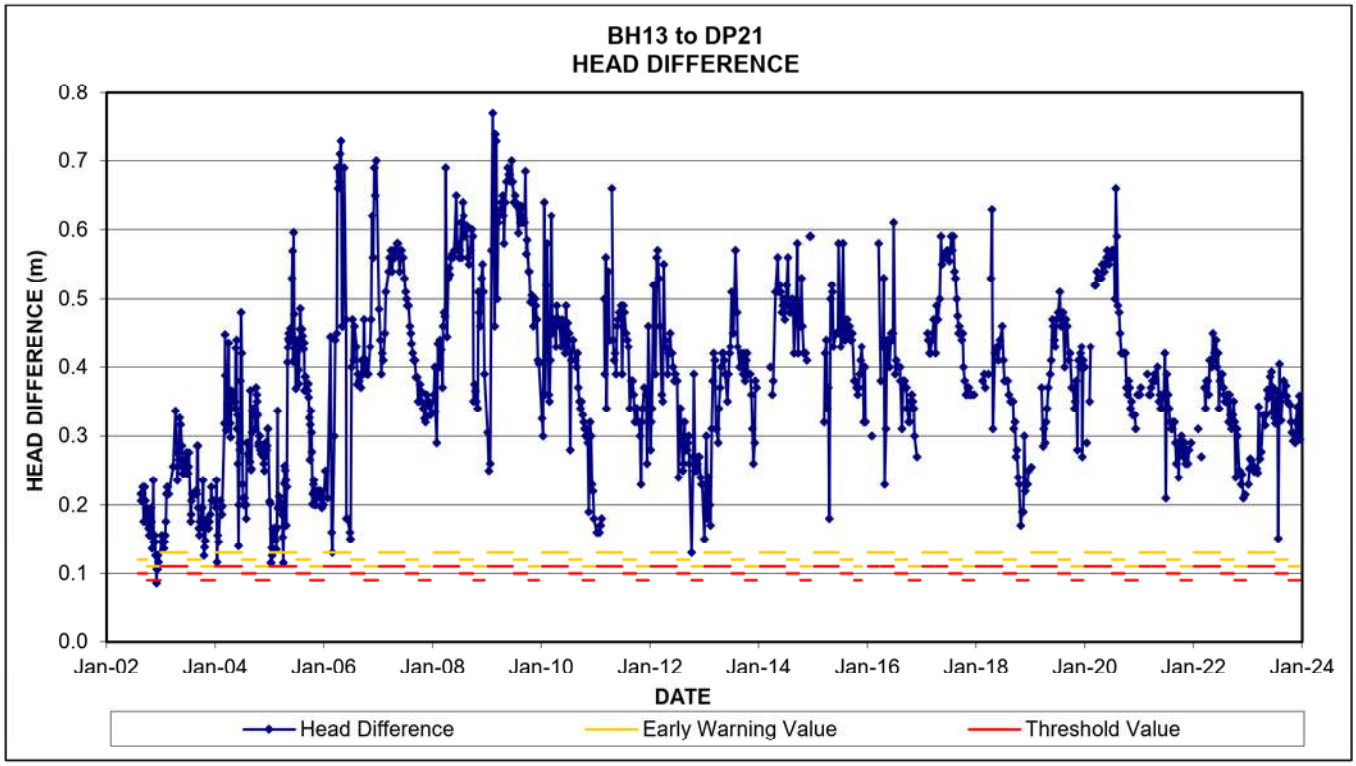

Figure 3-18: Hydraulic Head Difference for Monitoring Pair BH13/DP21; August 2002 to December 2023

On-Site Ponds (Figure 3-19)

The early warning and threshold values established for the Phase 1, 2, 3 and 4 ponds were not exceeded in 2023. The pond water levels typically decreased in 2020, 2021 and 2022, which reflects the lower precipitation amounts observed during that period. The 2023 pond water levels were similar to, or higher than, the levels observed from 2020 to 2022. In 2023, the pond levels remained within their respective historic range.

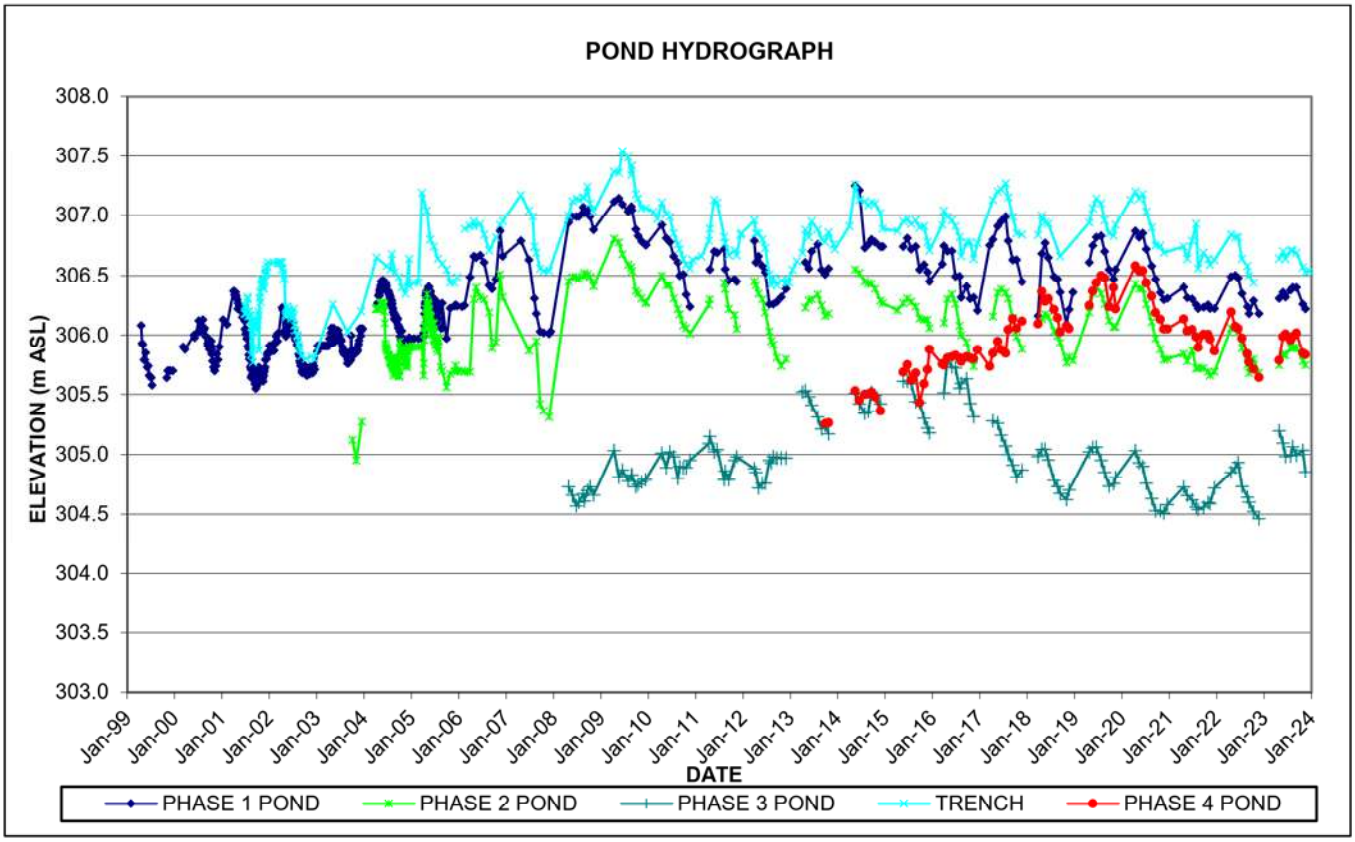

Figure 3-19: Pond Hydrograph; January 1999 to December 2023

3.3 Groundwater Contribution

Seasonal variation in stream flow is a reflection of normal long-term climatic seasonal variation, as well as specific climatic events.

During low flow periods, and in the absence of rainfall, stream flow is sustained by groundwater discharge to the creek. The groundwater discharge component of stream flow is termed base flow. Since base flow is derived from the groundwater flow system, which shows subdued seasonal changes compared to surface waters, the magnitude of the seasonal variation under base flow conditions will be less than that of the surface runoff component. In addition, since the temperature of groundwater, and particularly the deeper groundwater, does not fluctuate seasonally to anywhere near the same degree as does the surface water, the temperature of the groundwater discharge to the creek remains relatively more consistent.

Thus, groundwater discharge to the creek provides two important functions:

1. It provides base flow to maintain stream flow during low flow periods; and
2. It provides a cooling effect on the creek temperatures during the warm summer season, and a warming effect during the cold winter season.

Groundwater influx to Mill Creek is estimated at each drive point location for different flow conditions and the measurement interpolated for the stream sections between drive points. These calculations are presented in Technical Appendix B. The results of these calculations are summarized below in **Table 3-4**.

Table 3-4: Groundwater Influx (L/s) from the Mill Creek Aggregates Pit Property

	Historic Range (1989-1999)	Historic Average (1989-1999)	2023	2022	2021	2020	2019	2018	2017
Summer Low Flow Conditions (May to October)	15 - 24 L/s	18.9 L/s	29.6 L/s (May)	22.5 L/s (Sept)	27.7 L/s (May)	23.8 L/s (July)	23.1 L/s (Aug)	26.9 L/s (July)	28.2 L/s (Sept)
Winter Low Flow Conditions (November to April)	18 - 28 L/s	22.2 L/s	24.1 L/s (Nov)	23.4 L/s (Nov)	26.1 L/s (Nov)	25.3 L/s (Mar)	29.2 L/s (Apr)	26.0 L/s (Feb)	19.8 L/s (Dec)
Average		22.8 L/s	28.3 L/s	26.4 L/s	25.9 L/s	25.2 L/s	23.7 L/s *	28.9 L/s	27.3 L/s

* Data are interpreted with caution due to reduced flux values in the fall of 2019 due to beaver dam downstream of DP5CR

	2016	2015	2014	2013	2012	2011	2010	2009	2008
Summer Low Flow Conditions (May to October)	27.8 L/s (Aug)	29.2 L/s (Sept)	33.9 L/s (Aug)	24.1 L/s (Oct)	27.2 L/s (Aug)	33.0 L/s (July)	30.6 L/s (Aug)	26.4 L/s (Sept)	29.5 L/s (June)
Winter Low Flow Conditions (November to April)	26.2 L/s (Nov)	26.3 L/s (Dec)	25.2 L/s (Dec)	28.5 L/s (Apr)	21.6 L/s (Nov)	26.7 L/s (Mar)	35.1 L/s (Nov)	32.5 L/s (Nov)	31.7 L/s (Mar)
Average	27.5 L/s	29.0 L/s	30.3 L/s	28.3 L/s	25.6 L/s	34.6 L/s	35.7 L/s	33.0 L/s	31.5 L/s

	2007	2006	2005	2004	2003	2002	2001	2000
Summer Low Flow Conditions (May to October)	22.1 L/s (Sept)	24.7 L/s (Aug)	22.0 L/s (Oct)	23.8 L/s (Sept)	12.5 L/s (Aug)	16.1 L/s (Sept)	17.0 L/s (Aug)	21.7 L/s (May)
Winter Low Flow Conditions (November to April)	Not Available	25.2 L/s (Jan)	23.6 L/s (Nov)	22.1 L/s (Nov)	22.1 L/s (Apr)	24.5 L/s (Nov)	22.4 L/s (Apr)	26.5 L/s (Nov)
Average	26.9 L/s	27.6 L/s	26.7 L/s	27.3 L/s	19.9 L/s	22.6 L/s	24.1 L/s	25.5 L/s

The summer low flow groundwater influx values have fluctuated from 2004 to 2023. The calculated 2023 summer low flow groundwater influx (29.6 L/s) was about 57% higher than the historical average yearly summer low flow influx (18.9 L/s), which is based on the average of the yearly summer low flow data for each drive point for the period 1989 to 1999.

The winter low flow groundwater influx values increased from 2003 to 2010, decreased to 2012, and fluctuated from 2013 to 2023. The calculated 2023 winter low flow groundwater influx (24.1 L/s) was about 9% higher than the historical average yearly winter low flow influx (22.2 L/s), which is based on the average of the yearly winter low flow data for each drive point for the period 1989 to 1999.

The 2023 annual average influx (28.3 L/s) was about 24% higher than the pre-1999 historic long-term average influx (22.8 L/s). The higher values of groundwater discharge from 2004 to 2023 compared to the pre-1999 historic average are attributed to the consistently higher water level in the Phase 1 pond since 2004, and in the Phase 3 and Phase 4 ponds in recent years, and the resulting higher groundwater levels across the site.

The overall average groundwater influx to Mill Creek in 2023 was similar to the average historic conditions. An impact from aggregate operations at the Site on groundwater influx to the creek is not apparent.

3.4 Thermal Budget

The thermal effects on Mill Creek temperatures from the two tributaries, as well as the groundwater discharge component, are relatively significant during much of the year, based on the observed temperature differences between SWM1 (upstream) and SWM2 (downstream). Generally, during the summer low flow, those three sources of input water provide a cooling effect on Mill Creek. It is noted that canopy cover along some reaches also provides a cooling effect in Mill Creek during the summer months.

In 2023, the largest summer temperature difference between SWM1 and SWM2 (using average daily temperatures from data loggers) during routine monitoring events was noted on September 7, 2023. The mean temperature of the water entering the Mill Creek Aggregates Pit property at Highway 401 (SWM1) on September 7 was measured at 20.7°C. The mean water temperature in the creek leaving the property at SWM2 on September 7 was 19.4°C, which is 1.3°C lower than at SWM1. On September 7, the mean water temperature of Galt Creek (SWM4) and Pond Creek (SWM3) was 14.4°C and 12.4°C, respectively, which is strongly indicative of groundwater discharge into those tributaries.

The relative cooling effect of the two tributaries and groundwater on Mill Creek during the summer months was estimated during the period 2005 to 2012. Approximately 33% to 66% of the total temperature differential was attributed to the two tributaries, whereas approximately 34% to 67% was attributed to the combined groundwater discharge from both sides of Mill Creek. After 2012 stream flow monitoring in the two tributaries ceased so it is no longer possible to calculate the relative cooling effect of the tributaries compared with groundwater. However, there is no reason to believe that current conditions would differ substantially from the ranges of effect established during the period 2005-2012.

3.5 Summary of Groundwater Conditions

Monitoring results adjacent to the pond in Phase 1 indicate changes to the pond levels and local groundwater levels resulting from seasonal climatic variation, the pumping of water from the pond for aggregate processing, and the recirculation discharge of clean water back into the Phase 1 pond.

The water table in the wetland areas adjacent to Mill Creek continues to be at or near ground surface during the spring melt high groundwater conditions, with seasonal decreases in the order of 0.5 m over the course of the year.

From 2020 to 2022, groundwater levels in several monitors were lower compared to those recorded in 2019. Given the precipitation patterns described above, these lower groundwater levels experienced across the central and eastern areas of the site are not unexpected and are attributed to climatic conditions. In 2023, groundwater levels at the Site generally exhibited a recovery from the low levels observed in 2022, which is attributed to wetter climatic conditions.

In 2023, vertical gradients observed at the creek drive points south of Highway 401 were consistent with historical results.

The multi-level monitors within the sand and gravel aquifer continued to exhibit the general pattern of upward to neutral gradients, which is consistent with historic trends. Several observations of downward gradients also occurred in 2023, which is also consistent with historic trends. The groundwater temperatures at the multi-level

monitors showed a pattern similar to historic trends, with the shallow water temperatures exhibiting the greatest, and the deep temperatures showing the least, seasonal fluctuations. The multi-level monitor temperatures also show a time lag response pattern between the shallow, intermediate and deep profiles, which also is consistent with historic patterns.

The data from the Mill Creek drive point locations indicate that groundwater temperatures below the creek have generally increased over the long-term at the locations monitored. The rate of temperature change is similar at drive points located close to the Phase 3 pond (DP1, DP2) compared to the drive points far removed from the Phase 3 pond. As such, the data indicate that groundwater temperatures at the Mill Creek drive points have not been measurably affected by pit operations.

Shallow groundwater monitoring immediately downgradient of the pit ponds show the influence of the ponds on groundwater temperatures, but these temperatures quickly dissipate with distance from the ponds.

Exceedances of the Action Threshold Values established for the monitoring pairs located adjacent to Mill Creek occurred on one occasion (July 25) at two locations (92-12 to DP17R and DP6 to DP3) in 2023. The exceedances are attributed to a notable precipitation event and are not attributed to extraction activities at the Site, but are attributed to a lag in groundwater level response following a notable precipitation event. The head difference was measured again at both locations on the day following the original exceedance. The head differences on July 26 satisfied the Action Threshold Values, confirming that the original exceedances were temporary responses to a precipitation event.

Phase 1, 2, 3 and 4 pond water levels typically decreased from 2020 to 2022 and increased in 2023, which reflects precipitation patterns during that period. In 2023, the pond levels remained within their respective historic range and did not exceed their respective threshold values.

4.0 WATER QUALITY AND STREAM WATER TEMPERATURE

4.1 Surface Water Quality

4.1.1 Surface Water Quality Methods

For this report, water samples were collected by WSP on November 24, 2023 at the four surface water sampling stations (SWM1, SWM2, SWM3, and SWM4). A blind duplicate sample was collected at SWM1 and submitted to the laboratory as SWM5. Station locations are shown on **Figure 1**. Water samples were submitted to Bureau Veritas in Mississauga and analyzed for the following parameters:

- pH, conductivity, hardness
- total alkalinity
- nitrate, nitrite, ammonia
- total phosphorus, orthophosphate
- total organic carbon
- suspended solids
- chloride
- fecal coliform bacteria, Total coliforms and Escherichia coliforms (E. coli)
- biological oxygen demand, chemical oxygen demand

In addition to the field duplicate, the lab conducts its own internal QA/QC program which includes routine duplicate analysis, spiked matrix samples, spiked blanks, and method blank samples.

Water quality results for the period from 1993-2022 are found in Sub-Appendix A of **Technical Appendix C (Fisheries)**. Historical surface water quality data (pre-1993) are available in ESP et al. (1995). Groundwater chemistry is analyzed as part of the groundwater monitoring program (Technical Appendix B).

4.1.2 Surface Water Quality Results

The water quality monitoring program provides a snapshot of existing water quality conditions. Data for 2023 are provided in **Table 4-2**. The entirety of the data from 1993 to 2022 for water chemistry is provided in **Sub-Appendix A** of this report. Overall, the results indicate that water quality is similar within the Study Area, but the data do suggest possible influences from road salt and agricultural practices.

In 2023, the fecal coliform count ranged from 10 to 40 CFU/100 mL with no results exceeding the Provincial Water Quality Objective (PWQO) of 100 CFU/100 mL. These numbers have decreased from those reported in 2022 which results in a range of 10-120 CFU/mL. In 2022, SWM1 was recorded at 120 CFU/mL, exceeding the PWQO limits. However, this value has significantly decreased as of the 2023 results and the SWM1 station is now showing at 20 CFU/mL. The other sampling locations have shown steady low concentration values in 2022 and 2023.

For nitrate, there is no PWQO for the protection of freshwater biota, as it is relatively non-toxic to fish. There is a federal (Environment Canada) water quality guideline for nitrate of 12 mg/L and the Ontario Drinking Water Standard for nitrate is 10 mg/L. The concentrations of most of the water quality parameters are similar between the upstream (SWM1) and downstream (SWM2) limits of the Mill Creek property and follow concentration trends from previous years. The presence of nitrate in the two tributaries can be attributed to agricultural runoff in the watershed. In 2023, the highest nitrate level was observed at SWM3 (Pond Creek) with a value of 4.21 mg/L, which was similar to but lower than recent years (4.35 mg/L and 5.02 mg/L in 2021 and 2022, respectively) and is well below federal and provincial guidelines. In 2022 SWM4 noted an elevated level of nitrate at 4.72 mg/L, however 2023 levels have decreased to values similar to years 2021 and prior at 2.58 mg/L.

Like previous years, nitrite was not detected in 2023 (<0.010 mg/L).

Phosphorus levels in Mill Creek have varied historically from less than the analytical detection limits to exceeding the PWQO in different years. Total phosphorus was below detection limits (0.020 mg/L) at all sampling stations in 2023, remaining below PWQO limits (0.030 mg/L for streams).

The Canadian water quality guidelines for chloride for the protection of freshwater life are 640 mg/L (short term exposure of < 96 hrs) and 120 mg/L for long term or indefinite exposure (CCME, 2012). Chloride and conductivity were higher in Galt Creek (SWM4) relative to the other three stations (**Table 4-2**) which is consistent with previous years. The recent results show chloride concentrations in Mill Creek ranged from 33 mg/L at SWM3 to 88 mg/L at SWM4. Therefore, salt concentrations measured in Mill Creek are well below levels expected to impact fisheries.

The basic water chemistry of Mill Creek appears relatively unchanged over the past 30+ years, however, chloride and conductivity levels in Mill Creek appear to have gradually increased during the past 22 years. Prior to 1999, chloride levels in Mill Creek were consistently below 40 mg/L but are now routinely above 50 mg/L, with some recent values above 80 mg/L. Sampling has been conducted in November and December in recent years. It is likely that road salt has already been applied by this time and these changes are likely due to the influence of road salts applied within the watershed and entering the water system. Therefore, stream chloride and conductivity values could be influenced by seasonal conditions and time of sampling.

Conductivity values in Mill Creek are relatively high (typically greater than 650 µS/cm) for a surface stream indicating the high proportion of groundwater in the system. The higher conductivity in Galt Creek (SWM4) further emphasizes the strong groundwater influence on this small tributary.

Table 4-1: Mill Creek Water Quality November 24, 2023

	SWM1 Hwy 401	SMW2 (Boundary)	SWM3 Pond Creek	SMW4 Galt Creek	PWQO[1]	RDL[2]
All units are mg/L, unless otherwise indicated.						
pH (units)	8.34	8.33	8.35	8.30	**6.5-8.5**	**N/A**
Conductivity (mS/cm)	0.74	0.80	0.69	0.88	**-**	**0.001**
Hardness (mg/L as $CaCO_3$)	330	350	350	350	**-**	**1.0**
Alkalinity (Total mg/L as Ca CO_3)	270	270	280	270	**-**	**1.0**
Chloride	53	70	33	88	**-**	**1.0**
Nitrate (mg/L)	0.43	1.02	4.21	2.58	**See[3]**	**0.10**
Nitrite (mg/L)	<0.010/ND	<0.010/ND	<0.010/ND	<0.010/ND	**<0.1[4]**	**0.010**
Total Ammonia-N	<0.050	<0.050	<0.050	<0.050	**1.20**	**0.050**
Orthophosphate	<0.010/ND	<0.010/ND	<0.010/ND	<0.010/ND	**-**	**0.010**
Total Phosphorus	<0.020/ND	<0.020/ND	<0.020/ND	<0.020/ND	**0.030**	**0.020**
Total Organic Carbon	5.9	5.3	2.7	5.5	-	**0.40**
Total BOD	<2/ND	<2/ND	<2/ND	<2/ND	**-**	**2**
Total Chemical Oxygen Demand	17	18	11	16	**-**	**4.0**
Total Suspended Solids	<10/ND	<10/ND	<10/ND	<10/ND	**-**	**10**
Fecal Coliforms (CFU/100mL)	20	40	10	20	**100**	**10**
Total Coliforms (CFU/100mL)	610	480	610	310	**-**	**10**
Escherichia coli	<10	30	<10	10	**-**	**10**

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] RDL = Reportable Detection Limit
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)

N/A = Not Applicable ND = Not Detected

4.2 Groundwater Quality

4.2.1 Groundwater Quality Methods

Chemical analyses of groundwater and surface water were completed in March and November 2023 for samples collected from BH1-R, 92-32-III, and 92-8, and the Phase 1 pond. Samples were tested in the field for temperature, pH, and conductivity and then submitted to Bureau Veritas Laboratories for chemical analysis. Water samples were analyzed for major cations and anions, alkalinity, conductivity, pH, hardness, and oil and grease.

4.2.2 Groundwater Quality Results

The 2023 chemical results are generally similar to historic values, with some exceptions. Based on the 2023 chemical data, which are provided in Technical Appendix B, the following observations are made.

- Groundwater quality generally complies with the Ontario Drinking Water Quality Standards (ODWQS) for the parameters tested, except as outlined below.
  - BH1-R – hardness (March and November) and total dissolved solids (November)
  - 92-8 – hardness (March and November) and manganese (March and November)
  - 92-32-III – hardness (March and November) and manganese (March and November)

  Hardness, total dissolved solids and manganese are not considered to be health-related parameters. The standard for hardness is a guideline, which is established for parameters that need to be controlled to ensure efficient treatment of water supplies. The standards for total dissolved solids and manganese are aesthetic objectives, which are established for parameters that may impair the taste, odour, or colour of water. Hardness, total dissolved solids and manganese exceedances were observed historically at the property, both before and after extraction commenced. The elevated concentrations of hardness, total dissolved solids and manganese are attributed to natural conditions at the site.
- Over the short term, in 2023 the parameter concentrations were generally similar to the 2022 concentrations. The 2023 results from replacement well BH1-R were similar to the historical results from the original well (BH1).
- The concentrations of most parameters have been fluctuating slightly or have been relatively consistent over the long-term. Exceptions are (a) conductivity values (laboratory) and sodium and chloride concentrations at BH1/BH1-R (located at the eastern, upgradient, boundary of the property) and BH92-8, which have exhibited an overall increasing trend since the mid-1990s, and (b) sodium and chloride concentrations at Monitor BH8 I/92 32-III, which increased sharply in 2009, but have been stable or decreased in recent years. It is noted, however, that the following historically high concentrations were detected in 2023.
  - BH1/1-R: chloride (200 mg/L) in November, and conductivity (laboratory) (1,000 µS/cm) (both March and November)
  - 92-8: sodium (88 mg/L) in March, and potassium (3.3 mg/L) and conductivity (laboratory) (990 µS/cm) in November
  - 92-32-III: potassium (1.5 mg/L) in March
  - Phase 1 pond: potassium (3.7 mg/L) in March, sodium (95 mg/L) and chloride (180 mg/L), and conductivity (laboratory) (960 µS/cm) (both March and November)

The increasing sodium, chloride and conductivity concentrations may reflect road salting activities along Highway 401 and/or along the Township roads. As these increasing trends are observed at locations both upgradient and downgradient of the property, they are not attributed to operations at the Mill Creek Pit.

- Historically, and in 2023, with increasing distance downgradient across the site (from Monitor BH1/1-R/92-5 to 92-8 to BH8/92-32-III), detected parameter concentrations generally tend to either increase or fluctuate. Exceptions include sodium, potassium and chloride, which decreased across the site in 2023.
- Parameter concentrations in the Phase 1 pond are generally similar to values detected at Monitor BH1-R. The surface water quality complies with the Provincial Water Quality Objectives for the parameters tested in 2023.
- A concentration of total oil and grease (1.0 mg/L) was detected in the original sample collected from the Phase 1 pond in November 2023. A blind duplicate sample was collected from the Phase 1 pond during the November 2023 sampling event, and the blind duplicate sample was submitted for analysis of total oil and grease. The duplicate sample result (0.60 mg/L) confirmed the total oil and grease detection, but was reported at a lower concentration than the original sample. Occasional detections of oil and grease (up to 2.6 mg/L) have previously been reported at the Phase 1 pond.
- Trace concentrations of total oil and grease (1.2 mg/L – 2.0 mg/L) were detected at each of the three groundwater wells during the November 2023 sampling event. Similar detections have occurred historically.

4.3 Surface Water Temperature

4.3.1 Methods

Water temperatures in Mill Creek were measured with a thermistor within leveloggers installed at SWM1, SWM2, SWM3 and SWM4. Specifically, the loggers are in a 5 cm diameter steel pipe embedded into the stream bed approximately 1 m. Leveloggers rest on a bolt in the pipe and are at the substrate and water interface. Leveloggers were programmed to record water temperature every hour, continuously throughout the year. Temperature data were downloaded concurrently with water level data once per month.

4.3.2 Results

Water temperatures in the main channel of Mill Creek (SWM1 and SWM2) for the summer of 2023 are shown in **Figure 4-1** along with critical trout temperatures. The maximum recommended tolerable temperature for Brown trout is considered to be 26.8°C (Raleigh et al, 1986).

The maximum summer water temperature in Mill Creek in 2023 was 23.98°C at SWM1 on July 5 at 16:00 hours (**Figure 4-1**). The highest water temperature ever recorded in the Study Area was 27.9°C in 2002. The maximum surface water temperature in 2023 occurred the day after a two day long maximum air temperature which peaked at 29°C on July 4, and 31°C on July 5, 2021. Water temperatures relative to air temperatures are discussed in further detail in Technical Appendix A. The main branch of Mill Creek within the study area did not exceed the upper tolerable temperature for Brown trout (26.8°C) in 2023. However, the maximum temperature which Brook trout can tolerate is 24°C (Raleigh 1982) and this was very close to being matched but not exceeded on July 5, 2023 (**Figure 4-1**).

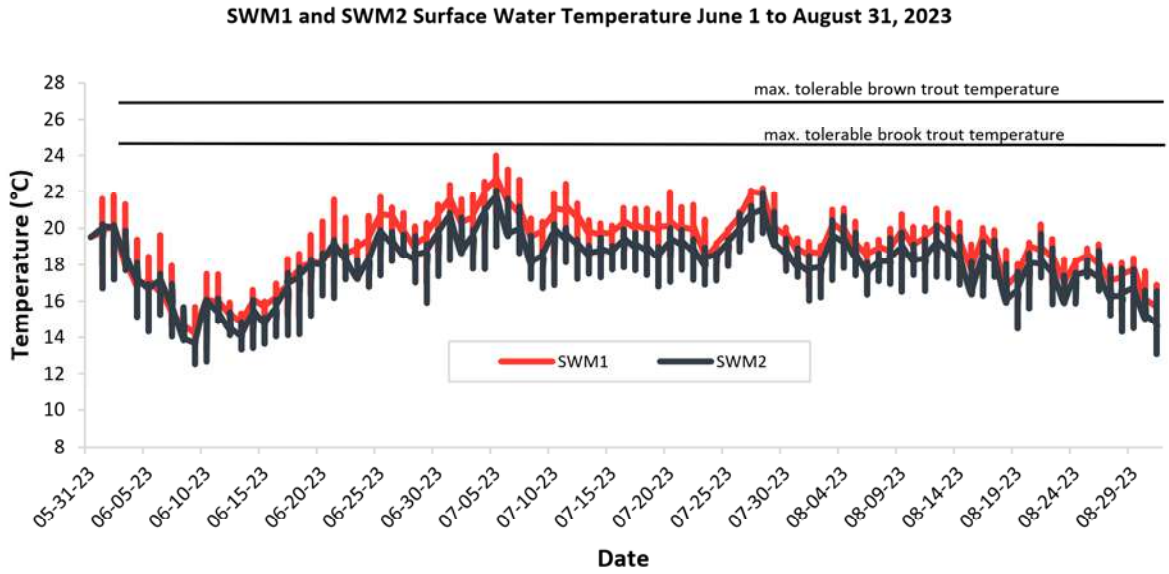

Figure 4-1: Thermographs from SWM1 and SWM2, for June 1 to August 31, 2023

Stream water temperatures have traditionally been cooler at the downstream SWM2 station compared with SWM1 and this trend continued in 2023. When the maximum water temperature occurred at SWM1 (23.98°C: July 5, 16:00), the temperature at SWM2 was 1.94°C lower (**Figure 4-2**). The maximum summer temperature at SWM2 in 2023 was 22.04°C, on July 5, at 20:00. The greatest temperature difference between SWM1 and SWM2 during the summer of 2023 occurred on June 21st at 15:00 when SWM2 was 3.34°C cooler than SWM1.

Surface water temperatures are cooler at SWM2 than SWM1 due to groundwater input, inflow of the two coldwater tributaries, and good shade from riparian vegetation within the University of Guelph reach down to Concession Road 2. The maximum summer temperatures in the two small tributaries were only 16.36°C (SWM3) and 16.95 °C (SWM4). Thus, through the conveyance from the coldwater tributaries, this reach of Mill Creek continues to protect and enhance the coldwater attributes of the stream and provides good habitat for Brown trout.

The continuous temperature recorders also illustrate the effect of diurnal solar warming on Mill Creek as the water temperatures gradually rise during the day and cool off at night. At SWM1 the temperature fluctuation was 2.5°C between July 5th and July 6th, following the maximum temperature. At SWM2 the temperature fluctuation was 2.1°C. At SWM3 and SWM4, the temperature fluctuation was 3.3°C and 0.9°C, respectively (**Figure 4-3**), again supporting the conclusion that the temperatures at SWM3 and SWM4 are controlled by groundwater inputs.

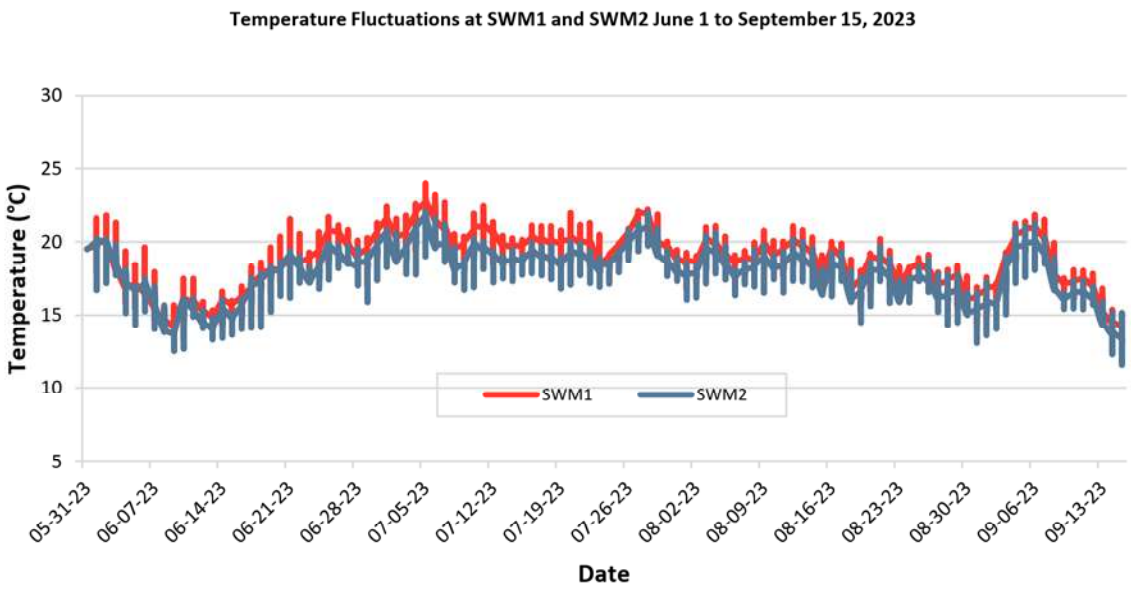

Figure 4-2: Diurnal Temperature Fluctuations from June 1 to September 15, 2023 at SWM1 and SWM2

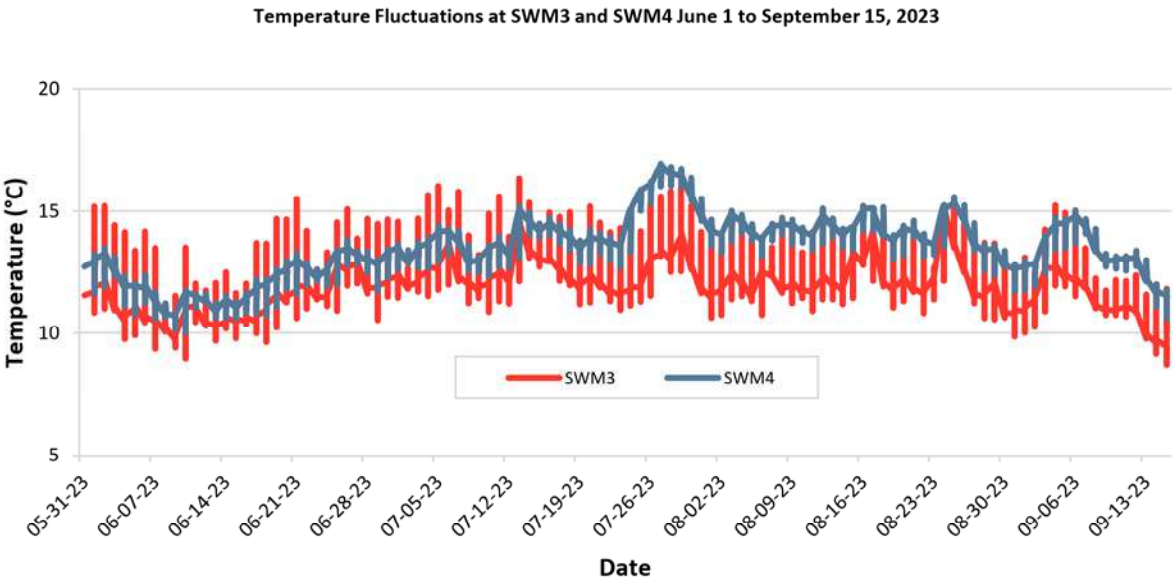

Figure 4-3: Diurnal Temperature Fluctuations from June 1 to September 15, 2023 at SWM3 and SWM4

The maximum surface water temperatures recorded at all four monitoring locations within Mill Creek since 1983 are illustrated in **Figures 4-4 and 4-5**, respectively. Surface water data were collected manually prior to 1997 and true maximum temperatures may not be represented by the dataset, since data were not recorded on a continual basis (sampling events were selected according to weather conditions). In addition, temperatures were typically recorded manually between noon and 15:00, but maximum temperatures can now be observed after 16:00.

Therefore, while water temperatures appear higher since 1998, maximum temperatures prior to 1997 may actually have been greater than those presented in **Figures 4-4 and 4-5**.

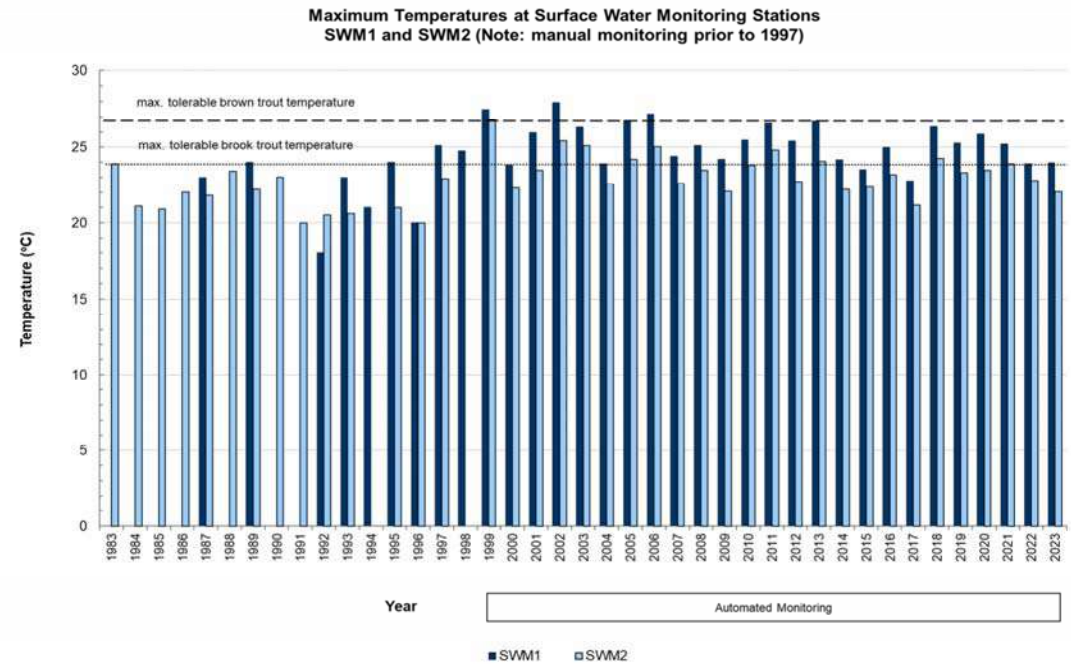

Figure 4-4: Historical Maximum Mid-Summer Water Temperatures in Mill Creek (1983 to 2023) at SWM1 and SWM2

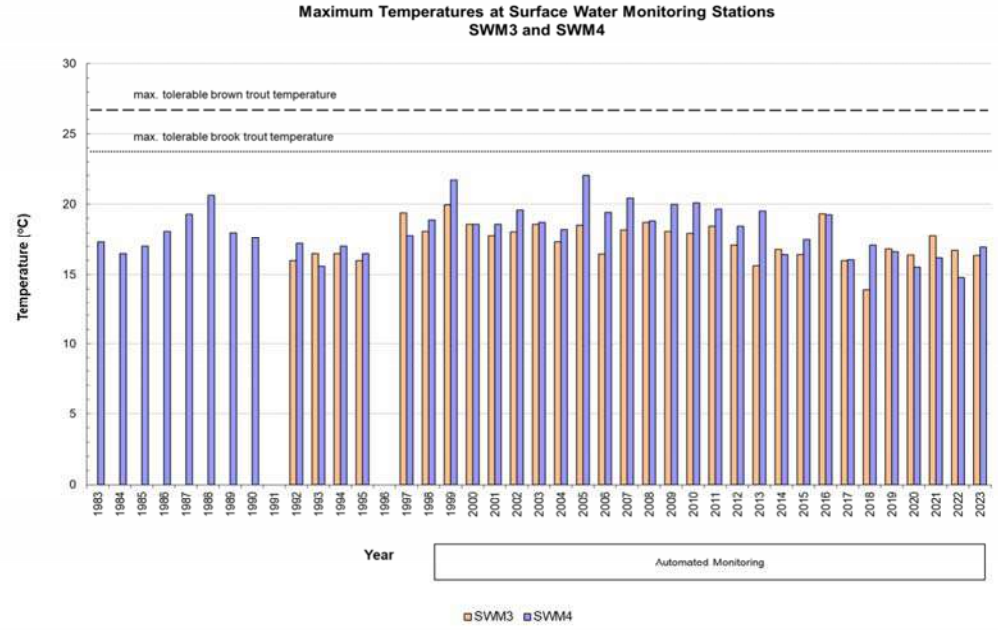

Figure 4-5: Historical Maximum Mid-Summer Water Temperatures in Mill Creek (1983 to 2023) for SWM3 and SWM4

5.0 FISHERIES

5.1 Methods

5.1.1 Redd Surveys

Trout redds have been counted in the study area over 41 years beginning in 1983. Although the staff have changed over the years, the redd surveys have continued to be conducted by experienced fisheries biologists who are familiar with the Study Area.

The annual Mill Creek Brown trout spawning (redd) survey was undertaken on November 24, 2023. The redds were recorded on spawning survey field sheets and compared to historical data. The location of each redd was identified by experienced fisheries biologists who are familiar with the Study Area, and classified as confirmed, probable, or a scrape. Generally, a trout redd is an obvious nest or disturbance in the substrate. WSP takes the assessment a step further, providing more detail in regard to the spawning evidence. A *confirmed redd* is a disturbance in the substrate and a sexually mature trout (determined based on general size) visually observed in close proximity; a *probable redd* has substrate disturbance but no fish visually observed; and a *scrape* is a less defined or small clearing of disturbed substrate with no fish visually observed. Brown trout redds are typically elongated scars in the streambed, characterized by a scour or hole in the substrate followed by a mound of substrate at the downstream end. Multiple redds have several scars and mounds created by more than one spawning pair. For comparison, Brook trout redds are smaller, rounder, and less obvious than Brown trout redds.

WSP conducted spawning surveys at the Hanlon Creek and University reaches of Mill Creek. Redd surveys are not conducted at the Bond Tract Station due to historic absence of suitable spawning habitat.

5.2 Results

5.2.1 Redd Surveys

The 2023 redd spawning survey indicated a total of 26 probable redds within the Mill Creek project limits. Historically the University section has higher redd counts, with the Hanlon section having lower counts. The 2023 redd surveys followed this trend with 16 redds noted in the University stretch, and 10 in the Hanlon stretch. The 2023 reported numbers shows that although the number increased slightly by 1 for 2023 at the University stretch, it went down from 15 to 10 in the Hanlon Stretch. Overall, the numbers are trending down and follow historical cyclic trends in the observations for both reaches (see **Figures 5-4 and 5-5**).

The lower number of scrapes noted in the 2023 survey may indicate the declining options for desirable spawning conditions as a result of sedimentation but may also be a result of the other factors impacting access to the spawning habitat (i.e., beaver damming downstream of the study limits). The highest number of redds recorded to date in this reach was 194 in 2010, and the lowest value on record was 9 total redds measured in 1984. Although redd counts are low, they are not below historic records and the water quality and temperate readings do not point directly to any concerns for the trout population beyond historic fluctuations in results.

The highest number of redds recorded to date in the Hanlon reach was 107 in 2016 which was also the first time that the number of redds in the reach exceeded the number of redds in the University reach. Although generally trending downward, the spawning results appear to be following historic trends similar to the University reach. The lowest redd count recorded for the project was 1, documented in 1988, and our recent 2023 results are still well above this historic low.

As previously discussed, a scrape is a less defined or small clearing of disturbed substrate with no fish visually observed. They could be indicators or redds being created but were then abandoned either due to fish being startled off, or the fish uncovered less then desirable spawning conditions in the substrate. 2020 was the first year in which scrapes had been recorded in the University and Hanlon sections, therefore it is unclear whether this is comparable to previous years; however, as more scrape data is recorded, trends may become evident. The number of scrapes in the University section was 6 in 2022 compared to 23 in 2021 and 18 in 2020. The number of scrapes in the Hanlon section in 2022 was 2, with 35 and 43 in 2021 and 2020, respectively. Due to an absence of scrapes none were recorded during the 2023 redd surveys. The lack of scrape presence may be due to a decrease in activity, as well as the survey being completed after the main trout migration causing the scrapes to be less identifiable. There are a number of variables that may be impacting the spawning conditions in the two reaches, but overall the results do appear to be following historic trends, and the water chemistry and temperatures of the two reaches have not returned any results that would suggest the spawning activity is being impacted by the Mill Creek Pit operation.

Redd survey dates and results are summarized in **Sub-Appendix B**. Redd surveys are not conducted at the Bond Tract Station due to absence of suitable spawning habitat.

In 2018 the very low numbers of Brown trout redds observed were largely attributed to the presence of beaver dams in the study reaches of Mill Creek. Beaver damming and sedimentation as a result of the dam release was observed in 2022 during the spawning season. Although no beaver dams were observed in the reaches assessed in 2023, the area has a lot of beaver activity and there might have been dams built beyond the study limits impacting flows. Since WSP's spawning surveys are only a once a year event, there may have been seasonal events like sedimentation from another dam release that also could have impacted spawning in 2023. WSP did report evidence of beaver presence in the reaches during the 2023 spawning surveys, although full dams impacting fish migration were not observed.

Beaver activity in Mill Creek is not new. A beaver dam was removed from the upper end of the University reach in July 2015. Beaver activity and dam development was observed again in 2017, 2018, 2020, and 2022. These structures caused decreased flow rates and flooding in the lower Hanlon reach, which already suffers from low flow rates and build-up of silt. Spawning generally does not occur in this area due to the sediment deposition and it has long been the recommendation of the monitoring team that rehabilitation work should be undertaken here.

In addition to the dams, the beavers have caused increased deadfall in the creek in the form of large trees as well as large expanses of shrubs and branches which have narrowed the width of the creek significantly near the upper end of the Hanlon reach. These woody debris jams may also have resulted in some redds being missed/obscured as staff had to move around large groupings of woody debris in sections of both reaches.

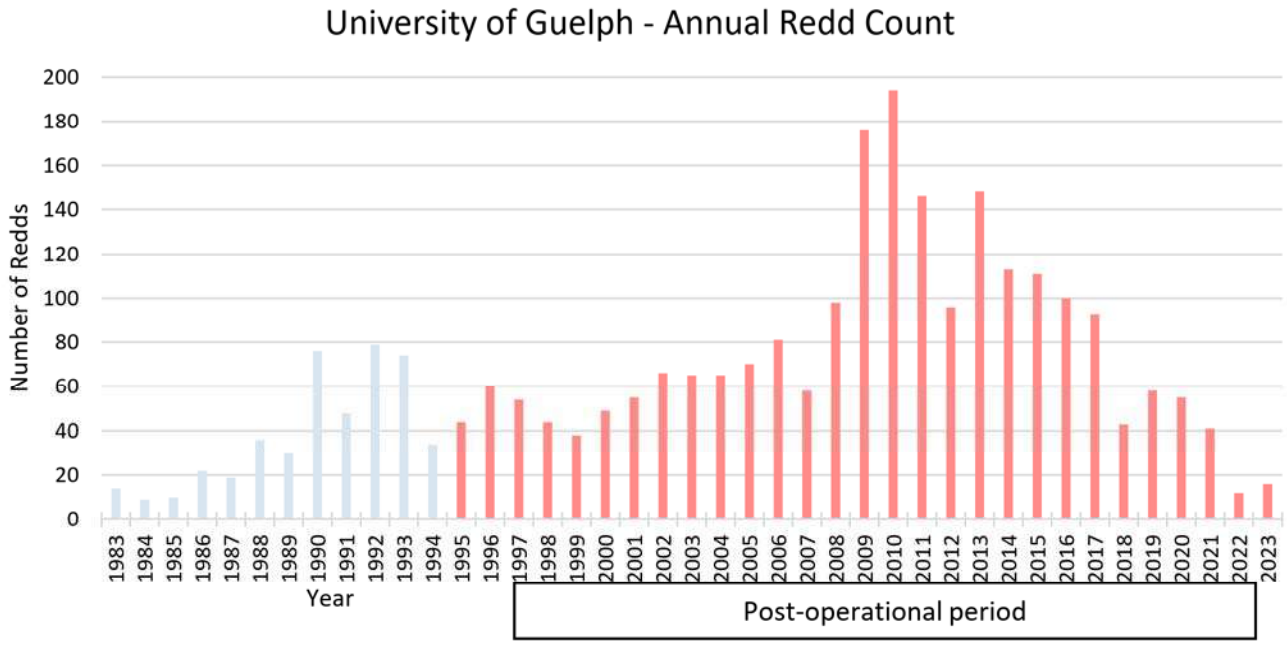

Figure 5-4: Annual Brown Trout Redd Counts in the University of Guelph Station

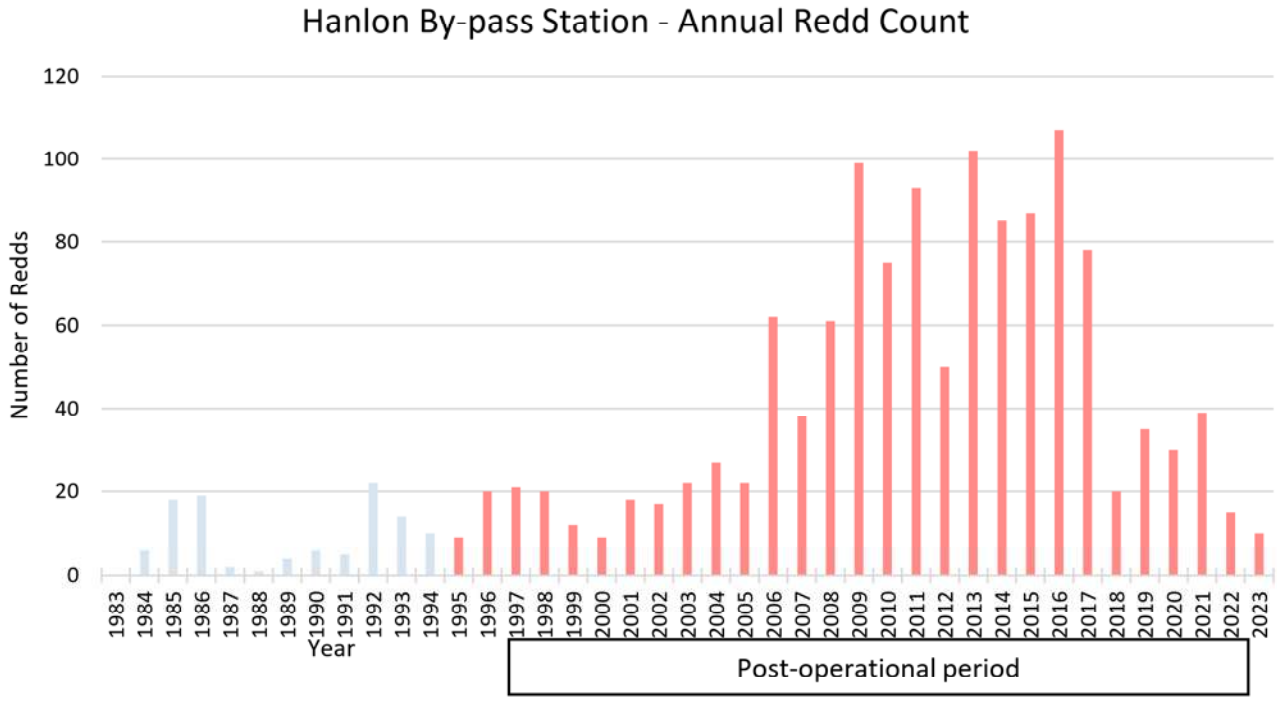

Figure 5-5: Annual Brown Trout Redd Counts in the Hanlon By-Pass Station

5.3 Summary of Redd Monitoring

This was the 41st consecutive year of trout redd surveys. Spawning activity as indicated by the observed number of redds has been trending downwards for the past 10 years. Typically, the University reach has higher spawning activity due to better habitat conditions, though in recent years the spawning data were comparable and showed a general cyclic pattern to the results that is consistent with historical observations. While the redd counts are more similar to numbers prior to the aggerate extraction below the water table, the 2022 Mark- Recapture fisheries monitoring program demonstrated that the Brown trout population within Mill Creek has remained healthy with high recruitment values suggest that spawning remains successful even if redd counts are down.

The results from 2023 provide further evidence that aggregate extraction below the water table (beginning in 1995) has had no measurable impact on the level of Brown trout spawning activity. Therefore, Dufferin Aggregates continues to be in compliance with Licence Condition #23, which states there must be no “net loss of the productive capacity of fish habitat in Mill Creek or its tributaries.”

6.0 SUMMARY

Site Conditions and Operations

- Extraction in 2023 occurred below the water table in Phase 2;
- Aggregate screening, crushing, washing, stockpiling and shipment occurred in Phase 5; and
- Naturally occurring fines removed by washing were deposited in Silt Pond 4.

Climate

- Mean monthly air temperature in 2023 was equal to the 30-year average of 8.3°C;
- Total precipitation in 2023 was 983 mm, which is 5% higher than the 30-year average of 935 mm; and
- In 2023, monthly precipitation was higher than the 30-year normal amount during five (5) months, while the monthly precipitation was below the 30-year normal during the remaining seven (7) months.

Hydrology

- The surface water monitoring completed in 2023 confirmed that surface water levels and temperatures were within historical ranges, and indicate that aggregate extraction has not affected stream flow in Mill Creek;
- The calculated minimum and maximum instantaneous flow rates at SWM2 were within the historical range observed since 2000;
- The 7-day low flow value at SWM2 (0.120 m^3/s) was observed in June and was within the range of the historical minimum 7 day low flow values recorded since 2000;
- Stream flow in Mill Creek responded to climatic conditions including precipitation events, periods of snow melt and periods of low precipitation; and
- Considering the extensive history of surface water monitoring data demonstrating a lack of surface water flow impacts by the pit operations, consideration should be given to reducing the surface water monitoring program.

Groundwater

- The head difference at the 92-12 to DP17R and DP6 to DP3 well pairs exceeded their respective Action Threshold Values on one occasion (July 25) in 2023. The exceedances are attributed to a notable precipitation event and not attributed to extraction activities at the Site;

- Water levels in the Phase 1 to Phase 4 ponds were within historical ranges and are reflective of precipitation;
- The estimated groundwater contribution from the Mill Creek Aggregates Pit property located north of Township Road 2 was similar in 2023 compared to the historic average;
- In 2023, vertical gradients observed at the creek drive points located south of Highway 401 were consistent with historical results;
- The calculated net water surplus for 2023 was 381 mm, which is 77 mm (25%) higher than the 30-year average surplus of 304 mm;
- Groundwater temperatures at the monitoring stations closest to the Phase 1 and 3 Ponds were influenced by water temperatures in the ponds, which is not unexpected; however, groundwater temperatures rapidly moderate away from the ponds and do not impact water temperatures in Mill Creek;
- Groundwater patterns at the Mill Creek site have been influenced by climatic conditions and the presence of beaver dams in recent years. Groundwater quality has generally remained consistent over the years. Some Ontario Drinking Water Quality Standards were exceeded due to natural conditions in the area, which is consistent with previous findings; and
- No changes to the groundwater monitoring program are recommended for 2024.

Mill Creek Water Quality and Temperature

- Surface water quality has remained relatively stable over the past decade. In recent years there have been signs of increasing conductivity and chloride levels which is not related to pit activities, and may be attributed to road salting activities;
- The maximum stream temperatures in 2023 were 23.98°C at SWM1 on July 5, 2023 and 22.04°C at SWM2 on July 5, 2023; which are within historical ranges and below historical highs;
- The upper tolerable temperature for Brown trout (26.8°C) was not exceeded at any of the monitoring stations during the summer of 2023;
- The upper tolerable temperature for brook trout (23.9°C) was close to being matched but not exceeded on July 5, 2023 at SWM1; and
- During the spring, summer and fall months, stream temperatures continue to decrease across the University property due to a combination of input from two coldwater tributaries, groundwater input, and shading which continue to enhance the coldwater fish habitat attributes of the stream.

Fisheries

- Brown trout spawning activity in 2023 continues to be on the low side in both the University and Hanlon reaches;
    - The number of redds in the University section was 16 in 2023, compared to 11 in 2022, 41 in 2021, and 58 in 2020;
    - In the Hanlon section, the redd count was 10 in 2023, compared to 15 in 2022, 39 in 2021, and 30 in 2020;
- Spawning activity as indicated by the observed number of redds has been trending downwards for the past 10 years. With the 2023 spawning results aligning with cyclical historic trends in Mill Creek, representing the dip in the cycle.
    - Water chemistry and temperature monitoring results do not suggest that the habitat suitability has changed significantly, and there are no concerns for the trout population within Mill Creek as the results from 2023 are will within historic trends for the watershed.

General Conclusion and Recommendations

- The available monitoring data do not indicate that the Mill Creek aggregate operation negatively impacted the local environment in 2023.

7.0 THRESHOLD AND REQUIRED ACTIONS

7.1 Thresholds

The action thresholds for the threshold pairs/locations, as proposed in the Monitoring Program, are presented in **Table 3-2**.

7.2 Action Response For Groundwater Threshold Pairs

Early Warning Value Exceedance

Included in **Table 3-2** is a summary of the early warning head difference values at each threshold pair. In the event of an exceedance of an early warning value, the following internal response protocol would be followed.

- Verify the water level data at the subject monitor pair within two days;
- If the head difference is confirmed to be less than the early warning value, the monitoring frequency will be increased to twice per week in the general vicinity of the monitoring pair;
- Concurrent with the intensified monitoring frequency, the extraction and processing operations will be reviewed with Dufferin Aggregates to determine if there is an obvious cause for the decline in head difference between the monitors. If such a cause is identified, it will be rectified as quickly as possible; and
- Monitoring will continue at the intensified frequency to establish a trend in the water levels, and to determine the cause of the problem (e.g., low stream flow upstream of the threshold pair, high rate of extraction, interruption of pumping cycle, abnormally dry season, etc.), and the degree of impact likely to ensue from an exceedance of the threshold. Groundwater discharge gradient conditions at the drive point monitors will be reviewed as part of the assessment.

In the event that the trend in the water levels indicates that the threshold value could be exceeded, Dufferin Aggregates will prepare and, if necessary, implement mitigation measures to prevent an exceedance of the threshold. Potential mitigation measures include the following.

- Relocation of extraction operations to another phase;
- Recharge injection wells or trench;
- Groundwater barrier wall (silt pond extensions);
- Pumping water from one of the on-site ponds to flood a particular area;
- Suspend extraction activities;
- Develop a groundwater source in the bedrock aquifer; and
- Divert a portion of the peak flows from Mill Creek into the on-site pond(s) to raise water levels. This approach is to be reviewed with agency staff to determine if it is feasible/appropriate.

Some mitigation measures will require approval by MNRF by way of an amendment to the site plans.

MNRF will be contacted prior to the implementation of any additional mitigation measures. The initial results of the mitigation will be documented and submitted to MNRF within one month of implementation. Any additional actions that may be required will be agreed to with MNRF at that time.

Groundwater Threshold Exceedance

In the event that mitigation measures are not successful while extraction is occurring, and a threshold is exceeded for more than seven consecutive days, then below water table extraction will cease at that location and not begin again until that threshold shows recovery for seven consecutive days. Dufferin Aggregates will notify MNRF immediately if a threshold has been exceeded for more than seven consecutive days.

7.3 Pond Level Thresholds

Low-water level threshold values and early warning values have been established for the Phase 1, Phase 2, Phase 3, and Phase 4 ponds, as well as silt pond SP3, to ensure that water levels do not become so low that groundwater discharge to Mill Creek would be affected. The threshold values and early warning values are presented in **Table 3-2**.

8.0 MONITORING PROGRAMS AND RECOMMENDATIONS

Surface Water Monitoring

- Considering the extensive history of surface water monitoring data demonstrating a lack of surface water flow impacts by the pit operations, consideration should be given to reducing the surface water monitoring program.

Groundwater Monitoring

- Groundwater monitoring should continue at the established stations.

Fisheries Monitoring

- Surface water quality data should continue to be collected every year, in the fall, as in past years, with the next sampling period planned for fall 2024;
- The annual redd survey should continue to be conducted every year, with the next planned for the fall of 2024.
    - To help facilitate the redd surveys in 2024, it is recommended that some of the more cumbersome large fallen trees and woody debris in the study reaches be removed, as well as any reoccurring beaver activity and dam building should also be addressed prior to the initiation of the fall spawning run.
- WSP is of the opinion that increasing the time between sampling periods for the mark/recapture surveys would only provide positive support for the trout population by not stressing the population out during a low period in their reproductive cycle. Instead of completing mark/recapture surveys in 2024, they can be moved to 2026. By allowing the population to grow un-impacted for a couple of years, the young of year from 2022 will have a chance to grow to reproductive age and establish spawning patterns in the Mill Creek reaches assessed.

- It is recommended that updated habitat mapping could be essential in helping to determine any cause of the decline in redd counts in the past few years, and if the general habitat suitability for spawning has changed. It would also lay the groundwork for any mitigation and enhancement opportunities in the creek if deemed required by the agencies.

9.0 REFERENCES

Blackport, B. and Portt, C. 2002. Mill and MacCrimmon Creek Review of Flow Requirements for Fish Habitat. Draft Report Prepared for the Department of Fisheries and Oceans.

C. Wren & Associates Inc. and Jagger Hims Ltd. 2006. Pre-Phase 3 Coordinated Monitoring Programs for Mill Creek Aggregates, Township of Puslinch. Prepared for Dufferin Aggregates Ltd. January 2006.

Eagles Planning Ltd. 2011. Pre-Phase Four Compliance Report Biological Monitoring Activities on the Mill Creek Aggregates Site Puslinch, Ontario. Prepared for Dufferin Aggregates Ltd.

Eagles Planning Ltd. 2005. Pre-Phase Three Compliance Report Biological Monitoring Activities on the Mill Creek Aggregates Site Puslinch, Ontario. Prepared for Dufferin Aggregates Ltd.

Eagles Planning Ltd. 2002. Pre-Phase Two Biological Monitoring Report for the Mill Creek Aggregates Site. Prepared for Dufferin Aggregates Ltd.

Planning Initiatives, 1993. Co-ordinated Report on Monitoring Programs for Mill Creek Aggregates. November, 1993.

Raleigh, R.F. 1982. Habitat Suitability Index Models: Brook Trout, U.S. Dept. Int., Fish and Wildlife Service. FWS/OBS-82/10.24. 42 pp.

Raleigh, R.F., LAD. Zuckerman and P.C. Nelson. 1986. Habitat Suitability Index Model and Instream Flow Suitability Curves: Brown Trout. Biological Report 82(10.124) of the U.S. Department of the Interior, Fish and Wildlife Service (National Ecology Center).

Signature Page

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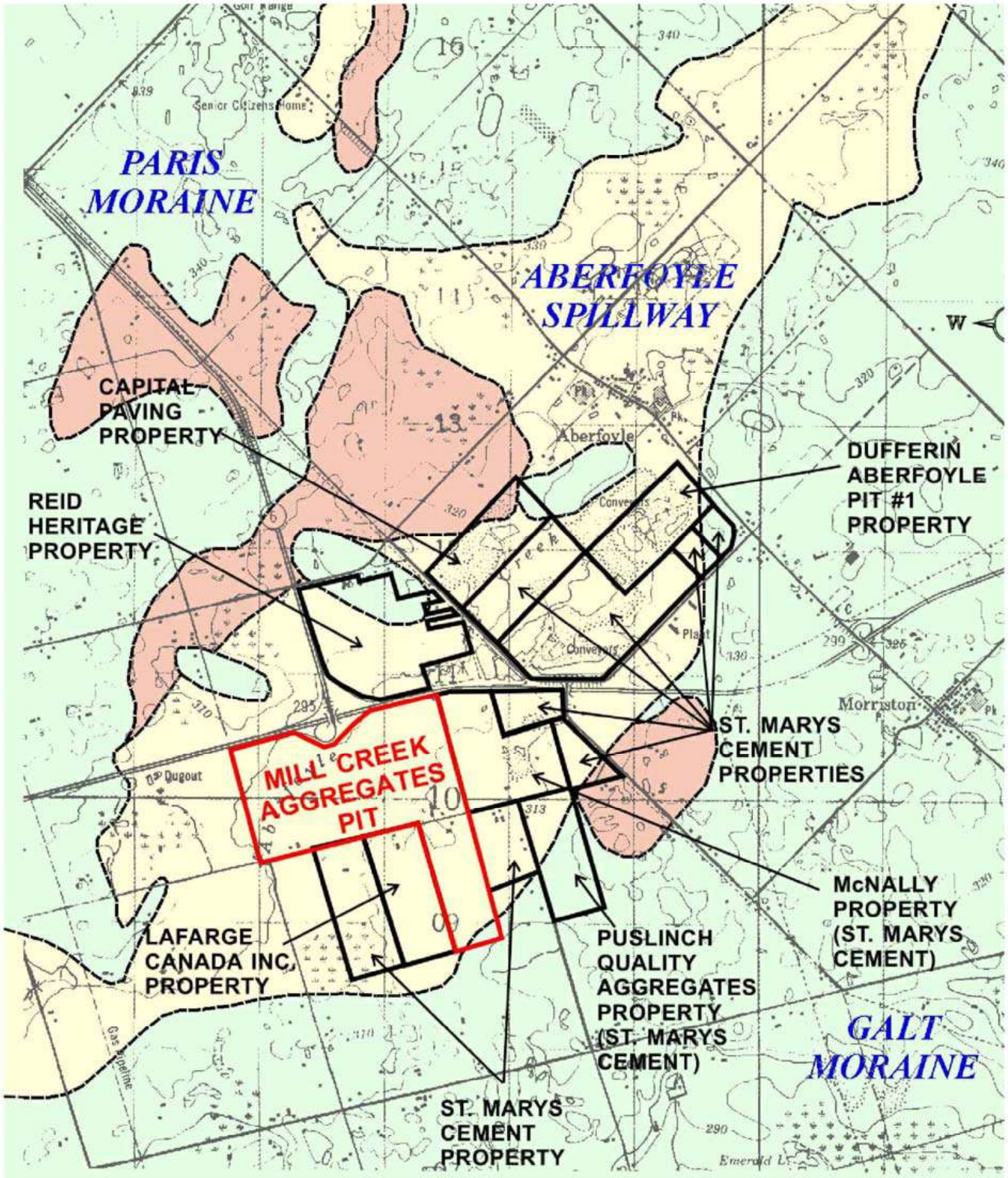
LK/RW/KL/rc

Figures



LEGEND

SANDY SILT TILL

ICE-CONTACT STRATIFIED DRIFT SAND, SILT, GRAVEL

OUTWASH SAND AND GRAVEL

0 1,000 2,000
1:50,000 METRES

REFERENCE(S)

GENERALIZED AFTER KARROW, 1987.

CLIENT
DUFFERIN AGGREGATES

PROJECT
2023 COORDINATED MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

CONSULTANT
wsp

YYYY-MM-DD	2024-03-06
DESIGNED	---
PREPARED	SC
REVIEWED	RW
APPROVED	RW

TITLE
LOCATION AND PHYSICAL SETTING

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0004	A	1

LEGEND

- BOUNDARY OF LICENSED PROPERTY
- LICENCED LIMIT OF EXTRACTION PER SITE PLANS
- BOUNDARY OF EXTRACTION AREA PER G.R.C.A. FILL PERMIT APPLICATION
- 3 PHASE DESIGNATION
- SP1 SILT POND DESIGNATION
- BERM
- INFILLED SILT POND
- PARTIALLY INFILLED SILT POND
- 2022 EXTRACTED AREA
- 2023 EXTRACTED AREA
- 2020-2022 DEPOSITION AREA
- 2023 DEPOSITION AREA

NOTE(S)

1. BASE MAPPING BY PLANNING INITIATIVES LTD., DATED AUGUST 1987, DRAWING NUMBERS 1A AND 1B OF 4.

REFERENCE(S)

1. POND BOUNDARIES BASED ON AERIAL PHOTOGRAPHY (DUFFERIN AGGREGATES, NOVEMBER 2020).

0 250 500
1:10,000 METRES

DUFFERIN AGGREGATES

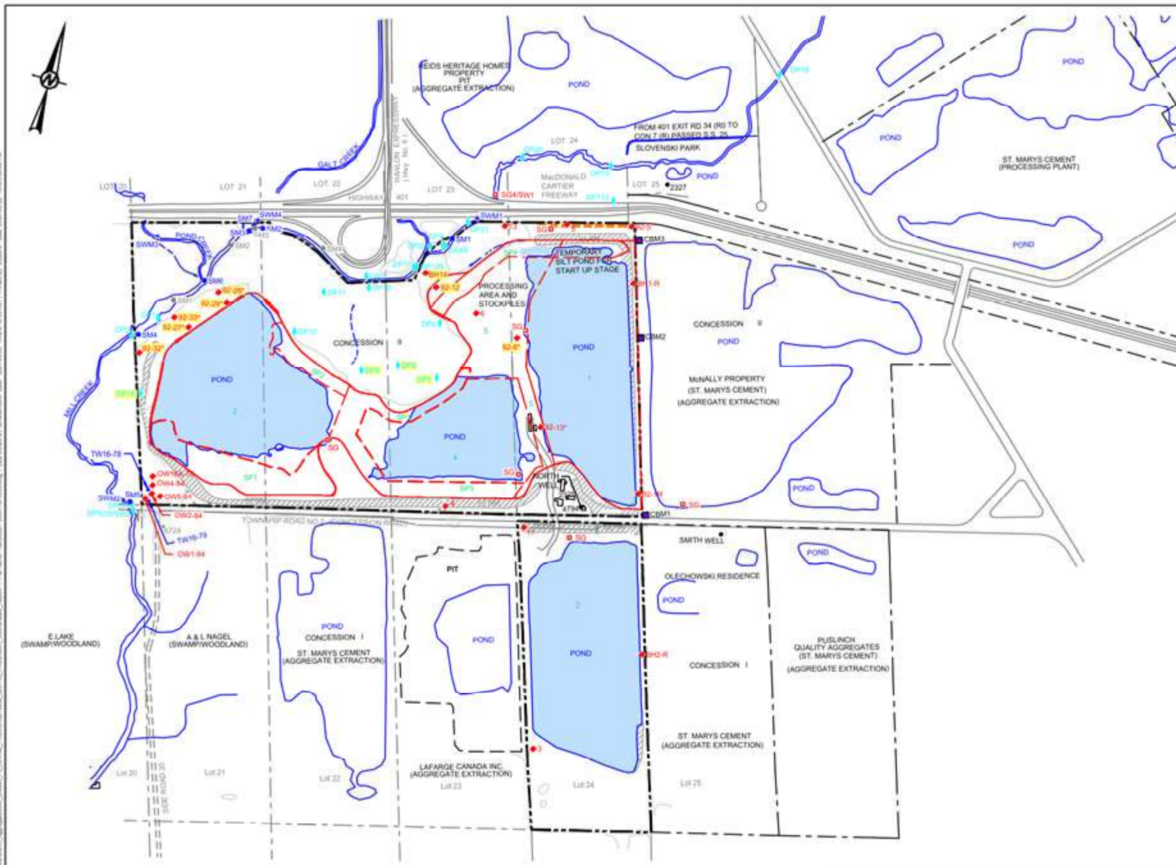
2023 COORDINATED MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

SITE PLAN SEQUENCING

2024-03-06	
—	
SC	
RW	
RW	

CONTROL CA0019938.6257-200 0004 A

FIGURE 2



LEGEND

BH2-R	BOREHOLE
	HYDRO/TELEPHONE LINE
	POST AND WIRE FENCE
	BUILDING
	TEST WELLS
	SURFACE WATER MONITORING STATION
92-28*	GROUNDWATER MONITOR AND DESIGNATION
*	DENOTES STANDPIPE MONITOR INSTALLED
	DENOTES DATALOGGER INSTALLED
SM1	STREAM QUALITY AND FISHERIES MONITORING STATIONS (WATER QUALITY BIOLOGICAL/FISHERIES AS PER FAUN AQUATICS REPORT)
DP9	DRIVE POINT
SG	STAFF GAUGE AND DESIGNATION
CBM1	CBM MONITOR AND DESIGNATION
SP1	SILT POND AND DESIGNATION
	WETLANDS
	POND
	NATURAL DRAINAGE
2327	WATER WELL WITH MOE IDENTIFICATION NUMBER
MILL CREEK	CREEK
	GATE
	WOODLANDS/FOREST (MIXED)
	BOUNDARY OF LICENCED PROPERTY
SM4	SEEPAGE METER DESIGNATION AND APPROXIMATE LOCATION (BY J. FITZGIBBON) (NO LONGER OPERATIVE)
	RECHARGE TRENCH
5	APPROVED PHASING

NOTE(S)

1. BASE MAPPING BY PLANNING INITIATIVES LTD., DATED AUGUST 1987, DRAWING NUMBERS 1A AND 1B OF 4.

REFERENCE(S)

1. POND BOUNDARIES BASED ON AERIAL PHOTOGRAPHY (DUFFERIN AGGREGATES, NOVEMBER 2020)

CLIENT
DUFFERIN AGGREGATES

PROJECT
2023 COORDINATED MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

CONSULTANT
wsp

YYYY-MM-DD	2024-03-06
DESIGNED	—
PREPARED	SC
REVIEWED	RW
APPROVED	RW

TITLE
GROUNDWATER MONITOR LOCATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
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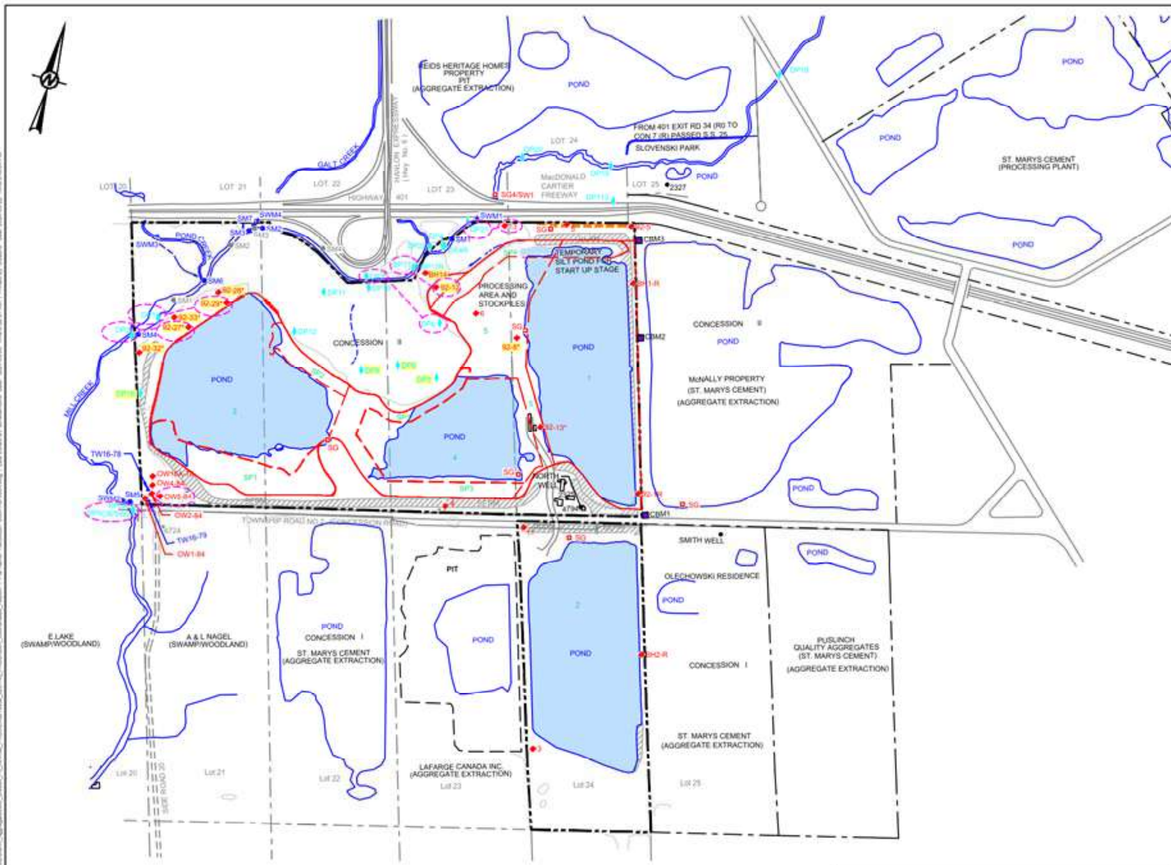

LEGEND

- GROUNDWATER THRESHOLD PAIRS
- BOREHOLE
- HYDRO/TELEPHONE LINE
- POST AND WIRE FENCE
- BUILDING
- TEST WELLS
- SURFACE WATER MONITORING STATION
- GROUNDWATER MONITOR AND DESIGNATION
- DENOTES STANDPIPE MONITOR INSTALLED
- DENOTES DATALOGGER INSTALLED
- STREAM QUALITY AND FISHERIES MONITORING STATIONS (WATER QUALITY BIOLOGICAL/FISHERIES AS PER FAUN AQUATICS REPORT)
- DRIVE POINT
- STAFF GAUGE AND DESIGNATION
- CBM MONITOR AND DESIGNATION
- SILT POND AND DESIGNATION
- WETLANDS
- POND
- NATURAL DRAINAGE
- WATER WELL WITH MOE IDENTIFICATION NUMBER
- CREEK
- GATE
- WOODLANDS/FOREST (MIXED)
- BOUNDARY OF LICENCED PROPERTY
- SEEPAGE METER DESIGNATION AND APPROXIMATE LOCATION (BY J. FITZGIBBON) (NO LONGER OPERATIVE)
- RECHARGE TRENCH
- APPROVED PHASING

NOTE(S)

1. BASE MAPPING BY PLANNING INITIATIVES LTD., DATED AUGUST 1987, DRAWING NUMBERS 1A AND 1B OF 4.

REFERENCE(S)

1. POND BOUNDARIES BASED ON AERIAL PHOTOGRAPHY (DUFFERIN AGGREGATES, NOVEMBER 2020).

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1:12,500 METRES

CLIENT
DUFFERIN AGGREGATES

CONSULTANT
wsp

YYYY-MM-DD	2024-03-06
DESIGNED	---
PREPARED	SC
REVIEWED	RW
APPROVED	RW

PROJECT
2023 COORDINATED MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
LOCATION OF GROUNDWATER THRESHOLD MONITORING PAIRS

PROJECT NO.	CONTROL	REV.	FIGURE
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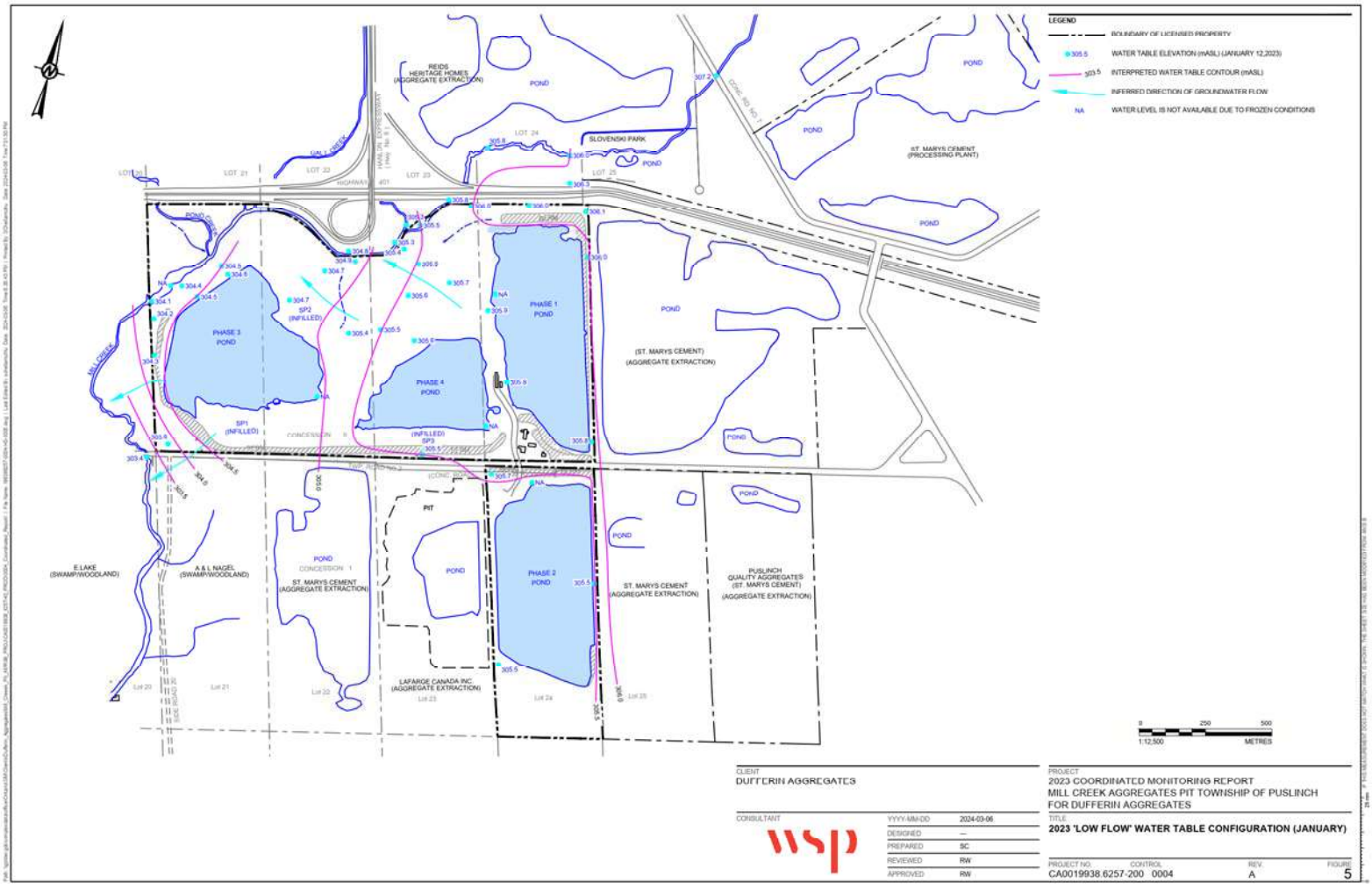

CLIENT
DUFFERIN AGGREGATES

CONSULTANT
wsp

YYYY-MM-DD	2024-03-06
DESIGNED	—
PREPARED	SC
REVIEWED	RW
APPROVED	RW

PROJECT
2023 COORDINATED MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
2023 'LOW FLOW' WATER TABLE CONFIGURATION (JANUARY)

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0004	A	5

APPENDIX A

Surface Water Report

APPENDIX B

Hydrogeology Report

APPENDIX C

Fisheries Report

wsp.com

REPORT

Mill Creek Aggregates Pit Surface Water

Appendix A of the 2023 Coordinated Monitoring Report

Submitted to:

Martin Bradley, Site Manager, Mill Creek Pit

Dufferin Aggregates
A CRH Company
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Submitted by:

WSP Canada Inc.
55 King Street Suite 700
St. Catharines, ON L2R 3H5

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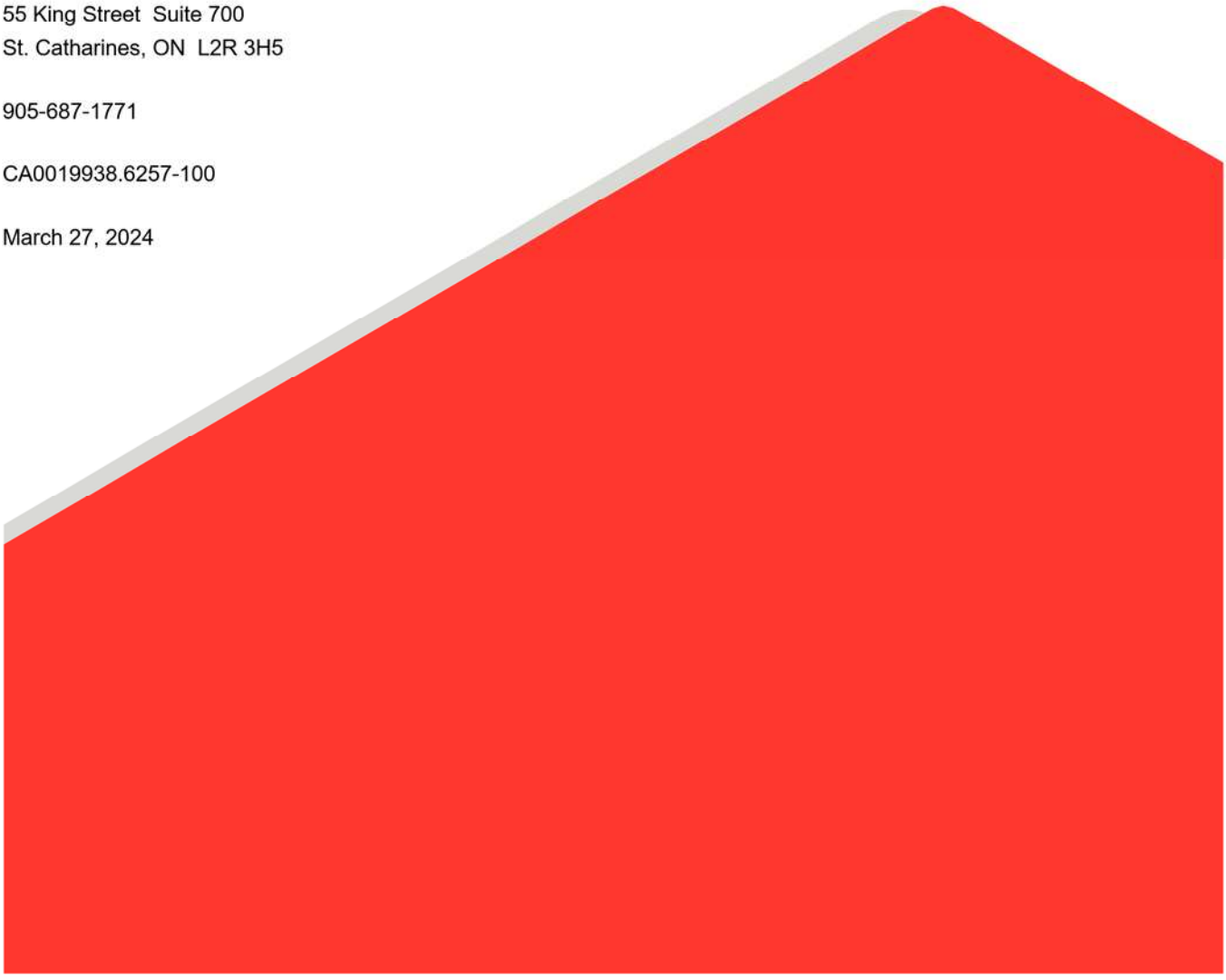
CA0019938.6257-100

March 27, 2024



Distribution List

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FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 Background

The University of Guelph owns approximately 185.5 ha of land situated in Part Lot 24, Concession 1, and Part Lots 21, 22, 23, and 24, Concession 2, Township of Puslinch, in the County of Wellington. Dufferin Aggregates, a CRH Company, leases the property from the University of Guelph. The property, called the Mill Creek Aggregates Pit (Site), is licenced by the Ministry of Natural Resources and Forestry (MNRF) as a Category 3 Class 'A' Pit Below Water for extraction of the aggregate resource from above and below the water table (Licence #5738).

The northwest corner of the property is traversed by Mill Creek and by two tributary creeks, Galt Creek and Pond Creek. Various reaches of Mill Creek are documented as supporting naturally sustaining brown trout and brook trout populations. Brown trout spawning is documented as occurring in the section of Mill Creek on the Mill Creek Aggregates Pit property. Approximately half of the University property on the north side of Township Road 2 is within the regulatory flood line of Mill Creek. There is also a substantial area of wetland adjacent to Mill Creek and the tributary streams which is part of the larger Galt Creek Swamp, an area that is designated as a Provincially Significant Wetland (formerly a Class 1 Wetland) by the MNRF.

A surface water monitoring program is conducted to satisfy operating license conditions 21(a), 21(c), 23 and 25. This report presents the surface water monitoring results for the period of January 1 through December 31, 2023, including a comparison to long term trends and available historical data.

1.2 Objective and Scope

The principal objectives of the 2023 Annual Surface Water Monitoring Program are:

- To comply with the pertinent requirements of the surface water monitoring program;
- To provide an assessment of the potential effects of on-site aggregate extraction activities on the local surface water setting; and
- To document results in an annual monitoring report and use to prepare the annual coordinated report for the Mill Creek Aggregates Pit operation.

This annual monitoring report includes the collation of the surface water monitoring data collected since 1993, a presentation of the results, and an analysis and discussion of the 2023 monitoring data. The accompanying summary document entitled "Mill Creek Coordinated Monitoring Report January 1 to December 31, 2023," integrates the monitoring results from the hydrogeology, surface water, and fisheries monitoring programs. This report forms **Appendix A** (Mill Creek Surface Water Monitoring Program) of the Coordinated Monitoring Report.

2.0 MONITORING PROGRAM

2.1 Climate Data

Daily precipitation data are obtained from the Grand River Conservation Authority (GRCA) climate station located at Shade's Mills Conservation Area in the city of Cambridge, Ontario. Data collected from the Kitchener/Waterloo climate station operated by Environment and Climate Change Canada (ECCC) were used to infill missing precipitation data.

As the 2023 air temperature data from the Shade's Mills Conservation Area climate station are unavailable, the data were obtained from the Kitchener/Waterloo climate station. Data collected from the Roseville climate station operated by ECCC were used to infill air temperature data missing from the Kitchener/Waterloo station. In addition, automated air temperature data are measured using a barometric data logger at two locations on-Site (Air Temperature Stations 1 and 2), as shown in **Figure 1**. Measurements are recorded hourly using the data logger and the data are downloaded and reviewed monthly. The climate data from the Kitchener/Waterloo climate station are used to verify the on-Site recorded air temperature data.

As reported in the 2022 Surface Water Report, the barometric data loggers installed at the Air Temperature Stations were discovered to have been taken by vandals in 2022. Between fall 2022 and February 14, 2023, air temperature and barometric pressure data were recorded hourly at the barometric data logger installed in monitoring well 92-13, which was historically installed for the groundwater monitoring program. On February 14, 2023, barometric data loggers were re-established at the Air Temperature Stations 1 and 2 locations.

The barometric data logger installed at Air Temperature Station 1 failed in December 2023 and was subsequently replaced in early 2024.

2.2 Mill Creek Discharge Monitoring

Four surface water monitoring stations (SWM1, SWM2, SWM3 and SWM4) were established on the Site in 1993. The locations of these stations are shown on **Figure 1**. Water level data have been obtained from SWM1 and SWM2 continually since 1993, while approval to discontinue monitoring at SWM3 and SWM4 was granted by the MNRF in 2013. The original location of station SWM2 was on the north side of Concession Road 2; however, in 2012, the station was relocated to the south side of Concession Road 2 due to property access issues. A new rating curve was developed for the relocated station; and the assumption was that flow estimates from the relocated SWM2 monitoring station would be directly comparable to the estimates collected from the former SWM2 location, since the locations were in close proximity to each other, and no additional surface water inputs enter the creek between the two locations.

The surface water monitoring stations consist of a 5 cm (2 inch) diameter steel pipe, installed to a depth of approximately 1 m below the stream bed. The pipe which extends above the stream bed is perforated to allow pressure equalization. The pipe extends above the stream bed to a level below the low water level of the creek. Since the pipe remains submerged, potential for vandalism or tampering with the monitor is reduced.

2.2.1 Water Level Data Collection

Automated surface water levels at SWM1 and SWM2 are measured hourly using data loggers installed within the steel pipe. The data loggers rest on a stainless-steel bolt inserted through the pipe, so that the data logger sits approximately at the elevation of the stream bed. The data are downloaded and reviewed monthly. The surface water level data are used to estimate stream discharge using rating curves.

The automated water level data are compensated for barometric pressure, using the atmospheric pressure data measured by the barometric data logger located at Air Temperature Station 1. Back-up barometric pressure data are also measured at Air Temperature Station 2.

2.2.2 Manual Stream Flow Measurements

Rating curves for SWM1 and SWM2, which were previously developed, are continually updated to improve the accuracy of discharge calculations. In 2023, manual flow measurements at SWM1 and SWM2 were collected by WSP on the following dates, which cover a wide range of seasonal and flow conditions.

January 13	May 26	September 8
February 15	June 15	October 27
March 15	July 25	November 16
April 28	August 9	December 19

Stream flow measurements were measured at established stream transects at each surface water monitoring location. Evenly spaced measurements were recorded along each transect to obtain a cross-sectional profile of the wetted channel. The number of measurements at each cross-section was determined by dividing the width of the channel by 10. At each measurement location, the depth of water and velocity were recorded. Velocity measurements were obtained using a portable velocity meter. Where the measured water depth was equal to, or less than, 0.5 m, velocity measurements were recorded at 60% of the total depth above the stream bed. Where the measured water depth was greater than 0.5 m, velocity measurements were recorded at 20%, 60% and 80% of the total depth and the average of the velocity measurements was used to calculate stream discharge. To calculate stream discharge, the cross-sectional area between measurement points was multiplied by the velocity measurement for that area. The sum of each of the calculated flow values provided the total stream discharge.

The variability of stream discharge measurements using this method was most recently evaluated by WSP in May 2023, by replicating discharge measurements at the same location immediately following the original measurement. In 2023, the observed variation observed using this method was +/- 16%.

2.2.3 Rating Curve Development

Rating curves for SWM1 and SWM2 have been developed using data collected since 2010 and 2014, respectively. Flow measurement data collected prior to 2014 at SWM2 have been excluded due to a change in data loggers at this monitoring station (Stantec, 2019).

The rating curves use the manual stream flow measurements and the water level data recorded by the data logger at the time of the stream flow measurement. An equation derived from the rating curves is used to convert the continuous depth readings from the data loggers to an estimate of stream flow.

2.3 Mill Creek Temperature Monitoring

Hourly water temperature is recorded by the data loggers installed at SWM1, SWM2, SWM3 and SWM4. The water temperature data were downloaded monthly.

3.0 ANNUAL MONITORING RESULTS

3.1 Climate Data

The 2023 daily climate data from the GRCA Shade's Mills and Kitchener/Waterloo climate stations are presented in **Table A-1** (**Appendix A**). Monthly climate data (2000 to 2023) from the GRCA Shade's Mills climate station are presented in **Table A-2** (temperature) and **Table A-3** (precipitation). **Tables A-2 and A-3** include the 30-year

climate normal temperature and precipitation data, which are calculated from the GRCA Shade's Mills climate station using climate data collected between 1991 and 2020.

3.1.1 Air Temperature

Graphs of the 2023 air temperature data are provided in **Appendix A**. **Figures A-1 to A-5** present the data recorded at on-Site with barometric data loggers, while **Figures A-11 to A-15** present the data recorded at the ECCC Kitchener/Waterloo climate station.

A graph presenting the 2023 average monthly air temperature recorded at the Kitchener/Waterloo climate station compared to the 30-year (1991-2020) climate normal monthly temperatures is presented in **Figure 3-1**, below. As shown in the figure, the average monthly air temperature values recorded in January, February and December 2023 were warmer than the 30-year normal values, while the average monthly air temperature values recorded in May, June, July and August 2023 were colder than the 30-year normal values. The average monthly air temperature values observed in the remaining months were similar to the 30-year normal values.

As shown in **Table D-2** (**Appendix D**), the mean monthly air temperature in 2023 was 8.3ºC, which is equal to the 30-year average and cooler than observed in 2020, 2021 and 2022 (9.6ºC, 10.1ºC and 8.9ºC, respectively).

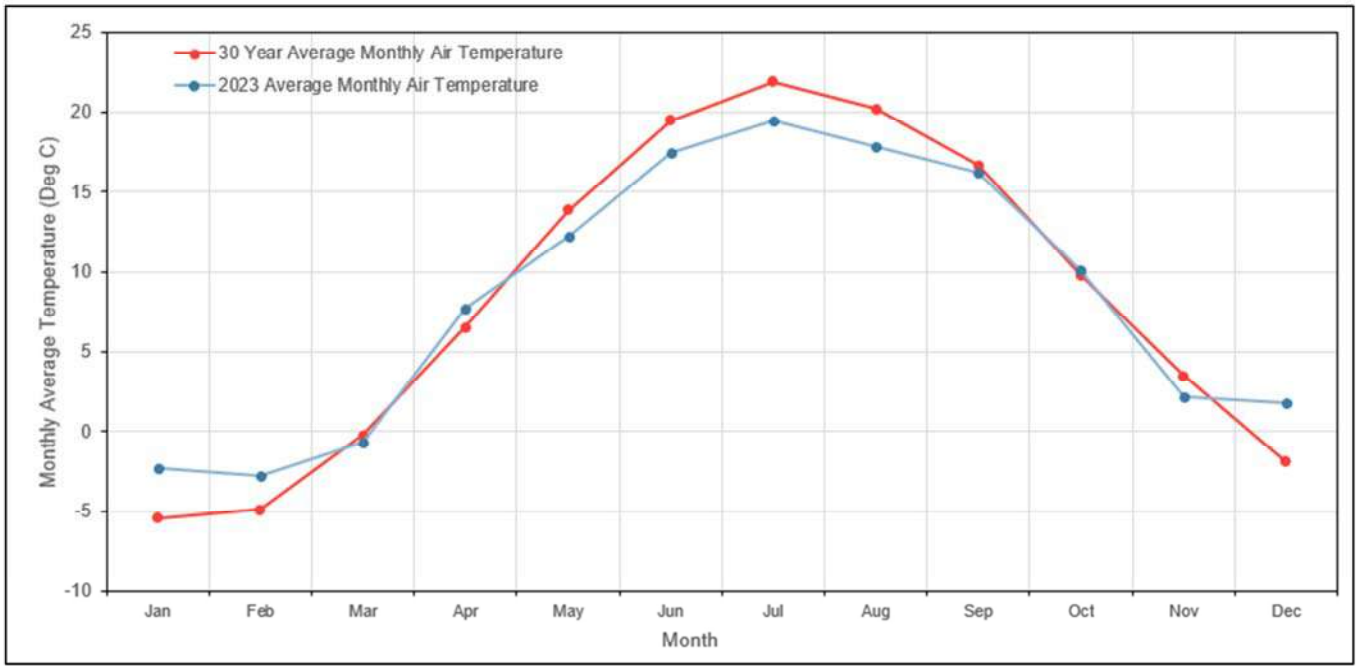

Figure 3-1: 2023 Monthly Air Temperature Compared to 30-Year Normal

3.1.2 Precipitation

Graphs presenting the 2023 total daily precipitation recorded at the GRCA Shade's Mills climate station are presented in **Figures A-6 to A-10** (**Appendix A**).

A graph of the 2023 total monthly precipitation compared to the 30-year average (1991-2020) monthly precipitation is presented in **Figure 3-2**, below. As shown in the figure, total monthly precipitation amounts received during March, July and August were considerably higher than the 30-year normal values for each month. The total monthly precipitation amounts received during May, September, October and November were

considerably lower than the 30-year normal values for each month. The monthly precipitation recorded in the remaining months were similar to the 30-year normal values. The 2023 total monthly precipitation was less than the 30-year average for the month in seven months of the year.

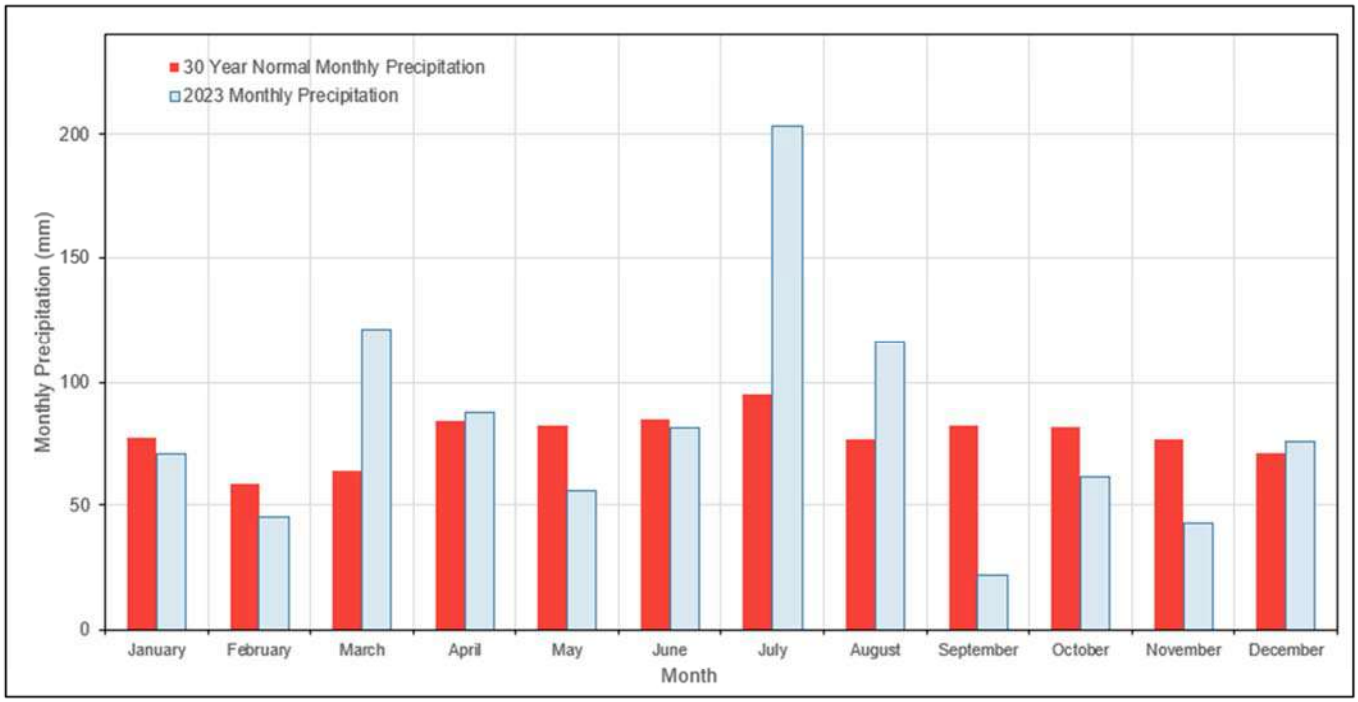

Figure 3-2: 2023 Total Monthly Precipitation Compared to 30-Year Normal

As shown in **Table A-3**, **Appendix A**, the total annual precipitation recorded at the GRCA Shade's Mills Climate Station in 2023 was 983 mm, which is 5% higher than the 30-year normal annual precipitation (935 mm) and considerably higher than the total precipitation received in 2022 (682 mm). It is also noted that 33% of the total annual precipitation recorded in 2023 was received in July and August. As shown in Table A-3, July 2023 was the wettest July recorded at the climate station since at least 2000.

3.2 Mill Creek Discharge Monitoring

3.2.1 Rating Curves

A table presenting the data used to prepare the SWM1 and SWM2 rating curves is provided in **Appendix B**. The rating curves for SWM1 and SWM2 are presented in **Figures 3-3 and 3-4**, respectively.

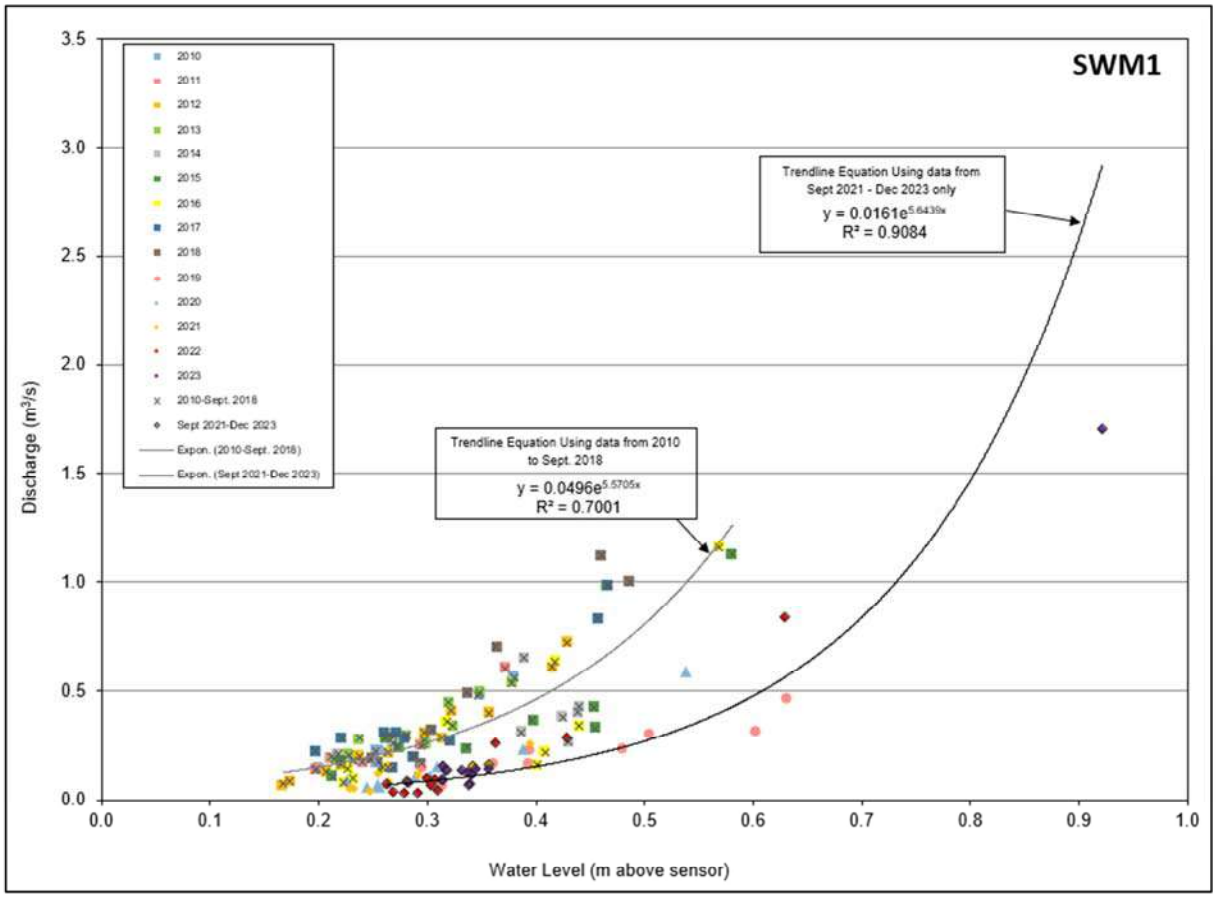

Figure 3-3: SWM1 Rating Curve

SWM1 is located at the farthest upstream monitoring location for the Site, within Mill Creek. A total of 141 manual stream flow measurements have been collected at SWM1 since 2001.

As noted in the 2019, 2020 and 2021 Surface Water Reports (WSP, 2020, 2021 and 2022), a beaver dam located downstream of SWM1 was discovered in 2018 and was removed in September 2021. The beaver dam was interpreted to be causing unrepresentative water levels/discharge and, as such, the stream flow measurements collected while the beaver dam was present were inconsistent with the rating curves developed prior to the presence of the beaver dam. Since the dam was removed in September 2021, the manual stream flow data points continued to be shifted compared to the rating curve developed with data collected prior to October 2018. Since the previously established rating curve formula would result in an over-estimation of 2023 stream flow, a new rating curve formula was fitted to the manual stream flow data points collected since the beaver dam was removed (September 2021 through December 2023), as shown in **Figure 3-3**. Stream flow calculations based on the 2023 water level data were completed using the new formula.

As shown in **Table B-1** (**Appendix B**), the depth of the water above the logger at SWM1 at the time of the manual flow measurements in 2023 ranged from 0.28 m to 0.92 m. Within this 0.64 m difference in water level, flow measurements ranged between 0.078 m^3/s and 1.701 m^3/s.

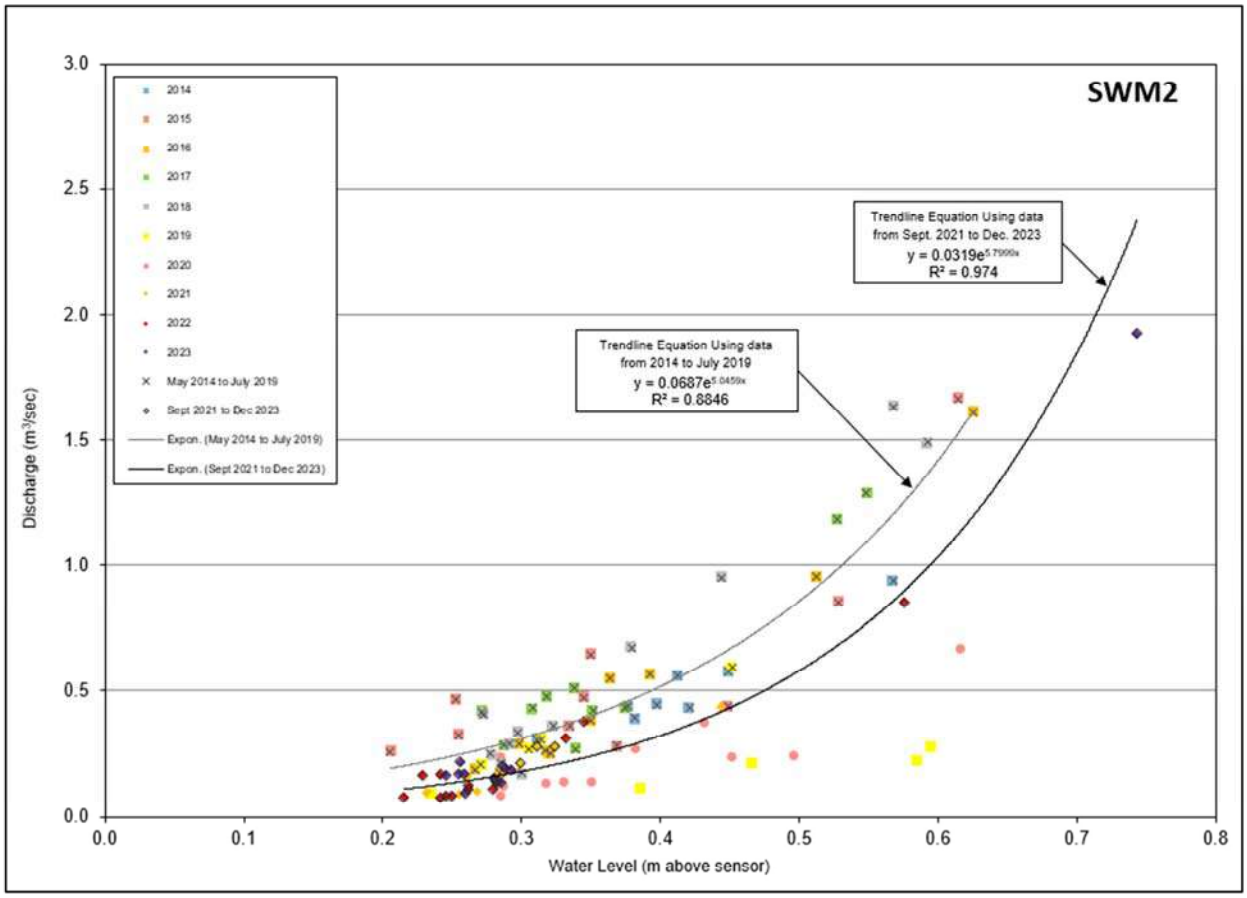

Figure 3-4: SWM2 Rating Curve

SWM2 is located within Mill Creek, at the downstream end of the Site. As shown in **Figure 1**, additional flow inputs from Galt Creek and Pond Creek enter Mill Creek between SWM1 and SWM2. A total of 106 manual stream flow measurements have been collected at SWM2 since 2014.

As noted in the 2019, 2020 and 2021 Surface Water Reports (WSP, 2020, 2021 and 2022), a beaver dam located downstream of SWM2 was discovered in 2019 and was removed in September 2021. The beaver dam was interpreted to be causing unrepresentative water levels/discharge and, as such, the stream flow measurements collected while the beaver dam was present were inconsistent with the rating curves developed prior to the presence of the beaver dam. Since the dam was removed in September 2021, the manual stream flow data points continued to be shifted compared to the rating curve developed with data collected prior to August 2019. Since the previously established rating curve formula would result in an over-estimation of 2023 stream flow, a new formula was fitted to the manual stream flow data points collected since the beaver dam was removed (September 2021 through December 2023), as shown in **Figure 3-4**. Stream flow calculations based on the 2023 water level data were completed using the new formula.

As shown in **Table B-1** (**Appendix B**), the depth of the water above the logger at SWM2 at the time of the 2023 manual flow measurements ranged between 0.25 m and 0.74 m above the data logger. Within this 0.49 m difference in water level, the flow measurement ranged between 0.094 m^3/s and 1.922 m^3/s.

The formulas generated using the rating curves, which are used to estimate the flow rates for the 2023 water level data, are shown in **Table 3-1**, below. The table also includes the correlation (R^2 value) for the rating curves. R^2 values can range between 0 and 1, with a higher value indicating a better relationship between logger depth and stream flow.

Table 3-1: Rating Curve Formulas Used to Estimate Stream Discharge for 2023 Water Level Data

SWM1	SWM2
$y = 0.0161e^{5.6439x}$ $R^2 = 0.9084$	$y = 0.0319e^{5.7999x}$ $R^2 = 0.974$
n = 28	n = 28

3.2.2 Quality Assurance and Quality Control

Stream discharge measurements and automated water level/temperature data were plotted on graphs to visually identify any potentially erroneous data. Periodically, an individual data logger measurement will be inconsistent compared to adjacent measurements, which typically corresponds to the data logger recording a reading while the data logger has been brought to ground surface for data download. In these instances, the individual data reading is excluded from the dataset.

Duplicate data loggers were maintained at several monitoring locations to ensure that a data back-up is available in the event of a data logger failure. In addition, if a data logger cannot be downloaded in the field and is required to be shipped to the manufacturer or returned to the office for maintenance/download, the duplicate data logger will continue to provide data during that time. The required hourly water level, water temperature and air temperature data were successfully collected in 2023.

3.2.3 Mill Creek 2023 Discharge Trends

The 2023 hourly discharge rates at SWM1 and SWM2, calculated using the 2023 rating curve formulas presented in **Table 3-1**, are presented in **Figure 3-5**, below. More detailed monthly figures are presented in **Figures C-1 to C-24** (**Appendix C**). As observed historically at the Site, the calculated flow at SWM2 is typically greater than, and proportional to, the flow calculated at SWM1.

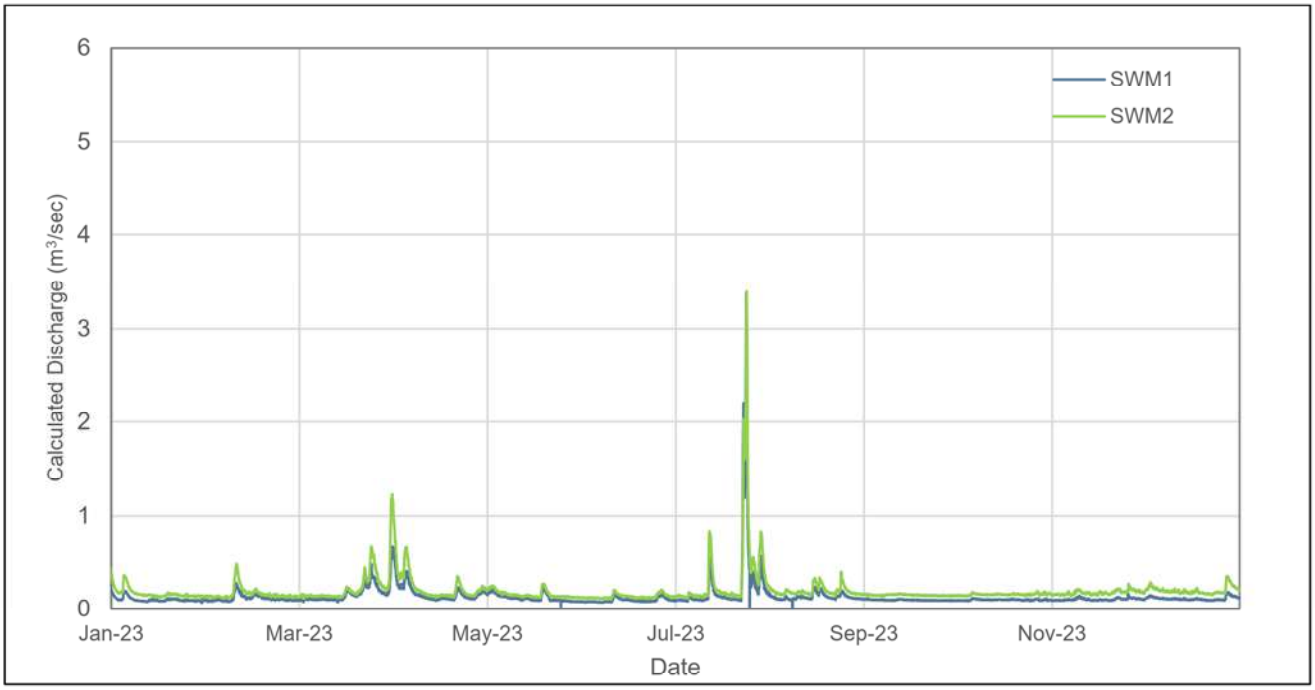

Figure 3-5: 2023 Calculated Hourly Stream Discharge at SWM1 and SWM2

The 2023 minimum and maximum calculated instantaneous stream discharge at stations SWM1 and SWM2, and the dates when these discharges occurred, are summarized in **Table 3-2**, below.

Table 3-2: 2023 Minimum and Maximum Instantaneous Stream Discharge Recorded at SWM1 and SWM2

	SWM1		SWM2	
	Discharge (m^3/s)	Date	Discharge (m^3/s)	Date
Minimum Stream Discharge	0.067	30-Jan-2023	0.109	11-Jun-2023
Maximum Stream Discharge	3.39	25-Jul-2023	3.40	25-Jul-2023

It is noted that the accuracy of flow estimates generated using rating curves decreases with higher flow levels because higher flow levels are typically greater than the range of flows measured to develop the rating curve. For example, as shown in **Table B-1** (**Appendix B**), the maximum manual flows measured at SWM1 and SWM2 in 2023, which are used to develop the rating curve, are 1.70 m^3/s and 1.92 m^3/s, respectively, but the 2023 flow data presented in **Figure 3-5** show occasions where the calculated flows are higher than these values.

3.2.4 Effects of Precipitation on Mill Creek Flow

Daily precipitation data recorded at the GRCA's Shade's Mills climate station are illustrated with the calculated average daily stream discharge at SWM1 and SWM2, in **Figures 3-6 and 3-7**, below. It is noted that the daily average flows shown below differ from the hourly flow measurements presented in **Figure 3-5**.

The plot of precipitation data with the flow data shows a strong correlation, as increased flows were often observed shortly after precipitation events. In the drier months, rainfall events did not always result in increases in discharge, which is likely attributed to higher soil infiltration and vegetative cover.

The maximum daily average flow at both SWM1 and SWM2 in 2023 occurred on July 25. Only 2 mm of precipitation were recorded at the GRCA Shade's Mill Conservation Area prior to the peak in stream flow; however, localized thunderstorms were observed in the area of the Site on July 24/25. According to the climate data recorded at various GRCA climate stations, over 30 mm of precipitation were recorded on July 24/25 at the Elora, Guelph, Woolwich and Arthur climate stations. As such, it is interpreted that a notable precipitation event occurred at the Site prior to the peak flows observed on July 25, 2023. The maximum average daily flow rates measured at SWM1 and SMW2 (2.11 and 2.38 m^3/s, respectively) are interpreted to be overestimated due to the lower accuracy of the rating curve formula at higher flows, as discussed in Section 3.2.3.

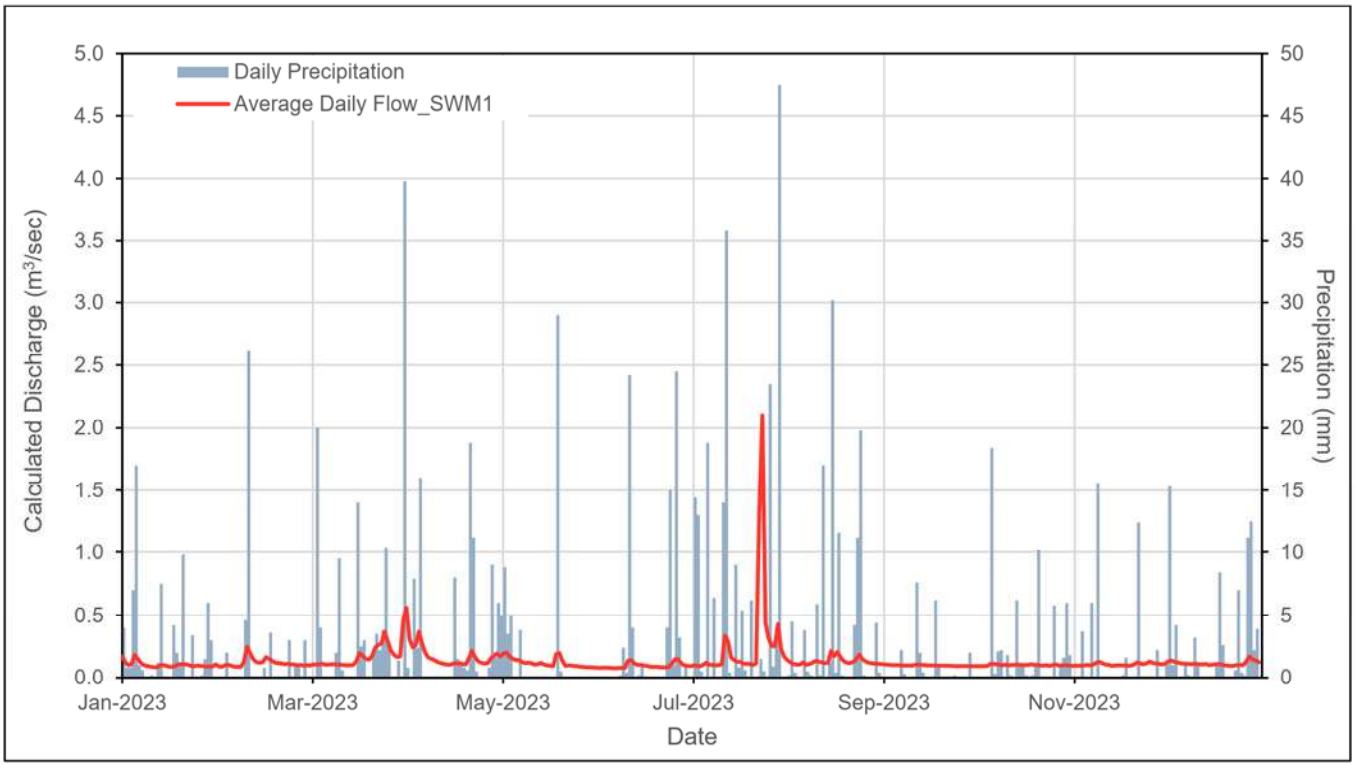

Figure 3-6: 2023 SWM1 Daily Average Flow and Daily Precipitation

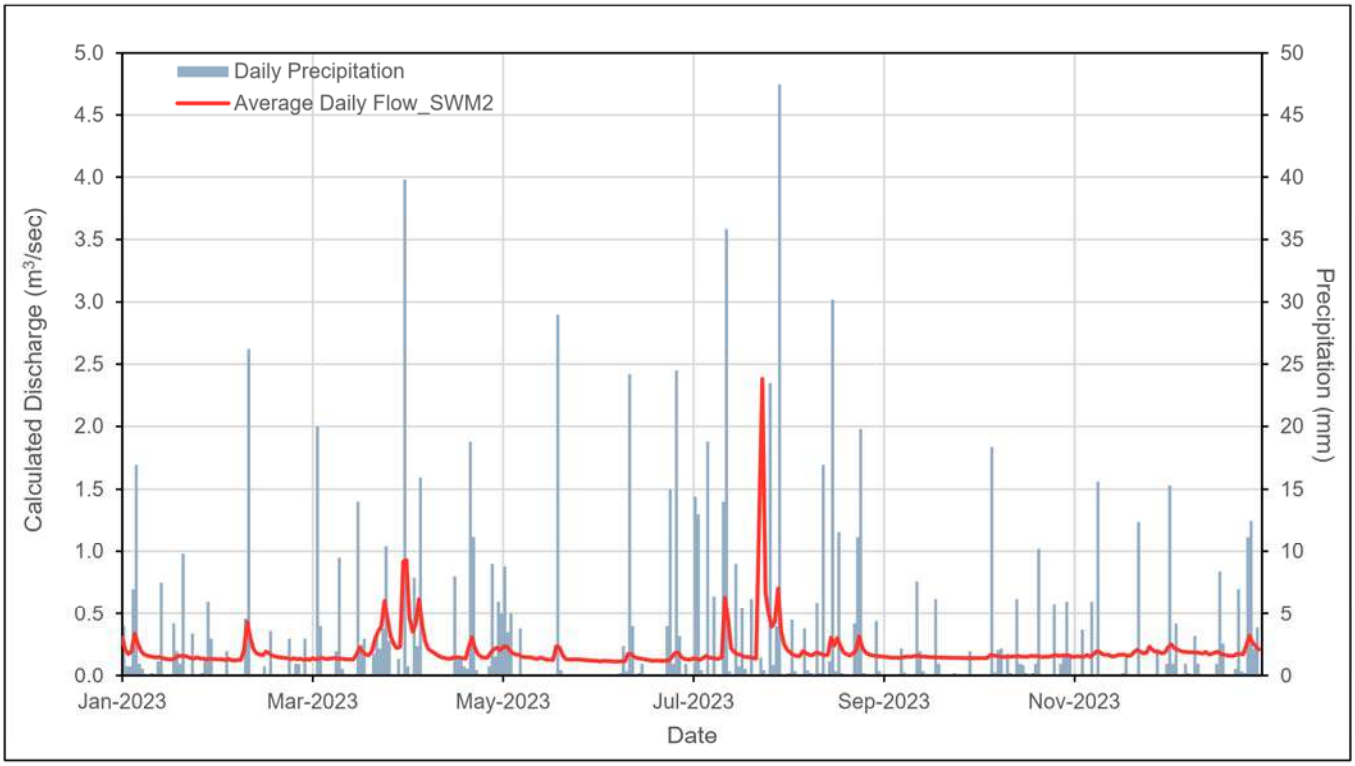

Figure 3-7: 2023 SWM2 Daily Average Flow and Daily Precipitation

3.2.5 Long Term Flow

The 7-day low flow is a standard hydrological value which represents the average flow rate of the 7-day period of lowest flow for each year. The 7-day low flow at SWM2 is used to compare low flows over time for the Site. In 2023, the 7-day low flow at SWM2 was 0.120 m^3/s, which occurred from June 5 to 11. As shown in Table A-1, the daily precipitation data indicate that less than 1 mm of precipitation was recorded between May 21 and June 10, 2023. As discussed in Section 3.1.2 of this report, the monthly precipitation amounts recorded in April, May and June were either similar to, or lower than, the 30-year normal conditions for those months. In the absence of rainfall and runoff, the 7-day low flow likely represents baseflow conditions.

The SWM2 7-day low flow values since 2000 are presented in **Figure 3-8**, below. The 2023 7-day low flow at SWM2 is similar to the 7-day low flow values recorded in 2007, 2020, 2021 and 2022. The average of the SWM2 7-day low flow values from 2000 to 2022 is 0.207 m^3/s. The 2023 7-day low flow of 0.120 m^3/s is considerably lower than the historical average. The lower 7-day low flow values recorded since 2020 are attributed to the lower-than-normal amount of precipitation received in 2020, 2021, 2022 and the first half of 2023.

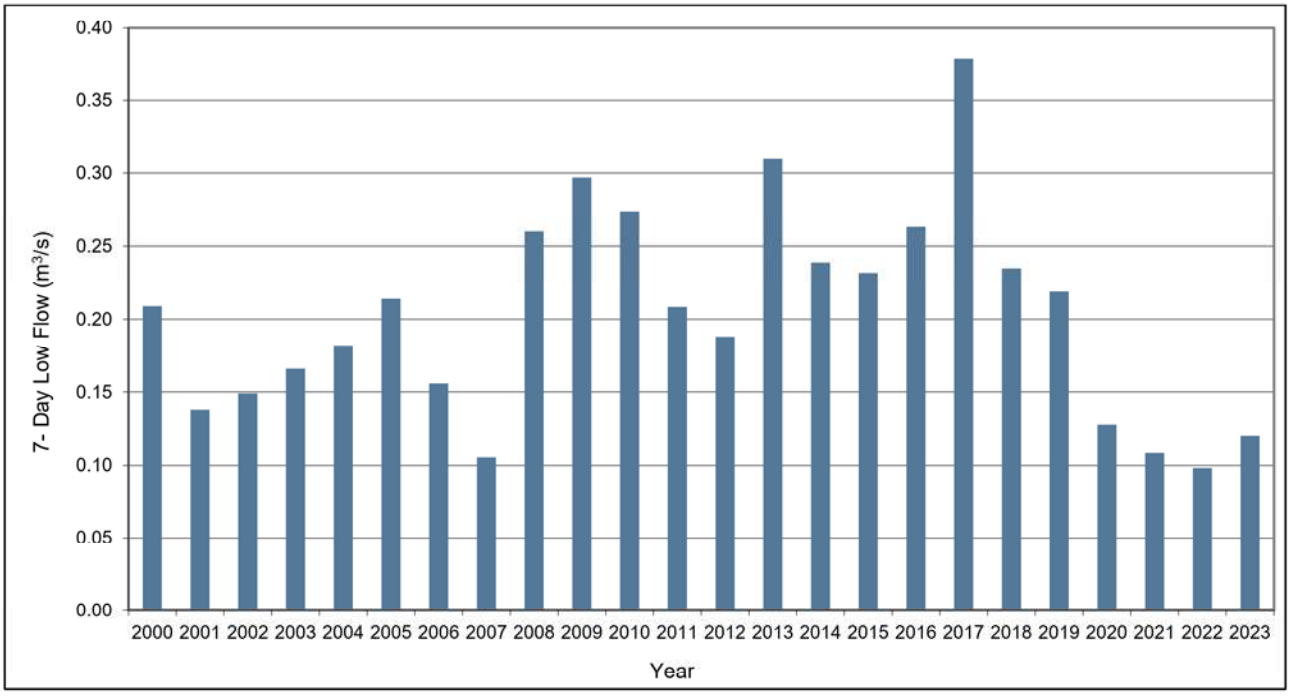

Figure 3-8: 7-Day Low Flow at SWM2 (2000-2023)

As in previous years, the 7-day low flow during the 2023 summer months (June 21 through September 22) was calculated. The summer 7-day low flow at SWM2 (0.138 m^3/s) occurred from June 30 to July 6 and was below the historical average (0.209 m^3/s). The 2023 summer 7-day low flow was slightly higher than the full year 7-day low flow observed in early June, which reflects the lack of precipitation recorded in May and June 2023, and the significant increase in precipitation observed in July.

The historical summer 7-day low flow values from SWM2 are plotted with the total summer precipitation (June 21 through September 22) and average summer air temperature (mean of the daily mean temperatures from June 21 to September 22) in **Figures 3-9 and 3-10**, respectively.

As shown in **Figure 3-9**, there is an apparent relationship between total summer precipitation and summer 7-day low flow. A linear regression of the data presented in the figure (2000 to 2023) indicates that there is a positive correlation between stream flow and summer precipitation at SWM2 (R^2 = 0.2137).

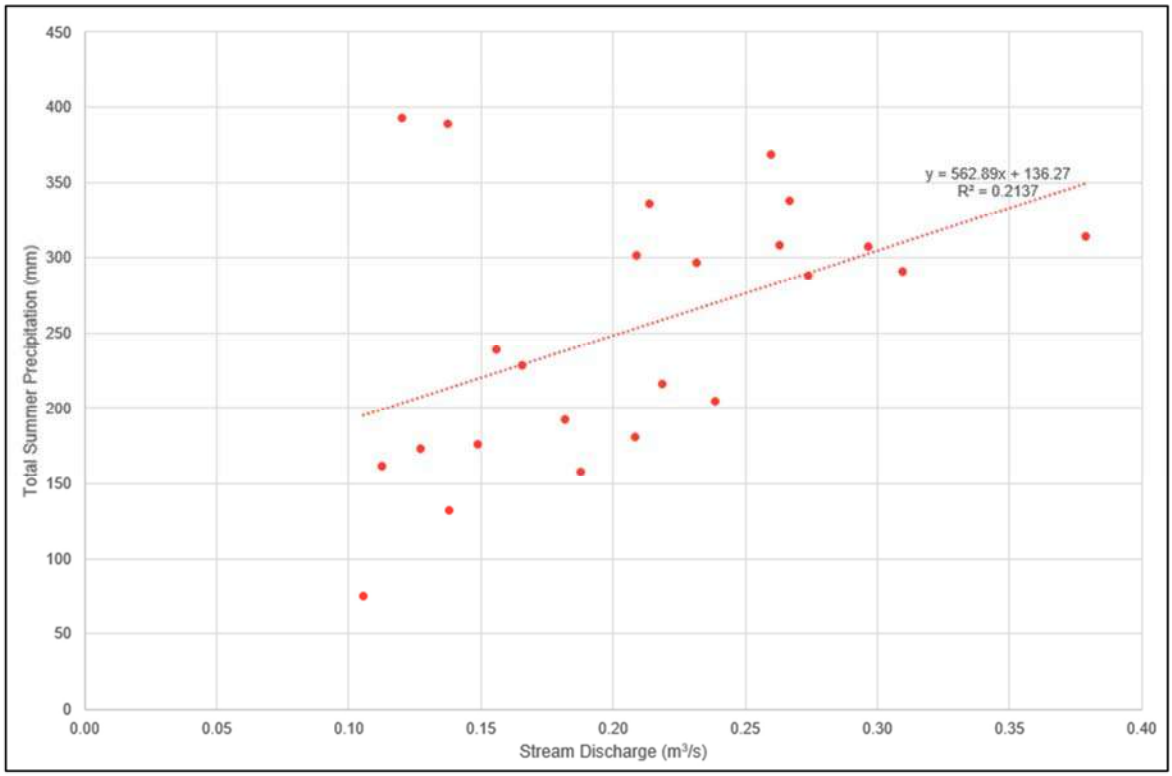

Figure 3-9: Total Summer Precipitation Versus Summer 7-Day Low Flow at SWM2 (2000-2023)

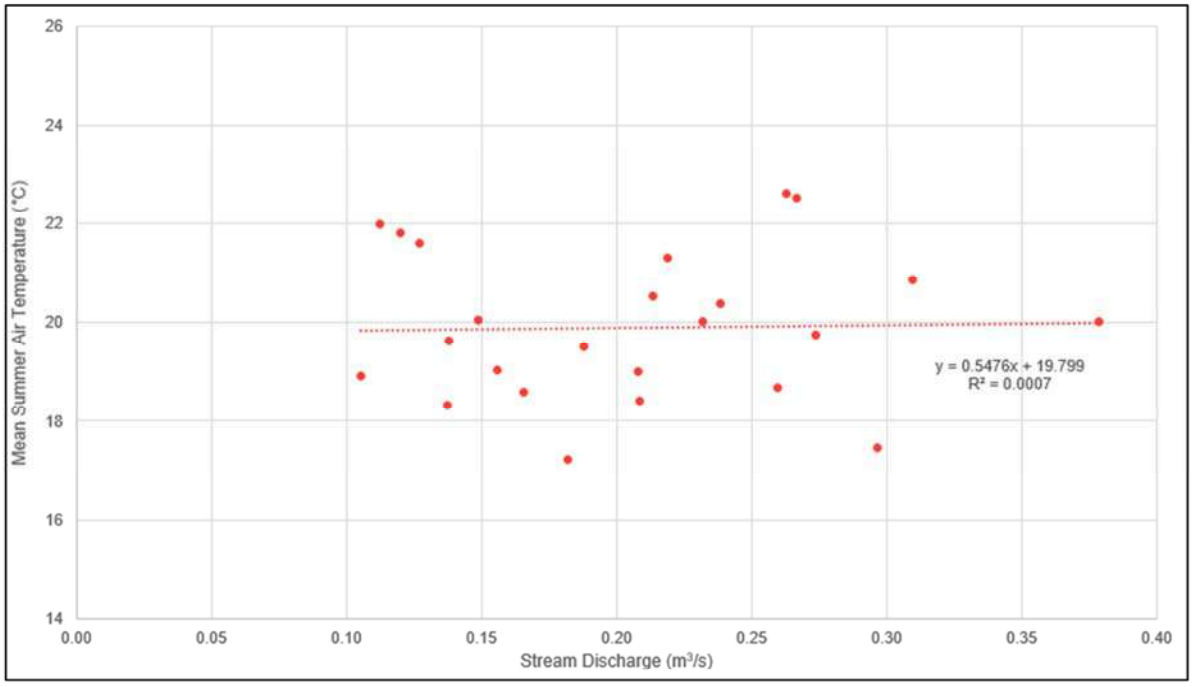

Figure 3-10: Mean Summer Air Temperature Versus Summer 7-Day Low Flow at SWM2 (2000-2023)

As shown in **Figure 3-10**, there is no apparent relationship between mean summer air temperature and summer 7-day low flow, which is confirmed by the linear regression of the data (R^2= 0.0007).

Regression analysis can identify potential relationships between the predictor variable (climate related variables) and the response variable (7-day low flow). Regression analysis includes calculating the P-value. A P-value of <0.05 is indicative of a statistically significant relationship between variables. Regression plots and statistical data output for these relationships are provided in **Appendix D**. As shown in **Appendix D**, the calculated P-value for the relationship between summer stream flow and summer precipitation is 0.032, indicating a statistically significant relationship. The calculated P-value for the relationship between summer stream flow and summer temperature is 0.685, which does not indicate a statistically significant relationship. These analyses are consistent with previous observations that summer stream flow in Mill Creek is influenced by summer precipitation.

3.2.6 Historical Mill Creek Discharge Trends

The 2023 instantaneous minimum and maximum stream discharge values from SWM1 and SWM2 are presented in **Table 3-2** in **Section 3.2.3** and are presented graphically in **Figures 3-11 and 3-12**, respectively.

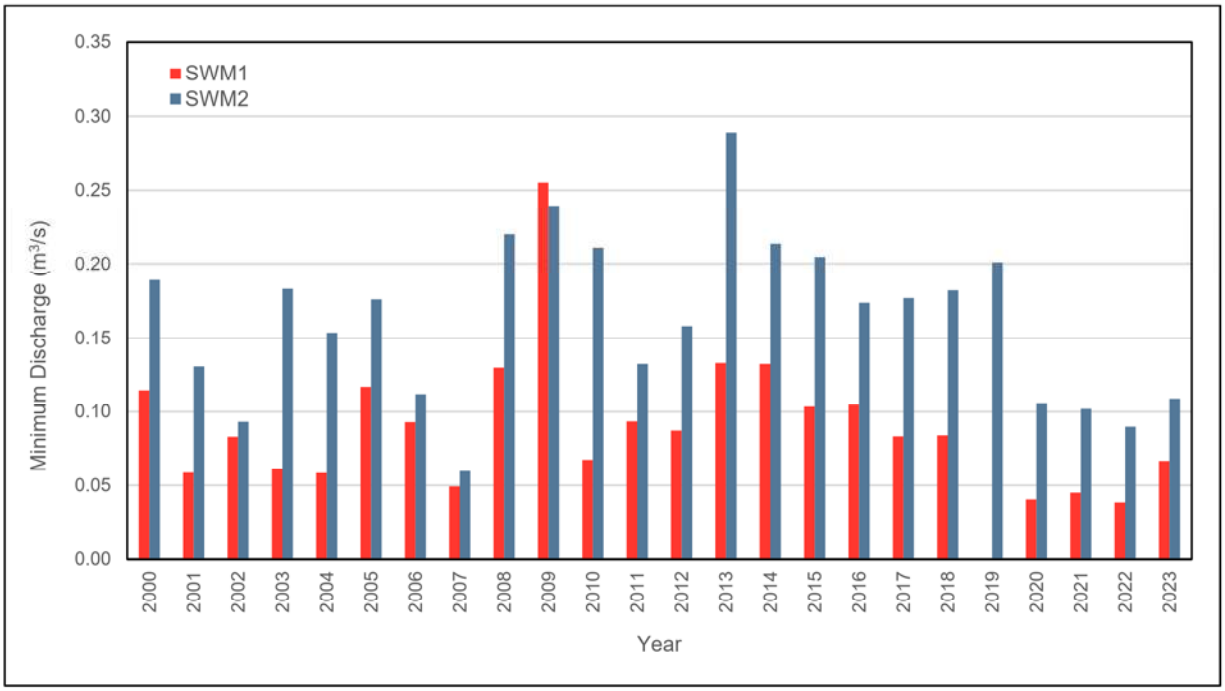

Figure 3-11: SWM1 and SWM2 Instantaneous Minimum Stream Discharge (2000-2023)

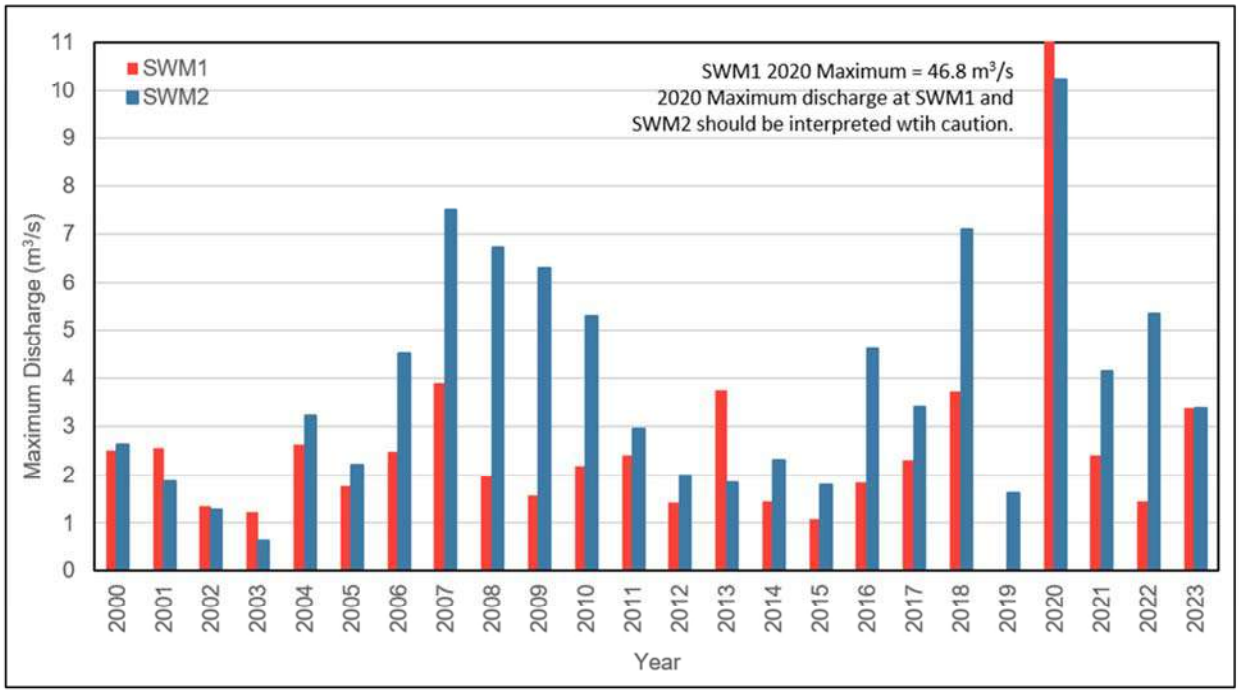

Figure 3-12: SWM1 and SWM2 Instantaneous Maximum Stream Discharge (2000-2023)

As shown in the figures, the 2023 minimum instantaneous stream discharge values at SWM1 and SWM2 are similar to the minimum instantaneous stream discharge values recorded since 2020. The 2023 minimum instantaneous and maximum instantaneous stream discharge values are within the historical range of values recorded since 2000.

A graph presenting the daily average stream discharge at SWM2 from 2003 to 2023 is provided in **Figure 3-13**, below.

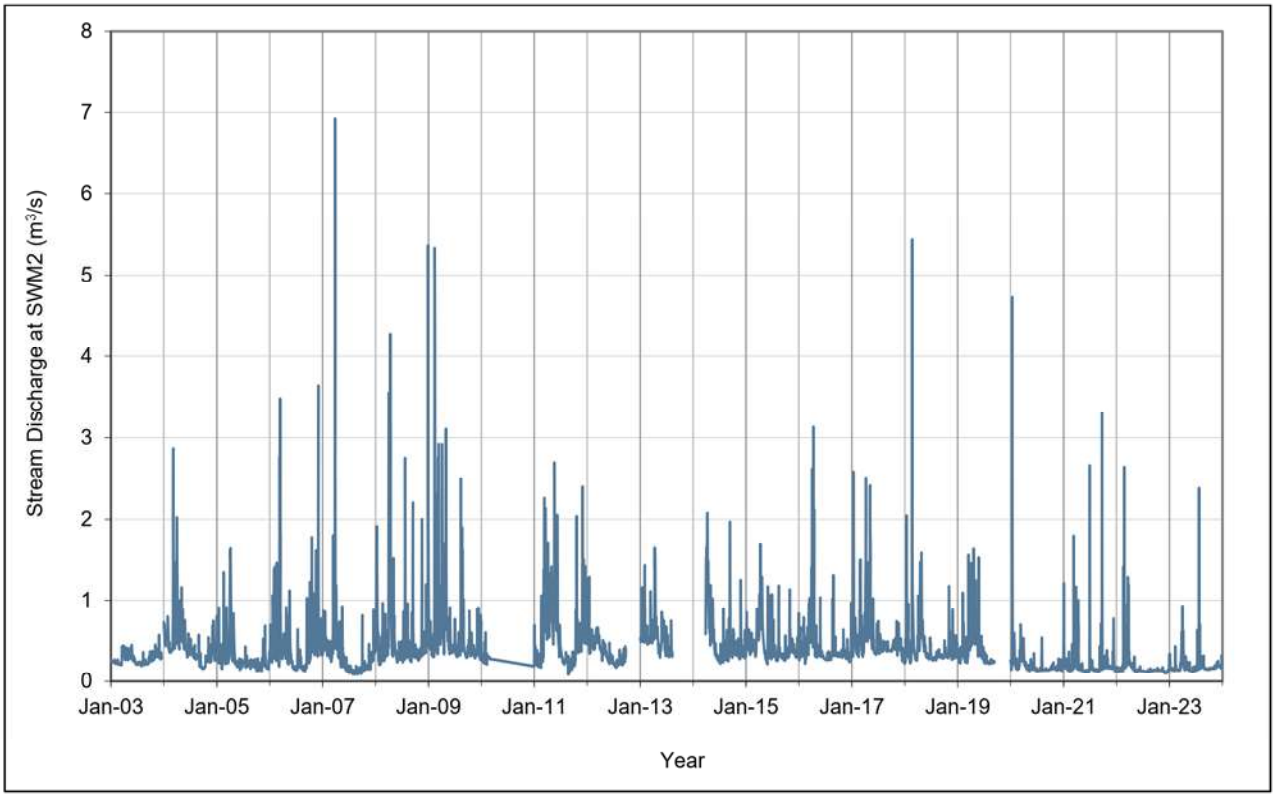

Figure 3-13: SWM2 Historical Daily Average Stream Discharge (2000-2023)

The daily average stream flow at SWM2 during the summer (June 21 to September 22) is presented in **Figure 3-14** along with annual and summer precipitation data. The flow data are presented as log transformed, in a box and whisker plot (boxplot). Boxplots are useful when comparing two or more datasets and allow for the visualization of flow data between years. The data were log transformed because variability in flow is high and the data are not normally distributed. The log-transformation provides clearer data representations and facilitates interpretation.

In **Figure 3-14**, data within the box represent 50% of the summer daily average flows, and data outside the box represent those daily average flows in the upper and lower quartiles (maximum and minimum calculated flows). The horizontal line within the box represents the median flow for the summer months.

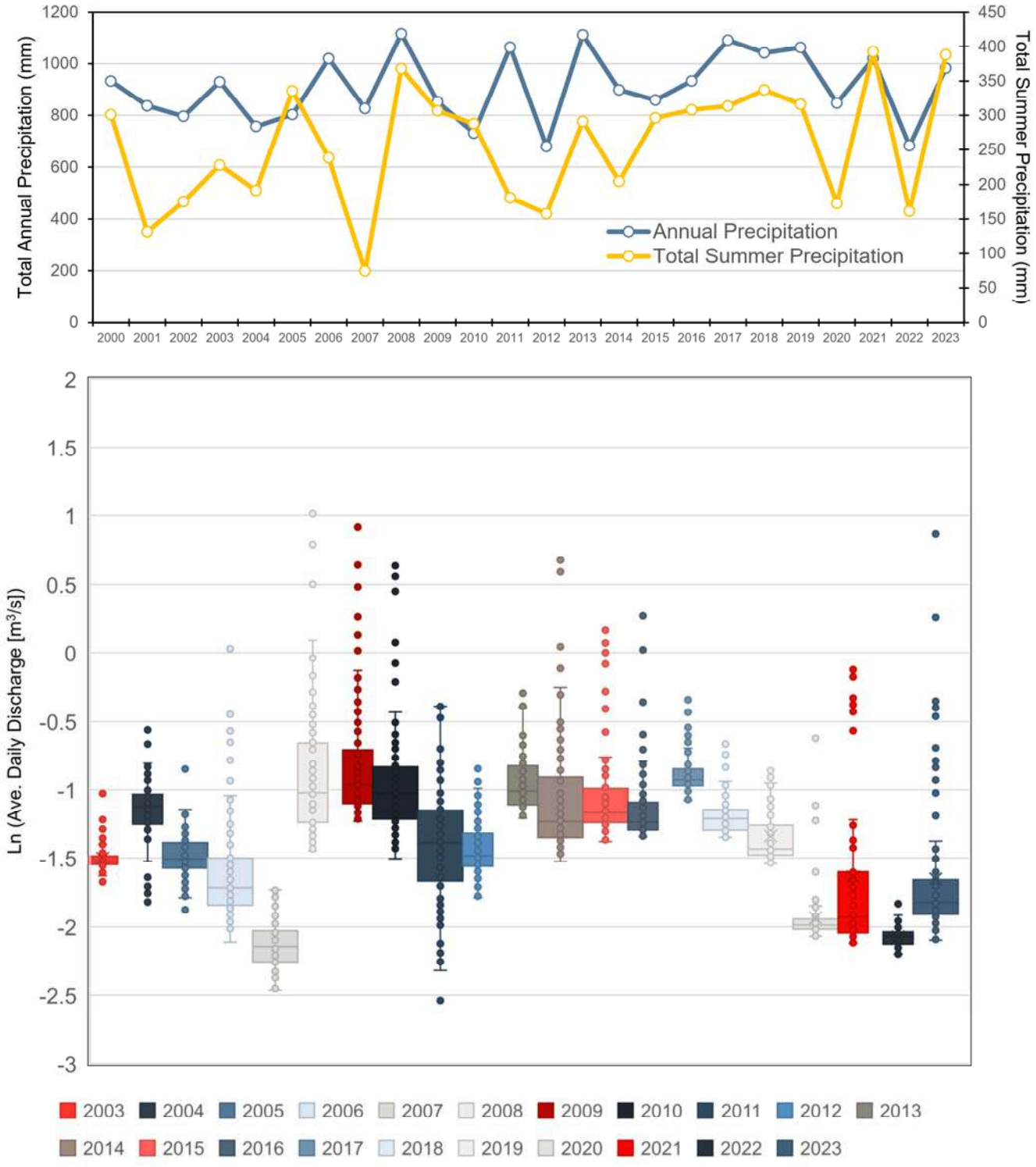

Figure 3-14: SWM2 Discharge Through Summer Months (2003-2023)

In 2023, the boxplot indicates that the daily average flow was often higher than observed in 2022 and that summer discharge fluctuated within a large range in 2023. **Figure 3-14** also shows that a long-term fluctuating trend in daily average summer flows has occurred in Mill Creek since 2003, rather than an increasing or decreasing trend. There is a general correlation between the summer precipitation and the average summer discharge at SWM2.

Based on the results of the 2023 and historical surface water monitoring program, there is no indication that aggregate extraction on the Dufferin Aggregates Mill Creek Pit Property, or the resulting ponds, are affecting stream flow in Mill Creek.

3.3 Mill Creek Temperature Monitoring

Ongoing water temperature monitoring is important to ensure that fish habitat is not impacted by operations at the Mill Creek Pit. Fish habitat can be impacted by elevated water temperatures because higher temperatures will reduce the capacity of water to hold oxygen. These effects are further discussed in Technical Appendix C of the Mill Creek Coordinated Monitoring Report.

Table 3-3, below, presents the maximum water temperatures recorded at the four surface water monitoring stations between 2003 and 2023. As shown in the table, there is no evident increasing or decreasing trend of maximum surface water temperature over the long-term, although temperatures at SWM4 have shown an overall declining trend since 2013. The maximum temperatures recorded at SWM1, SWM2, SWM3 and SWM4 in 2023 at each station are within 1 degree of the long-term average for each station.

Table 3-3: Maximum Recorded Surface Water Temperature (2003-2023)

Monitoring Year	SWM1		SWM2		SWM3		SWM4	
	Temperature (^{0}C)	Date(s)	Temperature (^{0}C)	Date(s)	Temperature (^{0}C)	Date(s)	Temperature (^{0}C)	Date(s)
2003	26	26-June	25	25-June	19	26-June	19	26-June
2004	24	20-July	23	3-Aug	17	13-May	19	4-July
2005	27	11-June	24	15-July	19	15-July	22	14-July
2006	27	1-Aug	25	1-Aug	16	15-July	19	1-Aug
2007	24	27-June 3-Aug	23	27-June	18	8-June	20	25-Aug
2008	25	9-June 17-July	23	9-June	19	8-June 24-July	19	9-June
2009	24	24-June	22	24-June	18	23-June	20	20-Aug
2010	26	8-July	24	8-July	18	23-July	20	24-July
2011	27	21-July	25	21-July	18	8-June	20	8-June
2012	25	17-July	22	6-July	17	19-June	18	21-June
2013	27	17-July	24	17-July	16	10-July	20	19-July
2014	24	30-June	22	30-June	17	10-Sept	18	10-Sept

Monitoring Year	SWM1		SWM2		SWM3		SWM4	
	Temperature (°C)	Date(s)	Temperature (°C)	Date(s)	Temperature (°C)	Date(s)	Temperature (°C)	Date(s)
2015	24	29-July	22	30-July	16*	15-Aug	17*	15-Aug
2016	25	13-July	23	22-July	19	25-Aug	19	25-Aug
2017	23	21-July	22	24-July	16	18-May	17	18-May
2018	26	1-July	24	1-July	14	6-Jul	17	30-June
2019	25	20-July	23	20-July	17	20-July	17	20-July
2020	26	09-July	23	09-July	16	2-Aug	16	27-July
2021	25	06-Jul	24	28-Jun	18	29-Jun	16	29-Aug
2022	24	07-Aug	23	22-Jun	17	22-Jun	15	21-Jul
2023	24	05-Jul	22	05-Jul	16	13-Jul	17	27-Jul
Average	25		23		17		18	

* Temperature logger data displayed atypical daily variability. Temperature should be interpreted with caution (Stantec, 2019).
2003 through 2018 data obtained from 2018 Surface Water Monitoring Report (Stantec, 2019).

The 2023 hourly surface water temperature data recorded at the surface water monitoring stations are presented in **Figures 3-15 and 3-16**, below. These data are also presented on more detailed figures (monthly), which are provided in **Appendix E**.

As shown in **Figure 3-15**, below, the surface water at SWM1 is typically warmer than the water at SWM2 in the summer months, which is consistent with previous observations. This difference is attributed to additional surface water inputs from the two colder tributaries which enter Mill Creek between SWM1 and SWM2, groundwater input along this reach, and shade provided by dense vegetation along Mill Creek on the Site.

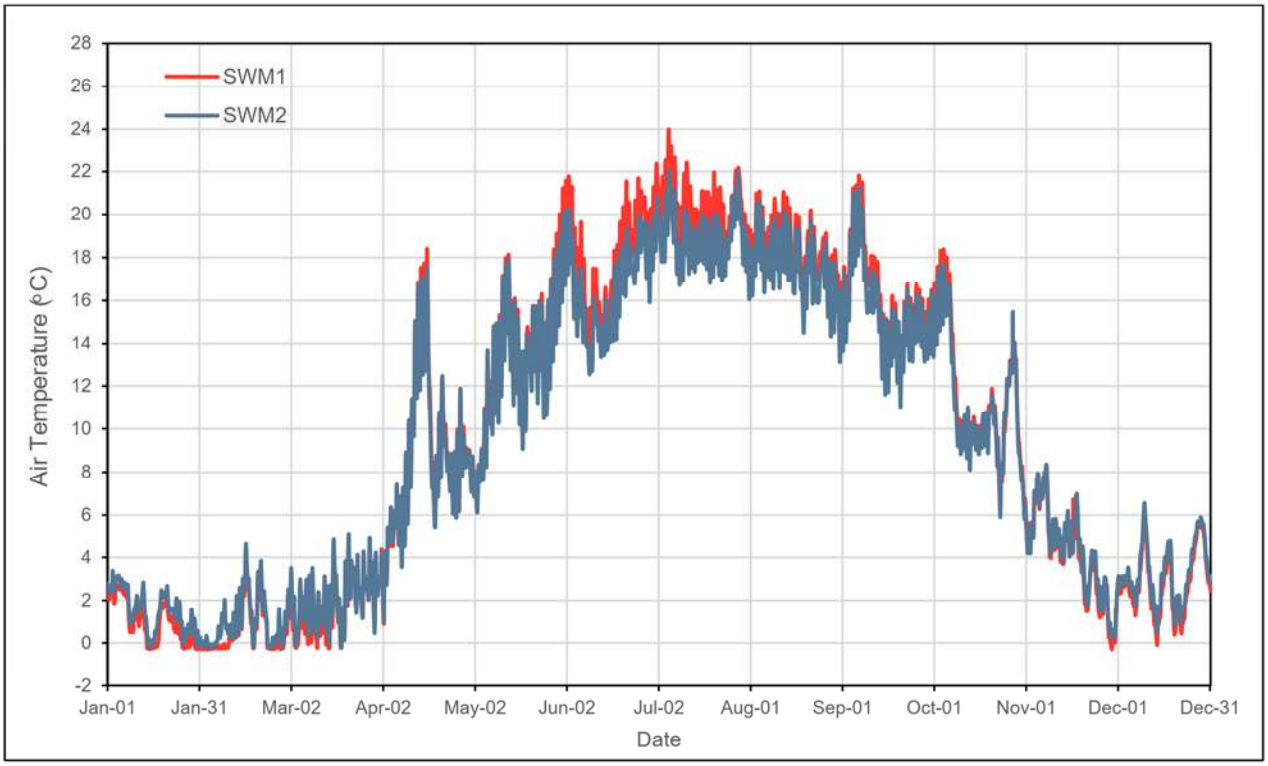

Figure 3-15: 2023 Hourly Water Temperature at SWM1 and SWM2

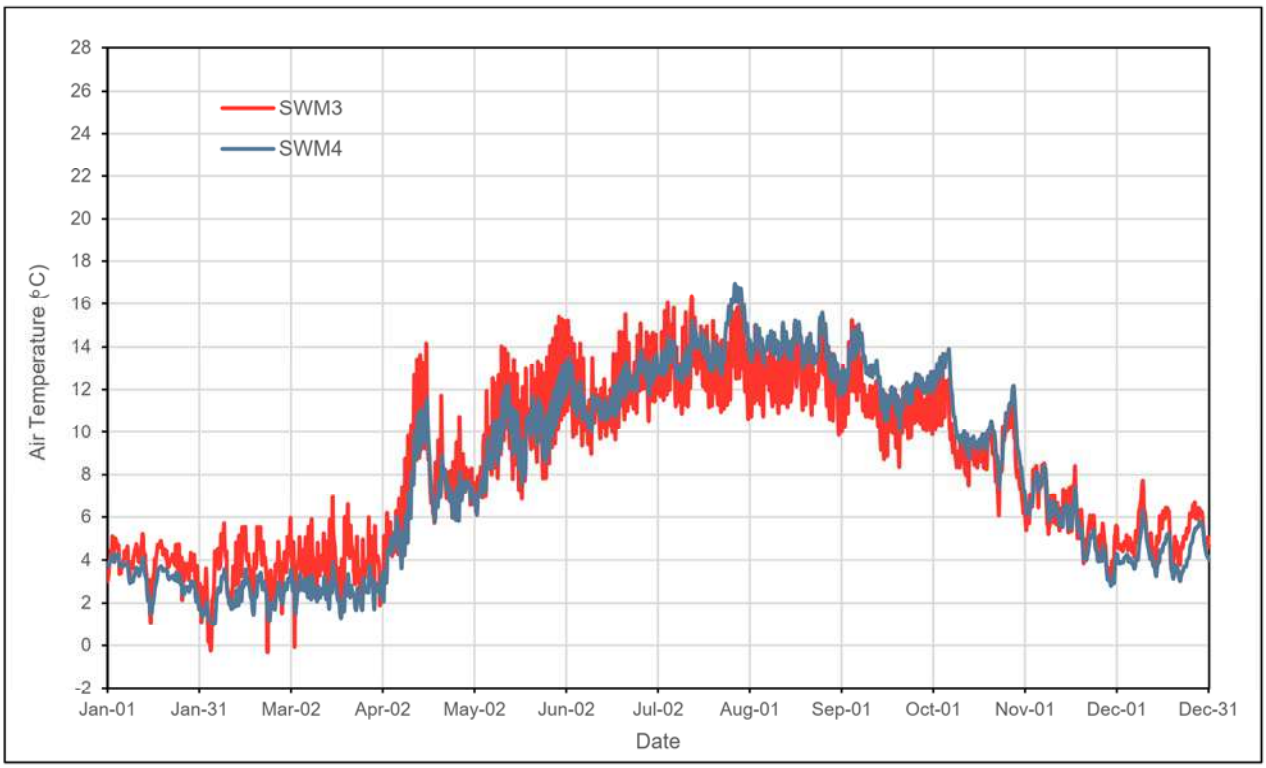

Figure 3-16: 2023 Hourly Water Temperature at SWM3 and SWM4

The water temperatures measured at SWM3 (Pond Creek) and SWM4 (Galt Creek) in 2023 (**Figure 3-16**) were more stable and showed less of an effect from air temperatures, compared to SWM1 and SWM2. This is consistent with historical results, where the maximum water temperatures observed at SWM3 and SWM4 are consistently lower than those observed at SWM1 and SWM2. The water temperatures recorded at SWM3 during the winter months are consistently warmer than those measured at SWM4, which is attributed to an increased groundwater influence in Pond Creek compared to Galt Creek.

Based on the 2023 monitoring data, there is no evidence that activities at the Mill Creek Pit have impacted water temperatures in Mill Creek.

The following four figures (**Figures 3-17 to 3-20**) present the 2023 hourly air temperature data from the on-Site barometric data logger with the hourly water temperatures at each respective surface water station.

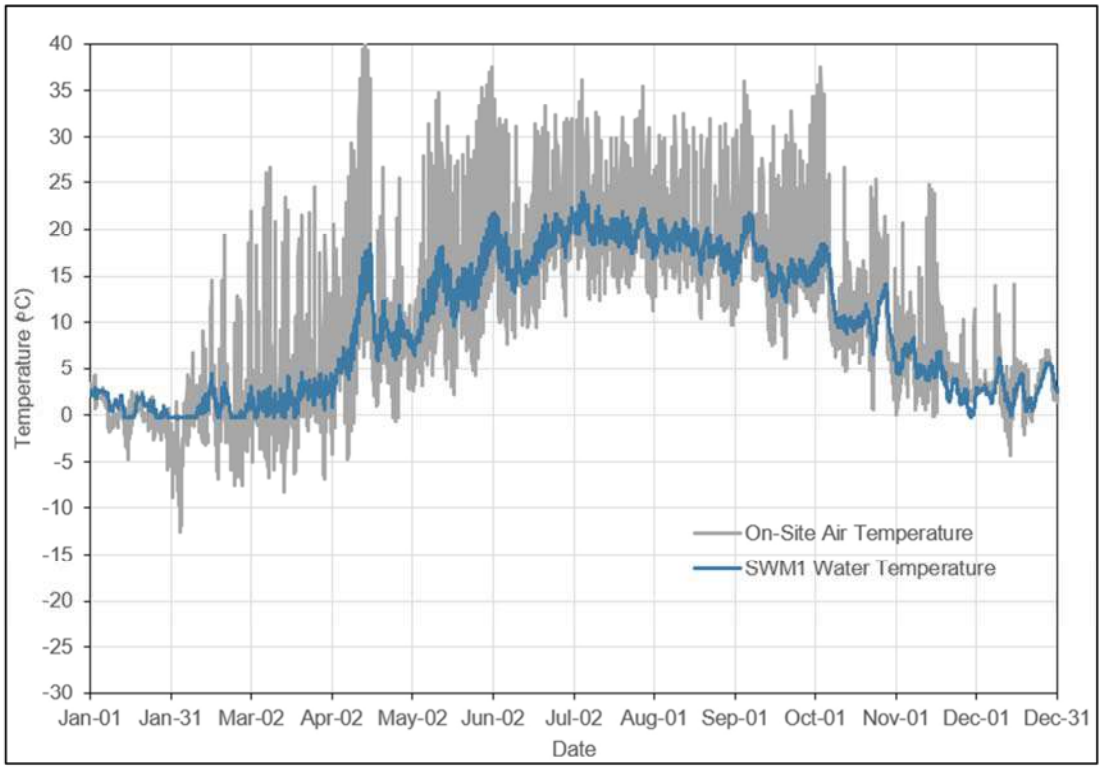

Figure 3-17: 2023 Air and Water Temperature at SWM1

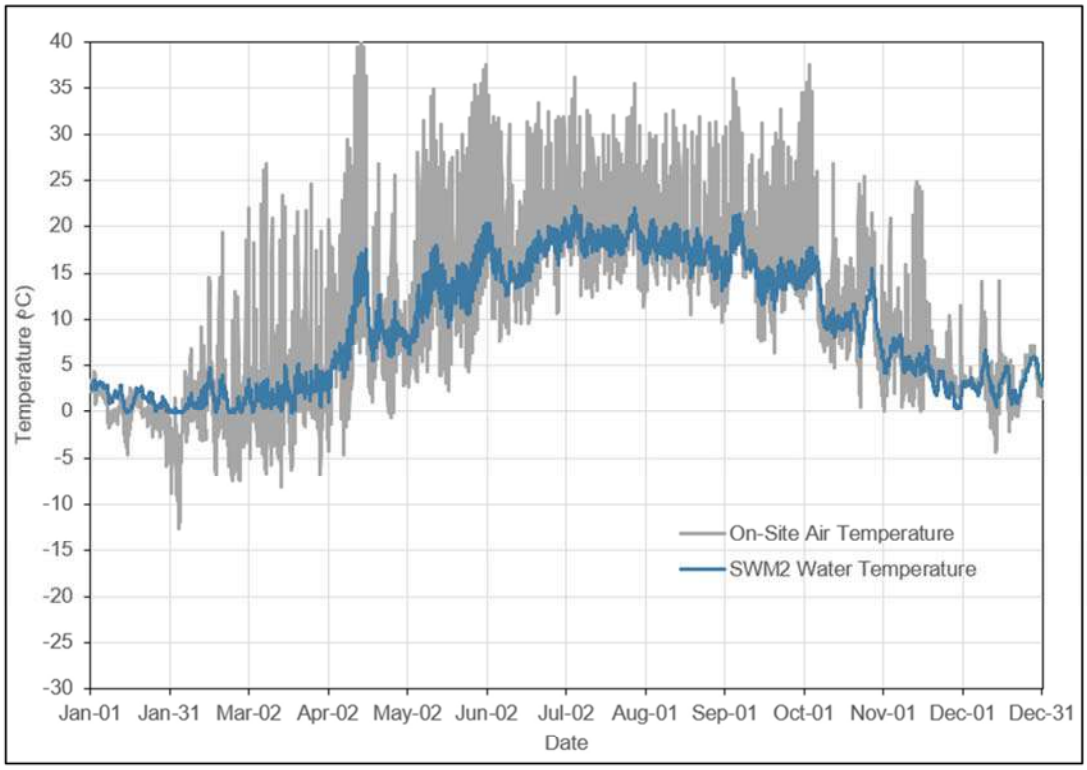

Figure 3-18: 2023 Air and Water Temperature at SWM2

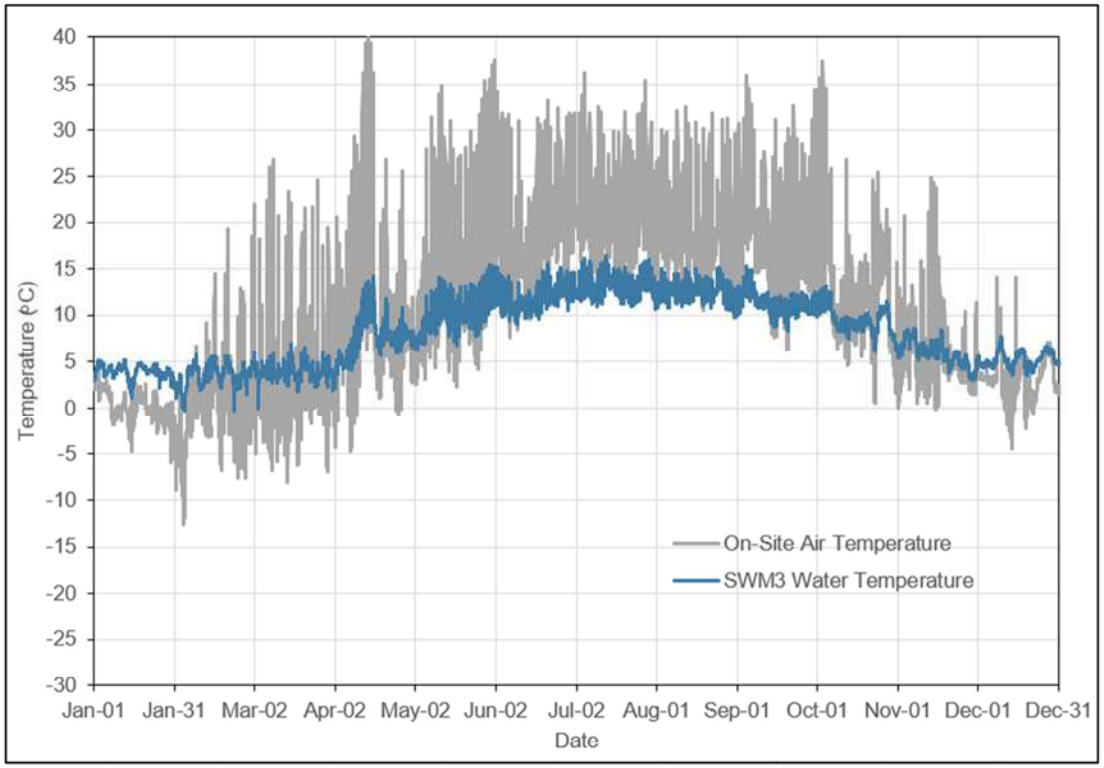

Figure 3-19: 2023 Air and Water Temperature at SWM3

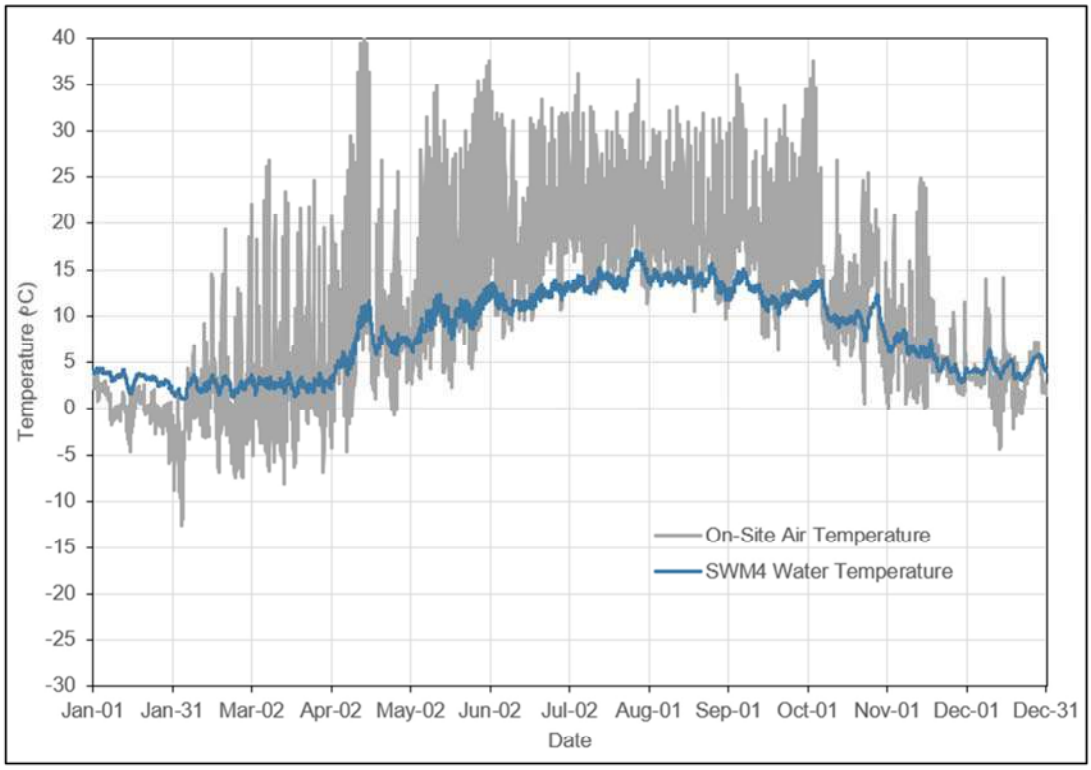

Figure 3-20: 2023 Air and Water Temperature at SWM4

The 2023 air temperature data recorded at Air Temperature Station 1 indicate that the maximum hourly temperature recorded in 2023 was 39.9ºC on April 14. The maximum temperature recorded at Air Temperature Station 2 in 2023 was 41.7ºC on April 14. An unusual stretch of warm weather was recorded between April 11 to 16, 2023, as shown in the daily climate data from the Kitchener/Waterloo climate station (Table A-1). The maximum air temperature recorded at the Kitchener/Waterloo climate station on April 14, 2023, was 28.1ºC. It is interpreted that higher air temperature values were recorded by the on-Site loggers as a result of sunshine reaching the monitoring wells in which the barometric loggers are hung when there was a lack of tree foliage present. During the summer months, the monitoring wells would be shaded by foliage.

The maximum temperature recorded at the Kitchener/Waterloo climate station in 2023 was 31.8ºC, recorded on June 2. The maximum air temperature recorded at Air Temperature Station 1 on June 2, 2023, was 34.1ºC.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings presented in this report, the following conclusions are provided.

- The 2023 monitoring program was completed in accordance with the surface water monitoring program required by the monitoring conditions.
- Based on the results of the 2023 and historical surface water monitoring program, there is no indication that aggregate extraction activities on the Dufferin Aggregates Mill Creek Pit Property, or the resulting ponds, have affected stream flow or water temperatures in Mill Creek.
- Considering the extensive history of surface water monitoring data demonstrating a lack of surface water flow impacts by the pit operations, consideration should be given to reducing the surface water monitoring program.

5.0 REFERENCES

Stantec Consulting Ltd., March 28, 2019. Technical Appendix A of the Mill Creek Coordinated Monitoring Report: 2018 Surface Water Monitoring Report. Final Report.

WSP Canada Inc., March 25, 2021. Appendix A of the 2020 Coordinated Monitoring Report: Mill Creek Aggregates Pit Surface Water. For Dufferin Aggregates, a CRH Company.

WSP Canada Inc., March 28, 2022. Appendix A of the 2021 Coordinated Monitoring Report: Mill Creek Aggregates Pit Surface Water. For Dufferin Aggregates, a Division of CRH Canada Inc.

WSP Canada Inc., March 29, 2023. Appendix A of the 2022 Coordinated Monitoring Report: Mill Creek Aggregates Pit Surface Water. For Dufferin Aggregates, a Division of CRH Canada Inc.

Signature Page

WSP Canada Inc.

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Project Engineer, Earth & Environment

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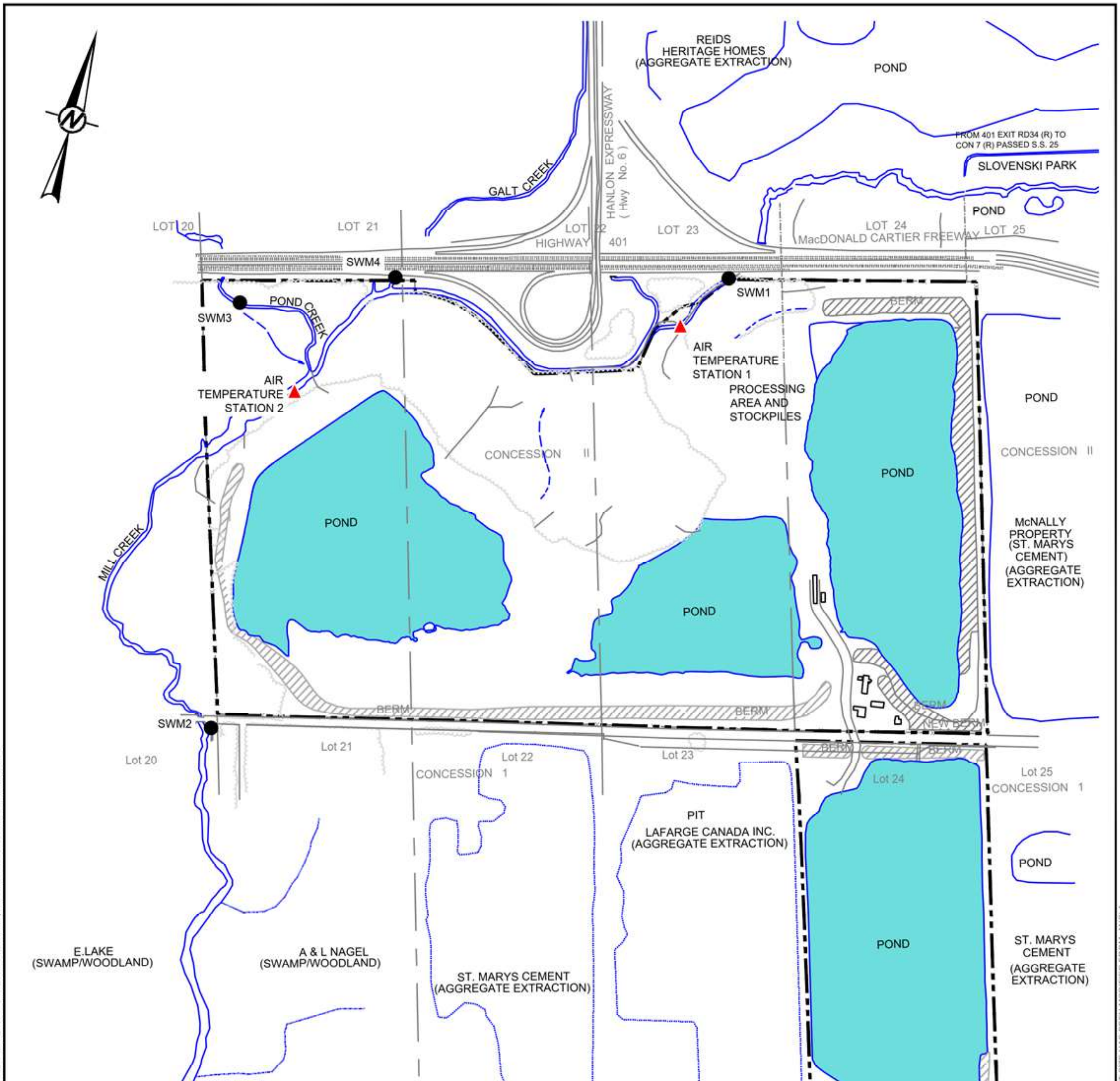
Director, Earth & Environment

RW/GS/rc

FIGURES



LEGEND

- HYDRO/TELEPHONE LINE
- POST AND WIRE FENCE
- BUILDING
- AIR TEMPERATURE MONITORING LOCATION
- GATE
- WOODLANDS/FOREST (MIXED)
- SURFACE WATER MONITORING (SWM) STATION
- POND
- NATURAL DRAINAGE
- CREEK
- BOUNDARY OF LICENSED PROPERTY

0 250 500
1:12,500 METRES

CLIENT DUFFERIN AGGREGATES		PROJECT 2023 ANNUAL SURFACE WATER MONITORING REPORT MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH	
CONSULTANT wsp	YYYY-MM-DD	2024-02-20	TITLE **SURFACE WATER MONITORING LOCATIONS**
	DESIGNED	-	
	PREPARED	SV	
	REVIEWED	RW	PROJECT NO. CA0019938.6257 · CONTROL 0001 · REV. A · FIGURE 1
	APPROVED	RW	

APPENDIX A

Climate Data

(Technical Appendix A - 2023 Surface Water Report)

Table A-1: 2023 Daily Climate Data from GRCA Shade's Mills Climate Station

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Mean Daily Temperature (°C)	Rain (mm)	Snow (cm)	Total Precipitation (mm)
01-Jan-23	4.1	1	2.6	4	0	4
02-Jan-23	3.9	-2.4	0.8	0.8	0	0.8
03-Jan-23	3.2	-2	0.6	0.8	0	0.8
04-Jan-23	2.4	1.5	2	7	0	7
05-Jan-23	2.9	0.5	1.7	17	0	17
06-Jan-23	2.1	0.3	1.2	1	0	1
07-Jan-23	1	-6.1	-2.6	0.6	0	0.6
08-Jan-23	-3	-6.5	-4.8	0	0	0
09-Jan-23	-0.2	-3.6	-1.9	0	0	0
10-Jan-23	0	-2.3	-1.2	0.2	0	0.2
11-Jan-23	0.4	-3.3	-1.5	0	0	0
12-Jan-23	2.4	-1.2	0.6	1.2	0	1.2
13-Jan-23	-1.2	-8.2	-4.7	2	5.5	7.5
14-Jan-23	-4.5	-15.4	-10	0	0	0
15-Jan-23	-2	-16.5	-9.3	0	0	0
16-Jan-23	2.1	-8.9	-3.4	0	0	0
17-Jan-23	4.3	-0.1	2.1	4.2	0	4.2
18-Jan-23	3	0.4	1.7	2	0	2
19-Jan-23	1.8	0.1	1	1	0	1
20-Jan-23	2.5	-2.3	0.1	9.8	0	9.8
21-Jan-23	-1.1	-2.4	-1.8	0	0	0
22-Jan-23	-0.8	-7.8	-4.3	0	0	0
23-Jan-23	0.3	-6.6	-3.2	0	3.4	3.4
24-Jan-23	0.8	-6.3	-2.8	0	0	0
25-Jan-23	-0.1	-6.3	-3.2	0	0	0
26-Jan-23	-0.3	-4.1	-2.2			0.2
27-Jan-23	0.7	-4.6	-2	0	1.5	1.5
28-Jan-23	1	-4.7	-1.9	0	6	6
29-Jan-23	1.2	-9.8	-4.3	0	3	3
30-Jan-23	-4.1	-12.8	-8.5	0	0	0
31-Jan-23	-8.7	-15.4	-12.1	0	0	0
01-Feb-23	-6.6	-12.8	-9.7	0	0	0
02-Feb-23	-0.4	-11.1	-5.8	0	0	0
03-Feb-23	-11.1	-20.9	-16	0	2	2
04-Feb-23	-4.3	-21.9	-13.1	0	0	0
05-Feb-23	2.7	-4.3	-0.8	0	0	0
06-Feb-23	-0.2	-6.8	-3.5	0	0	0
07-Feb-23	5	-10	-2.5	0	0	0
08-Feb-23	4.4	-4.3	0.1	0	0	0
09-Feb-23	5.7	-3.7	1	4.6	0	4.6
10-Feb-23	3.2	-3	0.1	26.2	0	26.2
11-Feb-23	1.4	-3.4	-1	0	0	0
12-Feb-23	6.9	-6.6	0.2	0	0	0
13-Feb-23	7.2	-6.2	0.5	0	0	0
14-Feb-23	8.8	-6	1.4	0	0	0
15-Feb-23	13.8	2.6	8.2	0.8	0	0.8
16-Feb-23	3.5	-2.2	0.7	0	0	0
17-Feb-23	-0.5	-9.4	-5	3.6	0	3.6
18-Feb-23	1.9	-9.7	-3.9	0	0	0
19-Feb-23	8.1	-0.6	3.8	0	0	0
20-Feb-23	5	-4.6	0.2	0	0	0
21-Feb-23	4	-4.8	-0.4			0
22-Feb-23	-2.2	-7.8	-5	0	0	0
23-Feb-23	1.9	-9.1	-3.6	0	3	3
24-Feb-23	-1.3	-12.3	-6.8	0	0	0
25-Feb-23	-3	-10.5	-6.8	0	1	1
26-Feb-23	0.7	-9.2	-4.3	0	1	1
27-Feb-23	0.1	-11.3	-5.6	0	0	0
28-Feb-23	0.4	-5.4	-2.5	0	3	3

Note: Grey shading indicates data are not available from Shade's Mills Climate Station. Data from Kitchener/Waterloo and/or Roseville Climate Station were used to infill missing data.

Table A-1: 2023 Daily Climate Data from GRCA Shade's Mills Climate Station

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Mean Daily Temperature (°C)	Rain (mm)	Snow (cm)	Total Precipitation (mm)
01-Mar-23	1.7	-5.4	-1.9	0	0	0
02-Mar-23	2.7	-4.7	-1	0	0	0
03-Mar-23	0.5	-9.3	-4.4	0	0	0
04-Mar-23	3.2	-2	0.6	0	20	20
05-Mar-23	3.3	-6.7	-1.7	4	0	4
06-Mar-23	0.9	-6.6	-2.9	0	0	0
07-Mar-23	0.8	-4.4	-1.8			0
08-Mar-23	1	-4.9	-2	0	0	0
09-Mar-23	3.3	-7.9	-2.3	0	0	0
10-Mar-23	-1.5	-3.2	-2.4	0	2	2
11-Mar-23	-1.3	-10.1	-5.7	0	9.5	9.5
12-Mar-23	-1.8	-11.8	-6.8			0.6
13-Mar-23	-0.2	-6.7	-3.5	0	0	0
14-Mar-23	-3.7	-7.1	-5.4	0	0	0
15-Mar-23	2.5	-8	-2.8	0	0	0
16-Mar-23	7.5	-4	1.8	0	0	0
17-Mar-23	6.2	-1.5	2.4	14	0	14
18-Mar-23	-1.5	-7.8	-4.7	2.5	0	2.5
19-Mar-23	-0.6	-8.7	-4.7	0	3	3
20-Mar-23	3.9	-4.6	-0.4	0	0	0
21-Mar-23	6.6	-0.1	3.3	0	0	0
22-Mar-23	6.9	-0.9	3	1.8	0	1.8
23-Mar-23	7.5	-2.1	2.7	3.5	0	3.5
24-Mar-23	5.2	-2.4	1.4	2.2	0	2.2
25-Mar-23	10.5	-0.4	5.1	3.8	0	3.8
26-Mar-23	9.1	-2.3	3.4	10.4	0	10.4
27-Mar-23	3.2	0	1.6	2.8	0	2.8
28-Mar-23	8.3	-2.8	2.8	0	0	0
29-Mar-23	6.8	-7.2	-0.2	0	0	0
30-Mar-23	3	-10.5	-3.8	1.4	0	1.4
31-Mar-23	8.2	-1.2	3.5	0	0	0
01-Apr-23	12.8	-3	4.9	39.8	0	39.8
02-Apr-23	4.5	-5.8	-0.7	0.8	0	0.8
03-Apr-23	12.2	-2.2	5	0	0	0
04-Apr-23	10.4	4.7	7.6	7.9	0	7.9
05-Apr-23	16	2.1	9.1	2.4	0	2.4
06-Apr-23	12.9	3	8	16	0	16
07-Apr-23	4.3	-4.7	-0.2	0	0	0
08-Apr-23	8.8	-7.2	0.8	0	0	0
09-Apr-23	12.8	-4.3	4.3	0	0	0
10-Apr-23	18.4	-2.3	8.1	0	0	0
11-Apr-23	22.3	5.8	14.1	0	0	0
12-Apr-23	25.7	9.8	17.8	0	0	0
13-Apr-23	28	13.6	20.8	0	0	0
14-Apr-23	28.1	5.8	17	0	0	0
15-Apr-23	27.2	7.6	17.4	0	0	0
16-Apr-23	26.8	7.1	17	0	0	0
17-Apr-23	5	2	3.5	8	0	8
18-Apr-23	3.1	-0.5	1.3	1.5	0	1.5
19-Apr-23	7.8	-1	3.4	1.3	0	1.3
20-Apr-23	11.9	2.5	7.2	0.8	0	0.8
21-Apr-23	22	5.1	13.6	0.6	0	0.6
22-Apr-23	10.3	4.3	7.3	18.8	0	18.8
23-Apr-23	7.3	2.4	4.9	11.2	0	11.2
24-Apr-23	7.1	1.7	4.4	0.5	0	0.5
25-Apr-23	9.5	-0.4	4.6	0	0	0
26-Apr-23	9.2	-2.8	3.2	0	0	0
27-Apr-23	13.7	-4	4.9	0	0	0
28-Apr-23	12	4	8	0.8	0	0.8
29-Apr-23	10.5	5	7.8	9	0	9
30-Apr-23	10.3	3.9	7.1	1.6	0	1.6

Note: Grey shading indicates data are not available from Shade's Mills Climate Station. Data from Kitchener/Waterloo and/or Roseville Climate Station were used to infill missing data.

Table A-1: 2023 Daily Climate Data from GRCA Shade's Mills Climate Station

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Mean Daily Temperature (°C)	Rain (mm)	Snow (cm)	Total Precipitation (mm)
01-May-23	9.4	1.7	5.6	6	0	6
02-May-23	5.7	0.3	3	5	0	5
03-May-23	10.4	1	5.7	8.8	0	8.8
04-May-23	11.1	3.4	7.3	3.5	0	3.5
05-May-23	14.9	2.3	8.6	5	0	5
06-May-23	19.2	0.8	10	0	0	0
07-May-23	15.1	4.9	10	0	0	0
08-May-23	19.4	5.5	12.5	3.8	0	3.8
09-May-23	17.2	4.3	10.8	0	0	0
10-May-23	20.6	2.1	11.4	0	0	0
11-May-23	25.6	6.1	15.9	0	0	0
12-May-23	26.4	7.8	17.1	0	0	0
13-May-23	23.5	10.3	16.9	0	0	0
14-May-23	17.9	2.9	10.4	0	0	0
15-May-23	20.9	0.5	10.7	0	0	0
16-May-23	22	8.5	15.3	0	0	0
17-May-23	12	-1	5.5	0	0	0
18-May-23	16.1	-3	6.6	0	0	0
19-May-23	24.1	0.7	12.4	0	0	0
20-May-23	14.9	9.3	12.1	29	0	29
21-May-23	21.5	7.1	14.3	0.5	0	0.5
22-May-23	17.7	4.7	11.2	0	0	0
23-May-23	23.9	3.2	13.6	0	0	0
24-May-23	16.5	4.1	10.3	0	0	0
25-May-23	17.7	1.2	9.5	0	0	0
26-May-23	21.6	0.1	10.9	0	0	0
27-May-23	24.4	2.8	13.6	0	0	0
28-May-23	27.2	5.6	16.4	0	0	0
29-May-23	27	6.4	16.7	0	0	0
30-May-23	30	7.5	18.8	0	0	0
31-May-23	30.6	10.1	20.4	0	0	0
01-Jun-23	31.4	10.6	21	0	0	0
02-Jun-23	31.8	12.9	22.4	0	0	0
03-Jun-23	23.3	8.7	16	0	0	0
04-Jun-23	23.4	6.4	14.9	0	0	0
05-Jun-23	24	6.8	15.4	0	0	0
06-Jun-23	23	8.3	15.7	0	0	0
07-Jun-23	20.6	5.5	13.1	0	0	0
08-Jun-23	18.4	9.5	14	0	0	0
09-Jun-23	21.7	7.6	14.7	0.2	0	0.2
10-Jun-23	26.6	5.2	15.9	2.4	0	2.4
11-Jun-23	22.7	13.9	18.3	0.4	0	0.4
12-Jun-23	17.1	10.8	14	24.2	0	24.2
13-Jun-23	18.7	9.5	14.1	4	0	4
14-Jun-23	20.9	9.2	15.1	0	0	0
15-Jun-23	20.1	6.9	13.5	0.2	0	0.2
16-Jun-23	21.7	12.3	17	1	0	1
17-Jun-23	24.8	9.6	17.2	0	0	0
18-Jun-23	26.2	6.9	16.6	0	0	0
19-Jun-23	25.5	8.1	16.8	0	0	0
20-Jun-23	25.9	11.9	18.9	0	0	0
21-Jun-23	27.8	10	18.9	0	0	0
22-Jun-23	25.1	11.4	18.3	0	0	0
23-Jun-23	23.1	15.9	19.5	0	0	0
24-Jun-23	26.2	15.6	20.9	4	0	4
25-Jun-23	28.9	14.8	21.9	15	0	15
26-Jun-23	24.3	17.5	20.9	1	0	1
27-Jun-23	23	17.5	20.3	24.5	0	24.5
28-Jun-23	23	12	17.5	3.2	0	3.2
29-Jun-23	25.8	7.5	16.7	0	0	0
30-Jun-23	28.3	16.2	22.3	1	0	1

Note: Grey shading indicates data are not available from Shade's Mills Climate Station. Data from Kitchener/Waterloo and/or Roseville Climate Station were used to infill missing data.

Table A-1: 2023 Daily Climate Data from GRCA Shade's Mills Climate Station

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Mean Daily Temperature (°C)	Rain (mm)	Snow (cm)	Total Precipitation (mm)
01-Jul-23	28.8	16.4	22.6	0	0	0
02-Jul-23	22	18.3	20.2	0	0	0
03-Jul-23	26.1	15.1	20.6	14.4	0	14.4
04-Jul-23	30.4	13.9	22.2	13	0	13
05-Jul-23	31.6	14.9	23.3	0.5	0	0.5
06-Jul-23	30.4	16.5	23.5	0	0	0
07-Jul-23	23.9	10	17	18.8	0	18.8
08-Jul-23	23.6	9	16.3	0	0	0
09-Jul-23	24.4	12.6	18.5	6.4	0	6.4
10-Jul-23	27.2	10.9	19.1	0	0	0
11-Jul-23	28.1	12.1	20.1	0	0	0
12-Jul-23	23.7	10.8	17.3	14	0	14
13-Jul-23	22.5	11.1	16.8	35.8	0	35.8
14-Jul-23	26	10	18	0.4	0	0.4
15-Jul-23	24.4	15.4	19.9	0	0	0
16-Jul-23	25.9	17.3	21.6	9	0	9
17-Jul-23	25.5	13.9	19.7	0.8	0	0.8
18-Jul-23	24.4	11.1	17.8	5.4	0	5.4
19-Jul-23	25.5	9.7	17.6	0.6	0	0.6
20-Jul-23	28.1	12.5	20.3	0	0	0
21-Jul-23	24.9	13.7	19.3	6.2	0	6.2
22-Jul-23	25.4	12.2	18.8	0	0	0
23-Jul-23	27.4	10.8	19.1	0	0	0
24-Jul-23	26.5	13.8	20.2	1.5	0	1.5
25-Jul-23	27.4	14.3	20.9	0.5	0	0.5
26-Jul-23	28.9	17.6	23.3	0	0	0
27-Jul-23	28.3	16.6	22.5	23.5	0	23.5
28-Jul-23	30.2	15	22.6	0.9	0	0.9
29-Jul-23	23.5	12.4	18	4	0	4
30-Jul-23	23.7	10.9	17.3	47.5	0	47.5
31-Jul-23	23.6	9.2	16.4	0	0	0
01-Aug-23	23.8	8.1	16	0	0	0
02-Aug-23	24.7	9.8	17.3	0.2	0	0.2
03-Aug-23	27.9	16.7	22.3	4.5	0	4.5
04-Aug-23	26.3	14.4	20.4	0.4	0	0.4
05-Aug-23	24	11.3	17.7	0	0	0
06-Aug-23	24.6	9.3	17	0	0	0
07-Aug-23	24.2	15.9	20.1	3.8	0	3.8
08-Aug-23	24.6	12.7	18.7	0.5	0	0.5
09-Aug-23	27.6	13.1	20.4	0.2	0	0.2
10-Aug-23	24	14.5	19.3	0	0	0
11-Aug-23	24.2	11.5	17.9	5.9	0	5.9
12-Aug-23	26.9	14.4	20.7	0.2	0	0.2
13-Aug-23	23.6	13.1	18.4	17	0	17
14-Aug-23	24.4	12.9	18.7	0	0	0
15-Aug-23	18.6	14.8	16.7	1.2	0	1.2
16-Aug-23	25.9	13.9	19.9	30.2	0	30.2
17-Aug-23	25.3	14.8	20.1	0.4	0	0.4
18-Aug-23	16.6	8.7	12.7	11.6	0	11.6
19-Aug-23	23.6	8.3	16	0.2	0	0.2
20-Aug-23	27.7	15.1	21.4	0	0	0
21-Aug-23	24.5	13.1	18.8	0	0	0
22-Aug-23	23.8	9.8	16.8	0	0	0
23-Aug-23	17.5	13.7	15.6	4.2	0	4.2
24-Aug-23	25	16	20.5	11.2	0	11.2
25-Aug-23	22.8	13.7	18.3	19.8	0	19.8
26-Aug-23	24.8	12.9	18.9	0.2	0	0.2
27-Aug-23	21.3	8.1	14.7	0	0	0
28-Aug-23	23.5	7.1	15.3	0	0	0
29-Aug-23	24.1	8.2	16.2	0	0	0
30-Aug-23	16.3	8.2	12.3	4.4	0	4.4
31-Aug-23	22.1	6.7	14.4	0.4	0	0.4

Note: Grey shading indicates data are not available from Shade's Mills Climate Station. Data from Kitchener/Waterloo and/or Roseville Climate Station were used to infill missing data.

Table A-1: 2023 Daily Climate Data from GRCA Shade's Mills Climate Station

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Mean Daily Temperature (°C)	Rain (mm)	Snow (cm)	Total Precipitation (mm)
01-Sep-23	23.6	7	15.3	0	0	0
02-Sep-23	23.5	8.9	16.2	0	0	0
03-Sep-23	28.5	13	20.8	0	0	0
04-Sep-23	30.3	16.9	23.6	0	0	0
05-Sep-23	31.2	14.8	23	0	0	0
06-Sep-23	30.5	17.6	24.1	0	0	0
07-Sep-23	25.9	14.9	20.4	2.2	0	2.2
08-Sep-23	17.4	12.5	15	0.3	0	0.3
09-Sep-23	18.8	13	15.9	0	0	0
10-Sep-23	21	15	18	0	0	0
11-Sep-23	21.5	14.5	18	0	0	0
12-Sep-23	20.5	13.2	16.9	7.6	0	7.6
13-Sep-23	17.4	7.2	12.3	2	0	2
14-Sep-23	18.3	4.8	11.6	0.4	0	0.4
15-Sep-23	20	3	11.5	0.1	0	0.1
16-Sep-23	20.2	4	12.1	0	0	0
17-Sep-23	21.3	10.9	16.1	0	0	0
18-Sep-23	18.9	7.8	13.4	6.2	0	6.2
19-Sep-23	19.5	4.7	12.1	1	0	1
20-Sep-23	20.8	1.9	11.4	0	0	0
21-Sep-23	23.7	11.3	17.5	0	0	0
22-Sep-23	21.8	9.3	15.6	0	0	0
23-Sep-23	20.6	6.8	13.7	0.1	0	0.1
24-Sep-23	20.9	6.8	13.9	0.2	0	0.2
25-Sep-23	22.4	14	18.2	0	0	0
26-Sep-23	19.4	13.3	16.4	0	0	0
27-Sep-23	19.4	11.9	15.7	0	0	0
28-Sep-23	18.7	10.2	14.5	0	0	0
29-Sep-23	21.7	9.3	15.5	2	0	2
30-Sep-23	24.1	9	16.6	0	0	0
01-Oct-23	24.8	8.7	16.8	0	0	0
02-Oct-23	27	10	18.5	0.1	0	0.1
03-Oct-23	28.4	10.6	19.5	0	0	0
04-Oct-23	28.4	10.7	19.6	0	0	0
05-Oct-23	24.8	15.9	20.4	0	0	0
06-Oct-23	20.4	7	13.7	18.4	0	18.4
07-Oct-23	12.9	6.8	9.9	0.3	0	0.3
08-Oct-23	10.2	6	8.1	2.1	0	2.1
09-Oct-23	9.1	5.2	7.2	2.2	0	2.2
10-Oct-23	11.7	5.8	8.8	0	0	0
11-Oct-23	12.5	2.3	7.4	1.8	0	1.8
12-Oct-23	15.3	2.2	8.8	0.2	0	0.2
13-Oct-23	13.4	0.5	7	0	0	0
14-Oct-23	12.4	5.4	8.9	6.2	0	6.2
15-Oct-23	9	5.6	7.3	1	0	1
16-Oct-23	11.2	4.1	7.7	0.9	0	0.9
17-Oct-23	13.9	6.9	10.4	0.2	0	0.2
18-Oct-23	14.6	6	10.3	0	0	0
19-Oct-23	15.2	4.6	9.9	0.2	0	0.2
20-Oct-23	14.1	8.8	11.5	1	0	1
21-Oct-23	10.2	4.2	7.2	10.2	0	10.2
22-Oct-23	9	-2.5	3.3	0	0	0
23-Oct-23	13.1	-4.5	4.3	0	0	0
24-Oct-23	20.3	4.7	12.5	0	0	0
25-Oct-23	19.7	13.6	16.7	0	0	0
26-Oct-23	18.9	14.2	16.6	5.8	0	5.8
27-Oct-23	21.9	16.1	19			0
28-Oct-23	17.6	3.6	10.6	1	0	1
29-Oct-23	6.3	3.5	4.9	1.6	0	1.6
30-Oct-23	5.2	0.5	2.9	6	0	6
31-Oct-23	5.1	-2.6	1.3	1.8	0	1.8

Note: Grey shading indicates data are not available from Shade's Mills Climate Station. Data from Kitchener/Waterloo and/or Roseville Climate Station were used to infill missing data.

Table A-1: 2023 Daily Climate Data from GRCA Shade's Mills Climate Station

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Mean Daily Temperature (°C)	Rain (mm)	Snow (cm)	Total Precipitation (mm)
01-Nov-23	4.4	-3.2	0.6	0	0	0
02-Nov-23	7.8	0.1	4	0	0	0
03-Nov-23	13.9	4.3	9.1	0	0	0
04-Nov-23	9.5	0.4	5	3.7	0	3.7
05-Nov-23	8.2	-2.4	2.9	0	0	0
06-Nov-23	12.9	4.5	8.7	0	0	0
07-Nov-23	11.6	-0.6	5.5	6	0	6
08-Nov-23	2.3	-4.3	-1	0	0	0
09-Nov-23	10.3	2.1	6.2	15.6	0	15.6
10-Nov-23	9.5	0.8	5.2	0	0	0
11-Nov-23	4.7	-2.4	1.2	0	0	0
12-Nov-23	6.5	-3.1	1.7	0	0	0
13-Nov-23	12.4	-1.2	5.6	0	0	0
14-Nov-23	8.6	-3.1	2.8	0	0	0
15-Nov-23	13.8	-4.5	4.7	0	0	0
16-Nov-23	14.6	-4.5	5.1	0	0	0
17-Nov-23	13.6	-2.5	5.6	0.2	0	0.2
18-Nov-23	7.2	-6.3	0.5	1.6	0	1.6
19-Nov-23	5.8	-7.5	-0.9	0	0	0
20-Nov-23	0.7	-9.6	-4.5	0	0	0
21-Nov-23	5.7	-1.5	2.1	0	0	0
22-Nov-23	6.3	1.4	3.9	12.4	0	12.4
23-Nov-23	5.2	-1.1	2.1	0	0	0
24-Nov-23	0.8	-4	-1.6	0	0	0
25-Nov-23	2.4	-3.8	-0.7	0	0	0
26-Nov-23	5.3	-5.9	-0.3	0	0	0
27-Nov-23	0.7	-5.9	-2.6			0
28-Nov-23	-2.5	-6.7	-4.6	0	2.2	2.2
29-Nov-23	-1.1	-7.9	-4.5	0	0	0
30-Nov-23	8	-6.9	0.6	0	0	0
01-Dec-23	6.8	-0.3	3.3	1	0	1
02-Dec-23	2.7	0.4	1.6	15.3	0	15.3
03-Dec-23	2.4	0	1.2	1	0	1
04-Dec-23	2.1	-2.4	-0.2	4.2	0	4.2
05-Dec-23	0.8	-0.9	-0.1	0	0	0
06-Dec-23	0	-3.2	-1.6	0	0	0
07-Dec-23	3.2	-0.8	1.2	0	1	1
08-Dec-23	10.2	-2.1	4.1	0.2	0	0.2
09-Dec-23	12	7.6	9.8	0	0	0
10-Dec-23	7.6	-0.2	3.7	3.2	0	3.2
11-Dec-23	1	-1.8	-0.4	1	0	1
12-Dec-23	4	-3.1	0.5	0	0	0
13-Dec-23	1.7	-6.4	-2.4	0	0	0
14-Dec-23	5.7	-5.6	0.1	0	0	0
15-Dec-23	10.5	2.7	6.6	0	0	0
16-Dec-23	6.7	0.8	3.8	0	0	0
17-Dec-23	6.2	3.1	4.7	1	0	1
18-Dec-23	5.4	-3.8	0.8	8.4	0	8.4
19-Dec-23	-1.4	-5.7	-3.6	2.6	0	2.6
20-Dec-23	2.1	-2.5	-0.2	0	0	0
21-Dec-23	0.6	-4.3	-1.9	0	0	0
22-Dec-23	0	-4.3	-2.2	0	0	0
23-Dec-23	3.2	-0.1	1.6	0.6	0	0.6
24-Dec-23	4.4	1.4	2.9	7	0	7
25-Dec-23	6.1	2.7	4.4	0.4	0	0.4
26-Dec-23	7.1	3	5.1	0.2	0	0.2
27-Dec-23	7.9	5.9	6.9	11.2	0	11.2
28-Dec-23	6.9	5.2	6.1	12.5	0	12.5
29-Dec-23	5.5	-0.1	2.7	2.2	0	2.2
30-Dec-23	0.1	-1.5	-0.7	3.9	0	3.9
31-Dec-23	0.6	-1.6	-0.5	0	0	0

Note: Grey shading indicates data are not available from Shade's Mills Climate Station. Data from Kitchener/Waterloo and/or Roseville Climate Station were used to infill missing data.

Table A-2: Mean Monthly Air Temperature at GRCA Shade's Mills Climate Station (2000-2023)

Year	Mean Monthly Air Temperature (°C)												Annual Average (°C)
	January	February	March	April	May	June	July	August	September	October	November	December	
2000	-7	-4	4	6	14	18	19	18	14	10	2	-9	7
2001	-5	-4	-2	7	13	19	19	21	15	9	6	0	8
2002	-2	-3	0	6	10	18	22	20	18	7	2	-4	8
2003	-10	-9	-3	5	11	17	19	20	15	7	4	-2	6
2004	-10	-6	1	6	12	16	19	17	16	9	4	-5	6
2005	-8	-6	-4	6	10	21	21	20	16	10	4	-5	5
2006	-1	-5	0	7	13	18	21	18	14	7	4	0	8
2007	-5	-10	-1	5	13	19	19	19	16	12	1	-4	7
2008	-4	-7	-4	8	10	18	20	18	15	8	1	-4	8
2009	-11	-5	0	7	12	16	17	19	15	7	5	-4	7
2010	-6	-5	3	9	14	18	21	20	14	9	3	-5	8
2011	-10.2	-7.8	-3.6	5.5	12.6	16.6	21.4	19.0	15.0	8.9	4.8	-1.3	7.5
2012	-3.9	-2.5	5.5	5.0	14.8	18.3	21.7	18.5	13.8	8.6	1.6	-0.7	8.4
2013	-3.5	-6.9	-1.3	5.4	15.4	19.3	22.6	20.7	16.5	10.8	2.0	-4.1	8.1
2014	-9.5	-9.8	-5.9	6.2	14.3	20.7	20.4	20.0	16.5	10.3	1.0	-0.4	7.0
2015	-9	-14	-3	7	17	18	22	20	20	10	6	4	8
2016	-4.5	-3.0	2.4	4.7	14.9	19.7	23.4	23.8	19.1	11.8	6.3	-2.0	9.7
2017	-2.2	-0.3	-0.3	9.2	12.5	19.5	21.6	20.4	18.8	13.1	3.1	-4.9	9.2
2018	-6.9	-2.5	-0.3	3.0	17.9	19.7	23.4	23.3	19.4	9.5	1.6	0.4	9.0
2019	-6.7	-4.8	-1.5	5.9	12.8	18.8	23.7	21.3	17.8	10.6	0.9	-0.9	8.2
2020	-1.4	-3.6	2.4	5.8	12.7	20.5	25.0	22.2	16.1	9.3	6.4	-0.6	9.6
2021	-2.7	-6.1	3.4	8.9	14.1	22.1	21.3	23.8	17.5	13.9	3.6	0.9	10.1
2022	-8.4	-5.4	1.0	6.9	16.1	19.8	22.7	22.3	17.8	10.0	4.7	-0.9	8.9
2023	-2.3	-2.8	-0.6	7.8	12.2	17.4	19.5	17.8	16.2	10.2	2.2	1.8	8.3
30-Year Normal *	-5.5	-4.9	-0.2	6.5	13.8	19.5	21.9	20.2	16.7	9.8	3.5	-1.9	8.3

Notes: 2023 air temperature data from GRCA Shade's Mill Climate Station is unavailable. Data shown is from Kitchener/Waterloo Climate Station.
* 30-year normal average temperature calculated from GRCA Shade's Mills climate station data between 1991-2020

Table A-3: Total Monthly Precipitation at GRCA Shade's Mills Climate Station (2000-2023)

Year	Total Monthly Precipitation (mm)												Annual Total (mm)
	January	February	March	April	May	June	July	August	September	October	November	December	
2000	39.9	48.5	45.0	75.2	145.3	150.0	98.0	53.0	95.5	21.1	70.3	91.1	933
2001	43.8	110.9	42.5	45.5	88.2	53.7	21.5	57.8	87.9	131.3	91.9	62.0	837
2002	64.3	66.5	64.4	110.1	105.9	95.8	69.0	10.7	80.7	55.7	57.0	16.0	796
2003	31.1	52.0	57.0	62.0	97.6	39.1	65.3	123.5	105.5	70.6	146.9	79.4	930
2004	37.5	22.0	84.5	63.5	116.5	60.5	86.0	45.0	27.0	70.5	66.0	77.5	757
2005	59.5	59.5	17.0	52.0	27.0	36.0	190.5	109.0	80.5	36.0	103.0	33.0	803
2006	93.8	85.0	62.8	69.5	93.5	18.0	182.5	38.0	141.0	45.0	105.4	85.6	1020
2007	73.3	65.0	53.4	103.8	103.0	25.5	66.5	56.5	45.6	61.6	83.3	89.0	827
2008	98.5	57.4	85.5	64.6	86.1	81.6	131.3	120.7	119.3	68.4	103.1	100.4	1117
2009	30.5	68.0	59.0	113.5	79.0	84.0	114.5	108.0	32.0	72.5	33.0	58.5	853
2010	20.5	14.5	47.0	57.7	67.1	130.7	129.3	27.7	112.6	76.2	33.2	14.2	731
2011	47.6	58.2	86.1	100.7	113.3	87.0	31.9	158.6	76.1	128.9	90.5	85.5	1064
2012	46.8	32.0	31.0	30.0	28.2	64.6	30.4	62.6	106.2	127.3	40.2	79.9	679
2013	80.5	71.2	40.6	123.8	102.0	122.3	130.9	69.5	142.9	142.9	33.7	52.2	1113
2014	90.7	70.5	45.0	87.2	79.1	51.6	127.9	25.2	144.2	71.8	78.2	27.3	899
2015	35.0	56.3	14.0	98.9	69.4	160.3	69.7	85.0	72.6	84.0	54.4	59.2	859
2016	44.8	52.4	99.5	90.8	31.8	42.2	93.0	183.3	68.8	45.8	67.6	113.5	934
2017	110.2	77.1	93.4	120.3	137.1	78.9	92.6	138.0	25.5	76.6	88.7	53.4	1092
2018	87.4	81.5	32.5	139.7	57.3	86.5	71.1	165.5	51.1	92.9	121.4	55.3	1042
2019	74.7	66.4	73.4	99.3	123.3	79.8	143.0	64.6	79.5	141.1	62.4	55.6	1063
2020	130.9	38.6	83.4	43.3	52.7	61.7	58.9	72.6	46.4	91.4	57.7	110.0	848
2021	32.6	54.2	53.4	64.9	33.0	132.2	95.3	83.5	222.7	129.7	46.1	72.4	1020
2022	36.6	109.7	64.4	36.6	55.1	57.2	33	87.2	28.2	52.5	39.7	82.1	682
2023	71.2	45.2	121.3	87.2	55.6	81.1	203.2	116.5	22.1	61	42.7	75.9	983
*30-Year Normal	77.2	58.2	63.6	84.2	82.2	84.7	95.4	76.9	82.5	81.6	76.6	71.4	935

Notes: * 30-year normal average precipitation calculated from GRCA Shade's Mills climate station data between 1991-2020

Figure A-1: 2023 Air Temperature at On-Site Monitoring Locations

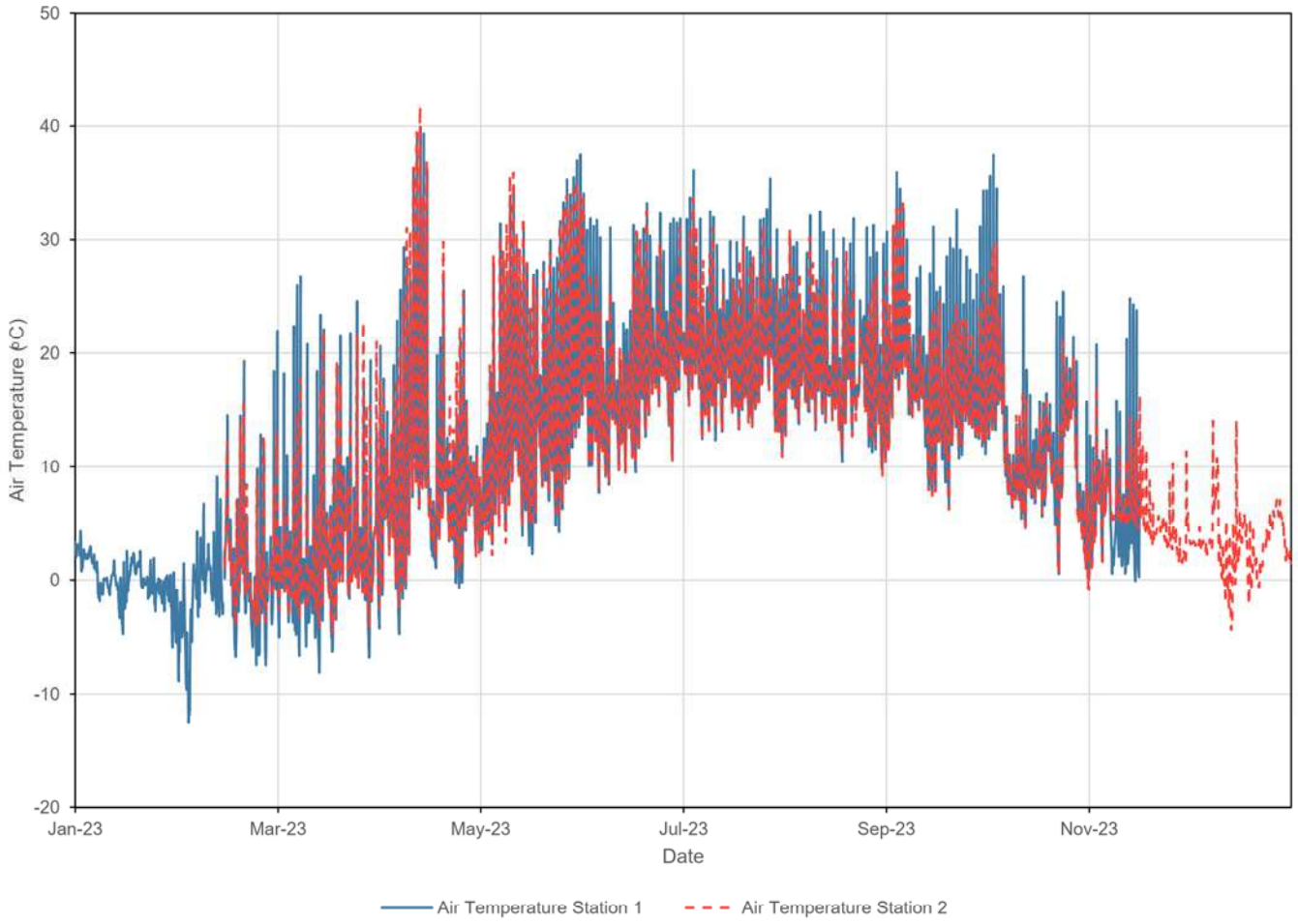


Figure A-2: 2023 Air Temperature at Two On-Site Monitoring Locations
January to March 2023

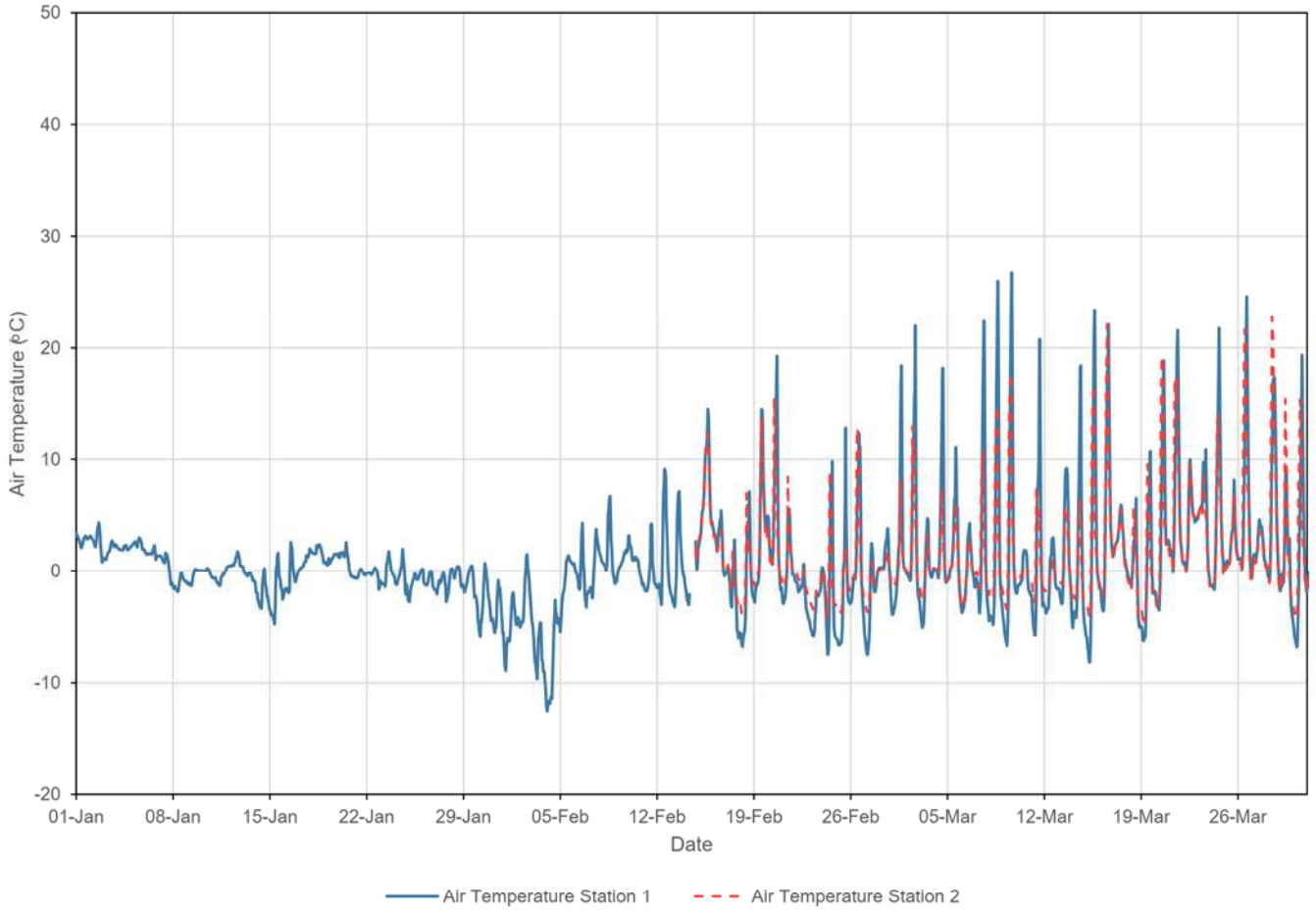


Figure A-3: 2023 Air Temperature at Two On-Site Monitoring Locations
April to June 2023

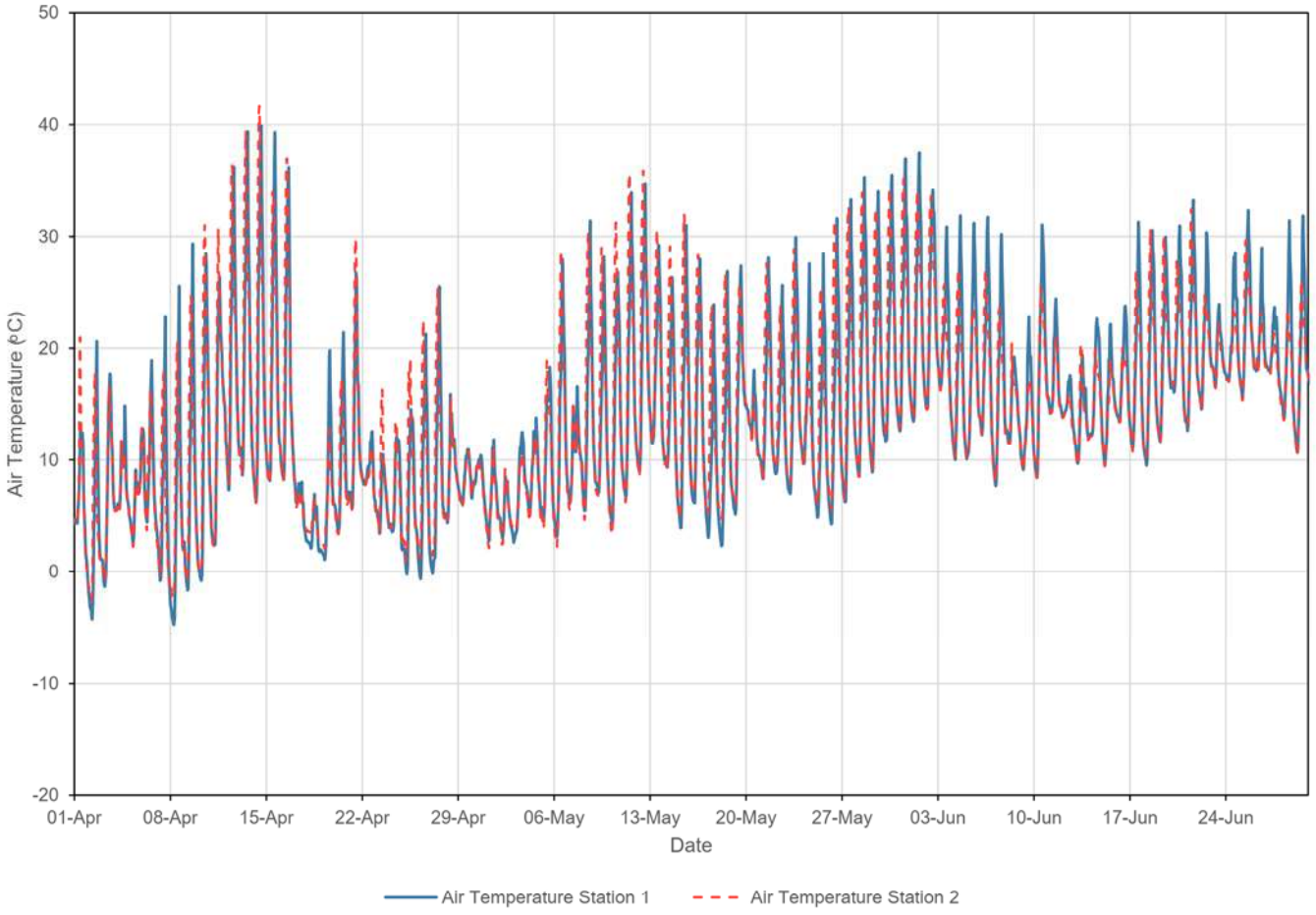


Figure A-4: 2023 Air Temperature at Two On-Site Monitoring Locations
July to September 2023

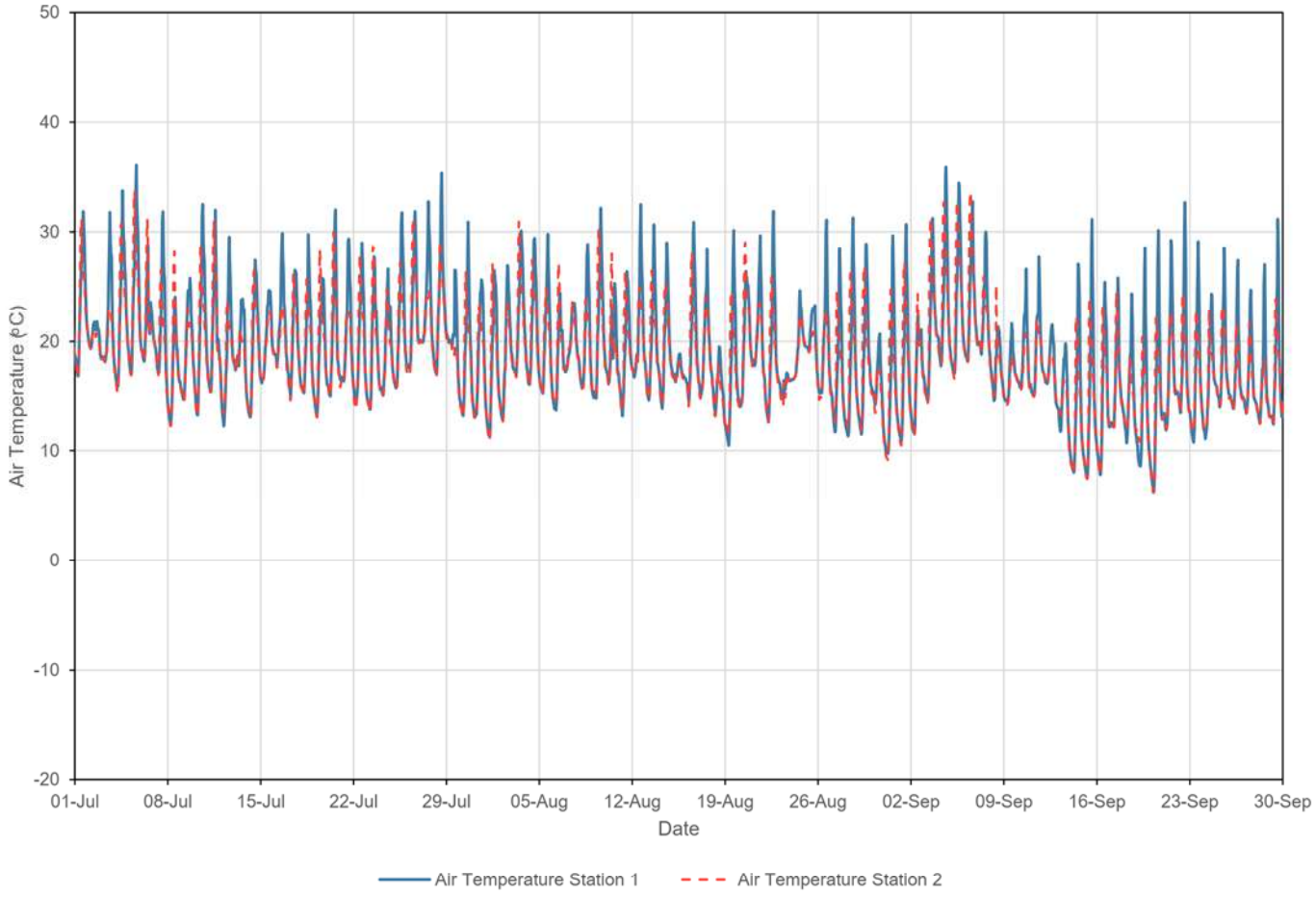


Figure A-5: 2023 Air Temperature at Two On-Site Monitoring Locations
October to December 2023

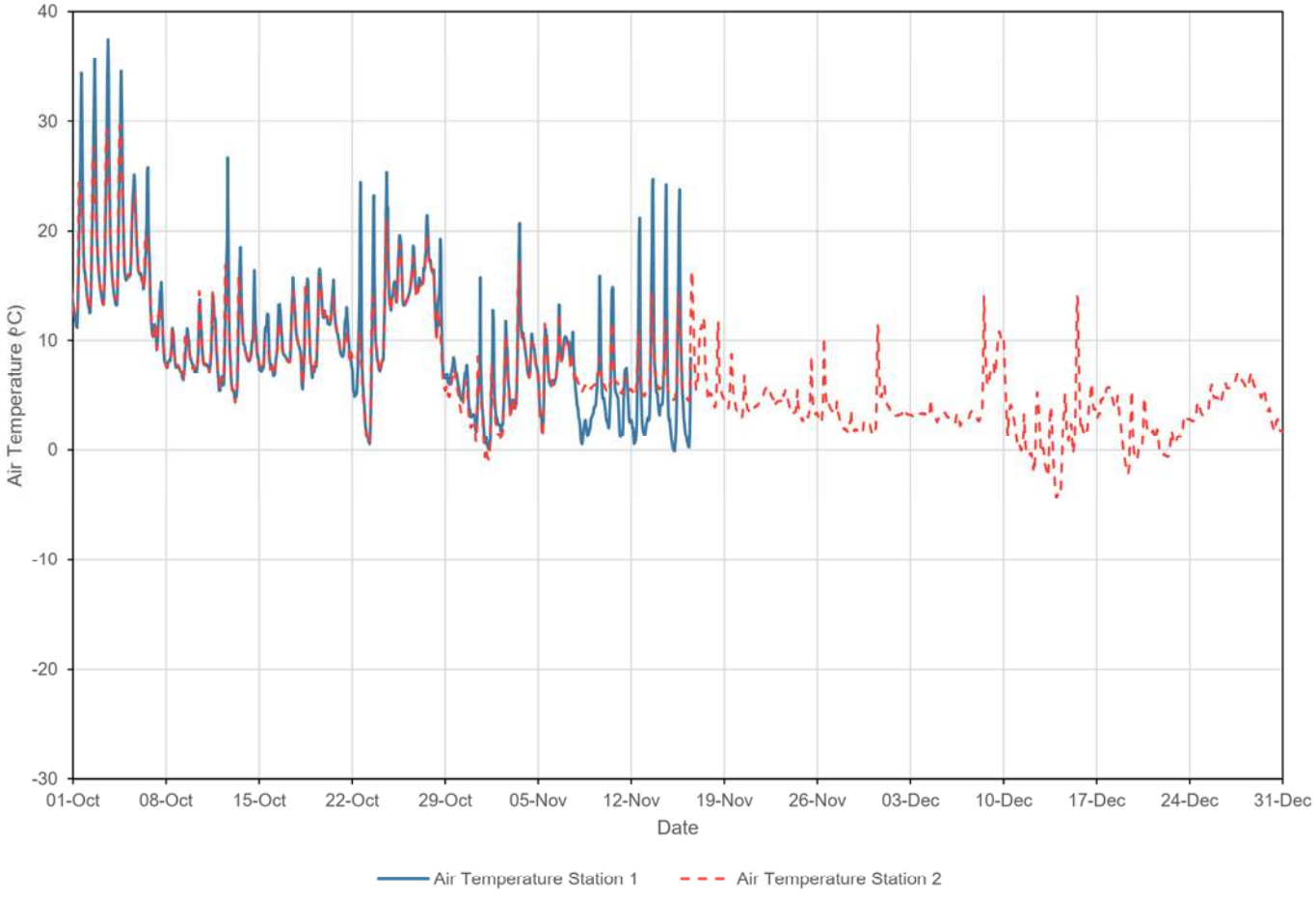


Figure A-6: 2023 Daily Precipitation at GRCA Shade's Mills Climate Station

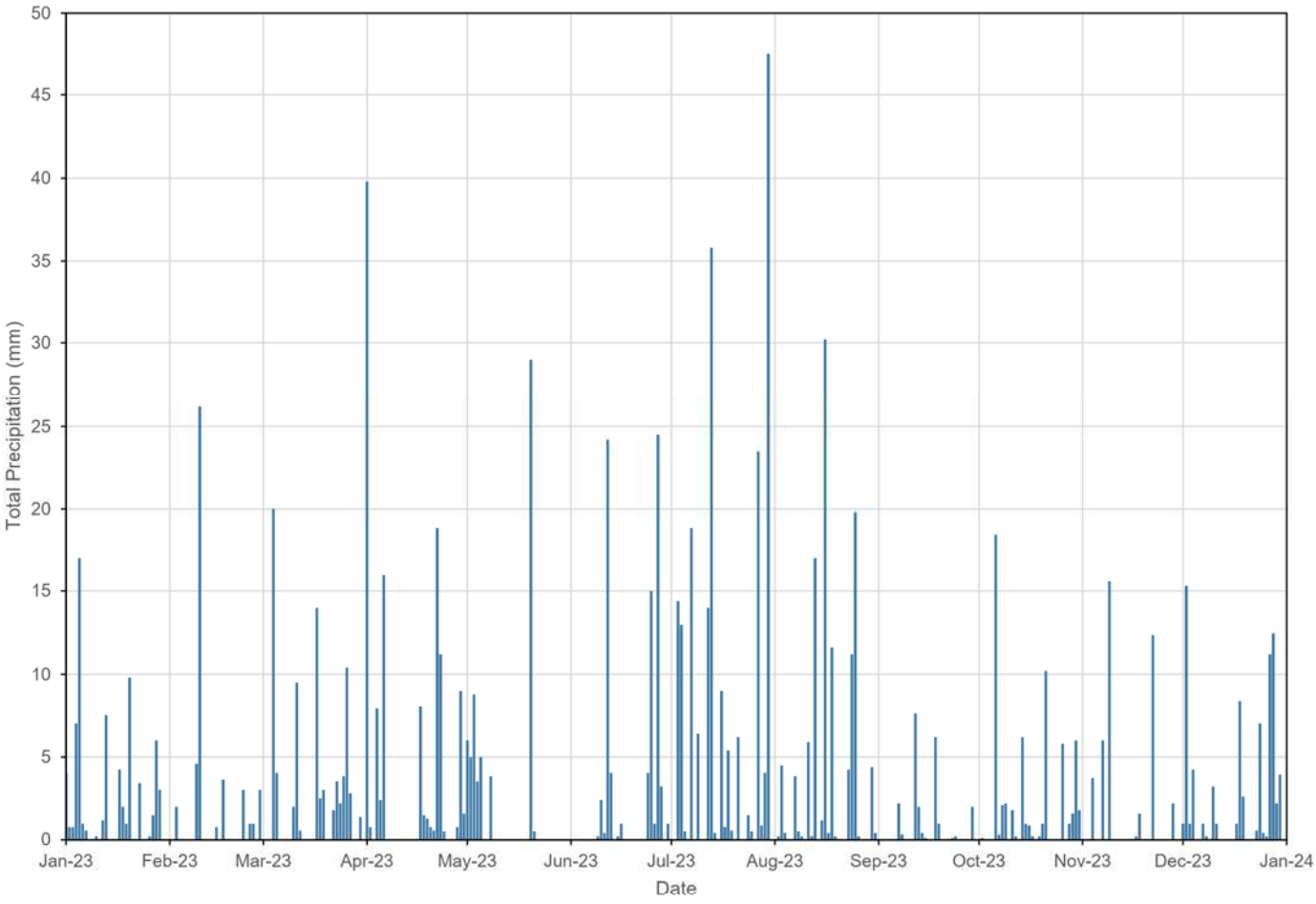


Figure A-7: 2023 Daily Precipitation at GRCA Shade's Mills Climate Station
January to March 2023

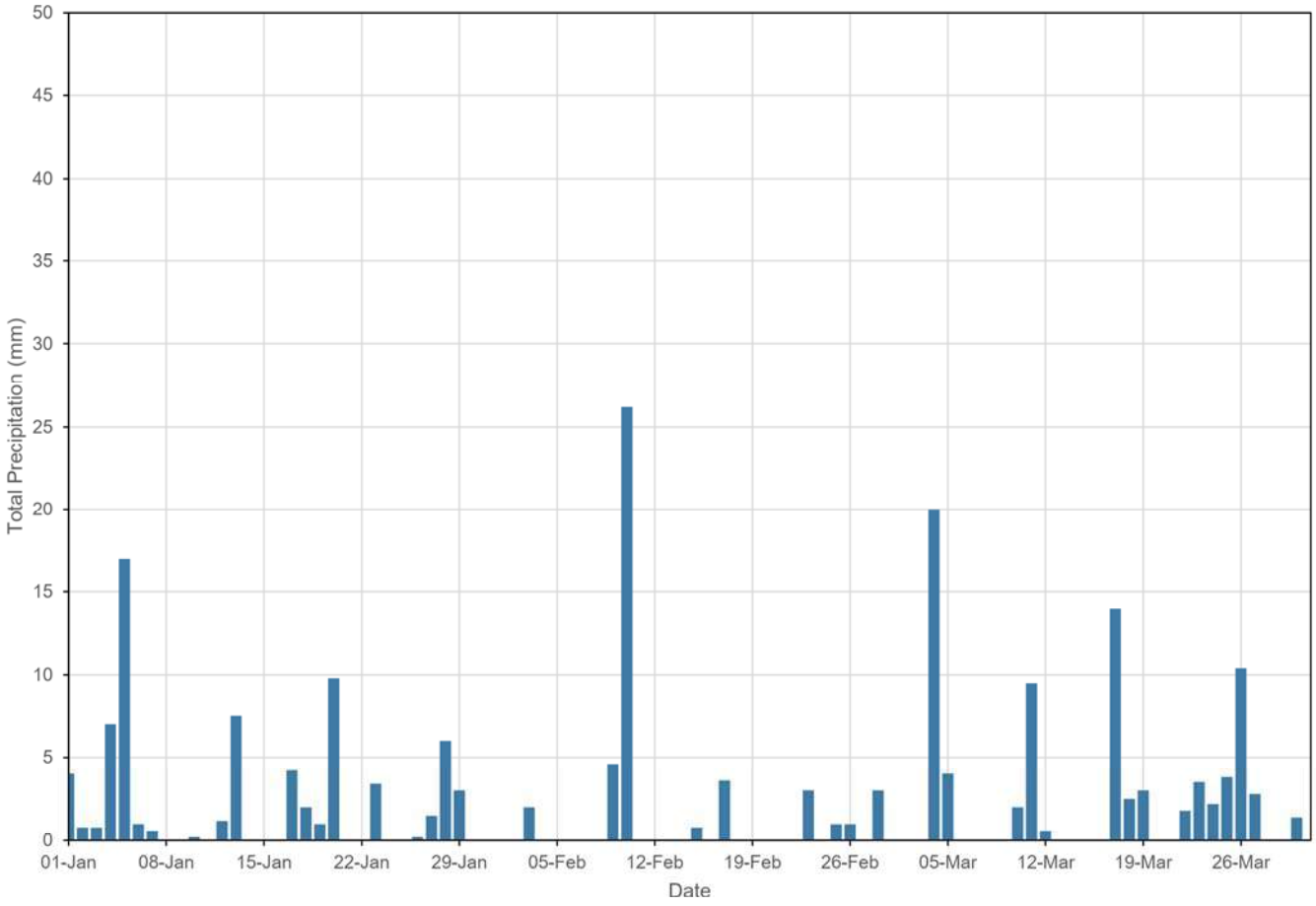


Figure A-8: 2023 Daily Precipitation at GRCA Shade's Mills Climate Station
April to June 2023

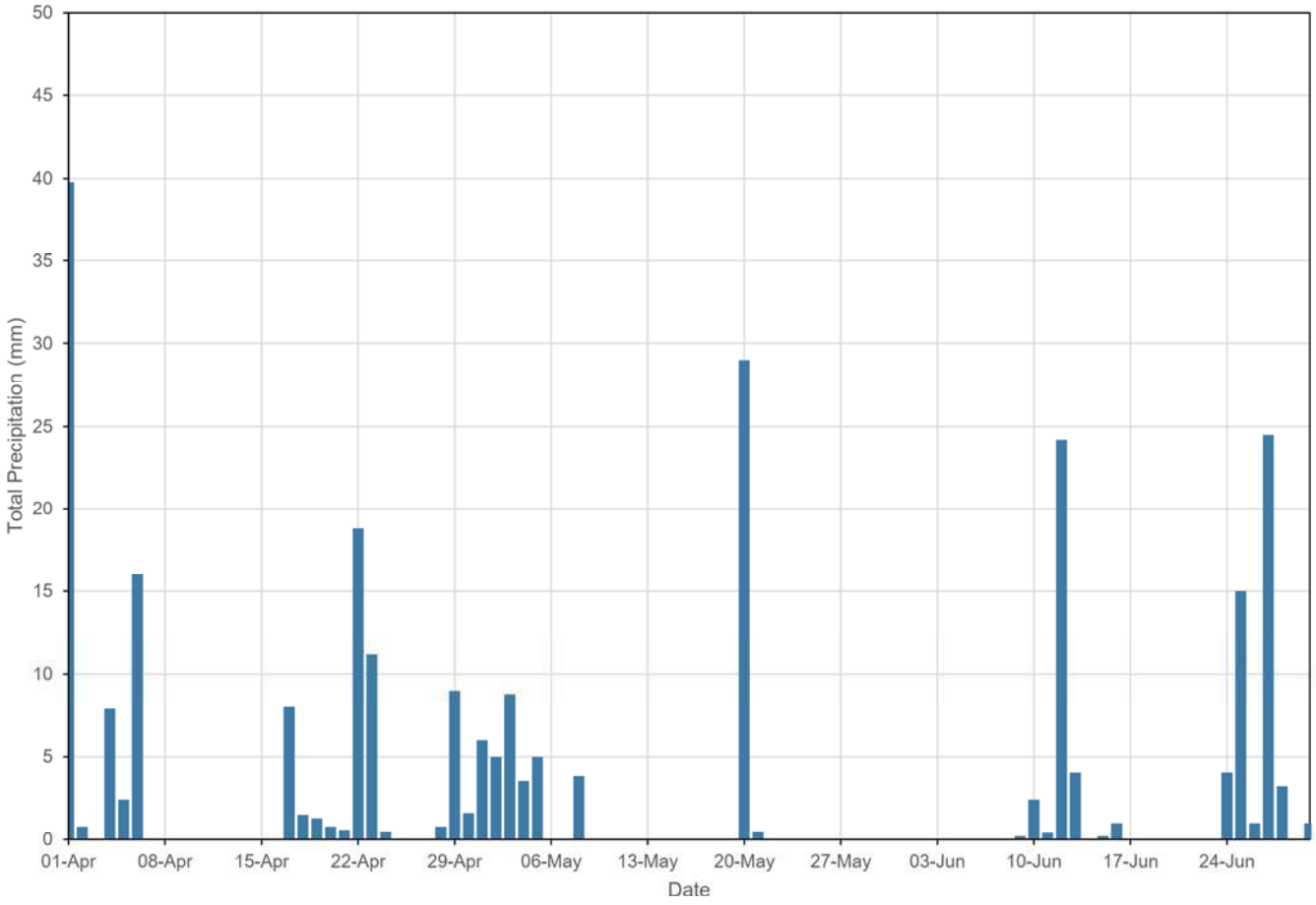


Figure A-9: 2023 Daily Precipitation at GRCA Shade's Mills Climate Station
July to September 2023

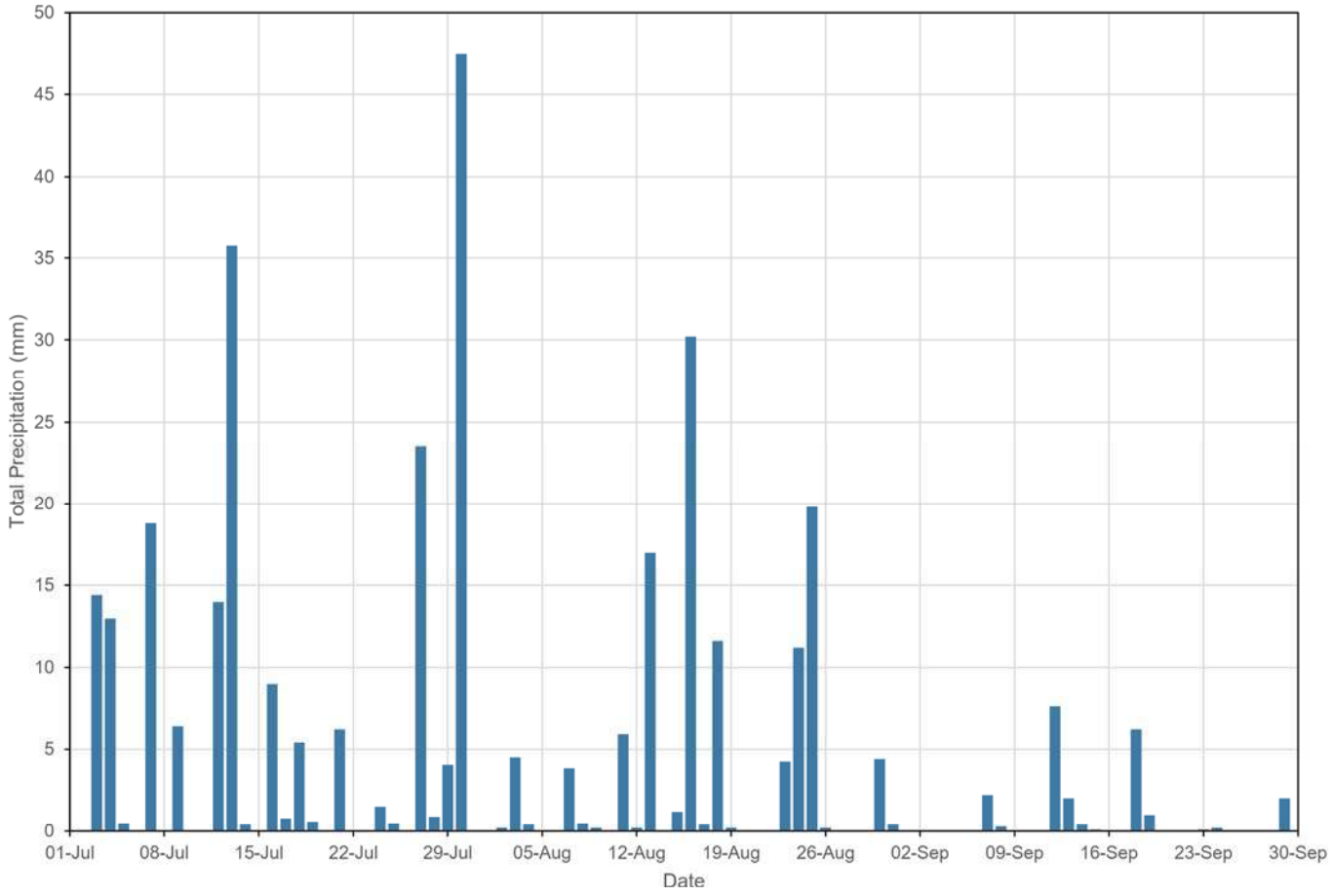


Figure A-10: 2023 Daily Precipitation at GRCA Shade's Mills Climate Station
October to December 2023

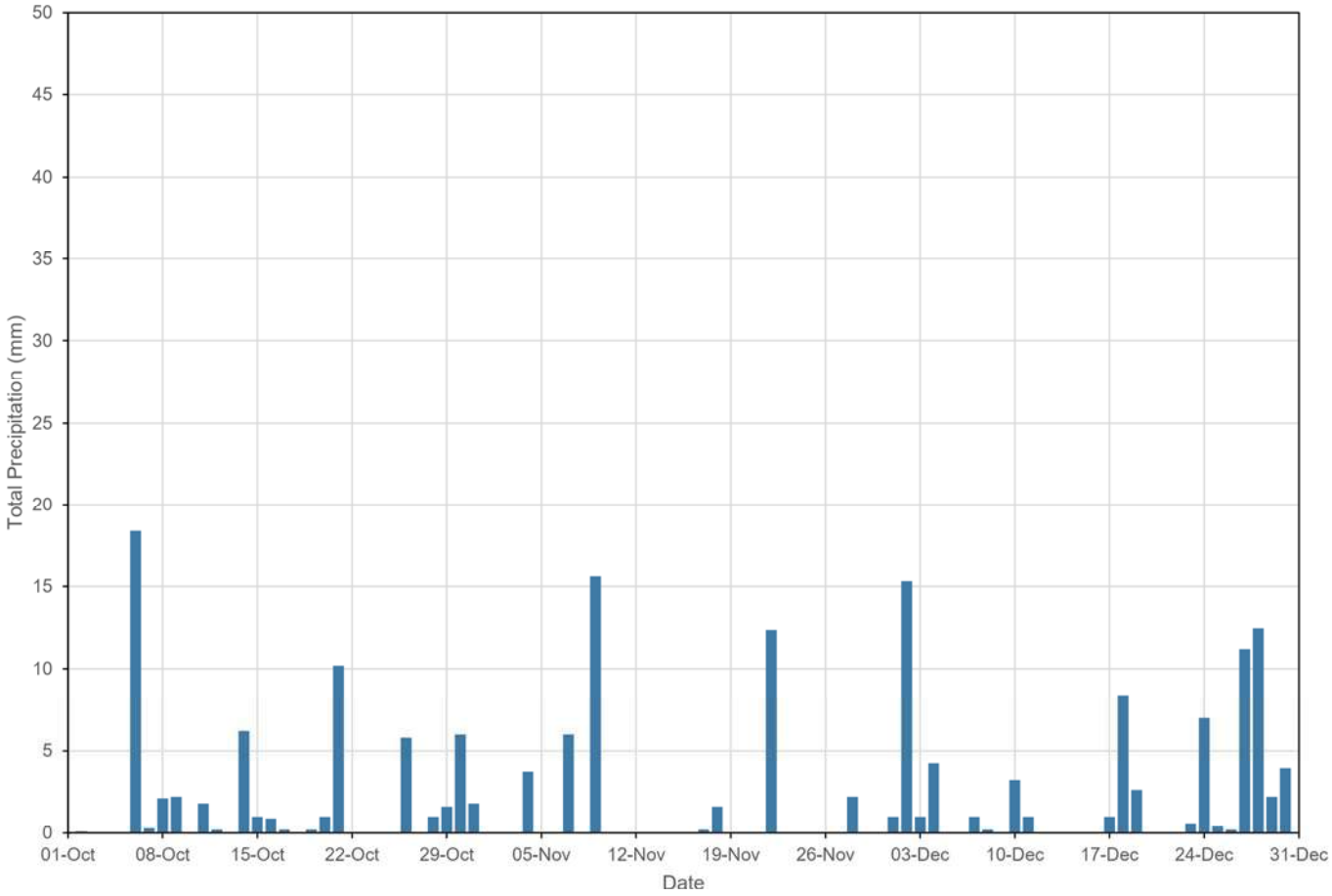


Figure A-11: 2023 Air Temperature at Kitchener/Waterloo Climate Station

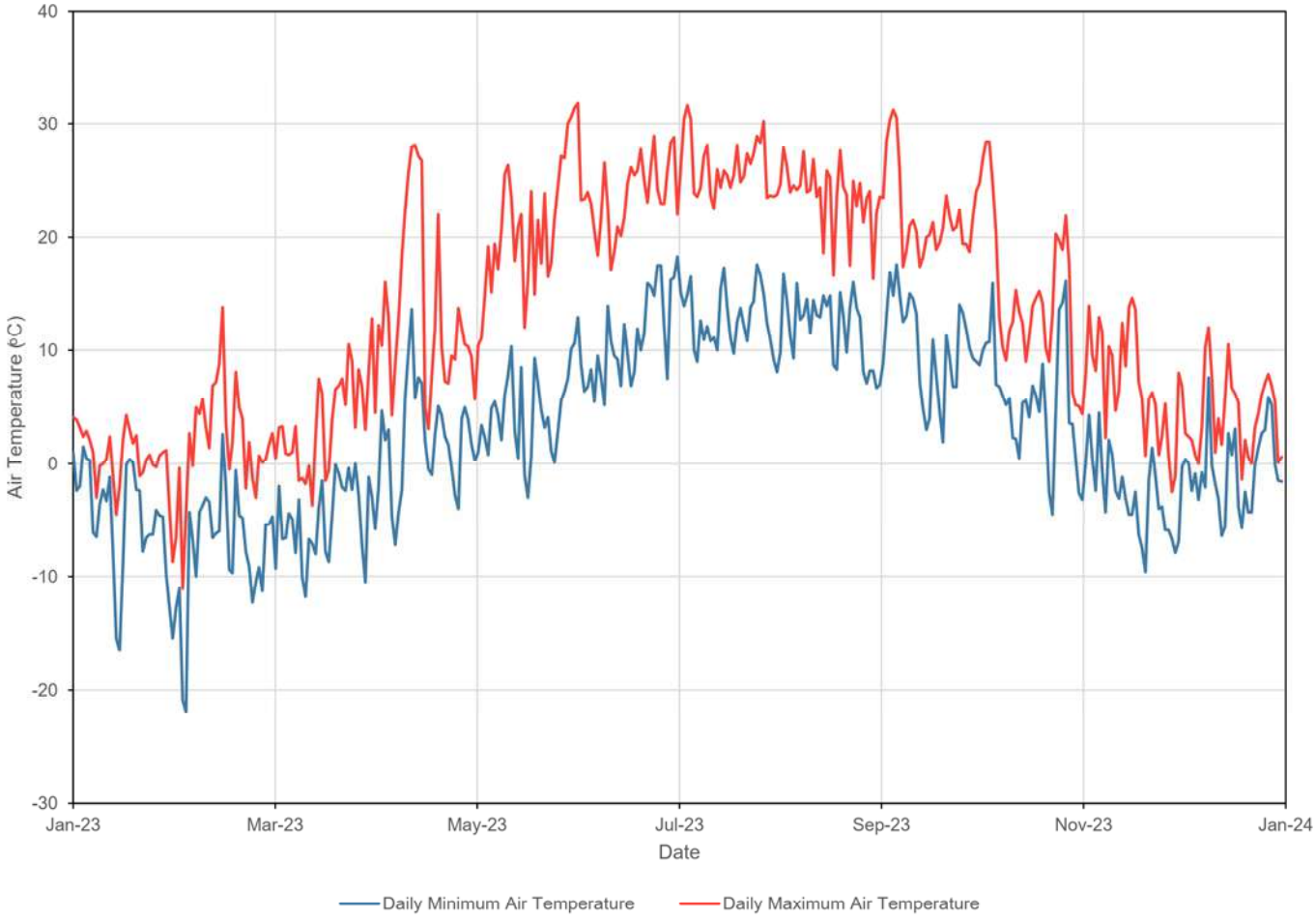


Figure A-12: 2023 Air Temperature at Kitchener/Waterloo Climate Station
January to March 2023

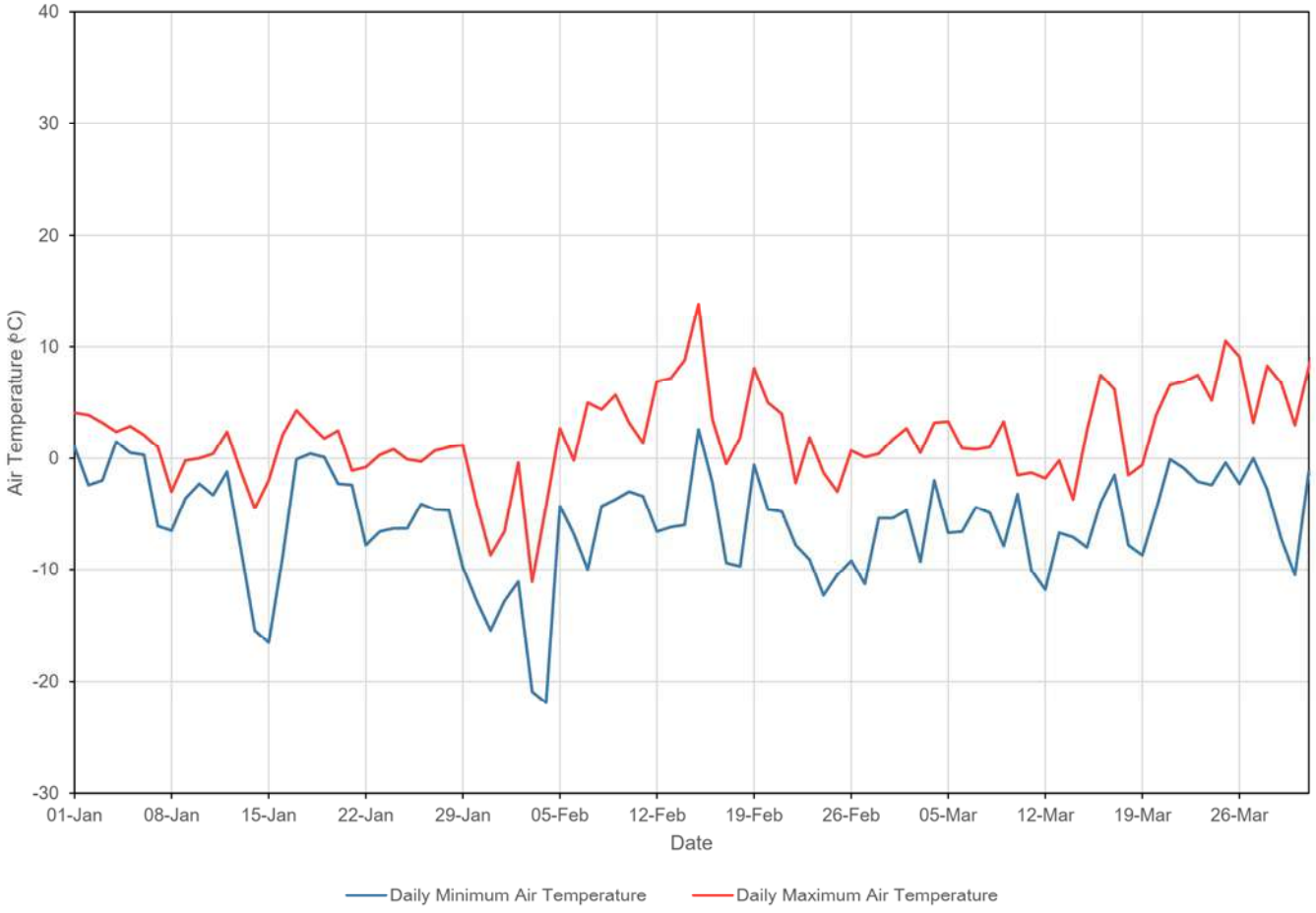


Figure A-13: 2023 Air Temperature at Kitchener/Waterloo Climate Station
April to June 2023

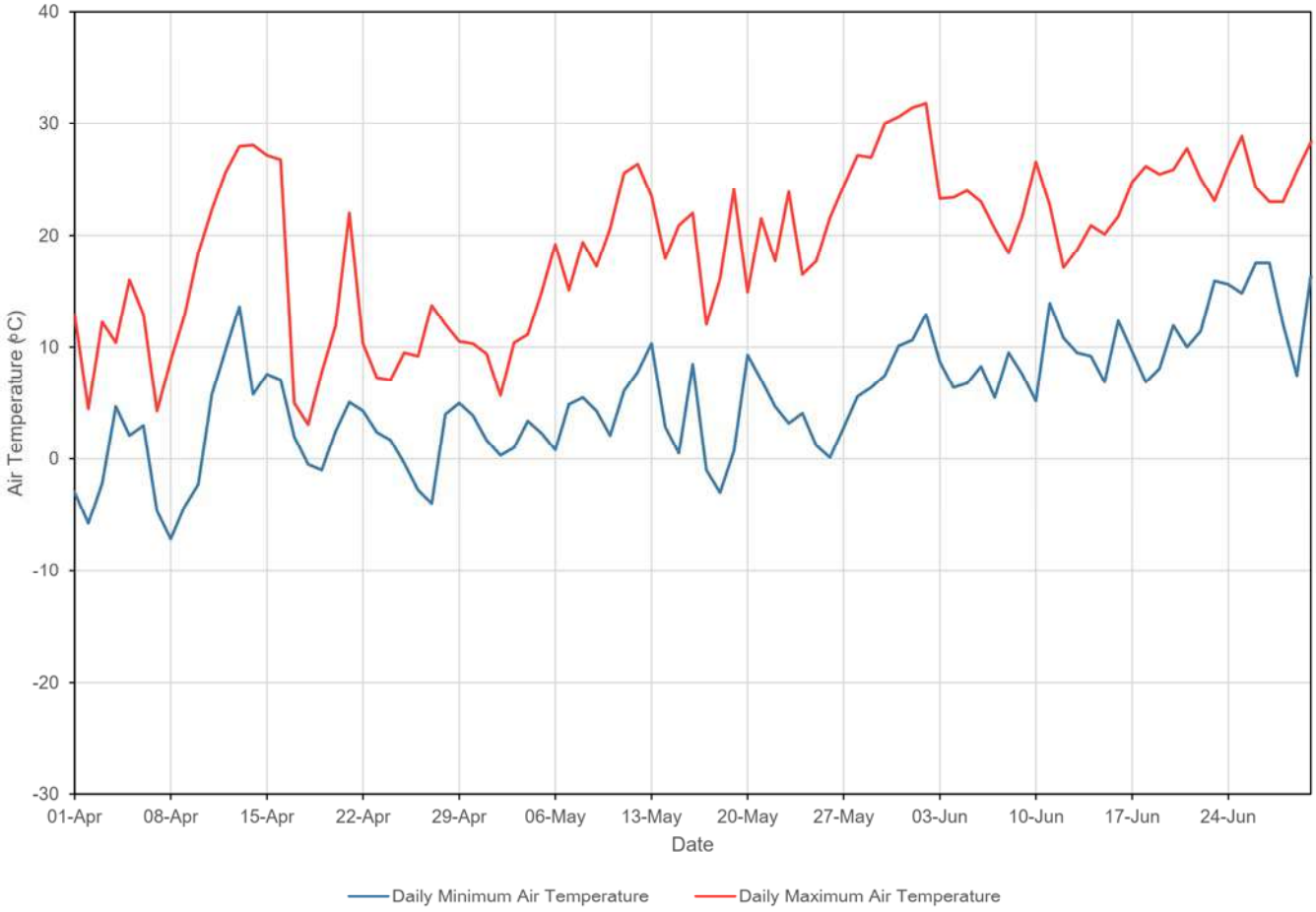


Figure A-14: 2023 Air Temperature at Kitchener/Waterloo Climate Station
July to September 2023

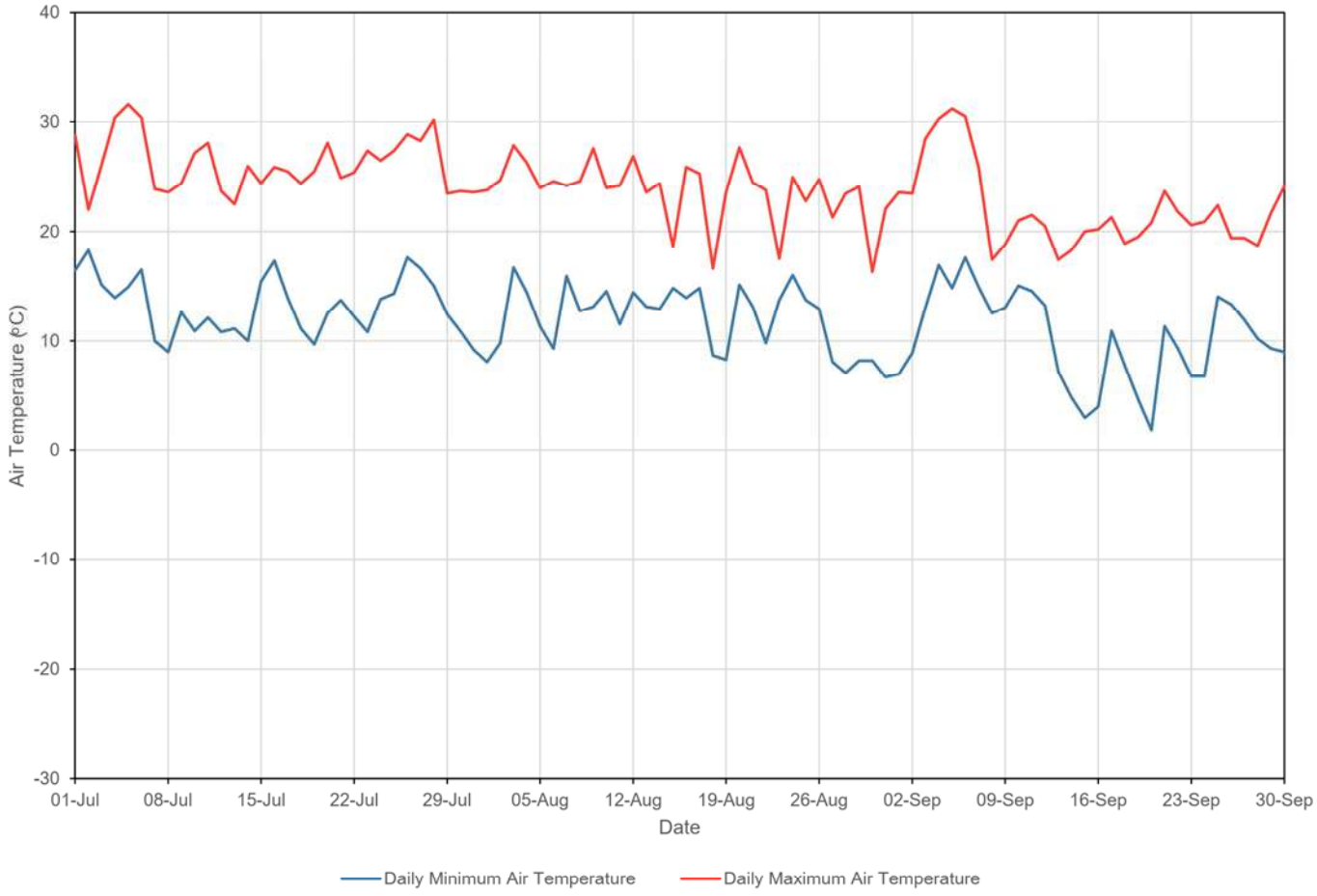
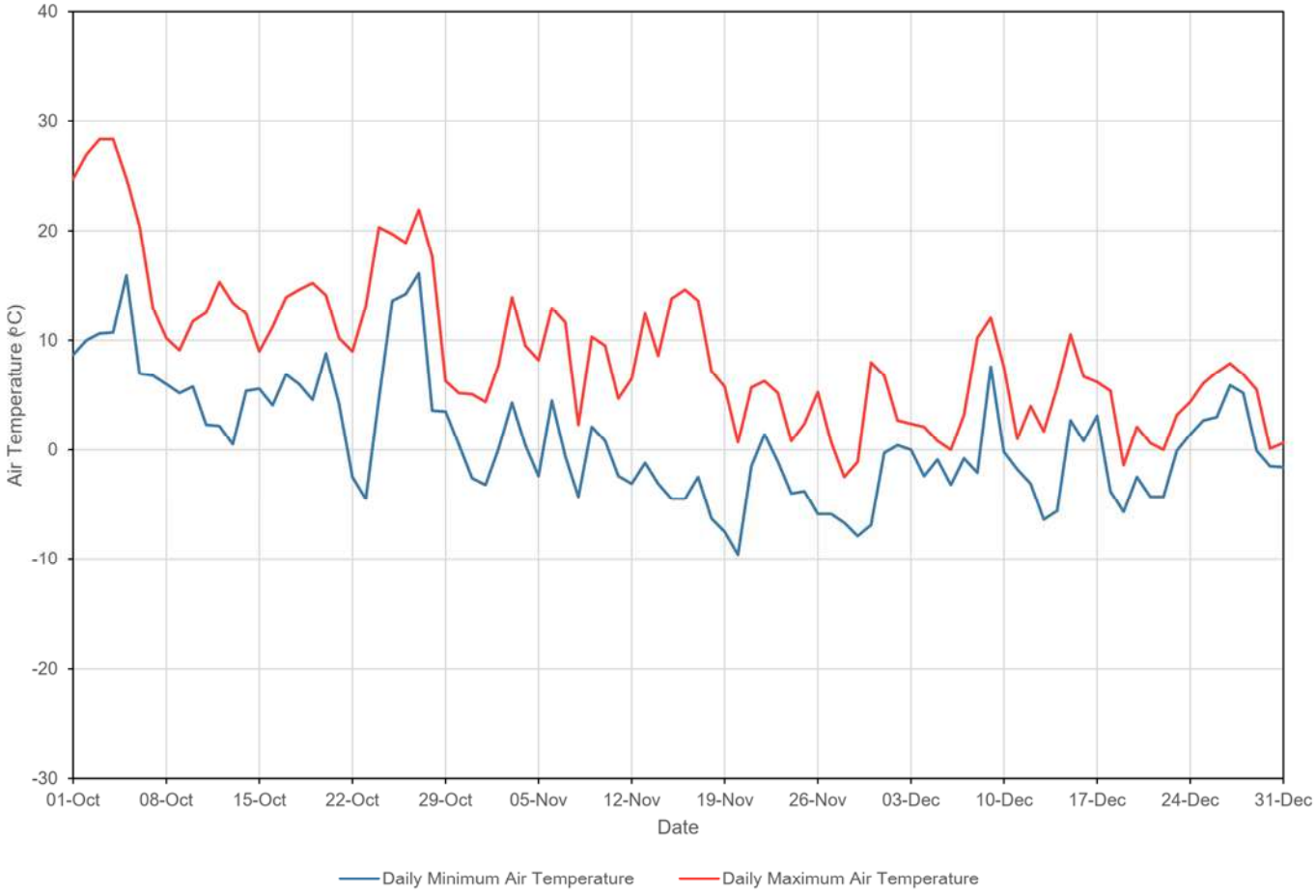


Figure A-15: 2023 Air Temperature at Kitchener/Waterloo Climate Station
October to December 2023



APPENDIX B

SWM1 and SWM2 Rating Curve Data

(Technical Appendix A - 2023 Surface Water Report)

Table B-1: SWM1 and SWM2 Rating Curve Data (2010-2023)

DATE	SWM1		SWM2	
	Water Level (m above logger)	Discharge (m^3/s)	Water Level (m above logger)	Discharge (m^3/s)
2010-Apr-01	0.3791	0.5578		
2010-Aug-30	0.1991	0.1440		
2010-Aug-04	0.2320	0.1810		
2010-Jun-11	0.3474	0.4786		
2010-Mar-05	0.2530	0.2244		
2010-Oct-13	0.2860	0.1970		
2011-Jun-02	0.3715	0.6025		
2011-Jul-12	0.2112	0.1950		
2011-Aug-22	0.1970	0.1380		
2011-Oct-12	0.2410	0.1730		
2011-Nov-08	0.2940	0.2520		
2012-Jan-11	0.3220	0.4106		
2012-Feb-01	0.4283	0.7185		
2012-Mar-05	0.4157	0.6063		
2012-Apr-11	0.2638	0.2173		
2012-May-02	0.2972	0.3090		
2012-Jun-06	0.2374	0.2035		
2012-Jul-10	0.1731	0.0873		
2012-Aug-03	0.1673	0.0720		
2012-Sep-06	0.2069	0.1291		
2012-Oct-02	0.2205	0.1621		
2012-Oct-25	0.3568	0.3969		
2012-Nov-26	0.2977	0.2689		
2012-Dec-14	0.3130	0.2868		
2013-Jan-08	0.2980	0.2557		
2013-Feb-07	0.3240	0.3409		
2013-Mar-20	0.3780	0.5361		
2013-Apr-17	0.4656	0.9823		
2013-May-09	0.2652	0.2998		
2013-Jun-13	0.3196	0.4461		
2013-Jul-22	0.2374	0.2822		
2013-Aug-26	0.2143	0.1867		
2013-Sep-16	0.2275	0.2069		
2013-Nov-19	0.3486	0.4941		
2013-Dec-16	0.2802	0.2977		
2014-Jan-20	0.4403	0.4256	BD	BD
2014-Mar-18	0.4394	0.3991	BD	BD
2014-May-07	0.3890	0.6505	0.5672	0.9354
2014-Jun-11	0.2685	0.2634	0.3764	0.4403
2014-Jul-15	0.2179	0.2112	0.3114	0.3092
2014-Aug-13	0.2688	0.2951	0.4125	0.5586
2014-Sep-30	0.2717	0.2431	0.3813	0.3921
2014-Oct-16	0.4248	0.3809	0.4486	0.5746
2014-Nov-17	0.4302	0.2647	0.3974	0.4467
2014-Dec-10	0.3861	0.3102	0.4207	0.4331
2015-Jan-20	0.3362	0.2373	0.3344	0.3616
2015-Mar-18	0.4530	0.4224	0.5280	0.8527
2015-Mar-26	0.3970	0.3646	0.3500	0.6412
2015-Apr-09	0.5810	1.1258	0.6145	1.6619
2015-May-19	0.2206	0.1786	0.2546	0.3285
2015-Jun-19	0.2616	0.2838	0.3453	0.4763
2015-Jul-20	0.2730	0.2424	0.2532	0.4641

Notes: BD - Beaver Dam located downstream; therefore, water level and discharge data not used
N/A - Water level/discharge measurement not available due to frozen/inaccessible conditions

Table B-1: SWM1 and SWM2 Rating Curve Data (2010-2023)

DATE	SWM1		SWM2	
	Water Level (m above logger)	Discharge (m^3/s)	Water Level (m above logger)	Discharge (m^3/s)
2015-Sep-15	0.2123	0.1071	0.3684	0.2821
2015-Oct-14	0.2594	0.1453	0.2057	0.2608
2015-Nov-16	0.4542	0.3319	0.4484	0.4401
2016-Feb-03	0.4175	0.6335	0.5123	0.9543
2016-Mar-04	0.4403	0.3401	0.3638	0.5504
2016-Apr-07	0.5685	1.1611	0.6255	1.6094
2016-May-04	0.3179	0.3561	0.3927	0.5631
2016-Jun-13	0.2267	0.1441	0.2983	0.2908
2016-Jul-05	0.2311	0.0991	0.2667	0.1903
2016-Aug-10	0.2225	0.0816	0.2841	0.1756
2016-Sep-27	0.2641	0.1452	0.3206	0.2525
2016-Oct-21	0.4087	0.2177	0.3499	0.3823
2016-Nov-18	0.4011	0.1612	0.3177	0.2624
2017-Jan-31	0.2605	0.3052	0.3385	0.5113
2017-Feb-16	0.1968	0.2204	0.2874	0.2869
2017-Mar-17	0.2212	0.2830	0.2716	0.4186
2017-Apr-12	0.4574	0.8291	0.5273	1.1843
2017-May-09	0.4664	0.9847	0.5489	1.2875
2017-Jun-12	0.2790	0.2830	0.3078	0.4290
2017-Jul-24	0.2879	0.1967	0.3518	0.4196
2017-Sep-21	0.2685	0.1475	0.3394	0.2692
2017-Oct-16	0.3208	0.2664	0.3745	0.4327
2017-Dec-08	0.2714	0.3052	0.3183	0.4778
2018-Jan-12	0.4859	0.9995	0.5923	1.4876
2018-Feb-09	N/A	N/A	0.2728	0.4086
2018-Mar-01	0.3637	0.7010	0.4446	0.9534
2018-Apr-04	0.4602	1.1219	0.5677	1.6301
2018-May-10	0.3368	0.4921	0.3793	0.6719
2018-Jun-18	0.2483	0.1872	0.2781	0.2478
2018-Jul-06	0.2542	0.1726	0.2856	0.2101
2018-Aug-09	0.3039	0.3207	0.3224	0.3643
2018-Sep-13	0.2940	0.1686	0.3006	0.1727
2018-Oct-30	BD	BD	0.2915	0.2919
2018-Nov-21	BD	BD	0.2971	0.3381
2019-Jan-03	BD	BD	0.4517	0.5925
2019-Feb-28	N/A	N/A	N/A	N/A
2019-Mar-20	0.6022	0.3100	N/A	N/A
2019-Apr-23	0.6312	0.4612	N/A	N/A
2019-May-23	0.4792	0.2310	0.3057	0.2708
2019-Jun-20	0.3611	0.1657	0.2712	0.2060
2019-Jul-18	0.3939	0.2256	0.3143	0.3089
2019-Aug-23	0.2833	0.0781	0.2352	0.0913
2019-Sep-25	0.3137	0.0661	0.3859	0.1123
2019-Oct-29	0.5038	0.2988	0.5950	0.2795
2019-Nov-27	0.3932	0.1666	0.5852	0.2220
2019-Dec-18	0.2952	0.1460	0.4663	0.2144
2020-Jan-07	0.3094	0.1479	0.4959	0.2434
2020-Feb-28	0.2522	0.1763	0.4512	0.2370
2020-Mar-12	0.5379	0.5878	0.6165	0.6633
2020-Apr-16	0.2584	0.2285	0.3816	0.2722

Notes:

BD - Beaver Dam located downstream; therefore, water level and discharge data not used

N/A - Water level/discharge measurement not available due to frozen/inaccessible conditions

Grey shading indicates measurements may be impacted by beaver dam activity downstream of monitoring locations

Table B-1: SWM1 and SWM2 Rating Curve Data (2010-2023)

DATE	SWM1		SWM2	
	Water Level (m above logger)	Discharge (m^3/s)	Water Level (m above logger)	Discharge (m^3/s)
2020-May-28	0.2889	0.1124	0.2987	0.1819
2020-Jun-25	0.2623	0.0816	0.2843	0.2364
2020-Jul-22	0.2545	0.0760	0.2867	0.1223
2020-Aug-25	0.2264	0.0891	0.3169	0.1318
2020-Sep-21	0.2445	0.0608	0.2843	0.0843
2020-Oct-30	0.3029	0.1116	0.3305	0.1435
2020-Nov-26	0.3874	0.2289	0.4319	0.3762
2020-Dec-18	0.2548	0.0594	0.3498	0.1399
2021-Jan-13	0.2920	0.1147	0.2840	0.1698
2021-Feb-26	0.2542	0.1239	0.2614	0.1618
2021-Mar-29	0.3938	0.2587	0.4433	0.4380
2021-Apr-29	0.2643	0.1587	0.2606	0.1563
2021-May-27	0.2285	0.0560	0.2314	0.0962
2021-Jun-22	0.2325	0.0531	0.2325	0.1045
2021-Jul-30	0.2650	0.0865	0.2682	0.1063
2021-Aug-13	0.2466	0.0422	0.2552	0.0880
2021-Sep-30	0.2810	0.0874	0.2813	0.1436
2021-Oct-25	0.3422	0.1572	0.3114	0.2854
2021-Nov-18	0.3177	0.1382	0.2990	0.2154
2021-Dec-15	0.3566	0.1645	0.3236	0.2829
2022-Jan-07	0.2627	0.0754	0.2416	0.1679
2022-Feb-22	0.3623	0.2631	0.3321	0.3126
2022-Mar-25	0.6290	0.8359	0.5760	0.8530
2022-Apr-22	0.4278	0.2887	0.3452	0.3789
2022-May-25	0.2996	0.1002	0.2286	0.1654
2022-Jun-16	0.3074	0.0957	0.2619	0.1256
2022-Jul-15	0.2786	0.0338	0.2414	0.0768
2022-Aug-26	0.2915	0.0308	0.2496	0.0840
2022-Sep-09	0.2682	0.0376	0.2454	0.0837
2022-Oct-14	0.3379	0.0731	0.2796	0.1121
2022-Nov-25	0.3031	0.0650	0.2615	0.1123
2022-Dec-20	0.3094	0.0479	0.2153	0.0800
2023-Jan-13	0.3410	0.1193	0.2803	0.1564
2023-Feb-15	0.3443	0.1399	0.2866	0.2009
2023-Mar-15	0.2824	0.0826	0.2548	0.1707
2023-Apr-28	0.3556	0.1412	0.2556	0.2213
2023-May-26	0.3132	0.0925	0.2457	0.1657
2023-Jun-15	0.3313	0.1346	0.2591	0.1761
2023-Jul-25	0.9214	1.7009	0.7432	1.9224
2023-Aug-09	0.3146	0.1533	0.2885	0.1915
2023-Sep-08	0.3171	0.1346	0.2595	0.0935
2023-Oct-27	0.3385	0.0779	0.2851	0.1378
2023-Nov-16	0.3144	0.0932	0.2820	0.1412
2023-Dec-19	0.3370	0.1268	0.2928	0.1886

Notes:

BD - Beaver Dam located downstream; therefore, water level and discharge data not used

N/A - Water level/discharge measurement not available due to frozen/inaccessible conditions

Grey shading indicates measurements may be impacted by beaver dam activity downstream of monitoring locations

APPENDIX C

Monthly Hydrographs

(Technical Appendix A - 2023 Surface Water Report)

Figure C-1: 2023 Calculated Stream Flow at SWM1
January 2023

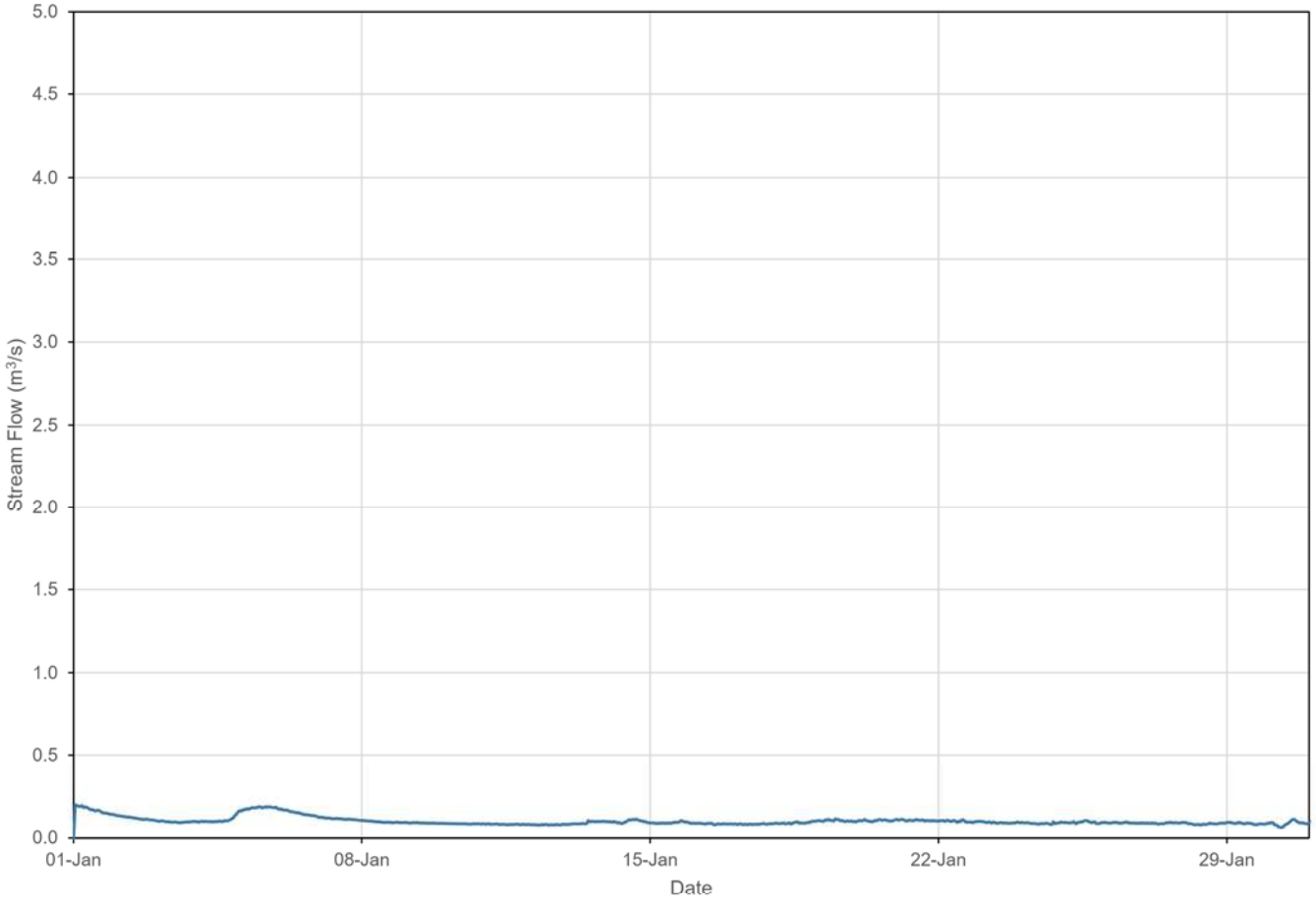


Figure C-2: 2023 Calculated Stream Flow at SWM1
February 2023

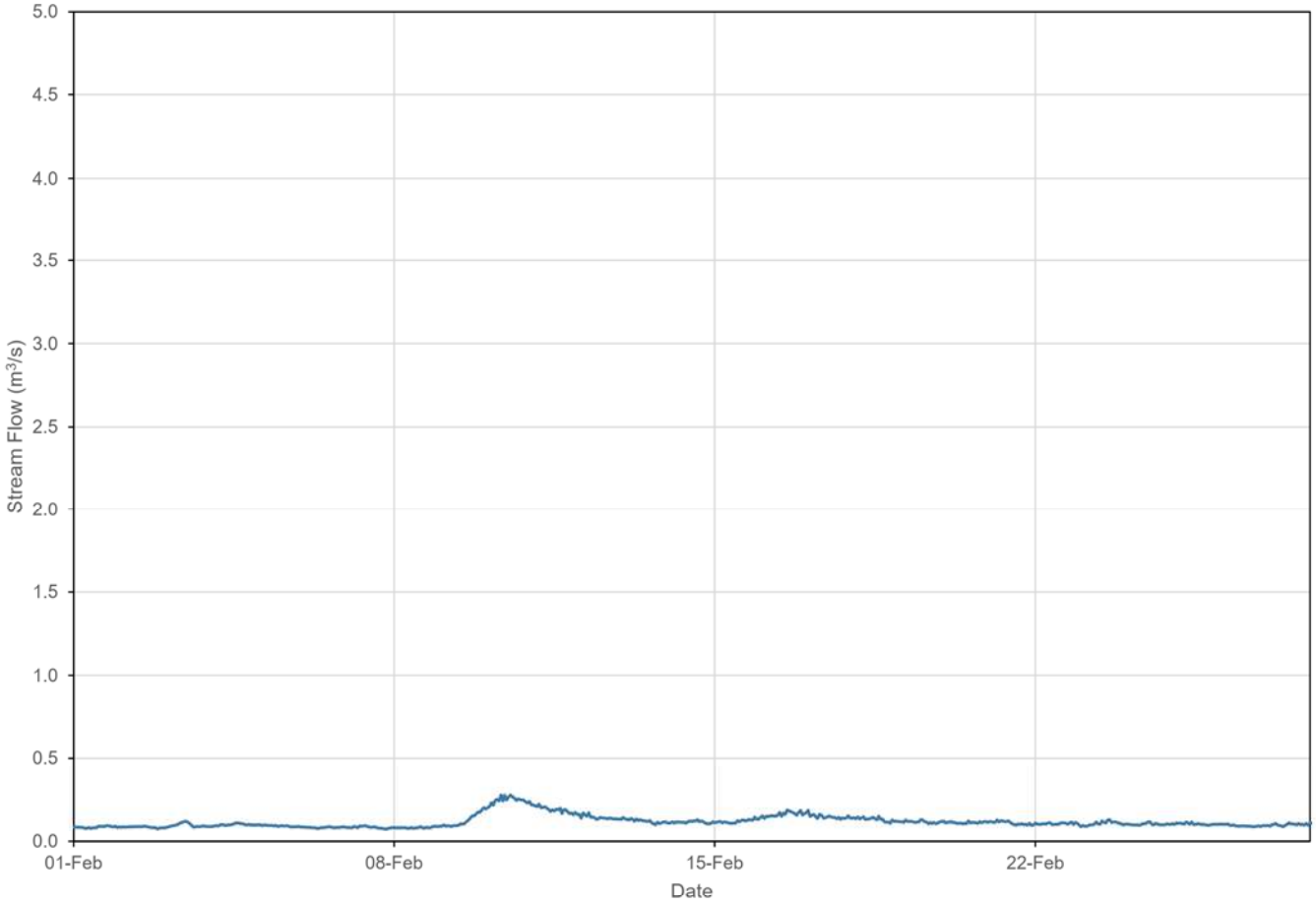


Figure C-3: 2023 Calculated Stream Flow at SWM1
March 2023

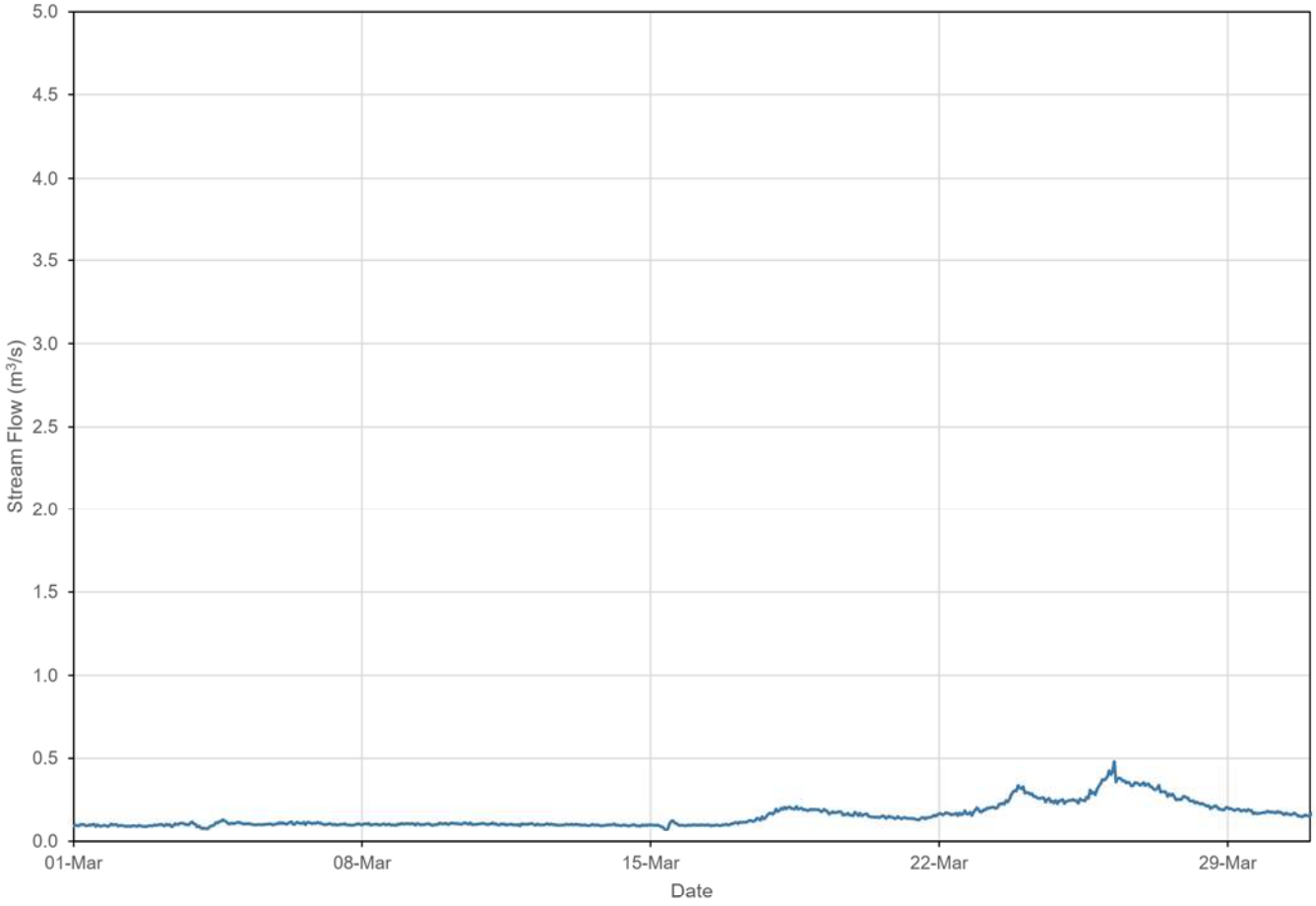


Figure C-4: 2023 Calculated Stream Flow at SWM1
April 2023

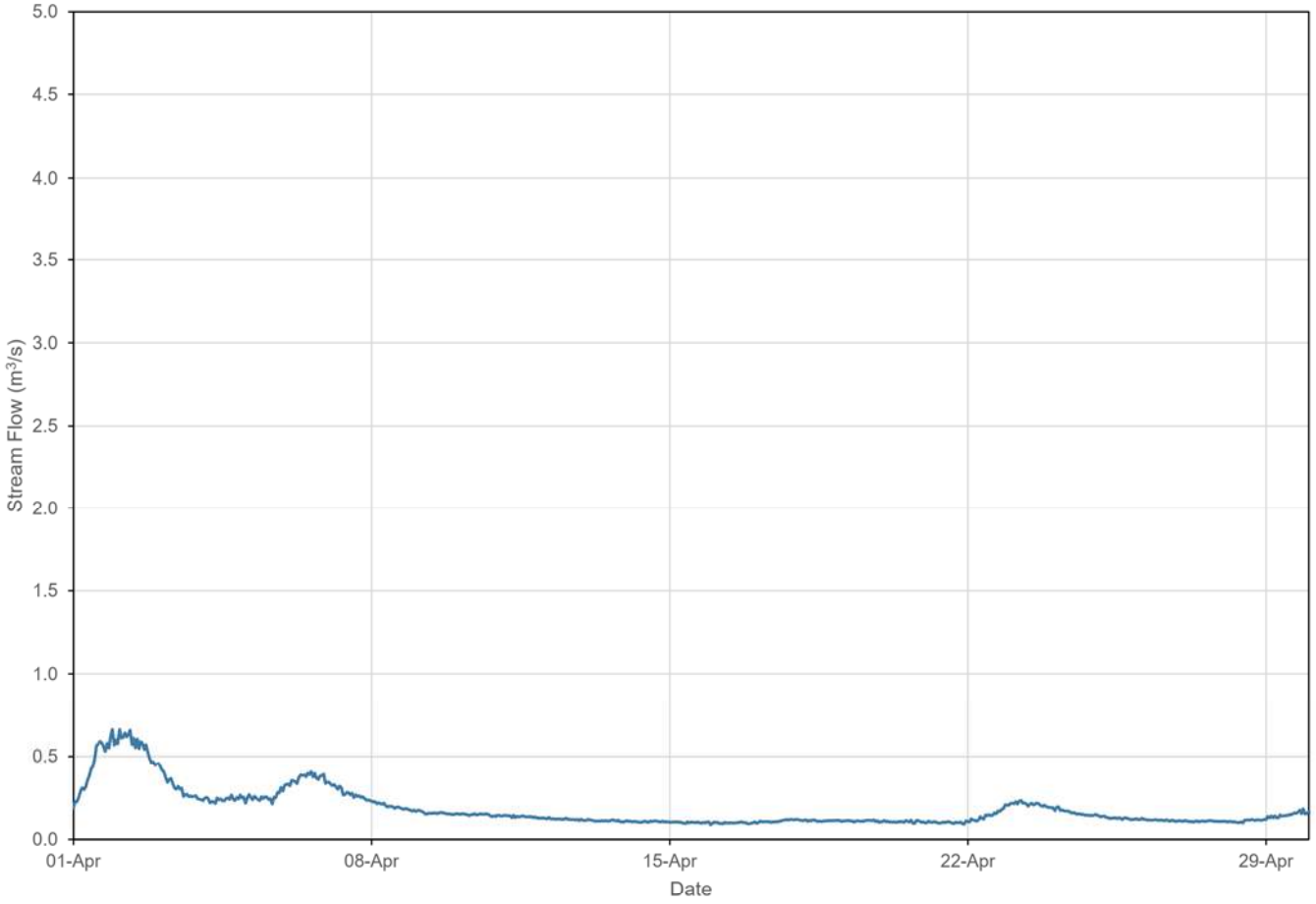


Figure C-5: 2023 Calculated Stream Flow at SWM1
May 2023

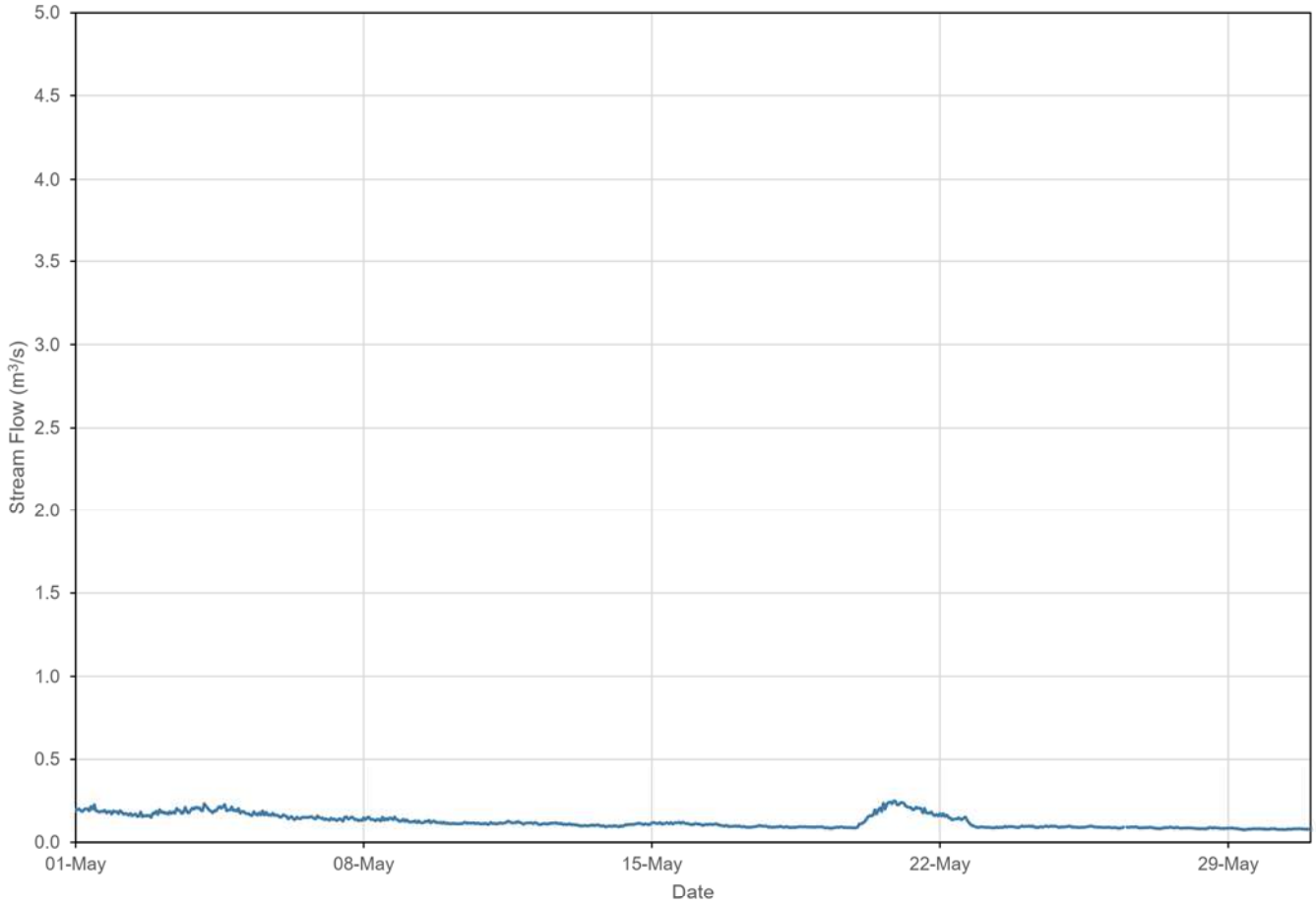


Figure C-6: 2023 Calculated Stream Flow at SWM1
June 2023

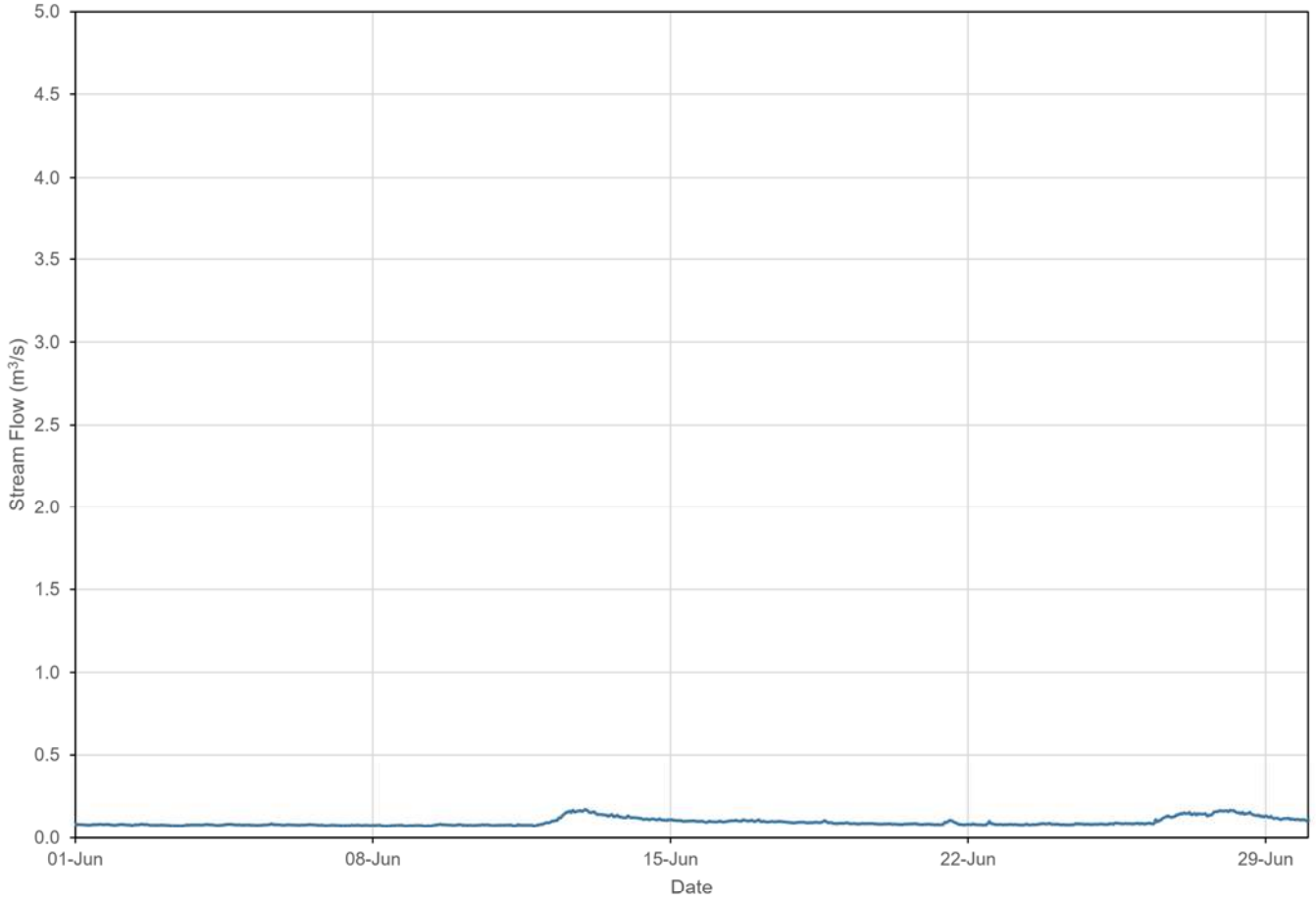


Figure C-7: 2023 Calculated Stream Flow at SWM1
July 2023

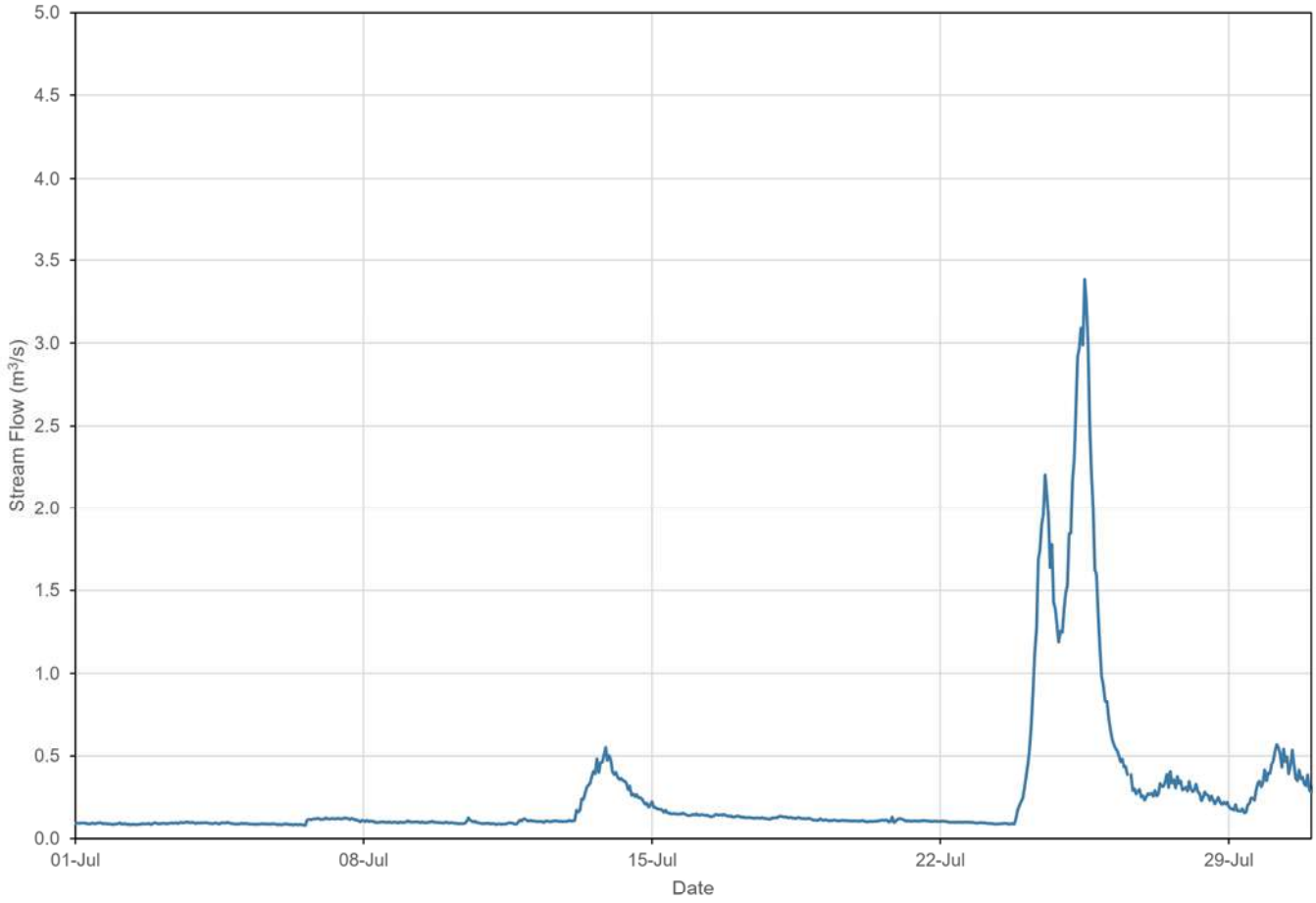


Figure C-8: 2023 Calculated Stream Flow at SWM1
August 2023

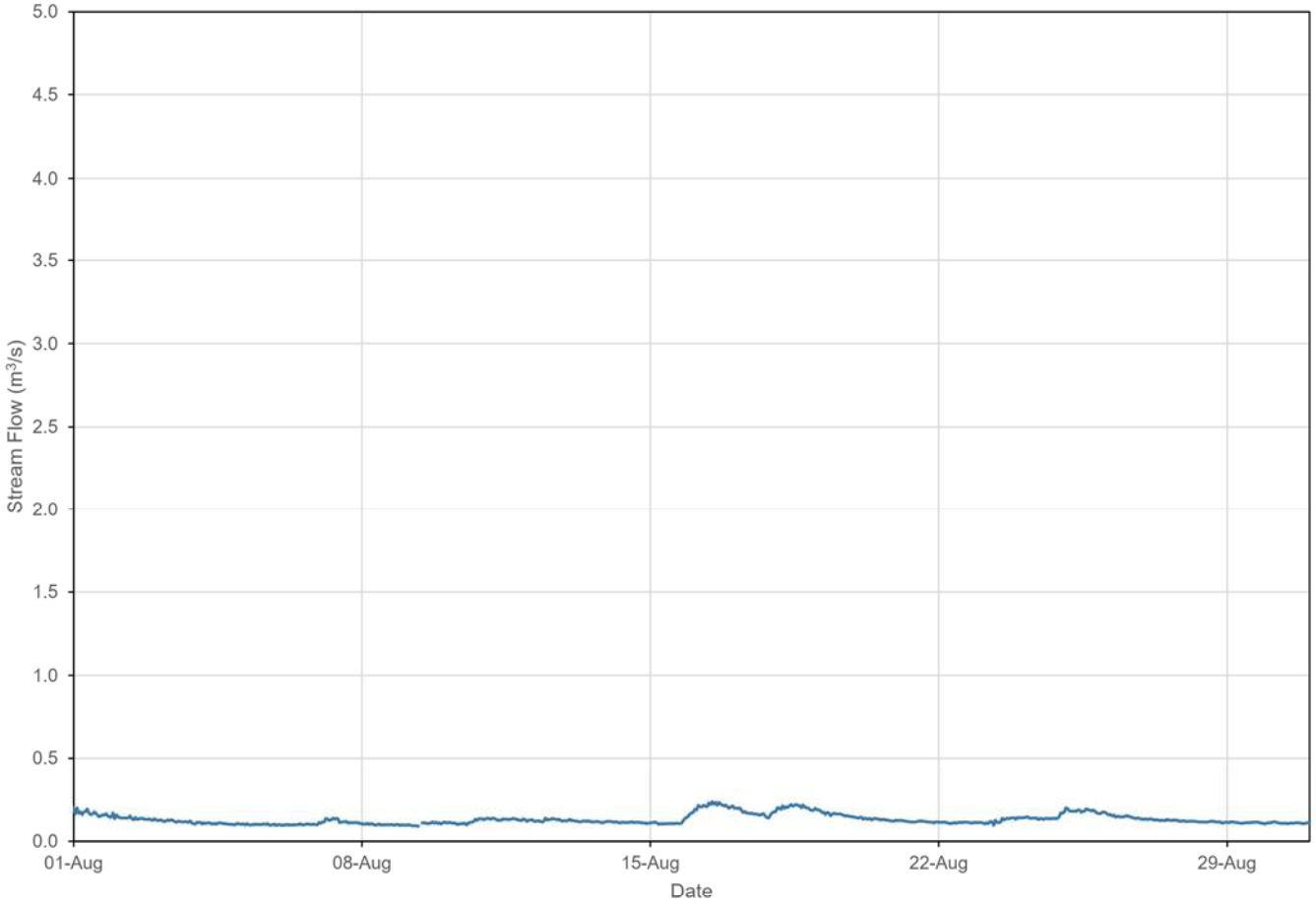


Figure C-9: 2023 Calculated Stream Flow at SWM1
September 2023

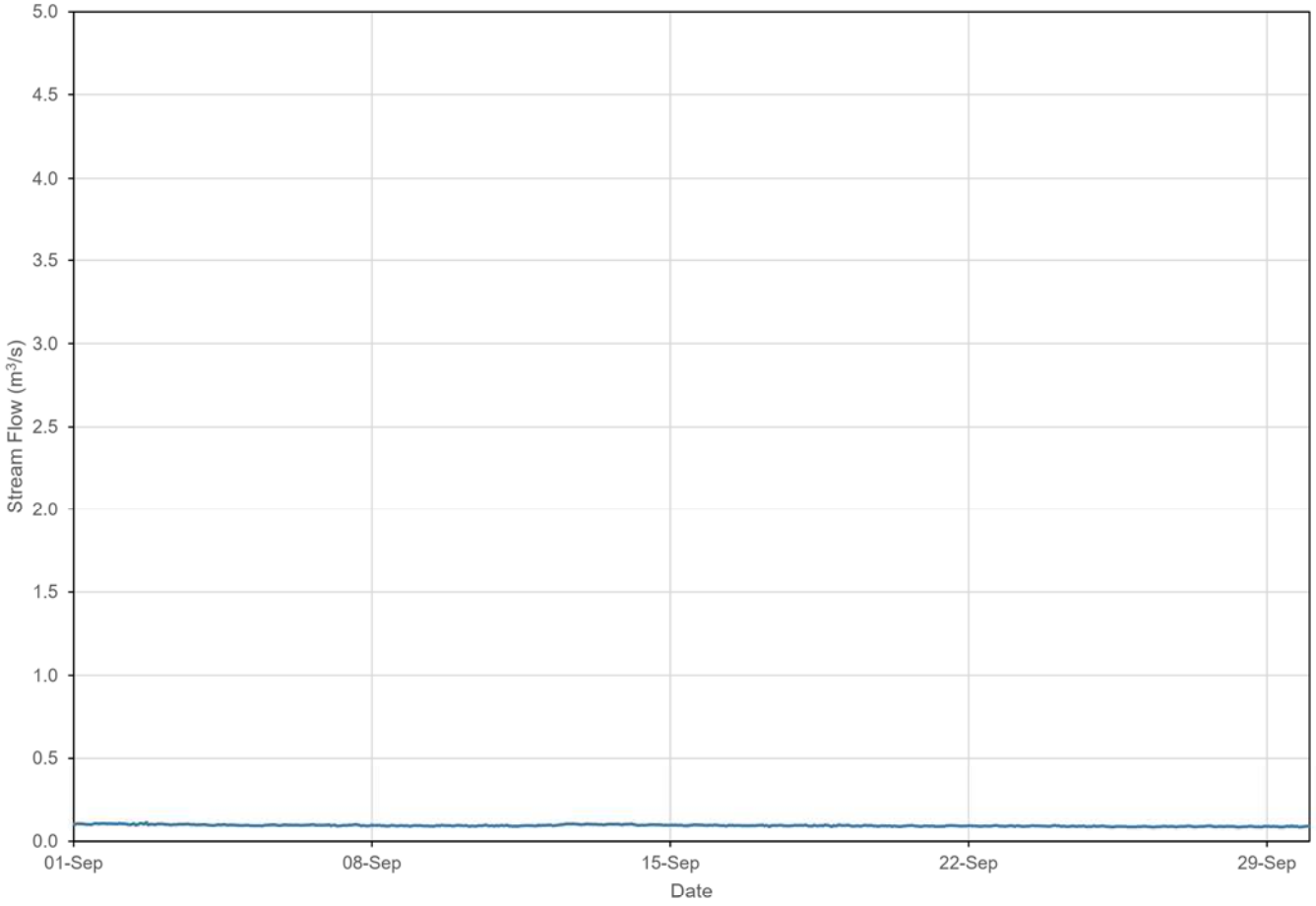


Figure C-10: 2023 Calculated Stream Flow at SWM1
October 2023

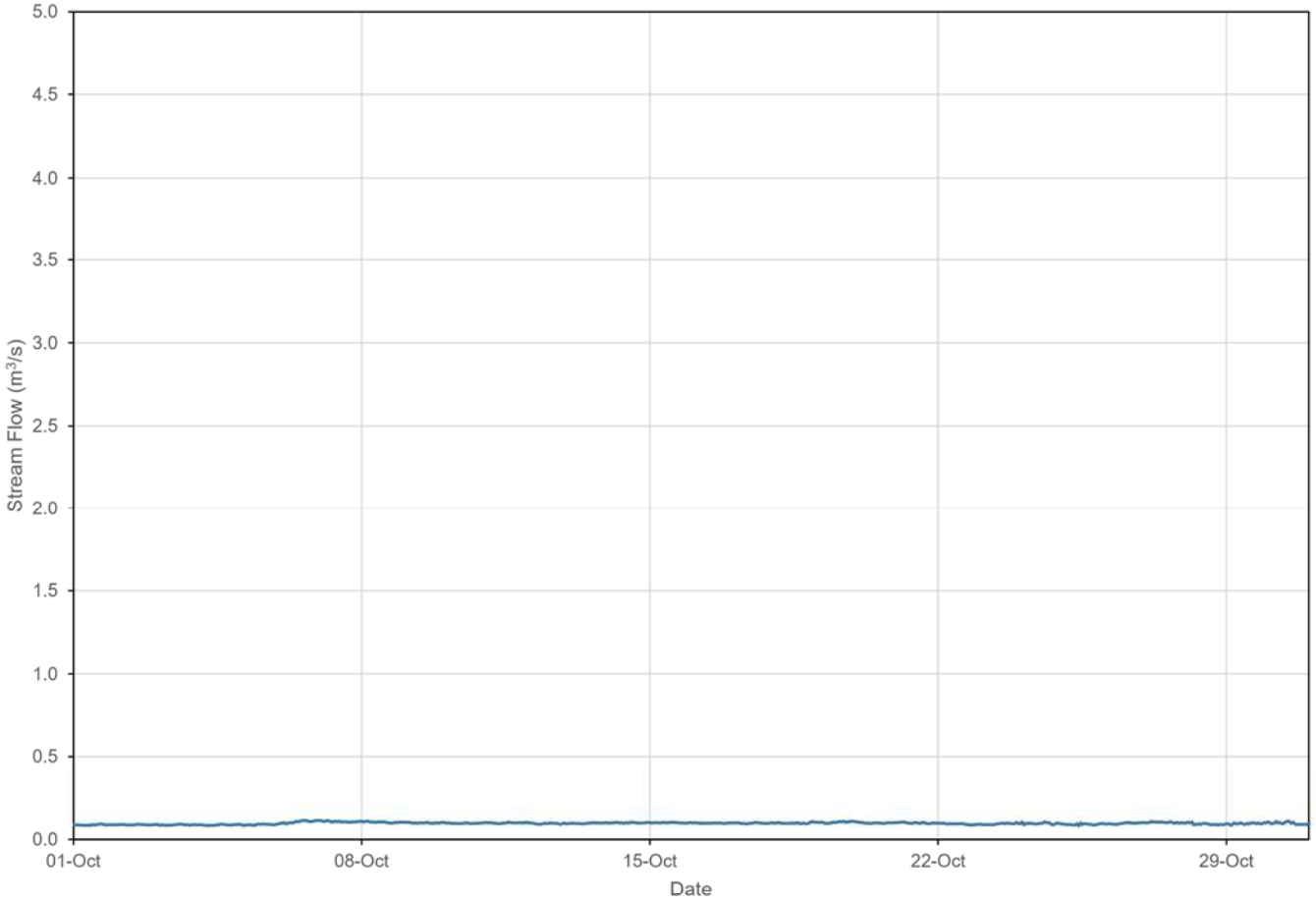


Figure C-11: 2023 Calculated Stream Flow at SWM1
November 2023

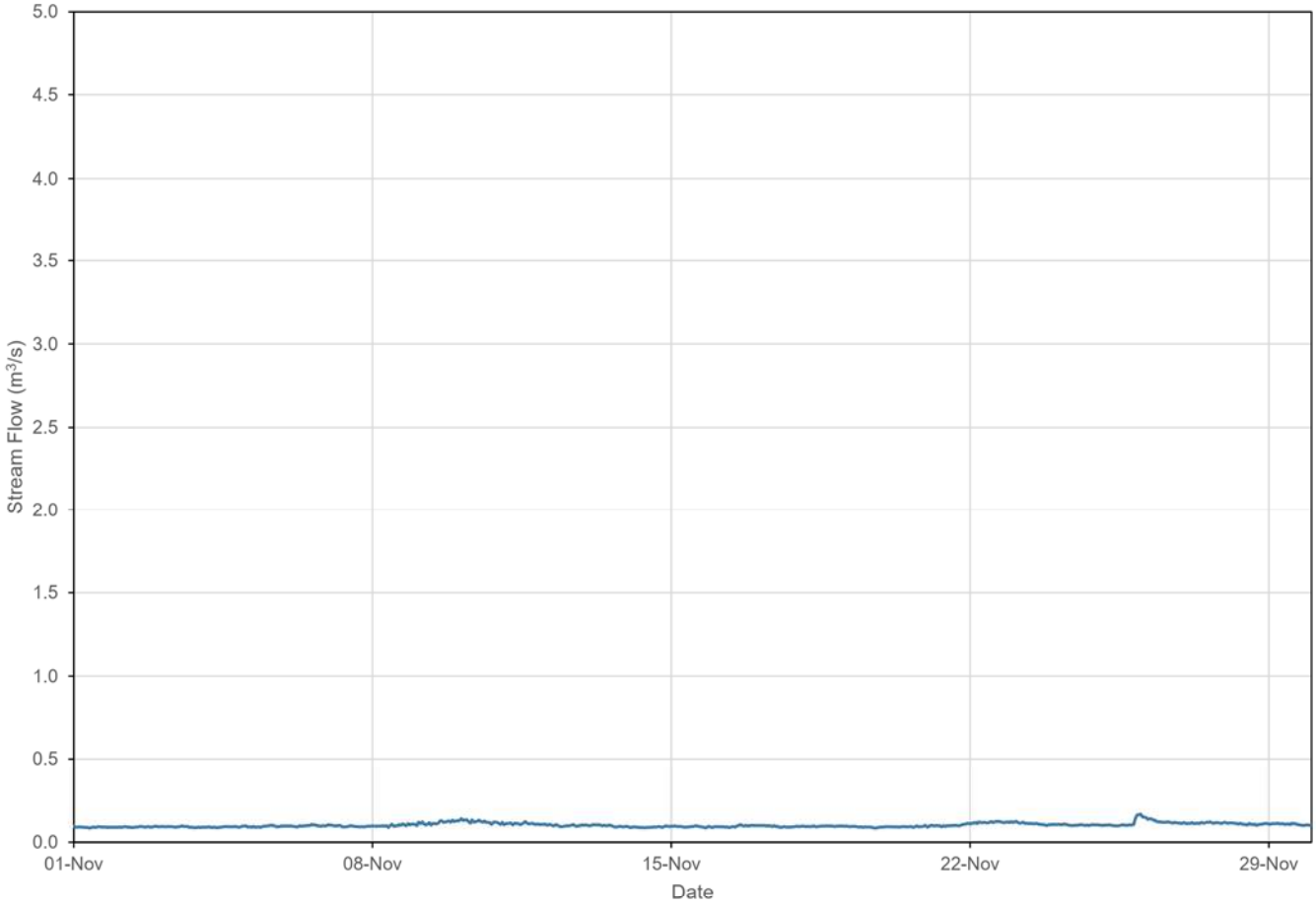


Figure C-12: 2023 Calculated Stream Flow at SWM1
December 2023

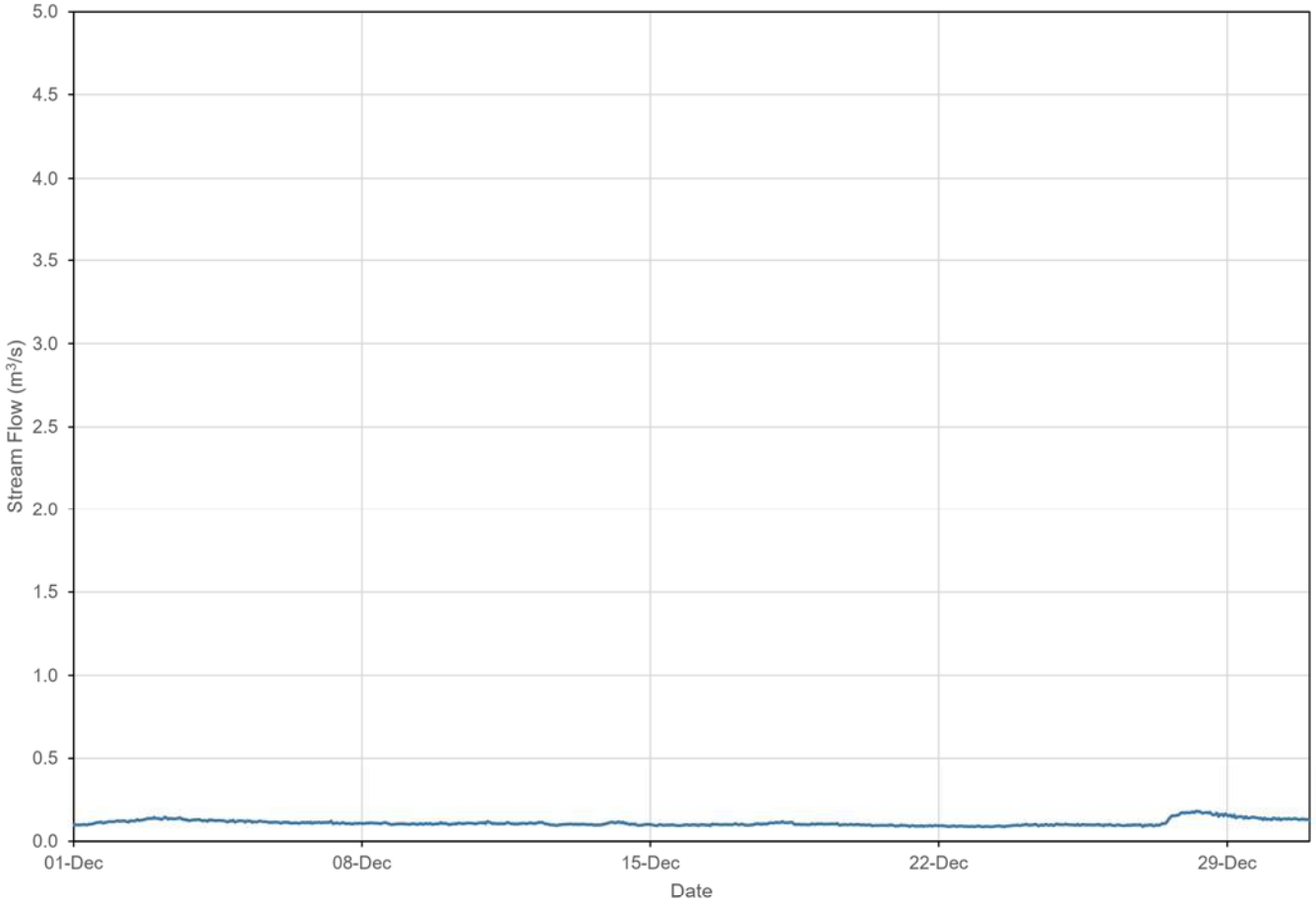


Figure C-13: 2023 Calculated Stream Flow at SWM2
January 2023

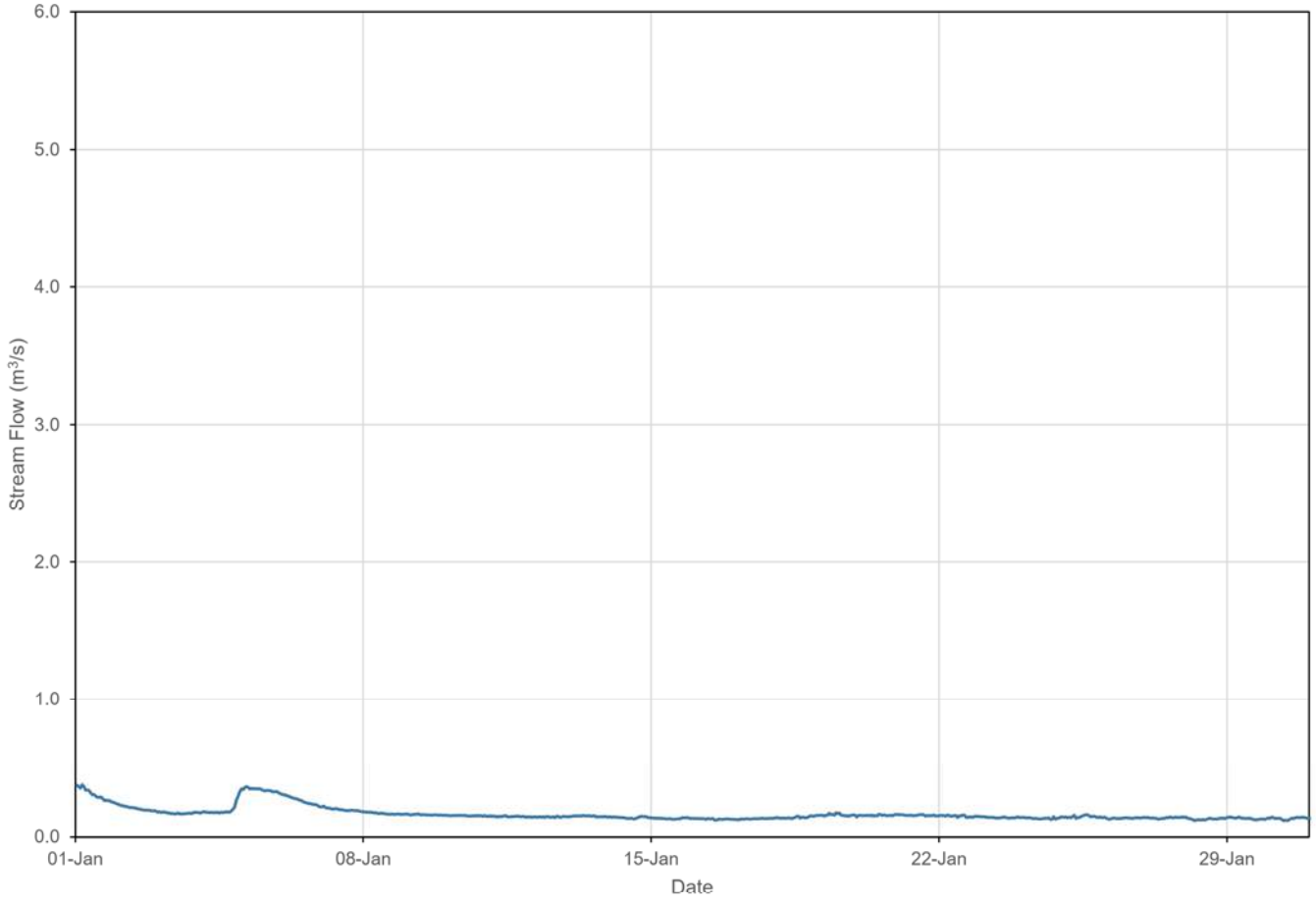


Figure C-14: 2023 Calculated Stream Flow at SWM2
February 2023

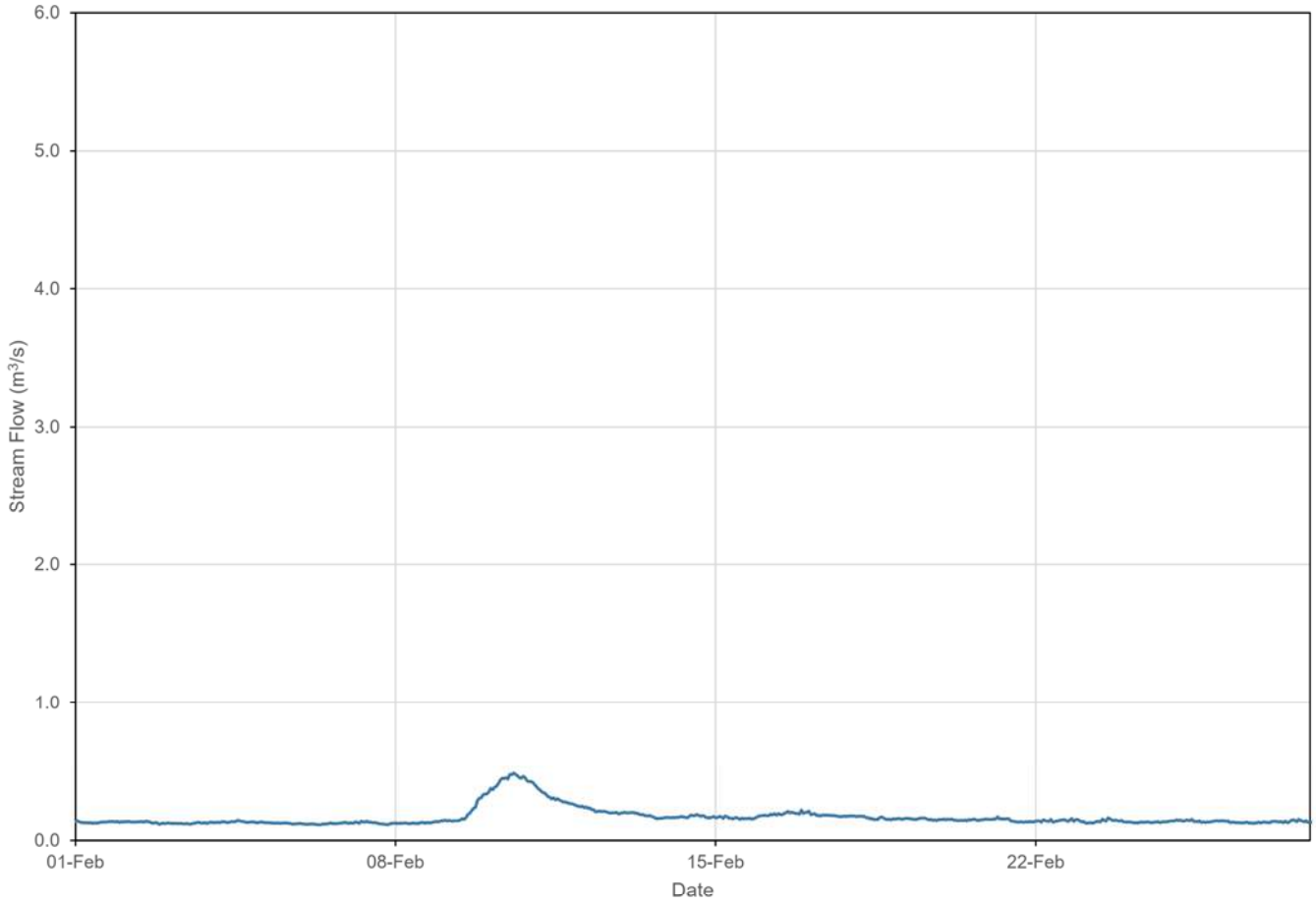


Figure C-15: 2023 Calculated Stream Flow at SWM2
March 2023

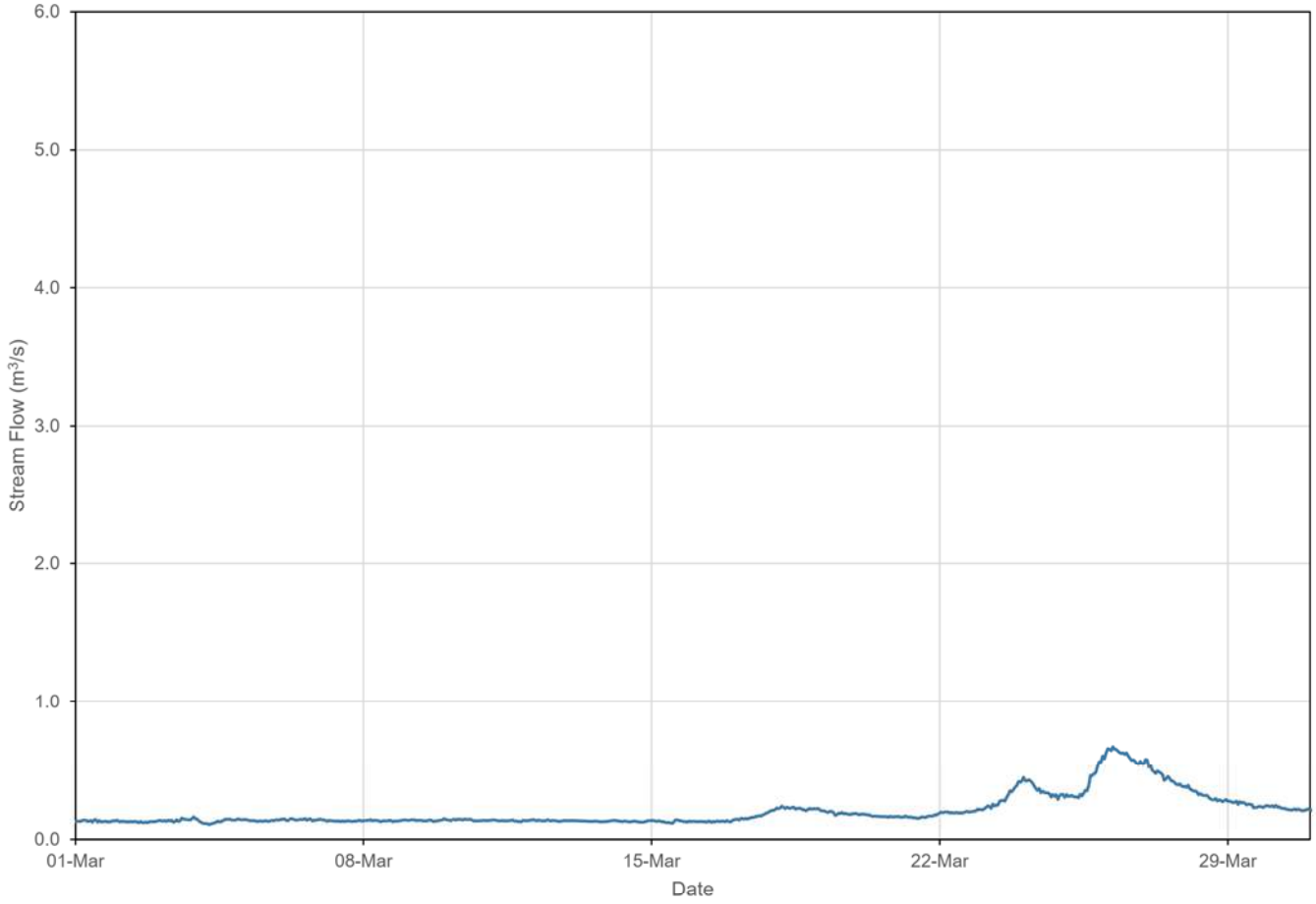


Figure C-16: 2023 Calculated Stream Flow at SWM2
April 2023

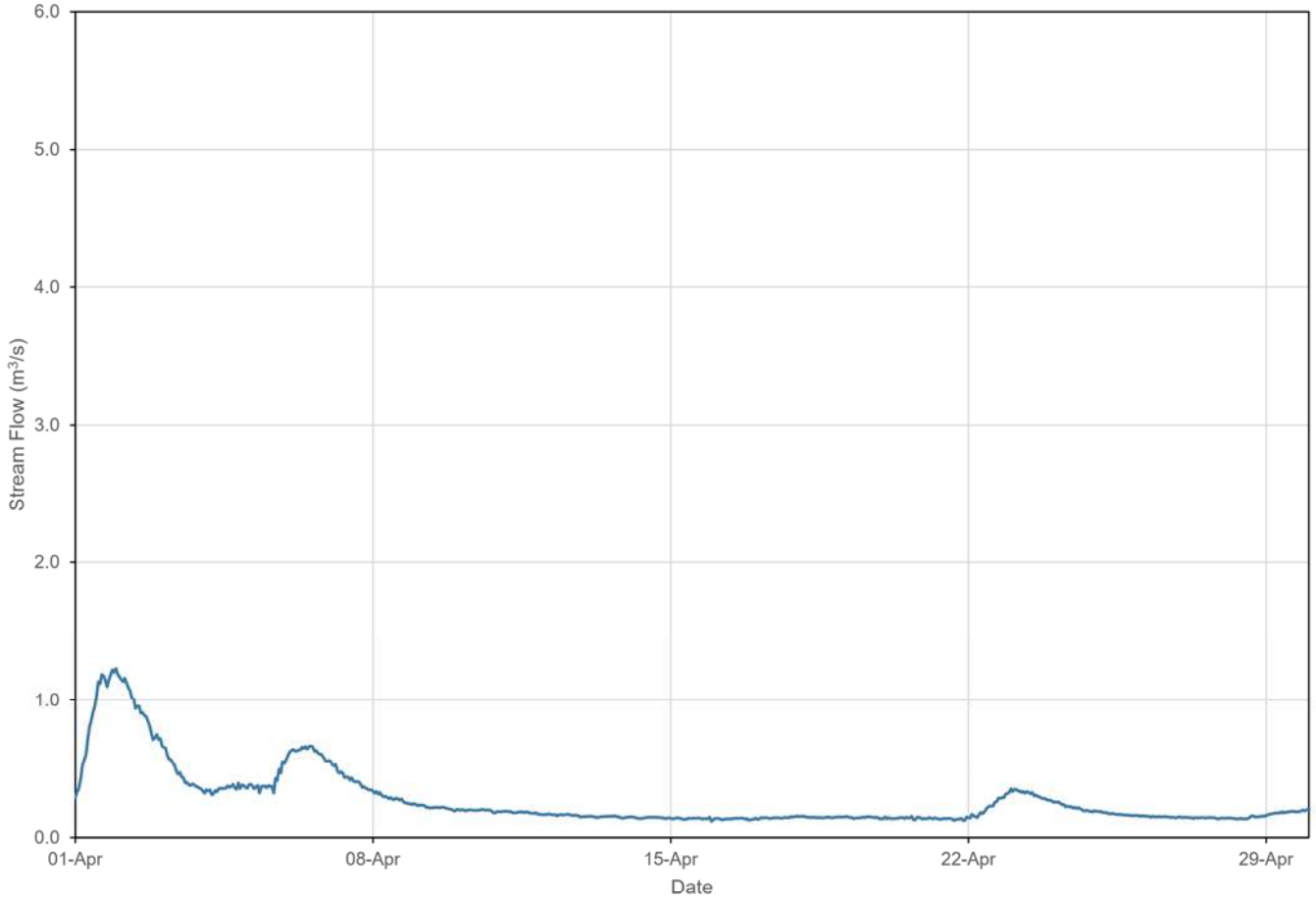


Figure C-17: 2023 Calculated Stream Flow at SWM2
May 2023

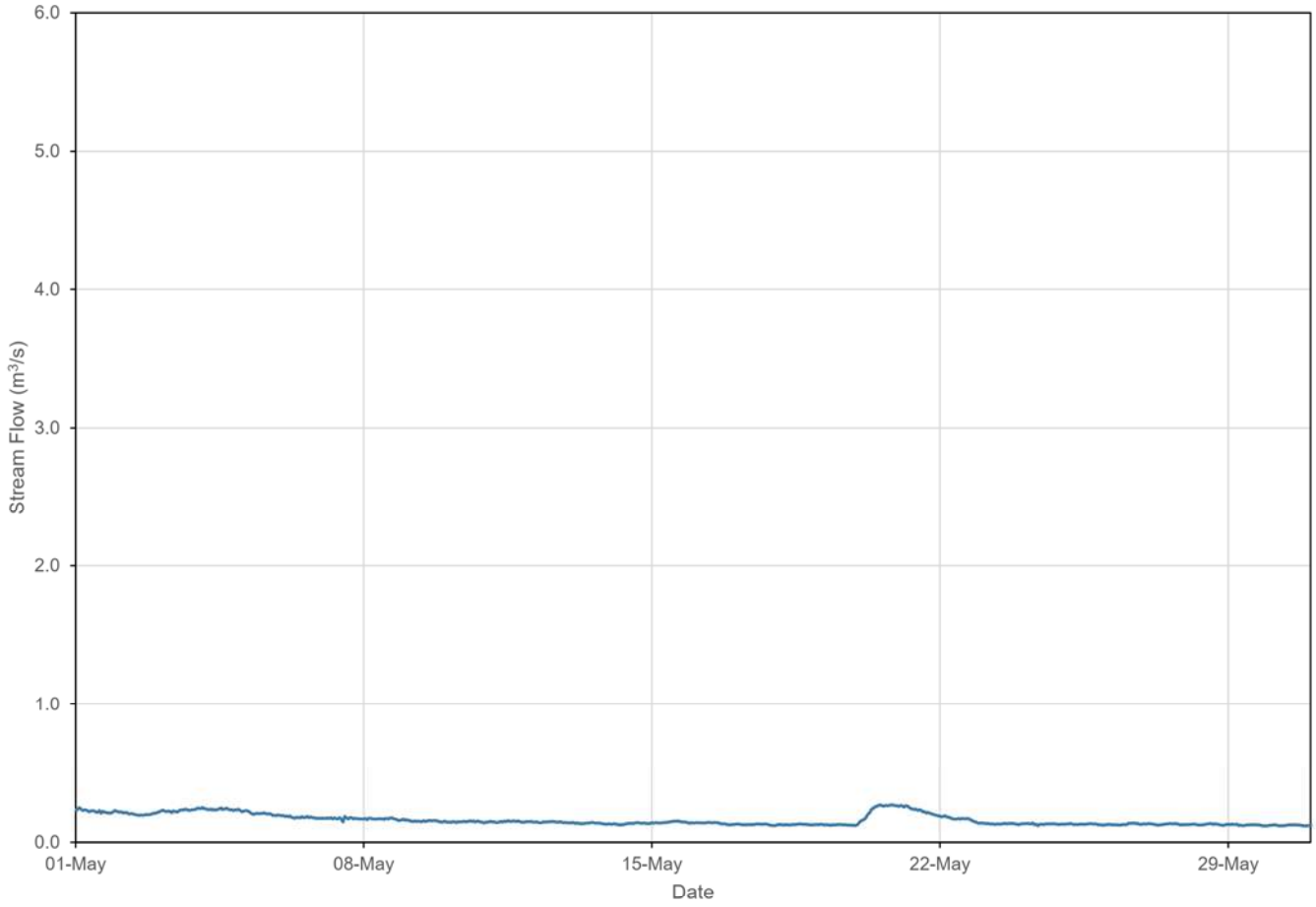


Figure C-18: 2023 Calculated Stream Flow at SWM2
June 2023

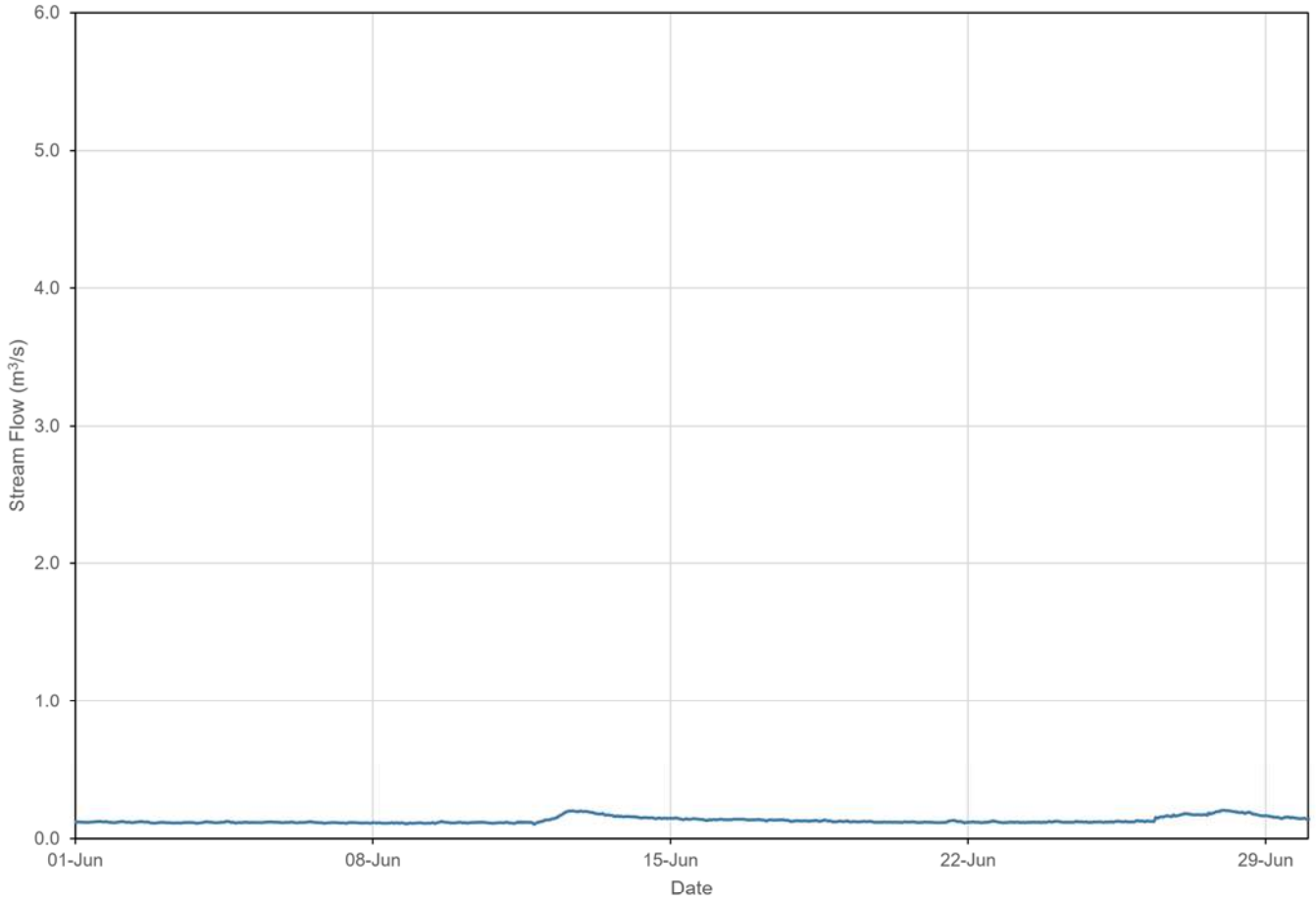


Figure C-19: 2023 Calculated Stream Flow at SWM2
July 2023

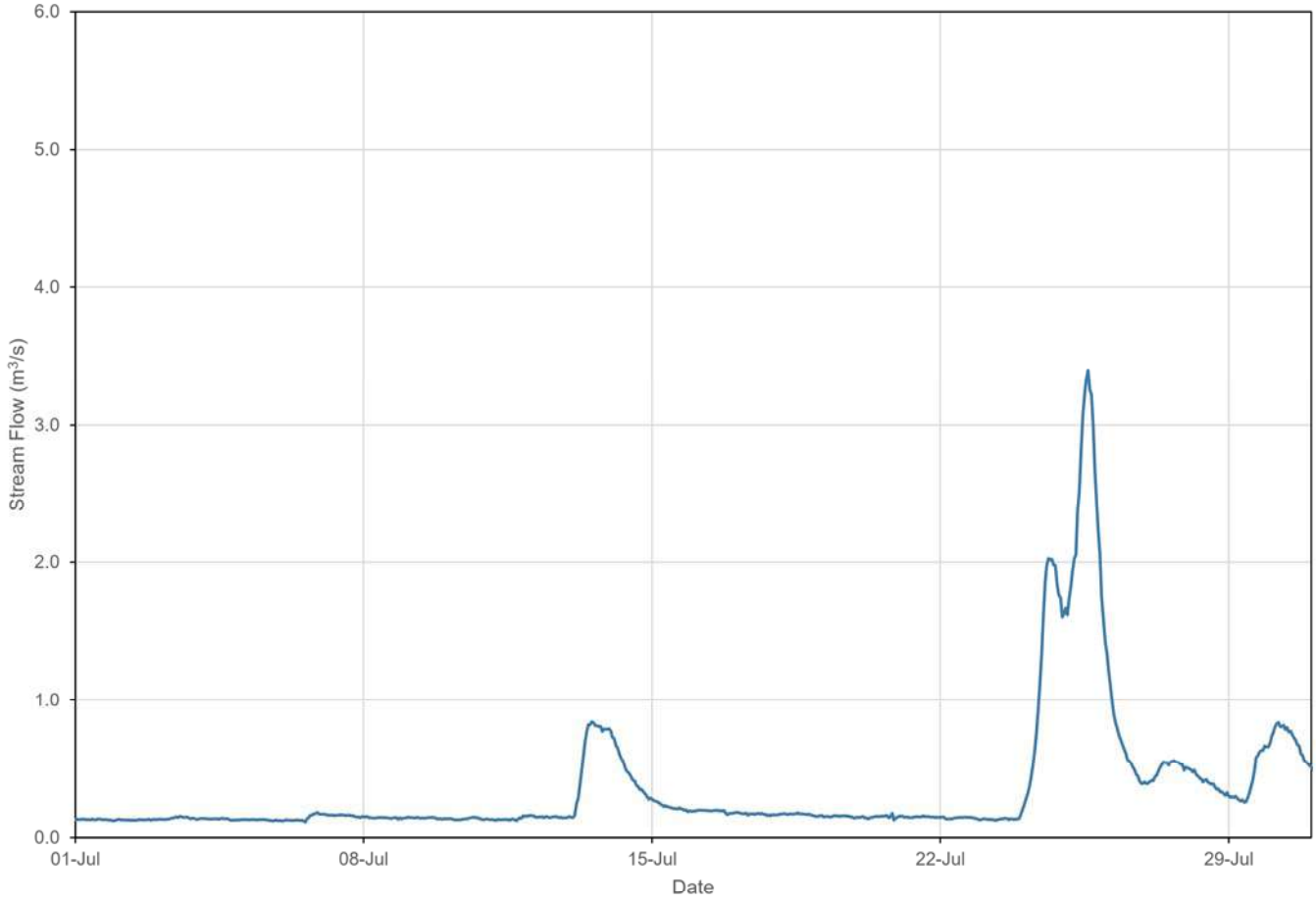


Figure C-20: 2023 Calculated Stream Flow at SWM2
August 2023

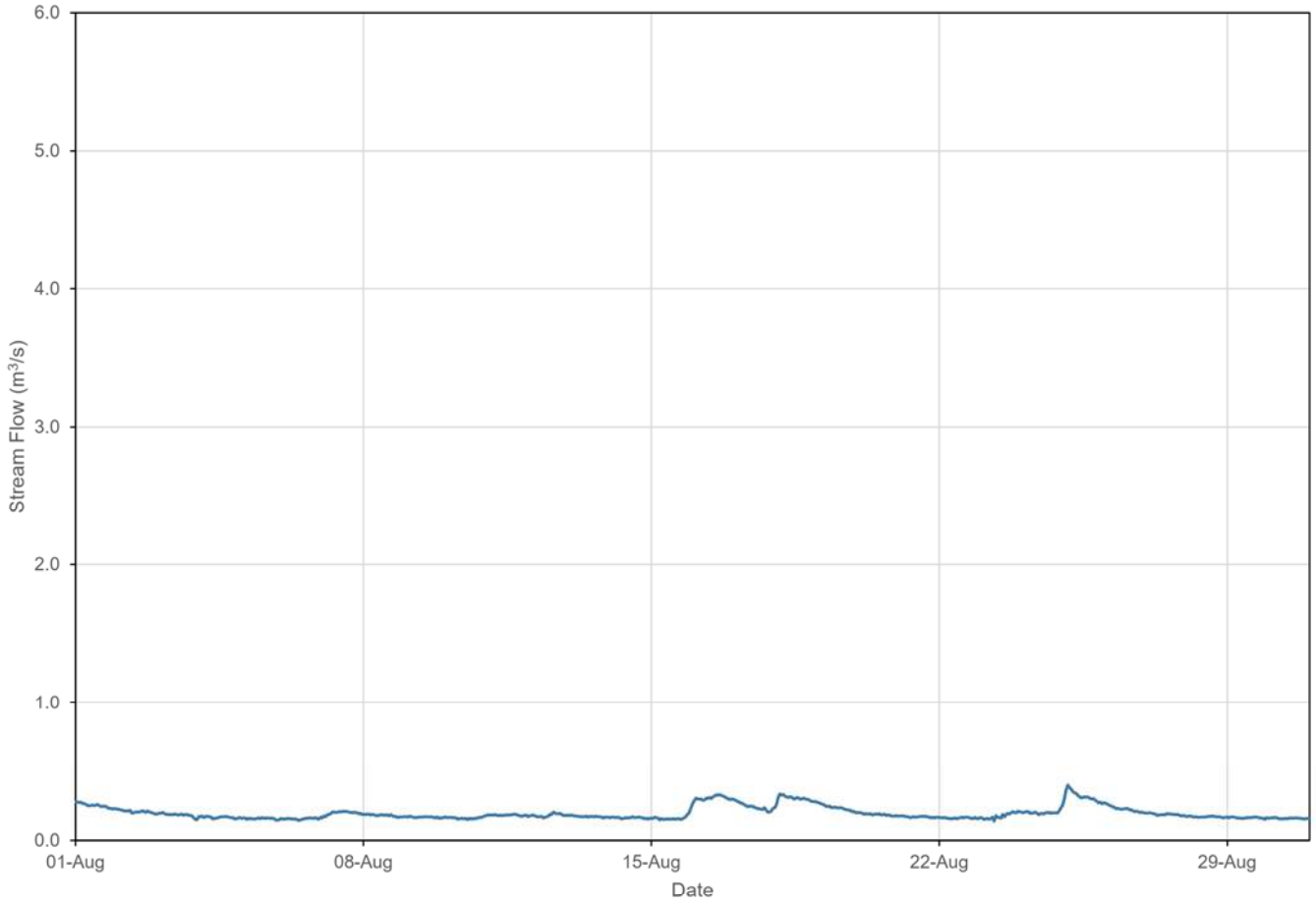


Figure C-21: 2023 Calculated Stream Flow at SWM2
September 2023

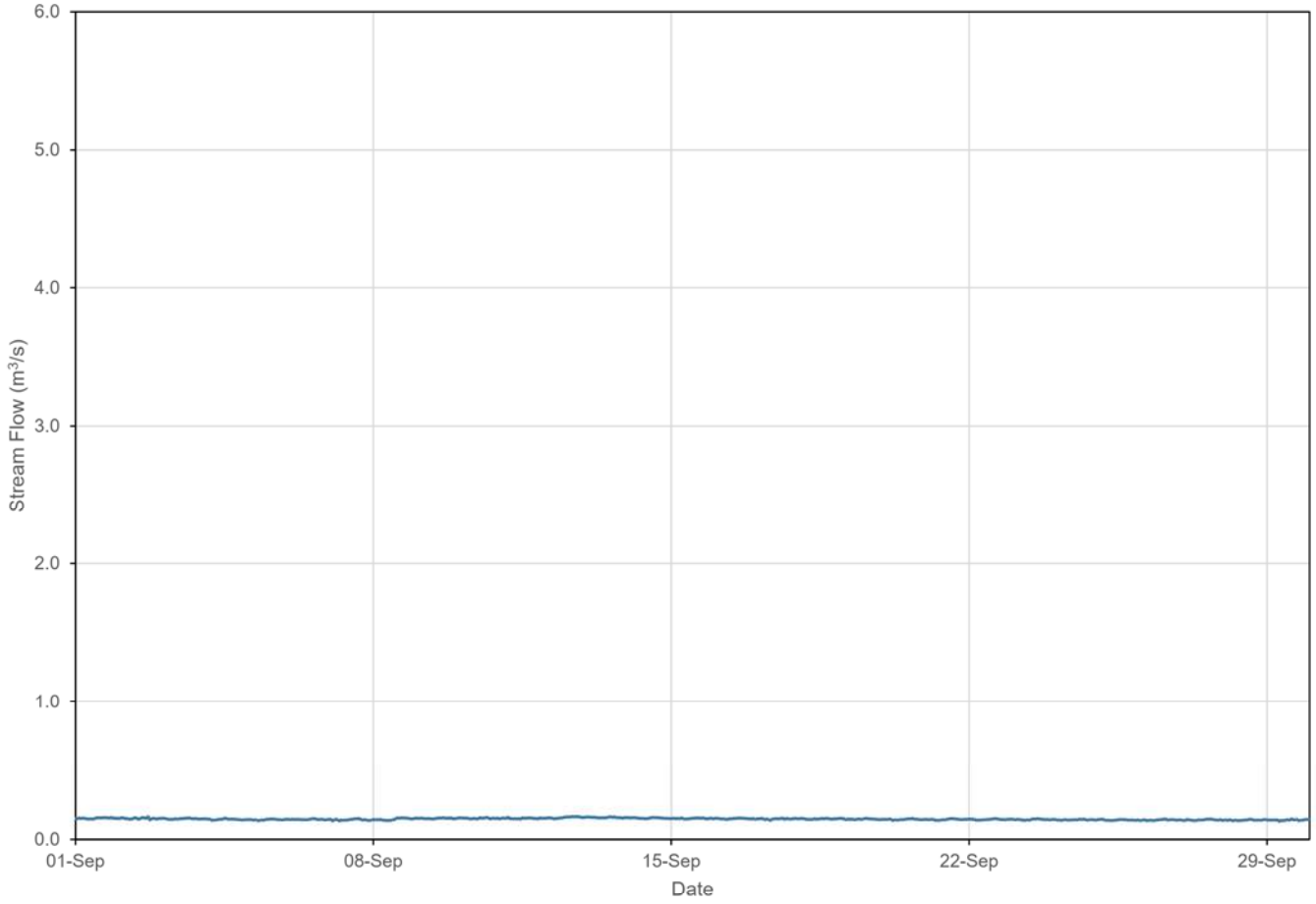


Figure C-22: 2023 Calculated Stream Flow at SWM2
October 2023

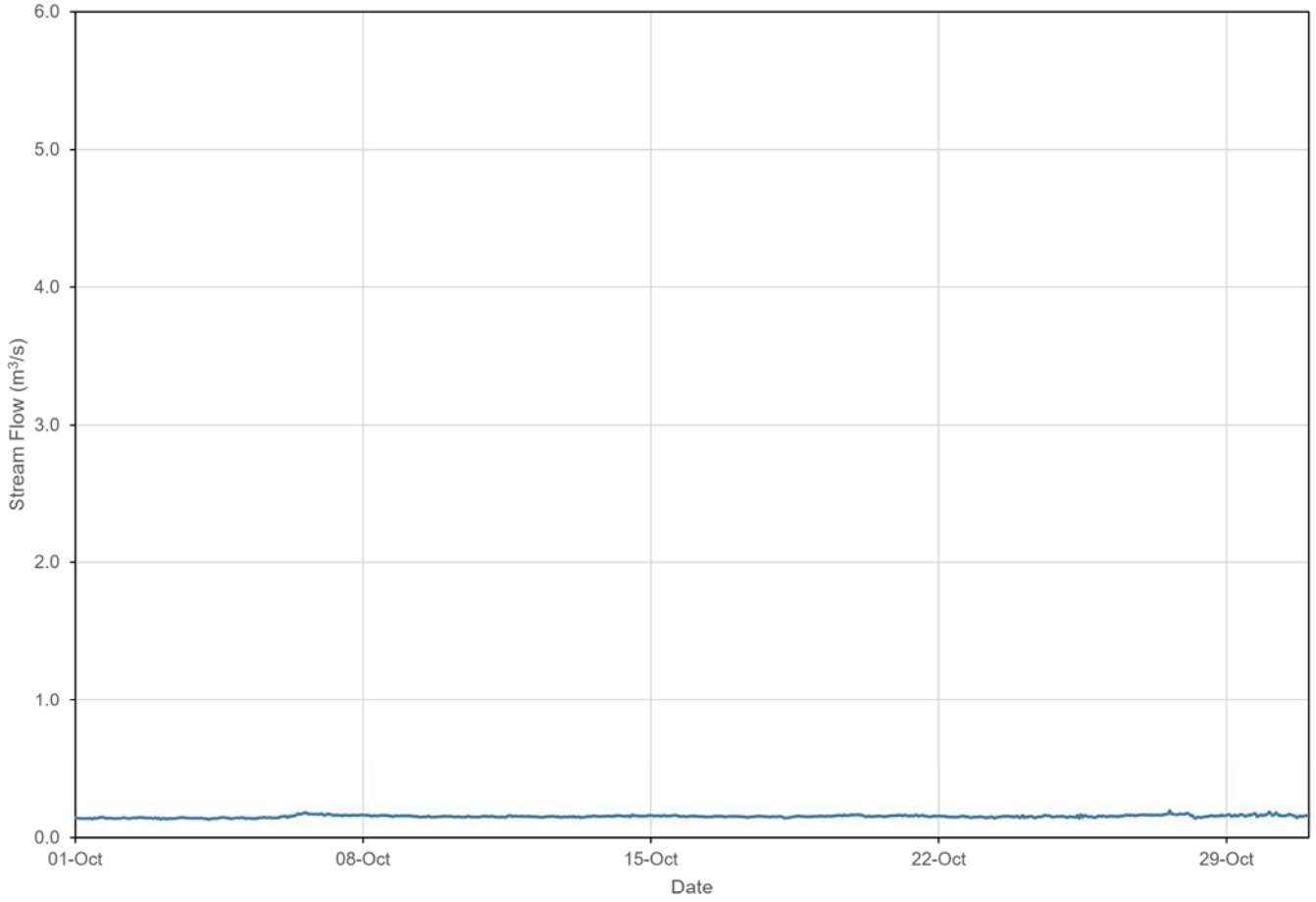


Figure C-24: 2023 Calculated Stream Flow at SWM2
November 2023

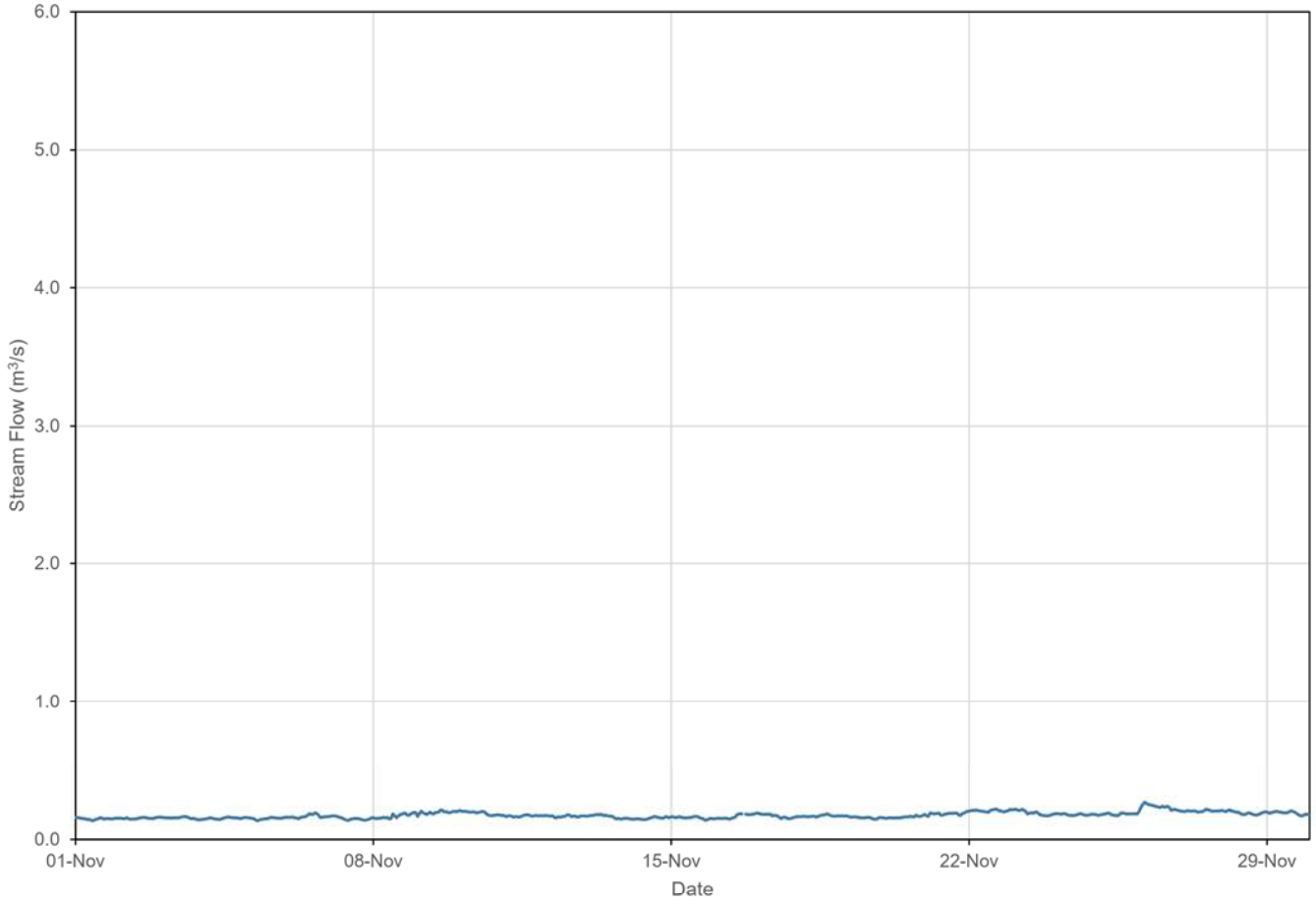
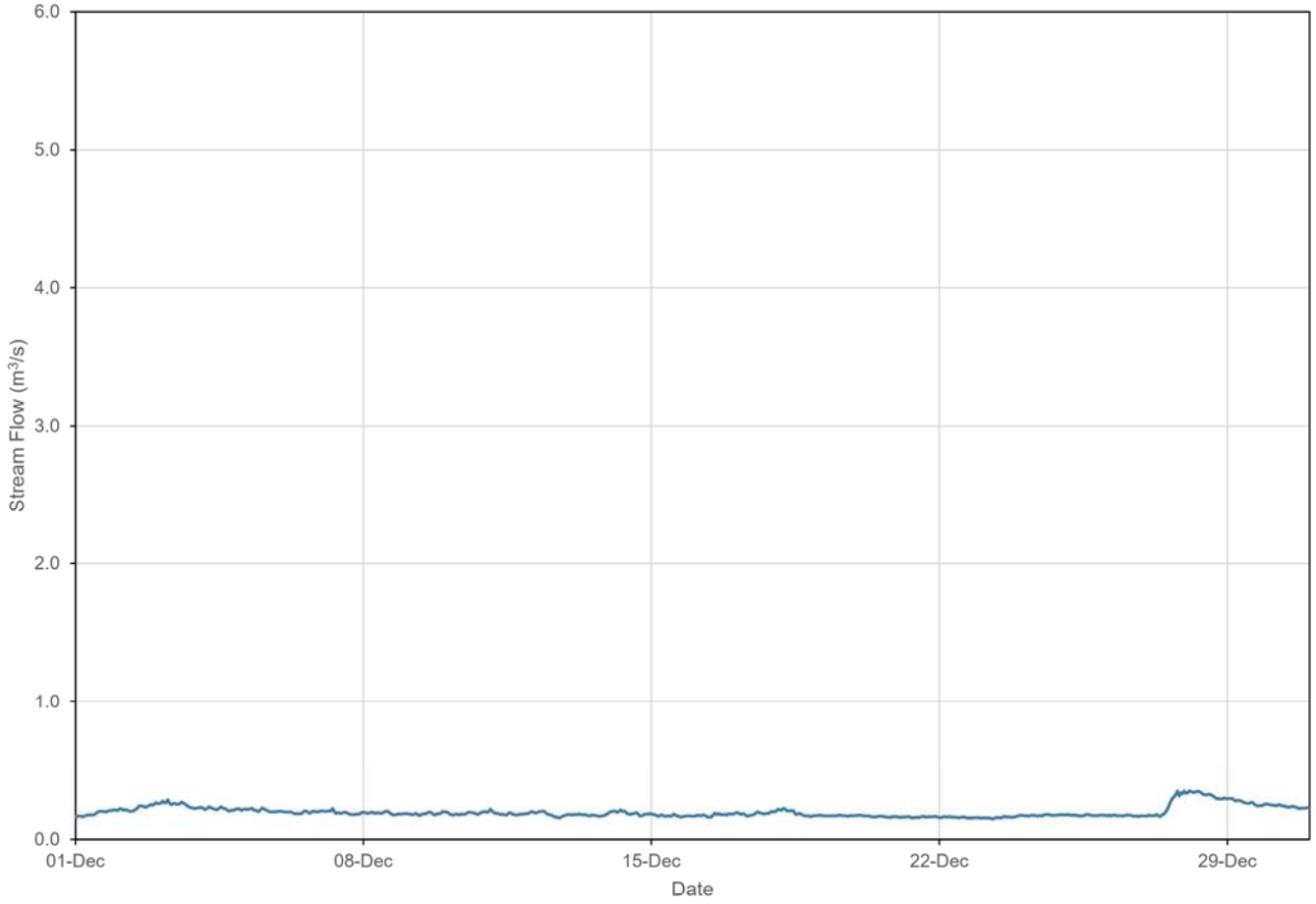


Figure C-24: 2023 Calculated Stream Flow at SWM2
December 2023



APPENDIX D

Regression Plots for Air Temperature and Precipitation vs. Flow

(Technical Appendix A - 2023 Surface Water Report)

Figure D-1: Regression Analysis Summary Output
Mean Summer Precipitation versus Summer 7-day Low Flow (2000-2023)

Regression Statistics	
Multiple R	0.439000971
R Square	0.192721853
Adjusted R Square	0.156027392
Standard Error	78.08973098
Observations	24

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	32027.15048	32027.15048	5.252069288	0.031859898
Residual	22	134156.1339	6098.006085		
Total	23	166183.2843			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	151.7604218	49.72663272	3.051894197	0.005845713	48.63369747	254.8871462	48.63369747	254.8871462
X Variable 1	518.5286865	226.2598862	2.291739359	0.031859898	49.29440214	987.7629709	49.29440214	987.7629709

RESIDUAL OUTPUT

Observation	*Predicted Y*	*Residuals*
1	260.1329173	40.8670827
2	223.3173806	-91.51738056
3	229.0211961	-53.52119611
4	237.8361838	-9.936183777
5	246.1326428	-54.63264276
6	262.7255607	72.77443927
7	232.6508969	5.849103088
8	206.7244626	-132.2244626
9	286.5778803	81.42211969
10	305.7634417	0.736558291
11	293.8372819	-6.137281919
12	259.6143886	-78.71438861
13	249.2438149	-91.24381488
14	312.5043146	-21.50431463
15	275.6887779	-70.98877789
16	293.8372819	2.162718081
17	288.1334664	19.96653363
18	348.282794	-34.782794
19	290.2075811	46.69241889
20	265.3182042	50.68179584
21	217.7691236	29.40587639
22	213.9838642	178.5161358
23	210.3541634	-48.75416339
24	223.3173806	164.8826194

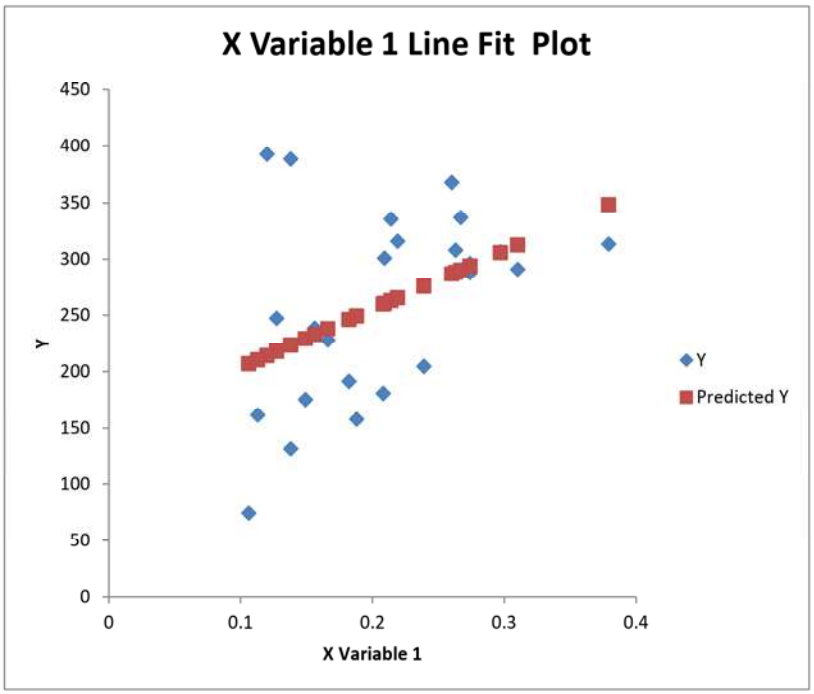


Figure D-2: Regression Analysis Summary Output
Total Summer Temperature versus Summer 7-day Low Flow (2000-2023)

Regression Statistics	
Multiple R	0.087386394
R Square	0.007636382
Adjusted R Square	-0.037471055
Standard Error	1.496686857
Observations	24

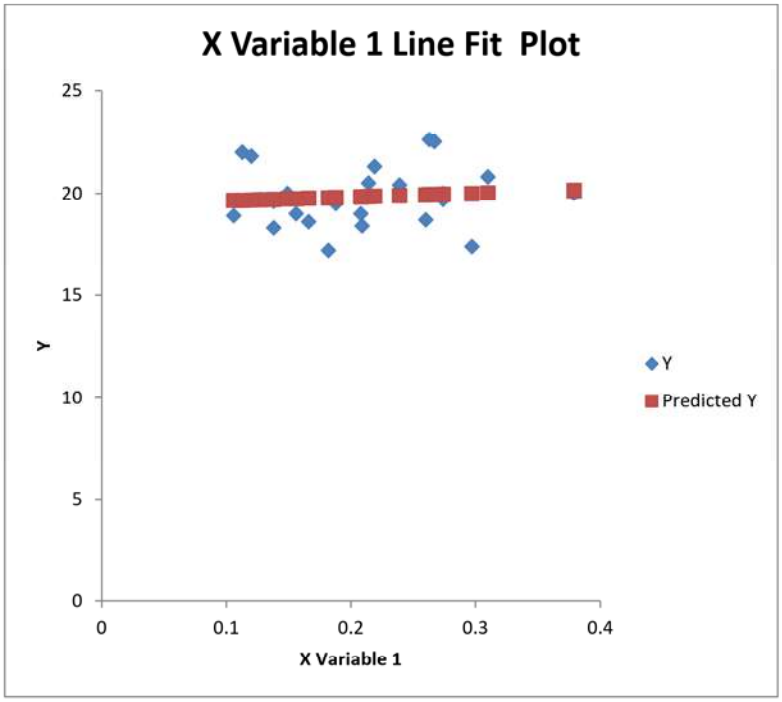
ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.379228856	0.379228856	0.169293189	0.684721554
Residual	22	49.28157406	2.240071548		
Total	23	49.66080292			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	19.45697653	0.953072788	20.41499534	8.67034E-16	17.48042454	21.43352852	17.48042454	21.43352852
X Variable 1	1.784285417	4.336552242	0.411452536	0.684721554	-7.20917349	10.77774432	-7.20917349	10.77774432

RESIDUAL OUTPUT

Observation	*Predicted Y*	*Residuals*
1	19.82989218	-1.42989218
2	19.70320792	-0.103207916
3	19.72283506	0.277164945
4	19.75316791	-1.153167907
5	19.78171647	-2.581716474
6	19.83881361	0.661186393
7	19.73532505	-0.735325053
8	19.64611078	-0.746110782
9	19.92089074	-1.220890737
10	19.9869093	-2.586909297
11	19.94587073	-0.245870732
12	19.82810789	-0.828107895
13	19.79242219	-0.292422187
14	20.01010501	0.789894993
15	19.88342074	0.516579257
16	19.94587073	0.054129268
17	19.92624359	2.673756407
18	20.1332207	-0.133220701
19	19.93338073	2.566619265
20	19.84773503	1.452264965
21	19.68411606	0.028145844
22	19.67109078	2.118909222
23	19.65860078	2.32139922
24	19.70320792	-1.403207916



APPENDIX E

Monthly Water Temperature Data

(Technical Appendix A - 2023 Surface Water Report)

Figure E-1: Water Temperature at SWM1 and SWM2
January 2023

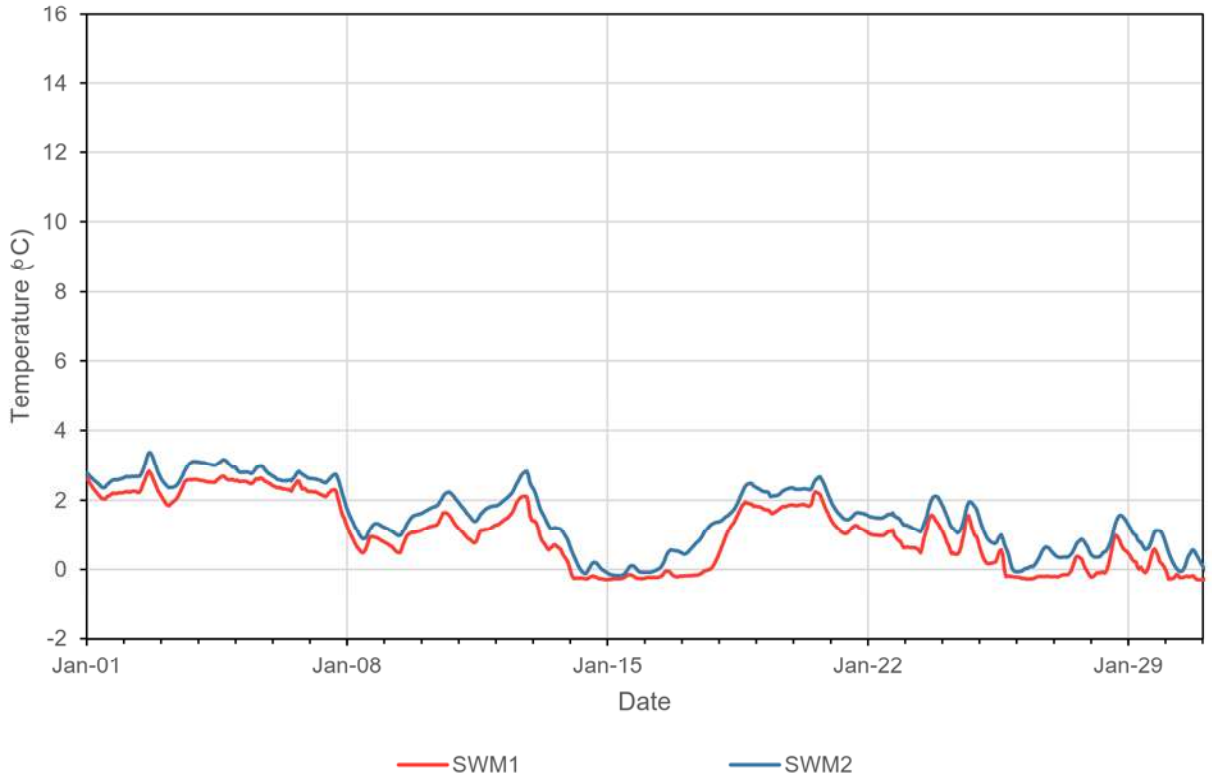


Figure E-2: Water Temperature at SWM3 and SWM4
January 2023

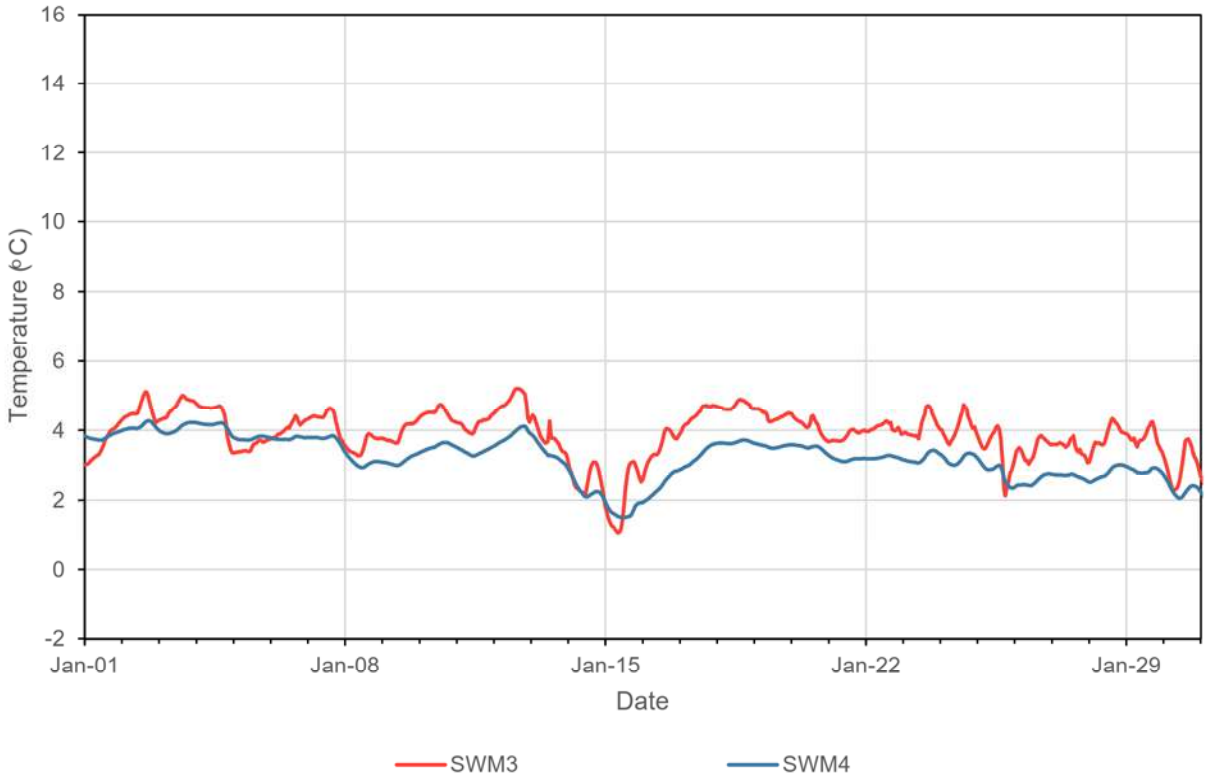


Figure E-3: Water Temperature at SWM1 and SWM2
February 2023

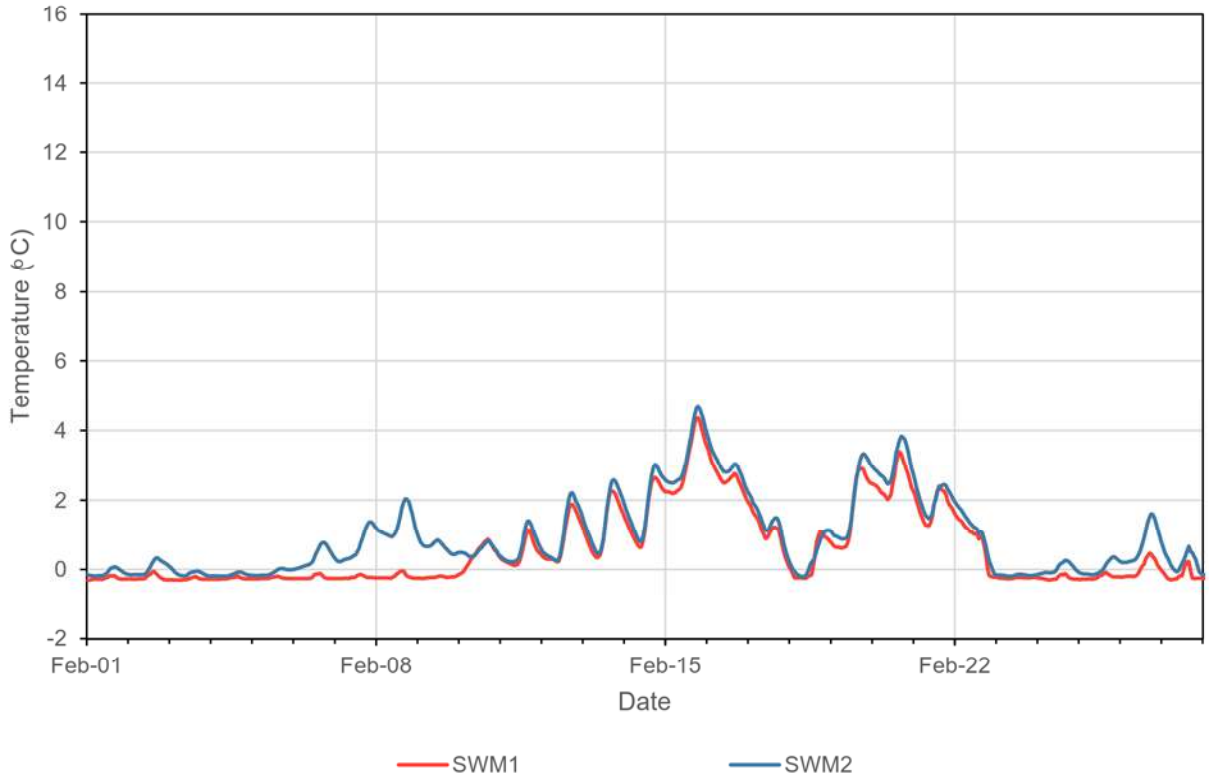


Figure E-4: Water Temperature at SWM3 and SWM4
February 2023

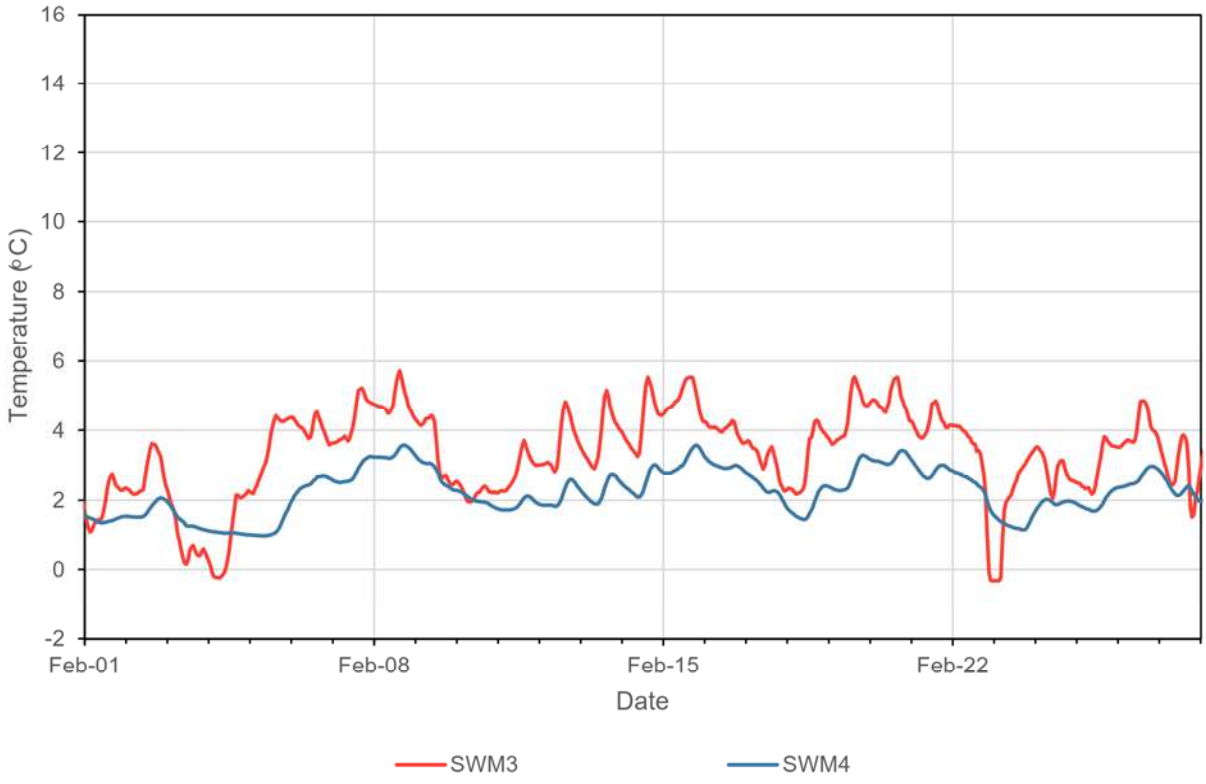


Figure E-5: Water Temperature at SWM1 and SWM2
March 2023

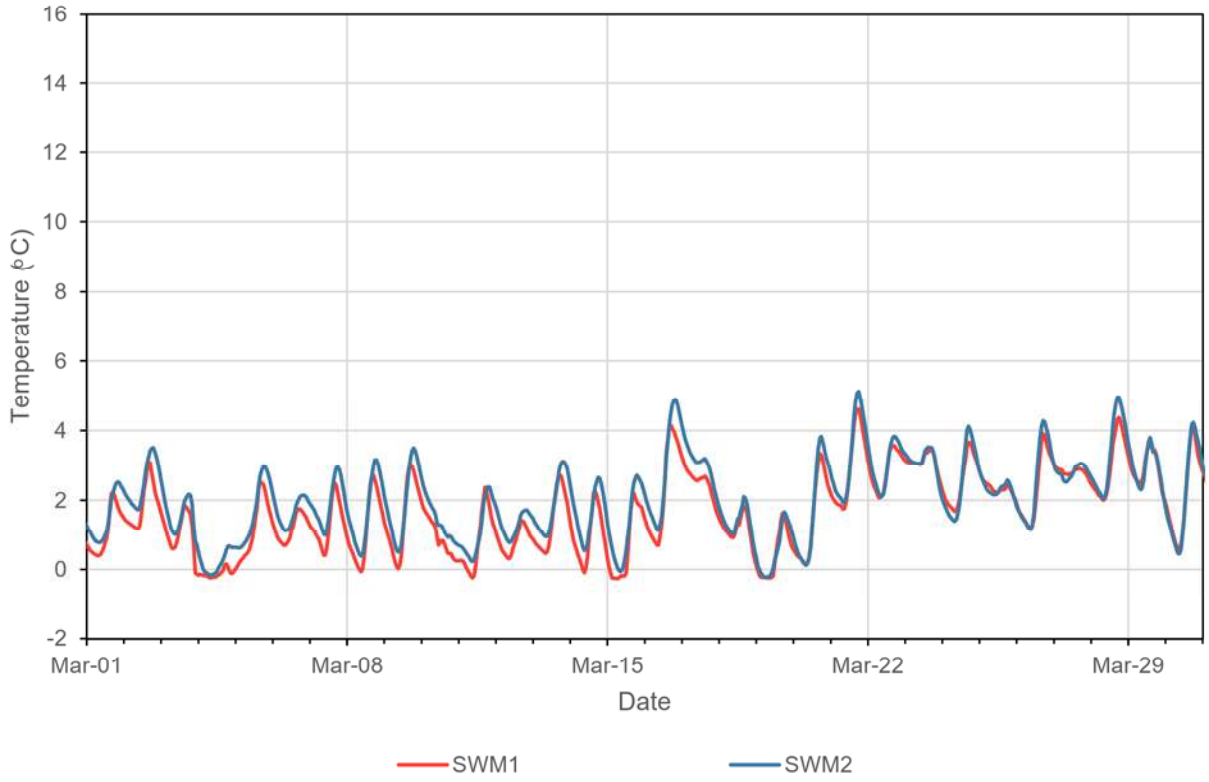


Figure E-6: Water Temperature at SWM3 and SWM4
March 2023

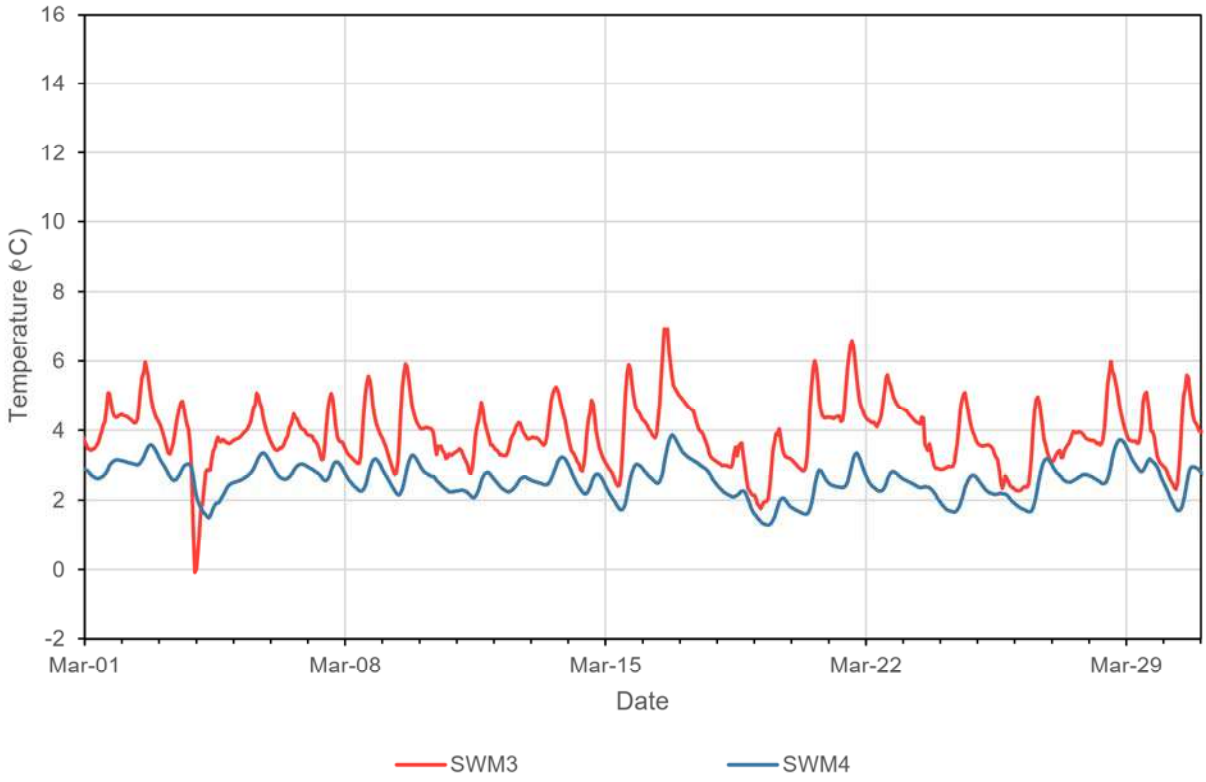


Figure E-7: Water Temperature at SWM1 and SWM2
April 2023

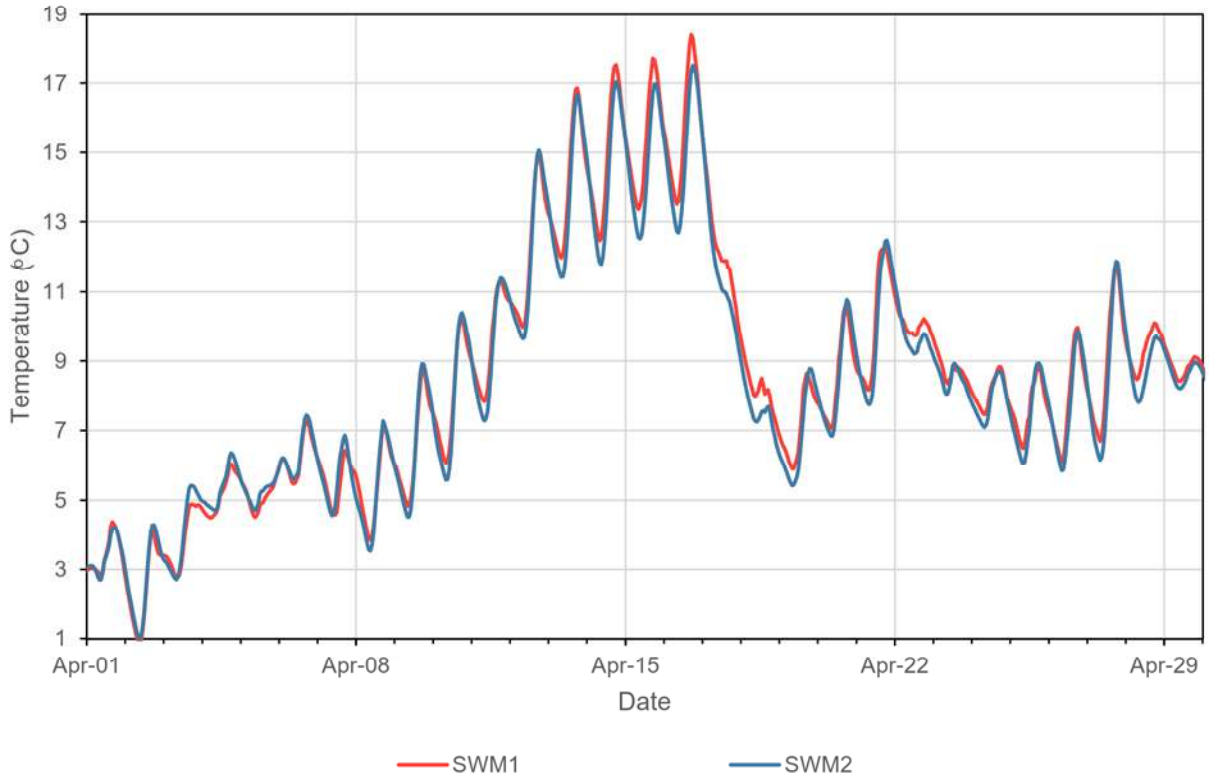


Figure E-8: Water Temperature at SWM3 and SWM4
April 2023

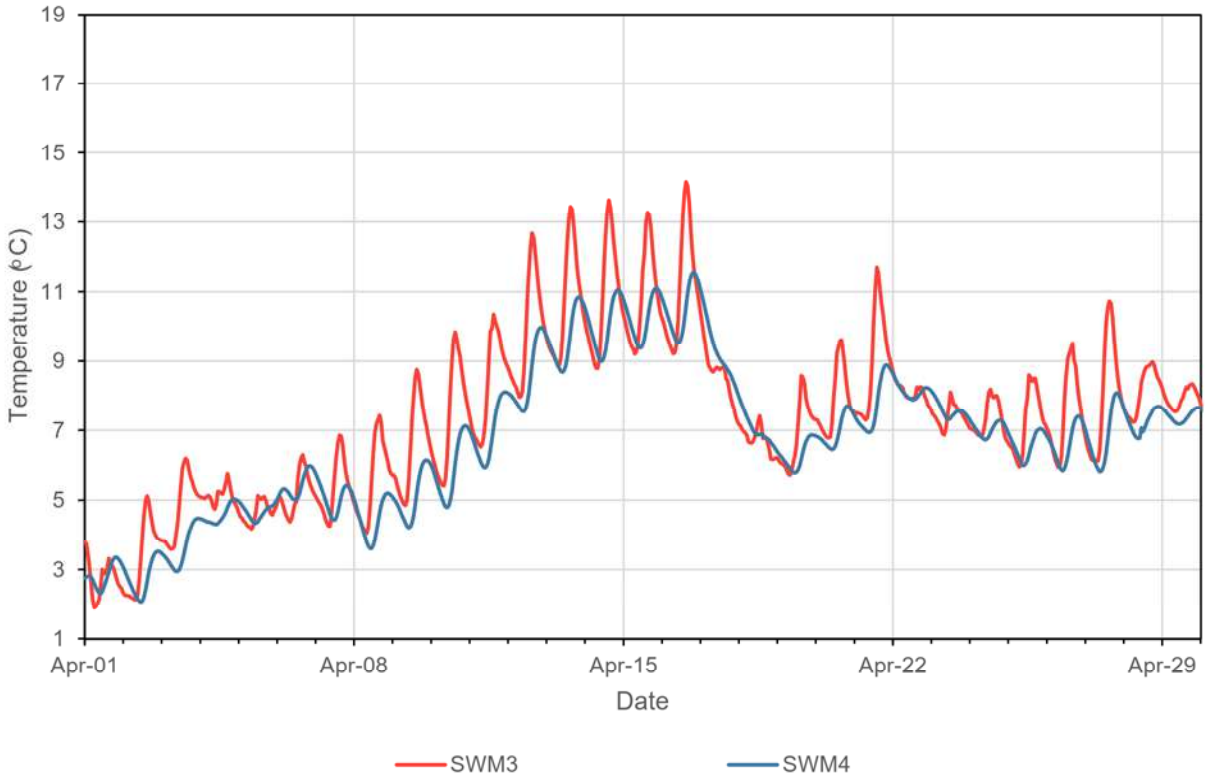


Figure E-9: Water Temperature at SWM1 and SWM2
May 2023

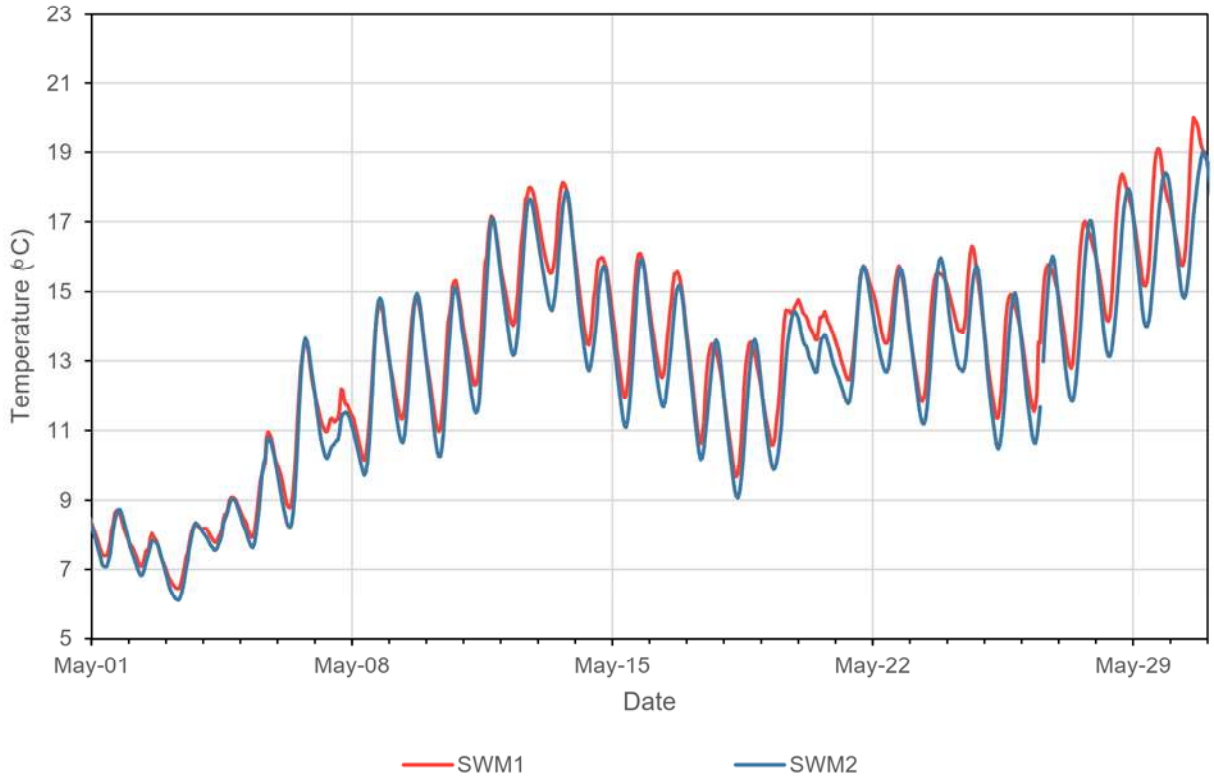


Figure E-10: Water Temperature at SWM3 and SWM4
May 2023

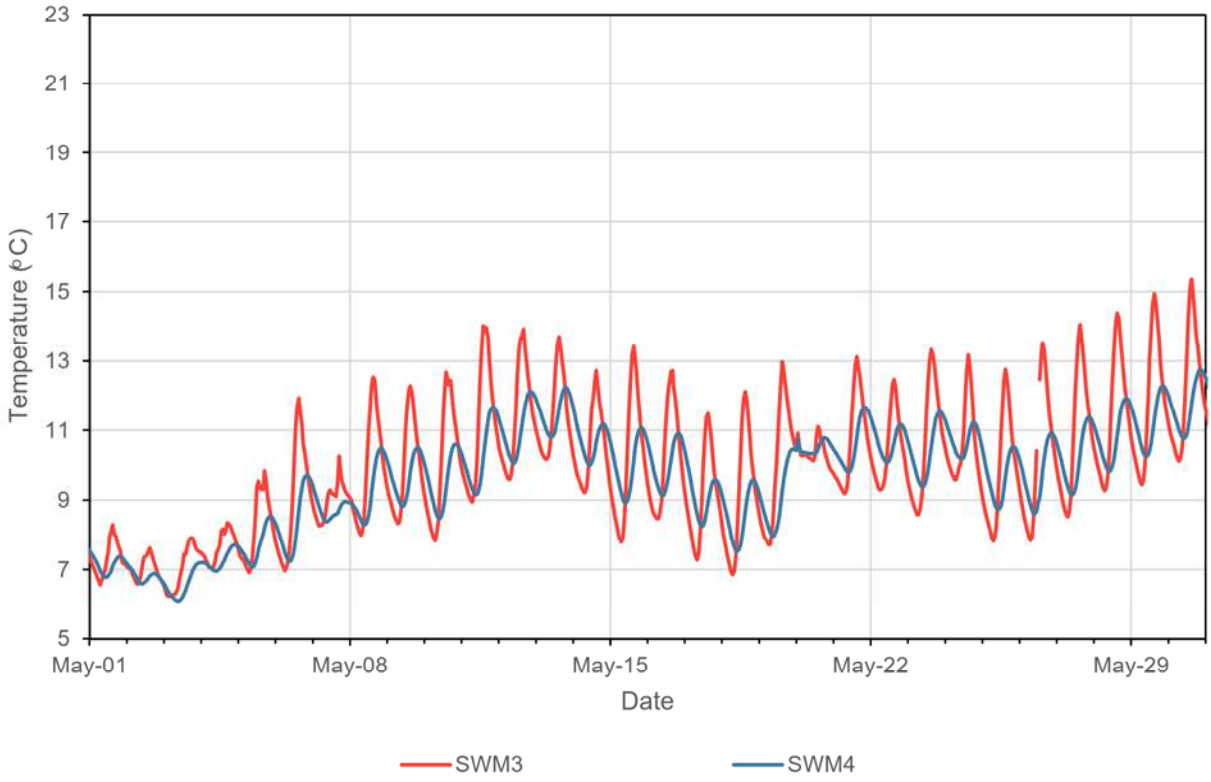


Figure E-11: Water Temperature at SWM1 and SWM2
June 2023

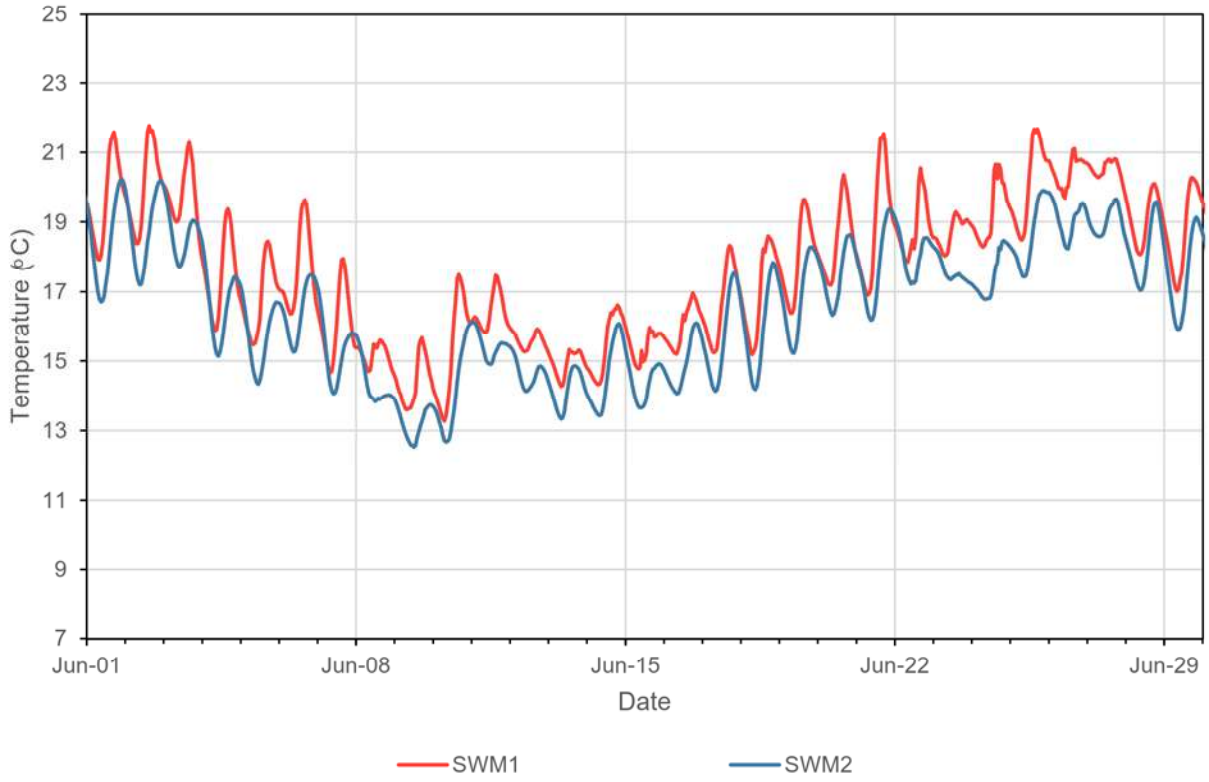


Figure E-12: Water Temperature at SWM3 and SWM4
June 2023

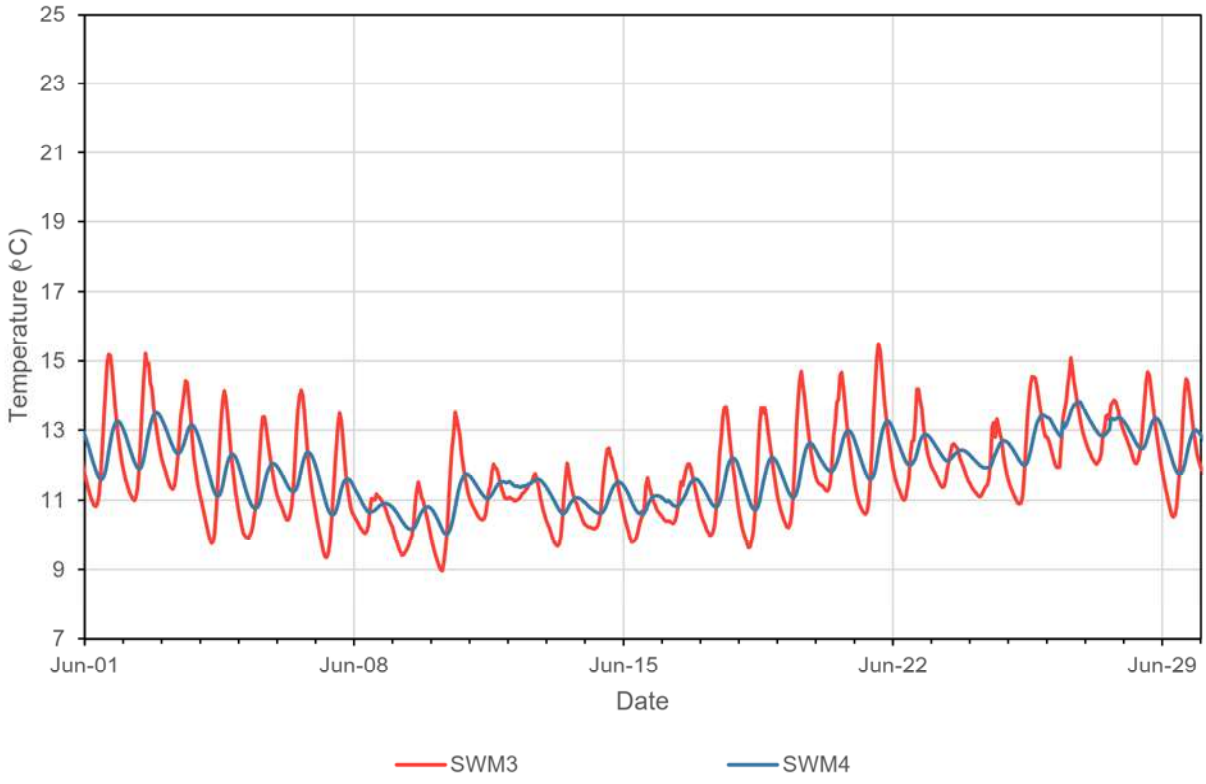


Figure E-13: Water Temperature at SWM1 and SWM2
July 2023

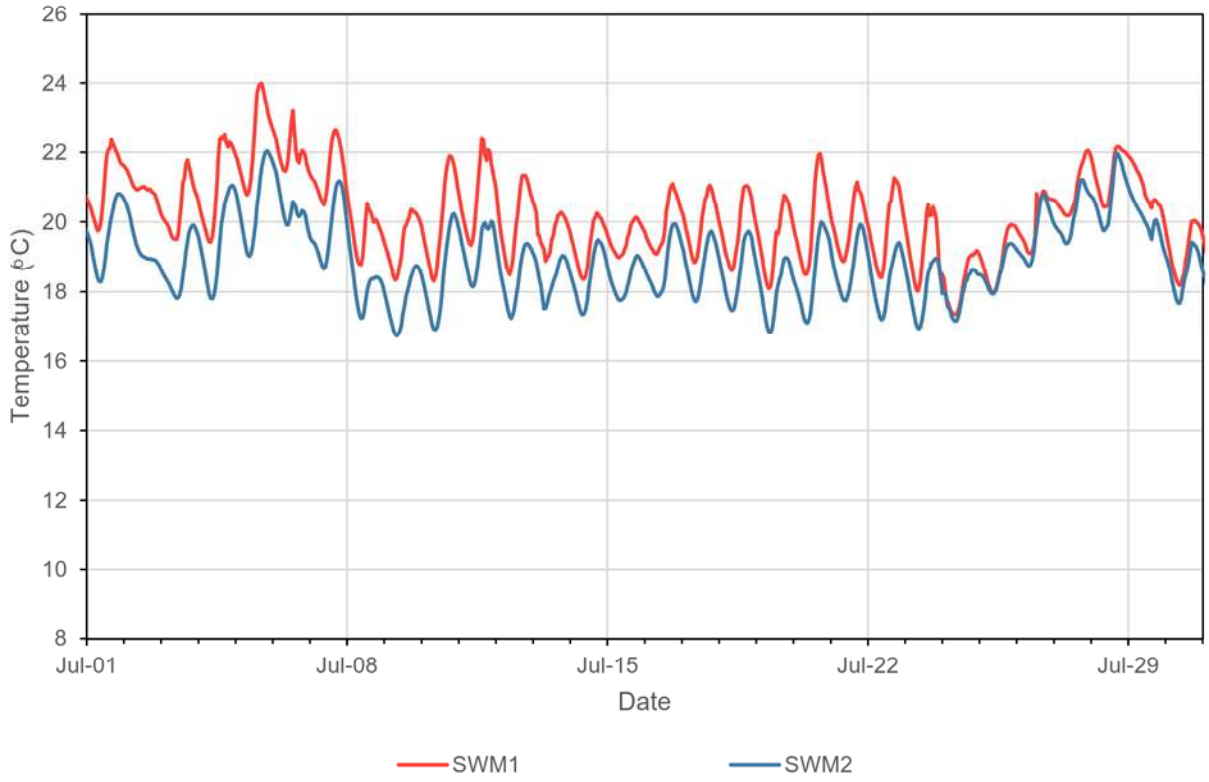


Figure E-14: Water Temperature at SWM3 and SWM4
July 2023

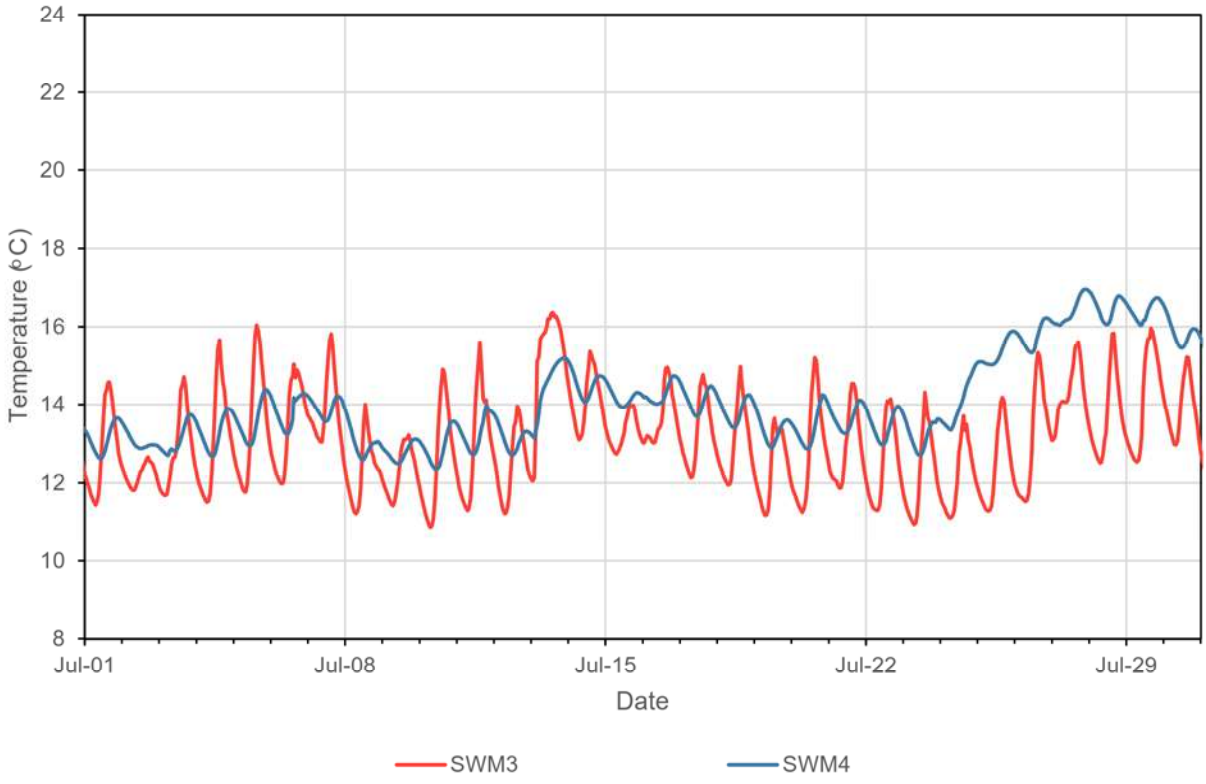


Figure E-15: Water Temperature at SWM1 and SWM2
August 2023

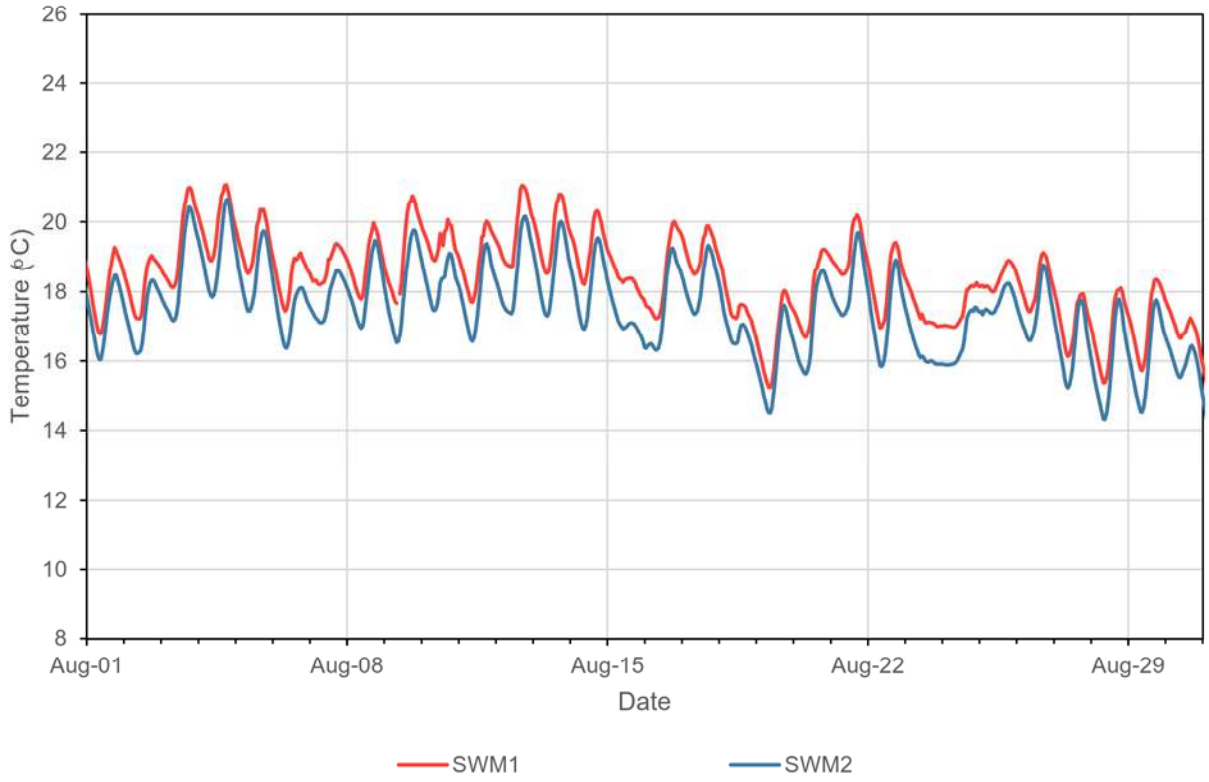


Figure E-16: Water Temperature at SWM3 and SWM4
August 2023

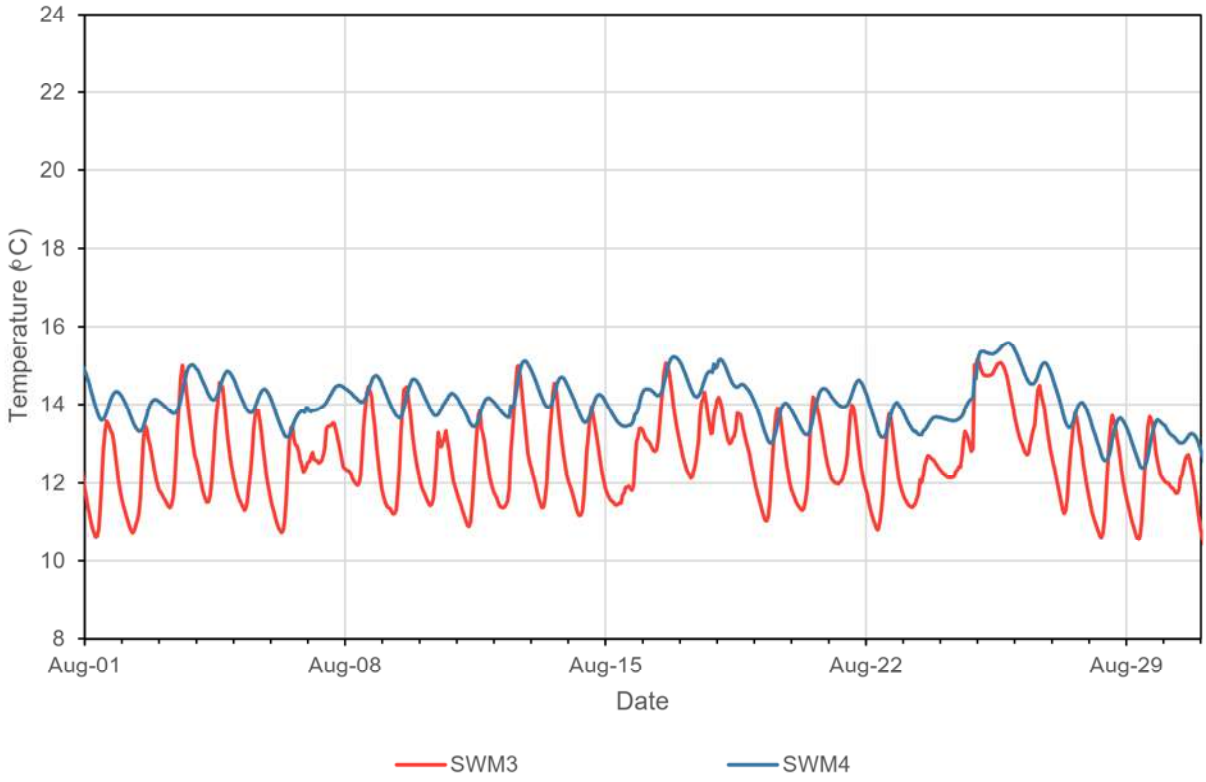


Figure E-17: Water Temperature at SWM1 and SWM2
September 2023

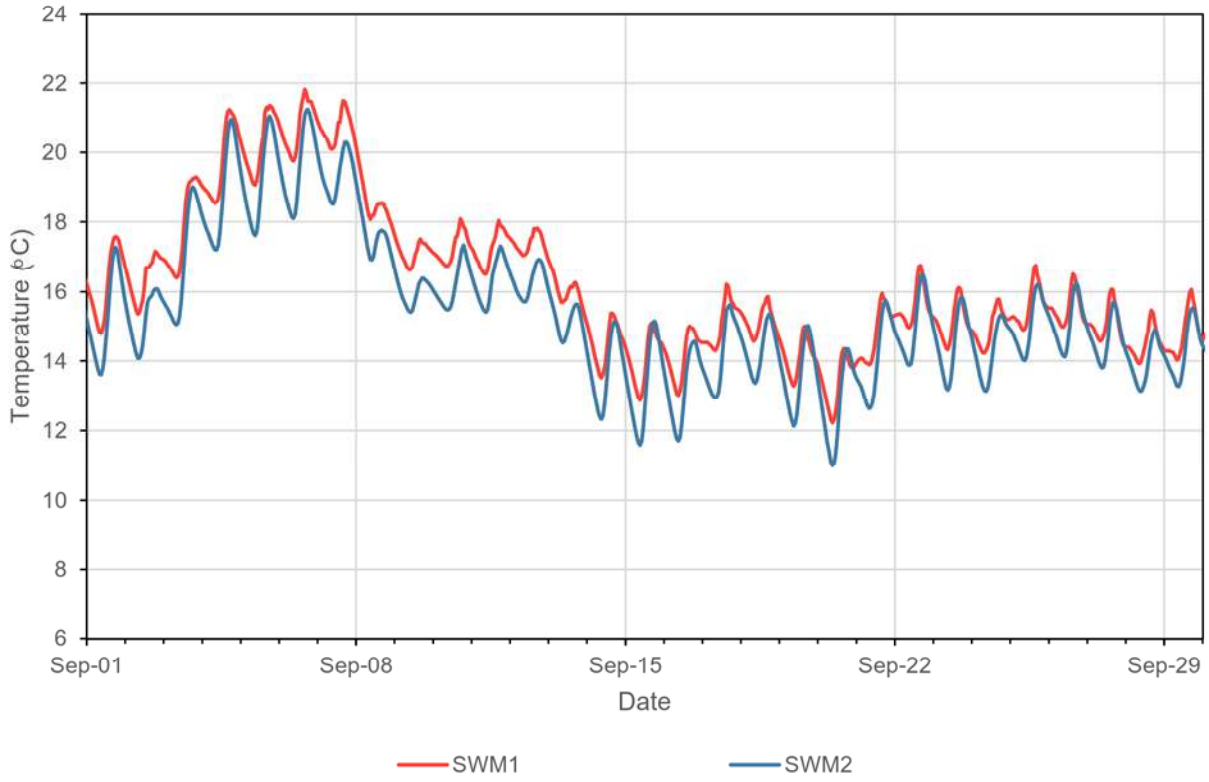


Figure E-18: Water Temperature at SWM3 and SWM4
September 2023

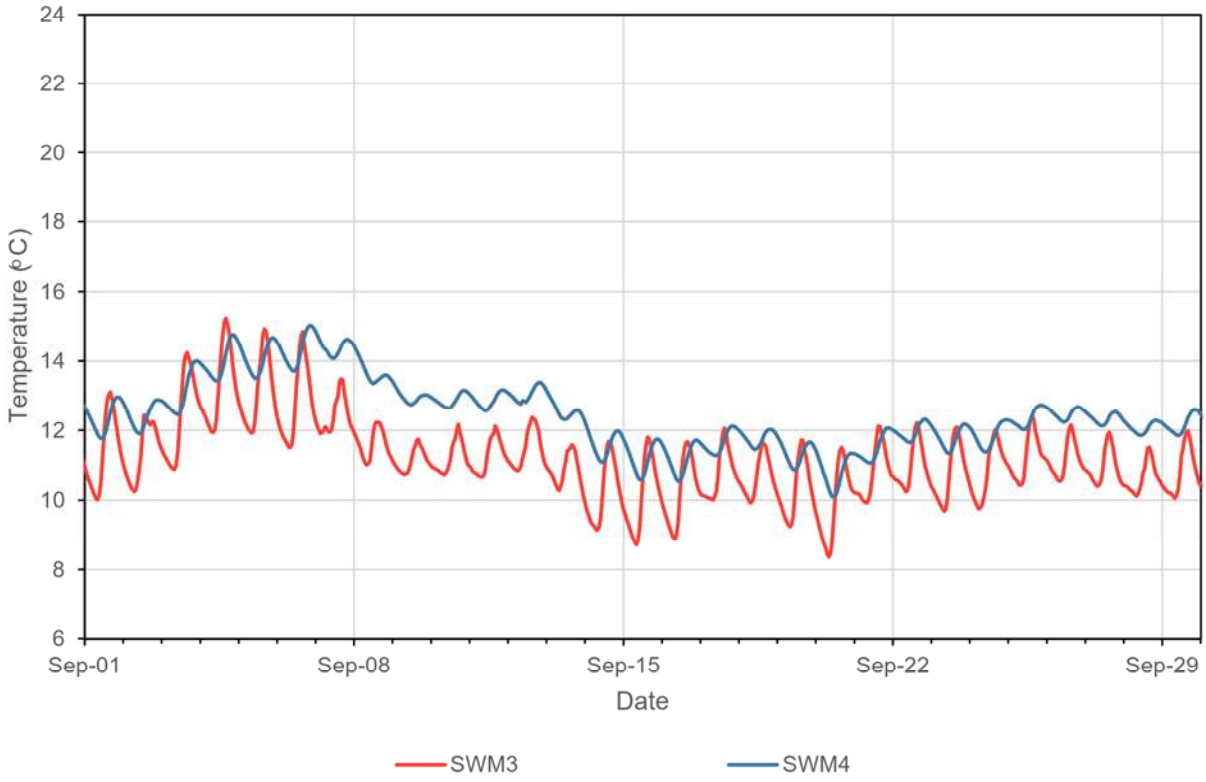


Figure E-19: Water Temperature at SWM1 and SWM2
October 2023

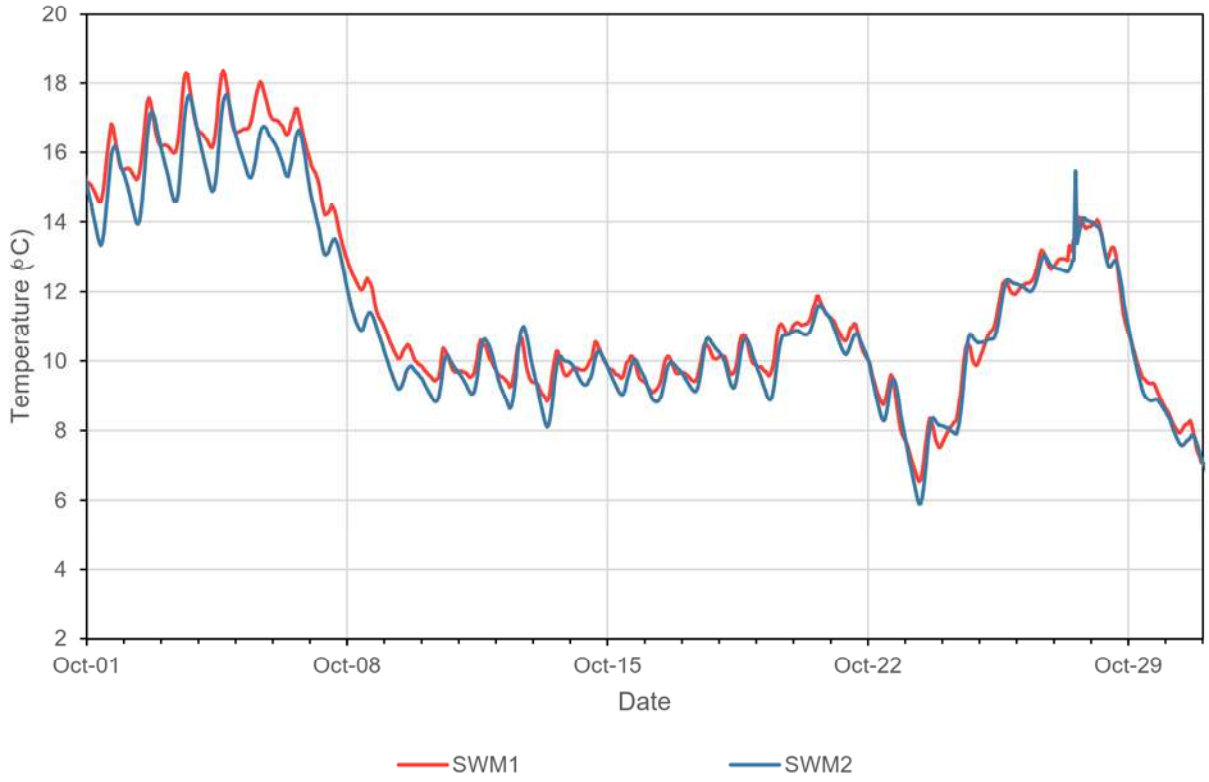


Figure E-20: Water Temperature at SWM3 and SWM4
October 2023

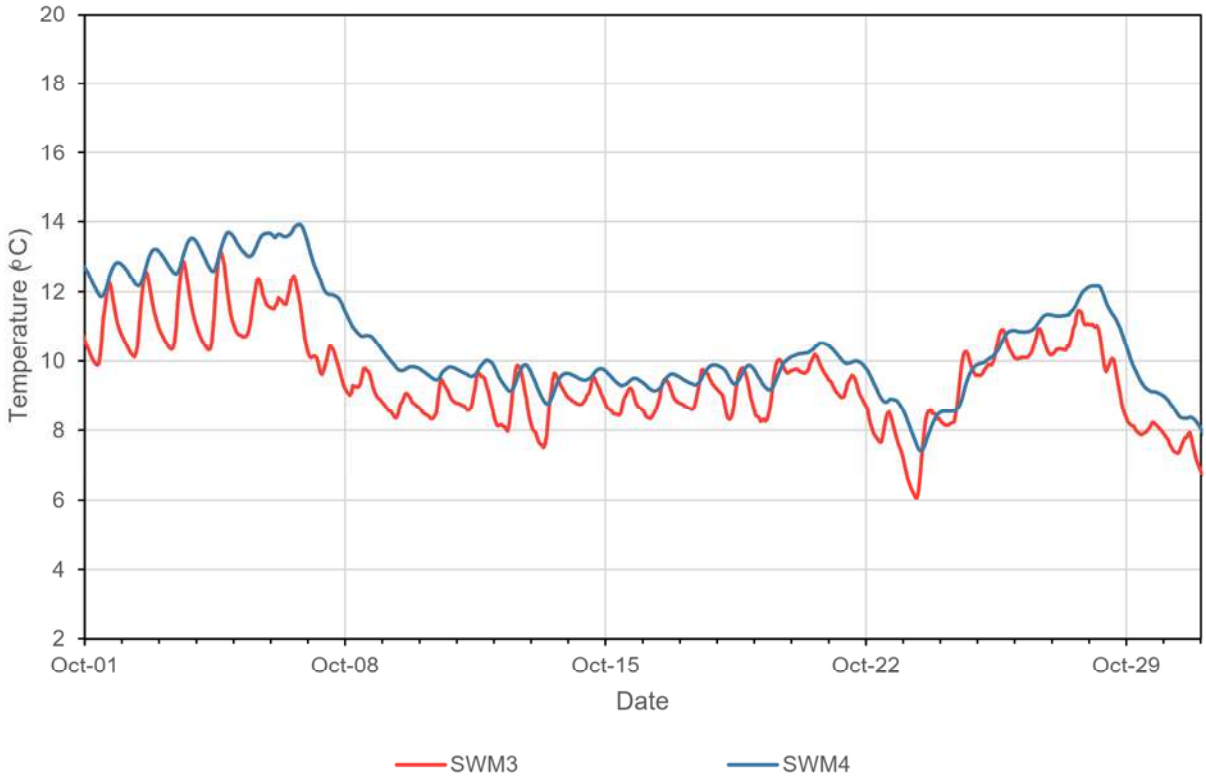


Figure E-21: Water Temperature at SWM1 and SWM2
November 2023

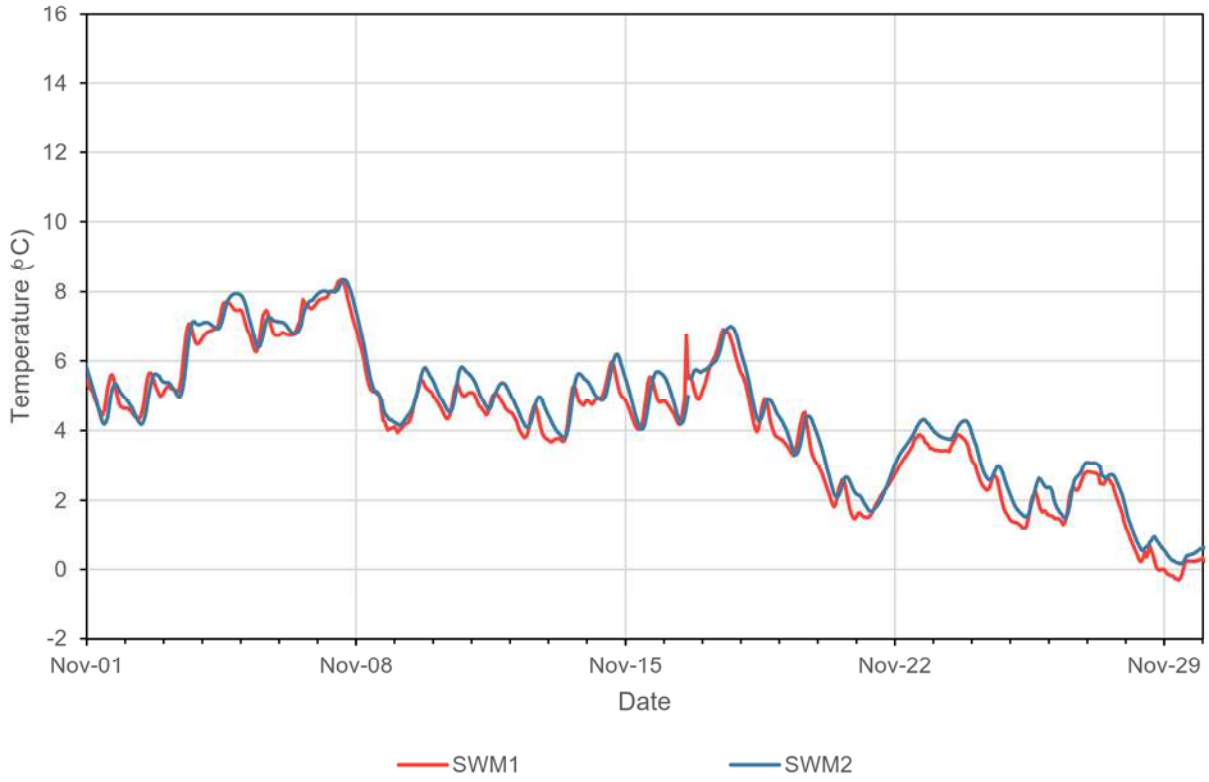


Figure E-22: Water Temperature at SWM3 and SWM4
November 2023

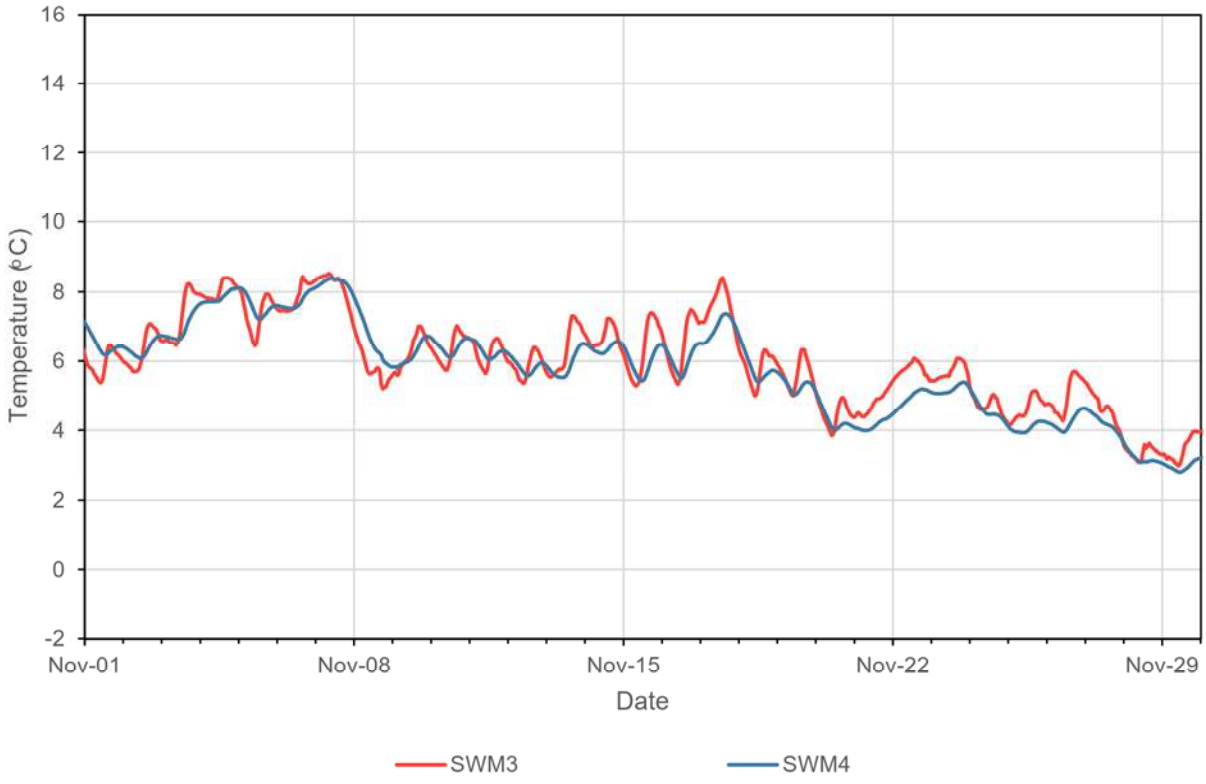


Figure E-23: Water Temperature at SWM1 and SWM2
December 2023

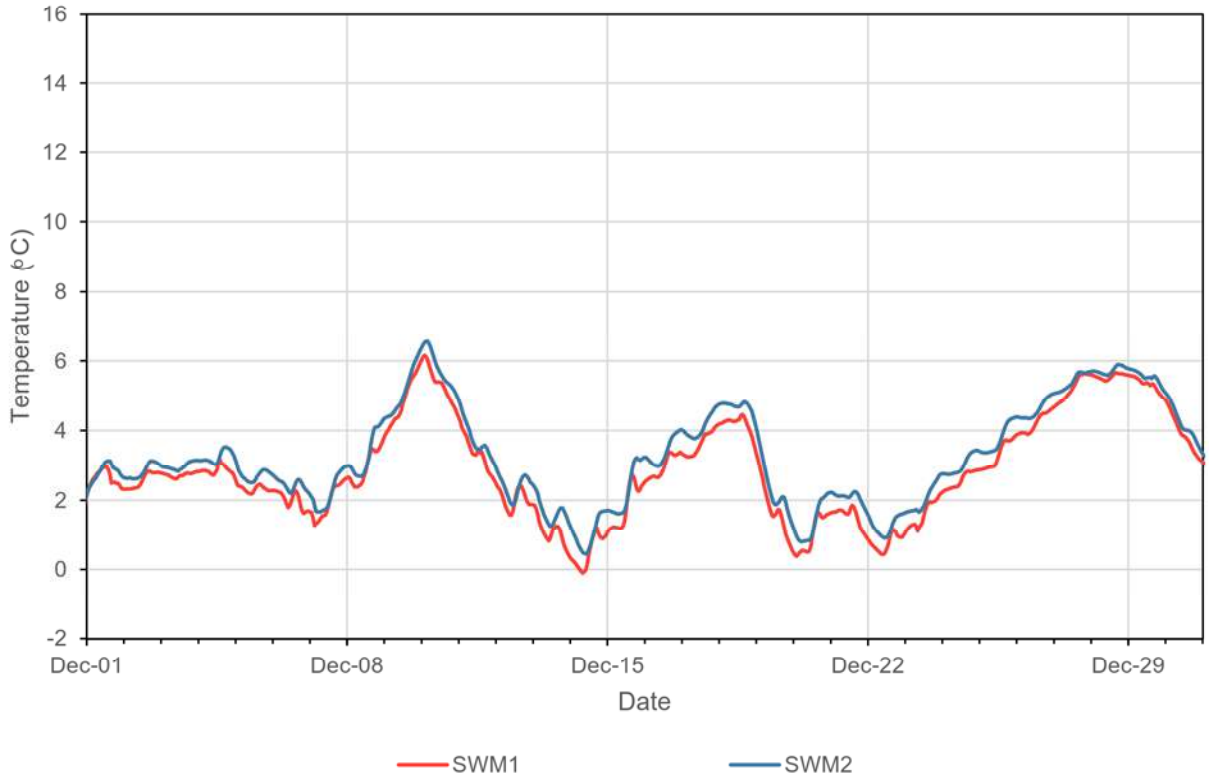
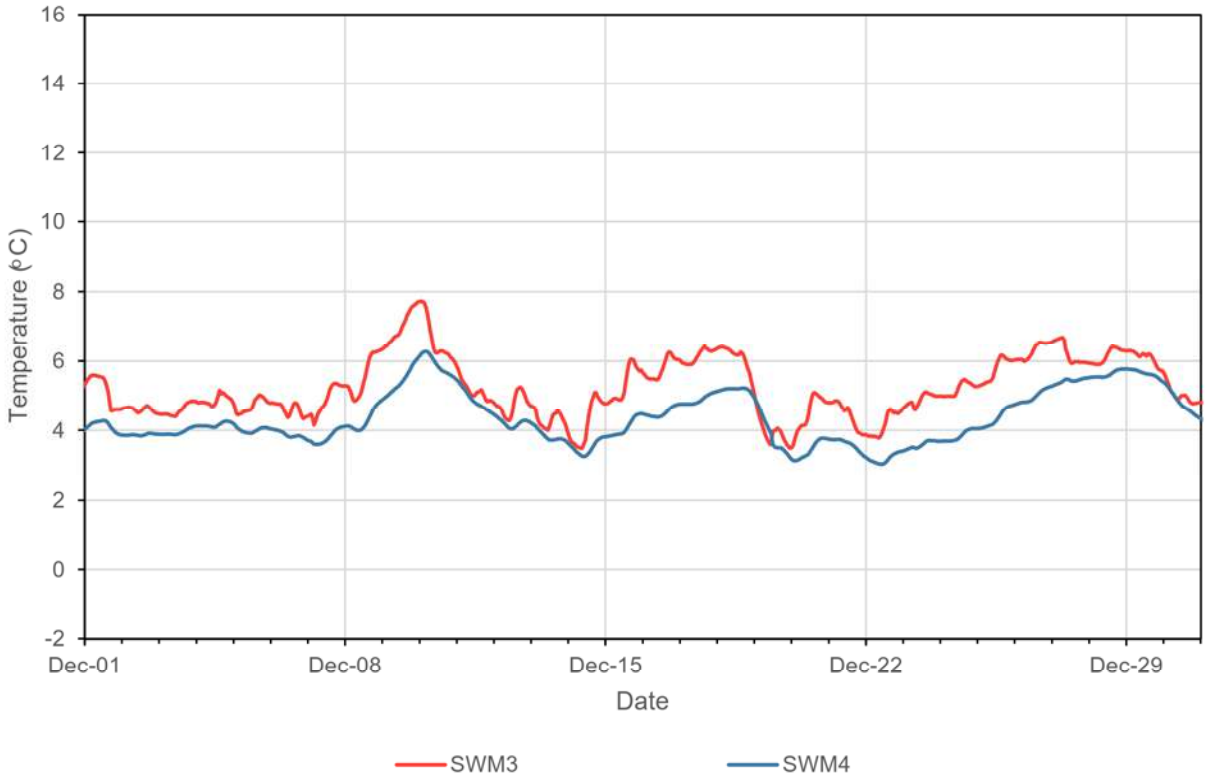


Figure E-24: Water Temperature at SWM3 and SWM4
December 2023



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REPORT

Mill Creek Aggregates Pit Hydrogeology

Appendix B of the 2023 Coordinated Monitoring Report

Submitted to:

Martin Bradley, Site Manager - Mill Creek Pit

Dufferin Aggregates,
A CRH Company
3300 Steeles Avenue West
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Concord, ON L4K 5X6

Submitted by:

WSP Canada Inc.

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March 27, 2024

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1.0 INTRODUCTION

1.1 Background

The University of Guelph owns approximately 185.5 ha of land situated in Part Lot 24, Concession 1, and Part Lots 21, 22, 23, and 24, Concession 2, Township of Puslinch, in the County of Wellington. Dufferin Aggregates, a CRH Company, leases the property from the University of Guelph. The property, called the Mill Creek Aggregates Pit, is underlain by a substantial outwash deposit, which extends to the northeast and southwest of Highway 401. See **Figure 1**, Location and Physical Setting, for details. This deposit forms the most important aggregate resource in this area. The subject property is licenced by the Ministry Natural Resources and Forestry (MNRF) as a Category 3 Class 'A' Pit Below Water for extraction of the aggregate resource from above and below the water table (Licence #5738).

The northwest corner of the property is traversed by Mill Creek and by two tributary creeks, Galt Creek and Pond Creek. Various reaches of Mill Creek are documented as supporting naturally sustaining brown trout and brook trout populations. Brown trout spawning is documented as occurring in the section of Mill Creek on the Mill Creek Aggregates Pit property. Approximately half of the University property on the north side of Township Road 2 is within the regulatory flood line of Mill Creek. There is also a substantial area of wetland adjacent to Mill Creek and the tributary streams, which is part of the larger Galt Creek Swamp, an area that is designated as a Provincially Significant Wetland (formerly a Class 1 Wetland) by the MNRF.

It was predicted and accepted by the approving agencies at the time of approval of the Mill Creek Aggregates Pit that sub-aqueous extraction of the sand and gravel and the progressive formation of large ponds would modify groundwater flow patterns and discharge conditions near Mill Creek. Predicted effects were greatest in the reach of Mill Creek upstream from the Hanlon interchange to north of Highway 401. The approved aggregate extraction operation was designed to limit the impacts on the western reach of Mill Creek and its two tributaries, and the wetland area adjacent to the creek.

Extraction below the water table commenced in Phase 1 in 1995 (see **Figure 3**), and occurred each year through to October 2002. In late 2002, extraction activities were undertaken in Phase 2, and continued through to 2012. Between 2007 and 2012, extraction activities were undertaken in Phases 2 and 3, and in 2013 extraction occurred in Phases 3 and 4. Approval for extraction in the area formerly designated on previous Site Plans as "Area To Be Monitored", located northwest of Phase 3, was obtained in 2010. Extraction in 2016 and 2017 occurred above the water table along the east (2016 only), west, and south boundaries of the Phase 2 pond as a result of obtaining MNRF approval to extract the setbacks. Below the water table extraction occurred in 2016 and 2017 near the east (2016 only) and west boundaries of the Phase 2 pond within the original licensed area. Extraction occurred in 2018 above and below the water table at the east and south boundaries of the Phase 1 pond because extraction had not previously been completed to the approved limit. Extraction within the setback on the east side of the Phase 1 pond also took place as a result of obtaining MNRF approval to extract the above-water table material within the setback, per the approved Site Plans. In 2019, extraction continued within the Phase 1 pond setback along the east side of the Site and occurred above and below the water table at the northeast corner of Phase 5 and silt pond SP4. Extraction in 2020 occurred above the water table in Phase 6, while extraction in 2021 occurred both above and below the water table in Phase 6. In 2022, extraction occurred both above and below the water table in Phase 2, Phase 5 and Phase 6, as well as below the water table in Silt Pond 4 (SP4). Extraction in 2023 occurred below the water table near the entrance of the Site (in Phase 2).

1.2 Groundwater Thresholds

On June 27, 2001 and following detailed negotiations with MNR and other regulatory agencies, Dufferin Aggregates issued a document entitled Mill Creek Aggregates Interim Groundwater Threshold and Action Response Plan. Interim thresholds and early warning values were set at six locations across the site, and each location includes a pair of groundwater monitors. The thresholds are based on maintaining positive seasonal hydraulic head differences on the water table between the monitor pairs, such that a hydraulic gradient will continue to exist from the site toward Mill Creek. The thresholds and early warning values have been developed to ensure that the quantity of groundwater that discharges to Mill Creek does not decline below a minimum level, and they are based on seasonal historic low water level data. The threshold values were revised in 2002, 2004, 2006 and 2022 and the 2006/2022 thresholds now form the basis of the environmental monitoring program that is undertaken at the Mill Creek Aggregates Pit.

Various additional threshold monitor pairs and threshold values for the on-Site ponds have been added to the program since 2003. In addition, due to well replacements and loss of access to wells, threshold pairs have been periodically replaced or revised, as required.

Drive point monitor DP5B was vandalized in the summer of 2012, and a replacement monitor, DP5C, was installed slightly upstream of DP5B in August 2012, as shown on **Figure 2**. New preliminary seasonal threshold values were established for the OW5-84 to DP5C threshold pair in the fall of 2012 based on the limited data available at that time for DP5C. In August 2013, drive point, DP5D was installed slightly downstream of DP5C, but thresholds were not established at this location. In Spring 2017, both drive points DP5C and DP5D were found removed from Mill Creek, and assumed to be removed by a vandal. Replacement drive point DP5CR was installed at the location of DP5C in May 2017. Revised early warning and threshold values were developed for the OW5-84 to DP5CR pair in 2021 and were approved for implementation by the MNRF in June 2022.

1.3 Objective and Scope

The principal objectives of the 2023 Annual Monitoring Program are:

- To comply with the pertinent terms of the 2023 water monitoring program;
- To provide an assessment of the effects of on-site aggregate extraction activities on the local groundwater and surface water setting;
- To determine and assess any changes in the groundwater quality;
- To document results in an annual monitoring report as part of a coordinated report; and
- To recommend a monitoring program for implementation in 2024.

The annual monitoring report includes the collation of the monitoring data collected since 1986, a presentation of the results, and an analysis and discussion of the 2023 monitoring data. The discussion includes aspects from the companion monitoring document on surface water (Technical Appendix A). The accompanying summary document entitled “Mill Creek Coordinated Monitoring Report January 1 to December 31, 2023” integrates the monitoring results from the hydrogeology, surface water, and fisheries monitoring programs.

Prior to the 2019 annual report, the full available dataset of historic monitoring results was presented in tabular form in the report appendices. The tabulated data presented in the appendices of the Hydrogeology Reports from 2019 onward have been reduced to show only the previous five (5) years of data, while the full available dataset

continues to be presented in the appended figures and graphs. Tabulated data from 1986 to 2018 can be found in previous annual reports or provided upon request.

1.4 Regulatory and Peer Review Comments

Grand River Conservation Authority

The Grand River Conservation Authority (GRCA) reviewed the 2022 Coordinated Monitoring Report for the Mill Creek Pit (WSP, 2023) and provided comments to Dufferin Aggregates in an e-mail dated September 25, 2023. A copy of the correspondence is included in **Appendix F**. The comments are copied below:

1) A '100-period' moving average was plotted against the raw data to facilitate interpretation of groundwater temperatures. Unfortunately, the actual time period for the moving average was not specified. It is recommended that the time period be specified as it will make a difference in the slope of the trend line.

2) The continued temperature increases at drivepoints further downstream (e.g. DP5CR) in recent years is noteworthy and it is recommended that this be investigated further to better understand possible causes for this trend. Additional analysis of the moving averages for various time periods (i.e. short- vs. long-term averages) and regression analysis may help determine if observed temperature increases have been exacerbated by below water extraction.

WSP Responses:

1) The '100-period' moving averages shown in Figures B-103 and B-104 of the 2022 Hydrogeology Monitoring Report (Appendix B of the 2022 Coordinated Monitoring Report) were generated from data which are generally recorded monthly. Therefore, the actual time period that is represented by the 100-period moving average is roughly 8.3 years. Revised graphs have been included in this report.

2) Additional analysis and discussion have been incorporated into this report in response to GRCA's comment. Refer to Section 3.7 and Figures B-103 and B-104. In addition, the following comments are provided:

- It is noted that the thermographs presented in Figures B-103 and B-104 of past annual reports included all available data points collected historically from the drive points. Therefore, the '100-period' moving averages included occasional periods of time when measurements were collected at a higher frequency at some locations. Also, there are several monitoring events where measurements could not be collected from all drive points. This could be due to access restrictions that impacted a drive point location for a period of time (for example, a beaver dam) or frozen conditions in the winter, etc. The inclusion of winter temperature readings at some drive points, for example, and not others, can impact trends and averages. Revised thermographs have been included in this report to assist with interpretation of temperature trends. To allow for a direct comparison between the various drive point locations, the data presented in Figures B-103 and B-104 now only include results from monitoring events where a temperature reading was successfully measured at all drive points.
- The automated groundwater temperatures recorded at the monitoring wells located between the Phase 3 pond and Mill Creek are a more reliable indicator of any long-term temperature changes that may be occurring due to the extraction activities at the Site, since temperature readings are collected at consistent time intervals and using consistent methodology/equipment. As discussed in this report, groundwater temperatures at wells located adjacent to the Phase 3 pond (92-27 and 92-29) have shown evidence of temperature impacts due to the proximity of the pond, but the impacts quickly dissipate with distance from the

pond. Based on the results from monitors 92-28, 92-32 and 92-33, located farther downgradient from the pond edge than monitors 92-27 and 92-29, minimal temperature impacts are observed. Additionally, it is noted that groundwater temperatures at creek drive points DP1 and DP2 are often higher compared to groundwater temperatures at the closest groundwater wells (92-33 and 92-32, respectively). Based on the automated temperature results from these wells, there is no evidence to suggest that extraction at the Site has impacted groundwater temperatures below the creek.

- The surface water monitoring program completed for the Site includes automated (hourly) monitoring of surface water temperatures, which has been ongoing since 2003. As discussed in the 2023 Surface Water Monitoring Report (Appendix A of the 2023 Coordinated Monitoring Report), surface water temperatures in Mill Creek at the northern (SWM1 / DP21) and southern (SWM2 / DP5CR) ends of the Site have been consistent over the long term. There is no evidence that extraction at the Site has impacted surface water temperatures in Mill Creek.

Township of Puslinch

In 2023, the Township of Puslinch retained Harden Environmental Services Ltd. (Harden) to complete a review of the 2022 monitoring data presented in the following documents:

- Mill Creek Aggregates Pit Surface Water, Appendix A of the Coordinated Monitoring Report (WSP, March 2023).
- Mill Creek Aggregates Pit Hydrogeology, Appendix B of the Coordinated Monitoring Report (WSP, March 2023).
- Mill Creek Aggregates Pit, Appendix C of the Coordinated Monitoring Report, WSP (WSP, March 2023).

The review comments were provided to the Township of Puslinch in a letter dated August 9, 2023. A copy of the letter is included in **Appendix F**. Harden provided the Township with two recommendations, as summarized below. WSP's response to the recommendations are also provided.

Comment 1: Harden's review concluded that lower Phase 3 pond levels are influencing groundwater flow towards Mill Creek west of the Phase 3 pond and that "groundwater flow is hovering around the minimum allowable" levels. Harden recommended a review of the Phase 3 pond levels and the factors that influence the pond levels.

WSP Response to Comment 1: Groundwater levels across the Site were at near-record lows in fall of 2022, which is attributed to appreciable and persistent dry climate conditions observed between 2020 and 2022. It is noted, however, that the head differences between the threshold well pairs west of the Phase 3 pond (92-29/DP1 and 92-27/DP2) consistently remained higher than the threshold values in 2022 and 2023. It is also noted that, as presented in this report, the head differences between the 92-29/DP1 and 92-27/DP2 well pairs generally increased in 2023 (Figures G-7 and G-9, Appendix G), which corresponded with an increase in the Phase 3 pond level (Figure G-15, Appendix G). In 2023, the Phase 3 pond level remained a minimum of 0.69 m higher than the Phase 3 pond early warning level.

Comment 2: Harden also recommended that the Township, in collaboration with the aggregate industry and other water users in the area, should identify the root cause of the reversal of groundwater flow to Mill Creek between Highway 401 and Concession Road 7, as indicated by drive point monitors DP18, DP19 and DP20.

WSP Response to Comment 2: The reversal of groundwater flow between Highway 401 and Concession Road 7 noted between July 2022 and December 2022 was caused by a sudden decrease in groundwater levels at the drive point locations, while the surface water levels remained consistent with historical results. The groundwater level at the creek drive point locations north of Mill Creek Pit decreased appreciably between June 15 and July 14, 2022 (0.74 m at DP20; 0.68 m at DP19; and 0.23 m at DP18). During the same period, groundwater levels decreased marginally (between 0.04 m and 0.15 m) at each monitoring location located near the northern end of the Site (creek drive points DP21, DP4R and DP17R, the Phase 1 pond, groundwater wells BH1-R, BH5 and 92-5, and off-Site drive point DP113). The cause of the abrupt decrease in groundwater level observed at DP18, DP19 and DP20 in July 2022 is not readily apparent. As discussed further in this report, the groundwater levels at DP19 and DP20 remained lower than normal through March 2023 before increasing sharply in April 2023. The groundwater levels remained consistent with pre-July 2022 levels from April through September 2023 and then decreased abruptly in October 2023. At DP19 and DP20, the groundwater levels observed from October through December 2023 were similar to the low levels observed between July 2022 and March 2023.

2.0 ROUTINE GROUNDWATER MONITORING PROGRAM

Figure 2, Groundwater Monitor Locations, identifies the location of the monitors in the network. Details of the monitor installations are presented in **Tables A-1 to A-5, Appendix A**. The 2023 monitoring program consisted of the following tasks that are outlined in the subsequent sections.

WATER LEVELS

Manually Recorded Monitors

Table 1, Monitor Groupings, presents the monitors grouped within the different hydrostratigraphic units and physical settings at the property. Monitoring was performed monthly at the following locations:

1) Monitors BH1-R, BH2-R, BH3 to BH6, BH11, BH13, and BH14; OW1-84 OW2-84, OW4-84, OW5-84, and OW16A-78, TW16-78, and TW16-79, which are adjacent to Mill Creek near the southwest corner of the site; and 92-1R, 92-5, 92-8, 92-12, 92-13, 92-27 to 92-29, 92-32, and 92 33, which were installed at select locations in the 1992 resource boreholes across the property.

2) In-stream drive point monitors DP1 to DP4R; DP5CR, and DP17R to DP22. Monitoring was performed monthly at the Mill Creek in-stream drive point monitors. Measurements at the Mill Creek drive point monitors included groundwater levels and temperatures, and surface water levels and temperatures. In addition, surface water levels are monitored manually at stations SW1 and SW2, both of which are located in Mill Creek.

3) Shallow water table drive point monitors DP6 to DP12 and DP16, which are established in the wetland areas on the Mill Creek Aggregates Pit property.

Additionally, weekly threshold monitoring was completed at Monitors BH13, BH92-12, BH92-27, BH92-29, OW5-84, DP1, DP2, DP3, DP5CR, DP6, DP17R, and DP21.

Multi-Level Monitors Equipped with Data Loggers

Several multi-level monitors are installed at the Site, as listed in **Table A-2, Appendix A**. Where multi-level monitors are present, the deepest monitor is designated 'I', the intermediate monitor is designated 'II' and the shallowest monitor is designated 'III'.

Monitors:

- 92-13 – east side of the property adjacent to the southwest corner of the Phase 1 pond. A replacement shallow data logger was installed at this monitor in May 2013.
- 92-28, 92-29, and 92-32 – west side of the property adjacent to Mill Creek – installed in November 2006 as part of extraction monitoring in Phase 3
- BH4, DP7, DP8, and DP9 – centre of property adjacent to Phase 4 operations. These are single level data logger installations.

Readings of water level and temperature were obtained once per day. The data were downloaded from the data loggers monthly for review.

A data logger was installed at standpipe monitor 92-33 in March 2012 for the purpose of collecting groundwater level and temperature data from the shallow part of the aquifer. The previous permanent, non-removable multi-level pressure transducer and thermistor instrumentation malfunctioned at monitor nest 92-33 in 2010. A second shallow data logger was installed at 92-33 in October 2017 at a depth similar to the previous (i.e., pre-2012) shallow data logger. The multi-level monitors have not been replaced as adjacent monitors can provide similar information, and extraction in that area is complete.

The data loggers at 92-26 were removed in December 2011 due to access safety issues. A data logger was re-installed in 92-26-III in June 2012 to provide groundwater level and temperature data in the shallow aquifer adjacent to the Phase 3 pond. Due to access safety issues, the data logger was removed in September 2013. Extraction is complete in Phase 3.

Data loggers were also installed in the following monitors in 2011/2012.

- Monitor 92-15 (shallow monitor only) – Removed in December 2013 in anticipation of the decommissioning of Monitor 92-15 in 2014;
- Monitor 92-12 (shallow monitor only);
- Monitor 92-27 (shallow monitor only); and
- Drive point DP16.

A data logger was installed in Monitor BH14, located between Monitor 92-12 and Mill Creek, in June 2015.

Water Wells

As in previous years, and although not part of the 1993 “official” monitoring program, water wells located on the property, and a well supplying a local resident in the vicinity of the property, were monitored monthly. Water level monitoring began in the summer of 1994 at select locations.

Pond Staff Gauges

Surveyed staff gauges were maintained in the Phase 1 pond, Phase 2 pond, Phase 3 pond, and Phase 4 pond. Measurements of pond water levels were made daily during the ice-free period through 2023. Pond temperatures were measured monthly during the ice-free period.

The 2023 and historic monitoring results are presented in **Appendix B**.

WATER QUALITY

In March and November 2023, groundwater samples were collected from Monitors BH1-R, 92-32-III, and 92-8, and a surface water sample was collected from the Phase 1 pond.

Samples were tested in the field for temperature, pH, and conductivity and then submitted to Bureau Veritas Laboratories for chemical analysis. Water samples were analyzed for major cations and anions, alkalinity, conductivity, pH, hardness, and oil and grease. The 2023 and historic groundwater chemical results are presented in **Appendix C**.

QA/QC PROGRAM

The groundwater monitoring program included a Quality Assurance/Quality Control component that consisted of the following.

1) Dufferin staff performed the routine monitoring in accordance with protocols established for those tasks. The data were forwarded to WSP for review and compilation.

2) WSP collected groundwater samples in March and November 2023. The analytical laboratory, Bureau Veritas Laboratories, was required to include a QA/QC component as part of the program that included a replicate analysis. The results of the laboratory's internal QA/QC testing are included in the reporting procedure and are kept on file.

3) Through 2023, Dufferin staff reviewed the results of the routine monitoring program for consistency with historic data, seasonal trends, and precipitation data. Any significant deviations from anticipated values that could not be explained, such as an increase/decrease in excess of 125% of previously established seasonal trends, were to be re-monitored for verification. If the deviations were confirmed, the MNRF was then to be notified in writing with suggestions for remedial measures, as appropriate. In 2023, no significant deviations were observed during the monitoring.

4) WSP performed the routine monthly monitoring, in accordance with protocols established for those tasks, during 2023.

REPORTING

An annual hydrogeological monitoring report is submitted to the MNRF for their review, as part of a coordinated report, by the end of March the following year. The annual hydrogeological report provides the following information:

1) Summary of monitoring results.

4) Description of monitoring methodology and monitoring locations. Any deviation from the standard methodology and/or monitoring locations is to be reported to the MNRF at that time. This information is summarized in the annual report.

5) Factual descriptions of monitoring results, including tables of water levels, hydrographs, and chemical data for the monitoring locations, as appropriate.

6) Discussion of monitoring results, with specific reference to key locations across the site, such as:

   a. Adjacent to current extraction area,

b. Multi-level (data logger) monitors,
c. Mill Creek drive points,
d. Wetland fringe groundwater levels,
e. Groundwater level profile(s) across the site through the wetland area,
f. Water table configuration across the site and trends in hydraulic gradient and groundwater discharge conditions, to demonstrate any changes with respect to pre-extraction conditions, and
g. Assessment with respect to early warning values and action thresholds at monitor pair locations.
h. Discussion and integration of monitoring results with respect to the other monitoring programs including:
    i. Surface water flow (with particular reference to base flow quantities);
    ii. Threshold action levels and implementation of contingency measures (if appropriate); and
    iii. Scope of future monitoring program, including frequency of monitoring and addition/deletion of monitoring stations.

3.0 ANNUAL MONITORING RESULTS

3.1 Physical Setting

The Mill Creek Aggregates Pit is located on the southeast side of a broad northeast-southwest trending glacial outwash spillway, as shown in **Figure 1**. Outwash sand and gravel materials, ranging from about seven to twenty metres in thickness, underlie the property. These outwash deposits consist of interbedded sands, gravel, and to a lesser extent, silts. Mill Creek is bottomed in these granular soils.

The surficial soils adjacent to the Creek in the west and north-central parts of the Mill Creek Aggregates Pit consist of thin organic deposits. These organic soils are developed in a wetland area because of the high groundwater table condition adjacent to the creek. Generally, the thickness of these soils ranges from 0.5 m to greater than 3 m. Granular outwash deposits underlie the organics. A layer of glacial silt till generally underlies the sand and gravel deposit. Dolostone bedrock underlies the overburden materials beneath the site. The thickness of glacial till across the property varies from 0 m to about 12 m. The thickest area of till corresponds to a drumlin landform that is exposed at ground surface on the southern edge of the main property. The bedrock beneath the subject property is dolostone of the Guelph Formation. This unit is moderately hard dolostone that is generally flat-lying and displays few irregularities that affect surface topography. The resource drilling data generally confirm the relatively moderate amount of variation in the elevation of the buried bedrock surface beneath the property. The dolostone bedrock serves as the main groundwater supply aquifer in the area, although some water supply wells are developed in the granular overburden soils.

3.2 Extraction Activities

Figure 3, Site Plan Sequencing, shows the site details based on the most current (2019) approved extraction areas. Extraction in 2023 occurred below the water table in Phase 2.

Similar to previous years, water was taken from the Phase 1 pond for aggregate washing and dust control during 2023. In 2023, the site operated under Amended PTTW #5557-B93NZ5, which was issued on February 7, 2019. A copy of the current PTTW is included in **Appendix F**.

The silty wash water from the processing plant was pumped into the extension of silt pond SP4/Phase 1 pond for settlement of the suspended silt. The detailed pumping data for 2023 are presented in **Table E-1**, and a summary of the monthly pumping totals is presented in **Table E-2**, both of which are in **Appendix E**.

3.3 Climate Data

Water budgets have been prepared based on 30-year climate normals from five different 30-year periods using a variety of climate stations, based on data availability. The five 30-year climate normal water budgets are based on data from: (a) Guelph Arboretum Climatological Station (1951 to 1980), (b) Preston Climatological Station (1961 to 1990), (c) Waterloo-Wellington Climatological Station (1971 to 2000), (d) Elora Climatological Station (1983 to 2012), and (e) Grand River Conservation Authority's (GRCA) Shade's Mills Climatological Station (1991 to 2020). The 30-year climate normal water budgets are presented in **Tables D-1 to D-5, Appendix D**.

Water budget calculations are also presented for annual climate data from the GRCA Shade's Mills Climatological Station from 2019 through 2023, as shown in **Tables D-6 through D-10**. Water budgets were prepared for the climate data using the Thornthwaite method. Graphs depicting the annual temperature profiles and the annual precipitation and water surplus are also presented in **Appendix D**.

Between the start of monitoring in 1988 and 2023, the total annual precipitation in the area has averaged 899 mm. This 36-year average is 35.2 mm lower than the 30-year normal precipitation of 935 mm (1991-2020 Shade's Mills) presented in **Table D-5**. Since 1988, the three highest total annual precipitations occurred in 2013, 2008, and 1992, when total precipitation was 1,113 mm, 1,117 mm, and 1,121 mm, respectively. The lowest amount of total annual precipitation recorded was 657 mm in 1998, while similar lows were recorded in 2012 (679 mm) and 2022 (682 mm).

The 2023 temperature and precipitation data are presented in **Figure 4** and are compared to the 30-year normal (1991 to 2020 Shade's Mills) data. Based on the data presented in **Appendix D** and in **Figure 4**, the following observations and trends are noted:

- The mean monthly temperatures in 2023 were typically similar to the 30-year average monthly temperatures. The average monthly temperatures recorded in January, February and December were 2.1°C to 3.7°C warmer than normal for those months, while the average monthly temperature recorded in April was 1.2°C warmer than normal. The average monthly temperatures recorded in June, July and August were 2.0°C to 2.4°C cooler than normal, while the average monthly temperatures recorded in May and November were between 1.3°C and 1.6°C cooler than normal. In March, September and October, the average monthly temperatures were within 0.5°C of the monthly normal.
- The annual average of the monthly mean temperatures in 2023 was 8.3°C, which is equal to the 30-year normal annual average temperature and is the lowest annual average recorded since 2019. Notwithstanding the 2023 results, a notable increase in air temperature has been observed since 2016, with annual averages ranging between 9.2°C and 10.1°C in 2016, 2017, 2018, 2020 and 2021.
- The total precipitation was 983 mm, which was higher than the 30-year average precipitation (935 mm) by 48 mm (5%).
- In the winter (January to March) months, January and February were similar to normal conditions, while March was considerably wetter than normal.
- In the spring (April to June) months, April and June were similar to normal conditions, while May was drier than normal.
- In the summer (July to September) months, July and August were considerably wetter than normal, while September was considerably drier than normal.

- In the fall (October to December) months, October and November were drier than normal, while December was similar to normal conditions.
- The resulting groundwater levels were generally higher than 2022 and recent years, as detailed later in this report. The 2023 data indicate that groundwater levels partially recovered from the low levels observed in fall 2022, the latter of which were attributed to cumulative impacts from low precipitation amounts received in 2020, the first half of 2021 and 2022.
- The months in which precipitation differed the most from the 30-year normal were March, July and August (58 mm, 108 mm and 40 mm higher than normal, respectively) and September and November (60 mm and 34 mm lower than normal, respectively).
- As shown in **Figure 4**, the water surplus in 2023 generally followed the typical seasonal trend of decreasing from a peak in the spring until late summer before increasing in the fall. Due to the precipitation trends in 2023, the monthly surplus was higher than normal in March, July and August, lower than normal in February, and similar to normal during the remaining months.
- Owing to the higher-than-average annual total precipitation, the calculated net water surplus for 2023 was 381 mm (**Table D-10**), which is 77 mm (25%) higher than the 30-year normal surplus of 304 mm (**Table D-5**). The 2023 value was 253 mm (196%) higher than the 2022 surplus of 129 mm.

Because of the permeable nature of the surficial soils at the site, the amount of precipitation received and the timing of that precipitation have a direct impact on the seasonal groundwater levels at the site. This is discussed in detail in later sections.

3.4 Bedrock Aquifer

As noted in **Table 1**, Monitor Groupings, there are two water wells on the property that are developed within the bedrock aquifer: TW16-78 and North Farmhouse Well 4794. Water level data for these wells are provided in **Tables B-1 and B-2, Appendix B**, and a groundwater hydrograph for the North Farmhouse Well 4794 is presented in **Figure B-47, Appendix B**.

Based on the 2023 groundwater level data and the hydrographs for the bedrock wells, the following observations are made.

- As in previous years, free-flowing artesian conditions were observed at TW16-78 during each of the monitoring events in 2023. The flowing conditions indicate that the vertical hydraulic gradient in the bedrock aquifer at that location (southwest corner of the site) was upwards at the time of the monitoring event, and that the magnitude of the confined pressure (piezometric) head was above grade.
- Monitoring at North Farmhouse Well 4794, which is the well for the farmhouse on the north property, began in 1994. Water levels at Well 4794 typically increase by between 0.5 m and 1.2 m in the late spring, which is attributed to recharge following the spring freshet, and then decrease through the fall or winter. In 2023, the water levels followed a similar pattern. The groundwater level increased from the near-record low recorded at the end of 2022 through to summer of 2023, before decreasing during the fall of 2023. It is also noted that the water level recorded at Well 4794 during July 2023 was approximately 0.7 m higher than the levels recorded in June and August 2023. The temporary water level increase may be attributed to wetter than normal climate conditions reported in July 2023 (Section 3.3). As shown in **Figure B-47**, the July 2023 groundwater level was within the historical range for the well.

In summary, the water levels in the bedrock aquifer well TW16-78, and North Farmhouse Well (as far as could be monitored) exhibited normal seasonal trends that reflected prevailing climatic conditions and were not affected by pit operations.

3.5 Sand and Gravel Aquifer

The monitors that are screened in the sand and gravel aquifer are noted in **Table 1**. Water level data from the previous 5 years (2019 to 2023) for the sand and gravel aquifer monitors are documented in **Table B-1, Appendix B**. Groundwater hydrographs for the monitors in the sand and gravel aquifer are also presented in **Figures B-1 through B-28, Appendix B**. A summary of the water level data from the previous 5 years (2019 to 2023) for the monitors is provided in **Table B-6, Appendix B**. Groundwater hydrographs for representative sand and gravel aquifer monitors (Monitors 1, 7-II and 92-32) located from east to west across the property are presented on **Figure 5**. Monitor 7-II was removed in March 2015 as part of extraction activities, so Monitor 4-I, which is also located in the central portion of the site, is included on **Figure 5** as well. Historic groundwater elevations at Monitors 4-I and 7-II are similar. Monitor 1-I was removed due to extraction activities in May 2019 and was reinstalled as Monitor 1-R in June 2020. Presented on **Figure 6** is the relationship between the shallow groundwater level at Monitor 92-28 (located in the northwest area of the site) and daily precipitation during 2023.

Compared to 2022, water levels in the representative monitors were, on average, 0.02 m lower (1-R to 92-32) to 0.19 m higher (92-32) in 2023. The average water levels at 1-R and 4-I remained similar from 2022 to 2023 due to the lower water levels observed from January through June being offset by the higher water levels observed from July through December. The average water levels at 92-32 were higher than observed in 2022 during most months in 2023, contributing to the higher average annual levels in 2023.

As observed in **Table B-6**, the 2023 average water levels at the individual monitors ranged from approximately 0.3 m above ground surface to 8.6 m below ground surface across the site, and fluctuations ranged from 0.2 m to 0.5 m during 2023. In 2023, the maximum and minimum water levels at the monitors were within their historical ranges, with one exception. In July 2023, the water level at BH14 was 0.04 m higher than the historic range of levels recorded since monitoring began in 2015.

Generally, water levels on both the east and west sides of the site in 2023 exhibited the typical seasonal variation observed in previous years, which is a peak in the spring due to the annual spring melt and precipitation recharge, decreasing through the summer, and an increase in the fall. Despite this typical seasonal variation, groundwater levels typically increased in July and August 2023 in response to wetter than normal climate conditions during those months (Section 3.3).

Based on the water level data, the hydrographs (**Figures B-1 through B-28**), and **Figures 5 and 6**, the following groundwater elevation trends were observed in 2023.

- With respect to **Figure 6**, the shallow groundwater level at 92-28 responded to precipitation events through most of the year.
- The highest water levels in 2023 generally were recorded in (a) March in the southwest corner, (b) April or July on the west side of the site, and (c) July, August or September on the east side of the site. The timing of the 2023 peak water levels is generally consistent compared to historical results, with the exceptions of the July and August peaks that were caused by higher than normal precipitation amounts received in summer 2023.

- Annual low water levels were generally recorded in (a) September in the southwest corner, (b) January on the west side of the site, and (c) January on the east side of the site. The low water levels in January reflect the near-record low levels observed at the end of 2022.

As in previous years, the fluctuations that were observed in groundwater elevations during 2023 were a direct response to several factors, including seasonal climatic conditions and proximity to open-water ponds. **Figures 7 and 8** present interpretations of the groundwater table configuration across the property based on water level data for August 8 and January 12, 2023, respectively. The August data are generally representative of the 2023 high water table conditions, which is historically observed in the spring following the spring freshet. In 2023, the high water table conditions occurred in August following the notably wet climate conditions in July and August. The January data are generally representative of the 2023 low water table conditions, as near-record low levels were observed across the Site at the end of 2022. Most water table conditions throughout the year fell between the high and low conditions shown on **Figures 7 and 8**, respectively, although, as indicated above, the annual high and low water levels at individual monitors occurred during various months throughout 2023.

The interpreted water table configuration illustrated on **Figures 7 and 8** indicates that groundwater continues to move from east to west across the northern property. The water table contours south of Highway 401 tend to "bend back" toward the creek, indicating that the creek receives groundwater discharge from the subject property along the reach south of Highway 401. Typically, water table contours bend back further (i.e., more strongly) under high flow water table conditions, indicating an increased component of groundwater flow northwestward toward the creek near the Hanlon interchange and to the west.

The water table configuration adjacent to Mill Creek north of Highway 401, from the western limit of Slovenski Park downstream to the 401 culvert, continues to exhibit a somewhat different trend relative to the lands to the south. The water level data in that area north of Highway 401 indicate that shallow groundwater movement is to the west, essentially parallel to the creek, with a component toward the reach of Mill Creek south of Highway 401 and east of the Hanlon interchange. This trend typically is more apparent in the low groundwater conditions (**Figure 8**), and is a result of the buffering influence of the water levels that occur in the Phase 1 pond and to the east in the St. Marys Cement (McNally) pond south of Highway 401, and in the Reid Heritage ponds to the north.

The pattern shown by the water table contours south of Township Road 2 indicates a generally west-southwesterly groundwater flow direction beneath the Mill Creek Aggregates Pit property and the lands to the west toward Mill Creek.

Profiles of the 2023 high and low water conditions from southeast to northwest across the north property are presented in **Figure 9**. The alignment of cross-section X-X' is shown on **Figures 7 and 8**. There was more variation between the high and low water level conditions in 2023, compared to 2022, which reflects the muted seasonal fluctuation observed across the Site in 2022.

Daily automatic readings of piezometric pressure were obtained from select locations across the property, as indicated with yellow shading on **Figure 2**. Given the large volume of data that has been collected for these multi-level monitors, the individual readings are not included in this report; they are available in electronic format, upon request. The automated data recorded by data loggers are presented in graphical form in **Appendix B**, as discussed later in the report.

The depths at which the multi-level monitors are installed are summarized below, together with comments on their functionality.

MULTI-LEVEL MONITOR	DEPTH OF PROBE (m)	STRATIGRAPHY	MONITOR FUNCTIONING?	
			PRESSURE TRANSDUCER	THERMISTOR
92-12-III	3.7	Gravelly fine to coarse sand	Yes (re-installed in June 2012)	Yes (re-installed in June 2012)
92-13-III	5.0	Gravelly medium to coarse sand	Yes (re-installed in May 2013)	Yes (re-installed in May 2013)
92-27-III	5.0	Gravelly Sand	Yes	Yes
92-28-I	4.0	Sandy gravel	Yes	Yes
92-28-II	3.1	Sandy gravel	Yes	Yes
92-28-III	2.4	Sandy gravel	Yes	Yes
92-29-I	8.5	Sandy gravel	Yes	Yes
92-29-II	5.4	Sand	Yes	Yes
92-29-III	3.0	Sandy gravel	Yes	Yes
92-32-I	13.9	Silt till	Yes	Yes
92-32-II	8.8	Silty fine sand	Yes	Yes
92-32-III	3.5	Sand	Yes	Yes
92-33-III	7.6	Gravelly sand	Yes (re-installed in March 2012)	Yes (re-installed in March 2012)
92-33-III	3.0	Gravelly sand	Yes (installed October 2017)	Yes (installed October 2017)
BH4	4.3	Sand and Gravel	Yes	Yes
BH14	6.0	Sand and Gravel/Gravelly Sand	Yes	Yes
DP7	2.3	Organics/gravelly sand	Yes	Yes
DP8	2.0	Organics/gravelly sand	Yes	Yes
DP9	1.8	Organics/gravelly sand	Yes	Yes

It is noted that the functioning data loggers provide sufficient information on groundwater levels and temperatures for continued assessment of potential impacts adjacent to the extraction ponds.

HYDROGRAPHS

Groundwater hydrographs produced using the levelogger data, including the multi-level monitors, are presented in **Figures B-29 to B-37**, and groundwater thermographs in **Figures B-38 to B-46, Appendix B**. For clarity, it is noted that hydrographs presenting manual monthly water level measurements at these wells are also presented in **Figures B-1 to B-28**. In each case, the manual water level data began earlier than the levelogger monitoring. Based on the hydrographs of the levelogger data, the following observations were noted at the monitors in 2023.

BH4

A data logger was installed at BH4 in 2011. The automated data are presented in **Figure B-29**. This monitor is located adjacent to Township Road No. 2, approximately 40 m south of silt pond SP3, and outside of the licenced extraction area. The 2023 water levels were within the historic range of water levels recorded at BH4 since the data logger was installed and exhibited a slight recovery from the near-record low levels observed in the fall of 2022. The 2023 water levels generally increased from January through August, declined from August through December and increased in late-December.

BH14

Monitor BH14 and a data logger were installed in June 2015. The automated data are presented in **Figure B-30**. This monitor is located in the north-central area of the property, approximately 40 m southeast of Mill Creek and about 60 m northwest of Monitor 92-12. The 2023 water levels were within the range of water levels measured at BH14 since the data logger was installed. Any post-installation aggregate extraction influence is not apparent. Water levels at BH14 generally decreased in January, increased from February to early April, decreased to mid-

June, increased in June and July, decreased to October, remained stable from October to mid-December and increased in late-December.

92-12

This monitor nest is located in the north-central area of the property, about 300 m west (downgradient) of the Phase 1 pond, and approximately 60 m and 100 m southeast (upgradient) of Monitor BH14 and Mill Creek, respectively. A data logger was installed in the shallow monitor at 92-12 in 2012. As shown in **Figure B-31**, the 2023 water levels were within the range of water levels measured at 92-12 since the data logger was installed. Any post-installation aggregate extraction influence is not apparent. The 2023 water levels generally decreased in January, increased from February to early April, decreased from April through June, increased in July and August, decreased in September and remained stable to the end of the year, which generally match the trends observed at adjacent Monitor BH14.

92-13

This nest of monitors is located approximately 20 m west of the pond in Phase 1. As shown in **Figure B-32**, the 2023 water levels were within the historic range of water levels measured at the shallow monitor at 92-13. Given the close proximity of 92-13 to the Phase 1 and Phase 4 ponds, the groundwater levels at 92-13 are similar to the levels of these ponds, as expected. The 2023 water levels remained stable in January, increased from February to August, decreased from September through mid-December and increased in late-December.

92-32

This monitor nest was installed in November 2006 and is located about 80 m northwest (downgradient) of the western limit of the Phase 3 pond, and approximately 60 m southeast (upgradient) of Mill Creek. The automated data from the well nest are presented in **Figure B-36**. It is noted that the data logger installed in the shallow monitor at this location (32-III) failed in November 2022 and was replaced on February 14, 2023. In addition, the automated data from shallow monitor 32-III are unavailable from June 16 to August 9, 2023, due to a data logger issue. The following table contains a summary of the range in vertical hydraulic gradients between the intermediate and shallow monitors and the deep and intermediate monitors from 2007 to 2023.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Intermediate/ Shallow	-0.005 to 0.019	-0.008 to 0.022	0.014 to 0.053	-0.008 to 0.022	-0.019 to 0.031	-0.003 to 0.019	0.002 to 0.024	0.006 to 0.027	0.011 to 0.026	-0.001 to 0.029	0.004 to 0.025
Deep/ Intermediate	0.007 to 0.029	0.013 to 0.037	0.011 to 0.043	0.002 to 0.040	-0.003 to 0.026	0.002 to 0.035	-0.003 to 0.042	0.000 to 0.052	0.022 to 0.050	0.030 to 0.060	0.022 to 0.053

	2018	2019	2020	2021	2022	2023
Intermediate/ Shallow	-0.013 to 0.022	0.004 to 0.028	-0.001 to 0.035	0.005 to 0.048	0.004 to 0.016	-0.004 to 0.021
Deep/ Intermediate	0.008 to 0.041	0.000 to 0.044	-0.004 to 0.042	-0.007 to 0.068	0.012 to 0.033	0.003 to 0.034

Note: "-" indicates a downward gradient.

In 2023, the gradient between the intermediate and shallow monitors ranged between a slightly downward gradient to a small upward gradient. Small upward gradients were observed between the deep and intermediate monitors throughout 2023. These trends are similar to the recent results. The peak vertical gradients between the intermediate and shallow monitors in 2023 were within the range of historical results. The peak vertical gradients between the intermediate and deep monitors in 2023 were within the range of historical results. An aggregate extraction influence on the vertical gradient is not apparent.

The three monitors show similar responses to precipitation recharge events, although the magnitude of the response is greatest at the shallow monitor and lowest at the deep monitor. The deep probe is located in the silt till beneath the sand and above the bedrock.

It is noted that the deep monitors at 92-32 and 92-33 are set within the glacial till soils that underlie the aggregate resource. The relatively strong vertical gradients that are observed at the deep monitors are likely a reflection, at least in part, of the upward gradients present in the underlying bedrock aquifer, which result in flowing artesian conditions in monitors at some locations.

On the west side of the north property, the data loggers/leveloggers have been divided into two lines of two monitor nests. Each line is discussed below.

NORTH LINE: 92-29 AND 92-28

92-29

This monitor nest was installed in November 2006 approximately 120 m southeast (upgradient) of Mill Creek, and is within 10 m of the western limit of the Phase 3 pond. The automated data from the well nest are presented in **Figure B-35**. The following table contains a summary of the range in vertical hydraulic gradients between the intermediate and shallow, and the deep and intermediate monitors from 2007 to 2023.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Intermediate/ Shallow	-0.052 to 0.02	-0.118 to 0.014	-0.079 to 0.01	-0.095 to 0.052	-0.017 to 0.015	-0.087 to 0.045	-0.083 to -0.021	-0.080 to -0.019	-0.083 to -0.016	-0.083 to -0.026	-0.039 to -0.010
Deep/ Intermediate	-0.021 to 0.037	-0.009 to 0.087	-0.094 to 0.104	-0.049 to 0.052	-0.009 to 0.010	-0.059 to 0.047	-0.025 to -0.002	-0.036 to -0.001	-0.051 to -0.009	-0.035 to -0.012	-0.029 to -0.003

	2018	2019	2020	2021	2022	2023
Intermediate/ Shallow	-0.031 to 0.018	-0.036 to 0.015	-0.031 to 0.008	-0.017 to 0.011	-0.031 to 0.014	-0.023 to 0.008
Deep/ Intermediate	-0.019 to 0.008	-0.033 to 0.029	-0.017 to 0.014	-0.026 to 0.006	-0.020 to 0.007	-0.028 to 0.007

Note: "-" indicates a downward gradient

In 2023, the gradient between the intermediate and shallow monitors, and between the intermediate and deep monitors, varied between a small upward gradient and a small downward gradient, which is similar to the gradients observed from 2007 to 2012 and 2018 to 2022. It is noted that positive gradients did not occur between the monitors from 2013 through 2017. The peak vertical gradients were within the historic ranges in 2023. The three monitors show similar responses to precipitation recharge events. Given that each of the three probes are located in sand and gravel within 10 m of the Phase 3 pond, small downward vertical gradients are not unexpected.

92-28

This monitor nest was installed in November 2006 and is located approximately 40 m northwest (downgradient) of 92-29, and 60 m east (upgradient) of Mill Creek. The automated data from the well nest are presented in **Figure B-34**. The following table contains a summary of the range in vertical hydraulic gradients between the intermediate and shallow monitors and the deep and intermediate monitors between 2007 and 2023.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Intermediate/ Shallow	-0.085 to 0.044	-0.080 to 0.021	-0.104 to 0.043	-0.093 to 0.026	-0.157 to 0.087	-0.252 to 0.525	-0.177 to -0.046	-0.162 to -0.031	-0.214 to 0.013	-0.044 to 0.026	-0.066 to -0.015
Deep/ Intermediate	-0.084 to 0.062	-0.017 to 0.043	-0.102 to 0.088	-0.075 to 0.101	-0.083 to 0.078	-0.538 to 0.190	-0.084 to 0.150	-0.028 to 0.011	-0.049 to 0.035	-0.068 to 0.003	-0.014 to 0.012

	2018	2019	2020	2021	2022	2023
Intermediate/ Shallow	-0.064 to 0.009	-0.057 to 0.118	-0.098 to 0.055	-0.060 to 0.085	-0.111 to 0.036	-0.186 to 0.058
Deep/ Intermediate	-0.017 to 0.041	-0.056 to 0.015	-0.026 to 0.025	-0.037 to 0.010	-0.024 to 0.006	-0.062 to 0.027

Note: "-" indicates a downward gradient

In 2023, the gradient between the intermediate and shallow monitors, and between the intermediate and deep monitors, varied between a small upward gradient and a small downward gradient, which is similar to the recent results. The peak vertical gradients were within the historic ranges in 2023. The three probes are located in sandy gravel and, therefore, small gradients would be expected. The three monitors show similar responses to precipitation recharge events.

Figure 6 shows the relationship between the shallow groundwater level (water table) and precipitation events at Monitor 92-28-III in 2023. The water level responded to precipitation through most of the year.

SOUTH LINE: 92-27 AND 92-33

92-27

This monitor nest is located about 100 m east (upgradient) of Mill Creek and is adjacent to the final western limit of the Phase 3 pond. A data logger was installed in the shallow monitor at this location in December 2011. The automated data are presented in **Figure B-33**. The seasonal peak water levels measured in April 2023 were similar to the peak water levels recorded at the well location in spring 2018, 2019 and 2020, but were higher than the spring peaks observed in 2021 and 2022. Following the seasonal peak in April, the water level decreased through June, increased again in July/August, decreased through mid-December and increased at the end of year, which follows 2023 precipitation patterns (Section 3.3). Overall, the 2023 water levels at monitor 92-27 were higher than the levels observed in 2020, 2021 and 2022 and were similar to those observed between 2017 and 2019. The pattern of water level fluctuations at 92-27 is similar to the water level fluctuations in the adjacent Phase 3 pond.

92-33

This monitor nest is located approximately 60 m northwest (downgradient) from 92-27, and 50 m east (upgradient) of Mill Creek and was operational since 1992, but all three pressure transducers and temperature thermistors malfunctioned in July 2010. A data logger was re-installed in the shallow monitor in March 2012, and a second shallow data logger was installed in October 2017 for temperature monitoring purposes at a depth similar to the previous (i.e., pre-2012) shallow data logger. The automated data are presented in **Figure B-37**. In 2023, the shallow water levels at this location generally remained stable in January, increased from February to April, decreased to late June, increased in July and August, decreased to October, remained stable through mid-December and then increased to the end of the year. Similar to the trends noted above at monitor 92-27, the spring 2023 peak level was similar to the spring peaks observed in 2018, 2019 and 2020, but was higher than the spring peaks observed in 2021 and 2022. Overall, the 2023 water levels at monitor 92-33 were higher than the levels observed in 2020, 2021 and 2022 and were similar to those observed between 2017 and 2019. The pattern of water level fluctuations at 92-33 is similar to the water level fluctuations in the adjacent Phase 3 pond.

THERMOGRAPHS

Groundwater thermographs produced using the levelogger data, including the multi-level monitors, are presented in **Figures B-38 to B-46, Appendix B**. Based on these thermographs, the following observations were noted at the monitors in 2023.

BH4

A levelogger transducer was installed in BH4 in August 2011. This monitor is located approximately 40 m south of silt pond SP3, adjacent to Township Road No. 2, and outside of the licenced extraction area. As shown in **Figure B-38**, the seasonal groundwater temperature fluctuation observed at this location exhibits a wave-like pattern. In 2023, the maximum and minimum temperatures were similar to the peak temperatures recorded from 2011 to 2022 and within the historic range. An aggregate extraction influence is not apparent at this location. Consideration should be given to discontinuing temperature monitoring at this location as impacts from off-site aggregate extraction south of BH4 are likely occurring. The temperature decreased from 8.5°C at the beginning of January to the annual low of 5.7°C in April. The temperature then increased to the annual high of 11.2°C in October before decreasing to 8.7°C by the end of December.

The following table summarizes the temperature range in the monitor.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Shallow	9.1* to 11.4	6.3 to 11.6	5.9 to 11.5	5.3 to 11.7	5.3 to 11.1	6.1 to 11.6	5.9 to 11.3	5.8 to 11.7	5.3 to 11.2	5.5 to 11.1	5.7 to 11.3	5.3 to 11.1	5.7 to 11.2

Note: Temperatures are recorded in degrees Celsius
" * " indicates data logger installed in August.

BH14

Monitor BH14, and a data logger, were installed in June 2015. This monitor is located in the north-central area of the property, approximately 40 m southeast of Mill Creek and about 60 m northwest of Monitor 92-12. In 2023, the temperature decreased from 9.7ºC at the start of the year to the annual low of 6.1ºC in April, as shown in **Figure B-39**. The temperature then increased to the annual high of 11.7ºC in October before decreasing to 9.7ºC by the end of December. In 2023, the minimum and maximum temperatures were within the historic range recorded since 2015.

The following table summarizes the temperature range in the monitor.

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Shallow	7.8* to 12.2	6.7 to 12.5	7.0 to 12.8	6.9 to 12.5	6.0 to 12.1	6.6 to 12.2	6.8 to 12.4	6.3 to 11.6	6.1 to 11.7

Note: Temperatures are recorded in degrees Celsius
" * " indicates data logger installed in June.

92-12

This monitor nest is located in the north-central area of the property, about 300 m west (downgradient) of the Phase 1 pond, and approximately 60 m and 100 m southeast (upgradient) of Monitor BH14 and Mill Creek, respectively. A data logger was installed in the shallow monitor at 92-12 in June 2012. As shown in **Figure B-40**, the 2023 peak temperatures were similar to the 2012 to 2022 peaks; however, the annual low temperatures observed in March 2023 were 0.5ºC lower than observed historically. An aggregate extraction influence is not apparent at this location. The temperature decreased from 6.1ºC at the beginning of January to the seasonal low of 2.0ºC in March. Following the seasonal low recorded in March, the temperature increased to the annual high of 17.5ºC in August before decreasing to 8.6ºC by the end of December.

The following table summarizes the temperature range in the monitor.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Shallow	7.7* to 18.8	3.8 to 17.0	2.8 to 17.9	3.2 to 18.3	4.7 to 16.2	4.3 to 14.5	2.5 to 17.5	3.2 to 15.7	2.9 to 16.1	3.3 to 17.6	3.2 to 17.4	2.0 to 17.5

Note: Temperatures are recorded in degrees Celsius
" * " indicates data logger installed in June.

92-13

This monitor nest is located approximately 20 m to the west (downgradient) of the pond in Phase 1. Given the close proximity of the monitor to the pond, this monitor provides data with respect to the thermal effects resulting from the presence of the pond, wash water pumping, and silt pond water recirculation. It is noted that this monitor will eventually be removed during the extraction in Phase 5.

The groundwater temperature fluctuations at this location (**Figure B-41**) resemble a wave-like pattern, similar to the ambient air temperature. The air temperature exhibits a generally consistent pattern that sees annual winter lows in January/February, increasing to annual highs in the summer (July/August) and then decreasing through the fall back to the winter season. The natural pre-extraction groundwater temperatures show a reasonably similar pattern, with annual lows of 5.7°C to 8.5°C that occur in late spring/early summer, increasing to annual highs of 9.0°C to 10.7°C in the fall, followed by a progressive decrease through the fall and into the winter. The historical data illustrate the pre-extraction (1992 to 1994) natural seasonal variation at the shallow monitor at nest 92-13, followed by the thermal modifications resulting from the progressive development of the Phase 1 pond. In 2023, the temperature at 92-13 decreased from 15.2°C at the beginning of January, to the annual low of 6.0°C in June. The temperature then increased to the annual high of 15.4°C in December.

The following table summarizes the temperature ranges observed at each of the three monitor elevations since installation.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Shallow	5.7 to 19.1	2.1 to 20.5	1.1 to 18.9	1.1 to 19.9	1.9 to 14.9	2.5 to 13.5	2.7 to 14.1	6.9 to 16.3	3.3 to 18.1	2.7 to 18.9
Intermediate	7.4 to 16.8	4.2 to 18.6	3.6 to 17.0	2.6 to 17.6	4.4 to 14.2	4.0 to 12.6	3.8 to 13.6	6.4 to 15.0	4.4 to 16.8	3.0 to 17.8
Deep	8.2 to 14.1	5.8 to 16.3	5.5 to 15.3	3.7 to 15.9	6.2 to 14.3	5.3 to 11.4	4.7 to 12.4	6.4 to 12.6	5.1 to 14.7	4.1 to 15.7

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Shallow	2.3 to 20.5	5.7 to 20.1	2.7 to 20.7	5.9 to 21.7	2.9 to 21.3	8.9 to 17.7	2.9 to 22.6	N/A	3.4 to 19.0	2.4 to 20.9
Intermediate	3.2 to 17.8	5.2 to 17.6	3.2 to 16.8	5.8 to 19.0	4.4 to 18.6	7.4 to 18.8	5.0 to 16.2	N/A	N/A	N/A
Deep	4.1 to 15.3	4.7 to 14.7	2.3 to 13.6	N/A	N/A	N/A	7.9 to 15.3	N/A	N/A	N/A

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Shallow	2.3 to 21.3	3.5 to 21.9	2.8 to 20.6	4.5 to 17.5	5.6 to 15.8	4.4 to 15.7	6.1 to 15.0	5.4 to 15.2	6.0 to 15.4
Intermediate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Deep	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: Temperatures are recorded in degrees Celsius.
"N/A" indicates temperatures not available due to data logger failure.
From May 2013 onward, only a shallow data logger was present.

92-32

This monitor nest was installed in November 2006 and is located approximately 60 m southeast (upgradient) of Mill Creek and approximately 90 m downgradient of the western limit of the Phase 3 pond. It is noted that the data logger installed in the shallow monitor at this location (32-III) failed in November 2022 and was replaced on February 14, 2023. In addition, the automated data from shallow monitor 32-III are unavailable from June 16, 2023 to August 9, 2023, due to a data logger issue. As shown in **Figure B-45**, the seasonal groundwater temperature fluctuations observed at the shallow monitor at this location (32-III) exhibit a wave-like pattern, with the annual low in late winter/spring and highs in the late summer/fall. The shallow monitor historically responds to thermal increases and decreases a couple of months prior to the intermediate monitor and a few months earlier than the deep monitor. In recent years, however, the lag has increased. The apparent seasonal changes in groundwater temperature in the intermediate and deep monitors are very small relative to the shallow monitor and to monitors at other locations. This is likely due to the greater depth at which these two lower monitors are installed, compared to other intermediate and deep probes, and/or the finer-grained materials in which the monitors are installed (silty fine sand and silt till, respectively). A slight increasing trend in groundwater temperatures at the intermediate and deep monitors was apparent in 2013 and temperatures have since fluctuated at this higher level.

Shallow Monitor – The temperature decreased from 5.9ºC at the start of monitoring on February 15 to the annual low of 4.3ºC in March, then increased to the annual high of 14.2ºC in September, and decreased to 7.2ºC through the end of the year.

Intermediate Monitor – The temperature gradually decreased from the annual high of 9.3ºC at the start of the year to the annual low of 9.0ºC in May, and increased to 9.2ºC by the end of the year.

Deep Monitor – The temperature at this monitor remained steady between 8.9ºC and 9.0ºC during 2023.

The following table contains a summary of the temperature ranges at each of the three monitors. The peak minimum and maximum temperatures in the shallow, intermediate and deep monitors in 2023 were similar to the historic ranges.

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Shallow	4.0 to 12.2	3.5 to 13.6	3.6 to 13.3	3.3 to 15.3	5.6 to 14.0	6.1 to 15.2	5.3 to 15.1	5.0 to 13.6	4.6 to 14.9
Intermediate	8.2 to 8.6	8.2 to 8.6	8.2 to 8.6	8.3 to 9.1	8.1 to 9.2	8.5 to 9.1	8.7 to 9.5	8.7 to 9.5	8.6 to 9.3
Deep	8.1 to 8.2	8.1 to 8.3	8.1 to 8.3	8.1 to 8.3	8.1 to 8.7	8.2 to 8.6	8.3 to 8.9	8.4 to 8.9	8.3 to 8.7

	2016	2017	2018	2019	2020	2021	2022	2023
Shallow	3.5 to 15.7	3.5 to 14.8	4.3 to 15.1	3.0 to 13.9	2.8 to 13.5	2.8 to 14.0	2.6 to 13.4	4.3 to 14.2
Intermediate	8.8 to 9.1	9.0 to 9.6	9.4 to 9.8	9.1 to 9.5	8.9 to 9.4	8.8 to 9.2	8.8 to 9.2	9.0 to 9.3
Deep	8.4 to 8.6	8.6 to 9.0	8.9 to 9.1	8.8 to 9.0*	8.9** to 9.1	8.8 to 9.1	8.9 to 9.0	8.9 to 9.0

Note: Temperatures are recorded in degrees Celsius.
* 2019 range excludes data from August 1 onward.
** 2020 range excludes data from January 1 to March 12.

On the west side of the north property, the data loggers have been divided into two lines of two monitor nests. Each line is discussed below.

NORTH LINE: 92-29 AND 92-28

92-29

This monitor nest was installed in November 2006 and is located within 10 m of the limit of extraction of the Phase 3 pond (completed in 2012), and approximately 120 m southeast of Mill Creek. As shown in **Figures 10 and B-44**, historically, the seasonal groundwater temperature fluctuations observed at each of the three monitors at this location exhibited a wave-like pattern, with the annual low typically in late winter/spring and highs typically in the late summer/fall. The shallow monitor (29-III) typically responded to thermal increases and decreases a couple of months prior to the intermediate monitor and a few months earlier than the deep monitor. The temperatures recorded from 2012 to 2023, however, do not follow the general patterns observed at this location prior to 2012, and now reflect the monitor's location adjacent to the western limit of the Phase 3 pond. The groundwater temperatures at the shallow and intermediate monitors generally mirrored each other throughout 2023, and much greater fluctuations occurred at each monitor from 2012 to 2023 compared to previous years. The thermal increases at the deep monitor lagged behind the other two monitors by a couple months, as typically occurs, but from 2014 to 2016, peak high temperatures at the deep monitor were greater than in previous years. The peak high temperatures since 2016, however, were lower than 2014 to 2016, although the 2023 peak high temperature was the highest observed since 2016. The annual peak low temperatures observed at the deep monitor since 2017 have returned to a temperature similar to pre-2014 levels; however, the peak low temperature at the deep monitor in 2023 was the highest peak low temperature at the monitor to date. These changes in temperature trends at this monitor are attributed to the excavation of the Phase 3 pond to within 10 m of the monitor nest.

Shallow Monitor – The temperature decreased from 5.9°C at the beginning of the year to the annual low of 1.0°C in March. The temperature then increased to the annual high of 22.9°C in August before decreasing to 3.1°C by the end of the year.

Intermediate Monitor – The temperature decreased from 9.9°C at the beginning of the year to the annual low of 3.1°C in February. The temperature then increased to the annual high of 23.5°C in July/August before decreasing to 3.8°C by the end of the year.

Deep Monitor – The temperature declined from 13.9ºC at the beginning of the year to the annual low of 9.0ºC in April. The groundwater temperature then increased to the annual high of 16.5ºC in October, and decreased to 13.1ºC by the end of the year.

The following table contains a summary of the temperature ranges at each of the three monitors.

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Shallow	4.1 to 15.0	3.3 to 15.1	4.0 to 14.9	3.2 to 15.9	4.0 to 15.3	2.2 to 24.7	0.7 to 26.3	-0.2 to 23.9	-0.4 to 24.9
Intermediate	7.0 to 11.5	6.1 to 11.7	6.4 to 11.1	6.6 to 11.9	6.6 to 11.3	2.1 to 24.6	1.4 to 26.7	1.5 to 24.0	1.6 to 24.6
Deep	8.0 to 10.1	7.9 to 10.0	7.8 to 10.0	7.9 to 10.3	7.8 to 10.3	8.3 to 16.6	5.7 to 17.3	3.9 to 18.1	3.5 to 17.8

	2016	2017	2018	2019	2020	2021	2022	2023
Shallow	-0.2 to 25.8	0.4 to 22.8	0.0 to 24.3	0.3 to 23.7	0.4 to 23.6	0.5 to 22.2	0.5 to 22.7	1.0 to 22.9
Intermediate	1.8 to 25.8	1.2 to 22.5	1.1 to 23.7	2.1 to 23.5	2.4 to 22.8	2.8 to 21.7	2.6 to 22.9	3.1 to 23.5
Deep	6.1 to 21.3	6.2 to 15.7	7.5 to 14.7	7.7 to 15.1	7.9 to 13.9	8.5 to 13.3	8.0 to 15.4	9.0 to 16.5

Note: Temperatures are recorded in degrees Celsius.

Figure 11 shows the relationship between the air temperature and the groundwater temperature at the three elevations in the aquifer throughout 2023. As expected, the groundwater continues to respond proportionately to seasonal air temperature changes, but it is also influenced by the water temperature in the adjacent Phase 3 pond.

92-28

This monitor nest was installed in November 2006 and is located approximately 40 m downgradient of 92-29 (which itself is within 10 m from the western limit of the Phase 3 pond), and 60 m east (upgradient) of Mill Creek. As shown in **Figure B-43**, the seasonal groundwater temperature fluctuations observed at each of the three monitors at this location through 2023 continue to exhibit a wave-like pattern similar to historical values, with the annual low in late winter/spring and highs in the late summer/fall. The magnitude and general timing of the seasonal temperature changes in the three monitors at this location are reasonably similar to each other, as each of the three monitors are relatively shallow (within 4 m of ground surface). Beginning in 2012, the winter low temperatures were 1 to 2ºC higher than the pre-2012 results. The winter low temperatures in 2019 were lower than in 2018, and were similar to the pre-2012 results; however, the winter low temperatures recorded since 2020 were slightly higher than observed in 2019. The summer/fall high temperatures at the shallow monitor also continue to be slightly lower than prior to 2012. The recent (2012 to 2023) data trends suggest that the presence of the Phase 3 pond in the northwest corner of the extraction area may have a subtle influence on groundwater

temperatures at the 92-28 nest, which is located approximately 50 m downgradient from the pond, and approximately 60 m upgradient from Mill Creek. Influences to date at this location are considered minor.

Shallow Monitor – The temperature declined from 7.7ºC at the beginning of the year to the annual low of 4.9ºC in March. Temperatures then increased to the annual high of 13.8ºC in September. It is noted that the annual high observed at the shallow monitor at 92-29 in 2023 was 9.1ºC higher than the high at 92-28, which demonstrates the considerable thermal plume dissipation that occurs over the 40 m distance between the two monitors. From September to the end of the year, the shallow groundwater temperature decreased to 7.7ºC.

Intermediate Monitor – The temperature decreased from 8.6ºC at the beginning of the year to the annual low of 5.4ºC in March. Temperatures then increased to the annual high of 13.7ºC in September. From September to the end of the year, the intermediate groundwater temperature decreased to 8.6ºC.

Deep Monitor – The temperature declined from 9.4ºC at the beginning of the year to the annual low of 5.8ºC in March. The groundwater temperature then increased to the annual high of 13.3ºC in September. From September to the end of the year, the deep groundwater temperature decreased to 9.1ºC.

The following table contains a summary of the temperature ranges at each of the three monitors.

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Shallow	3.8 to 14.1	3.6 to 14.7	3.6 to 14.9	3.5 to 15.5	3.5 to 14.5	4.9 to 14.1	5.3 to 14.1	5.4 to 13.6	5.6 to 13.3
Intermediate	4.3 to 13.4	3.8 to 14.2	3.9 to 14.1	3.8 to 14.6	4.0 to 14.3	5.1 to 13.9	5.5 to 13.9	5.8 to 13.4	6.2 to 12.9
Deep	5.1 to 12.5	4.6 to 13.0	4.9 to 12.7	4.6 to 13.4	4.6 to 13.2	5.7 to 12.6	6.4 to 12.5	6.8 to 12.2	6.4 to 12.1

	2016	2017	2018	2019	2020	2021	2022	2023
Shallow	5.4 to 14.3	6.0 to 14.0	5.1 to 14.3	4.0 to 13.7	4.8 to 13.9	4.9 to 14.0	4.8 to 13.5	4.9 to 13.8
Intermediate	5.8 to 14.2	6.3 to 13.8	5.7 to 13.9	4.8 to 13.5	5.3 to 13.6	5.3 to 13.8	5.4 to 13.1	5.4 to 13.7
Deep	6.3 to 13.7	6.7 to 13.0	5.7 to 13.1	4.8 to 12.6	5.4 to 12.6	5.3 to 13.0	5.4 to 13.1	5.8 to 13.3

Note: Temperatures are recorded in degrees Celsius.

SOUTH LINE: 92-27 AND 92-33

92-27

This monitor nest is located about 100 m east (upgradient) of Mill Creek and is adjacent to the western limit of the Phase 3 extraction. A data logger was installed in the shallow monitor at this location in December 2011, and a thermograph for the monitor is presented in **Figure B-42**. The temperature in 2023 decreased from 12.6ºC at the

beginning of the year to the annual low of 4.2ºC in April. The temperature then increased to the annual high of 20.5ºC in August before decreasing to 10.2ºC by the end of the year.

The following table contains a summary of the annual temperature range at this monitor location from 2012 to 2023. The peak minimum temperature in 2023 was similar to the peak minimum temperatures recorded since 2019, while the peak maximum temperature in 2023 was the highest recorded since 2016. The higher temperatures observed in the summer of 2023 are attributed to wetter than normal climate conditions in July/August 2023. The wetter conditions resulted in an increase in groundwater levels, and the infiltration of warmer water. The peak minimum and maximum temperatures recorded at 92-27 since 2017 have generally been higher and lower, respectively, compared to the pre-2017 results. Prior to 2017, the temperature pattern at 92-27 was similar to the pattern observed at 92-29, which indicated a similar pond influence at the two monitors. This similar pond influence is expected given the comparable separation distances between the monitors and the Phase 3 pond. The muted amplitude of annual temperature fluctuations observed at 92-27 since 2017 is attributed to the decrease in groundwater level observed at the monitor. Higher water levels recorded between 2013 and 2017 were typically near the ground surface, or higher than the ground surface, in the spring, which would have allowed for a greater influence from air temperatures. The decrease in groundwater levels at 92-27 since 2017, which is attributed to the water level decrease in the Phase 3 pond, has resulted in increased insulation of the groundwater at 92-27 from air temperature effects.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Shallow	3.9 to 20.2	1.7 to 22.2	0.6 to 21.8	-0.5 to 20.0	1.0 to 23.0	4.6 to 16.4	4.0 to 17.1	2.8 to 18.7	2.8 to 17.5	3.6 to 17.4	3.5 to 19.2	4.2 to 20.5

Note: Temperatures are recorded in degrees Celsius.

92-33

This monitor nest is located 50 m east (upgradient) of Mill Creek and was operational since 1992. All three thermistors malfunctioned in July 2010. A data logger was re-installed in the shallow monitor in March 2012. The monitor is located within approximately 70 m of the western edge of the Phase 3 pond. A second shallow data logger, denoted 'Shallow (A)' on **Figure B-46**, was installed in October 2017 for temperature monitoring purposes at a depth similar to the previous (i.e., pre-2012) shallow data logger. The 'Shallow (A)' data logger is installed about 4.7 m higher than the existing shallow data logger. The amplitude of the thermograph recorded by the 'Shallow (A)' data logger has been variable since 2012, although the temperatures have generally fluctuated within a similar range over the long term. In 2023, the temperature fluctuated between a minimum of 9.9ºC in August and a maximum of 11.4ºC in May.

The temperature profile of the 'Shallow (A)' data logger, which is installed at a similar depth to the previous shallow data logger (pre-2011), showed a similar pattern in 2023 compared to the pre-2011 data logger temperature data. The temperature in 2023 decreased from 7.9ºC at the beginning of the year to the annual low of 6.4ºC in February, and then increased to the annual high of 12.1ºC in October, and decreased to 11.5ºC by the end of the year.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Shallow	4.3 to 11.9	3.5 to 11.7	3.9 to 11.5	4.5 to 12.3	5.1 to 12.9	5.9 to 13.3	4.7 to 12.7	5.3 to 13.7	5.1 to 12.7	4.9 to 12.9
Intermediate	7.3 to 8.4	7.5 to 8.4	7.5 to 8.6	7.5 to 8.8	8.0 to 9.8	8.1 to 9.6	8.3 to 9.8	8.6 to 10.6	8.3 to 9.6	8.3 to 10.2
Deep	8.1 to 9.1	8.1 to 8.3	8.1 to 9.3	8.3 to 8.7	8.5 to 9.1	8.9 to 9.9	9.1 to 10.1	9.5 to 11.9	8.6 to 9.6	9.4 to 10.6

	2005	2006	2007	2008	2009	2010*	2011	2012**	2013	2014
Shallow	4.7 to 13.9	5.3 to 13.7	5.7 to 13.3	5.1 to 13.3	5.1 to 14.1	5.3 to 13.1	N/A	8.4 to 9.8	8.2 to 10.9	7.5 to 11.0
Intermediate	8.1 to 10.6	8.6 to 10.4	8.6 to 10.4	8.6 to 10.6	8.8 to 10.6	8.6 to 10.8	N/A	N/A	N/A	N/A
Deep	9.4 to 11.0	9.4 to 11.2	9.4 to 11.4	9.2 to 10.6	8.8 to 10.6	8.6 to 10.2	N/A	N/A	N/A	N/A

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Shallow	8.2 to 10.5	8.9 to 12.0	10.3 to 12.4	10.3 to 10.5	9.5 to 10.2	10.0 to 10.9	9.8 to 10.7	10.0 to 10.6	9.9 to 11.4
Shallow (A)†	N/A	N/A	8.0*** to 12.1	6.3 to 13.5	5.8 to 11.2	7.3 to 12.4	5.0 to 13.6	6.0 to 11.8	6.4 to 12.1
Intermediate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Deep	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: Temperatures are recorded in degrees Celsius.
"*" indicates January to July only.
"**" indicates March to December only.
"***" indicates October to December only.
"N/A" indicates temperatures not available due to data logger failure.
Blank indicates data logger not installed.
† ' Shallow (A)' logger is installed 4.7 m shallower than 'Shallow' logger.

3.6 Wetland Water Levels

The drive point monitors that are located in the wetland are noted in **Table 1**. Monitors DP6 to DP12 are located in the large wetland area in the north-central part of the property. DP16 is located in the wetland along the western side of the property.

Monitoring of wetland drive points on the Reid Heritage property adjacent to Mill Creek north of Highway 401 commenced in August 2000, and those monitors were incorporated into the routine monitoring program. These drive points were removed by others with the exception of DP113, located immediately north of Hwy 401. Results for this monitor are discussed later in this section.

The water level data from the previous five years (2019 to 2023) for the wetland drive points are documented in **Table B-3, Appendix B**. Groundwater hydrographs presenting the full dataset of historic results for the wetland drive points are presented in **Figures B-49 to B-58, B-60, B-62, and B-64, Appendix B**. In **Table B-7, Appendix B**, a summary of wetland water level data from the previous five years (2019 to 2023) is provided. A groundwater hydrograph presenting the full dataset of historic results of three representative drive points in the wetland is presented in **Figure 12**. As shown in the hydrograph, of the three representative drive points, the groundwater elevation at DP7 is typically highest, and the lowest elevations occur at DP11. This is expected, as DP7 is located furthest upgradient from Mill Creek and DP11 is closest, and groundwater flow at the site is toward Mill Creek.

Historically, the groundwater levels within the wetland remained reasonably close to ground surface throughout the year. The water levels are typically nearest to ground surface, and in some instances, they are above ground surface, mostly during the spring melt. The groundwater levels then show a progressive decline to their maximum depth below ground surface during the summer to early fall months. The fluctuation between the spring high water levels to the summer low water levels usually ranges from 0.1 m to 1.0 m, depending on the location.

In 2023, the following groundwater elevation trends were observed in the wetland monitors, based on the monthly monitoring results.

- In 2023, water levels in the wetland drive points followed the typical seasonal fluctuation of increasing water levels during the winter/spring and decreasing through the summer and into early fall. Despite the typical seasonal fluctuation, wetland water levels also increased in July/August 2023 following wetter than normal climate conditions.
- The highest water levels in 2023 were typically recorded during April and August. The lowest water levels were typically recorded in January.
- Based on manually measured groundwater levels, the overall seasonal variation in the elevation of the water table in the wetland in 2023 (seasonal high to low), ranged from 0.22 in DP6, located on the eastern edge of the wetland area, to 0.55 m at DP10, located near Mill Creek.
- In 2023, based on manually measured groundwater levels, the average depth of the water table below ground surface within the wetland monitors ranged from 0.3 m above ground surface at DP16, located on the west side of the property, to 1.0 m below ground surface at DP10, adjacent to Mill Creek. The maximum depth of the water table recorded in 2023 was 1.1 m below ground surface at DP10 in July, and the minimum depth of the water table recorded was 0.5 m above ground surface, recorded at DP16 in November.

A cross-section through the wetland showing the groundwater profiles for both the high and low water table conditions is presented in **Figure 13**. The location of the section is shown on the Site Plan, **Figure 2**.

The groundwater level recorded within the wetland areas in 2023 averaged about 0.06 m below the historical average, and about 0.06 m above the 2022 average for the site. The higher levels compared to 2022 are attributed to the higher water surplus that occurred at the site in 2023 compared to historic results. The increase in water levels within the wetland areas generally is less than the increase experienced at other locations across the site. This is primarily due to the proximity of the wetland areas to Mill Creek, which acts as a buffer, or hinge point, for the water table that reduces the magnitude of seasonal variations. The wetland groundwater levels recorded in 2023 were within the historical maximum and minimum groundwater levels. An aggregate extraction influence is not apparent.

Daily readings of piezometric pressure and water temperature were collected at drive points DP7, DP8, and DP9 in the north-central part of the property, and at drive point DP16 at the western side of the property. The groundwater in the shallower drive points DP9 and DP16 typically responds to thermal increases and decreases a few months prior to the deeper screened drive points DP7 and DP8. The automated temperature data from the wetland drive points (DP7, DP8, DP9 and DP16) are presented in **Figures B-59, B-61, B-63 and B-65**, respectively.

DP7 – The temperature decreased from 11.0ºC at the beginning of the year to the annual low of 9.2ºC in April/May. The temperature then increased to the annual high of 11.7ºC in November, and decreased to 10.8ºC by the end of the year.

DP8 – The groundwater temperature decreased from 9.7ºC at the beginning of the year to the annual low of 7.9ºC in April, then increased to the annual high of 10.6ºC in November before decreasing to 9.5ºC by the end of the year.

DP9 – The temperature decreased from 7.1ºC at the beginning of the year to the annual low of 4.1ºC in March, then increased to the annual high of 12.7ºC in September. The temperature decreased to 7.0ºC by the end of the year.

DP16 – The temperature decreased from 6.4ºC at the beginning of the year to the annual low of 5.1ºC in March. The temperature then increased to the annual high of 15.5ºC in September, then decreased to 7.9ºC by the end of the year.

The following table contains a summary of the temperature range in the drive points from August 2011 to 2023. The annual minimum and maximum temperatures recorded at the drive points in 2023 were within the ranges recorded since the data loggers were installed in 2011/2012. An aggregate extraction influence is not apparent.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
DP7	10.3 to 12.6	8.5 to 12.8	9.4 to 12.5	8.6 to 11.4	8.1 to 10.9	8.5 to 11.6	9.6 to 12.2	8.1 to 11.9	7.9 to 11.7	8.1 to 12.5	8.9 to 12.4	8.7 to 11.5	9.2 to 11.7
DP8	N/A	7.8* to 10.3*	7.8 to 10.3	7.6 to 9.4	7.4 to 10.2	7.8 to 10.3	7.8 to 10.1	7.2 to 10.5	7.6 to 10.5	7.5 to 10.7	7.9 to 10.7	7.7 to 10.7	7.9 to 10.6
DP9	6.9 to 13.3	4.5 to 13.3	4.3 to 12.9	4.1 to 13.2	3.7 to 13.0	4.5 to 13.0	4.0 to 12.5	3.5 to 13.2	2.9 to 12.9	3.7 to 13.1	3.3 to 13.3	3.7 to 12.3	4.1 to 12.7
DP16	N/A	8.6** to 18.3**	2.7 to 17.1	1.3 to 17.1	2.3 to 17.6	6.4 to 16.9	6.1 to 14.8	4.6 to 16.3	3.6 to 15.4	4.6 to 15.4	3.5 to 15.5	3.1 to 15.0	5.1 to 15.5

Note: Temperatures are recorded in degrees Celsius.
"N/A" indicates data logger not installed.
* 2012 DP8 data include only April to December.
** 2012 DP16 data include only June to December.

Based on the data from the data logger transducers at DP7, DP8, DP9, and DP16, the groundwater level in the wetland generally remained unchanged in January, increased between February and early April, decreased from April to June, increased in July and August and then fluctuated/decreased through the end of the year. The water

levels at DP7 (**Figure B-58**) and DP8 (**Figure B-60**) were similar to the levels recorded prior to 2018, which are slightly lower than the 2018 to 2020 levels. The higher water levels recorded at DP7 and DP8 between 2018 and 2020 are attributed to the higher seasonal water levels observed in the Phase 4 pond during the same period, as shown on **Figure B-68**. The higher water levels in the Phase 4 pond indicate that the silt barrier is functioning as designed. The decrease in water level observed at DP7 and DP8 since 2020 correlates with the decrease in water level observed in the Phase 4 pond, which is partially attributed to dry climatic conditions between 2020 and 2022. The water levels at DP7 and DP8 were generally higher in 2023 than in 2022, which is attributed to wetter climate conditions in 2023. The water levels at DP9 (**Figure B-62**) have been relatively stable over the long term. An aggregate extraction influence at DP9 is not apparent.

It is noted that, similar to the water levels at Monitor 92-32, located about 140 m north of DP16, the water levels at DP16 (**Figure B-64**) showed an overall downward trend from 2014 to 2020. The declining water levels at DP16 are attributed to the declining seasonal water levels observed in the Phase 3 pond during the same period, as shown on **Figure B-68**. The higher water levels in the Phase 4 pond relative to the lower water levels in the Phase 3 pond indicate that the silt barrier is functioning as designed. In 2021 and 2022, the water levels at DP16 and the Phase 3 pond remained similar to the levels measured in 2020, indicating that impacts from the silt barrier have stabilized. In 2023, the water levels at DP16 increased overall and were similar to those observed from 2015 to 2018.

3.7 Mill Creek Drive Points

The drive point monitors that are installed in the creek bed are listed in **Table 1**. The drive point locations are shown on **Figure 2**. The drive point monitors are used to provide groundwater and surface water temperature data. As well, the drive points provide a measure of the hydraulic head within the groundwater system beneath the creek, as well as providing a surface water level in the creek. These data are used to calculate the magnitude and direction (i.e., upward or downward) of the vertical hydraulic gradient at the creek.

Drive points DP18 to DP20 are located north of Highway 401, upstream from the property. Drive points DP3, DP4, DP17/R, DP21, and DP22 are located in the northeast section of the creek, from south of the Hanlon interchange upstream to Highway 401. Drive points DP1 and DP2 are located in the northwest section of the creek, downstream from the Galt Creek and Pond Creek tributaries, and DP5CR (formerly DP5A then DP5B then DP5C) is located just beyond the southwest corner of the site, where Mill Creek flows beneath the bridge at Concession Road 2.

The previous 5 years of water level data for the creek drive points are presented in **Table B-5**, and groundwater/ surface water hydrographs presenting the full historic dataset for the creek drive points are presented in **Figures B-70 to B-100, Appendix B**. Additionally, the previous 5 years of water level data for the original surface water monitoring stations SW1 and SW2 are presented in **Table B-4**, and full historic hydrographs are provided in **Figures B-66 and B-67**, respectively. A summary of the previous 5 years of creek drive point data, including temperature, vertical hydraulic gradients, and calculated discharge fluxes for each monitor, is presented in **Table B-5**. Thermographs of the groundwater and surface water temperatures at each drive point are presented in **Figures B-71 to B-104, Appendix B**.

The hydrographs for the drive point monitors show the seasonal changes in elevation of the groundwater at each monitor, together with the surface water elevation data for the creek. The yearly average vertical hydraulic gradients for the in-stream drive points, starting at the downstream location DP5A/B/C/CR and moving upgradient

to DP18, from 2023 back to 2005, and historically from the start of data collection (1988 to 1993) up to 2005, are shown below.

Average Vertical Hydraulic Gradient

DRIVE POINT	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
DP5A/B/C/CR	0.62	0.68	0.66	0.55	0.52*	0.54	0.47	0.18	0.21	0.28	0.18
DP2	0.16	0.24	0.25	0.24	0.25	0.26	0.25	0.33	0.34	0.29	0.33
DP1	0.32	0.28	0.23	0.20	0.25	0.27	0.25	0.33	0.33	0.37	0.37
DP3	0.05	0.06	0.06	0.05	0.04	0.07	0.04	0.06	0.05	0.05	0.05
DP17/R	0.08	0.04	0.04	0.06	0.05	0.07	0.06	0.04	0.05	0.03	0.03
DP22	0.04	0.04	0.04	0.06	0.07	0.07	0.08	0.05	0.05	0.08	0.05
DP4/R	0.04	0.03	0.02	0.06	0.13	0.13	0.16	0.10	0.14	0.17	0.11
DP21	0.08	0.08	0.07	0.12	0.08	0.06	0.11	0.03	0.06	0.08	0.07
DP20	-0.05	-0.07	0.08	0.11	0.13	0.08	0.14	0.10	0.12	0.12	0.14
DP19	-0.13	-0.20	0.03	0.06	0.05	0.02	0.01	-0.03	-0.01	0.06	0.03
DP18	-0.06	-0.09	0.15	0.10	0.10	0.06	0.12	0.08	0.11	0.09	0.10

DRIVE POINT	2012	2011	2010	2009	2008	2007	2006	2005	HISTORIC AVERAGE (UP TO 2005)
DP5A/B/C/CR	0.40	0.19	0.18	0.12	0.12	0.09	0.09	0.11	0.09
DP2	0.32	0.30	0.30	0.24	0.22	0.22	0.21	0.14	0.17
DP1	0.30	0.31	0.27	0.21	0.22	0.19	0.21	0.23	0.22
DP3	0.06	0.06	0.07	0.06	0.06	0.06	0.06	0.05	0.04
DP17/R	0.03	0.04	0.06	0.05	0.06	0.04	0.04	0.04	0.02
DP22	0.04	0.06	0.06	0.09	0.09	0.06	0.07	0.06	0.03
DP4/R	0.08	0.12	0.15	0.22	0.20	0.12	0.12	0.09	0.04
DP21	0.05	0.09	0.10	0.14	0.16	0.11	0.11	0.08	0.06
DP20	0.08	0.10	0.11	0.19	0.15	0.14	0.14	0.12	0.00
DP19	0.00	0.04	0.04	0.12	0.09	0.04	0.05	0.07	-0.06
DP18	0.07	0.08	0.07	0.13	0.12	0.06	0.07	0.08	0.03

NOTES:
1) (-) = downward vertical gradient.
2) Because of several drive point replacements due to vandalism, DP5 data from 2012 onward are interpreted with caution.
3) * Due to the presence of a beaver dam downstream of DP5CR, DP5CR data for 2019 are interpreted with caution.

The following patterns and trends were observed from the 2023 and historical results.

- Based on the average condition through 2023, upward gradients between the groundwater and the creek occurred from where Mill Creek crosses highway 401 (DP21) downstream to DP5CR. Groundwater discharge continues to provide base flow to these reaches of Mill Creek.
- As shown in the preceding table, the magnitude of the average vertical hydraulic gradient is variable from DP21 downstream to DP5A/B/C/CR, with the strongest upward gradients being observed at DP1, DP2, and DP5A/B/C/CR, and the weakest upward gradients in the creek between DP4/R, DP22 and DP3.
- Based on the average condition through 2023, downward gradients between the groundwater and the creek occurred at the drivepoints located north of Highway 401 (DP18, DP19 and DP20).
- Between 1998 and 2005, downward vertical gradients persisted in the reach north of Highway 401 at DP19 (**Figure B-93**). At DP18 (**Figure B-90**) and DP20 (**Figure B-96**), gradients varied from downward to upwards during the 1998 to 2005 period. From 2005 to June 2022, the vertical gradients at these drive points remained upward, with the exception of neutral and downward vertical gradient conditions on average over the course of the year at DP19 in 2012 and in 2015 and 2016, respectively (varied between downward and upward gradient conditions). Beginning in July 2022, strong downward gradients were frequently observed within the reach north of Highway 401. As shown in **Figures B-90, B-93 and B-96**, the downward gradients observed since July 2022 are stronger than observed historically at each of the three drive point locations. As shown in **Figures B-88, B-91 and B-94**, when the downward gradients are observed, they are caused by a notable decrease in groundwater level recorded at the drive point locations. These lower groundwater levels were not consistently observed in 2023. The cause of the sudden change in hydraulic gradient at DP18, DP19 and DP20 is not apparent; however, it is interpreted to be related to upgradient activities.
- In 2023, the average vertical hydraulic gradients were higher than the 2022 values at DP1, DP4/R, DP17/R, DP18, DP19 and DP20; equal to the 2022 values at DP21 and DP22; and lower than the 2022 values at the remaining in-stream drive points. The difference between the 2023 average and the 2022 average ranged between -0.08 at DP2 and 0.07 at DP19. The 2023 average vertical hydraulic gradients at the creek drive points were generally higher than, or similar to, the pre-2005 averages, with the exceptions of the locations north of Highway 401. This overall increase in hydraulic gradients likely reflects a buffering effect due to the presence of the Phase 1, Phase 3, and Phase 4 ponds, and translates into a proportional increase in the groundwater discharge to Mill Creek. This is discussed in further detail later in this section.
- Generally, the seasonal fluctuation of the surface water elevation in Mill Creek at the drive point monitors was similar to the variation of the groundwater elevation in 2023. Historically, greater seasonal groundwater fluctuations have been observed compared to surface water fluctuations.

The drive point hydrographs typically show clear seasonal patterns consisting of:

- A rise early in the year due to snowmelt and other groundwater discharge;
- A decline through the summer months;
- An increase in the late fall; and
- A gradual decline through the winter when the precipitation is generally bound up in the snow pack.

In 2023, the groundwater levels typically increased from January to April, decreased in May and June, increased in July, decreased in August and then fluctuated through the end of the year. The pattern was consistent with precipitation data and Phase 1, 2, 3 and 4 pond levels, which show that March, July and August were wet months and the remaining months were similar to, or drier than, normal conditions. Frozen conditions in groundwater were encountered at DP1 in January. The groundwater levels were within the historical ranges at each creek drive point in 2023, with the exception of the July 2023 elevation at DP3, which was higher than the previous maximum value and is attributed to a notable precipitation event, as discussed in the 2023 Surface Water Report (Appendix A of the 2023 Coordinated Monitoring Report).

The surface water levels at the creek drive points typically increased from January to March, decreased through June, increased notably in July, decreased through September and fluctuated to the end of the year. Surface water levels at the creek drive points were within their historic ranges in 2023, with the exceptions of DP3, DP4R, DP17R, DP20, DP21 and DP22 in July. As noted above, high water level conditions were observed across the Site during the July 2023 monthly event due to a notable precipitation event. It is noted that, owing to various reasons over the years, such as access issues and vandalism, the DP5 drive point has had to be re-installed a number of times in several different locations in this reach of Mill Creek. These different locations have had different stream bed elevations and hydrogeological properties, resulting in varying groundwater and surface water elevations being reported over time, as observed on **Figure B-82**. The data should be interpreted with caution.

THERMOGRAPHS

The in-creek drive point monitors are also used to provide a measure of the temperature of the groundwater discharge and the surface water at each location. As presented in the thermographs, **Figures B-71 to B-101**, the groundwater and surface water temperature data show the trends noted below. These surface water temperatures are based on manual measurements recorded once per month; therefore, surface water “maximum” temperatures differ from those recorded by the surface water data loggers, which are reported in Technical Appendices A and C of this annual report. The trends are as follows.

- A wide seasonal variation in the surface water temperatures, which are low in the winter and high in the summer, is observed. In 2023, the surface water temperature ranged from 1.5ºC to 21.4ºC, which was within the historical range.
- Whereas there is a somewhat smaller seasonal variation in groundwater temperatures recorded (historically between 2ºC and 21ºC when all drive point monitors are considered), this is still considered to be a wide seasonal variation for typical groundwater. It is noted, however, that thermal transfer from the creek surface water will affect the shallow groundwater temperatures at the drive points. In addition, the amount of monitor development that is completed before a groundwater temperature reading is taken can affect the value. The groundwater temperatures at the creek drive points in 2023 ranged from 1.7ºC to 19.8ºC.
- Along Mill Creek downstream of Highway 401 in 2023, vertical gradients were generally upward, and groundwater discharge provided a cooling influence on creek temperatures during the warm summer months, and a warming influence during the cold winter months.
- The temperature patterns for 2023 shown on the thermographs are generally consistent with historic patterns. The average 2023 groundwater temperatures at DP1, DP2, DP3 and DP17-R were higher than the historical averages, while the average 2023 groundwater temperatures at the remaining drive points were lower than the historical averages. The average 2023 surface water temperatures at DP1, DP2, DP5CR, DP18 and

DP19 were higher than the historical averages, while the average 2023 surface water temperatures at the remaining drive points were lower than the historical averages. Compared to the historical averages (start of monitoring to 2022), the 2023 groundwater temperature averages differed by between -0.8ºC and 1.1ºC, and the surface water temperature averages differed by between -0.5ºC and 0.7ºC.

Groundwater thermographs for each of the Mill Creek drive points are also presented in **Figures B-103 and B-104, Appendix B**. These graphs were prepared to enable long-term trend analyses of groundwater temperatures at the creek drive points locations across the Site. It is noted that, to allow for a direct comparison between the various drive point locations, these graphs only include results from monitoring events where readings were successfully collected from all creek drive points. As such, if one or more drive point readings were unavailable, the results from that monitoring event are excluded from the graphs. Each thermograph includes three (3) linear trendlines that were generated using the following datasets: (i) the full 30-year dataset from 1994 to 2023; (ii) the 20-year dataset from 2004 to 2023; and (iii) the 10-year dataset from 2014 to 2023. The graphs also include equations of each linear trendline. The following observations are noted regarding the thermographs:

- The linear trendlines generated using 30 years of monitoring data show that groundwater temperatures at each of the creek drive point locations, , have marginally increased over the long term. The rate of temperature increase is similar between each drive point location, including the drive points located upgradient from the site, as the slope of the linear trendline is 0.0002ºC/day at most locations. The slope of the linear trendline is slightly lower at DP18 (0.0001ºC/day) and slightly higher at DP3 and DP19 (0.0003ºC/day). The 30-year dataset of temperature results suggests that groundwater temperatures below the creek have not been impacted by extraction activities at the Site.
- The linear trendlines generated using the most recent 20 years of monitoring data also show that groundwater temperatures at each of the creek drive point locations, including the drive points located upgradient from the site, have marginally increased over the long term. The rate of temperature increase is similar between each drive point location as the slope of the linear trendline is 0.0002ºC/day at most locations. The slope of the linear trendline is slightly higher (0.0003ºC/day) at DP17/R, DP20, DP21 and DP22. The most recent 20 years of temperature data suggest that groundwater temperatures below the creek have not been impacted by extraction activities at the Site.
- The linear trendlines generated using the most recent 10 years of monitoring data show that groundwater temperatures at most locations have continued to show a marginal increasing trend, while a decreasing trend is observed at various locations. Based on the most recent 10 years of results, the rate of temperature changes at the drive point locations far removed from the on-Site ponds have either (i) remained relatively unchanged compared to the 20-year trendline (DP3, DP17/R, DP20); (ii) continued to increase but at a lower rate compared to the 20-year trendline (DP5A/B/C/CR, DP22); or (iii) have shown declining temperature trends (DP4/R, DP18, DP19, DP21). At DP1, located closest to the Phase 3 pond, the 10-year trendline shows that temperatures continue to increase but at a lower rate compared to the 20-year trendline. At DP2, also located in close proximity to the Phase 3 pond, the results show that temperatures have increased at a slightly higher rate over the past 10-years compared to the 20-year trendline. Given that the groundwater temperature results from DP1 are similar to the results from other on-Site drive point locations, the results suggest that groundwater temperatures below the creek are not being impacted by extraction activities at the Site.

GROUNDWATER DISCHARGE

Table B-5, Appendix B, includes the calculated groundwater discharge, or influx, to the creek bed at each in-creek drive point monitor location. **Tables 2 and 3** incorporate the calculated influx at each drive point location and provide an estimate of the distribution of groundwater influx into the creek, for various conditions. **Table 2** includes the distribution of groundwater influx for the 2023 average, winter low flow, and summer low flow conditions from DP18 downstream to DP5CR. **Table 3** includes the distribution for the overall historic average, historic winter low flow average, and the historic summer low flow average conditions. Locations of the monitoring stations and their separation distances are shown on **Figure 14**. The distribution of groundwater influx for each monitoring period from 2019 to 2023 is presented in **Table B-8, Appendix B**.

Figures 15, 16, and 17 show the distribution of groundwater influx for the 2023 summer low flow, winter low flow, and average conditions, respectively. Under summer low flow conditions, **Figure 15**, the 2023 groundwater flux from the Mill Creek Aggregates property to the creek is estimated at about 29.6 L/s, compared to about 23.6 L/s for the historical average summer low flow conditions. The 2023 value is 25% higher than the average condition. The 2023 summer low flow groundwater flux is 32% higher than the 2022 estimation of 22.5 L/s.

Under winter low flow conditions, **Figure 16**, the 2023 groundwater flux from the Mill Creek Aggregates Property to the creek is estimated at about 24.1 L/s, compared to about 25.5 L/s for the historical average winter low flow condition. The 2023 value is 5% lower than the average condition. The 2023 winter low flow groundwater flux is 3% lower than the 2022 estimation of 23.4 L/s.

As shown in **Figure 17**, the groundwater flux from the property is estimated to be about 28.3 L/s for the 2023 average condition, or 7% higher compared to about 26.5 L/s for the overall historical average condition. The 2023 estimation was 7% higher than the 2022 estimation of 26.4 L/s.

As shown in **Table B-8, Appendix B**, the calculated event-based groundwater influx in 2023 was higher in certain months, and lower in others, compared to the same months in 2022. In 2023, the maximum event-based estimated groundwater influx to the creek from the Mill Creek Aggregates Pit property (Highway 401 downstream to DP5CR) occurred in April and was about 33.6 L/s.

The minimum event-based estimated groundwater influx from the property (Highway 401 downstream to DP5CR) was about 24.1 L/s in November 2023. The historical average minimum event-based groundwater influx from the property is 18.9 L/s, with individual values varying from 15 L/s to 27 L/s (based on the average of the yearly summer low flow data for each drive point for the period 1989 to 1999).

As observed through comparison of **Tables 2 and 3**, the overall average groundwater influx to Mill Creek from the Site in 2023 was similar to the average historic conditions. An impact from aggregate operations at the Site on groundwater influx to the creek is not apparent.

As previously noted, downward gradients were occasionally observed at the three drive points located north of Highway 401 in 2023. The downward gradients were initially observed beginning in July 2022. As shown in **Table 2**, the result is that negative influx was calculated in the reaches of Mill Creek north of the Site, which means that surface water from the creek was discharging to the ground during the '2023 average' and '2023 winter low flow' conditions. Based on the calculated influx values, the discharge of surface water into the ground was greatest at the farthest upstream location DP18 and the rate of discharge decreased at each subsequent drive point approaching the Mill Creek Pit site. The results suggest that the cause of the downward gradients is located upgradient of the Site. During the 2023 summer low flow condition, surface water discharge to the ground

is interpreted at DP18, while groundwater influx towards the creek was calculated at the DP19 and DP20 drive point locations during the event.

3.8 Surface Water

WSP staff undertake stream flow monitoring on-site, and Stantec completed the monitoring prior to 2019. The results of historic pre-extraction stream flow measurements conducted by others are presented in the May 1989 Existing Conditions Consolidated Report, prepared by Gartner Lee Limited and Jagger Hims Limited (now WSP). The elevation data from the previous five years (2019 to 2023) for the water levels in the creek at the drive points are presented in **Table B-5, Appendix B**, while the full dataset of historic results is presented graphically in **Figures B-70 to B-102, Appendix B**. In addition, the elevations of the creek at the original surface water monitoring stations SW1 and SW2 from the previous five years (2019 to 2023) are provided in **Table B-4**. Graphs presenting the full dataset of historic results are also provided in **Figures B-66 and B-67, Appendix B**.

The stages of Mill Creek and the two tributaries historically were monitored on a continuous basis at the four surface water monitoring stations SWM1 to SWM4 to provide an estimate of stream flow during the year (see Technical Appendix A of the Coordinated Monitoring Report). Commencing in 2013, with the approval of the MNRF, stream flow estimations are now only provided for stations SWM1 and SWM2. Estimates of stream flow are calculated using the stage-discharge curves that have been established for each station. The data illustrate that Mill Creek and the tributary streams exhibit typical seasonal variation in flow. High flows occur for a relatively short period in the spring and during occasional winter thaw events, and relatively low flows occur during the winter when precipitation is usually bound up in the snow pack and frozen ground conditions prevail. The lowest flows occur during the summer, reflecting high evapotranspiration rates.

A summary of the 2023 instantaneous flow and temperature extremes at the surface water monitoring locations is provided below. It is noted that the high flow values are interpreted to be overestimated due to the lower accuracy of the rating curve formula at higher flows. The maximum daily average flow at both SWM1 and SWM2 in 2023 occurred on July 25. Only 2 mm of precipitation was recorded at the GRCA Shade's Mills Conservation Area prior to the peak in stream flow; however, localized thunderstorms were observed in the area of the Site on July 24/25. According to the climate data recorded at various GRCA climate stations, over 30 mm of precipitation was recorded on July 24/25 at the Elora, Guelph, Woolwich and Arthur climate stations. As such, it is interpreted that a notable precipitation event occurred at/upstream of the Site prior to the peak flows observed on July 25, 2023. It is noted that this date differs from the high flow indicated at SWM1 in the following table, as the table presents the instantaneous flow calculated using the hourly data logger data.

	SWM1 AT HWY 401 UPSTREAM	SWM4 GALT CREEK	SWM3 POND CREEK	SWM2 AT TWP. RD. 2 DOWNSTREAM
High Flow (L/s)	3,390	N/A	N/A	3,400
	July 25			July 25
Low Flow (L/s)	67	N/A	N/A	109
	January 30			June 11
High Temperature (°C) (Manual)	20.5	18.6	18.5	19.9
	September 7	July 25	July 26	September 7
High Temperature (°C) (Data logger)	24.0	17.0	16.4	22.0
	July 5	July 27	July 13	July 5
Low Temperature (°C) (Manual)	1.6	2.9	1.6	2.3
	February 14	February 14	February 14	February 14
Low Temperature (°C) (Data logger)	-0.3	1.0	-0.3	-0.2
	February 2	February 5	February 23	March 19

Notes: Data logger values shown are based on hourly data (i.e. instantaneous).
N/A indicates data not available.
High flow values are interpreted with caution due to the flow calculation method.

A comparison between the manually recorded open water temperatures (groundwater program) and the water temperatures recorded electronically (surface water program) illustrates the notable effect of solar warming within a given day. As indicated by temperatures recorded electronically, the creek temperature at SWM1 can fluctuate by as much as 7°C during a day (as indicated by historical data from the Surface Water Monitoring Program). Temperature data collected by WSP, which are in-stream manual measurements taken at the time of groundwater monitoring, are incorporated into this assessment.

Staff gauges are installed in the Phase 1 to Phase 4 ponds, and the former recharge trench at the northern limit of Phase 1. Water level and temperature data from the past five years are presented in **Table B-4**. The full dataset is presented in a pond hydrograph, **Figure B-68** and pond thermograph, **Figure B-69, in Appendix B**. The thermograph indicates that the temperature of the shallow water in the ponds generally ranges from frozen (or near frozen) conditions in the winter to a peak temperature of between 24°C to 29°C in the summer. The temperature then decreases through the fall, to near frozen conditions again in December.

3.9 Groundwater – Surface Water Interaction

Seasonal variation in stream flow is a reflection of normal long-term climatic seasonal variation, as well as specific climatic events. The high flows, which typically occur in the spring, are the result of the annual spring melt and rainfall events. The low flows, which typically occur during the latter part of the summer season, and to a lesser extent during mid-winter, are the result of moderately lower rainfall, and in the case of the summer, increased temperatures and evapotranspiration losses. In the mid-winter period, precipitation is generally bound up in the snow pack, except when thaws occur periodically.

During low flow periods, and in the absence of rainfall, stream flow is sustained by groundwater discharge to the creek. The groundwater discharge component of stream flow is termed base flow. Since base flow is derived from the groundwater flow system, which shows subdued seasonal changes compared to surface waters, the magnitude of the seasonal variation under base flow conditions will be less than that of the surface runoff

component. In addition, since the temperature of groundwater, and particularly the deeper groundwater, does not fluctuate seasonally to anywhere near the same degree as does the surface water, the temperature of the groundwater discharge to the creek remains relatively more consistent.

Thus, groundwater discharge to the creek provides two important functions:

1) It provides base flow to maintain stream flow during low flow periods; and

2) It provides a cooling effect on the creek temperatures during the warm summer season, and a warming effect during the cold winter season.

Given the diffuse nature of groundwater movement, it is not possible to directly measure the magnitude of the groundwater discharge component to Mill Creek from the Mill Creek Aggregates property. Groundwater influx to Mill Creek is estimated at each drive point location for different flow conditions and the measurement is interpolated for the stream sections between drive points. These calculations are presented in **Tables 2 and 3**, and the data are shown in plan view on **Figures 15 to 17**. The results of these calculations are summarized in the following table.

Groundwater Influx from the Mill Creek Aggregates Pit Property

	Historic Range (1989-1999)	Historic Average (1989-1999)	2023	2022	2021	2020	2019	2018	2017
Summer Low Flow Conditions (May to October)	15 - 24 L/s	18.9 L/s	29.6 L/s (May)	22.5 L/s (Sept)	27.7 L/s (May)	23.8 L/s (July)	23.1 L/s (Aug)	26.9 L/s (July)	28.2 L/s (Sept)
Winter Low Flow Conditions (November to April)	18 - 28 L/s	22.2 L/s	24.1 L/s (Nov)	23.4 L/s (Nov)	26.1 L/s (Nov)	25.3 L/s (Mar)	29.2 L/s (Apr)	26.0 L/s (Feb)	19.8 L/s (Dec)
Average		22.8 L/s	28.3 L/s	26.4 L/s	25.9 L/s	25.2 L/s	23.7 L/s *	28.9 L/s	27.3 L/s

* Data are interpreted with caution due to reduced flux values in the fall of 2019 due to beaver dam downstream of DP5CR

	2016	2015	2014	2013	2012	2011	2010	2009	2008
Summer Low Flow Conditions (May to October)	27.8 L/s (Aug)	29.2 L/s (Sept)	33.9 L/s (Aug)	24.1 L/s (Oct)	27.2 L/s (Aug)	33.0 L/s (July)	30.6 L/s (Aug)	26.4 L/s (Sept)	29.5 L/s (June)
Winter Low Flow Conditions (November to April)	26.2 L/s (Nov)	26.3 L/s (Dec)	25.2 L/s (Dec)	28.5 L/s (Apr)	21.6 L/s (Nov)	26.7 L/s (Mar)	35.1 L/s (Nov)	32.5 L/s (Nov)	31.7 L/s (Mar)
Average	27.5 L/s	29.0 L/s	30.3 L/s	28.3 L/s	25.6 L/s	34.6 L/s	35.7 L/s	33.0 L/s	31.5 L/s

	2007	2006	2005	2004	2003	2002	2001	2000
Summer Low Flow Conditions (May to October)	22.1 L/s (Sept)	24.7 L/s (Aug)	22.0 L/s (Oct)	23.8 L/s (Sept)	12.5 L/s (Aug)	16.1 L/s (Sept)	17.0 L/s (Aug)	21.7 L/s (May)
Winter Low Flow Conditions (November to April)	Not Available	25.2 L/s (Jan)	23.6 L/s (Nov)	22.1 L/s (Nov)	22.1 L/s (Apr)	24.5 L/s (Nov)	22.4 L/s (Apr)	26.5 L/s (Nov)
Average	26.9 L/s	27.6 L/s	26.7 L/s	27.3 L/s	19.9 L/s	22.6 L/s	24.1 L/s	25.5 L/s

The summer low flow groundwater influx values have fluctuated from 2004 to 2023. The calculated 2023 summer low flow groundwater influx (29.6 L/s) was about 57% higher than the historical average yearly summer low flow influx (18.9 L/s), which is based on the average of the yearly summer low flow data for each drive point for the period 1989 to 1999.

The winter low flow groundwater influx values increased from 2003 to 2010, decreased to 2012, and fluctuated from 2013 to 2023. The calculated 2023 winter low flow groundwater influx (24.1 L/s) was about 9% higher than the historical average yearly winter low flow influx (22.2 L/s), which is based on the average of the yearly winter low flow data for each drive point for the period 1989 to 1999.

From 2004 to 2007, the calculated average influx values fluctuated annually. From 2007 to 2010, the values increased, and the values have fluctuated since 2010. The 2023 annual average influx (28.3 L/s) was about 24% higher than the pre-1999 historic long-term average influx (22.8 L/s). The higher values of groundwater discharge from 2004 to 2023 compared to the pre-1999 historic average are attributed to the consistently higher water level in the Phase 1 pond since 2004, and in the Phase 3 and Phase 4 ponds in recent years, and the resulting higher groundwater levels across the site.

In 2023, twelve routine monthly monitoring events were conducted. The groundwater influx to Mill Creek was calculated using the drive point data from ten of the events. The January event was excluded due to frozen conditions and the July event was excluded due to several inaccessible drive point locations due to flooded conditions encountered during the monitoring event. A summary of the estimated influxes and the temperature data from the four surface water monitoring stations is presented in the table below.

DATE		SWM1 @ Hwy 401 Upstream	SWM4 Galt Creek	SWM3 Pond Creek	SWM2 @ Twp. Rd. 2 Downstream	Influx (L/s) (Both sides of Creek)*	Influx (L/s) (South of Creek Only)*
12-Jan-23	Flow (L/s)	84	NA	NA	149	Frozen	Frozen
	Temp. (°C)	2.3(1.7)	4.4(3.9)	4.4(4.8)	2.9(2.3)	5.3	
14-Feb-23	Flow (L/s)	119	NA	NA	175	52.4	28.1
	Temp. (°C)	1.6(2.0)	2.9(2.5)	1.6(4.2)	2.3(1.9)	4.2	
17-Mar-23	Flow (L/s)	135	NA	NA	173	55.4	29.7
	Temp. (°C)	3.3(2.6)	3.3(3.0)	3.6(4.1)	3.9(3.1)	5.7	
27-Apr-23	Flow (L/s)	113	NA	NA	147	62.5	33.6
	Temp. (°C)	8.8(9.0)	10.7(8.7)	8.2(8.0)	9.2(6.9)	8.9	
26-May-23	Flow (L/s)	93	NA	NA	134	55.5	29.6
	Temp. (°C)	13.6(13.8)	9.4(9.7)	12.4(10.2)	14.2(13.1)	11.1	
15-Jun-23	Flow (L/s)	103	NA	NA	145	48.8	26.0
	Temp. (°C)	15.4(15.5)	11.0(11.0)	11.4(10.6)	14.8(14.4)	12.7	
25-Jul-23	Flow (L/s)	2105	NA	NA	2384	**	**
	Temp. (°C)	18.5(18.9)	18.6(15.3)	18.5(12.4)	18.8(18.6)	18.5	
08-Aug-23	Flow (L/s)	104	NA	NA	183	48.5	26.2
	Temp. (°C)	18.6(18.8)	16.7(14.4)	17.7(12.8)	18.8(18.1)	15.5	
07-Sep-23	Flow (L/s)	100	NA	NA	146	57.5	31.0
	Temp. (°C)	20.5(20.7)	17.5(14.4)	18.4(12.4)	19.9(19.4)	16.4	
26-Oct-23	Flow (L/s)	101	NA	NA	162	48.3	26.0
	Temp. (°C)	12.8(12.5)	12.4(11.0)	13.1(10.3)	12.7(12.4)	12.1	
16-Nov-23	Flow (L/s)	100	NA	NA	171	45.0	24.1
	Temp. (°C)	5.3(4.9)	5.3(6.1)	6.1(6.5)	6.4(5.1)	8.9	
18-Dec-23	Flow (L/s)	110	NA	NA	195	53.2	28.7
	Temp. (°C)	5.3(4.2)	4.6(5.2)	5.2(6.1)	5.5(4.7)	6.2	

Notes:
(1) Flow values are daily averages.
(2) NA = not available.
(3) Temperature in brackets is approximate daily average from mid-creek data logger.
(4) * - Groundwater influx calculated from drive point data.
(5) Flow data no longer recorded at SWM3 and SWM4 as approved by the MNRF.
(6) ** - Flooded creek conditions, unable to calculate influx.

Surface water temperatures are recorded using in-stream temperature probes as part of the surface water monitoring program. The temperature data from those data loggers are collected from mid-stream at one-hour intervals. Since surface water temperatures fluctuate throughout the day, Dufferin Aggregates and WSP temperature data are presented, which are in-stream measurements collected manually at the time of groundwater monitoring. Available temperature values in brackets are from the data logger data.

Prior to 2013, the groundwater influx was estimated using the surface water data based on the following equation.

$$\text{Groundwater Influx} = [\text{SWM2} - (\text{SWM1} + \text{SWM3} + \text{SWM4})]$$

As stated in previous reports, however, estimating groundwater influx at this site based on stage-discharge relationships is considered inaccurate. Following the discontinuation of surface water flow rate estimations at

stations SWM3 and SWM4 in 2013, evaluating groundwater influx to the creek is no longer undertaken using that methodology. A higher degree of accuracy is achieved by estimating groundwater influx based on drive point data, and these estimates are presented in the above table.

The May 26, 2023 summer low flow drive point data estimate of groundwater influx from the Mill Creek Aggregates Pit (i.e., from the south side of the creek) of 29.6 L/s represents about 22% of the total estimated stream flow in Mill Creek at SWM2 under base flow conditions, which is estimated to be 134 L/s at that time. The combined groundwater discharge from both sides of the creek (55.5 L/s) represents about 41% of total stream flow. It is noted that in December 2023, when the flow in Mill Creek was higher, the groundwater discharge component from the property was estimated to be 28.7 L/s; however, since the flow in Mill Creek at that time was recorded as 195 L/s at SWM2, the groundwater influx from the pit property (south side of the creek) represented only about 15% of the total stream flow. The combined groundwater discharge from both sides of the creek (53.2 L/s) represented approximately 27% of the total stream flow under the higher flow conditions.

The thermal effects on Mill Creek temperatures from the two tributaries, as well as the groundwater discharge component, are relatively significant during much of the year, based on the observed temperature differences between SWM1 (upstream) and SWM2 (downstream). Generally, during the summer low flow, those three sources of input water provide a cooling effect on Mill Creek. It is noted that canopy cover along some reaches also provides a cooling effect in Mill Creek during the summer months.

In 2023, the largest summer temperature difference between SWM1 and SWM2 (using average daily temperatures from data loggers) during routine monitoring events was noted on September 7, 2023. The mean temperature of the water entering the Mill Creek Aggregates Pit property at Highway 401 (SWM1) on September 7 was measured at 20.7ºC. The mean water temperature in the creek leaving the property at SWM2 on September 7 was 19.4ºC, which is 1.3ºC lower than at SWM1. On September 7, the mean water temperature of Galt Creek (SWM4) and Pond Creek (SWM3) was 14.4ºC and 12.4ºC, respectively, which is strongly indicative of groundwater discharge into those tributaries. The temperature of the groundwater discharge component to Mill Creek was estimated to be about 16.4ºC, based on average temperatures recorded at the in-stream drive points. Historically (from 2005 to 2012), approximately 33% to 66% of the total temperature differential has been estimated to be attributed to the two tributaries, whereas approximately 34% to 67% has been attributed to the combined groundwater discharge from both sides of Mill Creek. As noted above, it is recognized that the vegetation canopy and riparian cover will also serve to reduce surface water temperatures across the property.

3.10 Groundwater Conditions Adjacent to Extraction Activities

Aggregate extraction from below the water table in Phase 1 began in 1995 and was completed in 2002. The operations were moved to Phase 2 in late 2002 and continued there throughout 2003 to 2012. In 2013, aggregate extraction from above and below the water table occurred in the central area of Phase 3 and in the western area of Phase 4. Extraction from above and below the water table occurred in the south-central and eastern area of Phase 4 in 2014 and 2015, respectively. Extraction in 2016 and 2017 occurred above and below the water table along the east (2016 only) and west boundaries and above the water table on the south boundary of the Phase 2 pond as a result of obtaining MNRF approval to extract the setbacks. Extraction in 2018 occurred above and below the water table along the east and south boundaries of the Phase 1 pond, for material that was not previously extracted up to the below water table extraction limit. In addition, extraction occurred above the water table in Phase 1, as a result of obtaining MNRF approval to extract the former excavation setback area above the water table, as per the approved Site Plans. In 2019, extraction continued within the Phase 1 pond setback along the east side of the Site, and occurred above and below the water table at the northeast corner of Phase 5 and silt

pond SP4. Extraction in 2020 occurred above the water table in Phase 6, while extraction in 2021 occurred both above and below the water table in Phase 6. In 2022, extraction occurred both above and below the water table in Phase 2, Phase 5 and Phase 6, as well as below the water table in Silt Pond 4 (SP4). Extraction in 2023 occurred below the water table in Phase 2, near the Site entrance.

Previous monitoring results at locations adjacent to the Phase 1 pond (Monitors 92-1, 92-5, 92-8, 92-13, 92-14, 92-15, BH1, BH5, and BH6) have indicated that operational activities, including the pumping of process water out of the pond, have an effect on local groundwater levels and temperatures. In 2023, pumping from the Phase 1 pond and the return of process water back to SP4/Phase 1 pond occurred between March 27 and December 8, as shown in **Tables E-1 and E-2, Appendix E**.

Until they malfunctioned in 2011, groundwater temperatures were measured daily by means of electronic temperature probes set at three horizons in the sand and gravel profile in Monitor nest 92-13. A new shallow data logger was installed at this monitor in May 2013. This monitor nest is located approximately 20 m to the west of the open water in the Phase 1 pond. The data have shown that groundwater temperatures at each of the three elevations are affected by the presence of open water in the Phase 1 pond.

The following observations are noted for the monitors located west of Phase 3, at the western limit of the Site, which are currently equipped with multiple data loggers.

- At Monitor 92-28, the vertical gradients remained similar to the 2007 gradients until 2012, when much larger gradients occurred. It is interpreted that extraction activities in the northwest corner of the Phase 3 pond resulted in localized influences on the groundwater levels observed at monitor nest 92-28, giving rise to the apparent higher vertical gradient conditions. The vertical gradients have decreased since 2012, which supports this interpretation as extraction activities in the northwest corner of the Phase 3 pond did not occur after 2012. Similar to the 2013 to 2022 period, smaller seasonal groundwater level fluctuations occurred in 2023 compared to previous years, resulting in higher average elevations at each of the three monitors. These smaller fluctuations are attributed to the buffering effect of the Phase 3 pond. Groundwater levels fluctuated with an overall declining trend at each of the three 92-28 monitors between 2016 and 2020, which is attributed to the declining water levels in the Phase 3 pond during the same period. In 2021 and 2022, water levels at monitor 92-28 remained similar to 2020, while water levels increased in 2023. The 2021 to 2023 water level trends are consistent with the water levels trends measured at the Phase 3 pond. The peak groundwater temperatures measured at the three monitors were slightly lower (i.e., higher annual low, lower annual high) than observed prior to 2012;
- At Monitor 92-29, which is now located adjacent to the Phase 3 pond, the vertical gradients in 2023 were similar to the 2007 to 2022 gradients. The magnitude of water level fluctuations, however, was lower at the three monitors in 2023 compared to the fluctuations from 2007 to 2012, and was similar to the fluctuations recorded from 2013 to 2022, and at Monitor 92-28. The increased average groundwater levels from 2013 to 2016 compared to pre-2012 levels, which occurred at Monitor 92-28, also occurred at Monitor 92-29, and are also attributed to the buffering effect of the Phase 3 pond. The decrease in water levels observed at each of the three 92-28 monitors since 2016 compared to the 2013 to 2016 period also occurred at 92-29, and is also attributed to the lower water levels in the Phase 3 pond since 2016 compared to that earlier period. In 2023, water levels at monitor 92-29 increased compared to the levels observed from 2020 to 2022, which is consistent with the water level trends measured at the Phase 3 pond. The groundwater temperatures at Monitor 92-29, which had been consistent from 2007 to 2011, have fluctuated much more since 2012. The typical time lag in temperatures between the shallow and intermediate monitors has not been observed since

2011, as the temperatures at the two monitors generally mirrored each other. These temperature trend changes are attributed to the advancement of the excavation/pond development to within a few metres of Monitor 92-29; and

- At Monitor 92-32, the vertical gradients in 2023 were generally consistent with the gradients measured from 2007 to 2022. The decrease in water levels observed at 92-28 and 92-29 since 2016 compared to the 2013 to 2016 period also occurred at 92-32 within each of the three monitors (shallow, intermediate, and deep), and is also attributed to water levels in the Phase 3 pond since 2016. The water levels increased in 2023 compared to the levels observed from 2020 to 2022, consistent with the Phase 3 pond water levels. The groundwater temperature trends at the three monitors were similar to previous years, although a slight increase in temperature at the intermediate and deep monitors was observed between 2010 and 2018. The groundwater temperatures have stabilized, or decreased, since 2018. The vertical gradients and groundwater temperatures at Monitor 92-32 do not appear to be measurably affected by the Phase 3 pond; however, the groundwater levels do appear to be influenced by the water levels in the Phase 3 pond.

3.11 Water Quality

Chemical analyses of groundwater and surface water were completed in March and November 2023 for samples collected from BH1-R, 92-32-III, and 92-8, and the Phase 1 pond. The field chemical results are presented in **Table C-1**, and the laboratory chemical results are presented in **Tables C-2 and C-3, Appendix C**. The laboratory chemical results and Quality Assurance/Quality Control (QA/QC) reports for the current year are included in **Appendix C**.

The groundwater and surface water temperatures, as measured in the field, fluctuate in response to the ambient air temperature. The pH and conductivity values were within their respective historical ranges at 92-32-III and 92-8 and at BH1-R when compared to the historical results from original well BH1.

The 2023 chemical results are generally similar to historic values, with some exceptions. Based on the 2023 chemical data, the following observations are made.

- For comparison purposes, groundwater quality was assessed versus the Ontario Drinking Water Quality Standards (ODWQS). Groundwater quality generally complies with the ODWQS for the parameters tested, except as outlined below.

  - BH1-R – hardness (March and November) and total dissolved solids (November)
  - 92-8 – hardness (March and November) and manganese (March and November)
  - 92-32-III – hardness (March and November) and manganese (March and November)

  Hardness, total dissolved solids and manganese are not considered to be health-related parameters. The standard for hardness is a guideline, which is established for parameters that need to be controlled to ensure efficient treatment of water supplies. The standards for total dissolved solids and manganese are aesthetic objectives, which are established for parameters that may impair the taste, odour, or colour of water. Hardness, total dissolved solids and manganese exceedances were observed historically at the property, both before and after extraction commenced. The elevated concentrations of hardness, total dissolved solids and manganese are attributed to natural conditions at the site.

- Over the short term, in 2023 the parameter concentrations were generally similar to the 2022 concentrations. The 2023 results from replacement well BH1-R were similar to the historical results from the original well (BH1).
- The concentrations of most parameters have been fluctuating slightly or have been relatively consistent over the long-term. Exceptions are (a) conductivity values (laboratory) and sodium and chloride concentrations at BH1/BH1-R (located at the eastern, upgradient, boundary of the property) and BH92-8, which have exhibited an overall increasing trend since the mid-1990s, and (b) sodium and chloride concentrations at Monitor BH8 I/92 32-III, which increased sharply in 2009, but have been stable or decreased in recent years. It is noted, however, that the following historically high concentrations were detected in 2023.
    - BH1/1-R: chloride (200 mg/L) in November, and conductivity (laboratory) (1,000 µS/cm) (both March and November)
    - 92-8: sodium (88 mg/L) in March, and potassium (3.3 mg/L) and conductivity (laboratory) (990 µS/cm) in November
    - 92-32-III: potassium (1.5 mg/L) in March
    - Phase 1 pond: potassium (3.7 mg/L) in March, sodium (95 mg/L) and chloride (180 mg/L) in November, and conductivity (laboratory) (960 µS/cm) (both March and November)

    The increasing sodium, chloride and conductivity concentrations may reflect road salting activities along Highway 401 and/or along the Township roads. As these increasing trends are observed at locations both upgradient and downgradient of the property, they are not attributed to operations at the Mill Creek Pit.
- Historically, and in 2023, with increasing distance downgradient across the site (from Monitor BH1/1-R/92-5 to 92-8 to BH8/92-32-III), detected parameter concentrations generally tend to either increase or fluctuate. Exceptions include sodium, potassium and chloride, which decreased across the site in 2023.
- Parameter concentrations in the Phase 1 pond are generally similar to values detected at Monitor BH1-R. The surface water quality complies with the Provincial Water Quality Objectives for the parameters tested in 2023.
- A concentration of total oil and grease (1.0 mg/L) was detected in the original sample collected from the Phase 1 pond in November 2023. A blind duplicate sample was collected from the Phase 1 pond during the November 2023 sampling event, and the blind duplicate sample was submitted for analysis of total oil and grease. The duplicate sample result (0.60 mg/L) confirmed the total oil and grease detection, but was reported at a lower concentration than the original sample. Occasional detections of oil and grease (up to 2.6 mg/L) have previously been reported at the Phase 1 pond.
- Trace concentrations of total oil and grease (1.2 mg/L – 2.0 mg/L) were detected at each of the three groundwater wells during the November 2023 sampling event, including upgradient well BH1-R. Similar detections have occurred historically.

3.12 Compliance With Interim Threshold Values

The early warning and interim threshold values, which came into effect on June 30, 2001, are based on maintaining positive seasonal hydraulic head gradients across the water table between specific monitor pairs, such that a positive hydraulic gradient continues to exist from the site toward Mill Creek. In other words, the groundwater levels should be lower at locations closer to Mill Creek. The thresholds were developed to ensure

that the quantity of groundwater discharging to Mill Creek does not decline below a minimum level. The creek drive point monitors tie the thresholds to groundwater level/discharge at the creek. Surface water elevations in the Phase 1 to Phase 4 ponds are also included with the compliance monitoring. Maximum and minimum elevations with associated early warning values are defined for each pond. The interim threshold and early warning values generally are based on a review of historic pre-extraction low water level data (where available) and are defined seasonally; pond threshold water level values do not change seasonally. Where necessary, threshold pairs have been modified over time to reflect current extraction conditions and the removal of individual monitor locations.

It is noted that the groundwater levels in the in-stream drive points typically respond more rapidly to precipitation and snowmelt events than the deeper groundwater monitors. As such, occasionally, early warning and threshold value exceedances can occur due to these natural events.

A summary of the head differences and pond elevations recorded since 2022 is included in **Tables G-1 to G-10**, and the full dataset of historic results is shown graphically in **Figures G-1 to G-16, Appendix G**. A summary of the early warning and threshold value compliance for 2023 is provided in the following table, and the monitor pairs and ponds are discussed below. In general, the early warning and threshold value exceedance observed in 2023 are not attributed to extraction activities at the Site.

MONITOR PAIR / LOCATION	EARLY WARNING VALUE EXCEEDANCE IN 2023?	THRESHOLD VALUE EXCEEDANCE IN 2023?
BH13 to DP21	No	No
BH92-12 to DP17R	Yes	Yes
DP6 to DP3	Yes	Yes
BH92-29 to DP1	Yes	No
BH92-27 to DP2	No	No
OW5-84 to DP5CR	No	No
Phase 1 Pond	No	No
Phase 2 Pond	No	No
Phase 3 Pond	No	No
Phase 4 Pond	No	No
Silt Pond SP3	No	No

BH13 to DP21

BH13 is located adjacent to the northern boundary of the property (north of Phase 5) and to the east of DP21. DP21 is an in-creek drive point monitor located immediately downstream of the property line, south of Highway 401. There were no exceedances of the threshold values or the early warning values at this pair in 2023 (see **Table G-1** and **Figures G-1 and G-2**).

BH92-12 to DP17R

BH92-12 was established in 2001 just outside the licensed area of extraction, west of Phase 5 (extraction began in the northeast corner of Phase 5 at the end of 2019). Monitor DP17R is an in-creek drive point located at the Hanlon interchange, upstream from DP3. The threshold values have not been exceeded since its implementation

on June 30, 2001 (see **Table G-2** and **Figures G 3 and G-4**). The early warning and threshold values were not exceeded at this pair in 2023 with one exception. The head difference between the pair exceeded the early warning and threshold value on July 25, 2023 (0.04 m). As previously noted, it is interpreted that a notable precipitation event (>30 mm) occurred at the Site immediately prior to the July 25, 2023 monitoring event, as supported by high creek flows and flooding observed on July 25. Threshold exceedances have historically been observed at the Site as a result of the lag in groundwater level response following a large precipitation event. To confirm the threshold value exceedance, the head difference was measured again on July 26, 2023, after the storm surge had passed. The head difference on July 26 (0.36 m) satisfied the early warning and threshold values.

DP6 to DP3

DP6 is located at the eastern limit of the central wetland area, adjacent to Phase 5, and DP3 is an in-creek drive point monitor located directly south of the Hanlon interchange. As shown in **Table G-3** and **Figures G-5 and G-6**, the head difference at the pair exceeded the early warning value on February 10, April 3, July 25 and July 26, and exceeded the threshold value on July 25. The daily climate data from the GRCA Shade's Mills climatological station indicate that large precipitation events were recorded prior to both the February 10 and April 3 monthly monitoring events. A total of 30.8 mm of precipitation was reported between February 9 and 10 and a total of 40.6 mm of precipitation was reported between April 1 and 2. As discussed above, a notable precipitation event (>30 mm) occurred immediately prior to the July 25/26 monitoring event. Therefore, the early warning/threshold exceedances are attributed to the lag in groundwater level response following notable precipitation events. To confirm the July 25 threshold value exceedance, the head difference was measured again on July 26, 2023, after the storm surge had passed. The head difference on July 26 satisfied the threshold value.

BH92-29 to DP1

This monitor pair replaced the BH92-30 to BH92-28 threshold pair in May 2012, as BH92-30 was removed during extraction activities in April 2012. This pair is located in the northwest corner of the site, south of the confluence between the Pond Creek tributary and Mill Creek. DP1 is an in-creek drive point located in Mill Creek near the western property boundary. There were no exceedances of the threshold values or the early warning values at this pair in 2023, with one exception (see **Table G-4** and **Figures G-7 and G-8**). The head difference recorded on February 10 exceeded the early warning value. A similar exceedance was observed at the DP6 to DP3 well pair on this date, as discussed above. The exceedance is attributed to the lag in groundwater level response following a sizable precipitation event.

BH92-27 to DP2

This pair of monitors is located in the western part of the site, west of the Phase 3 extraction area, and replaced BH92-26 to DP2 after November 2011 when BH92-26 became inaccessible due to its proximity to the extraction area. DP2 is an in-creek drive point located in Mill Creek at the western property boundary. There were no exceedances of the early warning values or threshold values at this pair in 2023 (see **Table G-5** and **Figures G-9 and G-10**).

OW5-84 to DP5CR

This pair of monitors is located in the southwest corner of the site, adjacent to Mill Creek. OW5-84 is a groundwater monitor screened to about full depth in the aquifer, and is situated just inside the property line. The location of DP5 has been modified several times due to vandalism and access issues. DP5A was an in-creek drive point situated in Mill Creek just north of the bridge at Township Road 2. DP5B replaced DP5A in this

threshold pair in December 2011 when DP5A became inaccessible due to landowner permission being withdrawn. DP5B, located south of the bridge, was vandalized in July 2012, and replaced with DP5C, which was installed slightly upstream from DP5B, but still south of the bridge. New (preliminary) threshold values were implemented for the OW5-84 to DP5C pair in September 2012. Based on hydraulic conductivity testing, it is interpreted that DP5C was installed in lower-conductivity soil that is not reflective of the sand/gravel aquifer in which DP5A and DP5B were developed. This condition would result in groundwater levels that do not respond to climatic conditions as quickly as nearby drive points screened in more representative soils with higher hydraulic conductivities.

DP5C was vandalised in Spring 2017 and replaced with DP5CR, which was installed at the location of DP5C. The early warning and threshold values were not exceeded at DP5C prior to the vandalism. Frequent exceedances of the early warning and threshold values at the OW5-84 to DP5CR pair occurred between the DP5CR installation in 2017 and 2021, which were considered to be “false” exceedances that are the result of the observed hydrogeological variability at this location in Mill Creek. Revised early warning and threshold values were developed by WSP in 2021 were approved by the MNRF in mid-2022.

There were no exceedances of the early warning values or threshold values at this pair in 2023 (see **Table G-6** and **Figures G-11 and G-12**).

On-Site Ponds

As shown in **Tables G-7 through G-10** and **Figures G-13 through 16**, the early warning and threshold values established for the Phase 1, 2, 3 and 4 ponds were not exceeded in 2023. It is noted that the constant water levels recorded during the winter months between 2000 and 2015 indicate that the extraction pond or silt pond was frozen. From 2015 onward, frozen conditions are better represented by a gap in the data.

A hydrograph presenting water levels at each of the ponds is provided in **Figure B-68**. As observed in the hydrograph, the pond water levels typically decreased in 2020, 2021 and 2022, which reflects the lower precipitation amounts observed during that period. The 2023 pond water levels were similar to, or higher than, the levels observed from 2020 to 2022. In 2023, the pond levels remained within their respective historic range.

As indicated above, the water levels in the Phase 3 pond were lower in 2017 through 2023 compared to the 2013 to 2016 period. The water levels, however, were similar to the 2009 to 2012 levels and remained well above the early warning value. The lower water levels observed in 2017 through 2023 are attributed to the effect of the fully developed silt barrier between the Phase 3 and Phase 4 ponds. The lower hydraulic conductivity of the silt barrier results in a reduction in the rate of movement of water from the Phase 4 pond westerly through the silt barrier and into the Phase 3 pond. As such, water that (a) naturally moves from east to west through the granular subsurface soil that remains in place between the Phase 1 pond and the Phase 4 pond, and (b) water that accumulates in the Phase 4 pond as direct precipitation, is “held back” by the silt barrier in the Phase 4 pond (as designed), resulting in higher water levels in the Phase 4 pond compared to the Phase 3 pond, as intended. The 2023 water levels in the Phase 3 pond were higher than observed between 2020 and 2022 and were similar to the levels observed from 2017 to 2019.

4.0 SUMMARY

Groundwater monitoring has been conducted at the Mill Creek Aggregates Pit property since late 1986. Aggregate extraction from below the water table has been ongoing at the property since 1995. The 2023 monitoring program included five components which were: (a) the monitoring of water levels and temperature conditions in the groundwater monitors, the multi-level monitors and the water wells, (b) groundwater quality monitoring, (c) quality assurance/quality control aspects, (d) assessment of compliance with the interim action thresholds, and (e) annual reporting.

The annual average of the monthly mean temperatures in 2023 was 8.3°C, which is equal to the 30-year normal annual average temperature and is the lowest annual average recorded since 2019. Although 2023 air temperatures were similar to normal values, a notable increase in air temperature has been observed since 2016, with annual averages ranging between 9.2°C and 10.1°C in 2016, 2017, 2018, 2020 and 2021. The 30-year normal total annual precipitation in this area is 935 mm, and the 30-year normal water surplus is estimated to be about 304 mm per year. In 2023, the corresponding values were 983 mm and 381 mm, respectively, which represent an increase of 5% in precipitation and 25% in the annual water surplus with respect to the 30-year climate normal conditions. Despite the wetter conditions in 2023, it is noted that persistent dry conditions were generally observed from early 2020 through the end of 2022.

In 2023, extraction occurred below the water table in Phase 2. Monitoring results adjacent to the pond in Phase 1 indicate an effect on the pond levels and local groundwater levels resulting from seasonal climatic variation, the pumping of water from the pond for aggregate processing, and the recirculation discharge of clean water back into the Phase 1 pond.

Shallow groundwater monitoring immediately downgradient of the pit ponds shows groundwater temperatures quickly dissipate a short distance from the ponds.

Groundwater conditions in 2023 generally were consistent with historic monitoring data, with groundwater flowing from east to west through the site toward, and discharging into, Mill Creek, except as discussed in the main text. The water table in the wetland areas adjacent to Mill Creek continues to be at or near ground surface during the spring melt high groundwater conditions, with seasonal decreases in the order of 0.5 m over the course of the year.

Groundwater discharge continues to provide a relatively consistent seasonal base flow component to Mill Creek, from Highway 401 downstream to Concession Road 2, resulting in a cooling influence on creek temperatures during the warm and dry summer months, and a warming influence during the late fall, winter, and early spring period. The estimated groundwater contribution from the Mill Creek Aggregates Pit property located north of Township Road 2 in 2023 was similar to the historic average and the values in recent years.

From 2020 to 2022, groundwater levels in several monitors were lower compared to those recorded in 2019. Given the precipitation patterns described above, these lower groundwater levels experienced across the central and eastern areas of the site are not unexpected and are attributed to climatic conditions. In 2023, groundwater levels at the Site generally exhibited a recovery from the low levels observed in 2022, which is attributed to wetter climatic conditions.

In 2023, vertical gradients observed at the creek drive points were consistent with historical results, with the exceptions of the drive point locations located within the reach north of Highway 401. Beginning in July 2022, strong downward gradients were frequently observed within the reach north of Highway 401. When the

downward gradients are observed, they are caused by a notable decrease in groundwater level recorded at the drive point locations. From 2005 to June 2022, the vertical gradients at these drive points have remained upward, with the exception of neutral and downward vertical gradient conditions on average over the course of the year at DP19 in 2012 and in 2015 and 2016, respectively (varied between downward and upward gradient conditions). The sudden change in gradient is attributed to upgradient activities.

The multi-level monitors within the sand and gravel aquifer continued to exhibit the general pattern of upward to neutral gradients, which is consistent with historic trends. Several observations of downward gradients also occurred in 2023, which is also consistent with historic trends. The groundwater temperatures at the multi-level monitors showed a pattern similar to historic trends, with the shallow water temperatures exhibiting the greatest, and the deep temperatures showing the least, seasonal fluctuations. The multi-level monitor temperatures also show a time lag response pattern between the shallow, intermediate and deep profiles, which also is consistent with historic patterns.

The data from the Mill Creek drive point locations indicate that groundwater temperatures below the creek have generally increased over the long-term at the locations monitored. The rate of temperature change is similar at drive point locations located close to the Phase 3 pond (DP1, DP2) compared to the drive point locations far removed from the Phase 3 pond. As such, the data indicate that groundwater temperatures at the Mill Creek drive points have not been measurably affected by pit operations.

Results of the two sets of groundwater and surface water quality chemical analyses completed in 2023 are generally consistent with historical values. Groundwater quality within on-site monitors complies with the Ontario Drinking Water Quality Standards for the parameters tested, except for hardness at each of the monitors tested, and total dissolved solids and manganese at some locations. Conductivity values and sodium and chloride concentrations have demonstrated an overall long-term increasing trend at upgradient well BH1/1-R and at Monitor BH92-8. These increases may be attributable to road salting on Highway 401 and/or along the Township roads.

Exceedances of the Action Threshold Values established for the monitoring pairs located adjacent to Mill Creek occurred on one occasion (July 25) at two locations (92-12 to DP17R and DP6 to DP3) in 2023. The exceedances are not attributed to extraction activities at the Site, as discussed in Section 3.12, but are instead attributed to a lag in groundwater level response following a sizable precipitation event. The head difference was measured again at both locations on the day following the original exceedance. The head differences on July 26 satisfied the Action Threshold Values, confirming that the original exceedances were temporary responses to a precipitation event.

Phase 1, 2, 3 and 4 pond water levels typically decreased from 2020 to 2022 and increased in 2023, which reflects precipitation patterns during that period. In 2023, the pond levels remained within their respective historic range and did not exceed their respective threshold values.

5.0 2024 MONITORING PROGRAM

The current monitoring program, as detailed in Section 2 of this report, should be continued through 2024.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings presented in this report, the following conclusions are provided.

- The 2023 monitoring program was completed in accordance with the groundwater monitoring program that was recommended in the original 1993 Coordinated Report on Monitoring Programs and as updated in July 2002, October 2004, and January 2006.
- The annual average of the monthly mean temperatures in 2023 was equal to the 30-year normal value. Although 2023 air temperatures were similar to normal values, a notable increase in air temperature has been observed since 2016.
- The total annual precipitation in 2023 was 983 mm, which was 48 mm (5%) higher than the 30-year normal value of 935 mm.
- The calculated annual water surplus for 2023 was 381 mm. This value is 25% higher than the 30-year normal surplus of 304 mm.
- Higher precipitation levels in 2023 resulted in higher groundwater levels at most locations in 2023 compared to 2022 levels. The 2023 water levels were typically within historical ranges.
- Results from Monitors 92-28, 92-29, and 92-32, located between the Phase 3 pond and Mill Creek, indicate that the vertical gradients in 2023 were generally similar to the 2022 results, with minor exceptions. Maximum and minimum temperatures at 92-28 and 92-32 in 2023 were similar to the historic values. Temperature effects at 92-29 are attributed to the extraction of the Phase 3 pond to within a few metres of 92-29 in 2012.
- In 2023, the multi-level monitors continued to exhibit the general pattern of upward to neutral vertical gradients at the base of the sand and gravel, which is consistent with historic trends. Occasional downward gradients were also observed, which is also consistent with historic trends.
- Phase 1, 2, 3 and 4 pond water levels typically decreased from 2020 to 2022 and increased in 2023, which reflects precipitation patterns during that period. In 2023, the pond levels remained within their respective historic range and satisfied their respective threshold values.
- The 2023 groundwater discharge was similar along Mill Creek compared to historical results.
- The long-term groundwater temperature trends at the Mill Creek drive point locations show a similar rate of temperature increase at locations close to the on-Site ponds as the locations located far removed from the ponds. As such, the data indicate that groundwater temperatures at the Mill Creek drive points have not been measurably affected by pit operations.
- Results of the groundwater quality chemical analyses completed in 2023 are generally consistent with historical data, except for conductivity values and sodium and chloride concentrations which have demonstrated a long-term increasing trend at upgradient Monitor BH1/BH1-R and at Monitor BH92-8. These increases may be attributed to road salting along Highway 401 and/or along the Township roads, and are not attributed to extraction activities at the Site.
- Exceedances of the Action Threshold Values established for the monitoring pairs located adjacent to Mill Creek occurred on one occasion (July 25) at two locations (92-12 to DP17R and DP6 to DP3) in 2023. The

exceedances are attributed to a notable precipitation event and are not attributed to extraction activities at the Site.

We respectfully submit the following recommendations, based on the study findings, for your consideration.

- The groundwater monitoring program should be continued in 2024.

7.0 REFERENCES

CH2M Gore & Storrie Ltd, Gartner Lee Ltd, RBA Planning Consultants Ltd, Salter Research Services, Schroeter & Associates Ltd and A. Wayne Caston Consulting Services Ltd. 1996. Mill Creek Subwatershed Plan, Prepared for: The Grand River Conservation Authority, June 1996.

Environment and Climate Change Canada (ECCC), 2023. Canadian National Climate Archives. [Online] Stations: Waterloo Wellington A and Kitcher-Waterloo, Ontario. http://climate.weather.gc.ca. Accessed June 2023.

Gartner Lee Limited (GLL). University of Guelph Hydrogeological Study for a Proposed Sand and Gravel Pit. Project 80-110. September 1980.

Gartner Lee Limited (GLL). Water Resource Study Baseline Conditions for a Proposed Sand and Gravel Pit, University of Guelph Property, Township of Puslinch. Project 87-245. December 1987.

Gartner Lee Limited (GLL). Potential Impact Assessment Report, Ground Water – Surface Water Aspects Proposed Sand and Gravel Pit, Township of Puslinch. Project 87-243. December 1987.

Gartner Lee Limited (GLL) & Jagger Hims Limited (JHL). Water Resource Study Addendum Report, 1988 Ground Water-Surface Water Studies, Proposed Sand and Gravel Pit, University of Guelph Property, Township of Puslinch. December 1988.

Grand River Conservation Authority (GRCA), 2023. GRCA Monitoring Data download through GRCA Open Data Licence. [Online] Station: Shade's Mill, Ontario. https://data.grandriver.ca/downloads-monitoring.html. Accessed June 2023.

Jagger Hims Limited (JHL) & C. Wren and Associates Inc. Updated Co-ordinated Environmental Monitoring Programs for Mill Creek Aggregates, Township of Puslinch, Licence #P726077. July 2002. Revised October 2004.

Jagger Hims Limited (JHL). Mill Creek Aggregates Pit Property, Township of Puslinch, Phase 3/Phase 4, Hydrogeological Considerations. File 00-880020.23. December 2009.

Lake Erie Region Source Protection Committee (LER SPC), 2022. Grand River Source Protection Area Approved Source Protection Plan, Under the Clean Water Act, 2006 (Ontario Regulation 287/07), February 9, 2022.

Ministry of the Environment, 2018. Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines. Issued June 2003, Revised June 2006, Revised January 2018.

Ministry of the Environment, Conservation and Parks (MECP), 2023. Water Well Information System database. [Online]. https://www.ontario.ca/page/map-well-records. Accessed June 2023.

Ministry of Natural Resources and Forestry (MNRF), 2020. Aggregate Resources of Ontario: Technical Reports and Information Standards. Ministry of Natural Resources and Forestry, August 2020.

Planning & Engineering Initiatives Ltd. and Staff of the Sedimentary Geoscience Section, Ontario Geological Survey 1999. Aggregate Resources Inventory of Wellington County: Townships of Minto, Arthur, West Luther, Maryborough, Peel, West Garafraxa, Pilkington, Nichol, Guelph, Eramosa, Erin, Puslinch and the City of Guelph; Ontario Geological Survey, Aggregate Resources Inventory Paper 162, 73p.

The Corporation of the County of Wellington, 2022. County of Wellington Official Plan, 1999, last updated June 1, 2022.

Township of Puslinch, 2021. Puslinch Zoning By-Law, Comprehensive Zoning By-Law No. 023-18, Consolidated May 2021.

WSP Canada Inc. Mill Creek Aggregates Pit, 2022 Coordinated Monitoring Report. March 2023.

WSP Canada Inc. Mill Creek Aggregates Pit, 2023 Coordinated Monitoring Report. March 2024.

Signature Page

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Tables

Technical Appendix B – 2023 Hydrogeology Report

TABLE 1
MONITOR GROUPINGS
MILL CREEK AGGREGATES PIT

Bedrock	Sand and Gravel			Wetland	Creek
TW16-78	1*	TW16-79	92-33	DP6	DP1
Well 4794	1-R	OW1-84	OW5-84	DP7	DP2
	2*	OW2-84		DP8	DP3
	2-R	OW4-84		DP9	DP4*
	3	92-1*		DP10	DP4R
	4	92-1R		DP11	DP5A**
	5	92-5		DP12	DP5B***
	6	92-8		DP16	DP5C***
	7-I*	92-12		DP113	DP5CR
	7-II*	92-13			DP17*
	11	92-14*			DP17R
	12*	92-15*			DP18
	13	92-15a*			DP19
	14	92-26			DP20
	OW16A-78	92-27			DP21
		92-28			DP22
		92-29			
		92-32			

NOTES:
- * Indicates monitor was decommissioned.
- ** Indicates monitor is no longer accessible.
- *** Indicates monitor was removed by vandals.

TABLE 2
DISTRIBUTION OF GROUNDWATER INFLUX, 2023 CONDITIONS
MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH	AVERAGE WIDTH	AVERAGE INFLUX (L/s/m²)			TOTAL GROUNDWATER INFLUX (L/s)			ESTIMATED GROUNDWATER FLUX FROM NORTH SIDE OF CREEK (L/s)			ESTIMATED GROUNDWATER FLUX FROM SOUTH SIDE OF CREEK (L/s)		
		(m)	(m)	2023 Average	2023 Winter Low Flow	2023 Summer Low Flow	2023 Average	2023 Winter Low Flow	2023 Summer Low Flow	2023 Average	2023 Winter Low Flow	2023 Summer Low Flow	2023 Average	2023 Winter Low Flow	2023 Summer Low Flow
DP18	**DP19**	670	6.5	-1.3E-03	-7.0E-04	-1.2E-03	-5.4	-3.0	-5.2	-2.7	-1.5	-2.6	-2.7	-1.5	-2.6
DP19	**DP20**	310	6.5	-1.0E-03	-5.2E-04	1.0E-03	-2.1	-1.0	2.0	-0.8	-0.4	0.8	-1.2	-0.6	1.2
DP20	**Hwy 401**	270	6.5	-3.8E-04	-3.4E-04	1.4E-03	-0.7	-0.6	2.4	-0.3	-0.2	1.0	-0.4	-0.4	1.4
Hwy 401	**DP21**	60	7.1	2.0E-03	1.6E-03	2.0E-03	0.9	0.7	0.8	0.3	0.3	0.3	0.5	0.4	0.5
DP21	**DP4/R**	100	7.3	1.9E-03	1.1E-03	1.5E-03	1.4	0.8	1.1	0.6	0.3	0.4	0.8	0.5	0.7
DP4/R	**DP22**	50	7.1	3.3E-03	1.0E-03	2.6E-03	1.2	0.4	0.9	0.5	0.1	0.4	0.7	0.2	0.5
DP22	**DP17/R**	100	6.6	3.3E-03	1.3E-03	2.6E-03	2.2	0.9	1.7	0.9	0.4	0.7	1.3	0.5	1.0
DP17/R	**DP3**	165	7.1	2.2E-03	1.9E-03	1.9E-03	2.6	2.2	2.2	1.0	0.9	0.9	1.6	1.3	1.3
DP3	**Galt Creek**	420	6.0	2.0E-03	2.0E-03	2.0E-03	5.0	5.0	5.0	2.0	2.0	2.0	3.0	3.0	3.0
Galt Creek	**Pond Creek**	255	8.1	3.0E-03	3.0E-03	3.0E-03	6.2	6.2	6.2	2.5	2.5	2.5	3.7	3.7	3.7
Pond Creek	**DP1**	250	8.0	8.8E-03	7.6E-03	1.0E-02	17.6	15.1	20.1	8.8	7.6	10.1	8.8	7.6	10.1
DP1	**DP2**	100	6.7	7.1E-03	5.8E-03	8.5E-03	4.8	3.9	5.7	2.4	2.0	2.9	2.4	2.0	2.9
DP2	**DP5CR**	800	7.6	1.8E-03	1.6E-03	1.9E-03	11.0	9.9	11.7	5.5	4.9	5.9	5.5	4.9	5.9
TOTALS							44.5	40.3	54.8	20.6	18.7	25.1	23.9	21.6	29.6

NOTES:
- Groundwater influx at Galt Creek and Pond Creek based on seepage meter data from May/June 1992.
- 2023 Average - Average of all 2023 data at each drive point.
- 2023 Winter Low Flow - Based on November 16, 2023 data.
- 2023 Summer Low Flow - Based on May 26, 2023 data.

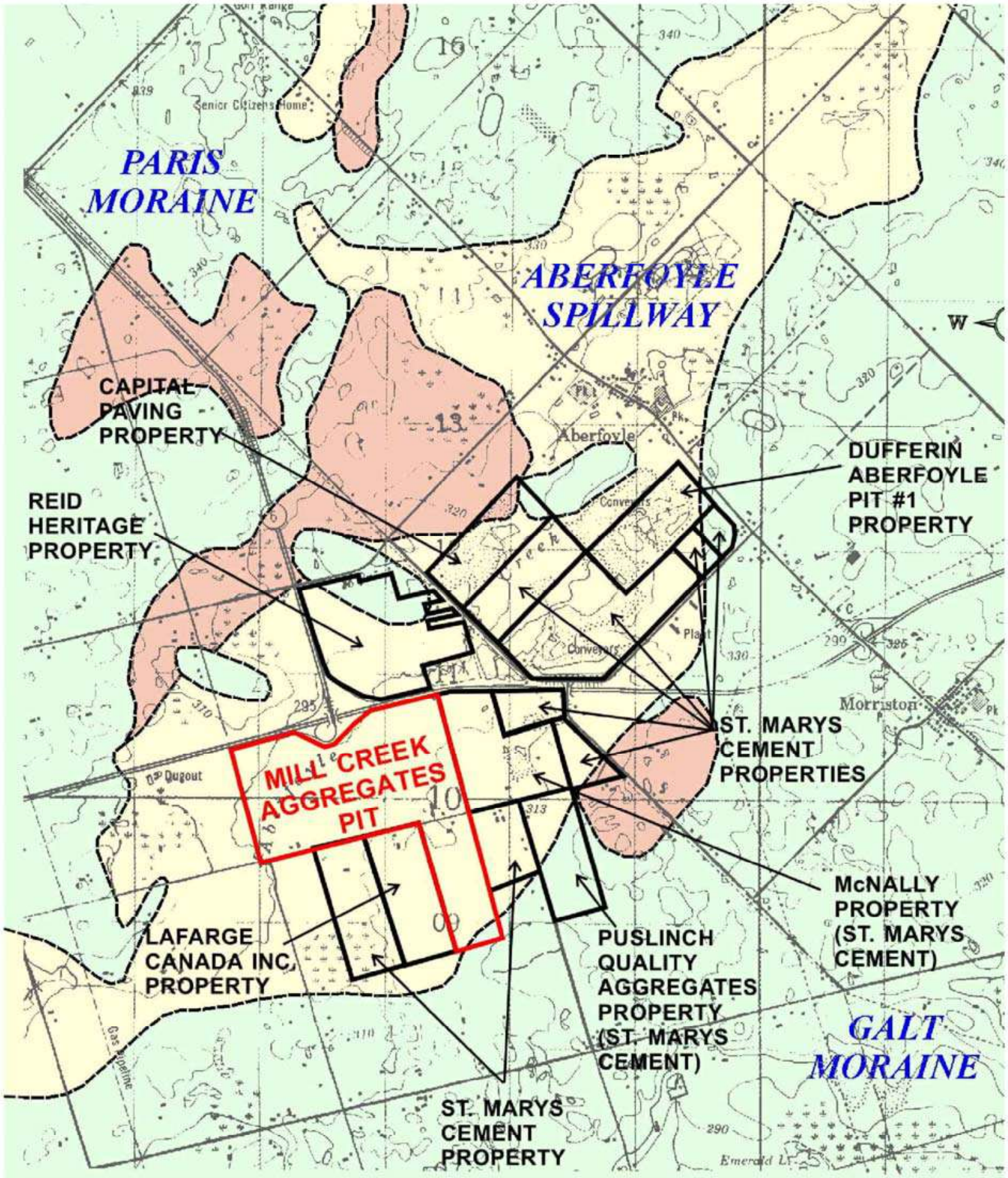
TABLE 3
DISTRIBUTION OF GROUNDWATER INFLUX, AVERAGE HISTORIC CONDITIONS (1993-2022)
MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH	AVERAGE WIDTH	AVERAGE INFLUX (L/s/m²)			TOTAL GROUNDWATER INFLUX (L/s)			ESTIMATED GROUNDWATER FLUX FROM NORTH SIDE OF CREEK (L/s)			ESTIMATED GROUNDWATER FLUX FROM SOUTH SIDE OF CREEK (L/s)		
		(m)	(m)	Overall Average	Winter Low Flow Average	Summer Low Flow Average	Overall Average	Winter Low Flow Average	Summer Low Flow Average	Overall Average	Winter Low Flow Average	Summer Low Flow Average	Overall Average	Winter Low Flow Average	Summer Low Flow Average
DP18	**DP19**	670	6.5	7.7E-04	1.7E-04	4.7E-04	3.4	0.7	2.0	1.7	0.4	1.0	1.7	0.4	1.0
DP19	**DP20**	310	6.5	5.1E-04	1.1E-04	6.1E-05	1.0	0.2	0.1	0.4	0.1	0.0	0.6	0.1	0.1
DP20	**Hwy 401**	270	6.5	1.2E-03	8.0E-04	7.3E-04	2.0	1.4	1.3	0.8	0.6	0.5	1.2	0.8	0.8
Hwy 401	**DP21**	60	7.1	1.6E-03	1.2E-03	1.4E-03	0.7	0.5	0.6	0.3	0.2	0.2	0.4	0.3	0.4
DP21	**DP4/R**	100	7.3	2.5E-03	1.8E-03	2.1E-03	1.9	1.3	1.5	0.7	0.5	0.6	1.1	0.8	0.9
DP4/R	**DP22**	50	7.1	3.8E-03	2.7E-03	3.2E-03	1.3	1.0	1.1	0.5	0.4	0.5	0.8	0.6	0.7
DP22	**DP17/R**	100	6.6	2.5E-03	2.0E-03	2.1E-03	1.7	1.4	1.4	0.7	0.5	0.6	1.0	0.8	0.9
DP17/R	**DP3**	165	7.1	1.4E-03	1.4E-03	1.3E-03	1.6	1.7	1.5	0.7	0.7	0.6	1.0	1.0	0.9
DP3	**Galt Creek**	420	6.0	1.7E-03	1.7E-03	1.6E-03	4.4	4.4	4.2	1.8	1.8	1.7	2.6	2.6	2.5
Galt Creek	**Pond Creek**	255	8.1	3.0E-03	3.0E-03	3.0E-03	6.2	6.2	6.2	2.5	2.5	2.5	3.7	3.7	3.7
Pond Creek	**DP1**	250	8.0	7.1E-03	6.8E-03	6.5E-03	14.1	13.6	13.0	7.1	6.8	6.5	7.1	6.8	6.5
DP1	**DP2**	100	6.7	5.6E-03	5.4E-03	5.0E-03	3.8	3.6	3.4	1.9	1.8	1.7	1.9	1.8	1.7
DP2	**DP5A/B/C/D/CR**	800	7.6	2.3E-03	2.3E-03	1.8E-03	13.7	14.2	10.9	6.9	7.1	5.4	6.9	7.1	5.4
TOTALS							55.8	50.1	47.3	25.8	23.3	21.9	30.0	26.9	25.4

NOTES:
- Groundwater influx at Galt Creek and Pond Creek based on seepage meter data from May/June 1992.
- Overall Average - Average of year-round historic data at each drive point.
- Winter Low Flow Average - Based on historic winter data at each drive point.
- Summer Low Flow Average - Based on historic summer data at each drive point.

Figures

Technical Appendix B – 2023 Hydrogeology Report



LEGEND

	SANDY SILT TILL
	ICE-CONTACT STRATIFIED DRIFT SAND, SILT, GRAVEL
	OUTWASH SAND AND GRAVEL

0 1,000 2,000
1:50,000 METRES

REFERENCE(S)
GENERALIZED AFTER KARROW, 1987.

CLIENT
DUFFERIN AGGREGATES

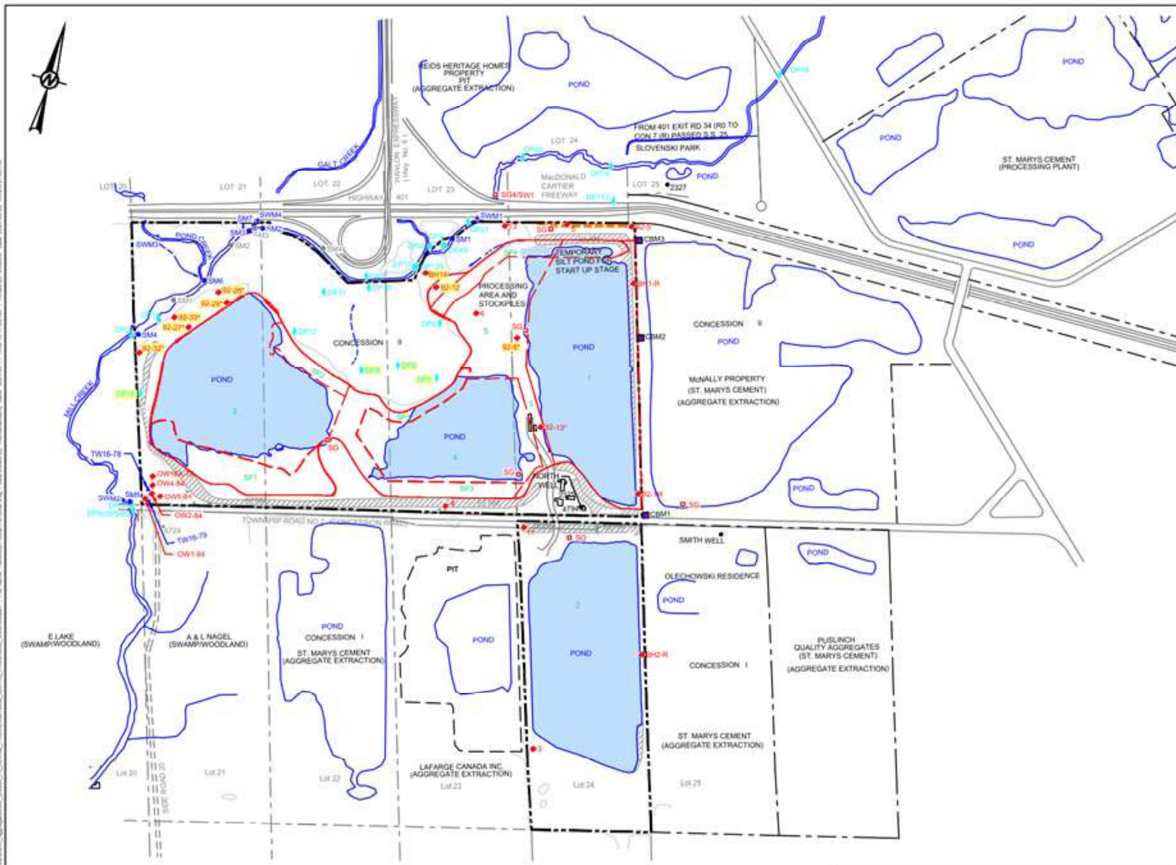
PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

CONSULTANT

YYYY-MM-DD	2024-03-11
DESIGNED	---
PREPARED	NV
REVIEWED	RW
APPROVED	RW

TITLE
LOCATION AND PHYSICAL SETTING

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	1



LEGEND

- BOREHOLE
- HYDRO/TELEPHONE LINE
- POST AND WIRE FENCE
- BUILDING
- TEST WELLS
- SURFACE WATER MONITORING STATION
- GROUNDWATER MONITOR AND DESIGNATION
- DENOTES STANDPIPE MONITOR INSTALLED
- DENOTES DATALOGGER INSTALLED
- STREAM QUALITY AND FISHERIES MONITORING STATIONS (WATER QUALITY BIOLOGICAL/FISHERIES AS PER FAUN AQUATICS REPORT)
- DRIVE POINT
- STAFF GAUGE AND DESIGNATION
- CBM MONITOR AND DESIGNATION
- SILT POND AND DESIGNATION
- WETLANDS
- POND
- NATURAL DRAINAGE
- WATER WELL WITH MOE IDENTIFICATION NUMBER
- CREEK
- GATE
- WOODLANDS/FOREST (MIXED)
- BOUNDARY OF LICENCED PROPERTY
- SEEPAGE METER DESIGNATION AND APPROXIMATE LOCATION (BY J. FITZGIBBON) (NO LONGER OPERATIVE)
- RECHARGE TRENCH
- APPROVED PHASING

NOTE(S)

1. BASE MAPPING BY PLANNING INITIATIVES LTD., DATED AUGUST 1987, DRAWING NUMBERS 1A AND 1B OF 4.

REFERENCE(S)

1. POND BOUNDARIES BASED ON AERIAL PHOTOGRAPHY (DUFFERIN AGGREGATES, NOVEMBER 2020)

0 250 500
1:12,500 METRES

CLIENT	
DUFFERIN AGGREGATES	
CONSULTANT	wsp
YYYY-MM-DD	2024-03-11
DESIGNED	---
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
GROUNDWATER MONITOR LOCATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	2

LEGEND

- BOUNDARY OF LICENSED PROPERTY
- LICENCED LIMIT OF EXTRACTION PER SITE PLANS
- BOUNDARY OF EXTRACTION AREA PER G.R.C.A. FILL PERMIT APPLICATION
- 3 PHASE DESIGNATION
- SP3 SILT POND DESIGNATION
- BERM
- INFILLED SILT POND
- PARTIALLY INFILLED SILT POND
- 2022 EXTRACTED AREA
- 2023 EXTRACTED AREA
- 2020-2022 DEPOSITION AREA
- 2023 DEPOSITION AREA

NOTE(S)

1. BASE MAPPING BY PLANNING INITIATIVES LTD., DATED AUGUST 1987, DRAWING NUMBERS 1A AND 1B OF 4.

REFERENCE(S)

1. POND BOUNDARIES BASED ON AERIAL PHOTOGRAPHY (DUFFERIN AGGREGATES, NOVEMBER 2020).

0 250 500
1:10,000 METRES

DUFFERIN AGGREGATES

wsp

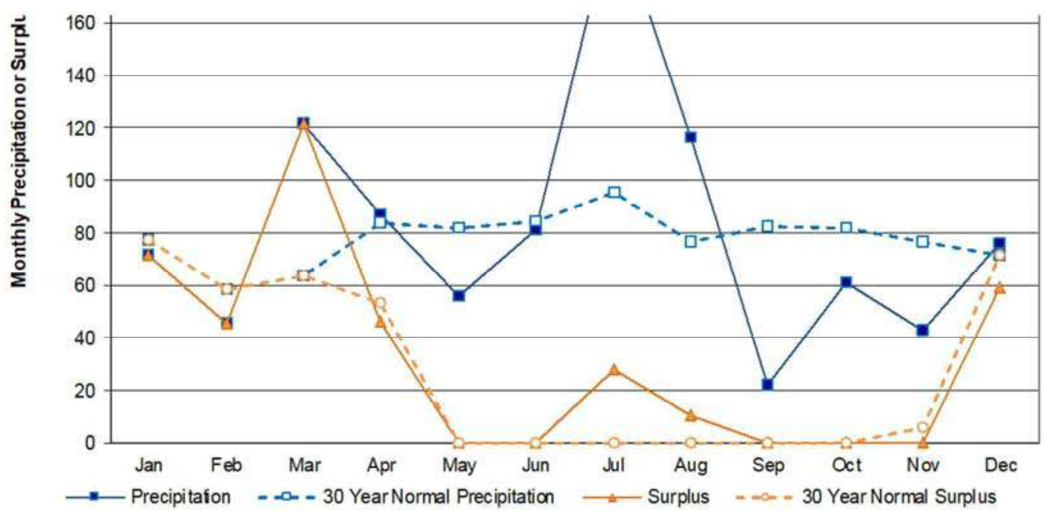
2024-03-11	
—	
NV	
RW	
RW	

2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

SITE PLAN SEQUENCING

CONTROL: CA0019938.6257-200 0002 A

FIGURE: 3



DRAFT

0 50 100
1:2,000 METRES

CLIENT DUFFERIN AGGREGATES		PROJECT 2023 ANNUAL GROUNDWATER MONITORING REPORT MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH FOR DUFFERIN AGGREGATES	
CONSULTANT	YYYY-MM-DD	2024-03-11	TITLE **2023 TEMPERATURE AND PRECIPITATION DATA**
	DESIGNED	---	
	PREPARED	NV	
	REVIEWED	RW	PROJECT NO. CONTROL REV. FIGURE
	APPROVED	RW	CA0019938.6257-200 0002 A 4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

25 mm

CLIENT
DUFFERIN AGGREGATES

CONSULTANT
wsp

YYYY-MM-DD	2024-03-11
DESIGNED	---
PREPARED	NV
REVIEWED	RW
APPROVED	RW

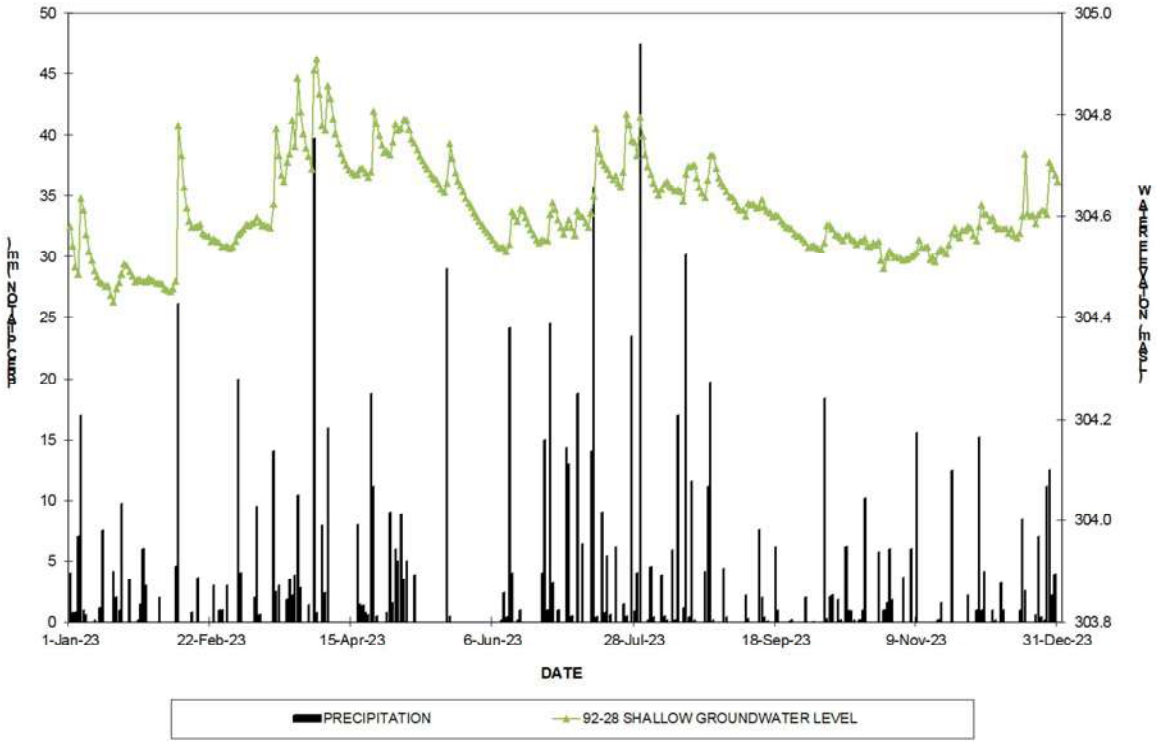
PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
GROUNDWATER HYDROGRAPH OF REPRESENTATIVE MONITORS IN THE SAND AND GRAVEL AQUIFER

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	5

Last Edited By: nvenkataswamy Date: 2024-03-11 Time:2:07:04 PM | Printed By: nvenkataswamy Date: 2024-03-11 Time:2:07:24 PM
Path: \\golder.gds\complexdata\office\Ontario\SIM\Clients\Dufferin_Aggregates\Mill_Creeek_Pit_AMR\99_PROJ\CA0019938_6257\40_PROD\0002_Groundwater\ | File Name: 199386257-0002-HS-0006.dwg

GROUNDWATER ELEVATION AND DAILY PRECIPITATION



CLIENT
DUFFERIN AGGREGATES

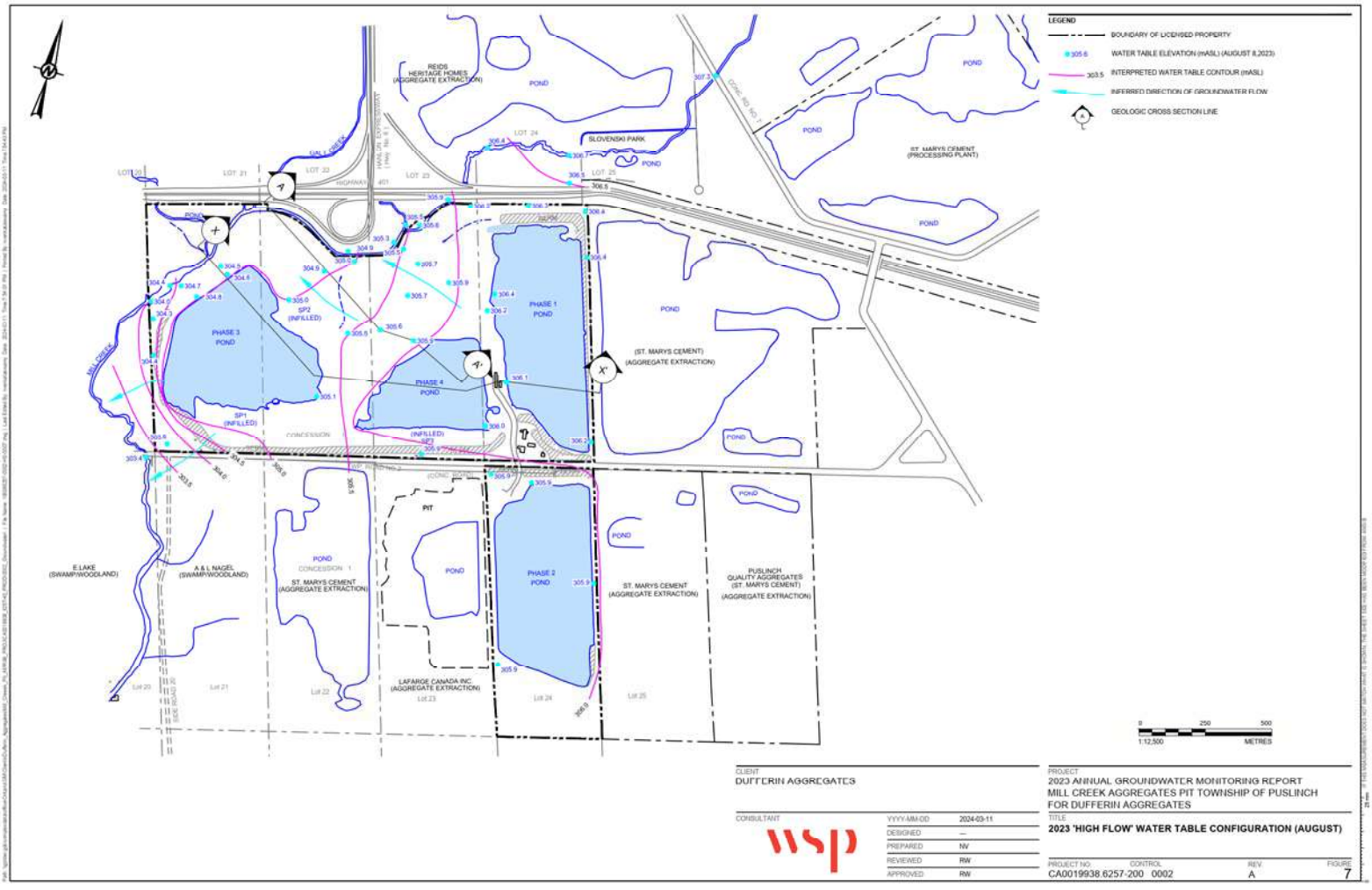
CONSULTANT
wsp

YYYY-MM-DD	2024-03-11
DESIGNED	---
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
SHALLOW GROUNDWATER ELEVATION AND DAILY PRECIPITATION AT MONITOR 92-28

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	6



CLIENT
DUFFERIN AGGREGATES

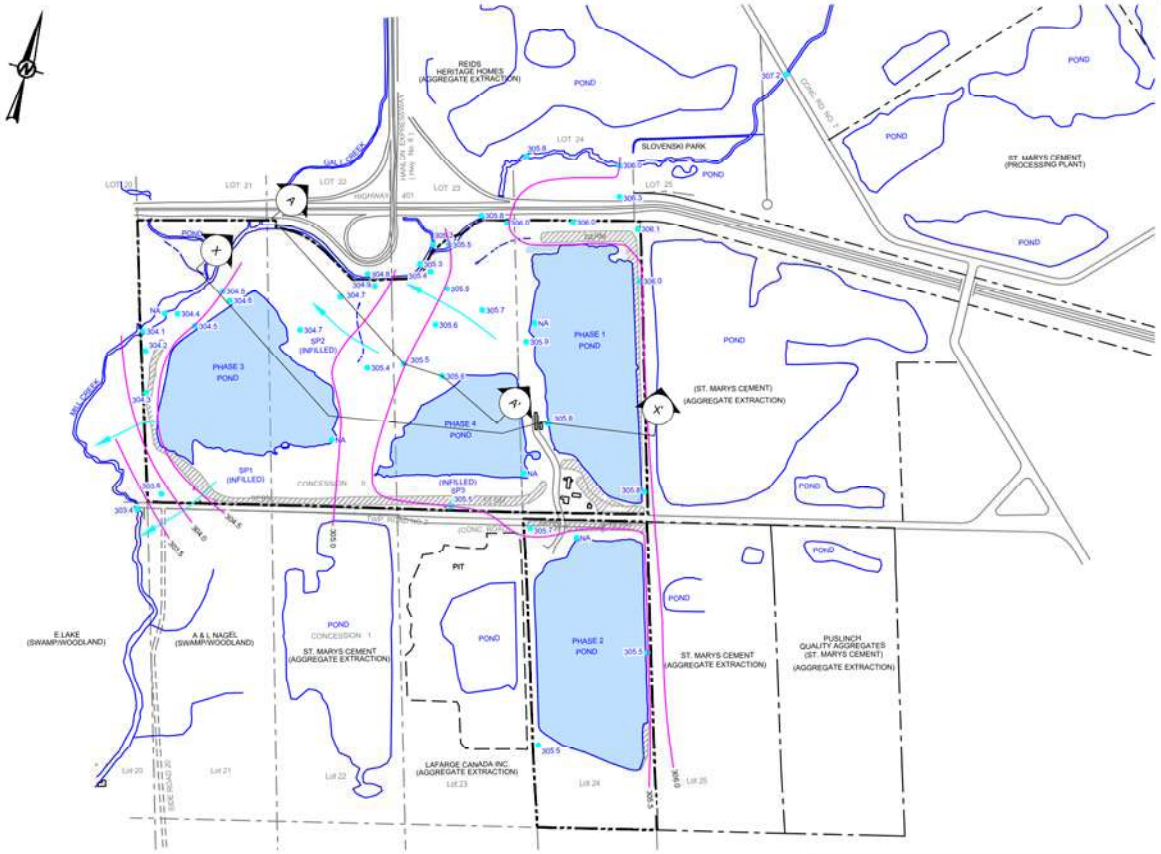
CONSULTANT
wsp

YYYY-MM-DD	2024-03-11
DESIGNED	—
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
2023 'HIGH FLOW' WATER TABLE CONFIGURATION (AUGUST)

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	7



LEGEND

- BOUNDARY OF LICENSED PROPERTY
- 305.5 WATER TABLE ELEVATION (mASL) (JANUARY 12,2023)
- 305.5 INTERPRETED WATER TABLE CONTOUR (mASL)
- INFERRED DIRECTION OF GROUNDWATER FLOW
- NA WATER LEVEL IS NOT AVAILABLE DUE TO FROZEN CONDITIONS
- GEOLOGIC CROSS SECTION LINE

0 250 500
1:12,500 METRES

CLIENT
DUFFERIN AGGREGATES

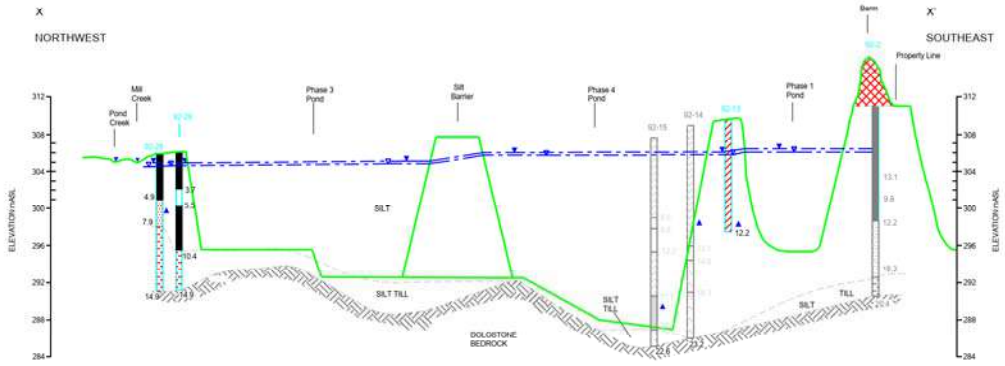
CONSULTANT
wsp

YYYY-MM-DD	2024-03-11
DESIGNED	—
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
2023 'LOW FLOW' WATER TABLE CONFIGURATION (JANUARY)

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	8



LEGEND

- GRAVEL, SANDY GRAVEL, SAND AND GRAVEL
- GRAVELLY, FINE TO COARSE, SAND
- SAND
- SILT, SILTY FINE SAND, FINE SAND
- SILTY TILL
- ASSUMED BEDROCK
- BOREHOLE DESIGNATION (GREYED OUT BOREHOLE = DECOMMISSIONED MONITOR)
- 2023 "HIGH FLOW" WATER TABLE PROFILE (AUGUST 2023)
- 2023 "LOW FLOW" WATER TABLE PROFILE (JANUARY 2023)
- 5.9 DEPTH TO CHANGE IN STRATA (m)
- GROUNDWATER MONITOR
- 14.9 BOTTOM OF BOREHOLE (m)

REFERENCE(S)

1. THE ACTUAL SOIL STRATIFICATION HAS BEEN VERIFIED FROM DATA OBTAINED AT THE BOREHOLE LOCATIONS ONLY.
2. THE INFERRED CONTACTS SHOWN ARE BASED ON GEOLOGICAL EVIDENCE AND THESE MAY VARY FROM THOSE SHOWN BETWEEN BORINGS.

0 1 2
1:40 HORIZONTAL METRES

CLIENT
DUFFERIN AGGREGATES

CONSULTANT
wsp

YYYY-MM-DD	2024-03-11
DESIGNED	—
PREPARED	NV
REVIEWED	RW
APPROVED	RW

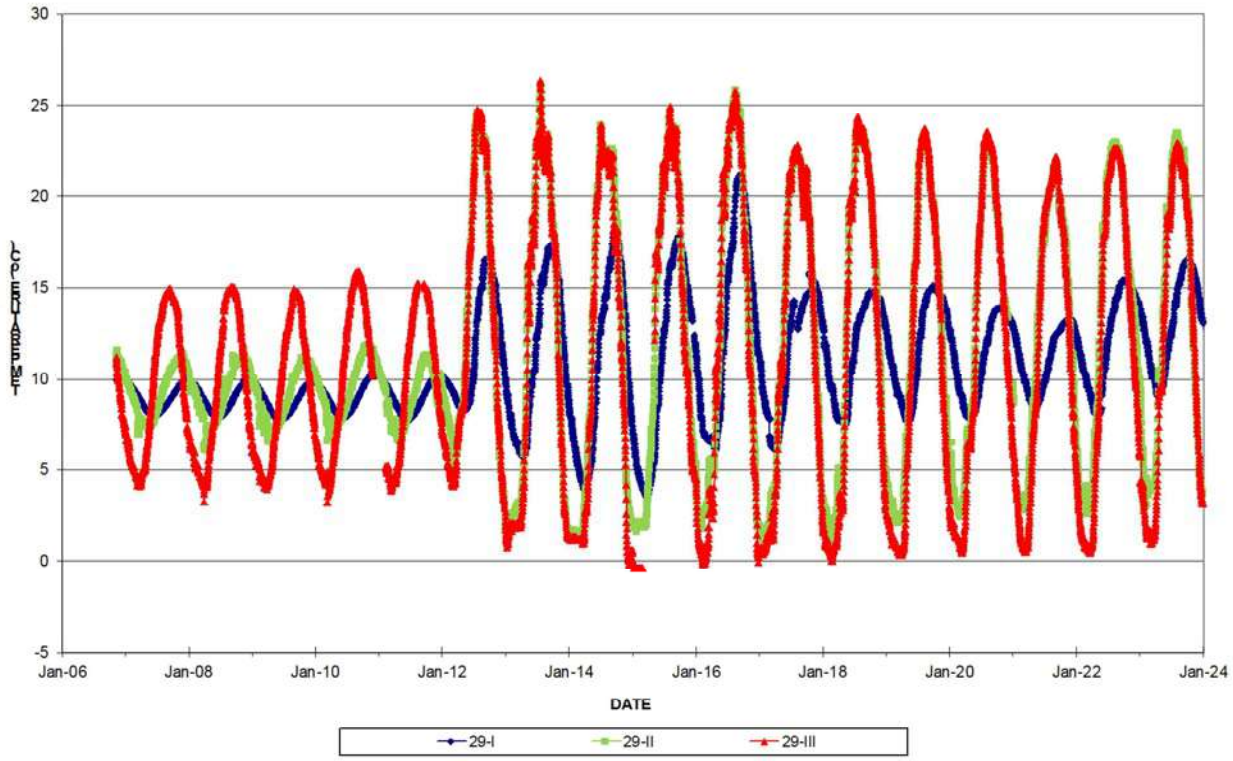
PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
WATER TABLE PROFILE

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	9

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B
25 mm

GROUNDWATER THERMOGRAPH
MULTI-LEVEL MONITOR 92-29



CLIENT
DUFFERIN AGGREGATES

CONSULTANT
wsp

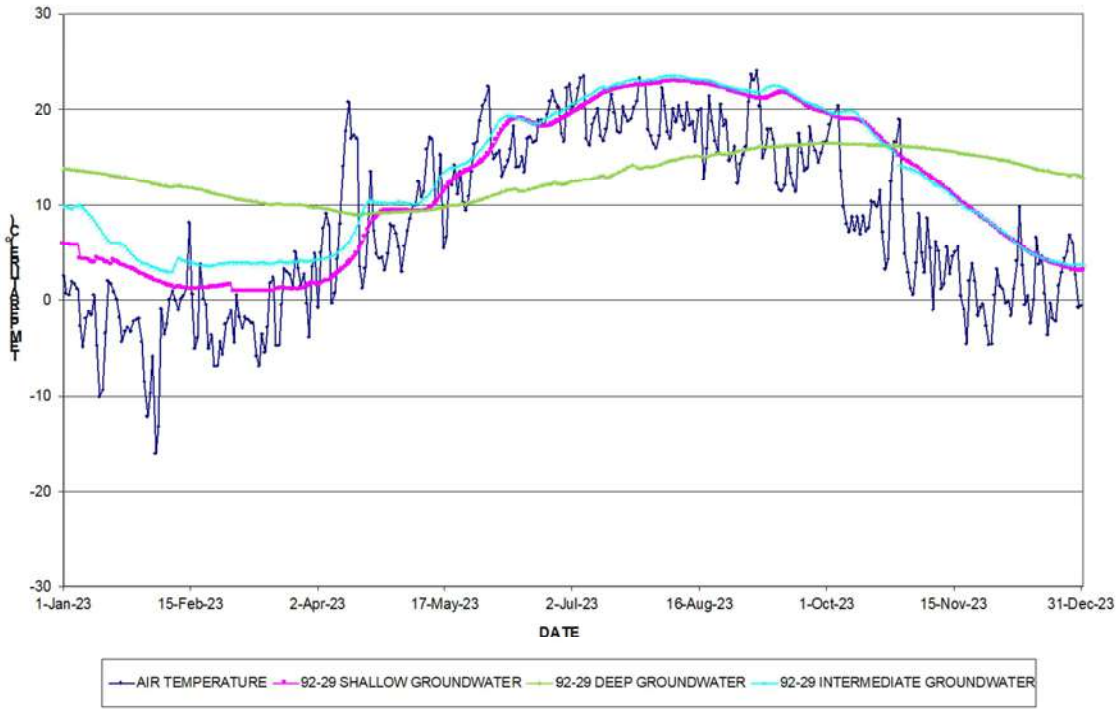
YYYY-MM-DD	2024-03-11
DESIGNED	---
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
GROUNDWATER TEMPERATURE PROFILE MULTI-LEVEL MONITOR 92-29

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	10

GROUNDWATER/AIR TEMPERATURE



CLIENT
DUFFERIN AGGREGATES

CONSULTANT
wsp

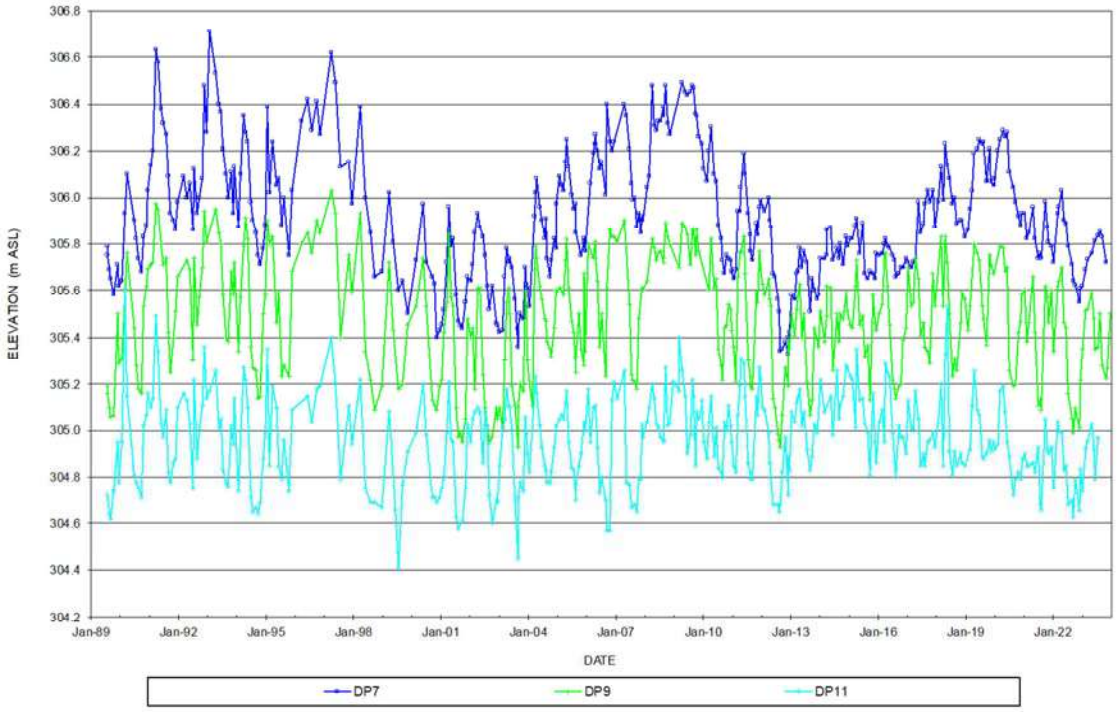
YYYY-MM-DD	2024-03-11
DESIGNED	---
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
GROUNDWATER VS AIR TEMPERATURE AT MULTI-LEVEL MONITOR 92-29

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	11

GROUNDWATER HYDROGRAPH
REPRESENTATIVE WETLAND DRIVE POINTS



CLIENT
DUFFERIN AGGREGATES

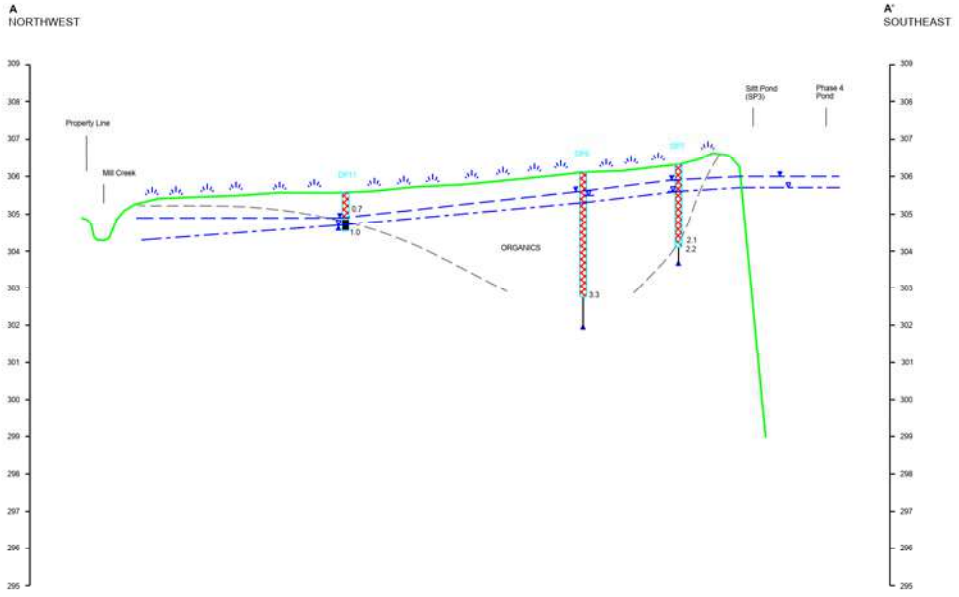
CONSULTANT
wsp

YYYY-MM-DD	2024-03-11
DESIGNED	---
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
GROUNDWATER HYDROGRAPH OF REPRESENTATIVE DRIVE POINTS IN THE WETLAND

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	12



LEGEND

- ORGANICS
- SAND AND GRAVEL
- GRAVELLY SAND
- SAND
- CLAYEY SILT
- SILTY TILL
- DH11 — BOREHOLE DESIGNATION
- BUSH/WETLAND DESIGNATION
- 2023 "HIGH FLOW" WATER TABLE PROFILE (AUGUST 2023)
- 2023 "LOW FLOW" WATER TABLE PROFILE (JANUARY 2023)
- 0.7 — DEPTH TO CHANGE IN STRATA (m)
- GROUNDWATER MONITOR
- 1.0 — BOTTOM OF BOREHOLE (m)

REFERENCE(S)

1. THE ACTUAL SOIL STRATIFICATION HAS BEEN VERIFIED FROM DATA OBTAINED AT THE BOREHOLE LOCATIONS ONLY.
2. THE INFERRED CONTACTS SHOWN ARE BASED ON GEOLOGICAL EVIDENCE AND THESE MAY VARY FROM THOSE SHOWN BETWEEN BORINGS.

0 1 2
1:40 HORIZONTAL METRES

CLIENT
DUFFERIN AGGREGATES

CONSULTANT
wsp

YYYY-MM-DD	2024-03-11
DESIGNED	—
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
GROUNDWATER LEVEL PROFILES THROUGH THE WETLAND

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	13

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

LEGEND

- POST AND WIRE FENCE
- CREEK
- NATURAL DRAINAGE
- BOUNDARY OF LICENCED PROPERTY
- SM2 — SEEPAGE METER DESIGNATION AND APPROXIMATE LOCATION (BY J. FITZGIBBON)
- DP3 — DRIVE POINT 2023 SUMMER "LOW FLOW" CONDITIONS (L/s) MAY26,2023

NOTE(S)

1. DISTANCES ARE APPROXIMATE, MEASURED FROM SITE PLAN BASE MAP.

REFERENCE(S)

1. BASE MAPPING BY PLANNING INITIATIVES LTD., DATED AUGUST 1987, DRAWING NUMBERS 1A AND 1B OF 4.

0 125 250
1:7,500 METRES

CLIENT
DUFFERIN AGGREGATES

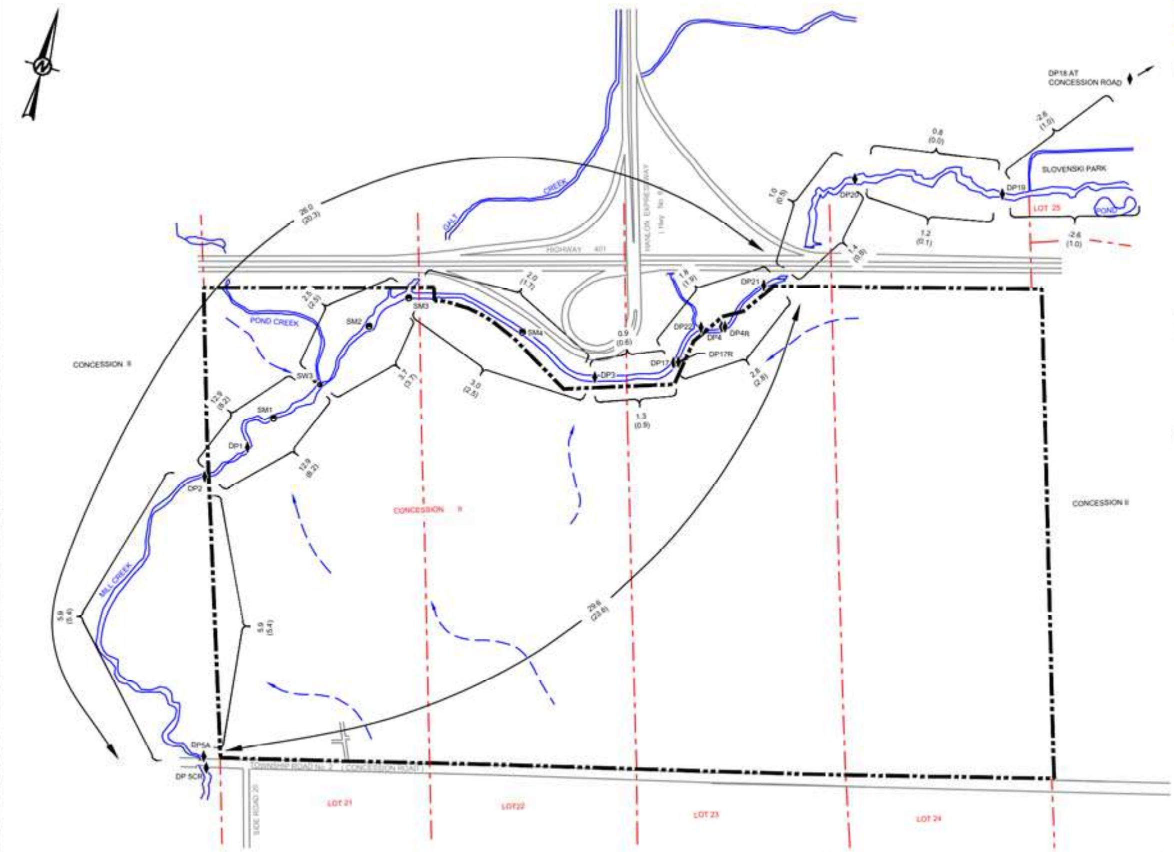
CONSULTANT
wsp

YYYY-MM-DD	2024-03-11
DESIGNED	—
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
MILL CREEK GROUNDWATER MONITORING LOCATIONS AND SEPARATION DISTANCES

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	14



LEGEND

- CREEK
- NATURAL DRAINAGE
- BOUNDARY OF LICENCED PROPERTY
- SM2 — SEEPAGE METER DESIGNATION AND APPROXIMATE LOCATION (BY J. FITZGIBBON)
- DP3 0.9 — DRIVE POINT 2023 SUMMER "LOW FLOW" CONDITIONS (L/s) MAY 26,2023
- (0.6) — AVERAGE OF YEARLY SUMMER "LOW FLOW" CONDITIONS (L/s) 1992 - 2022

NOTE(S)

1. SURFACE WATER FLOW AS GAUGED ON JULY 7,1988.
2. DRIVE POINT DATA AS NOTED IN TABLES 2 AND 3.

REFERENCE(S)

1. BASE MAPPING BY PLANNING INITIATIVES LTD., DATED AUGUST 1987, DRAWING NUMBERS 1A AND 1B OF 4.

0 125 250
1:7,500 METRES

CLIENT
DUFFERIN AGGREGATES

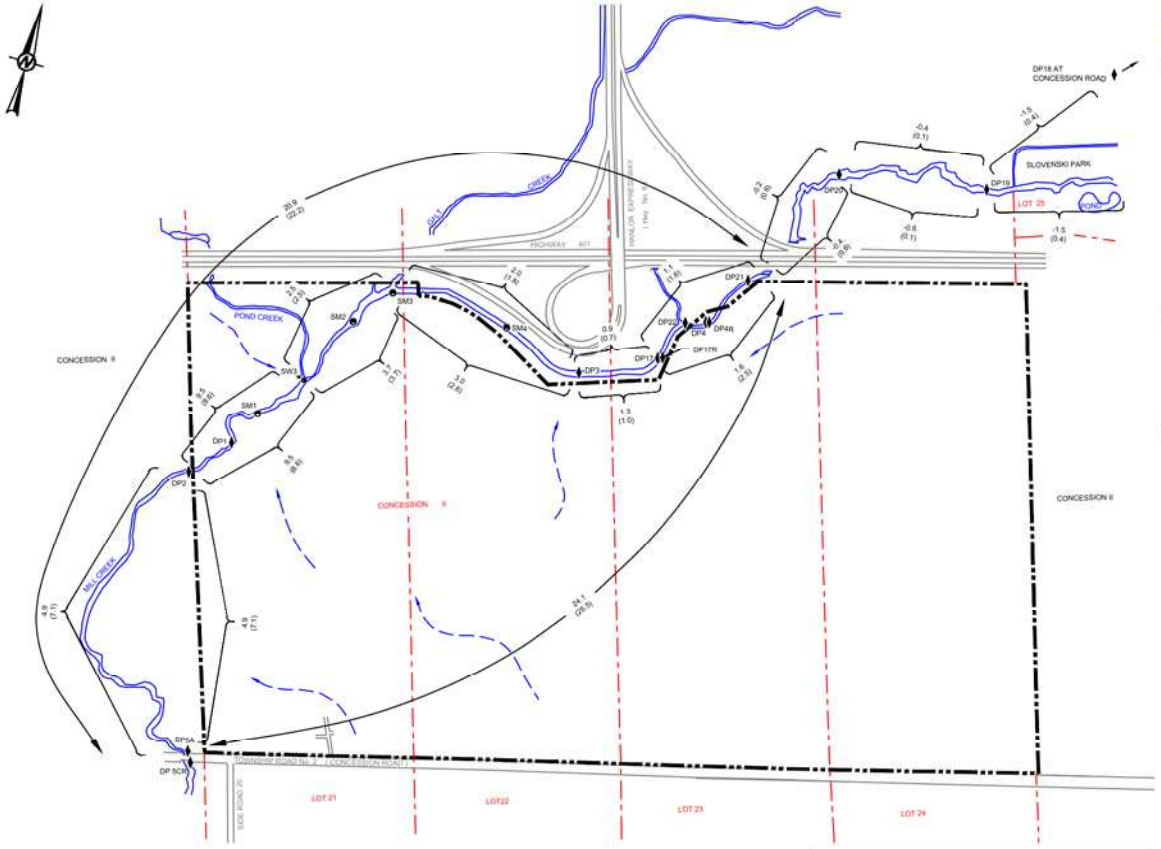
CONSULTANT
wsp

YYYY-MM-DD	2024-03-11
DESIGNED	—
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
DISTRIBUTION OF GROUNDWATER INFLUX FOR SUMMER "LOW FLOW" CONDITIONS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	15



LEGEND

- CREEK
- NATURAL DRAINAGE
- BOUNDARY OF LICENCED PROPERTY
- SM2 — SEEPAGE METER DESIGNATION AND APPROXIMATE LOCATION (BY J. FITZGIBBON)
- DP3 0.9 — DRIVE POINT 2023 WINTER "LOW FLOW" CONDITIONS (L/s) NOVEMBER 16, 2023
- (0.7) — AVERAGE OF YEARLY WINTER "LOW FLOW" CONDITIONS (L/s) 1992 - 2022

NOTE(S)

1. DRIVE POINT DATA AS NOTED IN TABLES 2 AND 3.

REFERENCE(S)

1. BASE MAPPING BY PLANNING INITIATIVES LTD., DATED AUGUST 1987, DRAWING NUMBERS 1A AND 1B OF 4.

0 125 250
1:7,500 METRES

CLIENT
DUFFERIN AGGREGATES

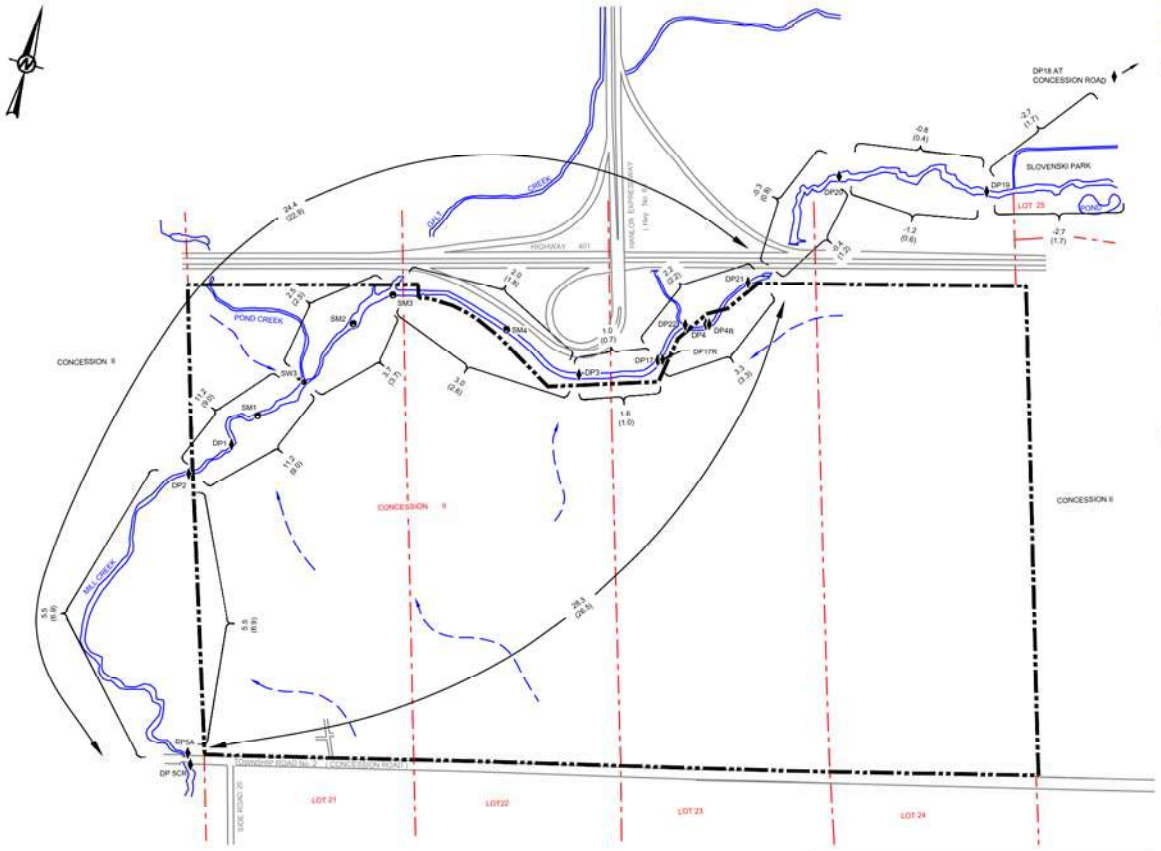
CONSULTANT
wsp

YYYY-MM-DD	2024-03-11
DESIGNED	—
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
DISTRIBUTION OF GROUNDWATER INFLUX FOR WINTER "LOW FLOW" CONDITIONS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	16



LEGEND

- CREEK
- NATURAL DRAINAGE
- BOUNDARY OF LICENCED PROPERTY
- SM2 — SEEPAGE METER DESIGNATION AND APPROXIMATE LOCATION (BY J. FITZGIBBON)
- DP3 1.0 — DRIVE POINT AVERAGE 2023 FLOW CONDITIONS (L/s)
- (0.7) — AVERAGE HISTORIC FLOW CONDITIONS (L/s) 1992 - 2022

NOTE(S)

1. DRIVE POINT DATA AS NOTED IN TABLES 2 AND 3.

REFERENCE(S)

1. BASE MAPPING BY PLANNING INITIATIVES LTD., DATED AUGUST 1987, DRAWING NUMBERS 1A AND 1B OF 4.

0 125 250
1:7,500 METRES

CLIENT
DUFFERIN AGGREGATES

CONSULTANT
wsp

YYYY-MM-DD	2024-03-11
DESIGNED	—
PREPARED	NV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 ANNUAL GROUNDWATER MONITORING REPORT
MILL CREEK AGGREGATES PIT TOWNSHIP OF PUSLINCH
FOR DUFFERIN AGGREGATES

TITLE
DISTRIBUTION OF GROUNDWATER INFLUX FOR "AVERAGE" CONDITIONS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257-200	0002	A	17

APPENDIX A

Monitor Details

Technical Appendix B – 2023 Hydrogeology Report

TABLE A-1
GROUNDWATER MONITOR DETAILS
MILL CREEK AGGREGATES PIT

BOREHOLE NO.	MONITOR NO.	MONITOR TYPE	MONITOR DIAMETER (mm)	MONITOR ELEVATION (T.O.P.) (mASL)	SCREENED INTERVAL ELEVATION (mASL)	FILTER PACK ELEVATION (mASL)	SEAL ELEVATION (mASL)	BACKFILL ELEVATION (mASL)
1		S	51	309.86	303.4 - 304.9		307.9 - 308.8	303.4 - 307.9
1-R		S	51	311.25	304.13 - 307.18	303.82 - 307.48	307.48 - 310.83	310.83 - 311.44
2A		S	51	313.41	297.08 - 300.82		309.61 - 312.66	296.76 - 309.61
2-R		S	51	315.19	304.46 - 307.51	304.26 - 307.92	307.92 - 313.71	313.71 - 314.32
3A		S	51	315.62	296.38 - 300.12		311.66 - 314.82	296.06 - 311.66
4		S	51	308.85	304.2 - 305.8		307.3 - 308.2	304.2 - 307.3
5		S	51	309.19	303.5 - 305.0		307.0 - 307.9	303.5 - 307.0
6		S	51	308.34	303.5 - 305.1		306.2 - 307.1	303.5 - 306.2
7	I	P	51	308.46	292.4 - 294.0		294.4 - 295.2	292.4 - 294.4
							306.5 - 307.4	295.2 - 306.5
7	II	S	51	308.4	303.0 - 304.5		306.5 - 307.4	303.0 - 306.5
11		S	51	310.09	300.28 - 306.38		308.58 - 309.28	300.18 - 308.58
12		S	51	311.61	301.23 - 307.43		310.43 - 311.13	300.43 - 310.43
13		S	51	307.59	299.26 - 305.77		306.17 - 306.87	306.17 - 299.26
14		S	51	308.14	302.84 - 304.36		304.67 - 307.41	
CBM1		S	51	312.85				
CBM2		S	51	310.83				
CBM3		S	51	312.17				
TW16-78		P	152	304.0	271.3 - 282.1 [1]		Cased from 282.1 - 303.6	
TW16-79		P	146	304.2	295.1 - 296.5 [2]		Cased from 296.5 - 303.7	
OW1-84		S	51	304.8	294.9 - 295.8		303.5 - 303.8	294.9 - 303.5
OW2-84		S	51	304.8	295.4 - 295.9		303.6 - 303.9	295.4 - 303.6
OW4-84		S	51	304.6	294.6 - 295.7		303.4 - 303.7	294.6 - 303.4
OW5-84		S	51	304.41	294.8 - 295.6		303.3 - 303.6	294.8 - 303.3
OW16A-78		S	38	304.5	295.5 - 296.7		302.6 - 303.5	295.5 - 302.6
92-1		S	51	313.0	303.0 - 306.0			303.0 - 312.2
92-1R		S	51	314.62	303.48 - 306.53	303.03 - 307.29	307.29 - 313.08	313.08 - 313.69
92-5		S	51	308.20	300.0 - 303.0			300.0 - 308.0
92-8		S	51	309.65	300.3 - 303.3			300.3 - 308.1
92-12		S	51	308.41	303.05 - 304.57			303.05 - 307.26
92-13		S [3]	76	310.0	297.8 - 309.5			297.8 - 309.5
92-14		S [3]	76	309.8	297.6 - 308.8			297.6 - 308.8
92-15		S [3]	76	309.1	289.7 - 308.4			289.7 - 308.4
92-15a		S	51	309.27	296.90 - 297.66			296.90 - 308.55
92-26		S [3]	76	306.3	295.9 - 305.4			295.9 - 305.4
92-27		S [3]	76	305.9	292.9 - 305.1			292.9 - 305.1
92-28		S [3]	76	306.6	299.3 - 305.8			299.3 - 305.8
92-29		S [3]	76	306.9	297.1 - 306.1			297.1 - 306.1
92-32		S [3]	76	305.4	290.1 - 304.9			290.1 - 304.9
92-33		S [3]	76	306.2	291.0 - 305.5			291.0 - 305.5

NOTES:
- P - Piezometer
- S - Standpipe
- mASL - Metres above sea level
- T.O.P. - Top of pipe
- (1) - Open hole
- (2) - Well Screen in an open hole
- (3) - Equipped with multi-level transducers
- * - Bedrock well; well completion details not available

TABLE A-2
MULTI-LEVEL MONITOR DETAILS
MILL CREEK AGGREGATES PIT

BOREHOLE NO.	MONITOR NO.	GROUND ELEVATION (mASL)	MONITOR ELEVATION (T.O.P.) (mASL)	PROBE DESIGNATION	PROBE ELEVATION (mASL)
92-13	I	309.5	310.0	Deep	299.3
	II			Intermediate	301.8
	III			Shallow	304.5
92-15	I	308.4	309.1	Deep	290.0
92-15 a	II		309.3	Intermediate	297.7
92-15	III		309.1	Shallow	305.4
92-26	I	305.48	306.36	Deep	296.30
	II		306.36	Intermediate	299.46
	III		306.30	Shallow	302.39
92-27	I	305.1	305.9	Deep	295.9
	II			Intermediate	299.2
	III			Shallow	302.7
92-28	I	305.83	306.73	Deep	301.81
	II		306.72	Intermediate	302.70
	III		306.60	Shallow	303.45
92-29	I	306.05	306.97	Deep	297.53
	II		306.97	Intermediate	300.61
	III		306.90	Shallow	303.10
92-32	I	304.93	305.58	Deep	290.90
	II		305.58	Intermediate	296.02
	III		305.40	Shallow	301.42
92-33	I	305.5	306.2	Deep	294.4
	II			Intermediate	298.5
	III			Shallow	303.5 / 298.5
	III			Shallow (A)	303.3

NOTES:
- Each probe is a combination water level pressure transducer and temperature thermistor.
- mASL - Metres above sea level
- T.O.P. - Top of pipe

TABLE A-3
DRIVE POINT MONITOR DETAILS
MILL CREEK AGGREGATES PIT

MONITOR	DRIVE POINT DIAMETER (mm)	GROUND ELEVATION (m ASL)	TOP OF PIPE ELEVATION (m ASL)	SCREENED INTERVAL ELEVATION (m ASL)	MID-POINT OF SCREEN BELOW GRADE (m)
DP1	32	303.55 [1]	304.86	301.86 - 302.46	1.39
DP2A	32	303.15 [1]	304.52	301.05 - 301.55	1.85
DP3	32	304.46 [1]	305.68	302.49 - 303.39	1.52
DP4	32	305.23 [1]	306.81	303.80 - 304.40	1.13
DP4R	32	305.29 [1]	306.46	304.53 - 304.83	0.61
DP5A	32	302.56 [1]	303.59	301.60 - 302.00	0.76
DP5B	32	302.43 [1]	303.50	301.51 - 301.91	0.72
DP5C	32	302.67 [1]	304.11	301.81 - 302.42	0.57
DP5CR	32	302.66 [1]	303.71	301.77 - 302.07	0.76
DP6	32	306.2	306.82	304.5 - 305.1	1.4
DP7	32	306.3	307.63	303.7 - 304.3	2.1
DP8	32	306.1	307.2	301.9 - 302.5	3.9
DP9	32	305.9	306.8	304.6 - 305.2	1.0
DP10	32	306.0	307.4	303.7 - 304.3	1.9
DP11	32	305.6	306.8	304.5 - 305.6	0.6
DP12	32	305.6	306.7	303.8 - 305.2	1.1
DP16	32	304.1	305.0	302.4 - 303.3	1.3
DP17	32	305.04 [1]	306.26	303.69 - 304.59	0.90
DP17R	32	305.07 [1]	306.38	304.45 - 304.80	0.45
DP18	32	307.07 [1]	307.74	306.04 - 306.64	0.73
DP19	32	306.33 [1]	307.53	303.93 - 304.43	2.15
DP20	32	306.02 [1]	307.14	303.64 - 304.04	2.18
DP21	32	305.47 [1]	306.77	303.98 - 304.48	1.24
DP22	32	304.89 [1]	306.01	302.41 - 302.91	2.23

NOTES:
- mASL - Metres above sea level
- (1) - Elevation of creek bed
- DP5B replaced DP5A when resident denied access to creek
- DP5C replaced DP5B when DP5B was removed by unauthorized personnel
- DP5D added to monitoring program
- DP5C and DP5D were removed by unauthorized personnel
- DP5CR added to monitoring program to replace DP5C
- DP17R replaced DP17 due to corrosion
- DP4R replaced DP4 due to corrosion

TABLE A-4
SURFACE WATER MONITOR DETAILS
MILL CREEK AGGREGATES PIT

MONITOR	TOP OF MONITOR ELEVATION (mASL)	MONITOR TYPE
SW1	306.65	1 metre staffing gauge
SW2	303.71	Drive Point
RT	307.44	2 metre staffing gauge in recharge trench
P1	306.63	1 metre staffing gauge in Phase 1 pond
P2	306.02	1 metre staffing gauge in Phase 2 pond
P3	305.21	1 metre staffing gauge in Phase 3 pond
P4	306.09	1 metre staffing gauge in Phase 4 pond

NOTE:
- SW1 resurveyed on May 16, 2013
- SW2 is measured from the top of DP5CR
- P1, P2, P3 and P4 surveyed on April 19, 2023

TABLE A-5
REID HERITAGE DRIVE POINT MONITOR DETAILS
MILL CREEK AGGREGATES PIT

MONITOR	TOP OF MONITOR ELEVATION (mASL)	GRADE ELEVATION (mASL)	MONITOR LENGTH (m)	BOTTOM OF MONITOR ELEVATION (mASL)	MONITOR TYPE
DP113	307.87	307.08	4.08	303.84	near creek drive point

APPENDIX B

Monitoring Results

Technical Appendix B – 2023 Hydrogeology Report

TABLE B-1
WATER LEVEL DATA - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

BH1-I/BH1-R			BH2-I/BH2B/BH2-R			BH3-I/BH3B		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-19	NA					28-Jan-19	NA	
27-Feb-19	3.33	306.53	Decommissioned and re-installed			27-Feb-19	9.77	305.85
19-Mar-19	3.17	306.69				19-Mar-19	9.68	305.94
24-Apr-19	3.06	306.80	10-Mar-21	9.35	305.84	24-Apr-19	9.48	306.14
			21-Apr-21	9.33	305.86	22-May-19	9.29	306.33
Decommissioned and re-installed			19-May-21	9.42	305.77	19-Jun-19	9.28	306.34
			25-Jun-21	9.40	305.79	26-Jul-19	9.35	306.27
11-Jun-20	4.56	306.69	27-Jul-21	9.44	305.75	20-Aug-19	9.32	306.30
08-Jul-20	4.96	306.29	12-Aug-21	9.46	305.73	25-Sep-19	NA	
19-Aug-20	4.67	306.58	23-Sep-21	9.46	305.73	29-Oct-19	9.60	306.02
17-Sep-20	4.28	306.97	27-Oct-21	9.48	305.71	13-Nov-19	9.64	305.98
23-Oct-20	4.87	306.38	10-Nov-21	9.55	305.64	16-Dec-19	9.65	305.97
19-Nov-20	4.93	306.32	16-Dec-21	9.53	305.66	09-Jan-20	NA	
03-Dec-20	5.12	306.13	14-Jan-22	9.45	305.74	10-Feb-20	NA	
08-Jan-21	5.00	306.25	24-Feb-22	9.33	305.86	09-Mar-20	9.34	306.28
10-Feb-21	5.09	306.16	17-Mar-22	9.28	305.91	14-Apr-20	9.26	306.36
10-Mar-21	4.87	306.38	21-Apr-22	9.12	306.07	13-May-20	9.32	306.30
21-Apr-21	4.87	306.38	24-May-22	9.09	306.10	11-Jun-20	9.33	306.29
19-May-21	5.14	306.11	15-Jun-22	9.13	306.06	08-Jul-20	9.48	306.14
25-Jun-21	5.07	306.18	14-Jul-22	9.27	305.92	19-Aug-20	9.58	306.04
27-Jul-21	5.02	306.23	25-Aug-22	9.40	305.79	17-Sep-20	9.74	305.88
12-Aug-21	4.86	306.39	08-Sep-22	9.48	305.71	23-Oct-20	9.86	305.76
23-Sep-21	5.04	306.21	13-Oct-22	9.62	305.57	19-Nov-20	9.92	305.70
27-Oct-21	5.03	306.22	24-Nov-22	9.77	305.42	18-Dec-20	9.95	305.67
10-Nov-21	5.05	306.20	16-Dec-22	9.73	305.46	08-Jan-21	(F)	
16-Dec-21	5.03	306.22	12-Jan-23	9.66	305.53	10-Feb-21	9.92	305.70
14-Jan-22	5.04	306.22	14-Feb-23	9.66	305.53	10-Mar-21	9.93	305.69
24-Feb-22	4.87	306.38	17-Mar-23	9.68	305.51	21-Apr-21	9.83	305.79
17-Mar-22	4.83	306.43	27-Apr-23	9.41	305.78	19-May-21	9.92	305.70
21-Apr-22	4.76	306.49	26-May-23	9.33	305.86	25-Jun-21	9.90	305.72
24-May-22	4.74	306.51	15-Jun-23	9.33	305.86	27-Jul-21	9.94	305.68
15-Jun-22	4.77	306.48	25-Jul-23	9.29	305.90	12-Aug-21	9.94	305.68
14-Jul-22	4.91	306.34	08-Aug-23	9.27	305.92	23-Sep-21	9.93	305.69
25-Aug-22	5.04	306.21	07-Sep-23	9.26	305.93	27-Oct-21	9.93	305.69
08-Sep-22	5.11	306.14	26-Oct-23	NA		10-Nov-21	10.00	305.62
13-Oct-22	5.18	306.07	16-Nov-23	NA		16-Dec-21	9.98	305.64
24-Nov-22	5.33	305.93	18-Dec-23	NA		14-Jan-22	9.98	305.64
16-Dec-22	5.30	305.95				24-Feb-22	9.83	305.79
12-Jan-23	5.21	306.04				17-Mar-22	9.76	305.86
14-Feb-23	5.16	306.09				21-Apr-22	9.61	306.01
17-Mar-23	5.11	306.14				24-May-22	9.58	306.04
27-Apr-23	4.98	306.27				15-Jun-22	9.61	306.01
26-May-23	4.92	306.33				14-Jul-22	9.75	305.87
15-Jun-23	4.96	306.29				25-Aug-22	9.87	305.75
25-Jul-23	4.92	306.33				08-Sep-22	9.94	305.68
08-Aug-23	4.90	306.36				13-Oct-22	10.06	305.56
07-Sep-23	4.89	306.36				24-Nov-22	10.17	305.46
26-Oct-23	5.01	306.24				16-Dec-22	10.17	305.45
16-Nov-23	5.08	306.17				12-Jan-23	10.12	305.50
18-Dec-23	5.06	306.19				14-Feb-23	10.07	305.55
						17-Mar-23	9.98	305.64
						27-Apr-23	9.85	305.78
						26-May-23	9.78	305.84
						15-Jun-23	9.77	305.85
						25-Jul-23	9.73	305.89
						08-Aug-23	9.72	305.90
						07-Sep-23	9.71	305.92
						26-Oct-23	9.80	305.82
						16-Nov-23	9.88	305.74
						18-Dec-23	9.91	305.71

NOTES:
- BTOP — Below top of pipe
- NA — Not available
- m ASL — metres above sea level
- (F) — Frozen

TABLE B-1
WATER LEVEL DATA - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

BH4-I			BH5-I			BH6-I		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-19	2.97	305.88	28-Jan-19	2.99	306.20	28-Jan-19	2.46	305.88
27-Feb-19	2.87	305.98	27-Feb-19	2.91	306.28	27-Feb-19	2.42	305.92
19-Mar-19	2.79	306.06	19-Mar-19	2.81	306.38	19-Mar-19	2.29	306.05
24-Apr-19	2.59	306.26	24-Apr-19	2.68	306.51	24-Apr-19	2.11	306.23
22-May-19	2.49	306.36	22-May-19	2.60	306.59	22-May-19	2.07	306.27
19-Jun-19	2.47	306.38	19-Jun-19	2.57	306.62	19-Jun-19	2.04	306.30
26-Jul-19	2.50	306.35	26-Jul-19	2.59	306.60	26-Jul-19	2.08	306.26
20-Aug-19	2.54	306.31	20-Aug-19	2.69	306.50	20-Aug-19	2.13	306.21
25-Sep-19	2.69	306.16	25-Sep-19	2.85	306.34	25-Sep-19	2.28	306.06
29-Oct-19	2.68	306.17	29-Oct-19	2.80	306.39	29-Oct-19	2.21	306.13
13-Nov-19	2.73	306.12	13-Nov-19	2.78	306.41	13-Nov-19	2.26	306.08
16-Dec-19	2.74	306.11	16-Dec-19	2.75	306.44	16-Dec-19	2.26	306.08
09-Jan-20	2.63	306.22	09-Jan-20	2.75	306.44	09-Jan-20	2.25	306.09
10-Feb-20	2.55	306.30	10-Feb-20	2.68	306.51	10-Feb-20	2.12	306.22
09-Mar-20	2.46	306.39	09-Mar-20	2.50	306.69	09-Mar-20	2.02	306.32
14-Apr-20	2.41	306.44	14-Apr-20	2.46	306.73	14-Apr-20	1.99	306.35
13-May-20	2.41	306.44	13-May-20	2.52	306.67	13-May-20	2.04	306.30
11-Jun-20	2.46	306.39	11-Jun-20	2.46	306.73	11-Jun-20	1.97	306.37
08-Jul-20	2.57	306.28	08-Jul-20	2.67	306.52	08-Jul-20	2.16	306.18
19-Aug-20	2.56	306.29	19-Aug-20	2.76	306.43	19-Aug-20	2.24	306.10
17-Sep-20	2.83	306.02	17-Sep-20	2.88	306.31	17-Sep-20	2.35	305.99
23-Oct-20	2.99	305.86	23-Oct-20	2.88	306.31	23-Oct-20	2.35	305.99
19-Nov-20	3.04	305.81	19-Nov-20	2.95	306.24	19-Nov-20	2.39	305.95
03-Dec-20	3.01	305.84	18-Dec-20	2.90	306.29	18-Dec-20	2.45	305.89
08-Jan-21	2.98	305.87	08-Jan-21	2.87	306.32	08-Jan-21	2.41	305.93
10-Feb-21	3.04	305.81	10-Feb-21	2.95	306.24	10-Feb-21	2.50	305.84
10-Mar-21	3.03	305.82	10-Mar-21	2.89	306.30	10-Mar-21	2.45	305.89
21-Apr-21	2.96	305.89	21-Apr-21	2.90	306.29	21-Apr-21	2.40	305.94
19-May-21	3.03	305.82	19-May-21	3.16	306.03	19-May-21	2.50	305.84
25-Jun-21	3.11	305.74	25-Jun-21	3.11	306.08	25-Jun-21	2.35	305.99
27-Jul-21	3.10	305.75	27-Jul-21	3.05	306.14	27-Jul-21	2.53	305.81
12-Aug-21	3.11	305.74	12-Aug-21	3.09	306.10	12-Aug-21	2.57	305.77
23-Sep-21	3.05	305.80	23-Sep-21	2.89	306.30	23-Sep-21	2.39	305.95
27-Oct-21	3.11	305.74	27-Oct-21	2.98	306.21	27-Oct-21	2.46	305.88
10-Nov-21	3.17	305.68	10-Nov-21	3.06	306.13	10-Nov-21	2.52	305.82
16-Dec-21	3.13	305.72	16-Dec-21	3.05	306.14	16-Dec-21	2.51	305.83
14-Jan-22	3.15	305.70	14-Jan-22	3.05	306.14	14-Jan-22	2.59	305.75
24-Feb-22	2.96	305.89	24-Feb-22	2.82	306.37	24-Feb-22	2.36	305.98
17-Mar-22	2.91	305.94	17-Mar-22	2.82	306.37	17-Mar-22	2.37	305.97
21-Apr-22	2.80	306.05	21-Apr-22	2.78	306.41	21-Apr-22	2.33	306.01
24-May-22	2.80	306.05	24-May-22	2.59	306.60	24-May-22	2.36	305.98
15-Jun-22	2.83	306.02	15-Jun-22	2.83	306.36	15-Jun-22	2.34	306.00
14-Jul-22	2.96	305.89	14-Jul-22	2.98	306.21	14-Jul-22	2.46	305.88
25-Aug-22	3.09	305.76	25-Aug-22	3.06	306.13	25-Aug-22	2.52	305.82
08-Sep-22	3.16	305.69	08-Sep-22	3.13	306.06	08-Sep-22	2.61	305.73
13-Oct-22	3.29	305.56	13-Oct-22	3.18	306.01	13-Oct-22	2.67	305.67
24-Nov-22	3.38	305.48	24-Nov-22	3.29	305.90	24-Nov-22	2.75	305.60
16-Dec-22	3.37	305.49	16-Dec-22	3.24	305.95	16-Dec-22	2.73	305.61
12-Jan-23	3.31	305.54	12-Jan-23	3.17	306.02	12-Jan-23	2.68	305.66
14-Feb-23	3.24	305.61	14-Feb-23	3.10	306.09	14-Feb-23	2.61	305.73
17-Mar-23	3.18	305.67	17-Mar-23	3.03	306.17	17-Mar-23	2.44	305.90
27-Apr-23	3.05	305.80	27-Apr-23	2.97	306.22	27-Apr-23	2.47	305.87
26-May-23	3.00	305.85	26-May-23	2.97	306.22	26-May-23	2.44	305.90
15-Jun-23	2.99	305.86	15-Jun-23	3.00	306.19	19-Jun-23	2.49	305.85
25-Jul-23	2.97	305.88	25-Jul-23	2.89	306.30	25-Jul-23	2.38	305.96
08-Aug-23	2.95	305.90	08-Aug-23	2.91	306.28	08-Aug-23	2.42	305.92
07-Sep-23	2.94	305.91	07-Sep-23	2.95	306.24	07-Sep-23	2.59	305.75
26-Oct-23	3.05	305.80	26-Oct-23	3.01	306.18	26-Oct-23	2.51	305.83
16-Nov-23	3.12	305.73	16-Nov-23	3.10	306.09	16-Nov-23	2.57	305.77
18-Dec-23	3.11	305.74	18-Dec-23	3.05	306.14	18-Dec-23	2.60	305.74

NOTES:
- · BTOP — Below top of pipe
- · NA — Not available
- · m ASL — metres above sea level
- · (F) — Frozen

TABLE B-1
WATER LEVEL DATA - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

BH 11			BH 13			BH 14		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-19	NA		28-Jan-19	1.45	306.14	28-Jan-19	2.65	305.49
27-Feb-19	4.65	305.44	27-Feb-19	1.39	306.20	27-Feb-19	2.58	305.56
19-Mar-19	3.96	306.13	19-Mar-19	1.26	306.33	19-Mar-19	2.47	305.67
24-Apr-19	3.81	306.28	24-Apr-19	1.16	306.43	24-Apr-19	2.41	305.73
22-May-19	3.62	306.47	22-May-19	1.20	306.39	22-May-19	2.51	305.63
19-Jun-19	3.63	306.46	19-Jun-19	1.20	306.39	19-Jun-19	2.56	305.58
26-Jul-19	3.66	306.43	26-Jul-19	1.23	306.36	26-Jul-19	2.56	305.58
20-Aug-19	3.71	306.38	20-Aug-19	1.28	306.31	20-Aug-19	2.57	305.57
25-Sep-19	3.87	306.22	25-Sep-19	1.33	306.26	25-Sep-19	2.61	305.53
29-Oct-19	3.86	306.23	29-Oct-19	1.26	306.33	29-Oct-19	2.49	305.65
13-Nov-19	3.99	306.10	13-Nov-19	1.28	306.31	13-Nov-19	2.55	305.59
16-Dec-19	4.00	306.09	16-Dec-19	1.26	306.33	16-Dec-19	2.53	305.61
09-Jan-20	3.99	306.10	09-Jan-20	1.27	306.32	09-Jan-20	2.60	305.54
10-Feb-20	3.80	306.29	10-Feb-20	1.23	306.36	10-Feb-20	2.51	305.63
09-Mar-20	3.63	306.46	09-Mar-20	1.06	306.53	09-Mar-20	2.42	305.72
14-Apr-20	3.60	306.49	14-Apr-20	1.07	306.52	14-Apr-20	2.48	305.66
13-May-20	3.69	306.40	13-May-20	1.12	306.47	13-May-20	2.51	305.63
11-Jun-20	3.68	306.41	11-Jun-20	1.02	306.57	11-Jun-20	2.43	305.71
08-Jul-20	3.85	306.24	08-Jul-20	1.20	306.39	08-Jul-20	2.60	305.54
19-Aug-20	3.88	306.21	19-Aug-20	1.30	306.29	19-Aug-20	2.69	305.45
17-Sep-20	3.96	306.13	17-Sep-20	1.37	306.22	17-Sep-20	2.63	305.51
23-Oct-20	4.20	305.89	23-Oct-20	1.30	306.29	23-Oct-20	2.61	305.53
19-Nov-20	4.21	305.88	19-Nov-20	1.41	306.18	19-Nov-20	2.62	305.52
18-Dec-20	4.22	305.87	18-Dec-20	1.45	306.14	03-Dec-20	2.57	305.57
08-Jan-21	4.15	305.94	08-Jan-21	1.40	306.19	08-Jan-21	2.57	305.57
10-Feb-21	4.32	305.77	10-Feb-21	1.37	306.22	10-Feb-21	2.65	305.49
10-Mar-21	4.21	305.88	10-Mar-21	1.70	305.89	10-Mar-21	2.60	305.54
21-Apr-21	4.16	305.93	21-Apr-21	1.37	306.22	21-Apr-21	2.56	305.58
19-May-21	4.37	305.72	19-May-21	1.48	306.11	19-May-21	2.68	305.46
25-Jun-21	4.26	305.83	25-Jun-21	1.28	306.31	25-Jun-21	2.69	305.45
27-Jul-21	4.28	305.81	27-Jul-21	1.51	306.08	27-Jul-21	2.69	305.45
12-Aug-21	4.30	305.79	12-Aug-21	1.54	306.05	12-Aug-21	2.72	305.42
23-Sep-21	4.24	305.85	23-Sep-21	1.23	306.36	23-Sep-21	2.34	305.80
27-Oct-21	4.28	305.81	27-Oct-21	1.39	306.20	27-Oct-21	2.54	305.60
10-Nov-21	4.37	305.72	10-Nov-21	1.48	306.11	10-Nov-21	2.62	305.52
16-Dec-21	4.34	305.75	16-Dec-21	1.44	306.15	16-Dec-21	2.59	305.55
14-Jan-22	4.34	305.75	14-Jan-22	1.53	306.06	14-Jan-22	2.69	305.45
24-Feb-22	4.17	305.92	24-Feb-22	1.26	306.33	24-Feb-22	2.49	305.65
17-Mar-22	4.12	305.97	17-Mar-22	1.29	306.30	17-Mar-22	2.52	305.62
21-Apr-22	3.99	306.10	21-Apr-22	1.25	306.34	21-Apr-22	2.54	305.60
24-May-22	3.94	306.15	24-May-22	1.34	306.25	24-May-22	2.61	305.53
15-Jun-22	3.96	306.13	15-Jun-22	1.34	306.25	15-Jun-22	2.61	305.53
14-Jul-22	4.17	305.92	14-Jul-22	1.47	306.12	14-Jul-22	2.70	305.44
25-Aug-22	4.28	305.81	25-Aug-22	1.51	306.08	25-Aug-22	2.69	305.45
08-Sep-22	4.36	305.73	08-Sep-22	1.58	306.01	08-Sep-22	2.75	305.39
13-Oct-22	4.47	305.63	13-Oct-22	1.58	306.01	13-Oct-22	2.69	305.45
24-Nov-22	4.58	305.52	24-Nov-22	1.67	305.92	24-Nov-22	2.74	305.40
16-Dec-22	4.57	305.52	16-Dec-22	1.61	305.99	16-Dec-22	2.69	305.45
12-Jan-23	4.42	305.68	12-Jan-23	1.59	306.00	12-Jan-23	2.70	305.44
14-Feb-23	4.46	305.64	14-Feb-23	1.52	306.07	14-Feb-23	2.62	305.52
17-Mar-23	4.39	305.70	17-Mar-23	1.40	306.19	17-Mar-23	2.63	305.51
27-Apr-23	4.27	305.82	27-Apr-23	1.42	306.17	27-Apr-23	2.60	305.54
26-May-23	4.18	305.91	26-May-23	1.42	306.17	26-May-23	2.64	305.50
15-Jun-23	4.20	305.89	15-Jun-23	1.44	306.15	15-Jun-23	2.63	305.51
25-Jul-23	4.18	305.91	25-Jul-23	1.26	306.33	25-Jul-23	2.30	305.84
08-Aug-23	4.16	305.93	08-Aug-23	1.38	306.21	08-Aug-23	2.60	305.54
07-Sep-23	4.11	305.98	07-Sep-23	1.41	306.18	07-Sep-23	2.64	305.50
26-Oct-23	4.24	305.85	26-Oct-23	1.47	306.12	26-Oct-23	2.64	305.50
16-Nov-23	4.29	305.80	16-Nov-23	1.52	306.07	16-Nov-23	2.67	305.47
18-Dec-23	4.32	305.77	18-Dec-23	1.49	306.11	18-Dec-23	2.65	305.49

NOTES:
- BTOP — Below top of pipe
- NA — Not available
- m ASL — metres above sea level
- (F) — Frozen

TABLE B-1
WATER LEVEL DATA - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

TW16-78			TW16-79			OW1-84		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-19		FLOWING	28-Jan-19	0.55	303.65	28-Jan-19	1.17	303.64
27-Feb-19		FLOWING	27-Feb-19	0.46	303.75	27-Feb-19	1.15	303.66
19-Mar-19		FLOWING	19-Mar-19	0.38	303.82	19-Mar-19	1.00	303.81
24-Apr-19		FLOWING	24-Apr-19	0.40	303.80	24-Apr-19	1.03	303.78
22-May-19		FLOWING	22-May-19	0.48	303.72	22-May-19	1.09	303.72
19-Jun-19		FLOWING	19-Jun-19	0.49	303.71	19-Jun-19	1.11	303.70
26-Jul-19		FLOWING	26-Jul-19	0.64	303.56	26-Jul-19	1.25	303.56
20-Aug-19		FLOWING	20-Aug-19	0.65	303.55	20-Aug-19	1.24	303.57
25-Sep-19		FLOWING	25-Sep-19	0.69	303.51	25-Sep-19	1.32	303.49
29-Oct-19		FLOWING	29-Oct-19	0.46	303.74	29-Oct-19	1.08	303.73
13-Nov-19		FLOWING	13-Nov-19	0.50	303.70	13-Nov-19	1.21	303.60
16-Dec-19		FLOWING	16-Dec-19	0.48	303.72	16-Dec-19	NA	
09-Jan-20		FLOWING	09-Jan-20	0.50	303.70	09-Jan-20	NA	
10-Feb-20		FLOWING	10-Feb-20	0.50	303.70	10-Feb-20	1.12	303.69
09-Mar-20		FLOWING	09-Mar-20	0.37	303.83	09-Mar-20	0.97	303.84
14-Apr-20		FLOWING	14-Apr-20	0.45	303.75	14-Apr-20	1.08	303.73
13-May-20		FLOWING	13-May-20	0.52	303.68	13-May-20	1.15	303.66
11-Jun-20		FLOWING	11-Jun-20	0.49	303.71	11-Jun-20	1.10	303.71
08-Jul-20		FLOWING	08-Jul-20	0.78	303.42	08-Jul-20	1.40	303.41
19-Aug-20		FLOWING	19-Aug-20	0.75	303.45	19-Aug-20	1.37	303.44
17-Sep-20		FLOWING	17-Sep-20	0.81	303.39	17-Sep-20	1.42	303.39
23-Oct-20		FLOWING	23-Oct-20	0.54	303.66	23-Oct-20	1.16	303.65
19-Nov-20		NO FLOW	19-Nov-20	0.62	303.58	19-Nov-20	1.24	303.57
18-Dec-20		NO FLOW	18-Dec-20	0.64	303.56	18-Dec-20	(F)	
08-Jan-21		NO FLOW	08-Jan-21	0.59	303.61	08-Jan-21	(F)	
10-Feb-21		NO FLOW	10-Feb-21	0.69	303.51	10-Feb-21	1.30	303.51
10-Mar-21		FLOWING	10-Mar-21	0.47	303.73	10-Mar-21	1.09	303.72
21-Apr-21		FLOWING	21-Apr-21	0.54	303.66	21-Apr-21	1.16	303.65
19-May-21		FLOWING	19-May-21	0.79	303.41	19-May-21	1.39	303.42
25-Jun-21		FLOWING	25-Jun-21	0.62	303.58	25-Jun-21	1.19	303.62
27-Jul-21		FLOWING	27-Jul-21	0.74	303.46	27-Jul-21	1.36	303.45
12-Aug-21		FLOWING	12-Aug-21	0.72	303.48	12-Aug-21	1.34	303.47
23-Sep-21		FLOWING	23-Sep-21	0.37	303.83	23-Sep-21	0.99	303.82
27-Oct-21		FLOWING	27-Oct-21	0.50	303.70	27-Oct-21	1.07	303.74
10-Nov-21		FLOWING	10-Nov-21	0.61	303.59	10-Nov-21	1.22	303.59
16-Dec-21		NO FLOW	16-Dec-21	0.51	303.69	16-Dec-21	1.14	303.67
14-Jan-22		FLOWING	14-Jan-22	0.54	303.66	14-Jan-22	1.25	303.56
24-Feb-22		FLOWING	24-Feb-22	0.35	303.85	24-Feb-22	1.00	303.81
17-Mar-22		FLOWING	17-Mar-22	0.39	303.81	17-Mar-22	1.01	303.80
21-Apr-22		FLOWING	21-Apr-22	0.41	303.79	21-Apr-22	1.03	303.78
24-May-22		FLOWING	24-May-22	0.56	303.64	24-May-22	1.20	303.61
15-Jun-22		FLOWING	15-Jun-22	0.56	303.64	15-Jun-22	1.19	303.62
14-Jul-22		FLOWING	14-Jul-22	0.78	303.42	14-Jul-22	1.42	303.39
25-Aug-22		FLOWING	25-Aug-22	0.73	303.47	25-Aug-22	1.34	303.47
08-Sep-22		FLOWING	08-Sep-22	0.83	303.37	08-Sep-22	1.44	303.37
13-Oct-22		FLOWING	13-Oct-22	0.64	303.56	13-Oct-22	1.31	303.50
24-Nov-22		FLOWING	24-Nov-22	0.68	303.52	24-Nov-22	1.30	303.52
16-Dec-22		FLOWING	16-Dec-22	0.53	303.67	16-Dec-22	1.15	303.67
12-Jan-23		FLOWING	12-Jan-23	0.55	303.66	12-Jan-23	1.16	303.65
14-Feb-23		FLOWING	14-Feb-23	0.50	303.71	14-Feb-23	1.11	303.70
17-Mar-23		FLOWING	17-Mar-23	0.35	303.85	17-Mar-23	0.96	303.85
27-Apr-23		FLOWING	27-Apr-23	0.46	303.74	27-Apr-23	1.07	303.74
26-May-23		FLOWING	27-May-23	0.50	303.70	26-May-23	1.13	303.68
15-Jun-23		FLOWING	19-Jun-23	0.54	303.66	15-Jun-23	1.13	303.68
25-Jul-23		FLOWING	25-Jul-23	0.43	303.77	25-Jul-23	1.05	303.76
08-Aug-23		FLOWING	08-Aug-23	0.50	303.70	08-Aug-23	1.13	303.69
07-Sep-23		FLOWING	07-Sep-23	0.61	303.59	07-Sep-23	1.21	303.60
26-Oct-23		FLOWING	26-Oct-23	0.56	303.64	26-Oct-23	1.17	303.64
16-Nov-23		FLOWING	16-Nov-23	0.55	303.65	16-Nov-23	1.19	303.62
18-Dec-23		FLOWING	18-Dec-23	0.49	303.71	18-Dec-23	1.10	303.71

NOTES:
- BTOP Below top of pipe
- NA Not available
- m ASL metres above sea level
- (F) Frozen

TABLE B-1
WATER LEVEL DATA - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

OW2-84			OW4-84			OW5-84		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-19	1.20	303.60	28-Jan-19	(F)		28-Jan-19	0.81	303.59
27-Feb-19	1.10	303.70	27-Feb-19	(F)		27-Feb-19	(F)	
19-Mar-19	(F)		19-Mar-19	(F)		19-Mar-19	(F)	
24-Apr-19	1.05	303.75	24-Apr-19	0.80	303.81	24-Apr-19	0.67	303.73
22-May-19	1.12	303.68	22-May-19	0.87	303.74	22-May-19	0.72	303.68
19-Jun-19	1.13	303.67	19-Jun-19	0.88	303.73	19-Jun-19	0.74	303.66
26-Jul-19	1.28	303.52	26-Jul-19	1.01	303.60	26-Jul-19	0.87	303.53
20-Aug-19	1.27	303.53	20-Aug-19	1.02	303.59	20-Aug-19	0.87	303.53
25-Sep-19	1.34	303.46	25-Sep-19	1.08	303.53	25-Sep-19	0.94	303.46
29-Oct-19	1.10	303.70	29-Oct-19	0.85	303.76	29-Oct-19	0.71	303.69
13-Nov-19	1.15	303.65	13-Nov-19	0.89	303.72	13-Nov-19	0.76	303.64
16-Dec-19	1.13	303.67	16-Dec-19	0.88	303.73	16-Dec-19	0.74	303.66
09-Jan-20	1.14	303.66	09-Jan-20	0.88	303.73	09-Jan-20	0.76	303.64
10-Feb-20	1.15	303.65	10-Feb-20	0.89	303.72	10-Feb-20	0.76	303.64
09-Mar-20	1.00	303.80	09-Mar-20	0.74	303.87	09-Mar-20	0.60	303.80
14-Apr-20	1.10	303.70	14-Apr-20	0.85	303.76	14-Apr-20	0.71	303.69
13-May-20	1.17	303.63	13-May-20	0.92	303.69	13-May-20	0.78	303.62
11-Jun-20	1.13	303.67	11-Jun-20	0.87	303.74	11-Jun-20	0.74	303.66
08-Jul-20	1.41	303.39	08-Jul-20	1.16	303.45	08-Jul-20	1.02	303.38
19-Aug-20	1.39	303.41	19-Aug-20	1.13	303.48	19-Aug-20	1.01	303.39
17-Sep-20	1.38	303.42	17-Sep-20	1.19	303.42	17-Sep-20	1.06	303.34
23-Oct-20	1.17	303.63	23-Oct-20	0.94	303.67	23-Oct-20	0.81	303.59
19-Nov-20	1.27	303.53	19-Nov-20	1.01	303.60	19-Nov-20	0.88	303.52
18-Dec-20	1.25	303.55	18-Dec-20	1.05	303.56	18-Dec-20	0.87	303.53
08-Jan-21	1.18	303.62	08-Jan-21	0.97	303.64	08-Jan-21	0.80	303.60
10-Feb-21	1.34	303.46	10-Feb-21	1.08	303.53	10-Feb-21	0.94	303.46
10-Mar-21	1.10	303.70	10-Mar-21	0.85	303.76	10-Mar-21	0.73	303.67
21-Apr-21	1.19	303.61	21-Apr-21	0.94	303.67	21-Apr-21	0.80	303.60
19-May-21	1.41	303.39	19-May-21	1.15	303.46	19-May-21	1.02	303.38
25-Jun-21	1.21	303.59	25-Jun-21	0.98	303.63	25-Jun-21	0.84	303.56
27-Jul-21	1.39	303.41	27-Jul-21	1.15	303.46	27-Jul-21	0.99	303.41
12-Aug-21	1.37	303.43	12-Aug-21	1.12	303.49	12-Aug-21	0.98	303.42
23-Sep-21	1.01	303.79	23-Sep-21	0.76	303.85	23-Sep-21	0.62	303.78
27-Oct-21	1.14	303.66	27-Oct-21	0.89	303.72	27-Oct-21	0.75	303.65
10-Nov-21	1.25	303.55	10-Nov-21	1.00	303.61	10-Nov-21	0.88	303.52
16-Dec-21	1.16	303.64	16-Dec-21	0.89	303.72	16-Dec-21	0.77	303.63
14-Jan-22	1.28	303.52	14-Jan-22	1.02	303.59	14-Jan-22	0.90	303.50
24-Feb-22	0.96	303.84	24-Feb-22	0.71	303.90	24-Feb-22	0.78	303.62
17-Mar-22	0.93	303.87	17-Mar-22	0.73	303.88	17-Mar-22	0.76	303.65
21-Apr-22	1.05	303.75	21-Apr-22	0.80	303.81	21-Apr-22	0.64	303.76
24-May-22	1.18	303.62	24-May-22	0.95	303.66	24-May-22	0.82	303.58
15-Jun-22	1.21	303.59	15-Jun-22	0.95	303.66	15-Jun-22	0.83	303.57
14-Jul-22	1.43	303.37	14-Jul-22	1.18	303.43	14-Jul-22	1.04	303.36
25-Aug-22	1.37	303.43	25-Aug-22	1.12	303.49	25-Aug-22	0.98	303.42
08-Sep-22	1.46	303.34	08-Sep-22	1.21	303.40	08-Sep-22	1.08	303.32
13-Oct-22	1.33	303.47	13-Oct-22	1.08	303.53	13-Oct-22	0.95	303.45
24-Nov-22	1.31	303.49	24-Nov-22	1.06	303.55	24-Nov-22	0.93	303.47
16-Dec-22	1.17	303.64	16-Dec-22	0.91	303.70	16-Dec-22	0.89	303.52
12-Jan-23	1.19	303.61	12-Jan-23	0.93	303.68	12-Jan-23	0.80	303.60
14-Feb-23	1.15	303.65	14-Feb-23	0.90	303.71	14-Feb-23	(F)	
17-Mar-23	1.00	303.80	17-Mar-23	0.73	303.88	17-Mar-23	0.60	303.80
27-Apr-23	1.10	303.70	27-Apr-23	0.84	303.77	27-Apr-23	0.70	303.70
26-May-23	1.15	303.65	26-May-23	0.89	303.72	26-May-23	0.76	303.64
15-Jun-23	1.17	303.63	15-Jun-23	0.90	303.71	15-Jun-23	0.78	303.62
25-Jul-23	1.08	303.72	25-Jul-23	0.82	303.79	25-Jul-23	0.69	303.71
08-Aug-23	1.15	303.65	08-Aug-23	0.90	303.72	08-Aug-23	0.76	303.64
07-Sep-23	1.27	303.53	07-Sep-23	0.98	303.63	07-Sep-23	0.85	303.55
26-Oct-23	1.20	303.61	26-Oct-23	0.94	303.67	26-Oct-23	0.81	303.59
16-Nov-23	1.21	303.59	16-Nov-23	0.94	303.67	16-Nov-23	0.82	303.59
18-Dec-23	1.13	303.67	18-Dec-23	0.87	303.74	18-Dec-23	0.74	303.66

NOTES:
- BTOP — Below top of pipe
- NA — Not available
- m ASL — metres above sea level
- (F) — Frozen

TABLE B-1
WATER LEVEL DATA - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

OW16A-78			BH92-1/BH92-1R			BH92-5		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-19	(F)					28-Jan-19	1.83	306.37
27-Feb-19	(F)		Decommissioned and re-installed			27-Feb-19	NA	
19-Mar-19	(F)					19-Mar-19	1.66	306.54
24-Apr-19	0.68	303.82	11-Jun-20	7.92	306.70	24-Apr-19	1.52	306.68
22-May-19	0.75	303.75	08-Jul-20	8.03	306.59	22-May-19	1.40	306.80
19-Jun-19	0.77	303.73	19-Aug-20	8.20	306.42	19-Jun-19	1.36	306.84
26-Jul-19	0.90	303.60	17-Sep-20	8.31	306.31	26-Jul-19	1.38	306.82
20-Aug-19	0.90	303.60	23-Oct-20	8.47	306.15	20-Aug-19	1.51	306.69
25-Sep-19	0.93	303.57	19-Nov-20	8.50	306.12	25-Sep-19	1.65	306.55
29-Oct-19	0.73	303.77	03-Dec-20	8.50	306.12	29-Oct-19	1.69	306.51
13-Nov-19	0.78	303.72	08-Jan-21	8.46	306.16	13-Nov-19	1.64	306.56
16-Dec-19	0.75	303.75	10-Feb-21	8.50	306.12	16-Dec-19	1.62	306.58
09-Jan-20	NA		10-Mar-21	8.49	306.13	09-Jan-20	1.58	306.62
10-Feb-20	NA		21-Apr-21	8.45	306.17	10-Feb-20	NA	
09-Mar-20	0.63	303.87	19-May-21	8.53	306.09	09-Mar-20	1.34	306.86
14-Apr-20	0.73	303.77	25-Jun-21	8.61	306.01	14-Apr-20	1.29	306.91
13-May-20	0.80	303.70	27-Jul-21	8.59	306.03	13-May-20	1.35	306.85
11-Jun-20	0.76	303.74	12-Aug-21	8.63	305.99	11-Jun-20	1.30	306.90
08-Jul-20	1.07	303.43	23-Sep-21	8.61	306.01	08-Jul-20	1.48	306.72
19-Aug-20	1.03	303.47	27-Oct-21	8.62	306.00	19-Aug-20	1.39	306.81
17-Sep-20	1.08	303.42	10-Nov-21	8.68	305.94	17-Sep-20	1.72	306.48
23-Oct-20	0.82	303.68	16-Dec-21	8.64	305.98	23-Oct-20	1.74	306.46
19-Nov-20	0.89	303.61	14-Jan-22	8.67	305.95	19-Nov-20	1.82	306.38
18-Dec-20	0.89	303.61	24-Feb-22	8.47	306.15	18-Dec-20	(F)	
08-Jan-21	(F)		17-Mar-22	8.39	306.23	08-Jan-21	(F)	
10-Feb-21	(F)		21-Apr-22	8.27	306.35	10-Feb-21	1.80	306.40
10-Mar-21	(F)		24-May-22	8.25	306.37	10-Mar-21	1.76	306.44
21-Apr-21	0.82	303.68	15-Jun-22	8.28	306.34	21-Apr-21	1.78	306.42
19-May-21	1.04	303.46	14-Jul-22	8.44	306.18	19-May-21	1.87	306.33
25-Jun-21	0.95	303.55	25-Aug-22	8.57	306.05	25-Jun-21	1.81	306.39
27-Jul-21	1.02	303.48	08-Sep-22	8.65	305.97	27-Jul-21	1.91	306.29
12-Aug-21	1.00	303.50	13-Oct-22	8.78	305.84	12-Aug-21	1.95	306.25
23-Sep-21	0.65	303.85	24-Nov-22	8.90	305.72	23-Sep-21	1.84	306.36
27-Oct-21	0.78	303.72	16-Dec-22	8.91	305.71	27-Oct-21	1.88	306.32
10-Nov-21	0.90	303.60	12-Jan-23	8.80	305.82	10-Nov-21	1.94	306.26
16-Dec-21	0.80	303.70	14-Feb-23	8.76	305.87	16-Dec-21	1.90	306.30
14-Jan-22	0.91	303.59	17-Mar-23	8.70	305.93	14-Jan-22	1.93	306.28
24-Feb-22	0.89	303.61	27-Apr-23	8.54	306.08	24-Feb-22	1.72	306.48
17-Mar-22	0.88	303.62	26-May-23	8.47	306.15	17-Mar-22	1.71	306.50
21-Apr-22	0.68	303.82	15-Jun-23	8.49	306.13	21-Apr-22	1.66	306.54
24-May-22	0.85	303.65	25-Jul-23	8.43	306.19	24-May-22	1.65	306.55
15-Jun-22	0.86	303.64	08-Aug-23	8.44	306.18	15-Jun-22	1.68	306.52
14-Jul-22	1.08	303.42	07-Sep-23	8.42	306.21	14-Jul-22	1.83	306.37
25-Aug-22	1.01	303.49	26-Oct-23	8.55	306.07	25-Aug-22	1.94	306.26
08-Sep-22	1.11	303.39	16-Nov-23	8.62	306.00	08-Sep-22	2.00	306.20
13-Oct-22	0.97	303.53	18-Dec-23	8.62	306.01	13-Oct-22	2.08	306.12
24-Nov-22	0.95	303.55				24-Nov-22	2.19	306.01
16-Dec-22	0.80	303.70				16-Dec-22	2.16	306.04
12-Jan-23	0.82	303.68				12-Jan-23	2.08	306.12
14-Feb-23	0.80	303.70				14-Feb-23	2.01	306.19
17-Mar-23	0.64	303.86				17-Mar-23	1.95	306.25
27-Apr-23	0.71	303.79				27-Apr-23	1.85	306.35
26-May-23	0.78	303.72				26-May-23	1.81	306.39
15-Jun-23	0.79	303.71				15-Jun-23	1.86	306.34
25-Jul-23	0.70	303.80				25-Jul-23	1.79	306.41
08-Aug-23	0.78	303.72				08-Aug-23	1.78	306.42
07-Sep-23	0.87	303.63				07-Sep-23	1.80	306.40
26-Oct-23	0.83	303.67				26-Oct-23	1.90	306.30
16-Nov-23	0.84	303.66				16-Nov-23	1.97	306.23
18-Dec-23	0.76	303.74				18-Dec-23	1.94	306.26

NOTES:
- BTOP Below top of pipe
- NA Not available
- m ASL metres above sea level
- (F) Frozen

TABLE B-1
WATER LEVEL DATA - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

BH92-8			BH92-12A			BH92-13		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-19	3.45	306.20	28-Jan-19	2.49	305.67	28-Jan-19	3.94	306.06
27-Feb-19	3.37	306.28	27-Feb-19	2.44	305.72	27-Feb-19	3.98	306.02
19-Mar-19	3.28	306.37	19-Mar-19	2.30	305.86	19-Mar-19	3.78	306.22
24-Apr-19	3.11	306.54	24-Apr-19	2.19	305.97	24-Apr-19	3.62	306.38
22-May-19	2.99	306.66	22-May-19	2.25	305.91	22-May-19	3.48	306.52
19-Jun-19	2.93	306.72	19-Jun-19	2.26	305.90	19-Jun-19	3.42	306.58
26-Jul-19	2.94	306.71	26-Jul-19	2.31	305.85	26-Jul-19	3.43	306.58
20-Aug-19	2.99	306.66	20-Aug-19	2.33	305.83	20-Aug-19	3.46	306.54
25-Sep-19	3.18	306.47	25-Sep-19	2.41	305.75	25-Sep-19	3.65	306.35
29-Oct-19	3.08	306.57	29-Oct-19	2.30	305.86	29-Oct-19	3.58	306.42
13-Nov-19	3.18	306.47	13-Nov-19	2.36	305.80	13-Nov-19	3.69	306.31
16-Dec-19	3.21	306.44	16-Dec-19	2.35	305.81	16-Dec-19	3.71	306.29
09-Jan-20	3.18	306.47	09-Jan-20	2.41	305.75	09-Jan-20	3.71	306.29
10-Feb-20	NA		10-Feb-20	2.24	305.92	10-Feb-20	3.48	306.52
09-Mar-20	2.93	306.72	09-Mar-20	2.18	305.98	09-Mar-20	3.43	306.57
14-Apr-20	2.87	306.78	14-Apr-20	2.19	305.97	14-Apr-20	3.35	306.65
13-May-20	2.92	306.73	13-May-20	2.25	305.91	13-May-20	3.38	306.62
11-Jun-20	2.88	306.77	11-Jun-20	2.18	305.98	11-Jun-20	3.36	306.64
08-Jul-20	3.05	306.60	08-Jul-20	2.36	305.80	08-Jul-20	3.50	306.50
19-Aug-20	3.11	306.54	19-Aug-20	2.42	305.74	19-Aug-20	3.62	306.38
17-Sep-20	3.26	306.39	17-Sep-20	2.48	305.68	17-Sep-20	3.73	306.27
23-Oct-20	3.32	306.33	23-Oct-20	2.37	305.79	23-Oct-20	3.85	306.15
19-Nov-20	3.38	306.27	19-Nov-20	2.46	305.70	19-Nov-20	3.91	306.09
18-Dec-20	3.41	306.24	03-Dec-20	2.50	305.66	03-Dec-20	3.89	306.11
08-Jan-21	3.38	306.27	08-Jan-21	2.42	305.74	08-Jan-21	3.85	306.15
10-Feb-21	3.44	306.21	10-Feb-21	2.51	305.65	10-Feb-21	3.92	306.08
10-Mar-21	3.41	306.24	10-Mar-21	2.46	305.70	10-Mar-21	3.92	306.08
21-Apr-21	3.34	306.31	21-Apr-21	2.39	305.77	21-Apr-21	3.86	306.14
19-May-21	3.50	306.15	19-May-21	2.59	305.57	19-May-21	3.92	306.08
25-Jun-21	3.40	306.25	25-Jun-21	2.32	305.84	25-Jun-21	4.04	305.96
27-Jul-21	3.48	306.17	27-Jul-21	2.56	305.60	27-Jul-21	3.96	306.04
12-Aug-21	3.51	306.14	12-Aug-21	2.59	305.57	12-Aug-21	4.03	305.97
23-Sep-21	3.40	306.25	23-Sep-21	2.23	305.93	23-Sep-21	3.97	306.03
27-Oct-21	3.44	306.21	27-Oct-21	2.41	305.75	27-Oct-21	3.98	306.02
10-Nov-21	3.49	306.16	10-Nov-21	2.49	305.67	10-Nov-21	4.03	305.97
16-Dec-21	3.54	306.11	16-Dec-21	2.47	305.69	16-Dec-21	4.10	305.90
14-Jan-22	3.57	306.08	14-Jan-22	2.57	305.59	14-Jan-22	4.09	305.91
24-Feb-22	3.39	306.26	24-Feb-22	2.33	305.83	24-Feb-22	3.93	306.07
17-Mar-22	3.34	306.31	17-Mar-22	2.36	305.80	17-Mar-22	3.86	306.14
21-Apr-22	3.24	306.41	21-Apr-22	2.32	305.84	21-Apr-22	3.73	306.27
24-May-22	3.31	306.34	24-May-22	2.44	305.72	24-May-22	3.82	306.18
15-Jun-22	3.33	306.32	15-Jun-22	2.43	305.73	15-Jun-22	3.84	306.16
14-Jul-22	3.44	306.21	14-Jul-22	2.55	305.61	14-Jul-22	3.94	306.06
25-Aug-22	3.54	306.11	25-Aug-22	2.82	305.59	25-Aug-22	4.08	305.92
08-Sep-22	3.62	306.03	08-Sep-22	2.89	305.52	08-Sep-22	4.16	305.84
13-Oct-22	3.68	305.97	13-Oct-22	2.89	305.52	13-Oct-22	4.23	305.77
24-Nov-22	3.77	305.88	24-Nov-22	2.96	305.45	24-Nov-22	4.32	305.68
16-Dec-22	3.74	305.91	16-Dec-22	2.89	305.52	16-Dec-22	4.29	305.72
12-Jan-23	3.71	305.94	12-Jan-23	2.88	305.53	12-Jan-23	4.24	305.76
14-Feb-23	3.67	305.98	14-Feb-23	2.79	305.62	14-Feb-23	4.22	305.79
17-Mar-23	3.64	306.01	17-Mar-23	2.78	305.63	17-Mar-23	4.20	305.81
27-Apr-23	3.54	306.11	27-Apr-23	2.75	305.67	27-Apr-23	4.12	305.88
26-May-23	3.43	306.22	26-May-23	2.75	305.66	26-May-23	3.97	306.03
15-Jun-23	3.43	306.22	15-Jun-23	2.75	305.66	15-Jun-23	3.97	306.03
25-Jul-23	3.49	306.16	25-Jul-23	2.57	305.84	25-Jul-23	4.06	305.95
08-Aug-23	3.41	306.24	08-Aug-23	2.71	305.70	08-Aug-23	3.95	306.05
07-Sep-23	3.42	306.23	07-Sep-23	2.75	305.66	07-Sep-23	3.94	306.06
26-Oct-23	3.52	306.13	26-Oct-23	2.78	305.63	26-Oct-23	4.08	305.93
16-Nov-23	3.58	306.07	16-Nov-23	2.83	305.58	16-Nov-23	4.13	305.87
18-Dec-23	3.62	306.03	18-Dec-23	2.81	305.60	18-Dec-23	4.15	305.85

NOTES:
- · BTOP Below top of pipe
- · NA Not available
- · m ASL metres above sea level
- · (F) Frozen

TABLE B-1
WATER LEVEL DATA - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

BH92-27			BH92-28			BH92-29		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-19	1.30	304.60	28-Jan-19	2.09	304.51	28-Jan-19	2.21	304.69
27-Feb-19	1.21	304.69	27-Feb-19	2.05	304.55	27-Feb-19	2.14	304.76
19-Mar-19	1.15	304.75	19-Mar-19	1.95	304.65	19-Mar-19	2.07	304.83
24-Apr-19	1.07	304.83	24-Apr-19	1.96	304.64	24-Apr-19	1.96	304.94
22-May-19	1.09	304.81	22-May-19	2.01	304.59	22-May-19	1.94	304.96
19-Jun-19	1.07	304.83	19-Jun-19	1.93	304.67	19-Jun-19	1.91	304.99
26-Jul-19	1.22	304.68	26-Jul-19	2.04	304.56	26-Jul-19	2.03	304.87
20-Aug-19	1.29	304.61	20-Aug-19	2.08	304.52	20-Aug-19	2.15	304.75
25-Sep-19	1.40	304.50	25-Sep-19	2.18	304.42	25-Sep-19	2.29	304.61
29-Oct-19	1.29	304.61	29-Oct-19	2.04	304.56	29-Oct-19	2.23	304.67
13-Nov-19	1.28	304.62	13-Nov-19	2.07	304.53	13-Nov-19	2.22	304.68
16-Dec-19	1.22	304.68	16-Dec-19	2.01	304.59	16-Dec-19	2.17	304.73
09-Jan-20	1.24	304.66	09-Jan-20	2.04	304.56	09-Jan-20	2.15	304.75
10-Feb-20	1.13	304.77	10-Feb-20	1.97	304.63	10-Feb-20	1.99	304.91
09-Mar-20	1.08	304.82	09-Mar-20	1.94	304.66	09-Mar-20	1.96	304.94
14-Apr-20	1.10	304.80	14-Apr-20	1.94	304.66	14-Apr-20	1.96	304.94
13-May-20	1.17	304.73	13-May-20	2.00	304.60	13-May-20	2.05	304.85
11-Jun-20	1.19	304.71	11-Jun-20	1.99	304.61	11-Jun-20	2.07	304.83
08-Jul-20	1.39	304.51	08-Jul-20	2.18	304.42	08-Jul-20	2.22	304.68
19-Aug-20	1.48	304.42	19-Aug-20	2.30	304.30	19-Aug-20	2.36	304.54
17-Sep-20	1.53	304.37	17-Sep-20	2.26	304.34	17-Sep-20	2.43	304.47
23-Oct-20	1.43	304.47	23-Oct-20	2.21	304.39	23-Oct-20	2.41	304.49
19-Nov-20	1.43	304.47	19-Nov-20	2.30	304.30	19-Nov-20	2.43	304.47
03-Dec-20	1.36	304.54	03-Dec-20	2.10	304.50	03-Dec-20	2.37	304.53
08-Jan-21	1.30	304.60	08-Jan-21	2.07	304.53	08-Jan-21	2.28	304.62
10-Feb-21	1.38	304.52	10-Feb-21	2.15	304.45	10-Feb-21	2.31	304.59
10-Mar-21	1.27	304.63	10-Mar-21	2.09	304.51	10-Mar-21	2.27	304.63
21-Apr-21	1.26	304.64	21-Apr-21	2.10	304.50	21-Apr-21	2.19	304.71
19-May-21	1.38	304.52	19-May-21	2.17	304.43	19-May-21	2.29	304.61
25-Jun-21	1.49	304.41	25-Jun-21	2.24	304.36	25-Jun-21	2.41	304.49
27-Jul-21	1.48	304.43	27-Jul-21	2.24	304.36	27-Jul-21	2.40	304.50
12-Aug-21	1.48	304.42	12-Aug-21	2.26	304.34	12-Aug-21	2.42	304.48
23-Sep-21	1.26	304.65	23-Sep-21	1.95	304.65	23-Sep-21	2.41	304.49
27-Oct-21	1.31	304.59	27-Oct-21	2.05	304.55	27-Oct-21	2.33	304.57
10-Nov-21	1.37	304.53	10-Nov-21	2.14	304.46	10-Nov-21	2.36	304.54
16-Dec-21	1.25	304.65	16-Dec-21	2.02	304.58	16-Dec-21	2.21	304.69
14-Jan-22	1.32	304.58	14-Jan-22	2.14	304.46	14-Jan-22	2.37	304.53
24-Feb-22	1.17	304.73	24-Feb-22	1.89	304.71	24-Feb-22	2.13	304.77
17-Mar-22	1.17	304.73	17-Mar-22	1.95	304.65	17-Mar-22	2.11	304.79
21-Apr-22	1.16	304.74	21-Apr-22	1.99	304.61	21-Apr-22	2.08	304.82
24-May-22	1.17	304.73	24-May-22	2.03	304.57	24-May-22	2.06	304.84
15-Jun-22	1.19	304.71	15-Jun-22	2.01	304.59	15-Jun-22	2.03	304.87
14-Jul-22	1.41	304.49	14-Jul-22	2.18	304.42	14-Jul-22	2.23	304.67
25-Aug-22	1.46	304.44	25-Aug-22	2.20	304.40	25-Aug-22	2.32	304.58
08-Sep-22	1.51	304.39	08-Sep-22	2.26	304.34	08-Sep-22	2.38	304.52
13-Oct-22	1.49	304.41	13-Oct-22	2.26	304.34	13-Oct-22	2.43	304.47
24-Nov-22	1.51	304.39	24-Nov-22	2.26	304.34	24-Nov-22	2.50	304.40
16-Dec-22	1.44	304.46	16-Dec-22	2.19	304.41	16-Dec-22	2.43	304.47
12-Jan-23	1.36	304.54	12-Jan-23	2.13	304.47	12-Jan-23	2.33	304.57
14-Feb-23	1.25	304.65	14-Feb-23	2.01	304.59	14-Feb-23	2.20	304.70
17-Mar-23	1.15	304.75	17-Mar-23	1.91	304.69	17-Mar-23	2.06	304.85
27-Apr-23	1.01	304.89	27-Apr-23	1.87	304.73	27-Apr-23	1.83	305.07
26-May-23	1.07	304.83	26-May-23	1.94	304.66	26-May-23	1.90	305.00
15-Jun-23	1.16	304.74	15-Jun-23	2.01	304.59	15-Jun-23	2.01	304.89
25-Jul-23	1.05	304.85	25-Jul-23	1.80	304.80	25-Jul-23	1.90	305.00
08-Aug-23	1.12	304.78	08-Aug-23	1.94	304.67	08-Aug-23	1.99	304.91
07-Sep-23	1.17	304.73	07-Sep-23	2.16	304.44	07-Sep-23	2.01	304.89
26-Oct-23	1.21	304.69	26-Oct-23	2.05	304.55	26-Oct-23	2.14	304.77
16-Nov-23	1.26	304.64	16-Nov-23	2.07	304.53	16-Nov-23	2.16	304.74
18-Dec-23	1.17	304.73	18-Dec-23	2.00	304.60	18-Dec-23	2.04	304.87

NOTES:
- BTOP — Below top of pipe
- NA — Not available
- m ASL — metres above sea level
- (F) — Frozen

TABLE B-1
WATER LEVEL DATA - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

BH92-32			BH92-33		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-19	1.23	304.17	28-Jan-19	1.72	304.48
27-Feb-19	1.10	304.30	27-Feb-19	1.65	304.55
19-Mar-19	1.03	304.37	19-Mar-19	1.58	304.62
24-Apr-19	1.14	304.26	24-Apr-19	1.50	304.70
22-May-19	0.92	304.48	22-May-19	1.61	304.59
19-Jun-19	1.07	304.33	19-Jun-19	1.54	304.66
26-Jul-19	1.32	304.08	26-Jul-19	1.66	304.54
20-Aug-19	1.21	304.19	20-Aug-19	1.72	304.48
25-Sep-19	1.35	304.05	25-Sep-19	1.83	304.37
29-Oct-19	1.32	304.08	29-Oct-19	1.71	304.49
13-Nov-19	1.26	304.14	13-Nov-19	1.70	304.50
16-Dec-19	1.27	304.13	16-Dec-19	1.65	304.55
09-Jan-20	1.26	304.14	09-Jan-20	1.68	304.52
10-Feb-20	1.14	304.26	10-Feb-20	1.57	304.63
09-Mar-20	1.09	304.31	09-Mar-20	1.52	304.68
14-Apr-20	1.10	304.30	14-Apr-20	1.55	304.65
13-May-20	1.15	304.25	13-May-20	1.60	304.60
11-Jun-20	1.04	304.36	11-Jun-20	1.64	304.56
08-Jul-20	1.37	304.03	08-Jul-20	1.83	304.37
19-Aug-20	1.42	303.98	19-Aug-20	1.91	304.29
17-Sep-20	1.53	303.87	17-Sep-20	1.94	304.26
23-Oct-20	1.35	304.05	23-Oct-20	1.86	304.34
19-Nov-20	1.34	304.06	19-Nov-20	1.84	304.36
03-Dec-20	1.24	304.16	03-Dec-20	1.77	304.43
08-Jan-21	1.08	304.32	08-Jan-21	1.73	304.47
10-Feb-21	1.19	304.21	10-Feb-21	1.80	304.40
10-Mar-21	1.31	304.09	10-Mar-21	1.74	304.46
21-Apr-21	1.37	304.03	21-Apr-21	1.70	304.50
19-May-21	1.28	304.12	19-May-21	1.81	304.39
25-Jun-21	1.36	304.04	25-Jun-21	1.91	304.29
27-Jul-21	1.32	304.08	27-Jul-21	1.90	304.31
12-Aug-21	1.39	304.01	12-Aug-21	1.90	304.30
23-Sep-21	1.08	304.32	23-Sep-21	1.64	304.56
27-Oct-21	1.21	304.19	27-Oct-21	1.72	304.48
10-Nov-21	1.30	304.10	10-Nov-21	1.78	304.42
16-Dec-21	1.18	304.22	16-Dec-21	1.67	304.53
14-Jan-22	1.26	304.14	14-Jan-22	1.76	304.44
24-Feb-22	1.08	304.32	24-Feb-22	1.59	304.61
17-Mar-22	1.08	304.32	17-Mar-22	1.60	304.60
21-Apr-22	1.02	304.38	21-Apr-22	1.60	304.60
24-May-22	1.09	304.31	24-May-22	1.63	304.57
15-Jun-22	1.08	304.32	15-Jun-22	1.64	304.56
14-Jul-22	1.31	304.09	14-Jul-22	1.85	304.35
25-Aug-22	1.33	304.07	25-Aug-22	1.86	304.34
08-Sep-22	1.42	303.98	08-Sep-22	1.93	304.27
13-Oct-22	1.37	304.03	13-Oct-22	1.91	304.29
24-Nov-22	1.41	303.99	24-Nov-22	1.92	304.28
16-Dec-22	1.28	304.12	16-Dec-22	1.86	304.35
12-Jan-23	1.24	304.16	12-Jan-23	1.78	304.42
14-Feb-23	1.13	304.27	14-Feb-23	1.68	304.53
17-Mar-23	0.94	304.46	17-Mar-23	1.59	304.61
27-Apr-23	0.90	304.50	27-Apr-23	1.47	304.73
26-May-23	0.80	304.60	26-May-23	1.54	304.66
15-Jun-23	1.06	304.34	15-Jun-23	1.63	304.57
25-Jul-23	0.97	304.43	25-Jul-23	1.46	304.74
08-Aug-23	1.06	304.34	08-Aug-23	1.55	304.65
07-Sep-23	1.11	304.29	07-Sep-23	1.62	304.58
26-Oct-23	1.10	304.30	26-Oct-23	1.51	304.70
16-Nov-23	1.18	304.22	16-Nov-23	1.69	304.51
18-Dec-23	0.96	304.44	18-Dec-23	1.61	304.59

NOTES:
- · BTOP — Below top of pipe
- · NA — Not available
- · m ASL — metres above sea level
- · (F) — Frozen

TABLE B-2
WATER LEVEL DATA - RESIDENTIAL WELLS
MILL CREEK AGGREGATES PIT

NORTH FARMHOUSE WELL (MOE WELL 4794)		SMITH WELL	
DATE	Water Level BTOC (m)	DATE	Water Level BTOC (m)
28-Jan-19	NA	28-Jan-19	NA
27-Feb-19	NA	27-Feb-19	NA
19-Mar-19	5.16	19-Mar-19	5.32
24-Apr-19	5	24-Apr-19	6.1
22-May-19	4.83	22-May-19	5.97
19-Jun-19	4.78	19-Jun-19	5.85
26-Jul-19	4.85	26-Jul-19	5.93
20-Aug-19	4.94	20-Aug-19	6.01
25-Sep-19	5.09	25-Sep-19	6.20
29-Oct-19	5.12	29-Oct-19	6.23
13-Nov-19	NA	13-Nov-19	6.27
16-Dec-19	5.1	16-Dec-19	6.26
09-Jan-20	5.09	09-Jan-20	6.26
10-Feb-20	4.91	10-Feb-20	6.06
09-Mar-20	4.82	09-Mar-20	5.95
14-Apr-20	NA	14-Apr-20	6.25
13-May-20	4.78	13-May-20	5.91
11-Jun-20	4.78	11-Jun-20	5.91
08-Jul-20	4.93	08-Jul-20	6.06
19-Aug-20	5.09	19-Aug-20	6.16
17-Sep-20	5.20	17-Sep-20	6.21
23-Oct-20	NA	23-Oct-20	6.44
19-Nov-20	5.39	19-Nov-20	6.47
18-Dec-20	5.38	18-Dec-20	6.50
08-Jan-21	NA	08-Jan-21	6.41
10-Feb-21	5.40	10-Feb-21	6.50
10-Mar-21	5.39	10-Mar-21	6.50
21-Apr-21	5.38	21-Apr-21	6.47
19-May-21	5.40	19-May-21	6.50
25-Jun-21	5.47	25-Jun-21	6.50
27-Jul-21	5.48	27-Jul-21	6.58
12-Aug-21	5.49	12-Aug-21	6.65
23-Sep-21	5.55	23-Sep-21	6.61
27-Oct-21	5.44	27-Oct-21	6.58
10-Nov-21	5.53	10-Nov-21	6.56
16-Dec-21	5.52	16-Dec-21	6.60
14-Jan-22	5.50	14-Jan-22	6.62
24-Feb-22	5.44	24-Feb-22	6.48
17-Mar-22	5.42	17-Mar-22	6.44
21-Apr-22	5.23	21-Apr-22	6.27
24-May-22	5.17	24-May-22	6.21
15-Jun-22	5.21	15-Jun-22	6.26
14-Jul-22	5.30	14-Jul-22	5.85
25-Aug-22	5.44	25-Aug-22	6.44
08-Sep-22	5.52	08-Sep-22	6.52
13-Oct-22	5.67	13-Oct-22	6.64
24-Nov-22	5.76	24-Nov-22	6.77
16-Dec-22	5.75	16-Dec-22	6.76
12-Jan-23	5.69	12-Jan-23	6.67
14-Feb-23	5.64	14-Feb-23	6.61
17-Mar-23	5.58	17-Mar-23	6.58
27-Apr-23	5.49	27-Apr-23	6.45
26-May-23	5.36	26-May-23	6.34
15-Jun-23	5.36	15-Jun-23	6.36
25-Jul-23	4.56	25-Jul-23	6.30
08-Aug-23	5.33	08-Aug-23	6.28
07-Sep-23	5.31	07-Sep-23	6.33
26-Oct-23	5.42	26-Oct-23	6.38
16-Nov-23	5.46	16-Nov-23	6.42
18-Dec-23	5.48	18-Dec-23	6.47

NOTES:
· BTOC — Below top of concrete crib
· NA — Not available

TABLE B-3
WATER LEVEL DATA - WETLAND DRIVE POINTS
MILL CREEK AGGREGATES PIT

DP6			DP7			DP8		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-2019	1.09	305.73	28-Jan-2019	1.77	305.86	28-Jan-2019	1.51	305.69
27-Feb-2019	1.10	305.72	27-Feb-2019	1.68	305.95	27-Feb-2019	1.46	305.74
19-Mar-2019	0.88	305.94	19-Mar-2019	1.60	306.03	19-Mar-2019	1.39	305.81
24-Apr-2019	0.72	306.10	24-Apr-2019	1.44	306.19	24-Apr-2019	1.26	305.94
22-May-2019	0.76	306.06	22-May-2019	1.42	306.21	22-May-2019	1.39	305.81
19-Jun-2019	0.76	306.06	19-Jun-2019	1.38	306.25	19-Jun-2019	1.23	305.97
26-Jul-2019	0.81	306.01	26-Jul-2019	1.40	306.23	26-Jul-2019	1.28	305.92
20-Aug-2019	0.82	306.00	20-Aug-2019	1.39	306.24	20-Aug-2019	1.31	305.89
25-Sep-2019	0.90	305.92	25-Sep-2019	1.56	306.07	25-Sep-2019	1.41	305.79
29-Oct-2019	0.77	306.05	29-Oct-2019	1.42	306.21	29-Oct-2019	1.28	305.92
13-Nov-2019	(F)		13-Nov-2019	1.56	306.07	13-Nov-2019	1.33	305.87
16-Dec-2019	(F)		16-Dec-2019	1.58	306.05	16-Dec-2019	1.33	305.87
09-Jan-2020	0.89	305.93	09-Jan-2020	1.55	306.08	09-Jan-2020	1.34	305.86
10-Feb-2020	0.80	306.02	10-Feb-2020	1.43	306.20	10-Feb-2020	(F)	
09-Mar-2020	0.68	306.14	09-Mar-2020	1.38	306.25	09-Mar-2020	1.33	305.87
14-Apr-2020	0.68	306.14	14-Apr-2020	1.34	306.29	14-Apr-2020	1.21	305.99
13-May-2020	0.75	306.07	13-May-2020	1.37	306.26	13-May-2020	1.23	305.97
11-Jun-2020	0.67	306.15	11-Jun-2020	1.35	306.28	11-Jun-2020	1.33	305.87
08-Jul-2020	0.91	305.91	08-Jul-2020	1.52	306.11	08-Jul-2020	1.39	305.81
19-Aug-2020	0.97	305.85	19-Aug-2020	1.59	306.04	19-Aug-2020	1.57	305.63
17-Sep-2020	1.06	305.76	17-Sep-2020	1.65	305.98	17-Sep-2020	1.52	305.68
23-Oct-2020	0.95	305.87	23-Oct-2020	1.71	305.92	23-Oct-2020	1.58	305.62
19-Nov-2020	0.99	305.83	19-Nov-2020	1.75	305.88	19-Nov-2020	1.53	305.67
03-Dec-2020	1.10	305.72	03-Dec-2020	1.70	305.93	03-Dec-2020	1.47	305.73
08-Jan-2021	1.04	305.78	08-Jan-2021	1.70	305.93	08-Jan-2021	1.43	305.77
10-Feb-2021	1.13	305.69	10-Feb-2021	1.81	305.82	10-Feb-2021	1.52	305.68
10-Mar-2021	1.07	305.75	10-Mar-2021	1.78	305.85	10-Mar-2021	1.54	305.66
21-Apr-2021	1.01	305.81	21-Apr-2021	1.67	305.96	21-Apr-2021	1.50	305.70
19-May-2021	1.17	305.65	19-May-2021	1.81	305.82	19-May-2021	1.51	305.69
25-Jun-2021	0.90	305.92	25-Jun-2021	1.89	305.74	25-Jun-2021	1.72	305.48
27-Jul-2021	1.18	305.64	27-Jul-2021	1.87	305.76	27-Jul-2021	1.66	305.54
12-Aug-2021	1.21	305.61	12-Aug-2021	1.89	305.74	12-Aug-2021	1.69	305.51
23-Sep-2021	0.84	305.98	23-Sep-2021	1.65	305.98	23-Sep-2021	1.54	305.66
27-Oct-2021	1.03	305.79	27-Oct-2021	1.76	305.87	27-Oct-2021	1.51	305.69
10-Nov-2021	1.11	305.71	10-Nov-2021	1.82	305.81	10-Nov-2021	1.54	305.66
16-Dec-2021	1.10	305.72	16-Dec-2021	1.84	305.79	16-Dec-2021	1.52	305.68
14-Jan-2022	1.22	305.60	14-Jan-2022	1.91	305.72	14-Jan-2022	1.58	305.62
24-Feb-2022	0.95	305.87	24-Feb-2022	1.70	305.93	24-Feb-2022	1.49	305.71
17-Mar-2022	0.96	305.87	17-Mar-2022	1.67	305.96	17-Mar-2022	1.45	305.75
21-Apr-2022	0.89	305.93	21-Apr-2022	1.60	306.03	21-Apr-2022	1.38	305.82
24-May-2022	1.06	305.76	24-May-2022	1.73	305.90	24-May-2022	1.46	305.74
15-Jun-2022	1.07	305.75	15-Jun-2022	1.74	305.89	15-Jun-2022	1.54	305.66
14-Jul-2022	1.17	305.65	14-Jul-2022	1.84	305.79	14-Jul-2022	1.73	305.47
25-Aug-2022	1.24	305.58	25-Aug-2022	1.92	305.71	25-Aug-2022	1.85	305.35
08-Sep-2022	1.32	305.50	08-Sep-2022	1.99	305.64	08-Sep-2022	1.89	305.31
13-Oct-2022	1.28	305.54	13-Oct-2022	2.01	305.63	13-Oct-2022	1.98	305.22
24-Nov-2022	1.35	305.47	24-Nov-2022	2.08	305.55	24-Nov-2022	1.96	305.24
16-Dec-2022	1.26	305.56	16-Dec-2022	2.02	305.61	16-Dec-2022	1.85	305.35
12-Jan-2023	1.27	305.55	12-Jan-2023	2.01	305.62	12-Jan-2023	1.73	305.47
14-Feb-2023	1.20	305.62	14-Feb-2023	1.94	305.69	14-Feb-2023	1.66	305.55
17-Mar-2023	1.11	305.72	17-Mar-2023	1.90	305.74	17-Mar-2023	1.61	305.59
27-Apr-2023	1.11	305.71	27-Apr-2023	1.87	305.76	27-Apr-2023	1.52	305.68
26-May-2023	1.12	305.70	26-May-2023	NA		26-May-2023	NA	
15-Jun-2023	1.13	305.69	15-Jun-2023	1.82	305.82	15-Jun-2023	1.63	305.58
25-Jul-2023	1.05	305.77	25-Jul-2023	1.80	305.83	25-Jul-2023	1.56	305.64
08-Aug-2023	1.08	305.74	08-Aug-2023	1.78	305.85	08-Aug-2023	1.57	305.64
07-Sep-2023	1.13	305.69	07-Sep-2023	1.80	305.83	07-Sep-2023	1.59	305.61
26-Oct-2023	1.22	305.61	26-Oct-2023	1.91	305.72	26-Oct-2023	1.72	305.49
16-Nov-2023	1.23	305.59	16-Nov-2023	1.93	305.70	16-Nov-2023	1.78	305.42
18-Dec-2023	1.22	305.60	18-Dec-2023	1.94	305.69	18-Dec-2023	1.65	305.55

NOTES:
- BTOP — Below top of pipe
- NA — Not available
- m ASL — metres above sea level
- (F) — Frozen

TABLE B-3
WATER LEVEL DATA - WETLAND DRIVE POINTS
MILL CREEK AGGREGATES PIT

DP9			DP10			DP11		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-2019	1.37	305.43	28-Jan-2019	(F)		28-Jan-2019	(F)	
27-Feb-2019	1.27	305.53	27-Feb-2019	2.40	305.01	27-Feb-2019	1.88	304.92
19-Mar-2019	(F)		19-Mar-2019	2.24	305.16	19-Mar-2019	1.69	305.11
24-Apr-2019	1.00	305.80	24-Apr-2019	2.09	305.31	24-Apr-2019	1.54	305.26
22-May-2019	1.04	305.76	22-May-2019	2.29	305.11	22-May-2019	1.71	305.09
19-Jun-2019	1.07	305.73	19-Jun-2019	2.24	305.16	19-Jun-2019	1.73	305.07
26-Jul-2019	1.27	305.53	26-Jul-2019	2.42	304.98	26-Jul-2019	1.91	304.89
20-Aug-2019	1.32	305.48	20-Aug-2019	2.38	305.02	20-Aug-2019	1.92	304.88
25-Sep-2019	1.43	305.37	25-Sep-2019	2.50	304.90	25-Sep-2019	1.90	304.90
29-Oct-2019	1.05	305.75	29-Oct-2019	2.28	305.12	29-Oct-2019	1.84	304.96
13-Nov-2019	1.09	305.71	13-Nov-2019	2.37	305.03	13-Nov-2019	1.89	304.91
16-Dec-2019	1.13	305.67	16-Dec-2019	2.35	305.05	16-Dec-2019	1.85	304.95
09-Jan-2020	(F)		09-Jan-2020	2.40	305.00	09-Jan-2020	1.88	304.92
10-Feb-2020	(F)		10-Feb-2020	2.38	305.02	10-Feb-2020	1.86	304.94
09-Mar-2020	1.01	305.79	09-Mar-2020	2.22	305.18	09-Mar-2020	1.63	305.17
14-Apr-2020	1.02	305.78	14-Apr-2020	2.24	305.16	14-Apr-2020	1.61	305.19
13-May-2020	1.12	305.68	13-May-2020	2.40	305.00	13-May-2020	1.72	305.08
11-Jun-2020	1.10	305.70	11-Jun-2020	2.51	304.89	11-Jun-2020	1.85	304.95
08-Jul-2020	1.54	305.26	08-Jul-2020	2.36	305.04	08-Jul-2020	1.91	304.89
19-Aug-2020	1.61	305.19	19-Aug-2020	2.54	304.86	19-Aug-2020	2.08	304.72
17-Sep-2020	1.60	305.20	17-Sep-2020	2.50	304.90	17-Sep-2020	2.01	304.79
23-Oct-2020	1.38	305.42	23-Oct-2020	2.47	304.93	23-Oct-2020	1.98	304.82
19-Nov-2020	1.33	305.47	19-Nov-2020	2.48	304.92	19-Nov-2020	2.01	304.79
03-Dec-2020	1.22	305.58	03-Dec-2020	2.41	304.99	03-Dec-2020	1.92	304.88
08-Jan-2021	1.20	305.60	08-Jan-2021	2.40	305.00	08-Jan-2021	1.90	304.90
10-Feb-2021	1.42	305.38	10-Feb-2021	2.45	304.95	10-Feb-2021	1.95	304.85
10-Mar-2021	1.34	305.46	10-Mar-2021	2.49	304.91	10-Mar-2021	1.95	304.85
21-Apr-2021	1.14	305.66	21-Apr-2021	2.46	304.94	21-Apr-2021	1.94	304.86
19-May-2021	1.38	305.42	19-May-2021	2.50	304.90	19-May-2021	1.98	304.82
25-Jun-2021	1.69	305.11	25-Jun-2021	2.32	305.08	25-Jun-2021	1.87	304.93
27-Jul-2021	1.67	305.14	27-Jul-2021	2.57	304.83	27-Jul-2021	2.12	304.68
12-Aug-2021	1.71	305.09	12-Aug-2021	2.60	304.80	12-Aug-2021	2.14	304.66
23-Sep-2021	1.18	305.62	23-Sep-2021	2.02	305.38	23-Sep-2021	1.75	305.05
27-Oct-2021	1.23	305.57	27-Oct-2021	2.36	305.04	27-Oct-2021	1.88	304.92
10-Nov-2021	1.34	305.46	10-Nov-2021	2.46	304.94	10-Nov-2021	1.90	304.90
16-Dec-2021	1.20	305.60	16-Dec-2021	2.40	305.00	16-Dec-2021	1.87	304.93
14-Jan-2022	1.46	305.34	14-Jan-2022	2.55	304.85	14-Jan-2022	2.05	304.75
24-Feb-2022	1.18	305.62	24-Feb-2022	2.30	305.10	24-Feb-2022	1.76	305.04
17-Mar-2022	1.16	305.64	17-Mar-2022	2.33	305.07	17-Mar-2022	1.80	305.00
21-Apr-2022	1.10	305.70	21-Apr-2022	2.35	305.05	21-Apr-2022	1.81	304.99
24-May-2022	1.34	305.46	24-May-2022	2.51	304.89	24-May-2022	1.97	304.83
15-Jun-2022	1.36	305.44	15-Jun-2022	2.52	304.88	15-Jun-2022	1.95	304.85
14-Jul-2022	1.64	305.16	14-Jul-2022	2.60	304.80	14-Jul-2022	2.12	304.68
25-Aug-2022	1.75	305.05	25-Aug-2022	2.58	304.82	25-Aug-2022	2.10	304.70
08-Sep-2022	1.81	304.99	08-Sep-2022	2.63	304.77	08-Sep-2022	2.17	304.63
13-Oct-2022	1.71	305.10	13-Oct-2022	2.54	304.86	13-Oct-2022	2.01	304.79
24-Nov-2022	1.79	305.01	24-Nov-2022	2.62	304.78	24-Nov-2022	2.15	304.66
16-Dec-2022	1.58	305.22	16-Dec-2022	2.53	304.87	16-Dec-2022	1.97	304.84
12-Jan-2023	1.45	305.35	12-Jan-2023	2.54	304.86	12-Jan-2023	2.06	304.74
14-Feb-2023	1.29	305.52	14-Feb-2023	2.45	304.95	14-Feb-2023	1.88	304.93
17-Mar-2023	1.28	305.52	17-Mar-2023	2.44	304.96	17-Mar-2023	1.85	304.95
27-Apr-2023	1.21	305.59	27-Apr-2023	2.43	304.97	27-Apr-2023	1.77	305.03
26-May-2023	1.32	305.48	26-May-2023	2.51	304.89	26-May-2023	1.88	304.92
15-Jun-2023	1.45	305.35	15-Jun-2023	2.51	304.89	15-Jun-2023	2.01	304.79
25-Jul-2023	1.44	305.36	25-Jul-2023	2.00	305.41	25-Jul-2023	1.83	304.97
08-Aug-2023	1.30	305.50	08-Aug-2023	2.43	304.97	08-Aug-2023	1.86	304.94
07-Sep-2023	1.52	305.28	07-Sep-2023	2.51	304.89	07-Sep-2023	1.98	304.82
26-Oct-2023	1.58	305.23	26-Oct-2023	2.49	304.92	26-Oct-2023	1.98	304.82
16-Nov-2023	1.54	305.27	16-Nov-2023	2.53	304.87	16-Nov-2023	1.99	304.81
18-Dec-2023	1.30	305.50	18-Dec-2023	2.49	304.91	18-Dec-2023	1.92	304.88

NOTES:
- BTOP — Below top of pipe
- NA — Not available
- m ASL — metres above sea level
- (F) — Frozen

TABLE B-3
WATER LEVEL DATA - WETLAND DRIVE POINTS
MILL CREEK AGGREGATES PIT

DP12			DP16			DP113		
DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)	DATE	Water Level BTOP (m)	Groundwater Elevation (m ASL)
28-Jan-2019	(F)		28-Jan-2019	(F)		28-Jan-2019	1.44	306.43
27-Feb-2019	1.88	304.82	27-Feb-2019	(F)		27-Feb-2019	(F)	
19-Mar-2019	1.72	304.98	19-Mar-2019	0.60	304.40	19-Mar-2019	1.31	306.56
24-Apr-2019	1.18	305.52	24-Apr-2019	0.55	304.45	24-Apr-2019	1.16	306.71
22-May-2019	1.29	305.41	22-May-2019	0.59	304.41	22-May-2019	1.07	306.80
19-Jun-2019	1.63	305.07	19-Jun-2019	0.61	304.39	19-Jun-2019	1.01	306.86
26-Jul-2019	1.81	304.89	26-Jul-2019	0.72	304.28	26-Jul-2019	1.05	306.82
20-Aug-2019	1.89	304.81	20-Aug-2019	0.78	304.22	20-Aug-2019	1.14	306.73
25-Sep-2019	2.01	304.69	25-Sep-2019	0.89	304.11	25-Sep-2019	1.24	306.63
29-Oct-2019	1.90	304.80	29-Oct-2019	0.71	304.29	29-Oct-2019	1.27	306.60
13-Nov-2019	1.88	304.82	13-Nov-2019	0.78	304.22	13-Nov-2019	1.24	306.63
16-Dec-2019	1.86	304.84	16-Dec-2019	0.70	304.30	16-Dec-2019	1.20	306.67
09-Jan-2020	1.90	304.80	09-Jan-2020	0.72	304.28	09-Jan-2020	1.29	306.58
10-Feb-2020	1.89	304.81	10-Feb-2020	0.69	304.31	10-Feb-2020	1.06	306.81
09-Mar-2020	1.45	305.25	09-Mar-2020	0.55	304.45	09-Mar-2020	1.05	306.82
14-Apr-2020	1.53	305.17	14-Apr-2020	0.65	304.35	14-Apr-2020	0.98	306.89
13-May-2020	1.58	305.12	13-May-2020	0.70	304.30	13-May-2020	0.97	306.90
11-Jun-2020	1.72	304.98	11-Jun-2020	0.63	304.37	11-Jun-2020	0.95	306.92
08-Jul-2020	1.90	304.80	08-Jul-2020	0.95	304.05	08-Jul-2020	1.22	306.65
19-Aug-2020	2.09	304.61	19-Aug-2020	0.97	304.03	19-Aug-2020	1.02	306.85
17-Sep-2020	2.03	304.67	17-Sep-2020	0.98	304.02	17-Sep-2020	1.16	306.71
23-Oct-2020	2.06	304.64	23-Oct-2020	0.83	304.17	23-Oct-2020	1.04	306.83
19-Nov-2020	2.14	304.56	19-Nov-2020	0.95	304.05	19-Nov-2020	1.23	306.64
03-Dec-2020	2.11	304.59	03-Dec-2020	0.78	304.22	03-Dec-2020	1.09	306.78
08-Jan-2021	2.08	304.62	08-Jan-2021	0.73	304.27	08-Jan-2021	1.16	306.71
10-Feb-2021	2.15	304.55	10-Feb-2021	0.86	304.14	10-Feb-2021	1.21	306.66
10-Mar-2021	1.97	304.73	10-Mar-2021	0.73	304.27	10-Mar-2021	1.26	306.61
21-Apr-2021	1.91	304.79	21-Apr-2021	0.72	304.28	21-Apr-2021	1.25	306.62
19-May-2021	1.95	304.75	19-May-2021	0.86	304.14	19-May-2021	1.34	306.53
25-Jun-2021	1.83	304.87	25-Jun-2021	0.94	304.06	25-Jun-2021	1.08	306.79
27-Jul-2021	2.15	304.56	27-Jul-2021	0.96	304.05	27-Jul-2021	1.34	306.53
12-Aug-2021	2.16	304.54	12-Aug-2021	0.96	304.04	12-Aug-2021	1.32	306.55
23-Sep-2021	1.87	304.83	30-Sep-2021	0.84	304.16	30-Sep-2021	1.22	306.65
27-Oct-2021	2.00	304.70	27-Oct-2021	0.73	304.27	27-Oct-2021	1.19	306.68
10-Nov-2021	2.08	304.62	10-Nov-2021	0.84	304.16	10-Nov-2021	1.22	306.65
16-Dec-2021	1.92	304.78	16-Dec-2021	0.71	304.29	16-Dec-2021	1.25	306.62
14-Jan-2022	1.99	304.71	14-Jan-2022	0.81	304.19	14-Jan-2022	1.32	306.55
24-Feb-2022	1.79	304.91	24-Feb-2022	0.54	304.46	24-Feb-2022	1.27	306.60
17-Mar-2022	1.78	304.92	17-Mar-2022	0.59	304.41	17-Mar-2022	1.28	306.59
21-Apr-2022	1.73	304.97	21-Apr-2022	0.55	304.45	21-Apr-2022	1.29	306.58
24-May-2022	1.85	304.85	24-May-2022	0.65	304.35	24-May-2022	1.31	306.56
15-Jun-2022	1.81	304.89	15-Jun-2022	0.64	304.36	15-Jun-2022	1.30	306.57
14-Jul-2022	2.01	304.69	14-Jul-2022	0.93	304.08	14-Jul-2022	1.36	306.51
25-Aug-2022	2.08	304.62	25-Aug-2022	0.89	304.11	25-Aug-2022	1.40	306.47
08-Sep-2022	2.13	304.57	08-Sep-2022	1.02	303.98	08-Sep-2022	1.43	306.44
13-Oct-2022	2.07	304.63	13-Oct-2022	0.94	304.07	13-Oct-2022	NA	
24-Nov-2022	2.21	304.49	24-Nov-2022	0.95	304.05	24-Nov-2022	1.56	306.31
16-Dec-2022	1.98	304.72	16-Dec-2022	0.83	304.17	16-Dec-2022	1.62	306.25
12-Jan-2023	2.05	304.65	12-Jan-2023	0.70	304.30	12-Jan-2023	1.58	306.29
14-Feb-2023	1.90	304.80	14-Feb-2023	0.65	304.35	14-Feb-2023	1.54	306.34
17-Mar-2023	1.52	305.18	17-Mar-2023	0.47	304.54	17-Mar-2023	1.53	306.34
27-Apr-2023	1.59	305.11	27-Apr-2023	0.41	304.59	27-Apr-2023	1.38	306.49
26-May-2023	1.70	305.00	26-May-2023	0.52	304.48	26-May-2023	1.40	306.47
15-Jun-2023	1.80	304.91	15-Jun-2023	0.65	304.35	15-Jun-2023	1.43	306.44
25-Jul-2023	1.68	305.02	25-Jul-2023	0.55	304.45	25-Jul-2023	1.36	306.52
08-Aug-2023	1.73	304.97	08-Aug-2023	0.61	304.39	08-Aug-2023	1.33	306.54
07-Sep-2023	1.79	304.91	07-Sep-2023	0.67	304.33	07-Sep-2023	1.38	306.49
26-Oct-2023	1.90	304.80	26-Oct-2023	0.72	304.29	26-Oct-2023	1.51	306.37
16-Nov-2023	1.90	304.81	16-Nov-2023	0.75	304.26	16-Nov-2023	1.53	306.34
18-Dec-2023	1.75	304.95	18-Dec-2023	0.71	304.29	18-Dec-2023	1.52	306.35

NOTES:
- BTOP — Below top of pipe
- NA — Not available
- m ASL — metres above sea level
- (F) — Frozen

TABLE B-4
WATER LEVEL DATA - SURFACE WATER STATIONS
MILL CREEK AGGREGATES PIT

SG4/SW1			SW2			Trench (West)		
DATE	Water Level On Gauge (m)	Surface Water Elevation (m ASL)	DATE	Water Level On Gauge (m)	Surface Water Elevation (m ASL)	DATE	Water Level FBOG (m)	Surface Water Elevation (m ASL)
28-Jan-2019	NA		28-Jan-2019	(F)		28-Jan-2019	(F)	
27-Feb-2019	(F)		27-Feb-2019	(F)		27-Feb-2019	(F)	
19-Mar-2019	0.43	306.08	19-Mar-2019	0.61	303.10	19-Mar-2019	(F)	
24-Apr-2019	0.47	306.12	24-Apr-2019	0.56	303.15	24-Apr-2019	1.50	306.94
22-May-2019	0.32	305.97	22-May-2019	0.69	303.02	22-May-2019	1.62	307.06
19-Jun-2019	0.28	305.93	19-Jun-2019	0.73	302.98	19-Jun-2019	1.70	307.14
26-Jul-2019	0.24	305.89	26-Jul-2019	0.80	302.91	26-Jul-2019	1.66	307.10
20-Aug-2019	0.25	305.90	20-Aug-2019	0.76	302.95	20-Aug-2019	1.52	306.96
25-Sep-2019	0.21	305.86	25-Sep-2019	0.58	303.13	25-Sep-2019	1.41	306.85
29-Oct-2019	0.39	306.04	29-Oct-2019	0.42	303.29	29-Oct-2019	1.39	306.83
13-Nov-2019	0.29	305.94	13-Nov-2019	0.47	303.24	13-Nov-2019	1.48	306.92
16-Dec-2019	0.30	305.95	16-Dec-2019	0.48	303.24	16-Dec-2019	(F)	
09-Jan-2020	0.31	305.96	09-Jan-2020	0.48	303.23	09-Jan-2020	(F)	
10-Feb-2020	0.29	305.94	10-Feb-2020	0.69	303.02	10-Feb-2020	(F)	
09-Mar-2020	0.37	306.02	09-Mar-2020	0.51	303.20	09-Mar-2020	1.69	307.13
14-Apr-2020	0.32	305.97	14-Apr-2020	0.62	303.09	14-Apr-2020	1.76	307.20
13-May-2020	0.26	305.91	13-May-2020	0.77	302.94	13-May-2020	1.70	307.14
11-Jun-2020	0.27	305.92	11-Jun-2020	0.55	303.16	11-Jun-2020	1.74	307.18
08-Jul-2020	0.21	305.86	08-Jul-2020	0.80	302.91	08-Jul-2020	1.59	307.03
19-Aug-2020	0.19	305.84	19-Aug-2020	0.81	302.90	19-Aug-2020	1.46	306.90
17-Sep-2020	0.17	305.82	17-Sep-2020	0.80	302.91	17-Sep-2020	1.31	306.75
23-Oct-2020	0.40	306.05	23-Oct-2020	0.67	303.04	23-Oct-2020	1.31	306.75
19-Nov-2020	0.24	305.89	19-Nov-2020	0.74	302.97	19-Nov-2020	1.25	306.69
18-Dec-2020	0.26	305.91	18-Dec-2020	0.79	302.92	18-Dec-2020	(F)	
08-Jan-2021	0.28	305.93	08-Jan-2021	0.70	303.01	08-Jan-2021	(F)	
10-Feb-2021	(F)		10-Feb-2021	0.86	302.85	10-Feb-2021	(F)	
10-Mar-2021	0.25	305.90	10-Mar-2021	0.62	303.09	10-Mar-2021	(F)	
21-Apr-2021	0.24	305.89	21-Apr-2021	0.81	302.90	21-Apr-2021	1.30	306.74
19-May-2021	0.36	306.01	19-May-2021	0.86	302.85	19-May-2021	1.20	306.64
25-Jun-2021	0.25	305.90	25-Jun-2021	0.39	303.32	25-Jun-2021	1.35	306.79
27-Jul-2021	0.19	305.84	27-Jul-2021	0.84	302.87	27-Jul-2021	1.49	306.93
12-Aug-2021	0.18	305.83	12-Aug-2021	0.84	302.87	12-Aug-2021	1.12	306.56
23-Sep-2021	0.24	305.89	23-Sep-2021	0.80	302.91	23-Sep-2021	1.25	306.69
27-Oct-2021	0.35	306.00	27-Oct-2021	0.71	303.00	27-Oct-2021	1.20	306.64
10-Nov-2021	0.28	305.93	10-Nov-2021	0.80	302.91	10-Nov-2021	1.15	306.59
16-Dec-2021	0.30	305.95	16-Dec-2021	0.78	302.93	16-Dec-2021	1.19	306.63
14-Jan-2022	0.22	305.87	14-Jan-2022	(F)		14-Jan-2022	(F)	
24-Feb-2022	0.48	306.13	24-Feb-2022	0.59	303.12	24-Feb-2022	(F)	
17-Mar-2022	0.34	305.99	17-Mar-2022	0.71	303.00	17-Mar-2022	(F)	
21-Apr-2022	0.32	305.97	21-Apr-2022	0.72	302.99	21-Apr-2022	1.40	306.84
24-May-2022	0.22	305.87	24-May-2022	0.82	302.89	24-May-2022	1.38	306.82
15-Jun-2022	0.22	305.87	15-Jun-2022	0.80	302.91	15-Jun-2022	1.38	306.82
14-Jul-2022	0.17	305.82	14-Jul-2022	0.85	302.86	14-Jul-2022	1.20	306.64
25-Aug-2022	0.18	305.83	25-Aug-2022	0.83	302.88	25-Aug-2022	1.14	306.58
08-Sep-2022	0.16	305.81	08-Sep-2022	0.84	302.87	08-Sep-2022	1.06	306.50
13-Oct-2022	0.23	305.88	13-Oct-2022	0.80	302.91	13-Oct-2022	1.00	306.44
24-Nov-2022	0.18	305.83	24-Nov-2022	0.85	302.87	24-Nov-2022	(F)	
16-Dec-2022	0.23	305.88	16-Dec-2022	0.81	302.90	16-Dec-2022	(F)	
12-Jan-2023	0.22	305.87	12-Jan-2023	0.84	302.87	12-Jan-2023	(F)	
14-Feb-2023	0.26	305.91	14-Feb-2023	0.78	302.93	14-Feb-2023	(F)	
17-Mar-2023	0.29	305.94	17-Mar-2023	0.79	302.92	17-Mar-2023	(F)	
27-Apr-2023	0.25	305.90	27-Apr-2023	0.81	302.90	27-Apr-2023	1.20	306.64
26-May-2023	0.22	305.87	26-May-2023	0.84	302.87	26-May-2023	1.26	306.70
15-Jun-2023	0.22	305.87	15-Jun-2023	0.90	302.81	15-Jun-2023	1.20	306.64
25-Jul-2023	0.78	306.43	25-Jul-2023	0.27	303.44	25-Jul-2023	1.27	306.71
08-Aug-2023	0.29	305.94	08-Aug-2023	0.78	302.94	08-Aug-2023	1.27	306.71
07-Sep-2023	0.23	305.88	07-Sep-2023	0.83	302.88	07-Sep-2023	1.25	306.69
26-Oct-2023	0.22	305.87	26-Oct-2023	0.81	302.90	26-Oct-2023	1.13	306.57
16-Nov-2023	0.22	305.87	16-Nov-2023	0.82	302.89	16-Nov-2023	1.09	306.53
18-Dec-2023	0.26	305.91	18-Dec-2023	0.83	302.88	18-Dec-2023	1.10	306.54

NOTES:
- NA — Not available
- m ASL — metres above sea level
- (F) — Frozen
- FBOG — from bottom of gauge
- SW2 is measured from the top of DP5A, DP5B, DB5C, DP5D or DP5CR

TABLE B-4
WATER LEVEL DATA - SURFACE WATER STATIONS
MILL CREEK AGGREGATES PIT

PHASE 1 POND				PHASE 2 POND			
DATE	Water Level FBOG (m)	Surface Water Elevation (m ASL)	Water Temperature at Surface (°C)	DATE	Water Level FBOG (m)	Surface Water Elevation (m ASL)	Water Temperature at Surface (°C)
28-Jan-2019	(F)			28-Jan-2019	(F)		
27-Feb-2019	(F)			27-Feb-2019	(F)		
19-Mar-2019	NA		2.8	19-Mar-2019	(F)		
24-Apr-2019	0.52	306.61	11.3	24-Apr-2019	0.56	306.19	9.2
22-May-2019	0.66	306.75	12.5	22-May-2019	0.72	306.35	12.4
19-Jun-2019	0.73	306.82	21.1	19-Jun-2019	0.78	306.41	22.5
26-Jul-2019	0.74	306.83	24.5	26-Jul-2019	0.72	306.35	24.9
20-Aug-2019	0.61	306.70	24.9	20-Aug-2019	0.63	306.26	23.1
25-Sep-2019	0.46	306.55	20.0	25-Sep-2019	0.49	306.12	19.5
29-Oct-2019	0.38	306.47	11.9	29-Oct-2019	0.44	306.07	12.3
13-Nov-2019	0.46	306.55	6.3	13-Nov-2019	0.44	306.07	6.2
16-Dec-2019	(F)			16-Dec-2019	(F)		
09-Jan-2020	(F)			09-Jan-2020	(F)		
10-Feb-2020	(F)			10-Feb-2020	(F)		
09-Mar-2020	(F)			09-Mar-2020	(F)		
14-Apr-2020	0.48	306.87	7.8	14-Apr-2020	0.70	306.43	7.7
13-May-2020	0.43	306.82	10.8	13-May-2020	0.66	306.39	10.9
11-Jun-2020	0.46	306.85	21.4	11-Jun-2020	0.66	306.39	20.0
08-Jul-2020	0.33	306.72	25.0	08-Jul-2020	0.53	306.26	25.8
19-Aug-2020	0.19	306.58	23.1	19-Aug-2020	0.38	306.11	24.2
17-Sep-2020	0.08	306.47	19.9	17-Sep-2020	0.24	305.97	20.7
23-Oct-2020	0.27	306.36	12.9	23-Oct-2020	0.15	305.88	13.0
19-Nov-2020	0.21	306.30	8.7	19-Nov-2020	0.06	305.79	10.8
18-Dec-2020	0.22	306.31	0.2	18-Dec-2020	0.07	305.80	1.1
08-Jan-2021	(F)			08-Jan-2021	(F)		
10-Feb-2021	(F)			10-Feb-2021	(F)		
10-Mar-2021	(F)		4.4	10-Mar-2021	(F)		
21-Apr-2021	0.82	306.40	10.8	21-Apr-2021	0.64	305.84	10.2
19-May-2021	0.73	306.31	16.1	19-May-2021	0.58	305.78	17.1
25-Jun-2021	0.72	306.30	24.5	25-Jun-2021	0.67	305.87	24.8
27-Jul-2021	0.67	306.25	22.8	27-Jul-2021	0.52	305.72	24.0
12-Aug-2021	0.64	306.22	24.2	12-Aug-2021	0.52	305.72	24.2
23-Sep-2021	0.65	306.23	19.7	23-Sep-2021	0.52	305.72	20.1
27-Oct-2021	0.67	306.25	14.7	27-Oct-2021	0.49	305.69	15.4
10-Nov-2021	0.64	306.22	11.2	10-Nov-2021	0.46	305.66	10.3
16-Dec-2021	0.64	306.22	5.4	16-Dec-2021	0.49	305.69	5.0
14-Jan-2022	(F)			14-Jan-2022	(F)		
24-Feb-2022	(F)			24-Feb-2022	(F)		
17-Mar-2022	(F)		4.8	17-Mar-2022	(F)		
21-Apr-2022	0.64	306.49	7.5	21-Apr-2022	0.80	306.06	8.1
24-May-2022	0.65	306.50	17.2	24-May-2022	0.80	306.06	18.9
15-Jun-2022	0.63	306.48	20.9	15-Jun-2022	0.77	306.03	22.3
14-Jul-2022	0.40	306.35	23.4	14-Jul-2022	0.60	305.89	23.5
25-Aug-2022	0.29	306.24	24.5	25-Aug-2022	0.46	305.75	24.8
08-Sep-2022	0.23	306.18	22.8	08-Sep-2022	0.39	305.68	22.8
13-Oct-2022	0.34	306.29	15.3	13-Oct-2022	0.51	305.80	14.8
24-Nov-2022	0.23	306.18	6.4	24-Nov-2022	0.39	305.68	6.6
16-Dec-2022	(F)		2.6	16-Dec-2022	(F)		2.9
12-Jan-2023	(F)		1.3	12-Jan-2023	(F)		1.2
14-Feb-2023	(F)			14-Feb-2023	(F)		
17-Mar-2023	(F)		3.5	17-Mar-2023	(F)		
27-Apr-2023	0.68	306.31	12.8	27-Apr-2023	0.73	305.75	12.7
26-May-2023	0.73	306.36	17.9	26-May-2023	0.82	305.84	18.4
15-Jun-2023	0.69	306.32	18.3	15-Jun-2023	0.81	305.83	18.9
25-Jul-2023	0.75	306.38	25.4	25-Jul-2023	0.87	305.89	27.2
08-Aug-2023	0.77	306.40	22.6	08-Aug-2023	0.87	305.89	23.9
07-Sep-2023	0.77	306.40	23.9	07-Sep-2023	0.88	305.90	24.2
26-Oct-2023	0.63	306.26	13.5	26-Oct-2023	0.76	305.78	14.6
16-Nov-2023	0.59	306.22	9.7	16-Nov-2023	0.73	305.75	9.6
18-Dec-2023	(F)		4.4	18-Dec-2023	(F)		4.0

Note:
- ·FBOG — from bottom of gauge
- ·m ASL — metres above sea level
- · (F) — Frozen
- · NA — Not available

TABLE B-4
WATER LEVEL DATA - SURFACE WATER STATIONS
MILL CREEK AGGREGATES PIT

PHASE 3 POND				PHASE 4 POND			
DATE	Water Level FBOG (m)	Surface Water Elevation (m ASL)	Water Temperature at Surface (°C)	DATE	Water Level FBOG (m)	Surface Water Elevation (m ASL)	Water Temperature at Surface (°C)
28-Jan-2019	(F)			28-Jan-2019	(F)		
27-Feb-2019	(F)			27-Feb-2019	(F)		
19-Mar-2019	(F)			19-Mar-2019	(F)		
24-Apr-2019	0.22	305.02	10.6	24-Apr-2019	0.04	306.25	9.8
22-May-2019	0.25	305.05	13.8	22-May-2019	0.16	306.37	12.8
19-Jun-2019	0.26	305.06	19.8	19-Jun-2019	0.23	306.44	20.1
26-Jul-2019	0.15	304.95	27.7	26-Jul-2019	0.29	306.50	28.3
20-Aug-2019	0.05	304.85	26.7	20-Aug-2019	0.27	306.48	26.4
25-Sep-2019	0.31	304.74	19.8	25-Sep-2019	0.03	306.24	19.3
29-Oct-2019	0.33	304.76	11.2	29-Oct-2019	0.19	306.40	11.2
13-Nov-2019	0.38	304.81	4.2	13-Nov-2019	0.01	306.22	6.3
16-Dec-2019	(F)			16-Dec-2019	(F)		
09-Jan-2020	(F)			09-Jan-2020	(F)		
10-Feb-2020	(F)			10-Feb-2020	(F)		
09-Mar-2020	(F)			09-Mar-2020	(F)		
14-Apr-2020	0.74	305.03	7.0	14-Apr-2020	0.24	306.58	7.2
13-May-2020	0.64	304.93	10.0	13-May-2020	0.20	306.54	13.0
11-Jun-2020	0.61	304.90	21.3	11-Jun-2020	0.20	306.54	21.6
08-Jul-2020	0.47	304.76	27.3	08-Jul-2020	0.10	306.44	26.3
19-Aug-2020	0.34	304.63	22.8	19-Aug-2020	0.21	306.33	22.8
17-Sep-2020	0.24	304.53	20.7	17-Sep-2020	0.07	306.19	19.6
23-Oct-2020	0.24	304.53	12.7	23-Oct-2020	0.42	306.13	12.7
19-Nov-2020	0.22	304.51	6.7	19-Nov-2020	0.34	306.05	9.9
18-Dec-2020	0.29	304.58	0.3	18-Dec-2020	0.34	306.05	0.9
08-Jan-2021	(F)			08-Jan-2021	(F)		
10-Feb-2021	(F)			10-Feb-2021	(F)		
10-Mar-2021	(F)			10-Mar-2021	(F)		
21-Apr-2021	0.42	304.73	9.1	21-Apr-2021	0.64	306.14	8.7
19-May-2021	0.35	304.66	14.9	19-May-2021	0.54	306.04	16.9
25-Jun-2021	0.31	304.62	27.6	25-Jun-2021	0.55	306.05	27.5
27-Jul-2021	0.25	304.56	25.3	27-Jul-2021	0.49	305.99	24.9
12-Aug-2021	0.23	304.54	24.6	12-Aug-2021	0.40	305.90	24.1
23-Sep-2021	0.25	304.56	19.5	23-Sep-2021	0.51	306.01	20.0
27-Oct-2021	0.29	304.60	12.0	27-Oct-2021	0.51	306.01	13.0
10-Nov-2021	0.28	304.59	8.5	10-Nov-2021	0.47	305.97	12.4
16-Dec-2021	0.41	304.72	4.5	16-Dec-2021	0.37	305.87	4.6
14-Jan-2022	(F)			14-Jan-2022	(F)		
24-Feb-2022	(F)			24-Feb-2022	(F)		
17-Mar-2022	(F)			17-Mar-2022	(F)		
21-Apr-2022	0.62	304.85	8.2	21-Apr-2022	0.58	306.19	8.3
24-May-2022	0.66	304.89	17.2	24-May-2022	0.46	306.07	17.5
15-Jun-2022	0.70	304.93	21.7	15-Jun-2022	0.44	306.05	21.1
14-Jul-2022	0.50	304.73	23.6	14-Jul-2022	0.36	305.97	23.6
25-Aug-2022	0.41	304.64	24.7	25-Aug-2022	0.23	305.84	23
08-Sep-2022	0.37	304.60	22.3	08-Sep-2022	0.16	305.77	22.1
13-Oct-2022	0.29	304.52	14.7	13-Oct-2022	0.10	305.71	15.4
24-Nov-2022	0.23	304.46	4.9	24-Nov-2022	0.03	305.64	6.8
16-Dec-2022	(F)			16-Dec-2022	(F)		
12-Jan-2023	(F)			12-Jan-2023	(F)		
14-Feb-2023	(F)			14-Feb-2023	(F)		
17-Mar-2023	(F)			17-Mar-2023	(F)		
27-Apr-2023	0.98	305.19	11.4	27-Apr-2023	0.70	305.79	11.6
26-May-2023	0.88	305.09	16.3	26-May-2023	0.90	305.99	16.2
15-Jun-2023	0.77	304.98	18.8	15-Jun-2023	0.92	306.01	18.2
25-Jul-2023	0.78	304.99	25.3	25-Jul-2023	0.87	305.96	25.5
08-Aug-2023	0.85	305.06	22.7	08-Aug-2023	0.90	305.99	22.4
07-Sep-2023	0.78	304.99	24.1	07-Sep-2023	0.93	306.02	23.4
26-Oct-2023	0.82	305.03	14.3	26-Oct-2023	0.76	305.85	14.6
16-Nov-2023	0.64	304.85	7.7	16-Nov-2023	0.75	305.84	7.6
18-Dec-2023	(F)		3.4	18-Dec-2023	(F)		3.6

Note:
- ·FBOG — from bottom of gauge
- ·m ASL — metres above sea level
- · (F) — Frozen
- · NA — Not available

TABLE B-5
SUMMARY OF CREEK BASED DRIVE POINT DATA
MILL CREEK AGGREGATES PIT

MONITOR LOCATION	DATE	G.W. LEVEL BTOP (m)	S.W. LEVEL BTOP (m)	GROUND-WATER ELEVATION (m ASL)	SURFACE WATER ELEVATION (m ASL)	HYDRAULIC HEAD IN GROUND-WATER (m)	VERTICAL HYDRAULIC GRADIENT	CALCULATED GROUNDWATER FLUX TO CREEK ($L/s/m^2$)	TEMPERATURE	
									GROUND-WATER (°C)	SURFACE WATER (°C)
DP1	28-Jan-19	(F)	(F)						(F)	(F)
	27-Feb-19	(F)	1.03		303.83				(F)	-0.1
	19-Mar-19	(F)	0.92		303.94				(F)	1.8
	24-Apr-19	0.49	0.88	304.37	303.98	0.39	0.28	1.07E-02	8.4	7.5
	22-May-19	0.68	0.99	304.18	303.87	0.31	0.22	8.54E-03	11.2	11.7
	19-Jun-19	0.55	1.00	304.31	303.86	0.45	0.32	1.24E-02	12.1	15.5
	26-Jul-19	0.64	1.05	304.22	303.81	0.41	0.29	1.12E-02	16.2	17.8
	20-Aug-19	0.66	1.04	304.20	303.82	0.38	0.27	1.05E-02	15.9	19.3
	25-Sep-19	0.73	1.05	304.13	303.81	0.32	0.23	8.81E-03	12.7	13.6
	29-Oct-19	0.54	0.74	304.32	304.12	0.20	0.14	5.51E-03	8.0	8.2
	13-Nov-19	(F)	0.99		303.87				(F)	1.0
	16-Dec-19	(F)	0.98		303.88				(F)	0.8
	09-Jan-20	(F)	1.03		303.83				(F)	0.5
	10-Feb-20	(F)	1.01		303.85				(F)	0.9
	09-Mar-20	0.51	0.89	304.35	303.97	0.38	0.27	1.05E-02	8.3	3.3
	14-Apr-20	0.58	1.01	304.28	303.85	0.43	0.31	1.18E-02	9.0	8.4
	13-May-20	0.60	1.03	304.26	303.83	0.43	0.31	1.18E-02	8.8	6.9
	11-Jun-20	0.55	0.89	304.31	303.97	0.34	0.24	9.36E-03	15.0	18.6
	08-Jul-20	0.73	1.09	304.13	303.77	0.36	0.26	9.91E-03	16.2	17.8
	19-Aug-20	0.78	1.00	304.08	303.86	0.22	0.16	6.06E-03	14.2	14.8
	17-Sep-20	0.80	1.07	304.06	303.79	0.27	0.19	7.43E-03	12.3	13.2
	23-Oct-20	0.59	0.70	304.27	304.16	0.11	0.08	3.03E-03	11.0	10.5
	19-Nov-20	0.63	0.59	304.23	304.27	-0.04	-0.03	-1.10E-03	6.7	4.5
	18-Dec-20	(F)	0.86		304.00				(F)	0.4
	08-Jan-21	(F)	0.90		303.96				(F)	0.1
	10-Feb-21	(F)	(F)						(F)	(F)
	10-Mar-21	0.62	0.93	304.24	303.93	0.31	0.22	8.54E-03	6.7	3.1
	21-Apr-21	0.60	0.94	304.26	303.92	0.34	0.24	9.36E-03	8.2	5.2
	19-May-21	0.69	1.09	304.17	303.77	0.40	0.29	1.10E-02	12.1	11.8
	25-Jun-21	0.43	0.53	304.43	304.33	0.10	0.07	2.75E-03	17.8	21.4
	27-Jul-21	0.74	1.06	304.13	303.80	0.32	0.23	8.95E-03	14.6	17.5
	12-Aug-21	0.74	1.07	304.12	303.79	0.33	0.24	9.09E-03	14.9	18.6
	30-Sep-21	0.69	1.05	304.17	303.81	0.36	0.26	9.91E-03	11.3	11.8
	27-Oct-21	0.60	0.92	304.26	303.94	0.32	0.23	8.81E-03	10.4	8.8
	10-Nov-21	0.66	1.01	304.20	303.85	0.35	0.25	9.64E-03	9.3	7.4
	16-Dec-21	0.60	0.98	304.26	303.88	0.38	0.27	1.05E-02	8.7	6.4
	14-Jan-22	(F)	1.07		303.79				(F)	0.8
	24-Feb-22	0.45	0.75	304.41	304.11	0.30	0.22	8.26E-03	7.5	2.4
	17-Mar-22	0.53	0.96	304.33	303.90	0.43	0.31	1.18E-02	7.5	2.4
	21-Apr-22	0.53	1.00	304.33	303.86	0.47	0.34	1.29E-02	8.1	6.7
	24-May-22	0.57	1.08	304.29	303.78	0.51	0.37	1.40E-02	12.9	12.1
	15-Jun-22	0.55	1.09	304.31	303.77	0.54	0.39	1.49E-02	14.5	16.0
	14-Jul-22	0.70	1.12	304.16	303.74	0.42	0.30	1.16E-02	15.4	14.1
	25-Aug-22	0.71	0.99	304.15	303.87	0.28	0.20	7.71E-03	19.8	17.1
	08-Sep-22	0.77	1.13	304.09	303.73	0.36	0.26	9.91E-03	13.4	14.9
	13-Oct-22	0.73	1.06	304.13	303.81	0.32	0.23	8.95E-03	11.8	12.5
	24-Nov-22	0.75	1.10	304.11	303.76	0.35	0.25	9.64E-03	6.8	4.1
	16-Dec-22	0.69	1.05	304.17	303.81	0.36	0.26	9.91E-03	4.1	2.7
	12-Jan-23	(F)	1.07		303.79				(F)	4.4
	14-Feb-23	0.57	1.02	304.29	303.85	0.44	0.32	1.23E-02	3.1	2.0
	17-Mar-23	0.48	0.99	304.38	303.87	0.51	0.37	1.41E-02	4.6	3.7
	27-Apr-23	0.44	1.02	304.42	303.85	0.58	0.41	1.59E-02	10.5	8.7
	26-May-23	0.49	1.05	304.37	303.81	0.56	0.40	1.54E-02	10.9	11.2
	15-Jun-23	0.54	1.00	304.32	303.86	0.46	0.33	1.27E-02	13.2	14.6
	26-Jul-23	0.39	0.68	304.47	304.19	0.29	0.21	7.90E-03	16.0	19.9
	08-Aug-23	0.51	0.94	304.35	303.92	0.43	0.31	1.18E-02	15.8	18.2
	07-Sep-23	0.55	1.01	304.31	303.85	0.46	0.33	1.27E-02	14.9	18.8
	26-Oct-23	0.57	0.98	304.29	303.88	0.41	0.29	1.13E-02	11.7	12.7
	16-Nov-23	0.61	0.98	304.26	303.88	0.38	0.27	1.04E-02	11.2	5.9
	18-Dec-23	0.51	0.96	304.35	303.91	0.44	0.32	1.23E-02	5.0	5.3
2023 AVERAGE VALUES						0.45	0.32	1.24E-02	10.6	10.5
OVERALL AVERAGE VALUES						0.34	0.25	9.40E-03	9.9	10.1

NOTES:
- m ASL — metres above sea level
- (F) — Frozen
- L/s/m² — Litres per second per square metre
- Depth of screen midpoint below the creek bed is 1.39 m
- Assumed vertical permeability is 3.80E-05 m/s

TABLE B-5
SUMMARY OF CREEK BASED DRIVE POINT DATA
MILL CREEK AGGREGATES PIT

MONITOR LOCATION	DATE	G.W. LEVEL BTOP (m)	S.W. LEVEL BTOP (m)	GROUND-WATER ELEVATION (m ASL)	SURFACE WATER ELEVATION (m ASL)	HYDRAULIC HEAD IN GROUND-WATER (m)	VERTICAL HYDRAULIC GRADIENT	CALCULATED GROUND WATER FLUX TO CREEK (L/s/m^2)	TEMPERATURE	
									GROUND-WATER (°C)	SURFACE WATER (°C)
DP2	28-Jan-19	(F)	(F)						(F)	(F)
	27-Feb-19	(F)	0.91		303.61				(F)	-0.1
	19-Mar-19	(F)	0.76		303.76				(F)	1.8
	24-Apr-19	0.25	0.70	304.27	303.82	0.45	0.24	2.07E-03	6.4	7.4
	22-May-19	0.29	0.86	304.23	303.66	0.57	0.31	2.62E-03	11.3	11.7
	19-Jun-19	0.42	0.87	304.10	303.65	0.45	0.24	2.07E-03	12.2	15.5
	26-Jul-19	0.39	0.92	304.13	303.60	0.526	0.28	2.42E-03	17.4	17.6
	20-Aug-19	0.41	0.90	304.11	303.62	0.49	0.26	2.25E-03	17.9	19.4
	25-Sep-19	0.50	0.94	304.02	303.58	0.44	0.24	2.02E-03	13.1	13.6
	29-Oct-19	0.61	0.89	303.91	303.63	0.28	0.15	1.29E-03	9.0	8.1
	13-Nov-19	(F)	0.84		303.68				(F)	0.9
	16-Dec-19	(F)	0.84		303.68				(F)	0.8
	09-Jan-20	(F)	0.91		303.61				(F)	0.5
	10-Feb-20	(F)	0.87		303.65				(F)	0.9
	09-Mar-20	0.26	0.74	304.26	303.78	0.48	0.26	2.21E-03	7.5	3.5
	14-Apr-20	0.32	0.88	304.20	303.64	0.56	0.30	2.57E-03	8.9	8.3
	13-May-20	0.35	0.92	304.17	303.60	0.57	0.31	2.62E-03	8.7	7.0
	11-Jun-20	0.30	0.74	304.22	303.78	0.44	0.24	2.02E-03	14.8	18.5
	08-Jul-20	0.46	0.84	304.06	303.68	0.38	0.21	1.75E-03	16.8	16.4
	19-Aug-20	0.69	0.99	303.83	303.53	0.3	0.16	1.38E-03	14.6	15.4
	17-Sep-20	0.59	0.95	303.93	303.57	0.36	0.19	1.65E-03	12.5	13.2
	23-Oct-20	**	**						**	**
	19-Nov-20	**	**						**	**
	18-Dec-20	**	**						**	**
	08-Jan-21	**	**						**	**
	10-Feb-21	**	**						**	**
	10-Mar-21	**	**						**	**
	21-Apr-21	**	**						**	**
	19-May-21	0.66	1.07	303.86	303.45	0.41	0.22	1.88E-03	11.6	11.8
	25-Jun-21	**	**						**	**
	27-Jul-21	0.55	1.01	303.97	303.51	0.46	0.25	2.11E-03	15.1	17.6
	12-Aug-21	**	**						**	**
	30-Sep-21	0.19*	0.95	304.33*	303.57	0.76*	0.41*	3.49E-03*	12.5	11.8
	27-Oct-21	0.37	0.78	304.15	303.74	0.41	0.22	1.88E-03	10.4	8.8
	10-Nov-21	0.39	0.88	304.13	303.64	0.49	0.26	2.25E-03	9.4	7.4
	16-Dec-21	0.39	0.86	304.13	303.66	0.47	0.25	2.16E-03	8.8	6.3
	14-Jan-22	(F)	0.98		303.54				(F)	0.7
	24-Feb-22	(F)	(F)						(F)	(F)
	17-Mar-22	0.29	0.81	304.23	303.71	0.52	0.28	2.39E-03	4.5	2.6
	21-Apr-22	0.29	0.84	304.23	303.68	0.55	0.30	2.53E-03	8.3	6.8
	24-May-22	0.31	0.96	304.21	303.56	0.65	0.35	2.99E-03	12.9	12.2
	15-Jun-22	0.31	0.96	304.21	303.56	0.65	0.35	2.99E-03	15.1	16.0
	14-Jul-22	0.67	1.02	303.85	303.50	0.35	0.19	1.61E-03	16.3	14.1
	25-Aug-22	0.63	1.12	303.89	303.40	0.49	0.26	2.25E-03	19.2	17.2
	08-Sep-22	0.73	1.15	303.79	303.37	0.42	0.23	1.93E-03	13.6	14.7
	13-Oct-22	0.58	0.92	303.94	303.60	0.34	0.18	1.56E-03	11.8	12.2
	24-Nov-22	0.67	0.92	303.86	303.60	0.25	0.14	1.17E-03	5.1	4.2
	16-Dec-22	0.57	0.76	303.95	303.76	0.19	0.10	8.73E-04	4.0	2.8
	12-Jan-23	0.46	0.88	304.06	303.65	0.42	0.22	1.91E-03	4.1	3.4
	14-Feb-23	0.47	0.82	304.05	303.70	0.35	0.19	1.61E-03	1.7	2.0
	17-Mar-23	0.59	0.80	303.94	303.72	0.22	0.12	9.88E-04	4.1	3.8
	27-Apr-23	0.39	0.80	304.13	303.72	0.41	0.22	1.87E-03	9.3	8.5
	26-May-23	0.48	0.83	304.04	303.69	0.35	0.19	1.61E-03	11.8	11.5
	15-Jun-23	0.49	0.78	304.03	303.75	0.28	0.15	1.31E-03	14.7	14.3
	26-Jul-23	0.41	0.47	304.11	304.05	0.06	0.03	2.71E-04	18.8	19.8
	08-Aug-23	0.51	0.71	304.01	303.81	0.20	0.11	9.19E-04	18.7	18.4
	07-Sep-23	0.29	0.79	304.23	303.73	0.50	0.27	2.30E-03	19.8	18.9
	26-Oct-23	0.50	0.78	304.02	303.75	0.27	0.15	1.26E-03	13.1	12.7
	16-Nov-23	0.55	0.82	303.97	303.71	0.26	0.14	1.22E-03	11.9	5.8
	18-Dec-23	0.51	0.75	304.01	303.78	0.24	0.13	1.08E-03	4.9	5.3
2023 AVERAGE VALUES						0.30	0.16	1.36E-03	11.1	10.4
OVERALL AVERAGE VALUES						0.35	0.22	1.83E-03	10.0	10.2

NOTES:
- · m ASL — metres above sea level
- · (F) — Frozen
- · * — Sept. 30, 2021 water level at DP2 is interpreted to be anomalous. On Oct. 6, the water level elevation at DP2 was 304.09 m ASL.
- · ** — Unavailable due to unsafe conditions
- · L/s/m² — Litres per second per square metre
- · Depth of screen midpoint below the creek bed is 1.85 m
- · Assumed vertical permeability is 8.50E-06 m/s

TABLE B-5
SUMMARY OF CREEK BASED DRIVE POINT DATA
MILL CREEK AGGREGATES PIT

MONITOR LOCATION	DATE	G.W. LEVEL BTOP (m)	S.W. LEVEL BTOP (m)	GROUND-WATER ELEVATION (m ASL)	SURFACE WATER ELEVATION (m ASL)	HYDRAULIC HEAD IN GROUND-WATER (m)	VERTICAL HYDRAULIC GRADIENT	CALCULATED GROUNDWATER FLUX TO CREEK (L/s/m^2)	TEMPERATURE	
									GROUND-WATER (°C)	SURFACE WATER (°C)
DP3	28-Jan-19	(F)	(F)						(F)	(F)
	27-Feb-19	(F)	(F)						(F)	(F)
	19-Mar-19	0.62	1.19	305.06	304.49	0.57	0.37	1.69E-02	5.2	2.1
	24-Apr-19	0.57	0.72	305.11	304.96	0.15	0.10	4.44E-03	8.6	8.2
	22-May-19	0.74	0.61	304.94	305.07	-0.13	-0.09	-3.85E-03	9.4	13.0
	19-Jun-19	0.79	0.74	304.89	304.94	-0.05	-0.03	-1.48E-03	13.7	16.9
	26-Jul-19	0.85	0.86	304.83	304.82	0.01	0.01	2.96E-04	15.1	19.5
	20-Aug-19	0.86	0.81	304.82	304.87	-0.05	-0.03	-1.48E-03	17.1	20.5
	25-Sep-19	0.90	0.85	304.78	304.83	-0.05	-0.03	-1.48E-03	14.3	14.9
	29-Oct-19	0.70	0.73	304.98	304.95	0.03	0.02	8.88E-04	11.3	10.3
	13-Nov-19	0.80	0.82	304.88	304.86	0.02	0.01	5.92E-04	7.1	1.6
	16-Dec-19	(F)	0.78		304.90				(F)	1.0
	09-Jan-20	(F)	0.78		304.90				(F)	0.3
	10-Feb-20	(F)	0.80		304.88				(F)	0.9
	09-Mar-20	0.68	0.74	305.00	304.94	0.06	0.04	1.78E-03	8.5	5.2
	14-Apr-20	0.70	0.79	304.98	304.89	0.09	0.06	2.66E-03	6.4	5.8
	13-May-20	0.80	0.85	304.88	304.83	0.05	0.03	1.48E-03	8.1	8.0
	11-Jun-20	0.70	0.73	304.98	304.95	0.03	0.02	8.88E-04	14.7	18.9
	08-Jul-20	0.81	0.83	304.87	304.85	0.02	0.01	5.92E-04	14.4	15.2
	19-Aug-20	0.94	1.06	304.74	304.62	0.12	0.08	3.55E-03	13.2	16.2
	17-Sep-20	0.94	1.05	304.74	304.63	0.11	0.07	3.26E-03	12.8	14.6
	23-Oct-20	0.80	0.91	304.88	304.77	0.11	0.07	3.26E-03	11.4	10.7
	19-Nov-20	0.87	0.95	304.81	304.73	0.08	0.05	2.37E-03	10.3	6.3
	18-Dec-20	(F)	1.03		304.65				(F)	0.7
	08-Jan-21	(F)	0.97		304.71				(F)	0.3
	10-Feb-21	(F)	0.95		304.73				(F)	0.1
	10-Mar-21	0.75	0.93	304.93	304.75	0.18	0.12	5.33E-03	4.1	3.0
	21-Apr-21	0.88	0.92	304.80	304.76	0.04	0.03	1.18E-03	9.0	7.3
	19-May-21	1.00	1.11	304.68	304.57	0.11	0.07	3.26E-03	11.8	13.2
	25-Jun-21	0.81	0.85	304.87	304.83	0.04	0.03	1.18E-03	21.4	21.2
	27-Jul-21	0.96	1.01	304.72	304.67	0.05	0.03	1.48E-03	14.6	18.8
	12-Aug-21	0.98	1.10	304.70	304.58	0.12	0.08	3.55E-03	15.5	20.8
	30-Sep-21	0.91	0.97	304.77	304.71	0.06	0.04	1.78E-03	13.2	13.7
	27-Oct-21	0.65	0.81	305.03	304.87	0.16	0.11	4.74E-03	11.7	9.8
	10-Nov-21	0.85	0.92	304.83	304.76	0.07	0.05	2.07E-03	10.4	8.2
	16-Dec-21	0.87	0.89	304.81	304.79	0.02	0.01	5.92E-04	9.3	7.0
	14-Jan-22	(F)	1.01		304.67				(F)	0.0
	24-Feb-22	0.59	0.78	305.09	304.90	0.19	0.12	5.62E-03	(F)	0.5
	17-Mar-22	0.75	0.87	304.93	304.82	0.12	0.08	3.40E-03	7.1	3.4
	21-Apr-22	0.77	0.85	304.91	304.83	0.08	0.05	2.37E-03	8.3	7.9
	24-May-22	0.93	1.03	304.75	304.65	0.10	0.07	2.96E-03	13.1	12.6
	15-Jun-22	0.94	1.03	304.74	304.65	0.09	0.06	2.66E-03	15.0	17.6
	14-Jul-22	1.00	1.09	304.68	304.59	0.09	0.06	2.66E-03	14.3	15.5
	25-Aug-22	0.98	1.07	304.70	304.61	0.09	0.06	2.66E-03	16.0	18.8
	08-Sep-22	1.01	1.07	304.67	304.61	0.06	0.04	1.78E-03	13.9	16.2
	13-Oct-22	0.90	0.99	304.78	304.69	0.09	0.06	2.66E-03	12.1	12.7
	24-Nov-22	0.99	1.08	304.69	304.60	0.09	0.06	2.66E-03	5.2	2.8
	16-Dec-22	0.92	1.01	304.76	304.67	0.09	0.06	2.66E-03	8.1	1.7
	12-Jan-23	0.93	1.03	304.75	304.66	0.10	0.06	2.84E-03	6.3	2.3
	14-Feb-23	0.85	0.94	304.84	304.74	0.09	0.06	2.81E-03	4.7	1.7
	17-Mar-23	0.86	0.96	304.83	304.73	0.10	0.07	2.96E-03	7.0	3.4
	27-Apr-23	0.85	0.96	304.83	304.73	0.10	0.07	3.11E-03	8.2	8.1
	26-May-23	0.93	1.02	304.75	304.66	0.09	0.06	2.66E-03	9.4	12.7
	15-Jun-23	0.97	1.01	304.71	304.67	0.04	0.03	1.18E-03	12.7	15.4
	25-Jul-23	0.23	0.20	305.45	305.48	-0.03	-0.02	-8.88E-04	18.9	18.5
	08-Aug-23	0.82	0.91	304.87	304.78	0.09	0.06	2.66E-03	12.9	18.2
	07-Sep-23	0.90	1.00	304.79	304.68	0.11	0.07	3.11E-03	14.3	20.1
	26-Oct-23	0.88	0.98	304.80	304.70	0.10	0.07	2.96E-03	11.4	12.7
	16-Nov-23	0.90	0.99	304.78	304.69	0.09	0.06	2.66E-03	9.1	5.7
	18-Dec-23	0.84	0.94	304.84	304.75	0.10	0.06	2.81E-03	6.7	5.0
2023 AVERAGE VALUES						0.08	0.05	2.41E-03	10.1	10.3
OVERALL AVERAGE VALUES						0.07	0.05	2.13E-03	9.5	10.5

NOTES:
- m ASL — metres above sea level
- (F) — Frozen
- L/s/m² — Litres per second per square metre
- Depth of screen midpoint below the creek bed is 1.52 m
- Assumed vertical permeability is 4.50E-05 m/s

TABLE B-5
SUMMARY OF CREEK BASED DRIVE POINT DATA
MILL CREEK AGGREGATES PIT

MONITOR LOCATION	DATE	G.W. LEVEL BTOP (m)	S.W. LEVEL BTOP (m)	GROUND-WATER ELEVATION (m ASL)	SURFACE WATER ELEVATION (m ASL)	HYDRAULIC HEAD IN GROUND-WATER (m)	VERTICAL HYDRAULIC GRADIENT	CALCULATED GROUNDWATER FLUX TO CREEK (L/s/m^2)	TEMPERATURE	
									GROUND-WATER (°C)	SURFACE WATER (°C)
DP4	28-Jan-19	(F)	1.37		305.43				(F)	0
	27-Feb-19	(F)	1.31		305.49				(F)	0
	19-Mar-19	1.08	1.22	305.72	305.58	0.14	0.12	4.21E-03	3.3	1.9
	24-Apr-19	1.12	1.22	305.68	305.58	0.10	0.09	3.01E-03	9.5	8.0
	22-May-19	1.11	1.30	305.69	305.50	0.19	0.17	5.72E-03	13.0	13.1
	19-Jun-19	1.16	1.31	305.64	305.49	0.15	0.13	4.51E-03	14.7	17.4
	26-Jul-19	1.16	1.33	305.64	305.47	0.17	0.15	5.12E-03	18.5	19.7
	20-Aug-19	1.21	1.33	305.59	305.47	0.12	0.11	3.61E-03	20.3	22.9
	25-Sep-19	1.23	1.34	305.57	305.46	0.11	0.10	3.31E-03	14.9	15.0
	29-Oct-19	1.11	1.28	305.69	305.52	0.17	0.15	5.12E-03	12.0	9.9
	13-Nov-19	(F)	1.32		305.48				(F)	0.7
	16-Dec-19	1.11	1.27	305.69	305.53				(F)	0.7
	09-Jan-20	(F)	1.30		305.50				(F)	0.3
	10-Feb-20	(F)	1.20		305.60				(F)	1.0
	09-Mar-20	1.16	1.22	305.64	305.58	0.06	0.05	1.81E-03	7.6	4.8
	14-Apr-20	**	1.25		305.55				**	5.9
				DRIVE POINT WAS REPLACED DUE TO CORROSION						
DP4R	13-May-20	0.85	0.94	305.61	305.52	0.09	0.15	5.02E-03		
	11-Jun-20	0.78	0.85	305.68	305.61	0.07	0.11	3.90E-03	13.3	19.2
	08-Jul-20	1.20	1.34	305.26	305.12	0.14	0.23	7.80E-03	17.6	20.5
	19-Aug-20	0.94	0.98	305.52	305.48	0.04	0.07	2.23E-03	14.1	16.6
	17-Sep-20	0.92	0.97	305.54	305.49	0.05	0.08	2.79E-03	13.9	15.0
	23-Oct-20	0.84	0.90	305.62	305.56	0.06	0.10	3.34E-03	12.1	10.5
	19-Nov-20	0.88	0.95	305.58	305.51	0.07	0.11	3.90E-03	10.3	6.3
	18-Dec-20	(F)	0.95		305.51				(F)	0.5
	08-Jan-21	(F)	0.93		305.53				(F)	0.1
	10-Feb-21	0.92	0.85	305.54	305.61	-0.07	-0.11	-3.90E-03	(F)	-0.2
	10-Mar-21	0.89	0.92	305.57	305.54	0.03	0.05	1.67E-03	5.1	3.0
	21-Apr-21	0.92	0.95	305.54	305.51	0.03	0.05	1.67E-03	8.0	6.8
	19-May-21	0.94	0.99	305.52	305.47	0.05	0.08	2.79E-03	14.0	14.1
	25-Jun-21	0.61	0.61	305.85	305.85	0.00	0.00	0.00E+00	20.3	21.3
	27-Jul-21	0.94	0.98	305.52	305.48	0.04	0.07	2.23E-03	16.4	19.4
	12-Aug-21	0.96	0.99	305.50	305.47	0.03	0.05	1.67E-03	17.7	21.5
	30-Sep-21	0.92	0.98	305.54	305.48	0.06	0.10	3.34E-03	13.9	13.7
	27-Oct-21	0.83	0.88	305.63	305.58	0.05	0.08	2.79E-03	12.4	9.8
	10-Nov-21	0.90	0.94	305.56	305.52	0.04	0.07	2.23E-03	11.5	8.3
	16-Dec-21	0.87	0.90	305.59	305.56	0.03	0.05	1.67E-03	9.3	6.7
	14-Jan-22	(F)	0.98		305.48				(F)	0.0
	24-Feb-22	0.72	0.83	305.74	305.63	0.11	0.18	6.13E-03	(F)	0.6
	17-Mar-22	0.84	0.87	305.62	305.59	0.03	0.05	1.67E-03	5.4	3.2
	21-Apr-22	0.85	0.90	305.61	305.56	0.05	0.08	2.79E-03	8.4	7.8
	24-May-22	0.93	0.95	305.53	305.51	0.02	0.03	1.11E-03	12.0	12.8
	15-Jun-22	0.93	0.97	305.53	305.49	0.04	0.07	2.23E-03	15.0	18.1
	14-Jul-22	0.97	1.01	305.49	305.45	0.04	0.07	2.23E-03	14.4	16.3
	25-Aug-22	0.96	0.99	305.50	305.47	0.03	0.05	1.67E-03	17.7	19.4
	08-Sep-22	0.99	1.01	305.47	305.45	0.02	0.03	1.11E-03	16.5	16.8
	13-Oct-22	0.93	0.94	305.53	305.52	0.01	0.02	5.57E-04	12.1	12.8
	24-Nov-22	0.98	0.98	305.48	305.48	0.00	0.00	0.00E+00	5.2	2.4
	16-Dec-22	0.93	0.95	305.53	305.51	0.02	0.03	1.11E-03	3.5	1.2
	12-Jan-23	0.96	0.96	305.51	305.50	0.00	0.01	2.79E-04	4.8	2.2
	14-Feb-23	0.90	0.93	305.57	305.53	0.04	0.06	1.95E-03	4.7	1.6
	17-Mar-23	0.89	0.91	305.57	305.55	0.02	0.03	8.92E-04	5.2	3.3
	27-Apr-23	0.89	0.92	305.57	305.54	0.03	0.05	1.67E-03	8.0	8.8
	26-May-23	0.92	0.94	305.54	305.52	0.02	0.03	1.11E-03	11.6	12.8
	15-Jun-23	0.91	0.95	305.55	305.51	0.04	0.07	2.23E-03	12.3	15.3
	25-Jul-23	0.44	0.41	306.02	306.05	-0.03	-0.05	-1.73E-03	19.1	18.6
	08-Aug-23	0.88	0.91	305.58	305.56	0.02	0.04	1.39E-03	15.0	18.4
	07-Sep-23	0.91	0.98	305.55	305.48	0.07	0.11	3.90E-03	15.8	20.6
	26-Oct-23	0.90	0.94	305.56	305.53	0.04	0.06	1.95E-03	12.0	12.8
	16-Nov-23	0.94	0.95	305.52	305.51	0.01	0.02	5.57E-04	7.5	5.5
	18-Dec-23	0.91	0.96	305.55	305.50	0.05	0.08	2.79E-03	6.6	5.2
2023 AVERAGE VALUES						0.03	0.04	1.42E-03	10.2	10.4
OVERALL AVERAGE VALUES						0.08	0.08	3.55E-03	10.5	10.7

NOTES:
- · m ASL — metres above sea level
- · (F) — Frozen
- · ** — Unavailable due to damaged drive point
- · L/s/m² — Litres per second per square metre
- · Depth of screen midpoint below the creek bed was 1.13 m for DP4, 0.61 for DP4R
- · Assumed vertical permeability is 3.40E-05 m/s

TABLE B-5
SUMMARY OF CREEK BASED DRIVE POINT DATA
MILL CREEK AGGREGATES PIT

MONITOR LOCATION	DATE	G.W. LEVEL BTOP (m)	S.W. LEVEL BTOP (m)	GROUND-WATER ELEVATION (m ASL)	SURFACE WATER ELEVATION (m ASL)	HYDRAULIC HEAD IN GROUND-WATER (m)	VERTICAL HYDRAULIC GRADIENT	CALCULATED GROUNDWATER FLUX TO CREEK (L/s/m^2)	TEMPERATURE	
									GROUND-WATER (°C)	SURFACE WATER (°C)
DP5CR	28-Jan-19	(F)	(F)						(F)	(F)
	27-Feb-19	(F)	(F)						(F)	(F)
	19-Mar-19	(F)	0.61		303.10				(F)	2.5
	24-Apr-19	0.27	0.56	303.44	303.15	0.29	0.38	1.26E-03	8.9	9.4
	22-May-19	0.33	0.69	303.38	303.02	0.36	0.47	1.56E-03	10.3	12.4
	19-Jun-19	0.34	0.73	303.37	302.98	0.39	0.51	1.69E-03	14.3	17.6
	26-Jul-19	0.46	0.80	303.26	302.91	0.34	0.45	1.49E-03	23.1	21.2
	20-Aug-19	0.44	0.76	303.27	302.95	0.32	0.42	1.39E-03	17.3	17.6
	25-Sep-19	0.43	0.58	303.28	303.13	0.15	0.20	6.51E-04	12.1	12.6
	29-Oct-19	0.20	0.42	303.51	303.29	0.22	0.29	9.55E-04	10.2	8.1
	13-Nov-19	(F)	0.47		303.24				(F)	1.4
	16-Dec-19	(F)	0.48		303.24				(F)	1.1
	09-Jan-20	(F)	0.48		303.23				(F)	0.4
	10-Feb-20	0.30	0.69	303.42	303.02	0.39	0.52	1.72E-03	(F)	0.8
	09-Mar-20	0.16	0.51	303.55	303.20	0.35	0.46	1.52E-03	6.2	3.3
	14-Apr-20	0.25	0.62	303.46	303.09	0.37	0.49	1.61E-03	7.1	6.3
	13-May-20	0.33	0.77	303.38	302.94	0.44	0.58	1.91E-03	8.8	9.2
	11-Jun-20	0.25	0.55	303.46	303.16	0.30	0.39	1.30E-03	12.5	18.4
	08-Jul-20	0.53	0.80	303.18	302.91	0.27	0.36	1.17E-03	16.0	18.2
	19-Aug-20	0.52	0.81	303.19	302.90	0.29	0.38	1.26E-03	13.9	14.2
	17-Sep-20	0.52	0.80	303.19	302.91	0.28	0.37	1.22E-03	13.2	13.4
	23-Oct-20	0.32	0.67	303.39	303.04	0.35	0.46	1.52E-03	11.4	10.2
	19-Nov-20	0.66	0.74	303.05	302.97	0.08	0.11	3.47E-04	10.7	6.7
	18-Dec-20	(F)	0.79		302.92				(F)	0.6
	08-Jan-21	(F)	0.70		303.01				(F)	0.2
	10-Feb-21	(F)	0.86		302.85				(F)	0.1
	10-Mar-21	0.16	0.62	303.55	303.09	0.46	0.61	2.00E-03	7.7	4.9
	21-Apr-21	0.36	0.81	303.35	302.90	0.45	0.59	1.95E-03	8.9	8.0
	19-May-21	0.51	0.86	303.20	302.85	0.35	0.46	1.52E-03	11.6	12.0
	25-Jun-21	0.27	0.39	303.44	303.32	0.12	0.16	5.21E-04	17.2	21.1
	27-Jul-21	0.50	0.84	303.21	302.87	0.34	0.45	1.48E-03	15.9	18.1
	12-Aug-21	0.47	0.84	303.24	302.87	0.37	0.49	1.61E-03	16.9	20.3
	30-Sep-21	0.39	0.71	303.32	303.00	0.32	0.42	1.39E-03	13.4	13.1
	27-Oct-21	0.34	0.80	303.37	302.91	0.46	0.61	2.00E-03	12.8	10.1
	10-Nov-21	0.37	0.78	303.34	302.93	0.41	0.54	1.78E-03	10.9	8.5
	16-Dec-21	0.31	0.78	303.40	302.93	0.47	0.62	2.04E-03	9.3	7.7
	14-Jan-22	(F)	(F)						(F)	0.7
	24-Feb-22	(F)	0.59		303.12				(F)	0.4
	17-Mar-22	0.24	0.71	303.47	303.00	0.47	0.62	2.04E-03	7.5	5.1
	21-Apr-22	0.25	0.72	303.46	302.99	0.47	0.62	2.04E-03	9.2	8.2
	24-May-22	0.36	0.82	303.35	302.89	0.46	0.61	2.00E-03	13.4	14.5
	15-Jun-22	0.37	0.80	303.34	302.91	0.43	0.57	1.87E-03	15.0	17.3
	14-Jul-22	0.53	0.85	303.18	302.86	0.32	0.42	1.39E-03	15.6	16.6
	25-Aug-22	0.49	0.83	303.22	302.88	0.34	0.45	1.48E-03	17.3	18.4
	08-Sep-22	0.56	0.84	303.15	302.87	0.28	0.37	1.22E-03	16.0	15.7
	13-Oct-22	0.45	0.80	303.26	302.91	0.35	0.46	1.52E-03	12.0	12.4
	24-Nov-22	0.45	0.85	303.27	302.87	0.40	0.53	1.74E-03	6.9	4.4
	16-Dec-22	0.44	0.81	303.27	302.90	0.37	0.49	1.61E-03	7.8	2.5
	12-Jan-23	0.36	0.84	303.36	302.87	0.48	0.64	2.11E-03	5.6	2.9
	14-Feb-23	0.27	0.78	303.44	302.93	0.51	0.67	2.20E-03	5.1	2.3
	17-Mar-23	0.15	0.79	303.56	302.92	0.64	0.84	2.79E-03	7.1	3.9
	27-Apr-23	0.30	0.81	303.41	302.90	0.51	0.67	2.21E-03	8.6	9.2
	26-May-23	0.32	0.84	303.39	302.87	0.52	0.68	2.26E-03	10.2	14.2
	15-Jun-23	0.38	0.90	303.33	302.81	0.52	0.68	2.26E-03	12.2	14.8
	25-Jul-23	0.16	0.27	303.55	303.44	0.11	0.14	4.78E-04	18.6	19.5
	08-Aug-23	0.31	0.78	303.40	302.94	0.46	0.61	2.02E-03	15.7	18.8
	07-Sep-23	0.39	0.83	303.32	302.88	0.44	0.58	1.91E-03	16.3	19.9
	26-Oct-23	0.36	0.81	303.35	302.90	0.45	0.59	1.95E-03	11.7	12.7
	16-Nov-23	0.35	0.82	303.36	302.89	0.47	0.62	2.04E-03	9.1	6.4
	18-Dec-23	0.28	0.83	303.43	302.88	0.55	0.72	2.39E-03	6.3	5.5
2023 AVERAGE VALUES						0.47	0.62	2.05E-03	10.5	10.8
OVERALL AVERAGE VALUES						0.14	0.20	2.62E-03	10.9	10.1

NOTES:

- m ASL metres above sea level
- (F) Frozen
- L/s/m² Litres per second per square metre
- New pipe added March 2012, elevation of Top of Pipe is now 304.348 m ASL.
- Depth of screen midpoint below the creek bed is 0.72 m for DP5B, 0.57 m for DP5C, 0.62 m for DP5D and 0.76 m for DP5CR.
- Horizontal hydraulic conductivity (Kh) value for DP5B/5C data in 2011/2012 estimated as the geometric mean of slug test values for DP5A and DP5C. Vertical hydraulic conductivity value (Kv) calculated as 1.0E-06 m/s based on assumed Kv:Kh of 1:10.
- Vertical hydraulic conductivity value (Kv) for DP5D calculated as 4.7E-06 m/s based on assumed Kv:Kh of 1:10.
- Vertical hydraulic conductivity value (Kv) for DP5CR calculated as 3.3E-06 m/s based on geometric mean of slug test values for DP5A, DP5C, and DP5CR, and assumed Kv:Kh of 1:10.
- Underlining indicates data are interpreted with caution due to beaver dam downstream of DP5CR

TABLE B-5
SUMMARY OF CREEK BASED DRIVE POINT DATA
MILL CREEK AGGREGATES PIT

MONITOR LOCATION	DATE	G.W. LEVEL BTOP (m)	S.W. LEVEL BTOP (m)	GROUND-WATER ELEVATION (m ASL)	SURFACE WATER ELEVATION (m ASL)	HYDRAULIC HEAD IN GROUND-WATER (m)	VERTICAL HYDRAULIC GRADIENT	CALCULATED GROUNDWATER FLUX TO CREEK (L/s/m^2)	TEMPERATURE	
									GROUND-WATER (°C)	SURFACE WATER (°C)
DP17	28-Jan-19	(F)	(F)						(F)	(F)
	27-Feb-19	(F)	1.03		305.23				(F)	0
	19-Mar-19	0.91	0.96	305.35	305.30	0.05	0.06	9.83E-04	8.9	1.9
	24-Apr-19	0.87	0.92	305.39	305.34	0.05	0.06	9.83E-04		8.8
		DRIVE POINT WAS REPLACED DUE TO CORROSION								
DP17R	22-May-19	0.91	0.96	305.47	305.42	0.05	0.11	1.97E-03	10.3	13.1
	19-Jun-19	0.92	0.95	305.46	305.43	0.03	0.07	1.18E-03	15.6	17.2
	26-Jul-19	1.06	1.11	305.32	305.27	0.05	0.11	1.97E-03	14.7	19.7
	20-Aug-19	1.06	1.08	305.32	305.30	0.02	0.04	7.87E-04	14.9	20.4
	25-Sep-19	1.11	1.13	305.27	305.25	0.02	0.04	7.87E-04	14.3	14.3
	29-Oct-19	0.99	1.05	305.39	305.33	0.06	0.13	2.36E-03	12.1	10.1
	13-Nov-19	(F)	1.10		305.28				(F)	0.2
	16-Dec-19	(F)	1.08		305.30				(F)	0.7
	09-Jan-20	(F)	1.08		305.30				(F)	0.3
	10-Feb-20	1.01	1.07	305.37	305.31	0.06	0.13	2.36E-03	(F)	1.0
	09-Mar-20	0.95	1.10	305.43	305.28	0.15	0.33	5.90E-03	8.1	4.8
	14-Apr-20	0.98	1.05	305.40	305.33	0.07	0.16	2.75E-03	6.4	5.9
	13-May-20	1.02	1.07	305.36	305.31	0.05	0.11	1.97E-03	8.4	7.8
	11-Jun-20	0.96	1.01	305.42	305.37	0.05	0.11	1.97E-03	16.2	18.9
	08-Jul-20	1.09	1.13	305.29	305.25	0.04	0.09	1.57E-03	14.2	20.3
	19-Aug-20	1.09	1.13	305.29	305.25	0.04	0.09	1.57E-03	14.2	16.7
	17-Sep-20	1.09	1.11	305.29	305.27	0.02	0.04	7.87E-04	15.1	15.0
	23-Oct-20	1.00	1.05	305.38	305.33	0.05	0.11	1.97E-03	12.1	10.6
	19-Nov-20	1.05	1.09	305.33	305.29	0.04	0.09	1.57E-03	11.0	5.8
	18-Dec-20	(F)	1.11		305.27				(F)	0.5
	08-Jan-21	(F)	1.09		305.29				(F)	0.1
	10-Feb-21	(F)	1.00		305.38				(F)	-0.1
	10-Mar-21	0.99	1.07	305.39	305.31	0.08	0.18	3.15E-03	3.5	2.4
	21-Apr-21	1.05	1.09	305.33	305.29	0.04	0.09	1.57E-03	8.1	6.7
	19-May-21	1.12	1.14	305.26	305.24	0.02	0.04	7.87E-04	13.5	13.9
	25-Jun-21	0.80	0.84	305.58	305.54	0.04	0.09	1.57E-03	21.6	21.4
	27-Jul-21	1.09	1.12	305.29	305.26	0.03	0.07	1.18E-03	15.6	19.1
	12-Aug-21	1.11	1.13	305.27	305.25	0.02	0.04	7.87E-04	17.4	21.4
	30-Sep-21	1.06	1.11	305.32	305.27	0.05	0.11	1.97E-03	12.9	13.8
	27-Oct-21	0.99	1.02	305.39	305.36	0.03	0.07	1.18E-03	12.3	9.8
	10-Nov-21	1.04	1.07	305.34	305.31	0.03	0.07	1.18E-03	10.4	8.2
	16-Dec-21	1.01	1.06	305.37	305.32	0.05	0.11	1.97E-03	9.1	6.8
	14-Jan-22	(F)	1.08		305.30				(F)	0.0
	24-Feb-22	0.94	1.03	305.44	305.35	0.09	0.20	3.54E-03	(F)	0.4
	17-Mar-22	1.01	1.06	305.37	305.32	0.05	0.11	1.97E-03	8.2	3.1
	21-Apr-22	1.01	1.06	305.37	305.32	0.05	0.11	1.97E-03	8.5	7.8
	24-May-22	1.06	1.11	305.32	305.27	0.05	0.11	1.97E-03	12.2	12.6
	15-Jun-22	1.09	1.12	305.29	305.26	0.03	0.07	1.18E-03	14.7	17.9
	14-Jul-22	1.14	1.16	305.24	305.22	0.02	0.04	7.87E-04	14.1	15.6
	25-Aug-22	1.12	1.14	305.26	305.24	0.02	0.04	7.87E-04	16.1	19.3
	08-Sep-22	1.15	1.15	305.23	305.23	0.00	0.00	0.00E+00	15.3	16.7
	13-Oct-22	1.08	1.10	305.30	305.28	0.02	0.04	7.87E-04	12.1	12.8
	24-Nov-22	1.13	1.15	305.25	305.23	0.02	0.04	7.87E-04	6.0	2.0
	16-Dec-22	1.09	1.11	305.29	305.27	0.02	0.04	7.87E-04	2.5	1.2
	12-Jan-23	1.10	1.12	305.28	305.26	0.02	0.04	7.87E-04	5.5	2.2
	14-Feb-23	1.06	1.10	305.32	305.28	0.05	0.10	1.77E-03	5.2	1.6
	17-Mar-23	1.05	1.10	305.33	305.28	0.05	0.11	1.97E-03	6.8	3.3
	27-Apr-23	1.06	1.09	305.32	305.29	0.03	0.07	1.18E-03	10.0	8.6
	26-May-23	1.08	1.11	305.30	305.27	0.03	0.07	1.18E-03	NA	12.1
	15-Jun-23	1.08	1.11	305.30	305.27	0.03	0.07	1.18E-03	11.7	15.3
	25-Jul-23	0.58	0.57	305.80	305.81	-0.01	-0.03	-5.51E-04	18.9	18.6
	08-Aug-23	1.05	1.08	305.33	305.30	0.03	0.07	1.22E-03	14.4	18.3
	07-Sep-23	1.09	1.13	305.29	305.25	0.04	0.09	1.57E-03	16.5	20.4
	26-Oct-23	1.08	1.11	305.30	305.27	0.03	0.07	1.30E-03	12.1	12.8
	16-Nov-23	1.09	1.12	305.29	305.26	0.03	0.07	1.18E-03	NA	5.5
	18-Dec-23	0.97	1.11	305.41	305.27	0.14	0.31	5.51E-03	6.6	5.0
2023 AVERAGE VALUES						0.04	0.09	1.52E-03	10.8	10.3
OVERALL AVERAGE VALUES						0.03	0.04	6.30E-04	10.1	10.6

NOTES:
- m ASL
- (F)
- L/s/m²
- NA - Not available due to equipment failure
- Depth of screen midpoint below the creek bed is 0.90 m for DP17 and 0.45 m for DP17R
- Assumed vertical permeability is 1.77E-05 m/s

TABLE B-5
SUMMARY OF CREEK BASED DRIVE POINT DATA
MILL CREEK AGGREGATES PIT

MONITOR LOCATION	DATE	G.W. LEVEL BTOP (m)	S.W. LEVEL BTOP (m)	GROUND-WATER ELEVATION (m ASL)	SURFACE WATER ELEVATION (m ASL)	HYDRAULIC HEAD IN GROUND-WATER (m)	VERTICAL HYDRAULIC GRADIENT	CALCULATED GROUNDWATER FLUX TO CREEK (L/s/m^2)	TEMPERATURE	
									GROUND-WATER (°C)	SURFACE WATER (°C)
DP18	28-Jan-19	(F)	(F)						(F)	(F)
	27-Feb-19	(F)	0.44		307.30				(F)	-0.4
	19-Mar-19	0.22	0.25	307.52	307.49	0.03	0.04	8.34E-04	3.2	0.8
	24-Apr-19	0.19	0.22	307.55	307.52	0.03	0.04	8.34E-04	7.0	7.3
	22-May-19	0.30	0.37	307.44	307.37	0.07	0.10	1.95E-03	12.0	12.4
	19-Jun-19	0.30	0.39	307.44	307.35	0.09	0.12	2.50E-03	17.3	18.3
	26-Jul-19	0.34	0.46	307.40	307.28	0.12	0.16	3.34E-03	19.1	19.7
	20-Aug-19	0.37	0.48	307.37	307.26	0.11	0.15	3.06E-03	21.0	22.0
	25-Sep-19	0.43	0.48	307.31	307.26	0.05	0.07	1.39E-03	16.6	16.8
	29-Oct-19	0.23	0.31	307.51	307.43	0.08	0.11	2.22E-03	9.8	8.4
	13-Nov-19	(F)	0.38		307.36				(F)	0.9
	16-Dec-19	(F)	0.36		307.38				(F)	0.8
	09-Jan-20	(F)	0.38		307.36				(F)	0.3
	10-Feb-20	0.31	0.39	307.43	307.35	0.08	0.11	2.22E-03	(F)	1.0
	09-Mar-20	0.25	0.27	307.49	307.47	0.02	0.03	5.56E-04	3.9	2.9
	14-Apr-20	0.28	0.33	307.46	307.41	0.05	0.07	1.39E-03	6.8	6.4
	13-May-20	0.28	0.41	307.46	307.33	0.13	0.18	3.62E-03	8.4	10.8
	11-Jun-20	0.16	0.24	307.58	307.50	0.08	0.11	2.22E-03	16.6	18.4
	08-Jul-20	0.45	0.50	307.29	307.24	0.05	0.07	1.39E-03	17.3	19.1
	19-Aug-20	0.41	0.52	307.33	307.22	0.11	0.15	3.06E-03	16.6	16.8
	17-Sep-20	0.45	0.51	307.29	307.23	0.06	0.08	1.67E-03	14.6	14.8
	23-Oct-20	0.27	0.36	307.47	307.38	0.09	0.12	2.50E-03	11.1	10.4
	19-Nov-20	0.34	0.42	307.40	307.32	0.08	0.11	2.22E-03	9.2	6.5
	18-Dec-20	(F)	0.39		307.35				(F)	0.8
	08-Jan-21	(F)	0.37		307.37				(F)	0.2
	10-Feb-21	(F)	0.49		307.25				(F)	-0.2
	10-Mar-21	0.34	0.43	307.40	307.31	0.09	0.12	2.50E-03	3.8	2.7
	21-Apr-21	0.34	0.43	307.40	307.31	0.09	0.12	2.50E-03	9.2	7.4
	19-May-21	0.49	0.57	307.25	307.17	0.08	0.11	2.22E-03	13.2	13.6
	25-Jun-21	0.25	0.40	307.49	307.34	0.15	0.21	4.17E-03	20.6	21.5
	27-Jul-21	0.39	0.49	307.35	307.25	0.10	0.14	2.78E-03	18.6	19.8
	12-Aug-21	0.43	0.51	307.31	307.23	0.08	0.11	2.22E-03	20.7	22.0
	30-Sep-21	0.21	0.45	307.53	307.29	0.24	0.33	6.67E-03	14.2	13.3
	27-Oct-21	0.21	0.29	307.53	307.45	0.08	0.11	2.22E-03	11.7	9.2
	10-Nov-21	0.29	0.38	307.45	307.36	0.09	0.12	2.50E-03	9.5	8.1
	16-Dec-21	0.26	0.34	307.48	307.40	0.08	0.11	2.22E-03	8.5	6.7
	14-Jan-22	(F)	0.45		307.29				(F)	0.1
	24-Feb-22	(F)	0.13		307.61				(F)	0.8
	17-Mar-22	0.23	0.32	307.51	307.42	0.09	0.12	2.50E-03	6.7	5.0
	21-Apr-22	0.24	0.30	307.50	307.44	0.06	0.08	1.67E-03	8.6	8.1
	24-May-22	0.33	0.44	307.41	307.30	0.11	0.15	3.06E-03	14.2	14.9
	15-Jun-22	0.35	0.45	307.39	307.29	0.10	0.14	2.78E-03	16.8	19.3
	14-Jul-22	0.58	0.51	307.16	307.23	-0.07	-0.10	-1.95E-03	19.3	18.8
	25-Aug-22	0.71	0.48	307.03	307.26	-0.23	-0.32	-6.40E-03	21.4	20.6
	08-Sep-22	0.57	0.52	307.17	307.22	-0.05	-0.07	-1.39E-03	18.0	17.6
	13-Oct-22	0.70	0.44	307.04	307.30	-0.26	-0.36	-7.23E-03	13.4	12.8
	24-Nov-22	0.74	0.47	307.00	307.27	-0.27	-0.37	-7.51E-03	5.3	3.7
	16-Dec-22	0.54	0.43	307.20	307.31	-0.11	-0.15	-3.06E-03	3.9	3.0
	12-Jan-23	0.54	0.44	307.21	307.31	-0.10	-0.14	-2.78E-03	4.6	3.5
	14-Feb-23	0.50	0.39	307.25	307.36	-0.11	-0.15	-3.06E-03	3.2	2.9
	17-Mar-23	0.41	0.36	307.33	307.38	-0.05	-0.07	-1.39E-03	3.8	3.4
	27-Apr-23	0.49	0.39	307.25	307.35	-0.10	-0.14	-2.78E-03	8.9	11.3
	26-May-23	0.56	0.45	307.18	307.29	-0.11	-0.15	-3.06E-03	12.4	14.9
	15-Jun-23	0.39	0.45	307.35	307.30	0.06	0.08	1.53E-03	15.2	16.2
	25-Jul-23	0.19	0.09	307.55	307.65	-0.10	-0.13	-2.67E-03	16.6	19.8
	08-Aug-23	0.42	0.35	307.33	307.40	-0.07	-0.10	-1.95E-03	17.7	19.7
	07-Sep-23	0.38	0.45	307.37	307.29	0.07	0.10	2.09E-03	18.6	20.9
	26-Oct-23	0.58	0.40	307.16	307.34	-0.18	-0.25	-5.01E-03	13.2	13.4
	16-Nov-23	0.46	0.44	307.28	307.31	-0.02	-0.03	-6.95E-04	8.3	5.5
	18-Dec-23	0.38	0.60	307.36	307.14	0.22	0.30	6.12E-03	4.9	5.3
2023 AVERAGE VALUES						-0.04	-0.06	-1.14E-03	10.6	11.4
OVERALL AVERAGE VALUES						0.03	0.05	8.05E-03	11.4	10.6

NOTES:
- m ASL metres above sea level
- (F) Frozen
- L/s/m² Litres per second per square metre
- n/a not available
- Depth of screen midpoint below the creek bed is 0.73 m
- Assumed vertical permeability is 2.03E-05 m/s

TABLE B-5
SUMMARY OF CREEK BASED DRIVE POINT DATA
MILL CREEK AGGREGATES PIT

MONITOR LOCATION	DATE	G.W. LEVEL BTOP (m)	S.W. LEVEL BTOP (m)	GROUND-WATER ELEVATION (m ASL)	SURFACE WATER ELEVATION (m ASL)	HYDRAULIC HEAD IN GROUND-WATER (m)	VERTICAL HYDRAULIC GRADIENT	CALCULATED GROUNDWATER FLUX TO CREEK (L/s/m^2)	TEMPERATURE	
									GROUND-WATER (°C)	SURFACE WATER (°C)
DP19	28-Jan-19	(F)	(F)						(F)	(F)
	27-Feb-19	(F)	0.84		306.69				(F)	-0.4
	19-Mar-19	(F)	0.80		306.73				4.3	0.8
	24-Apr-19	0.71	0.73	306.82	306.80	0.02	0.01	1.34E-04	7.0	7.5
	22-May-19	0.73	0.92	306.80	306.61	0.19	0.09	1.27E-03	11.3	12.4
	19-Jun-19	0.74	0.92	306.79	306.61	0.18	0.08	1.21E-03	16.8	20.1
	26-Jul-19	0.88	0.98	306.65	306.55	0.10	0.05	6.70E-04	19.4	19.7
	20-Aug-19	0.87	0.99	306.66	306.54	0.12	0.06	8.04E-04	19.2	19.6
	25-Sep-19	0.95	1.00	306.58	306.53	0.05	0.02	3.35E-04	16.3	16.6
	29-Oct-19	0.76	0.85	306.77	306.68	0.09	0.04	6.03E-04	9.7	8.3
	13-Nov-19	(F)	0.92		306.61				(F)	0.6
	16-Dec-19	(F)	0.90		306.63				(F)	0.8
	09-Jan-20	(F)	0.86		306.67				(F)	0.1
	10-Feb-20	0.73	0.93	306.80	306.60	0.20	0.09	1.34E-03	(F)	1.0
	09-Mar-20	0.67	0.83	306.86	306.70	0.16	0.07	1.07E-03	4.8	3.2
	14-Apr-20	0.67	0.87	306.86	306.66	0.20	0.09	1.34E-03	7.5	6.3
	13-May-20	0.70	0.93	306.83	306.60	0.23	0.11	1.54E-03	8.0	10.1
	11-Jun-20	0.68	0.75	306.85	306.78	0.07	0.03	4.69E-04	14.0	19.8
	08-Jul-20	0.98	1.00	306.55	306.53	0.02	0.01	1.34E-04	17.2	19.3
	19-Aug-20	0.92	1.02	306.61	306.51	0.10	0.05	6.70E-04	16.3	16.8
	17-Sep-20	0.96	1.05	306.57	306.48	0.09	0.04	6.03E-04	14.4	14.9
	23-Oct-20	0.80	0.91	306.73	306.62	0.11	0.05	7.37E-04	10.0	10.4
	19-Nov-20	0.94	0.95	306.59	306.58	0.01	0.00	6.70E-05	8.1	5.4
	18-Dec-20	(F)	0.92		306.61				(F)	0.6
	08-Jan-21	(F)	0.85		306.68				(F)	0.2
	10-Feb-21	(F)	0.88		306.65				(F)	-0.1
	10-Mar-21	0.91	0.95	306.62	306.58	0.04	0.02	2.68E-04	4.6	3.0
	21-Apr-21	0.80	0.97	306.73	306.56	0.17	0.08	1.14E-03	9.1	7.3
	19-May-21	0.93	1.03	306.60	306.50	0.10	0.05	6.70E-04	12.5	13.7
	25-Jun-21	0.81	0.90	306.72	306.63	0.09	0.04	6.03E-04	19.8	20.2
	27-Jul-21	1.02	1.03	306.51	306.50	0.01	0.00	6.70E-05	18.9	19.7
	12-Aug-21	1.07	1.03	306.46	306.50	-0.04	-0.02	-2.68E-04	20.9	22.0
	30-Sep-21	0.90	0.98	306.63	306.55	0.08	0.04	5.36E-04	14.8	13.3
	27-Oct-21	0.78	0.81	306.75	306.72	0.03	0.01	2.01E-04	12.4	9.3
	10-Nov-21	0.77	0.88	306.76	306.65	0.11	0.05	7.37E-04	9.7	8.1
	16-Dec-21	0.89	0.87	306.64	306.66	0.11	0.05	7.37E-04	7.9	6.6
	14-Jan-22	(F)	0.92		306.61				(F)	0.2
	24-Feb-22	(F)	0.49		307.04				(F)	(F)
	17-Mar-22	0.78	0.81	306.75	306.72	0.03	0.01	2.01E-04	7.7	5.2
	21-Apr-22	0.79	0.84	306.74	306.69	0.05	0.02	3.35E-04	7.8	7.9
	24-May-22	0.88	0.94	306.65	306.59	0.06	0.03	4.02E-04	14.6	14.8
	15-Jun-22	0.90	0.92	306.63	306.61	0.02	0.01	1.34E-04	16.3	18.7
	14-Jul-22	1.58	0.98	305.95	306.55	-0.60	-0.28	-4.02E-03	19.1	19
	25-Aug-22	1.63	0.94	305.90	306.59	-0.69	-0.32	-4.62E-03	20.6	20.6
	08-Sep-22	1.91	0.98	305.62	306.55	-0.93	-0.43	-6.23E-03	18.0	17.7
	13-Oct-22	1.80	0.99	305.73	306.54	-0.81	-0.38	-5.43E-03	12.1	12.9
	24-Nov-22	1.63	0.95	305.90	306.58	-0.68	-0.32	-4.55E-03	6.8	4.1
	16-Dec-22	1.58	0.91	305.96	306.63	-0.67	-0.31	-4.49E-03	5.1	2.8
	12-Jan-23	1.51	0.95	306.02	306.58	-0.56	-0.26	-3.76E-03	5.4	2.6
	14-Feb-23	1.53	0.91	306.00	306.63	-0.63	-0.29	-4.20E-03	4.6	2.6
	17-Mar-23	1.58	0.90	305.95	306.63	-0.68	-0.32	-4.57E-03	5.7	3.5
	27-Apr-23	0.86	0.97	306.67	306.56	0.11	0.05	7.37E-04	8.8	11.4
	26-May-23	0.88	0.98	306.65	306.55	0.10	0.05	6.70E-04	12.5	15.2
	15-Jun-23	1.04	0.98	306.49	306.55	-0.06	-0.03	-4.02E-04	15.2	16.5
	25-Jul-23	0.83	0.47	306.71	307.07	-0.36	-0.17	-2.41E-03	18.1	20.0
	08-Aug-23	0.86	0.90	306.67	306.63	0.04	0.02	2.68E-04	17.9	19.4
	07-Sep-23	0.93	0.95	306.61	306.58	0.02	0.01	1.67E-04	18.4	21.3
	26-Oct-23	1.60	0.90	305.94	306.63	-0.70	-0.32	-4.65E-03	12.4	12.8
	16-Nov-23	1.02	0.91	306.52	306.62	-0.10	-0.05	-7.03E-04	8.7	6.2
	18-Dec-23	1.53	0.91	306.01	306.62	-0.61	-0.29	-4.12E-03	5.5	5.2
2023 AVERAGE VALUES						-0.29	-0.13	-1.91E-03	11.1	11.4
OVERALL AVERAGE VALUES						-0.05	-0.02	7.53E-03	11.3	10.7

NOTES:
- m ASL — metres above sea level
- (F) — Frozen
- L/s/m² — Litres per second per square metre
- Depth of screen midpoint below the creek bed is 2.15 m
- Assumed vertical permeability is 1.44E-05 m/s

TABLE B-5
SUMMARY OF CREEK BASED DRIVE POINT DATA
MILL CREEK AGGREGATES PIT

MONITOR LOCATION	DATE	G.W. LEVEL BTOP (m)	S.W. LEVEL BTOP (m)	GROUND-WATER ELEVATION (m ASL)	SURFACE WATER ELEVATION (m ASL)	HYDRAULIC HEAD IN GROUND-WATER (m)	VERTICAL HYDRAULIC GRADIENT	CALCULATED GROUNDWATER FLUX TO CREEK (L/s/m^2)	TEMPERATURE	
									GROUND-WATER (°C)	SURFACE WATER (°C)
DP20	28-Jan-19	(F)	(F)						(F)	(F)
	27-Feb-19	(F)	0.79		306.35				(F)	-0.4
	19-Mar-19	(F)	0.82		306.32				(F)	0.8
	24-Apr-19	0.53	0.79	306.61	306.35	0.26	0.12	1.47E-03	6.6	7.3
	22-May-19	0.57	0.90	306.57	306.24	0.33	0.15	1.86E-03	11.3	12.3
	19-Jun-19	0.59	0.91	306.55	306.23	0.32	0.15	1.81E-03	17.0	19.9
	26-Jul-19	0.62	0.95	306.52	306.19	0.33	0.15	1.86E-03	18.8	19.5
	20-Aug-19	0.65	0.96	306.49	306.18	0.31	0.14	1.75E-03	18.6	19.9
	25-Sep-19	0.76	0.96	306.38	306.18	0.20	0.09	1.13E-03	16.7	16.9
	29-Oct-19	0.59	0.86	306.55	306.28	0.27	0.12	1.52E-03	9.9	8.3
	13-Nov-19	(F)	0.91		306.23				(F)	0.6
	16-Dec-19	(F)	0.91		306.23				(F)	0.8
	09-Jan-20	(F)	0.76		306.38				(F)	0.1
	10-Feb-20	0.56	0.67	306.58	306.47	0.11	0.05	6.21E-04	(F)	1.0
	09-Mar-20	0.69	0.84	306.45	306.30	0.15	0.07	8.46E-04	4.2	2.9
	14-Apr-20	0.49	0.88	306.65	306.26	0.39	0.18	2.20E-03	6.8	6.4
	13-May-20	0.52	0.94	306.62	306.20	0.42	0.19	2.37E-03	7.8	10.0
	11-Jun-20	0.49	0.76	306.65	306.38	0.27	0.12	1.52E-03	13.7	19.4
	08-Jul-20	0.82	0.96	306.32	306.18	0.14	0.06	7.90E-04	17.1	19.5
	19-Aug-20	0.72	0.96	306.42	306.18	0.24	0.11	1.35E-03	16.6	16.8
	17-Sep-20	0.75	1.00	306.39	306.14	0.25	0.11	1.41E-03	14.6	14.7
	23-Oct-20	0.63	0.82	306.51	306.32	0.19	0.09	1.07E-03	11.5	10.5
	19-Nov-20	0.76	0.91	306.38	306.23	0.15	0.07	8.46E-04	7.7	5.1
	18-Dec-20	(F)	0.90		306.24				(F)	0.7
	08-Jan-21	(F)	0.82		306.32				(F)	0.1
	10-Feb-21	(F)	(F)						(F)	(F)
	10-Mar-21	0.63	0.91	306.51	306.23	0.28	0.13	1.58E-03	4.3	2.8
	21-Apr-21	0.68	0.93	306.46	306.21	0.25	0.11	1.41E-03	9.4	7.5
	19-May-21	0.76	1.02	306.38	306.12	0.26	0.12	1.47E-03	12.4	13.8
	25-Jun-21	0.65	0.86	306.49	306.28	0.21	0.10	1.18E-03	18.5	19.3
	27-Jul-21	0.82	0.96	306.32	306.18	0.14	0.06	7.90E-04	18.3	20.1
	12-Aug-21	0.84	0.97	306.30	306.17	0.13	0.06	7.33E-04	20.9	22.3
	30-Sep-21	0.77	0.92	306.37	306.22	0.15	0.07	8.46E-04	14.5	13.6
	27-Oct-21	0.70	0.80	306.44	306.34	0.10	0.05	5.64E-04	11.8	9.3
	10-Nov-21	0.90	1.00	306.24	306.14	0.10	0.05	5.64E-04	10.4	8.3
	16-Dec-21	0.72	0.86	306.42	306.28	0.14	0.06	7.90E-04	7.5	6.6
	14-Jan-22	(F)	0.92		306.22				(F)	0.2
	24-Feb-22	0.42	(F)	306.72					(F)	(F)
	17-Mar-22	0.55	0.81	306.59	306.33	0.26	0.12	1.47E-03	7.6	5.1
	21-Apr-22	0.56	0.83	306.58	306.31	0.27	0.12	1.52E-03	8.0	7.9
	24-May-22	0.69	0.89	306.45	306.25	0.20	0.09	1.13E-03	13.1	15.2
	15-Jun-22	0.70	0.89	306.44	306.25	0.19	0.09	1.07E-03	15.4	18.8
	14-Jul-22	1.44	0.94	305.70	306.20	-0.50	-0.23	-2.82E-03	18.8	19.9
	25-Aug-22	1.38	0.91	305.76	306.23	-0.47	-0.22	-2.65E-03	21.5	21.3
	08-Sep-22	1.21	0.95	305.93	306.19	-0.26	-0.12	-1.47E-03	19.1	19.2
	13-Oct-22	1.34	0.90	305.80	306.24	-0.44	-0.20	-2.48E-03	13.6	13.1
	24-Nov-22	1.30	0.94	305.85	306.20	-0.35	-0.16	-1.99E-03	7.2	3.5
	16-Dec-22	1.24	0.92	305.90	306.22	-0.32	-0.15	-1.81E-03	5.1	2.6
	12-Jan-23	1.37	0.94	305.77	306.20	-0.43	-0.20	-2.44E-03	5.9	2.4
	14-Feb-23	1.32	0.91	305.82	306.23	-0.41	-0.19	-2.32E-03	5.4	2.9
	17-Mar-23	1.11	0.89	306.04	306.26	-0.22	-0.10	-1.24E-03	6.0	3.4
	27-Apr-23	0.70	0.91	306.44	306.23	0.21	0.10	1.18E-03	9.0	11.9
	26-May-23	0.72	0.96	306.42	306.18	0.24	0.11	1.35E-03	12.4	15.6
	15-Jun-23	0.94	0.94	306.20	306.20	0.00	0.00	0.00E+00	15.0	16.5
	25-Jul-23	0.51	0.47	306.63	306.67	-0.04	-0.02	-2.26E-04	18.9	19.8
	08-Aug-23	0.71	0.91	306.43	306.23	0.20	0.09	1.13E-03	18.5	19.8
	07-Sep-23	0.73	0.92	306.41	306.22	0.19	0.09	1.07E-03	18.4	21.4
	26-Oct-23	1.35	0.92	305.79	306.22	-0.43	-0.20	-2.43E-03	12.5	13.0
	16-Nov-23	0.93	0.87	306.22	306.28	-0.06	-0.03	-3.39E-04	8.7	6.2
	18-Dec-23	1.28	0.90	305.86	306.25	-0.38	-0.18	-2.17E-03	6.0	5.1
2023 AVERAGE VALUES						-0.11	-0.05	-6.33E-04	10.9	10.8
OVERALL AVERAGE VALUES						0.11	0.05	8.56E-03	11.3	10.9

NOTES:
- m ASL — metres above sea level
- (F) — Frozen
- L/s/m² — Litres per second per square metre
- NA — Not available
- Depth of screen midpoint below the creek bed is 2.18 m
- Assumed vertical permeability is 1.23E-05 m/s

TABLE B-5
SUMMARY OF CREEK BASED DRIVE POINT DATA
MILL CREEK AGGREGATES PIT

MONITOR LOCATION	DATE	G.W. LEVEL BTOP (m)	S.W. LEVEL BTOP (m)	GROUND-WATER ELEVATION (m ASL)	SURFACE WATER ELEVATION (m ASL)	HYDRAULIC HEAD IN GROUND-WATER (m)	VERTICAL HYDRAULIC GRADIENT	CALCULATED GROUNDWATER FLUX TO CREEK (L/s/m^2)	TEMPERATURE	
									GROUND-WATER (°C)	SURFACE WATER (°C)
DP21	28-Jan-19	(F)	(F)						(F)	(F)
	27-Feb-19	(F)	(F)						(F)	(F)
	19-Mar-19	0.81	0.76	305.96	306.01	-0.05	-0.04	-8.87E-04	3.0	1.9
	24-Apr-19	0.68	0.74	306.09	306.03	0.06	0.05	1.06E-03	8.4	8.3
	22-May-19	0.79	0.86	305.98	305.91	0.07	0.06	1.24E-03	10.2	13.2
	19-Jun-19	0.81	0.87	305.96	305.90	0.06	0.05	1.06E-03	14.9	17.3
	26-Jul-19	0.87	1.04	305.90	305.73	0.17	0.14	3.02E-03	18.0	19.8
	20-Aug-19	0.86	1.02	305.91	305.75	0.16	0.13	2.84E-03	18.2	20.3
	25-Sep-19	0.94	1.02	305.83	305.75	0.08	0.06	1.42E-03	15.5	15.0
	29-Oct-19	0.79	0.84	305.98	305.93	0.05	0.04	8.87E-04	10.8	9.8
	13-Nov-19	0.74	0.94	306.03	305.83	0.20	0.16	3.55E-03	(F)	0.5
	16-Dec-19	0.73	0.93	306.04	305.84	0.20	0.16	3.55E-03	(F)	1.0
	09-Jan-20	(F)	0.95		305.82				(F)	0.1
	10-Feb-20	0.84	1.00	305.93	305.77	0.16	0.13	2.84E-03	(F)	1.0
	09-Mar-20	0.76	0.92	306.01	305.85	0.16	0.13	2.84E-03	7.0	5.0
	14-Apr-20	0.78	0.97	305.99	305.80	0.19	0.15	3.37E-03	6.6	5.9
	13-May-20	0.84	1.04	305.93	305.73	0.20	0.16	3.55E-03	8.0	7.5
	11-Jun-20	0.75	0.92	306.02	305.85	0.17	0.14	3.02E-03	14.5	19.1
	08-Jul-20	0.95	1.05	305.82	305.72	0.10	0.08	1.77E-03	17.4	20.6
	19-Aug-20	0.96	1.10	305.81	305.67	0.14	0.11	2.48E-03	16.4	16.7
	17-Sep-20	0.97	1.09	305.80	305.68	0.12	0.10	2.13E-03	14.6	14.8
	23-Oct-20	0.86	0.96	305.91	305.81	0.10	0.08	1.77E-03	12.2	10.6
	19-Nov-20	0.92	1.03	305.85	305.74	0.11	0.09	1.95E-03	7.7	7.6
	18-Dec-20	(F)	1.07		305.70				(F)	0.4
	08-Jan-21	(F)	1.04		305.73				(F)	0.1
	10-Feb-21	(F)	0.99		305.78				(F)	0.0
	10-Mar-21	0.91	1.03	305.86	305.74	0.12	0.10	2.13E-03	3.5	2.5
	21-Apr-21	0.93	1.05	305.84	305.72	0.12	0.10	2.13E-03	8.1	6.7
	19-May-21	1.00	1.12	305.77	305.65	0.12	0.10	2.13E-03	12.7	14.3
	25-Jun-21	0.67	0.69	306.10	306.08	0.02	0.02	3.55E-04	16.6	21.3
	27-Jul-21	1.01	1.09	305.76	305.68	0.08	0.06	1.42E-03	18.0	19.7
	12-Aug-21	1.03	1.10	305.74	305.67	0.07	0.06	1.24E-03	18.9	21.6
	30-Sep-21	0.96	1.07	305.81	305.70	0.11	0.09	1.95E-03	14.7	13.8
	27-Oct-21	0.84	0.85	305.93	305.92	0.01	0.01	1.77E-04	13.0	9.8
	10-Nov-21	0.92	1.01	305.85	305.76	0.09	0.07	1.60E-03	11.3	8.6
	16-Dec-21	0.91	1.00	305.86	305.77	0.09	0.07	1.60E-03	7.6	6.7
	14-Jan-22	(F)	1.08		305.69				(F)	0
	24-Feb-22	0.71	0.93	306.06	305.84	0.22	0.18	3.90E-03	(F)	0.7
	17-Mar-22	0.84	0.98	305.93	305.79	0.14	0.11	2.48E-03	5.3	3.2
	21-Apr-22	0.84	0.99	305.93	305.78	0.15	0.12	2.66E-03	7.9	7.8
	24-May-22	0.94	1.08	305.83	305.69	0.14	0.11	2.48E-03	14.8	16.3
	15-Jun-22	0.94	1.04	305.83	305.73	0.10	0.08	1.77E-03	16.8	18.4
	14-Jul-22	1.04	1.12	305.73	305.65	0.08	0.06	1.42E-03	14.6	16.5
	25-Aug-22	1.01	1.10	305.76	305.67	0.09	0.07	1.60E-03	18.3	19.6
	08-Sep-22	1.09	1.13	305.68	305.64	0.04	0.03	7.10E-04	17.2	17.1
	13-Oct-22	1.00	1.03	305.77	305.74	0.03	0.02	5.32E-04	12.6	13.1
	24-Nov-22	1.10	1.15	305.68	305.62	0.05	0.04	9.76E-04	6.8	2.5
	16-Dec-22	1.00	1.07	305.77	305.71	0.06	0.05	1.15E-03	5.3	1.2
	12-Jan-23	1.02	1.08	305.75	305.69	0.06	0.05	1.06E-03	5.4	2.3
	14-Feb-23	0.95	1.05	305.83	305.73	0.10	0.08	1.77E-03	4.6	1.6
	17-Mar-23	0.92	1.05	305.85	305.72	0.13	0.10	2.31E-03	5.0	3.3
	27-Apr-23	0.92	1.04	305.86	305.73	0.13	0.10	2.22E-03	8.2	8.8
	26-May-23	0.96	1.07	305.81	305.70	0.11	0.09	1.95E-03	12.2	13.6
	15-Jun-23	0.96	1.06	305.82	305.71	0.11	0.08	1.86E-03	12.7	15.4
	25-Jul-23	0.60	0.53	306.18	306.24	-0.07	-0.05	-1.15E-03	19.0	18.5
	08-Aug-23	0.91	1.03	305.86	305.74	0.12	0.10	2.13E-03	16.2	18.6
	07-Sep-23	0.95	1.09	305.82	305.68	0.14	0.11	2.48E-03	17.3	20.5
	26-Oct-23	0.96	1.06	305.82	305.71	0.11	0.08	1.86E-03	12.3	12.8
	16-Nov-23	0.99	1.08	305.78	305.69	0.09	0.07	1.60E-03	7.5	5.3
	18-Dec-23	0.96	1.07	305.81	305.70	0.11	0.09	1.95E-03	6.5	5.3
2023 AVERAGE VALUES						0.09	0.08	1.67E-03	10.6	10.5
OVERALL AVERAGE VALUES						0.09	0.07	2.26E-03	11.0	11.0

NOTES:
- m ASL — metres above sea level
- (F) — Frozen
- L/s/m² — Litres per second per square metre
- Depth of screen midpoint below the creek bed is 1.24 m
- Assumed vertical permeability is 2.20E-05 m/s

TABLE B-5
SUMMARY OF CREEK BASED DRIVE POINT DATA
MILL CREEK AGGREGATES PIT

MONITOR LOCATION	DATE	G.W. LEVEL BTOP (m)	S.W. LEVEL BTOP (m)	GROUND-WATER ELEVATION (m ASL)	SURFACE WATER ELEVATION (m ASL)	HYDRAULIC HEAD IN GROUND-WATER (m)	VERTICAL HYDRAULIC GRADIENT	CALCULATED GROUNDWATER FLUX TO CREEK (L/s/m^2)	TEMPERATURE	
									GROUND-WATER (°C)	SURFACE WATER (°C)
DP22	28-Jan-19	(F)	(F)						(F)	(F)
	27-Feb-19	(F)	(F)						(F)	(F)
	19-Mar-19	0.42	0.55	305.59	305.46	0.13	0.06	4.78E-03	3.4	1.9
	24-Apr-19	0.33	0.51	305.68	305.50	0.18	0.08	6.62E-03	7.6	8.0
	22-May-19	0.43	0.61	305.58	305.40	0.18	0.08	6.62E-03	9.9	13.0
	19-Jun-19	0.49	0.63	305.52	305.38	0.14	0.06	5.15E-03	14.8	17.3
	26-Jul-19	0.46	0.67	305.55	305.34	0.21	0.09	7.72E-03	16.6	19.7
	20-Aug-19	0.56	0.69	305.45	305.32	0.13	0.06	4.78E-03	18.4	20.4
	25-Sep-19	0.56	0.72	305.45	305.29	0.16	0.07	5.88E-03	14.6	14.7
	29-Oct-19	0.41	0.59	305.60	305.42	0.18	0.08	6.62E-03	11.6	10.2
	13-Nov-19	(F)	0.64		305.37				(F)	0.2
	16-Dec-19	(F)	0.63		305.38				(F)	0.7
	09-Jan-20	(F)	0.63		305.38				(F)	0.3
	10-Feb-20	(F)	0.63		305.38				(F)	1.0
	09-Mar-20	0.65	0.56	305.36	305.45	-0.09	-0.04	-3.31E-03	7.7	5.0
	14-Apr-20	0.36	0.58	305.65	305.43	0.22	0.10	8.09E-03	6.3	5.8
	13-May-20	0.43	0.54	305.58	305.47	0.11	0.05	4.04E-03	8.1	7.5
	11-Jun-20	0.35	0.52	305.66	305.49	0.17	0.08	6.25E-03	14.5	19.1
	8-Jul-20	0.57	0.71	305.44	305.30	0.14	0.06	5.15E-03	16.7	20.6
	19-Aug-20	0.54	0.72	305.47	305.29	0.18	0.08	6.62E-03	15.6	16.7
	17-Sep-20	0.55	0.71	305.46	305.30	0.16	0.07	5.88E-03	15.2	15.0
	23-Oct-20	0.47	0.61	305.54	305.40	0.14	0.06	5.15E-03	11.9	10.6
	19-Nov-20	0.51	0.66	305.50	305.35	0.15	0.07	5.52E-03	10.1	5.7
	18-Dec-20	(F)	0.69		305.32				(F)	0.5
	08-Jan-21	(F)	0.66		305.35				(F)	0.2
	10-Feb-21	(F)	(F)						(F)	(F)
	10-Mar-21	0.77	0.64	305.24	305.37	-0.13	-0.06	-4.78E-03	3.0	2.5
	21-Apr-21	0.51	0.66	305.50	305.35	0.15	0.07	5.52E-03	8.4	6.6
	19-May-21	0.58	0.74	305.43	305.27	0.16	0.07	5.88E-03	13.8	14.0
	25-Jun-21	0.30	0.33	305.71	305.68	0.03	0.01	1.10E-03	21.5	21.3
	27-Jul-21	0.59	0.71	305.42	305.30	0.12	0.05	4.41E-03	16.2	19.2
	12-Aug-21	0.61	0.73	305.40	305.28	0.12	0.05	4.41E-03	17.9	21.5
	30-Sep-21	0.56	0.69	305.45	305.32	0.13	0.06	4.78E-03	14.1	13.7
	27-Oct-21	0.46	0.58	305.55	305.43	0.12	0.05	4.41E-03	13.1	9.7
	10-Nov-21	0.51	0.64	305.50	305.37	0.13	0.06	4.78E-03	11.2	8.2
	16-Dec-21	0.49	0.52	305.52	305.49	0.03	0.01	1.10E-03	9.0	6.8
	14-Jan-22	(F)	0.69		305.32				(F)	0.0
	24-Feb-22	0.31	0.54	305.70	305.47	0.23	0.10	8.46E-03	(F)	0.5
	17-Mar-22	0.45	0.57	305.56	305.45	0.12	0.05	4.23E-03	4.9	3.1
	21-Apr-22	0.43	0.58	305.58	305.43	0.15	0.07	5.52E-03	8.5	9.2
	24-May-22	0.76	0.68	305.25	305.33	-0.08	-0.04	-2.94E-03	12.7	12.6
	15-Jun-22	0.55	0.68	305.46	305.33	0.13	0.06	4.78E-03	15.4	18.0
	14-Jul-22	0.61	0.75	305.40	305.26	0.14	0.06	5.15E-03	14.3	16.0
	25-Aug-22	0.67	0.72	305.34	305.29	0.05	0.02	1.84E-03	17.8	19.4
	08-Sep-22	0.68	0.74	305.33	305.27	0.06	0.03	2.21E-03	16.0	16.7
	13-Oct-22	0.62	0.67	305.39	305.34	0.05	0.02	1.84E-03	12.5	12.8
	24-Nov-22	0.65	0.72	305.36	305.29	0.07	0.03	2.57E-03	6.6	2.4
	16-Dec-22	0.62	0.68	305.39	305.33	0.06	0.03	2.21E-03	6.8	1.0
	12-Jan-23	0.71	0.65	305.30	305.36	-0.06	-0.03	-2.24E-03	5.2	2.3
	14-Feb-23	0.52	0.64	305.50	305.38	0.12	0.05	4.41E-03	4.8	1.5
	17-Mar-23	0.50	0.64	305.52	305.37	0.14	0.07	5.33E-03	5.4	3.2
	27-Apr-23	0.30	0.64	305.71	305.37	0.34	0.15	1.25E-02	8.0	8.8
	26-May-23	0.54	0.65	305.47	305.36	0.11	0.05	4.04E-03	11.8	12.5
	15-Jun-23	0.55	0.67	305.46	305.34	0.12	0.05	4.41E-03	11.9	15.3
	25-Jul-23	0.22	0.10	305.79	305.91	-0.12	-0.05	-4.41E-03	18.9	18.5
	08-Aug-23	0.49	0.63	305.52	305.39	0.14	0.06	5.04E-03	15.4	18.4
	07-Sep-23	0.54	0.72	305.47	305.29	0.18	0.08	6.62E-03	16.2	20.5
	26-Oct-23	0.60	0.67	305.42	305.34	0.07	0.03	2.76E-03	12.2	12.8
	16-Nov-23	0.62	0.66	305.39	305.35	0.04	0.02	1.47E-03	5.9	8.9
	18-Dec-23	0.66	0.67	305.35	305.34	0.01	0.00	3.68E-04	6.8	5.0
2023 AVERAGE VALUES						0.09	0.04	3.36E-03	10.2	10.6
OVERALL AVERAGE VALUES						0.10	0.05	6.34E-03	10.7	10.8

NOTES:
- · m ASL metres above sea level
- · (F) Frozen
- · L/s/m² Litres per second per square metre
- · Depth of screen midpoint below the creek bed is 2.23 m
- · Assumed vertical permeability is 8.20E-05 m/s

TABLE B-6
WATER LEVEL SUMMARY - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

YEAR		BH1-I/BH1-R		BH2-I/2B/BH2-R		BH3-I/3B		BH4-I		BH5-I		BH6-I		BH7-II	
		Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)
2019	MAXIMUM	306.80	2.3			306.34	8.1	306.38	2.3	306.62	1.7	306.30	1.2		
	MINIMUM	306.53	2.0			305.85	7.6	305.88	1.8	306.20	1.3	305.88	0.8		
	AVERAGE	306.67	2.1			306.11	7.8	306.18	2.0	306.44	1.5	306.12	1.0		
	FLUCTUATION	0.27	0.3			0.49	0.5	0.50	0.5	0.42	0.4	0.42	0.4		
	NUMBER	3		0		10		12		12		12		0	
2020	MAXIMUM	306.97	4.9	306.42	9	306.36	8.3	306.44	2.4	306.73	1.6	306.37	1.2		
	MINIMUM	306.13	4.1	305.82	8	305.67	7.6	305.81	1.7	306.24	1.2	305.89	0.7		
	AVERAGE	306.48	4.6	306.07	8	306.04	7.9	306.19	2.0	306.49	1.4	306.15	1.0		
	FLUCTUATION	0.84	0.8	1	1	0.69	0.7	0.63	0.6	0.49	0.5	0.48	0.5		
	NUMBER	7		7		10		12		12		12		0	
2021	MAXIMUM	306.39	4.9	305.88	8.7	305.79	8.3	305.89	2.5	306.32	1.9	305.99	1.3		
	MINIMUM	306.11	4.7	305.64	8.4	305.62	8.1	305.68	2.3	306.03	1.6	305.77	1.1		
	AVERAGE	306.25	4.8	305.76	8.6	305.69	8.2	305.78	2.4	306.19	1.7	305.87	1.2		
	FLUCTUATION	0.28	0.3	0.24	0.2	0.17	0.2	0.21	0.2	0.29	0.3	0.22	0.2		
	NUMBER	12		12		11		12		12		12		0	
2022	MAXIMUM	306.51	5.1	306.10	8.9	306.04	8.5	306.05	2.7	306.60	2.0	306.01	1.5		
	MINIMUM	305.93	4.6	305.42	8.2	305.45	7.9	305.48	2.1	305.90	1.3	305.60	1.1		
	AVERAGE	306.27	4.8	305.80	8.5	305.76	8.2	305.79	2.4	306.21	1.7	305.83	1.3		
	FLUCTUATION	0.58	0.6	0.68	0.7	0.59	0.6	0.57	0.6	0.70	0.7	0.42	0.4		
	NUMBER	12		12		12		12		12		12		0	
2023	MAXIMUM	306.36	5.0	305.93	8.8	305.92	8.4	305.91	2.6	306.30	1.9	305.96	1.4		
	MINIMUM	306.04	4.7	305.51	8.4	305.50	8.0	305.54	2.3	306.02	1.6	305.66	1.1		
	AVERAGE	306.24	4.8	305.75	8.6	305.76	8.2	305.77	2.4	306.18	1.7	305.82	1.3		
	FLUCTUATION	0.32	0.3	0.42	0.4	0.42	0.4	0.37	0.4	0.28	0.3	0.30	0.3		
	NUMBER	12		9		12		12		12		12		0	
1986 to 2022	MAXIMUM	307.69	5.7	307.41	9.4	306.83	9.3	306.96	2.9	306.99	2.3	306.70	1.8	307.00	2.2
	MINIMUM	305.41	3.4	304.92	6.9	304.66	7.1	305.28	1.2	305.56	0.9	305.30	0.4	305.20	0.4
	AVERAGE	306.48	4.6	306.14	8.2	305.81	8.1	305.98	2.2	306.35	1.5	305.97	1.1	306.06	1.3
	FLUCTUATION	2.28	2.3	2.49	2.5	2.17	2.2	1.68	1.7	1.43	1.4	1.40	1.4	1.80	1.8
	NUMBER	460		332		374		392		506		492		303	

Notes: mASL - Groundwater elevation in metres above sea level
mBGL - Groundwater levels in metres below ground level
Number - Indicates number of readings taken during the indicated time period
Fluctuations - Difference between the maximum and minimum groundwater reading
Negative groundwater levels indicate groundwater level above ground surface

TABLE B-6
WATER LEVEL SUMMARY - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

YEAR		BH11		BH12		BH13		BH14	
		Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)
2019	MAXIMUM	306.47	3.9			306.43	0.8	305.73	1.9
	MINIMUM	305.44	2.8			306.14	0.5	305.49	1.7
	AVERAGE	306.20	3.1			306.32	0.6	305.60	1.8
	FLUCTUATION	1.03	1.0			0.29	0.3	0.24	0.2
	NUMBER	11		0		12		12	
2020	MAXIMUM	306.49	3.4			306.57	0.8	305.72	2.0
	MINIMUM	305.87	2.8			306.14	0.4	305.45	1.7
	AVERAGE	306.20	3.1			306.36	0.6	305.58	1.8
	FLUCTUATION	0.62	0.6			0.43	0.4	0.27	0.3
	NUMBER	12		0		12		12	
2021	MAXIMUM	305.94	3.6			306.36	1.1	305.80	2.0
	MINIMUM	305.72	3.4			305.89	0.6	305.42	1.6
	AVERAGE	305.82	3.5			306.16	0.8	305.53	1.9
	FLUCTUATION	0.22	0.2			0.47	0.5	0.38	0.4
	NUMBER	12		0		12		12	
2022	MAXIMUM	306.15	3.8			306.34	1.0	305.65	2.0
	MINIMUM	305.52	3.2			305.92	0.6	305.39	1.8
	AVERAGE	305.85	3.5			306.14	0.8	305.50	1.9
	FLUCTUATION	0.63	0.6			0.42	0.4	0.26	0.3
	NUMBER	12		0		12		12	
2023	MAXIMUM	305.98	3.7			306.33	0.9	305.84	2.0
	MINIMUM	305.64	3.3			306.00	0.6	305.44	1.6
	AVERAGE	305.82	3.5			306.15	0.8	305.53	1.9
	FLUCTUATION	0.34	0.3			0.32	0.3	0.40	0.4
	NUMBER	12		0		12		12	
1986 to 2022	MAXIMUM	307.11	4.1	306.53	6.2	306.77	1.2	305.80	2.0
	MINIMUM	305.25	2.2	304.88	4.5	305.72	0.2	305.39	1.6
	AVERAGE	306.09	3.2	305.74	5.3	306.16	0.8	305.56	1.9
	FLUCTUATION	1.86	1.9	1.65	1.6	1.05	1.0	0.41	0.4
	NUMBER	259		180		443		92	

Notes: **mASL - Groundwater elevation in metres above sea level**
mBGL - Groundwater levels in metres below ground level
Number - Indicates number of readings taken during the indicated time period
Fluctuations - Difference between the maximum and minimum groundwater reading
Negative groundwater levels indicate groundwater level above ground surface

TABLE B-6
WATER LEVEL SUMMARY - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

YEAR		TW16-79		OW1-84		OW2-84		OW4-84		OW5-84		OW16A-78	
		Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)
2019	MAXIMUM	303.81	0.2	303.81	0.3	303.77	0.4	303.83	0.2	303.76	0.2	303.83	0.0
	MINIMUM	303.47	-0.1	303.46	0.0	303.43	0.1	303.48	-0.1	303.41	-0.2	303.48	-0.4
	AVERAGE	303.64	0.0	303.63	0.2	303.61	0.3	303.64	0.1	303.58	0.0	303.63	-0.2
	FLUCTUATION	0.34	0.3	0.35	0.4	0.34	0.3	0.35	0.4	0.35	0.4	0.35	0.3
	NUMBER	12		12		12		10		11		9	
2020	MAXIMUM	303.82	0.2	303.81	0.3	303.75	0.4	303.81	0.2	303.73	0.1	303.82	-0.1
	MINIMUM	303.51	-0.1	303.49	0.0	303.46	0.1	303.53	-0.1	303.46	-0.1	303.57	-0.4
	AVERAGE	303.69	0.0	303.66	0.1	303.63	0.2	303.69	0.0	303.62	0.0	303.70	-0.2
	FLUCTUATION	0.31	0.3	0.32	0.3	0.29	0.3	0.28	0.3	0.27	0.3	0.25	0.3
	NUMBER	12		12		11		9		10		9	
2021	MAXIMUM	303.83	0.3	303.84	0.4	303.80	0.5	303.87	0.3	303.80	0.3	303.87	0.0
	MINIMUM	303.39	-0.2	303.39	0.0	303.39	0.1	303.42	-0.2	303.34	-0.2	303.42	-0.4
	AVERAGE	303.62	0.1	303.61	0.2	303.59	0.3	303.64	0.1	303.57	0.0	303.63	-0.2
	FLUCTUATION	0.44	0.4	0.45	0.4	0.41	0.4	0.45	0.4	0.46	0.5	0.45	0.4
	NUMBER	12		10		12		12		12		10	
2022	MAXIMUM	303.85	0.3	303.81	0.4	303.87	0.5	303.90	0.3	303.76	0.3	303.82	0.1
	MINIMUM	303.37	-0.2	303.37	0.0	303.34	0.0	303.40	-0.2	303.32	-0.2	303.39	-0.4
	AVERAGE	303.62	0.1	303.59	0.2	303.58	0.3	303.63	0.1	303.52	0.1	303.58	-0.1
	FLUCTUATION	0.48	0.5	0.44	0.4	0.53	0.5	0.50	0.5	0.44	0.4	0.43	0.4
	NUMBER	12		12		12		12		12		12	
2023	MAXIMUM	303.85	0.1	303.85	0.2	303.80	0.3	303.88	0.1	303.80	0.1	303.86	-0.2
	MINIMUM	303.59	-0.2	303.60	-0.1	303.53	0.1	303.63	-0.2	303.55	-0.2	303.63	-0.4
	AVERAGE	303.70	0.0	303.69	0.1	303.65	0.2	303.72	0.0	303.64	0.0	303.72	-0.3
	FLUCTUATION	0.26	0.3	0.25	0.3	0.27	0.3	0.25	0.2	0.25	0.2	0.23	0.2
	NUMBER	12		12		12		12		11		12	
1986 to 2022	MAXIMUM	304.01	0.4	303.99	0.6	303.95	0.7	304.01	0.5	303.93	0.4	303.99	0.2
	MINIMUM	303.27	-0.3	303.19	-0.2	303.17	-0.1	303.21	-0.3	303.20	-0.3	303.26	-0.5
	AVERAGE	303.61	0.1	303.60	0.2	303.58	0.3	303.62	0.1	303.48	0.1	303.61	-0.2
	FLUCTUATION	0.74	0.7	0.80	0.8	0.78	0.8	0.80	0.8	0.73	0.7	0.73	0.7
	NUMBER	392		392		396		391		599		360	

Notes: mASL - Groundwater elevation in metres above sea level
mBGL - Groundwater levels in metres below ground level
Number - Indicates number of readings taken during the indicated time period
Fluctuations - Difference between the maximum and minimum groundwater reading
Negative groundwater levels indicate groundwater level above ground surface

TABLE B-6
WATER LEVEL SUMMARY - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

YEAR		BH92-I/BH92-1R		BH92-5		BH92-8		BH92-12A		BH92-13		BH92-14	
		Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)
2019	MAXIMUM	306.55	6.0	306.77	2.1	306.58	2.0	306.01	1.7	306.41	3.5		
	MINIMUM	306.17	5.6	306.19	1.6	306.17	1.6	305.66	1.3	305.99	3.1		
	AVERAGE	306.34	5.8	306.52	1.8	306.36	1.8	305.77	1.6	306.19	3.3		
	FLUCTUATION	0.38	0.4	0.58	0.6	0.41	0.4	0.35	0.4	0.42	0.4		
	NUMBER	9		11		11		12		12		0	
2020	MAXIMUM			306.84	2.0	306.72	1.9	305.97	1.7	306.58	3.5		
	MINIMUM			306.37	1.5	306.20	1.4	305.67	1.4	306.02	2.9		
	AVERAGE			306.63	1.7	306.51	1.6	305.83	1.5	306.36	3.1		
	FLUCTUATION			0.47	0.5	0.52	0.5	0.30	0.3	0.56	0.6		
	NUMBER	0		11		12		12		12		0	
2021	MAXIMUM	306.70	7.6	306.91	1.9	306.78	1.9	305.98	1.7	306.65	3.4		
	MINIMUM	306.12	7.0	306.38	1.4	306.24	1.4	305.66	1.4	306.09	2.8		
	AVERAGE	306.35	7.3	306.70	1.6	306.53	1.6	305.82	1.5	306.40	3.1		
	FLUCTUATION	0.58	0.6	0.53	0.5	0.54	0.5	0.32	0.3	0.56	0.6		
	NUMBER	7		10		11		12		12		0	
2022	MAXIMUM	306.37	8.0	306.55	2.3	306.41	2.2	305.84	1.9	306.27	3.8		
	MINIMUM	305.71	7.3	306.01	1.8	305.88	1.7	305.45	1.5	305.68	3.2		
	AVERAGE	306.08	7.6	306.32	2.0	306.15	2.0	305.64	1.7	305.98	3.5		
	FLUCTUATION	0.66	0.7	0.54	0.5	0.52	0.5	0.39	0.4	0.59	0.6		
	NUMBER	12		12		12		12		12		0	
2023	MAXIMUM	306.21	7.9	306.42	2.2	306.24	2.2	305.84	1.8	306.06	3.7		
	MINIMUM	305.82	7.5	306.12	1.9	305.94	1.9	305.53	1.5	305.76	3.4		
	AVERAGE	306.06	7.6	306.30	2.0	306.11	2.0	305.65	1.7	305.92	3.6		
	FLUCTUATION	0.38	0.4	0.30	0.3	0.30	0.3	0.32	0.3	0.30	0.3		
	NUMBER	12		12		12		12		12		0	
1986 to 2022	MAXIMUM	307.46	8.3	307.43	2.9	307.13	3.3	306.37	1.9	307.27	4.0	307.54	2.9
	MINIMUM	305.42	6.2	305.47	0.9	304.83	1.0	305.45	1.0	305.46	2.2	305.95	1.3
	AVERAGE	306.39	7.3	306.48	1.9	306.17	2.0	305.81	1.5	306.27	3.2	306.67	2.2
	FLUCTUATION	2.04	2.0	1.96	2.0	2.30	2.3	0.92	0.9	1.81	1.8	1.59	1.6
	NUMBER	328		436		336		547		339		222	

Notes: mASL - Groundwater elevation in metres above sea level
mBGL - Groundwater levels in metres below ground level
Number - Indicates number of readings taken during the indicated time period
Fluctuations - Difference between the maximum and minimum groundwater reading
Negative groundwater levels indicate groundwater level above ground surface

TABLE B-6
WATER LEVEL SUMMARY - GROUNDWATER MONITORS
MILL CREEK AGGREGATES PIT

YEAR		BH92-15		BH92-26		BH92-27		BH92-28		BH92-29		BH92-32		BH92-33	
		Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)	Groundwater Elevation (m ASL)	Groundwater Level (m BGL)
2019	MAXIMUM					304.83	0.6	304.75	1.4	304.98	1.5	304.37	0.9	304.70	1.2
	MINIMUM					304.48	0.3	304.41	1.1	304.52	1.1	304.03	0.6	304.36	0.8
	AVERAGE					304.63	0.5	304.54	1.3	304.75	1.3	304.20	0.7	304.50	1.0
	FLUCTUATION					0.35	0.4	0.34	0.3	0.46	0.5	0.34	0.3	0.34	0.3
	NUMBER	0		0		12		12		12		12		12	
2020	MAXIMUM					304.83	0.6	304.67	1.4	304.99	1.5	304.48	0.9	304.70	1.1
	MINIMUM					304.50	0.3	304.42	1.1	304.61	1.1	304.05	0.5	304.37	0.8
	AVERAGE					304.68	0.4	304.57	1.2	304.79	1.3	304.22	0.7	304.54	1.0
	FLUCTUATION					0.33	0.3	0.25	0.3	0.38	0.4	0.43	0.4	0.33	0.3
	NUMBER	0		0		12		12		12		12		12	
2021	MAXIMUM					304.82	0.8	304.66	1.5	304.94	1.6	304.36	1.1	304.68	1.3
	MINIMUM					304.37	0.3	304.30	1.1	304.47	1.1	303.87	0.6	304.26	0.8
	AVERAGE					304.61	0.5	304.50	1.3	304.70	1.4	304.15	0.8	304.47	1.0
	FLUCTUATION					0.45	0.4	0.36	0.4	0.47	0.5	0.49	0.5	0.42	0.4
	NUMBER	0		0		12		12		12		12		12	
2022	MAXIMUM					304.74	0.7	304.71	1.5	304.87	1.7	304.38	1.0	304.61	1.3
	MINIMUM					304.39	0.4	304.34	1.1	304.40	1.2	303.98	0.6	304.27	0.9
	AVERAGE					304.57	0.6	304.49	1.3	304.64	1.4	304.17	0.8	304.44	1.1
	FLUCTUATION					0.35	0.3	0.37	0.4	0.47	0.5	0.40	0.4	0.34	0.3
	NUMBER	0		0		12		12		12		12		12	
2023	MAXIMUM					304.89	0.6	304.80	1.4	305.07	1.5	304.60	0.8	304.74	1.1
	MINIMUM					304.54	0.2	304.44	1.0	304.57	1.0	304.16	0.4	304.42	0.8
	AVERAGE					304.74	0.4	304.61	1.2	304.85	1.2	304.36	0.6	304.61	0.9
	FLUCTUATION					0.35	0.4	0.36	0.4	0.50	0.5	0.44	0.4	0.32	0.3
	NUMBER	0		0		12		12		12		12		12	
1986 to 2022	MAXIMUM	307.21	2.9	305.29	1.7	305.18	1.1	305.06	1.7	305.58	1.9	304.93	1.2	305.04	1.5
	MINIMUM	305.53	1.2	303.74	0.1	304.01	-0.1	304.09	0.8	304.16	0.5	303.75	0.0	304.00	0.5
	AVERAGE	306.24	2.2	304.19	1.3	304.61	0.5	304.46	1.3	304.69	1.4	304.29	0.7	304.50	1.0
	FLUCTUATION	1.68	1.7	1.55	1.6	1.17	1.2	0.97	1.0	1.42	1.4	1.18	1.2	1.04	1.0
	NUMBER	239		436		340		615		351		358		347	

Notes: mASL - Groundwater elevation in metres above sea level
mBGL - Groundwater levels in metres below ground level
Number - Indicates number of readings taken during the indicated time period
Fluctuations - Difference between the maximum and minimum groundwater reading
Negative groundwater levels indicate groundwater level above ground surface

TABLE B-7
WATER LEVEL SUMMARY - WETLAND DRIVE-POINTS
MILL CREEK AGGREGATES PIT

YEAR		DP6		DP7		DP8		DP9		DP10		DP11	
		GROUNDWATER ELEVATION (m ASL)	GROUNDWATER LEVEL (m BGL)	GROUNDWATER ELEVATION (m ASL)	GROUNDWATER LEVEL (m BGL)	GROUNDWATER ELEVATION (m ASL)	GROUNDWATER LEVEL (m BGL)	GROUNDWATER ELEVATION (m ASL)	GROUNDWATER LEVEL (m BGL)	GROUNDWATER ELEVATION (m ASL)	GROUNDWATER LEVEL (m BGL)	GROUNDWATER ELEVATION (m ASL)	GROUNDWATER LEVEL (m BGL)
2019	MAXIMUM	306.10	0.5	306.25	0.4	305.97	0.5	305.80	0.6	305.31	1.1	305.26	0.7
	MINIMUM	305.72	0.2	305.86	0.1	305.69	0.2	305.37	0.1	304.90	0.6	304.88	0.4
	AVERAGE	305.96	0.3	306.11	0.2	305.85	0.3	305.61	0.3	305.08	0.9	304.99	0.5
	FLUCTUATION	0.38	0.4	0.39	0.4	0.28	0.3	0.43	0.4	0.41	0.4	0.38	0.4
	NUMBER	10		12		12		11		11		11	
2020	MAXIMUM	306.15	0.5	306.29	0.4	305.99	0.5	305.79	0.7	305.18	1.1	305.19	0.9
	MINIMUM	305.72	0.1	305.88	0.0	305.62	0.2	305.19	0.1	304.86	0.8	304.72	0.4
	AVERAGE	305.95	0.3	306.10	0.2	305.79	0.4	305.51	0.4	304.99	1.0	304.93	0.7
	FLUCTUATION	0.43	0.4	0.41	0.4	0.37	0.4	0.60	0.6	0.32	0.3	0.47	0.5
	NUMBER	12		12		11		10		12		12	
2021	MAXIMUM	305.98	0.6	305.98	0.6	305.77	0.7	305.66	0.8	305.38	1.2	305.05	0.9
	MINIMUM	305.61	0.3	305.74	0.3	305.48	0.4	305.09	0.3	304.80	0.6	304.66	0.6
	AVERAGE	305.75	0.5	305.84	0.5	305.64	0.5	305.43	0.5	304.98	1.0	304.86	0.7
	FLUCTUATION	0.37	0.4	0.24	0.2	0.29	0.3	0.57	0.6	0.58	0.6	0.39	0.4
	NUMBER	12		12		12		12		12		12	
2022	MAXIMUM	305.93	0.8	306.03	0.8	305.82	0.9	305.70	0.9	305.10	1.2	305.04	1.0
	MINIMUM	305.47	0.3	305.55	0.3	305.22	0.3	304.99	0.2	304.77	0.9	304.63	0.6
	AVERAGE	305.67	0.6	305.78	0.5	305.52	0.6	305.31	0.6	304.90	1.1	304.81	0.8
	FLUCTUATION	0.46	0.5	0.48	0.6	0.60	0.6	0.71	0.7	0.33	0.3	0.41	0.4
	NUMBER	12		12		12		12		12		12	
2023	MAXIMUM	305.77	0.7	305.85	0.7	305.68	0.7	305.59	0.7	305.41	1.1	305.03	0.9
	MINIMUM	305.55	0.5	305.62	0.5	305.42	0.5	305.23	0.3	304.86	0.6	304.74	0.6
	AVERAGE	305.66	0.6	305.75	0.6	305.56	0.6	305.41	0.5	304.96	1.0	304.88	0.7
	FLUCTUATION	0.22	0.2	0.23	0.2	0.26	0.3	0.37	0.4	0.55	0.5	0.29	0.3
	NUMBER	12		11		11		12		12		12	
1989 to 2022	MAXIMUM	306.39	1.1	306.58	1.0	306.45	1.1	306.03	1.0	305.58	1.6	305.61	1.2
	MINIMUM	305.15	-0.1	305.31	-0.3	305.05	-0.3	304.93	-0.1	304.36	0.4	304.41	0.0
	AVERAGE	305.71	0.5	305.88	0.4	305.75	0.4	305.48	0.4	304.91	1.0	304.95	0.7
	FLUCTUATION	1.24	1.2	1.27	1.3	1.40	1.4	1.10	1.1	1.22	1.2	1.20	1.2
	NUMBER	653		375		370		367		382		375	

Notes: **mASL - Groundwater elevation in metres above sea level**
mBGL - Groundwater level in metres below ground level
Number - indicates number of readings taken during the indicated period
Fluctuation - difference between the maximum and minimum groundwater elevations
Negative groundwater levels indicate groundwater level above ground surface

TABLE B-7
WATER LEVEL SUMMARY - WETLAND DRIVE-POINTS
MILL CREEK AGGREGATES PIT

YEAR		DP12		DP16		DP113	
		GROUNDWATER ELEVATION (m ASL)	GROUNDWATER LEVEL (m BGL)	GROUNDWATER ELEVATION (m ASL)	GROUNDWATER LEVEL (m BGL)	GROUNDWATER ELEVATION (m ASL)	GROUNDWATER LEVEL (m BGL)
2019	MAXIMUM	305.52	1.0	304.45	0.0	306.86	0.6
	MINIMUM	304.69	0.1	304.11	-0.4	306.43	0.2
	AVERAGE	304.97	0.7	304.31	-0.2	306.68	0.4
	FLUCTUATION	0.83	0.8	0.34	0.3	0.43	0.4
	NUMBER	11		10		11	
2020	MAXIMUM	305.25	1.1	304.45	0.1	306.92	0.5
	MINIMUM	304.56	0.4	304.02	-0.4	306.58	0.1
	AVERAGE	304.83	0.8	304.22	-0.1	306.78	0.3
	FLUCTUATION	0.69	0.7	0.43	0.4	0.34	0.3
	NUMBER	12		12		12	
2021	MAXIMUM	304.87	1.1	304.29	0.0	306.79	0.5
	MINIMUM	304.54	0.8	304.04	-0.2	306.53	0.3
	AVERAGE	304.69	1.0	304.18	-0.1	306.63	0.4
	FLUCTUATION	0.33	0.3	0.25	0.3	0.26	0.3
	NUMBER	12		12		12	
2022	MAXIMUM	304.97	1.2	304.46	0.1	306.60	0.8
	MINIMUM	304.49	0.7	303.98	-0.4	306.25	0.5
	AVERAGE	304.75	0.9	304.22	-0.1	306.49	0.6
	FLUCTUATION	0.48	0.6	0.48	0.6	0.36	0.4
	NUMBER	12		12		11	
2023	MAXIMUM	305.18	1.0	304.59	-0.2	306.54	0.8
	MINIMUM	304.65	0.5	304.26	-0.5	306.29	0.5
	AVERAGE	304.92	0.7	304.38	-0.3	306.41	0.7
	FLUCTUATION	0.53	0.5	0.33	0.3	0.25	0.3
	NUMBER	12		12		12	
1989 to 2022	MAXIMUM	305.78	1.2	304.80	0.4	307.17	1.4
	MINIMUM	304.45	-0.1	303.69	-0.7	305.68	-0.1
	AVERAGE	305.14	0.5	304.25	-0.2	306.45	0.6
	FLUCTUATION	1.33	1.3	1.11	1.1	1.49	1.5
	NUMBER	400		368		378	

Notes: mASL - Groundwater elevation in metres above sea level
mBGL - Groundwater level in metres below ground level
Number - indicates number of readings taken during the indicated period
Fluctuation - difference between the maximum and minimum groundwater elevations
Negative groundwater levels indicate groundwater level above ground surface

TABLE B-8

COMPARISON OF GROUNDWATER INFLUX, 2019 CONDITIONS

MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH	AVERAGE WIDTH	AVERAGE INFLUX (L/s/m²)							TOTAL GROUNDWATER INFLUX (L/s)						
		(m)	(m)	24-Apr-19	22-May-19	19-Jun-19	26-Jul-19	20-Aug-19	25-Sep-19	29-Oct-19	24-Apr-19	22-May-19	19-Jun-19	26-Jul-19	20-Aug-19	25-Sep-19	29-Oct-19
DP18	DP19	670	6.5	4.8E-04	1.6E-03	1.9E-03	2.0E-03	1.9E-03	8.6E-04	1.4E-03	2.1	7.0	8.1	8.7	8.4	3.8	6.2
DP19	DP20	310	6.5	8.0E-04	1.6E-03	1.5E-03	1.3E-03	1.3E-03	7.3E-04	1.1E-03	1.6	3.2	3.0	2.6	2.6	1.5	2.1
DP20	Hwy 401	270	6.5	1.5E-03	1.9E-03	1.8E-03	1.9E-03	1.7E-03	1.1E-03	1.5E-03	2.6	3.3	3.2	3.3	3.1	2.0	2.7
Hwy 401	DP21	60	7.1	1.1E-03	1.2E-03	1.1E-03	3.0E-03	2.8E-03	1.4E-03	8.9E-04	0.5	0.5	0.5	1.3	1.2	0.6	0.4
DP21	DP4	100	7.3	2.0E-03	3.5E-03	2.8E-03	4.1E-03	3.2E-03	2.4E-03	3.0E-03	1.5	2.5	2.0	3.0	2.4	1.7	2.2
DP4	DP22	50	7.1	4.8E-03	6.2E-03	4.8E-03	6.4E-03	4.2E-03	4.6E-03	5.9E-03	1.7	2.2	1.7	2.3	1.5	1.6	2.1
DP22	DP17/R	100	6.6	3.8E-03	3.8E-03	2.9E-03	4.4E-03	2.6E-03	3.1E-03	3.9E-03	2.5	2.5	1.9	2.9	1.7	2.1	2.6
DP17/R	DP3	165	7.1	2.7E-03	-1.4E-03	-4.5E-04	6.4E-04	-5.4E-04	-5.4E-04	1.0E-03	3.2	-1.7	-0.5	0.7	-0.6	-0.6	1.2
DP3	Galt Creek	420	6.0	2.9E-03	-1.3E-03	-1.1E-04	7.8E-04	-1.1E-04	-1.1E-04	1.1E-03	7.2	-3.3	-0.3	2.0	-0.3	-0.3	2.7
Galt Creek	Pond Creek	255	8.1	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Pond Creek	DP1	250	8.0	7.7E-03	6.6E-03	8.5E-03	8.0E-03	7.6E-03	6.8E-03	5.1E-03	15.4	13.2	17.1	15.9	15.2	13.5	10.2
DP1	DP2	100	6.7	6.4E-03	5.6E-03	7.2E-03	6.8E-03	6.4E-03	5.4E-03	3.4E-03	4.3	3.8	4.9	4.6	4.3	3.6	2.3
DP2	DP5CR	800	7.6	1.9E-03	2.4E-03	2.2E-03	2.2E-03	2.1E-03	1.4E-03	1.3E-03	11.3	14.2	13.1	13.3	12.4	8.8	7.8
TOTALS											**60.1**	**53.7**	**60.8**	**66.7**	**57.9**	**44.4**	**48.6**

Notes - Groundwater influx at Galt Creek and Pond Creek based on seepage data from May/June 1992

- Underlining indicates reduced flux value may be attributed to beaver dam downstream of DP5CR

TABLE B-8

COMPARISON OF GROUNDWATER INFLUX, 2019 CONDITIONS

MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH	AVERAGE WIDTH	ESTIMATED GROUNDWATER FLUX FROM NORTH SIDE OF CREEK (L/s)							ESTIMATED GROUNDWATER FLUX FROM SOUTH SIDE OF CREEK (L/s)						
		(m)	(m)	24-Apr-19	22-May-19	19-Jun-19	26-Jul-19	20-Aug-19	25-Sep-19	29-Oct-19	24-Apr-19	22-May-19	19-Jun-19	26-Jul-19	20-Aug-19	25-Sep-19	29-Oct-19
DP18	DP19	670	6.5	1.1	3.5	4.0	4.4	4.2	1.9	3.1	1.1	3.5	4.0	4.4	4.2	1.9	3.1
DP19	DP20	310	6.5	0.6	1.3	1.2	1.0	1.0	0.6	0.9	1.0	1.9	1.8	1.5	1.5	0.9	1.3
DP20	Hwy 401	270	6.5	1.0	1.3	1.3	1.3	1.2	0.8	1.1	1.5	2.0	1.9	2.0	1.8	1.2	1.6
Hwy 401	DP21	60	7.1	0.2	0.2	0.2	0.5	0.5	0.2	0.2	0.3	0.3	0.3	0.8	0.7	0.4	0.2
DP21	DP4	100	7.3	0.6	1.0	0.8	1.2	0.9	0.7	0.9	0.9	1.5	1.2	1.8	1.4	1.0	1.3
DP4	DP22	50	7.1	0.7	0.9	0.69	0.9	0.6	0.7	0.8	1.0	1.3	1.0	1.4	0.9	1.0	1.2
DP22	DP17/R	100	6.6	1.0	1.0	0.8	1.2	0.7	0.8	1.0	1.5	1.5	1.1	1.7	1.0	1.2	1.6
DP17/R	DP3	165	7.1	1.3	-0.7	-0.2	0.3	-0.3	-0.3	0.5	1.9	-1.0	-0.3	0.4	-0.4	-0.4	0.7
DP3	Galt Creek	420	6.0	2.9	-1.3	-0.1	0.8	-0.1	-0.1	1.1	4.3	-2.0	-0.2	1.2	-0.2	-0.2	1.6
Galt Creek	Pond Creek	255	8.1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Pond Creek	DP1	250	8.0	7.7	6.6	8.5	8.0	7.6	6.8	5.1	7.7	6.6	8.5	8.0	7.6	6.8	5.1
DP1	DP2	100	6.7	2.2	1.9	2.4	2.3	2.1	1.8	1.1	2.2	1.9	2.4	2.3	2.1	1.8	1.1
DP2	DP5CR	800	7.6	5.7	7.1	6.5	6.7	6.2	4.4	3.9	5.7	7.1	6.5	6.7	6.2	4.4	3.9
TOTALS				**27.4**	**25.3**	**28.6**	**30.9**	**27.2**	**20.7**	**22.1**	**32.8**	**28.4**	**32.2**	**35.8**	**30.7**	**23.7**	**26.5**

Notes - Groundwater influx at Galt Creek and Pond Creek based on seepage data from May/June 1992

- Underlining indicates reduced flux value may be attributed to beaver dam downstream of DP5CR

TABLE B-8

COMPARISON OF GROUNDWATER INFLUX, 2020 CONDITIONS

MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH (m)	AVERAGE WIDTH (m)	AVERAGE INFLUX (L/s/m²)						TOTAL GROUNDWATER INFLUX (L/s)					
				09-Mar-20	13-May-20	11-Jun-20	08-Jul-20	19-Aug-20	17-Sep-20	09-Mar-20	13-May-20	11-Jun-20	08-Jul-20	19-Aug-20	17-Sep-20
DP18	DP19	670	6.5	8.1E-04	2.6E-03	1.3E-03	7.6E-04	1.9E-03	1.1E-03	3.5	11.2	5.9	3.3	8.1	4.9
DP19	DP20	310	6.5	9.6E-04	2.0E-03	1.0E-03	4.6E-04	1.0E-03	1.0E-03	1.9	3.9	2.0	0.9	2.0	2.0
DP20	Hwy 401	270	6.5	8.5E-04	2.4E-03	1.5E-03	7.9E-04	1.4E-03	1.4E-03	1.5	4.2	2.7	1.4	2.4	2.5
Hwy 401	DP21	60	7.1	2.8E-03	3.5E-03	3.0E-03	1.8E-03	2.5E-03	2.1E-03	1.2	1.5	1.3	0.8	1.1	0.9
DP21	DP4/R	100	7.3	2.3E-03	3.1E-03	2.6E-03	3.0E-03	1.8E-03	1.8E-03	1.7	2.3	1.9	2.2	1.3	1.3
DP4/R	DP22	50	7.1	-7.5E-04	3.4E-03	4.2E-03	4.7E-03	3.9E-03	3.7E-03	-0.3	1.2	1.5	1.7	1.4	1.3
DP22	DP17/R	100	6.6	-1.8E-04	2.5E-03	3.6E-03	3.0E-03	3.7E-03	3.1E-03	-0.1	1.7	2.4	2.0	2.5	2.1
DP17/R	DP3	165	7.1	2.4E-03	1.2E-03	9.4E-04	6.9E-04	2.2E-03	1.8E-03	2.8	1.4	1.1	0.8	2.5	2.1
DP3	Galt Creek	420	6.0	1.5E-03	1.4E-03	1.1E-03	9.3E-04	2.4E-03	2.3E-03	3.9	3.5	2.7	2.3	6.1	5.7
Galt Creek	Pond Creek	255	8.1	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	6.2	6.2	6.2	6.2	6.2	6.2
Pond Creek	DP1	250	8.0	7.6E-03	8.3E-03	7.0E-03	7.3E-03	5.4E-03	6.1E-03	15.2	16.5	14.1	14.6	10.8	12.1
DP1	DP2	100	6.7	6.3E-03	7.2E-03	5.7E-03	5.8E-03	3.7E-03	4.5E-03	4.3	4.9	3.8	3.9	2.5	3.1
DP2	DP5CR	800	7.6	2.1E-03	2.6E-03	1.9E-03	1.7E-03	1.5E-03	1.6E-03	12.8	15.6	11.4	10.0	9.3	9.9
TOTALS										**54.5**	**74.1**	**56.8**	**50.1**	**56.1**	**54.2**

Notes - Groundwater influx at Galt Creek and Pond Creek based on seepage data from May/June 1992

TABLE B-8

COMPARISON OF GROUNDWATER INFLUX, 2020 CONDITIONS

MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH (m)	AVERAGE WIDTH (m)	ESTIMATED GROUNDWATER FLUX FROM NORTH SIDE OF CREEK (L/s)						ESTIMATED GROUNDWATER FLUX FROM SOUTH SIDE OF CREEK (L/s)					
				09-Mar-20	13-May-20	11-Jun-20	08-Jul-20	19-Aug-20	17-Sep-20	09-Mar-20	13-May-20	11-Jun-20	08-Jul-20	19-Aug-20	17-Sep-20
DP18	DP19	670	6.5	1.8	5.6	2.9	1.7	4.1	2.5	1.8	5.6	2.9	1.7	4.1	2.5
DP19	DP20	310	6.5	0.8	1.6	0.8	0.4	0.8	0.8	1.2	2.4	1.2	0.6	1.2	1.2
DP20	Hwy 401	270	6.5	0.6	1.7	1.1	0.6	1.0	1.0	0.9	2.5	1.6	0.8	1.4	1.5
Hwy 401	DP21	60	7.1	0.5	0.6	0.5	0.3	0.4	0.4	0.7	0.9	0.8	0.5	0.6	0.5
DP21	DP4/R	100	7.3	0.7	0.9	0.7	0.9	0.5	0.5	1.0	1.4	1.1	1.3	0.8	0.8
DP4/R	DP22	50	7.1	-0.1	0.5	0.59	0.7	0.6	0.5	-0.2	0.7	0.9	1.0	0.8	0.8
DP22	DP17/R	100	6.6	0.0	0.7	1.0	0.8	1.0	0.8	-0.1	1.0	1.4	1.2	1.5	1.2
DP17/R	DP3	165	7.1	1.1	0.6	0.4	0.3	1.0	0.9	1.7	0.9	0.7	0.5	1.5	1.3
DP3	Galt Creek	420	6.0	1.5	1.4	1.1	0.9	2.4	2.3	2.3	2.1	1.6	1.4	3.7	3.4
Galt Creek	Pond Creek	255	8.1	2.5	2.5	2.5	2.5	2.5	2.5	3.7	3.7	3.7	3.7	3.7	3.7
Pond Creek	DP1	250	8.0	7.6	8.3	7.0	7.3	5.4	6.1	7.6	8.3	7.0	7.3	5.4	6.1
DP1	DP2	100	6.7	2.1	2.4	1.9	2.0	1.3	1.5	2.1	2.4	1.9	2.0	1.3	1.5
DP2	DP5CR	800	7.6	6.4	7.8	5.7	5.0	4.6	5.0	6.4	7.8	5.7	5.0	4.6	5.0
TOTALS				**25.4**	**34.5**	**26.2**	**23.2**	**25.5**	**24.7**	**29.1**	**39.6**	**30.6**	**26.9**	**30.6**	**29.5**

Notes - Groundwater influx at Galt Creek and Pond Creek based on seepage data from May/June 1992

TABLE B-8

COMPARISON OF GROUNDWATER INFLUX, 2021 CONDITIONS

MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH (m)	AVERAGE WIDTH (m)	AVERAGE INFLUX (L/s/m²)						TOTAL GROUNDWATER INFLUX (L/s)					
				19-May-21	27-Jul-21	30-Sep-21	27-Oct-21	10-Nov-21	16-Dec-21	19-May-21	27-Jul-21	30-Sep-21	27-Oct-21	10-Nov-21	16-Dec-21
DP18	DP19	670	6.5	1.4E-03	1.4E-03	3.6E-03	1.2E-03	1.6E-03	1.5E-03	6.3	6.2	15.7	5.3	7.1	6.4
DP19	DP20	310	6.5	1.1E-03	4.3E-04	6.0E-04	3.8E-04	6.5E-04	7.6E-04	2.2	0.9	1.4	0.8	1.3	1.5
DP20	Hwy 401	270	6.5	1.5E-03	7.9E-04	8.5E-04	5.6E-04	5.6E-04	7.9E-04	2.6	1.4	1.5	1.0	1.0	1.4
Hwy 401	DP21	60	7.1	2.1E-03	1.4E-03	2.0E-03	1.8E-04	1.6E-03	1.6E-03	0.9	0.6	0.8	0.1	0.7	0.7
DP21	DP4/R	100	7.3	1.8E-03	1.3E-03	1.9E-03	8.4E-04	1.4E-03	1.2E-03	1.3	1.0	1.4	0.6	1.0	0.9
DP4/R	DP22	50	7.1	3.7E-03	2.8E-03	3.3E-03	3.0E-03	3.0E-03	1.0E-03	1.3	1.0	1.2	1.1	1.1	0.4
DP22	DP17/R	100	6.6	3.1E-03	2.5E-03	2.9E-03	2.5E-03	2.7E-03	1.0E-03	2.1	1.7	1.9	1.7	1.8	0.7
DP17/R	DP3	165	7.1	1.8E-03	1.0E-03	1.4E-03	2.7E-03	1.3E-03	7.9E-04	2.1	1.2	1.6	3.1	1.6	0.9
DP3	Galt Creek	420	6.0	2.3E-03	1.4E-03	1.5E-03	3.0E-03	1.7E-03	9.3E-04	5.7	3.5	3.9	7.6	4.2	2.3
Galt Creek	Pond Creek	255	8.1	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	6.2	6.2	6.2	6.2	6.2	6.2
Pond Creek	DP1	250	8.0	7.9E-03	6.8E-03	7.3E-03	6.8E-03	7.2E-03	7.6E-03	15.7	13.7	14.6	13.5	14.3	15.2
DP1	DP2	100	6.7	6.4E-03	5.5E-03	6.2E-03	5.3E-03	5.9E-03	6.3E-03	4.3	3.7	4.1	3.6	4.0	4.2
DP2	DP5CR	800	7.6	2.0E-03	2.0E-03	2.1E-03	2.3E-03	2.3E-03	2.4E-03	11.8	12.4	12.8	13.8	14.0	14.8
TOTALS										**62.6**	**53.3**	**67.1**	**58.2**	**58.2**	**55.6**

Notes - Groundwater influx at Galt Creek and Pond Creek based on seepage data from May/June 1992

- September 2021 DP2 flux value is calculated using groundwater elevation measured on Oct. 6 and surface water elevation measured on Sept. 30, due to anomalous groundwater level on Sept. 30

TABLE B-8

COMPARISON OF GROUNDWATER INFLUX, 2021 CONDITIONS

MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH (m)	AVERAGE WIDTH (m)	ESTIMATED GROUNDWATER FLUX FROM NORTH SIDE OF CREEK (L/s)						ESTIMATED GROUNDWATER FLUX FROM SOUTH SIDE OF CREEK (L/s)					
				19-May-21	27-Jul-21	30-Sep-21	27-Oct-21	10-Nov-21	16-Dec-21	19-May-21	27-Jul-21	30-Sep-21	27-Oct-21	10-Nov-21	16-Dec-21
DP18	DP19	670	6.5	3.2	3.1	7.8	2.6	3.5	3.2	3.2	3.1	7.8	2.6	3.5	3.2
DP19	DP20	310	6.5	0.9	0.3	0.6	0.3	0.5	0.6	1.3	0.5	0.8	0.5	0.8	0.9
DP20	Hwy 401	270	6.5	1.0	0.6	0.6	0.4	0.4	0.6	1.5	0.8	0.9	0.6	0.6	0.8
Hwy 401	DP21	60	7.1	0.4	0.2	0.3	0.0	0.3	0.3	0.5	0.4	0.5	0.0	0.4	0.4
DP21	DP4/R	100	7.3	0.5	0.4	0.5	0.2	0.4	0.4	0.8	0.6	0.8	0.4	0.6	0.5
DP4/R	DP22	50	7.1	0.5	0.4	0.47	0.4	0.4	0.1	0.8	0.6	0.7	0.6	0.6	0.2
DP22	DP17/R	100	6.6	0.8	0.7	0.8	0.7	0.7	0.3	1.2	1.0	1.1	1.0	1.1	0.4
DP17/R	DP3	165	7.1	0.9	0.5	0.6	1.2	0.6	0.4	1.3	0.7	1.0	1.9	0.9	0.6
DP3	Galt Creek	420	6.0	2.3	1.4	1.5	3.0	1.7	0.9	3.4	2.1	2.3	4.6	2.5	1.4
Galt Creek	Pond Creek	255	8.1	2.5	2.5	2.5	2.5	2.5	2.5	3.7	3.7	3.7	3.7	3.7	3.7
Pond Creek	DP1	250	8.0	7.9	6.8	7.3	6.8	7.2	7.6	7.9	6.8	7.3	6.8	7.2	7.6
DP1	DP2	100	6.7	2.2	1.9	2.1	1.8	2.0	2.1	2.2	1.9	2.1	1.8	2.0	2.1
DP2	DP5CR	800	7.6	5.9	6.2	6.4	6.9	7.0	7.4	5.9	6.2	6.4	6.9	7.0	7.4
TOTALS				**28.8**	**24.9**	**31.6**	**26.9**	**27.2**	**26.3**	**33.7**	**28.4**	**35.5**	**31.3**	**31.0**	**29.3**

Notes - Groundwater influx at Galt Creek and Pond Creek based on seepage data from May/June 1992

- September 2021 DP2 flux value is calculated using groundwater elevation measured on Oct. 6 and surface water elevation measured on Sept. 30, due to anomalous groundwater level on Sept. 30

TABLE B-8
COMPARISON OF GROUNDWATER INFLUX, 2022 CONDITIONS
MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH	AVERAGE WIDTH	AVERAGE INFLUX (L/s/m²)										TOTAL GROUNDWATER INFLUX (L/s)									
		(m)	(m)	17-Mar-22	21-Apr-22	24-May-22	15-Jun-22	14-Jul-22	25-Aug-22	08-Sep-22	13-Oct-22	24-Nov-22	16-Dec-22	17-Mar-22	21-Apr-22	24-May-22	15-Jun-22	14-Jul-22	25-Aug-22	08-Sep-22	13-Oct-22	24-Nov-22	16-Dec-22
DP18	DP19	670	6.5	1.4E-03	1.0E-03	1.7E-03	1.5E-03	-3.0E-03	-5.5E-03	-3.8E-03	-6.3E-03	-6.0E-03	-3.8E-03	5.9	4.4	7.5	6.3	-13.0	-24.0	-16.6	-27.6	-26.3	-16.4
DP19	DP20	310	6.5	8.3E-04	9.3E-04	7.7E-04	6.0E-04	-3.4E-03	-3.6E-03	-3.8E-03	-4.0E-03	-3.3E-03	-3.1E-03	1.7	1.9	1.5	1.2	-6.9	-7.3	-7.8	-8.0	-6.6	-6.3
DP20	Hwy 401	270	6.5	1.5E-03	1.5E-03	1.1E-03	1.1E-03	-2.8E-03	-2.7E-03	-1.5E-03	-2.5E-03	-2.0E-03	-1.8E-03	2.6	2.7	2.0	1.9	-5.0	-4.7	-2.6	-4.4	-3.5	-3.2
Hwy 401	DP21	60	7.1	2.5E-03	2.7E-03	2.5E-03	1.8E-03	1.4E-03	1.6E-03	7.1E-04	5.3E-04	9.8E-04	1.2E-03	1.1	1.1	1.1	0.8	0.6	0.7	0.3	0.2	0.4	0.5
DP21	DP4	100	7.3	1.7E-03	2.1E-03	1.5E-03	1.5E-03	1.3E-03	1.2E-03	6.6E-04	4.2E-04	4.9E-04	8.8E-04	1.2	1.5	1.1	1.1	1.0	0.9	0.5	0.3	0.4	0.6
DP4	DP22	50	7.1	2.6E-03	3.5E-03	-1.2E-03	3.0E-03	3.2E-03	1.4E-03	1.4E-03	1.1E-03	1.3E-03	1.4E-03	0.9	1.2	-0.4	1.1	1.1	0.5	0.5	0.4	0.5	0.5
DP22	DP17	100	6.6	2.6E-03	3.2E-03	-9.8E-04	2.7E-03	2.8E-03	1.1E-03	1.1E-03	1.1E-03	1.5E-03	1.3E-03	1.7	2.2	-0.6	1.8	1.8	0.7	0.7	0.7	1.0	0.9
DP17	DP3	165	7.1	2.2E-03	1.7E-03	2.0E-03	1.6E-03	1.5E-03	1.5E-03	8.9E-04	1.5E-03	1.5E-03	1.5E-03	2.6	2.0	2.3	1.9	1.8	1.8	1.0	1.8	1.8	1.8
DP3	Galt Creek	420	6.0	2.3E-03	1.8E-03	2.1E-03	2.0E-03	2.0E-03	2.0E-03	1.5E-03	2.0E-03	2.0E-03	2.0E-03	5.9	4.6	5.4	5.0	5.0	5.0	3.9	5.0	5.0	5.0
Galt Creek	Pond Creek	255	8.1	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Pond Creek	DP1	250	8.0	8.3E-03	8.8E-03	9.4E-03	9.8E-03	8.1E-03	6.2E-03	7.3E-03	6.8E-03	7.2E-03	7.3E-03	16.5	17.7	18.8	19.6	16.3	12.4	14.6	13.7	14.3	14.6
DP1	DP2	100	6.7	7.1E-03	7.7E-03	8.5E-03	8.9E-03	6.6E-03	5.0E-03	5.9E-03	5.3E-03	5.4E-03	5.4E-03	4.8	5.2	5.7	6.0	4.4	3.4	4.0	3.5	3.6	3.6
DP2	DP5CR	800	7.6	2.6E-03	2.6E-03	2.8E-03	2.7E-03	1.7E-03	2.1E-03	1.8E-03	1.8E-03	1.7E-03	1.5E-03	15.5	15.9	17.1	16.6	10.5	12.8	10.8	10.9	10.6	9.1
TOTALS														**66.5**	**66.4**	**67.6**	**69.3**	**23.8**	**8.3**	**15.5**	**2.8**	**7.3**	**16.9**

Notes - Groundwater influx at Galt Creek and Pond Creek based on seepage data from May/June 1992

TABLE B-8
COMPARISON OF GROUNDWATER INFLUX, 2022 CONDITIONS
MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH	AVERAGE WIDTH	ESTIMATED GROUNDWATER FLUX FROM NORTH SIDE OF CREEK (L/s)										ESTIMATED GROUNDWATER FLUX FROM SOUTH SIDE OF CREEK (L/s)									
		(m)	(m)	17-Mar-22	21-Apr-22	24-May-22	15-Jun-22	14-Jul-22	25-Aug-22	08-Sep-22	13-Oct-22	24-Nov-22	16-Dec-22	17-Mar-22	21-Apr-22	24-May-22	15-Jun-22	14-Jul-22	25-Aug-22	08-Sep-22	13-Oct-22	24-Nov-22	16-Dec-22
DP18	DP19	670	6.5	2.9	2.2	3.8	3.2	-6.5	-12.0	-8.3	-13.8	-13.1	-8.2	2.9	2.2	3.8	3.2	-6.5	-12.0	-8.3	-13.8	-13.1	-8.2
DP19	DP20	310	6.5	0.7	0.7	0.6	0.5	-2.8	-2.9	-3.1	-3.2	-2.6	-2.5	1.0	1.1	0.9	0.7	-4.1	-4.4	-4.7	-4.8	-4.0	-3.8
DP20	Hwy 401	270	6.5	1.0	1.1	0.8	0.8	-2.0	-1.9	-1.0	-1.7	-1.4	-1.3	1.5	1.6	1.2	1.1	-3.0	-2.8	-1.5	-2.6	-2.1	-1.9
Hwy 401	DP21	60	7.1	0.4	0.5	0.4	0.3	0.2	0.3	0.1	0.1	0.2	0.2	0.6	0.7	0.6	0.5	0.4	0.4	0.2	0.1	0.2	0.3
DP21	DP4	100	7.3	0.5	0.6	0.5	0.4	0.4	0.4	0.2	0.1	0.1	0.3	0.7	0.9	0.7	0.7	0.6	0.5	0.3	0.2	0.2	0.4
DP4	DP22	50	7.1	0.4	0.5	-0.17	0.4	0.5	0.2	0.2	0.2	0.2	0.2	0.5	0.7	-0.2	0.6	0.7	0.3	0.3	0.2	0.3	0.3
DP22	DP17	100	6.6	0.7	0.9	-0.3	0.7	0.7	0.3	0.3	0.3	0.4	0.3	1.0	1.3	-0.4	1.1	1.1	0.4	0.4	0.4	0.6	0.5
DP17	DP3	165	7.1	1.0	0.8	0.9	0.8	0.7	0.7	0.4	0.7	0.7	0.7	1.5	1.2	1.4	1.1	1.1	1.1	0.6	1.1	1.1	1.1
DP3	Galt Creek	420	6.0	2.4	1.8	2.1	2.0	2.0	2.0	1.5	2.0	2.0	2.0	3.5	2.8	3.2	3.0	3.0	3.0	2.3	3.0	3.0	3.0
Galt Creek	Pond Creek	255	8.1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Pond Creek	DP1	250	8.0	8.3	8.8	9.4	9.8	8.1	6.2	7.3	6.8	7.2	7.3	8.3	8.8	9.4	9.8	8.1	6.2	7.3	6.8	7.2	7.3
DP1	DP2	100	6.7	2.4	2.6	2.9	3.0	2.2	1.7	2.0	1.8	1.8	1.8	2.4	2.6	2.9	3.0	2.2	1.7	2.0	1.8	1.8	1.8
DP2	DP5CR	800	7.6	7.7	7.9	8.6	8.3	5.2	6.4	5.4	5.4	5.3	4.6	7.7	7.9	8.6	8.3	5.2	6.4	5.4	5.4	5.3	4.6
TOTALS				**30.9**	**30.9**	**31.9**	**32.6**	**11.3**	**3.8**	**7.5**	**1.2**	**3.2**	**7.8**	**35.6**	**35.5**	**35.6**	**36.7**	**12.5**	**4.5**	**8.0**	**1.6**	**4.2**	**9.0**

Notes - Groundwater influx at Galt Creek and Pond Creek based on seepage data from May/June 1992

TABLE B-8
COMPARISON OF GROUNDWATER INFLUX, 2023 CONDITIONS
MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH	AVERAGE WIDTH	AVERAGE INFLUX (L/s/m²)										TOTAL GROUNDWATER INFLUX (L/s)									
		(m)	(m)	14-Feb-23	17-Mar-23	27-Apr-23	26-May-23	15-Jun-23	08-Aug-23	07-Sep-23	26-Oct-23	16-Nov-23	18-Dec-23	14-Feb-23	17-Mar-23	27-Apr-23	26-May-23	15-Jun-23	08-Aug-23	07-Sep-23	26-Oct-23	16-Nov-23	18-Dec-23
DP18	DP19	670	6.5	-3.6E-03	-3.0E-03	-1.0E-03	-1.2E-03	5.6E-04	-8.4E-04	1.1E-03	-4.8E-03	-7.0E-04	1.0E-03	-15.8	-13.0	-4.5	-5.2	2.5	-3.7	4.9	-21.0	-3.0	4.4
DP19	DP20	310	6.5	-3.3E-03	-2.9E-03	9.6E-04	1.0E-03	-2.0E-04	7.0E-04	6.2E-04	-3.5E-03	-5.2E-04	-3.1E-03	-6.6	-5.9	1.9	2.0	-0.4	1.4	1.2	-7.1	-1.0	-6.3
DP20	Hwy 401	270	6.5	-2.3E-03	-1.2E-03	1.2E-03	1.4E-03	0.0E+00	1.1E-03	1.1E-03	-2.4E-03	-3.4E-04	-2.2E-03	-4.1	-2.2	2.1	2.4	0.0	2.0	1.9	-4.3	-0.6	-3.8
Hwy 401	DP21	60	7.1	1.8E-03	2.3E-03	2.2E-03	2.0E-03	1.9E-03	2.1E-03	2.5E-03	1.9E-03	1.6E-03	2.0E-03	0.8	1.0	0.9	0.8	0.8	0.9	1.1	0.8	0.7	0.8
DP21	DP4	100	7.3	1.9E-03	1.6E-03	1.9E-03	1.5E-03	2.0E-03	1.8E-03	3.2E-03	1.9E-03	1.1E-03	2.4E-03	1.4	1.2	1.4	1.1	1.5	1.3	2.3	1.4	0.8	1.7
DP4	DP22	50	7.1	3.2E-03	3.1E-03	7.1E-03	2.6E-03	3.3E-03	3.2E-03	5.3E-03	2.4E-03	1.0E-03	1.6E-03	1.1	1.1	2.5	0.9	1.2	1.1	1.9	0.8	0.4	0.6
DP22	DP17	100	6.6	3.1E-03	3.6E-03	6.8E-03	2.6E-03	2.8E-03	3.1E-03	4.1E-03	2.0E-03	1.3E-03	2.9E-03	2.0	2.4	4.5	1.7	1.9	2.1	2.7	1.3	0.9	1.9
DP17	DP3	165	7.1	2.3E-03	2.5E-03	2.1E-03	1.9E-03	1.2E-03	1.9E-03	2.3E-03	2.1E-03	1.9E-03	4.2E-03	2.7	2.9	2.5	2.2	1.4	2.3	2.7	2.5	2.2	4.8
DP3	Galt Creek	420	6.0	2.0E-03	2.1E-03	2.2E-03	2.0E-03	1.2E-03	2.0E-03	2.2E-03	2.1E-03	2.0E-03	2.0E-03	5.2	5.4	5.5	5.0	3.1	5.0	5.5	5.4	5.0	5.2
Galt Creek	Pond Creek	255	8.1	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Pond Creek	DP1	250	8.0	8.5E-03	9.4E-03	1.0E-02	1.0E-02	8.7E-03	8.3E-03	8.7E-03	8.0E-03	7.6E-03	8.5E-03	17.0	18.8	20.6	20.1	17.4	16.5	17.4	16.0	15.1	17.0
DP1	DP2	100	6.7	6.9E-03	7.5E-03	8.9E-03	8.5E-03	7.0E-03	6.4E-03	7.5E-03	6.3E-03	5.8E-03	6.7E-03	4.7	5.1	6.0	5.7	4.7	4.3	5.0	4.2	3.9	4.5
DP2	DP5CR	800	7.6	1.9E-03	1.9E-03	2.0E-03	1.9E-03	1.8E-03	1.5E-03	2.1E-03	1.6E-03	1.6E-03	1.7E-03	11.5	11.4	12.4	11.7	10.8	8.9	12.7	9.7	9.9	10.5
TOTALS														**26.0**	**34.4**	**62.1**	**54.8**	**50.9**	**48.3**	**65.6**	**15.9**	**40.3**	**47.4**

Notes - Groundwater influx at Galt Creek and Pond Creek based on seepage data from May/June 1992

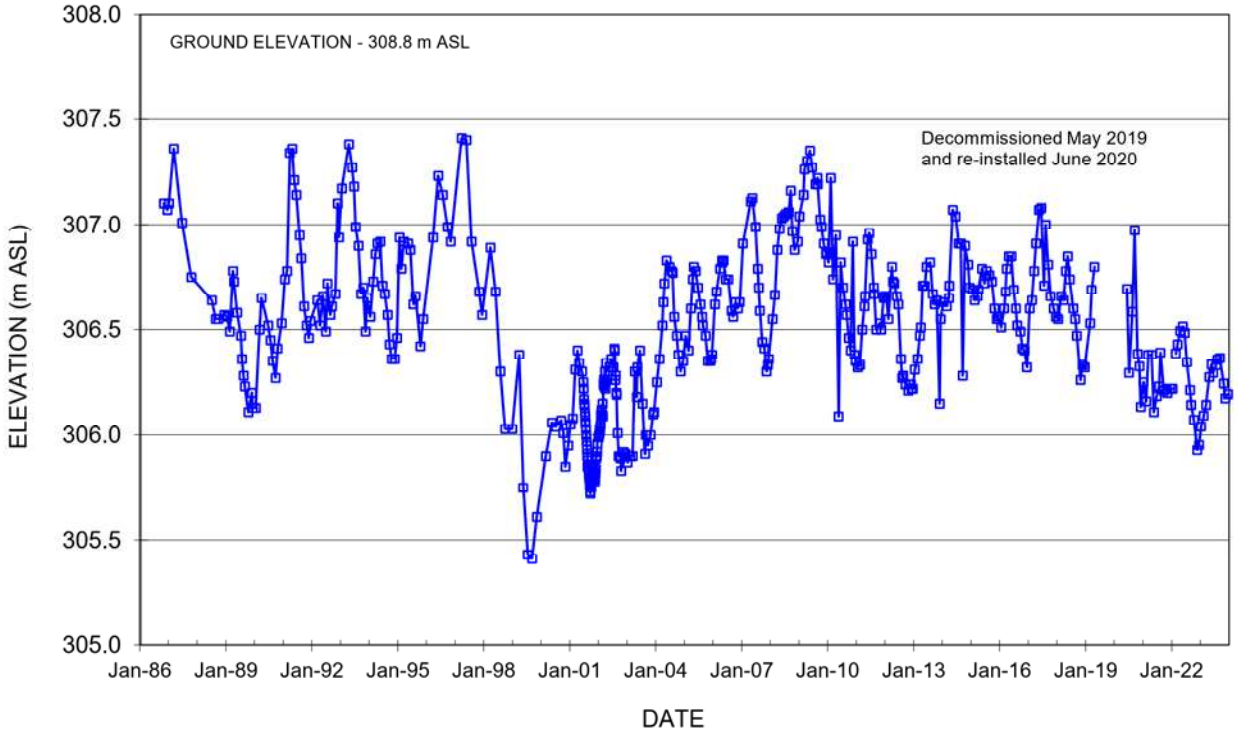
TABLE B-8
COMPARISON OF GROUNDWATER INFLUX, 2023 CONDITIONS
MILL CREEK AGGREGATES PIT

FROM	TO	LENGTH	AVERAGE WIDTH	ESTIMATED GROUNDWATER FLUX FROM NORTH SIDE OF CREEK (L/s)										ESTIMATED GROUNDWATER FLUX FROM SOUTH SIDE OF CREEK (L/s)									
		(m)	(m)	14-Feb-23	17-Mar-23	27-Apr-23	26-May-23	15-Jun-23	08-Aug-23	07-Sep-23	26-Oct-23	16-Nov-23	18-Dec-23	14-Feb-23	17-Mar-23	27-Apr-23	26-May-23	15-Jun-23	08-Aug-23	07-Sep-23	26-Oct-23	16-Nov-23	18-Dec-23
DP18	DP19	670	6.5	-7.9	-6.5	-2.2	-2.6	1.2	-1.8	2.5	-10.5	-1.5	2.2	-7.9	-6.5	-2.2	-2.6	1.2	-1.8	2.5	-10.5	-1.5	2.2
DP19	DP20	310	6.5	-2.6	-2.3	0.8	0.8	-0.2	0.6	0.5	-2.9	-0.4	-2.5	-3.9	-3.5	1.2	1.2	-0.2	0.8	0.7	-4.3	-0.6	-3.8
DP20	Hwy 401	270	6.5	-1.6	-0.9	0.8	1.0	0.0	0.8	0.8	-1.7	-0.2	-1.5	-2.4	-1.3	1.2	1.4	0.0	1.2	1.1	-2.6	-0.4	-2.3
Hwy 401	DP21	60	7.1	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.5	0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.4	0.5
DP21	DP4	100	7.3	0.5	0.5	0.6	0.4	0.6	0.5	0.9	0.6	0.3	0.7	0.8	0.7	0.9	0.7	0.9	0.8	1.4	0.8	0.5	1.0
DP4	DP22	50	7.1	0.5	0.4	1.01	0.4	0.5	0.5	0.7	0.3	0.1	0.2	0.7	0.7	1.5	0.5	0.7	0.7	1.1	0.5	0.2	0.3
DP22	DP17	100	6.6	0.8	1.0	1.8	0.7	0.7	0.8	1.1	0.5	0.4	0.8	1.2	1.5	2.7	1.0	1.1	1.2	1.6	0.8	0.5	1.2
DP17	DP3	165	7.1	1.1	1.1	1.0	0.9	0.6	0.9	1.1	1.0	0.9	1.9	1.6	1.7	1.5	1.3	0.8	1.4	1.6	1.5	1.3	2.9
DP3	Galt Creek	420	6.0	2.1	2.1	2.2	2.0	1.2	2.0	2.2	2.1	2.0	2.1	3.1	3.2	3.3	3.0	1.9	3.0	3.3	3.2	3.0	3.1
Galt Creek	Pond Creek	255	8.1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Pond Creek	DP1	250	8.0	8.5	9.4	10.3	10.1	8.7	8.3	8.7	8.0	7.6	8.5	8.5	9.4	10.3	10.1	8.7	8.3	8.7	8.0	7.6	8.5
DP1	DP2	100	6.7	2.3	2.5	3.0	2.9	2.4	2.1	2.5	2.1	2.0	2.2	2.3	2.5	3.0	2.9	2.4	2.1	2.5	2.1	2.0	2.2
DP2	DP5CR	800	7.6	5.8	5.7	6.2	5.9	5.4	4.4	6.4	4.9	4.9	5.3	5.8	5.7	6.2	5.9	5.4	4.4	6.4	4.9	4.9	5.3
TOTALS				**12.1**	**16.0**	**28.3**	**25.1**	**23.9**	**21.9**	**30.2**	**7.2**	**18.7**	**22.6**	**13.9**	**18.4**	**33.8**	**29.6**	**27.0**	**26.4**	**35.3**	**8.6**	**21.6**	**24.8**

Notes - Groundwater influx at Galt Creek and Pond Creek based on seepage data from May/June 1992

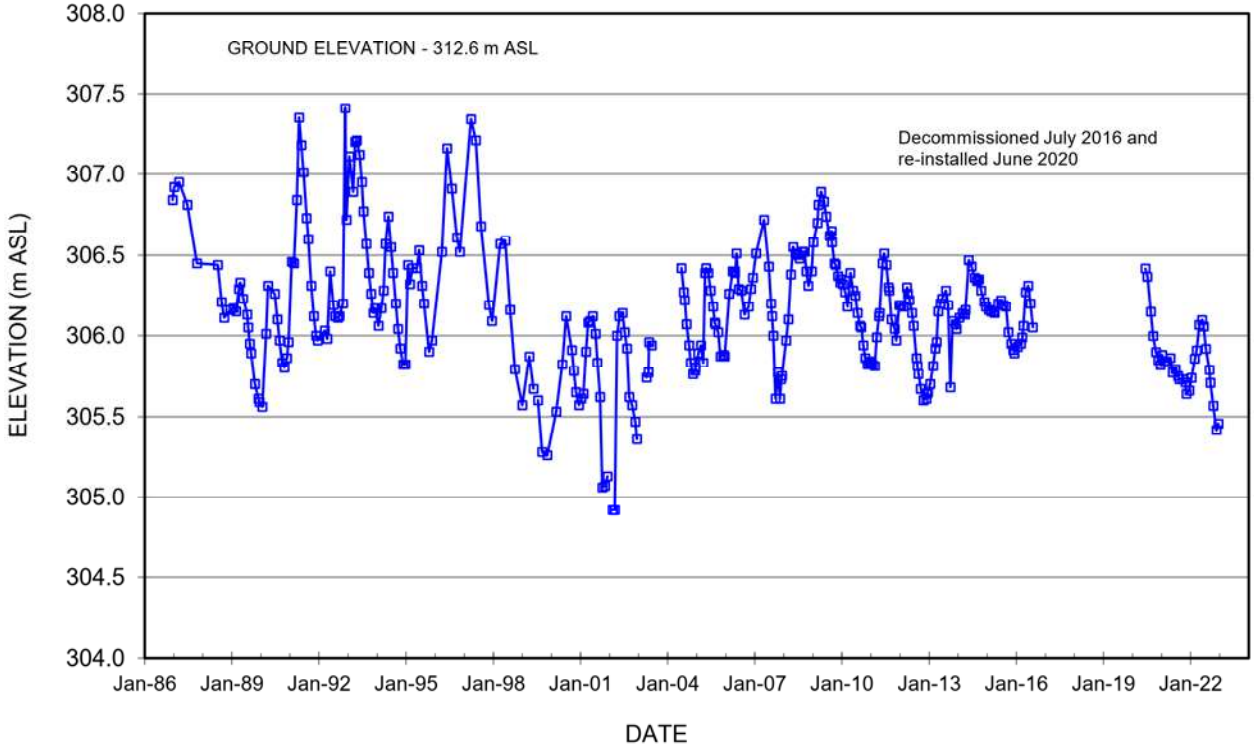
GROUNDWATER HYDROGRAPH
BOREHOLE 1-I/1-R

FIGURE B-1



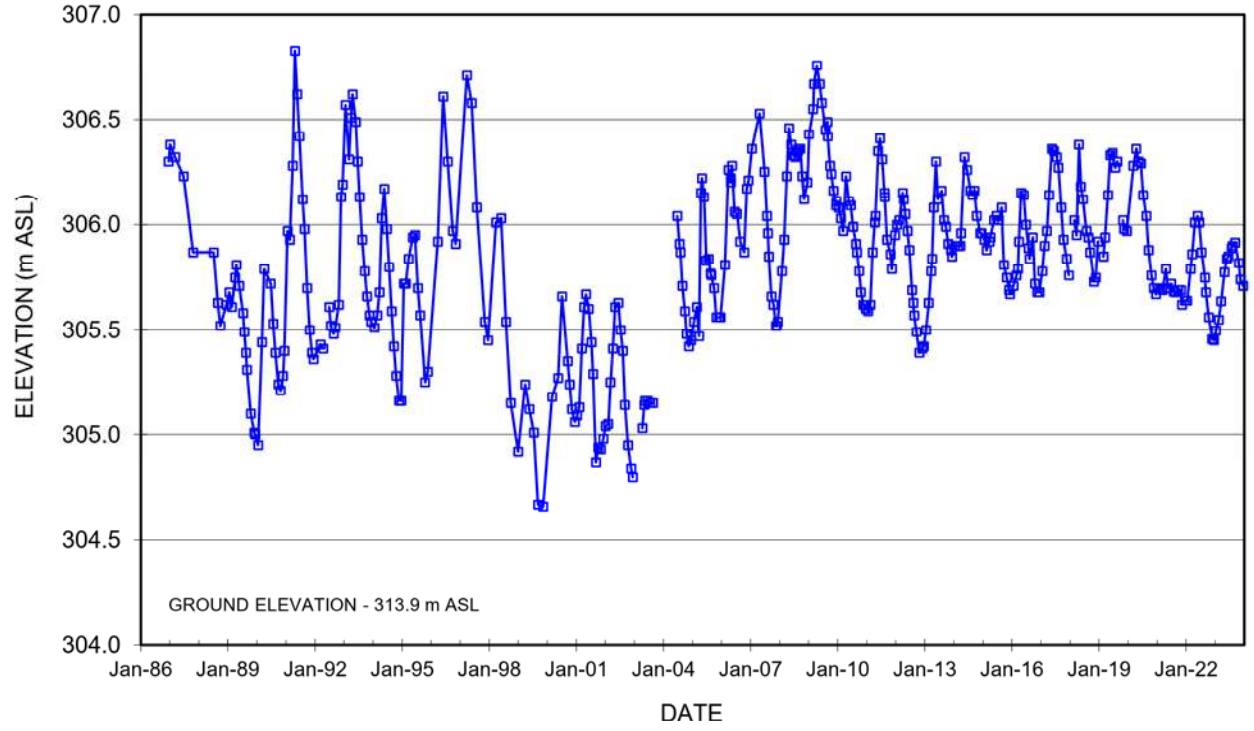
GROUNDWATER HYDROGRAPH
BOREHOLE 2/2B/2-R

FIGURE B-2



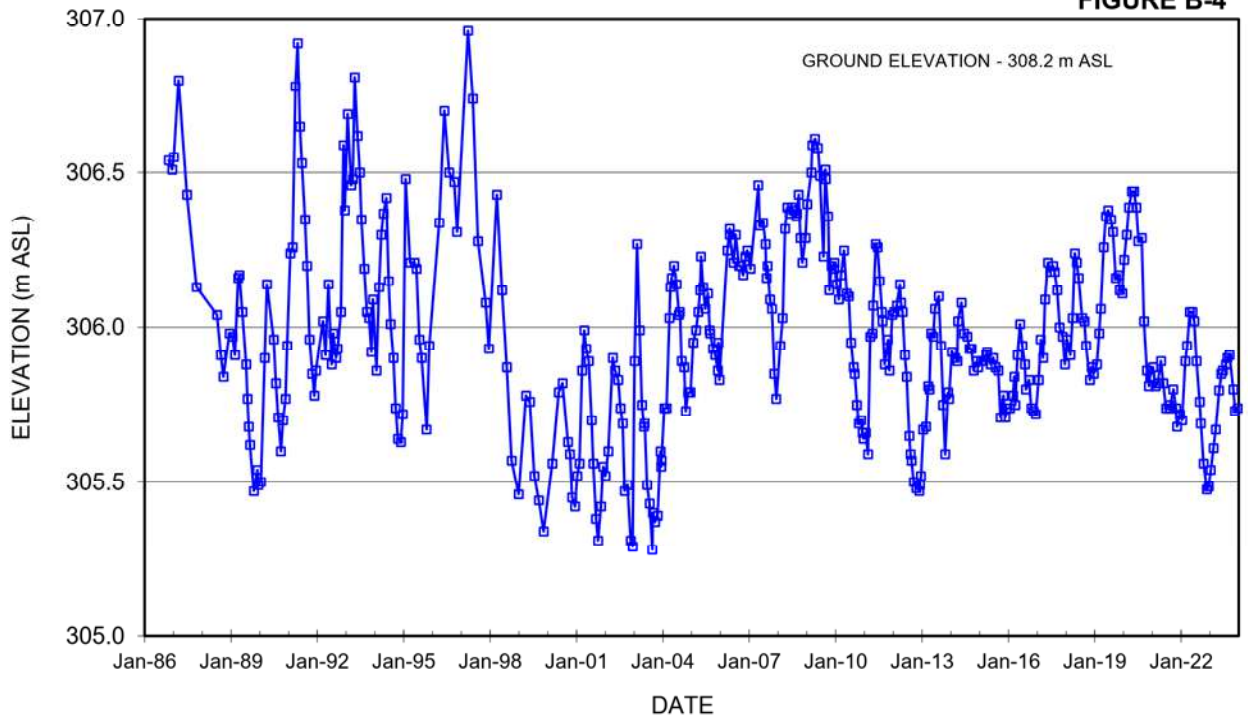
GROUNDWATER HYDROGRAPH
BOREHOLE 3

FIGURE B-3



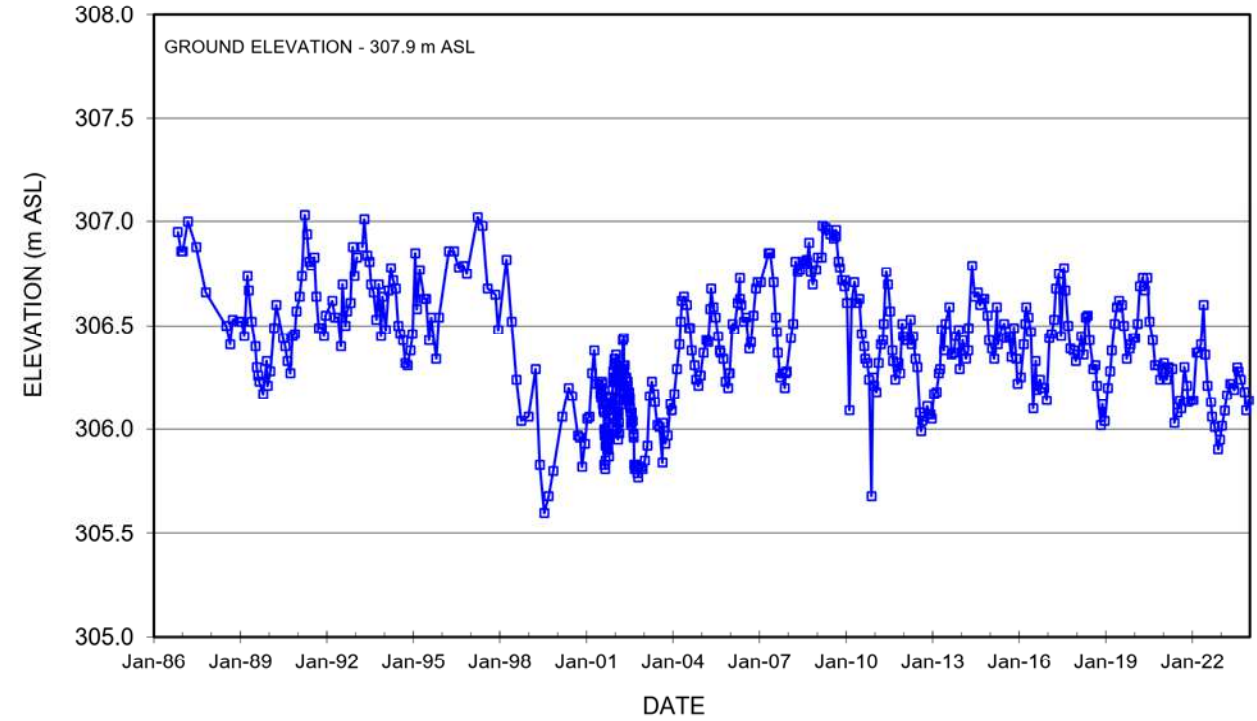
GROUNDWATER HYDROGRAPH
BOREHOLE 4-I

FIGURE B-4



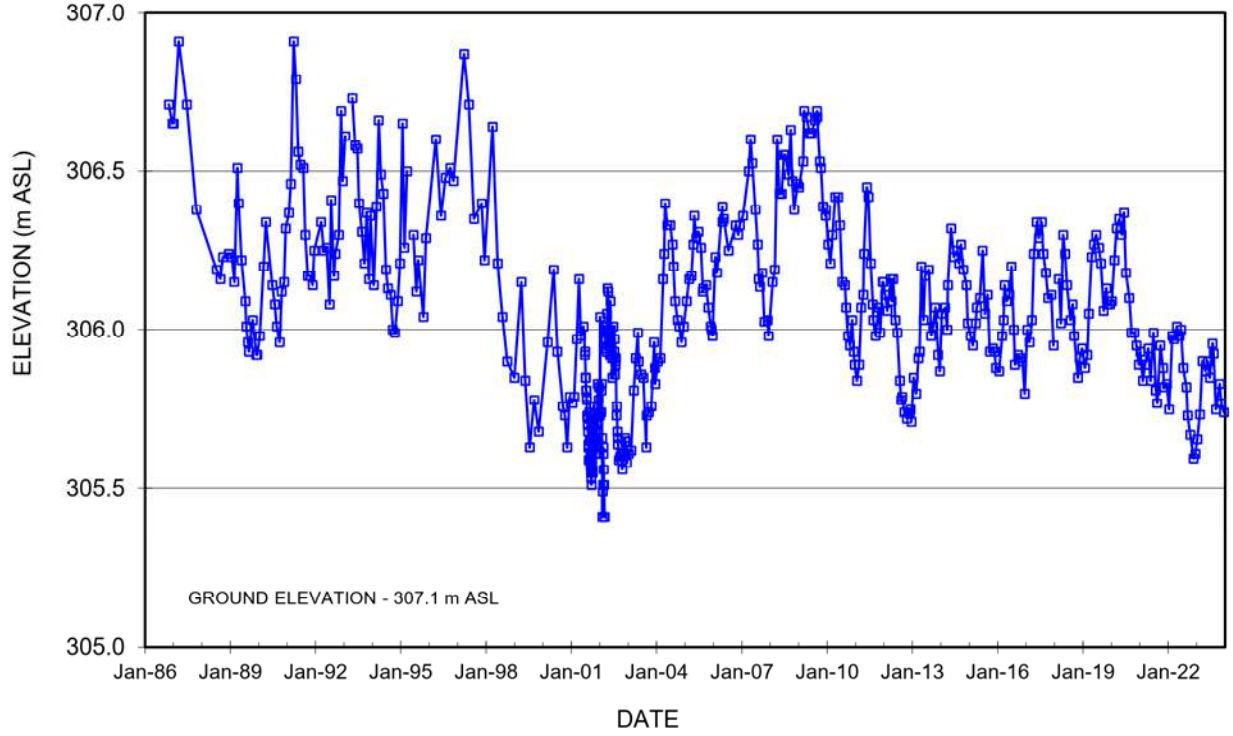
GROUNDWATER HYDROGRAPH
BOREHOLE 5-I

FIGURE B-5



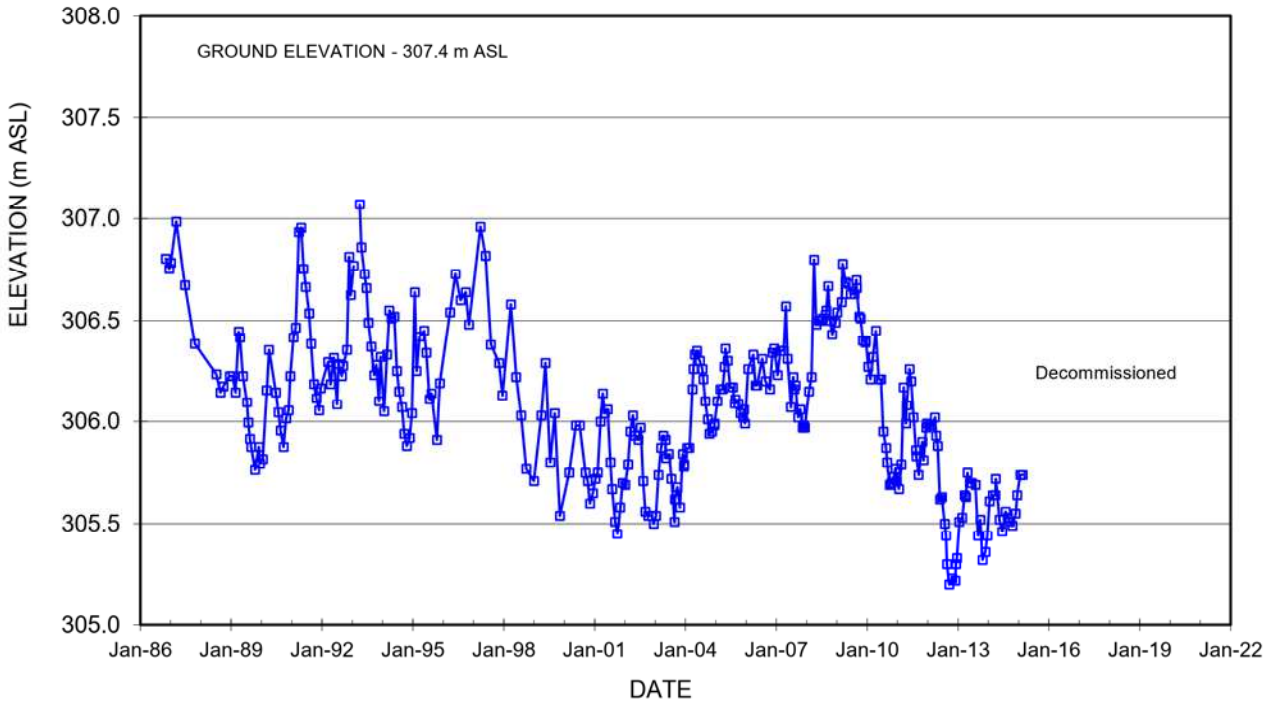
GROUNDWATER HYDROGRAPH
BOREHOLE 6-I

FIGURE B-6



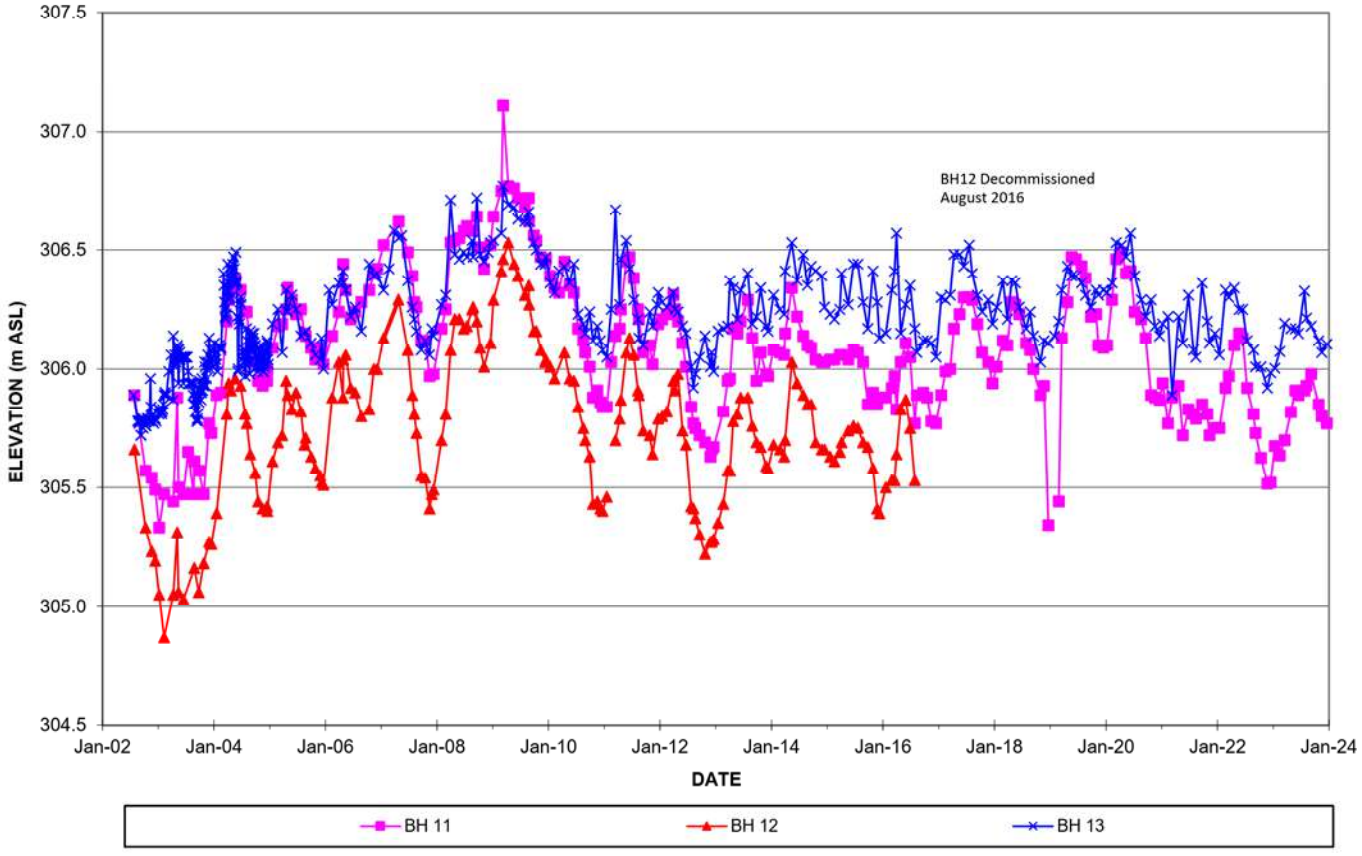
GROUNDWATER HYDROGRAPH
BOREHOLE 7

FIGURE B-7



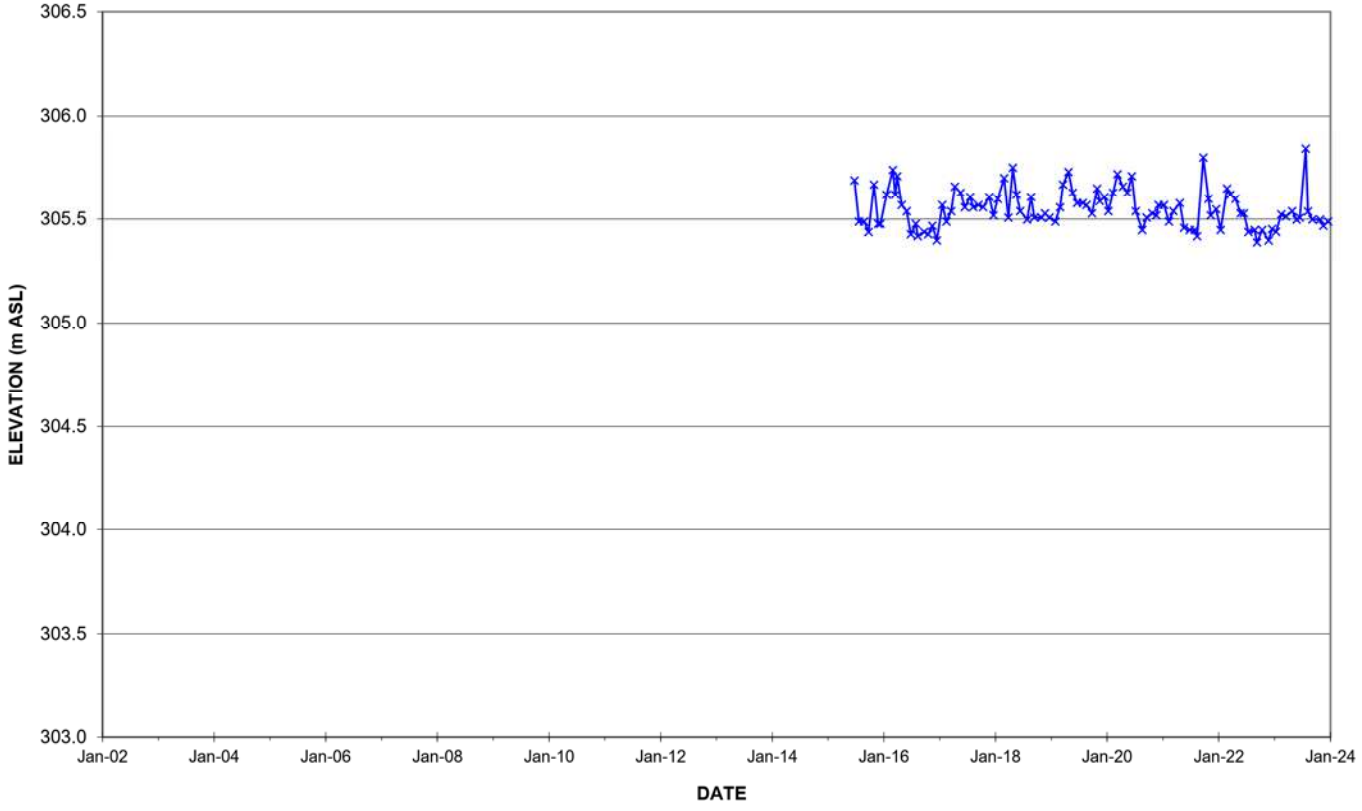
GROUNDWATER HYDROGRAPH
2002 MONITORS

FIGURE B-8



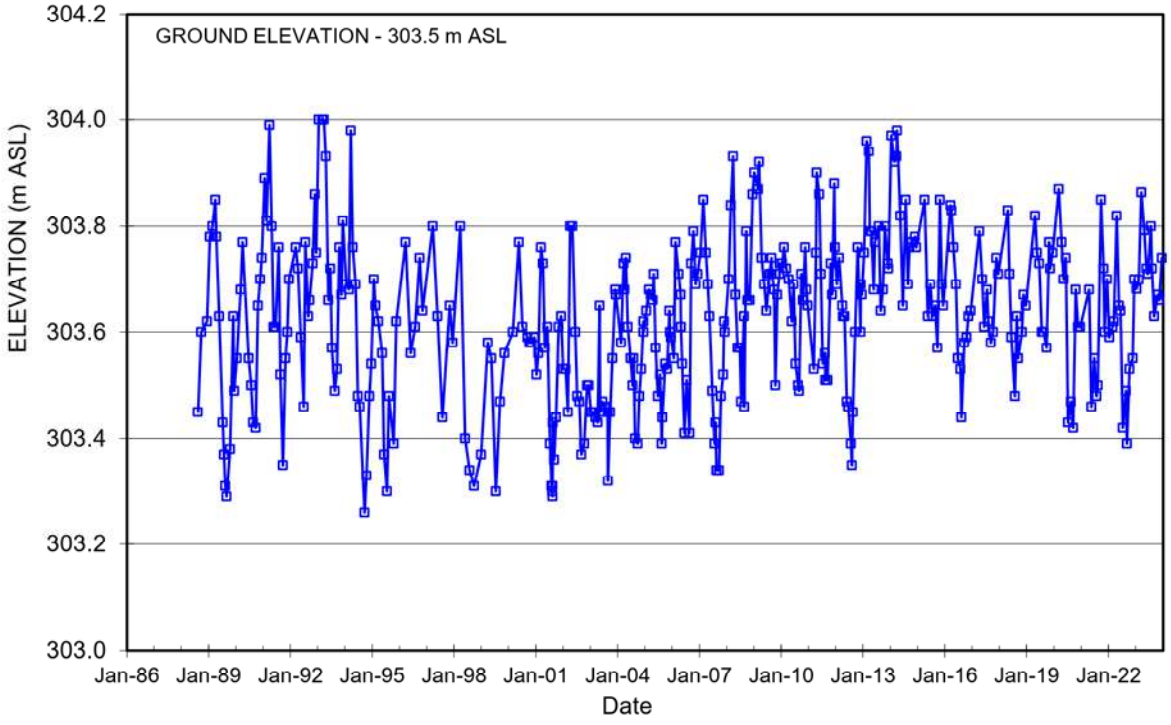
GROUNDWATER HYDROGRAPH
BOREHOLE 14

FIGURE B-9



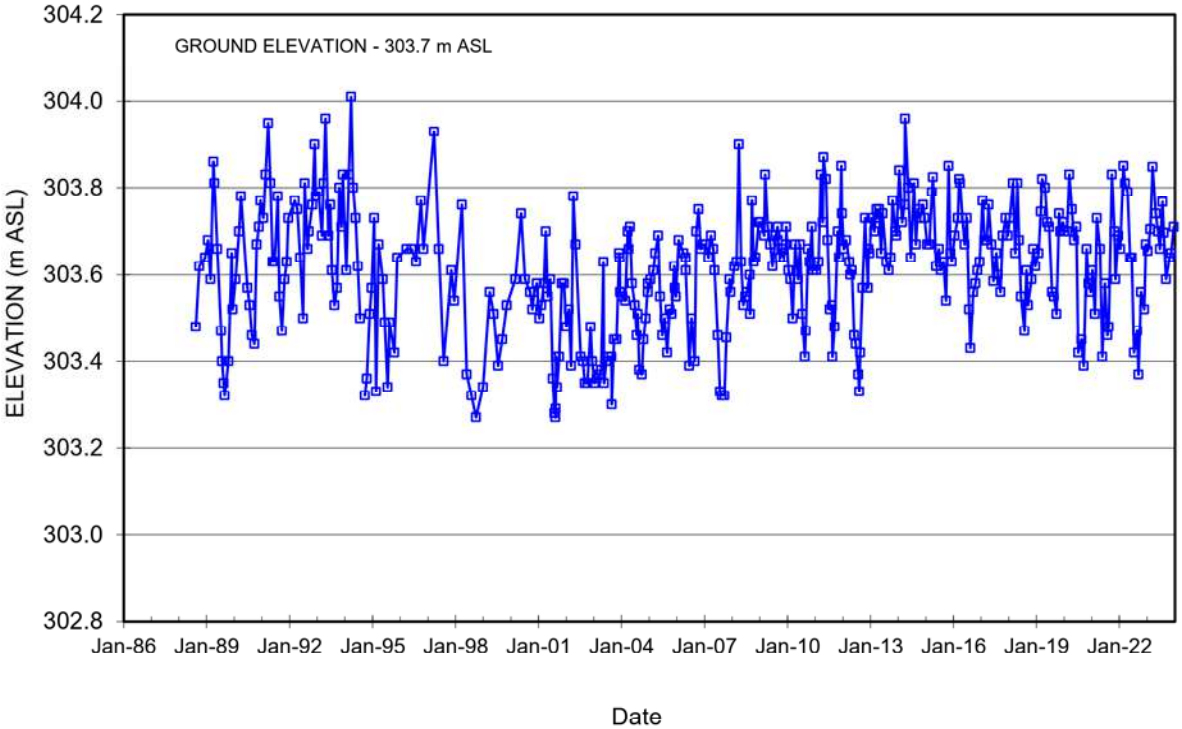
GROUNDWATER HYDROGRAPH
OW16A-78

FIGURE B-10



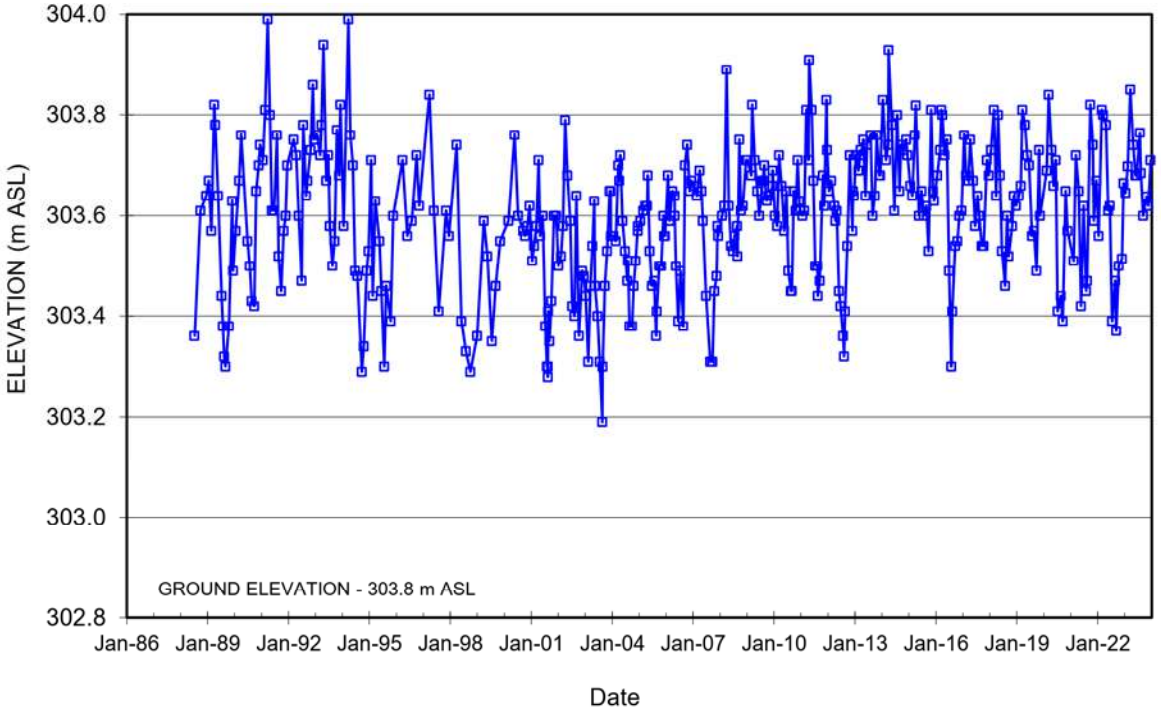
GROUNDWATER HYDROGRAPH
TW16-79

FIGURE B-11



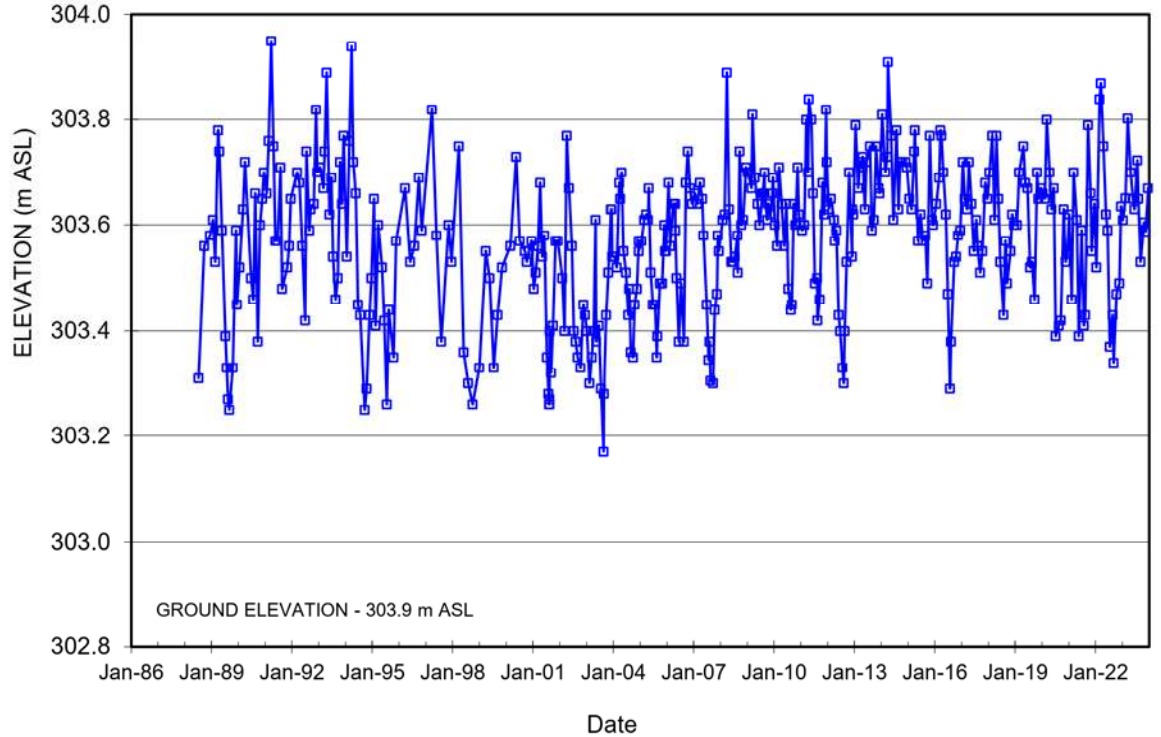
GROUNDWATER HYDROGRAPH
OW1-84

FIGURE B-12



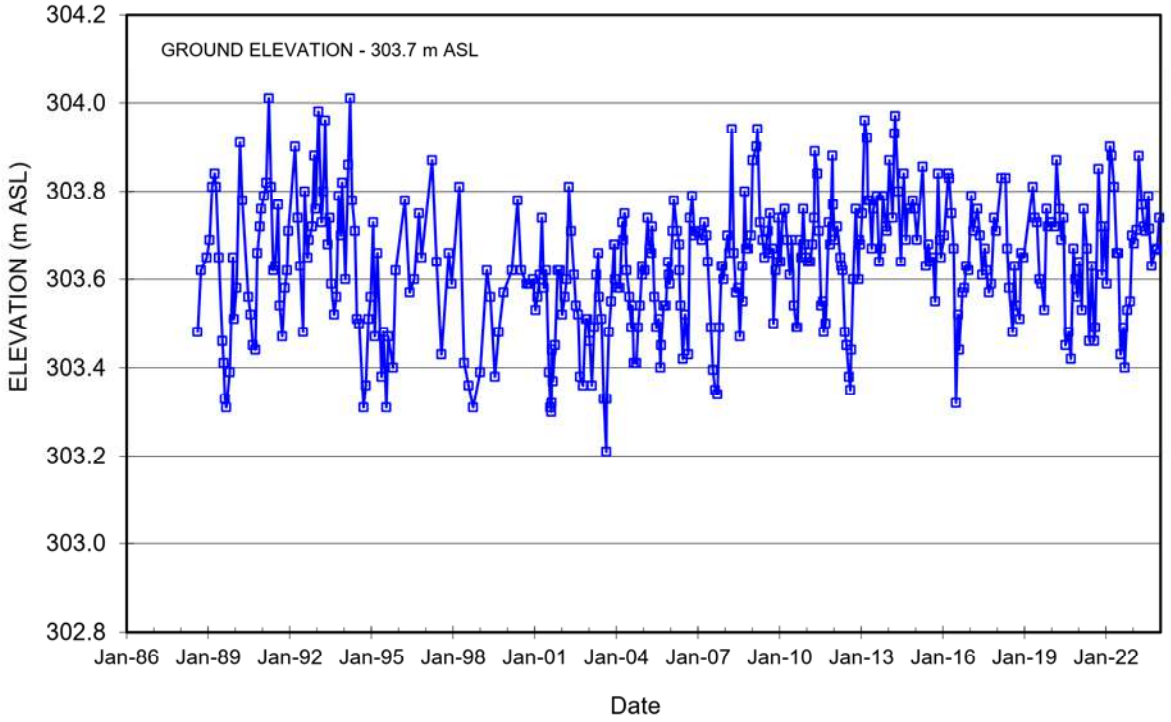
GROUNDWATER HYDROGRAPH
OW2-84

FIGURE B-13



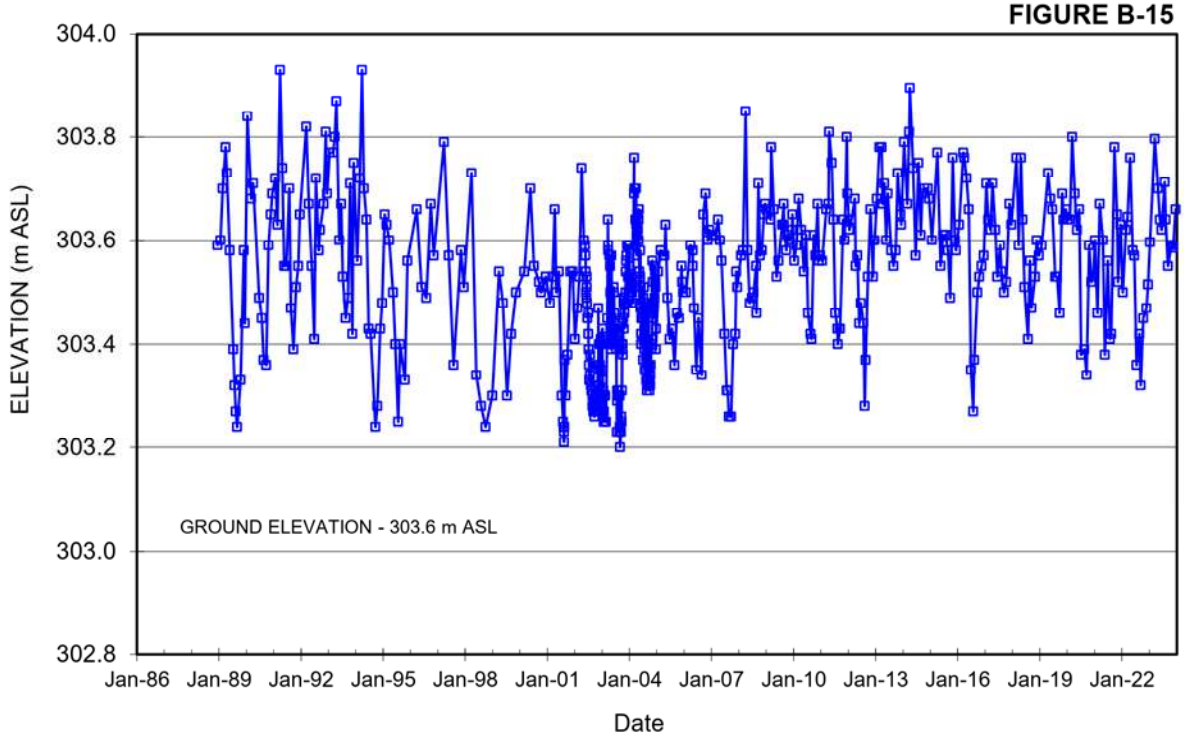
GROUNDWATER HYDROGRAPH
OW4-84

FIGURE B-14



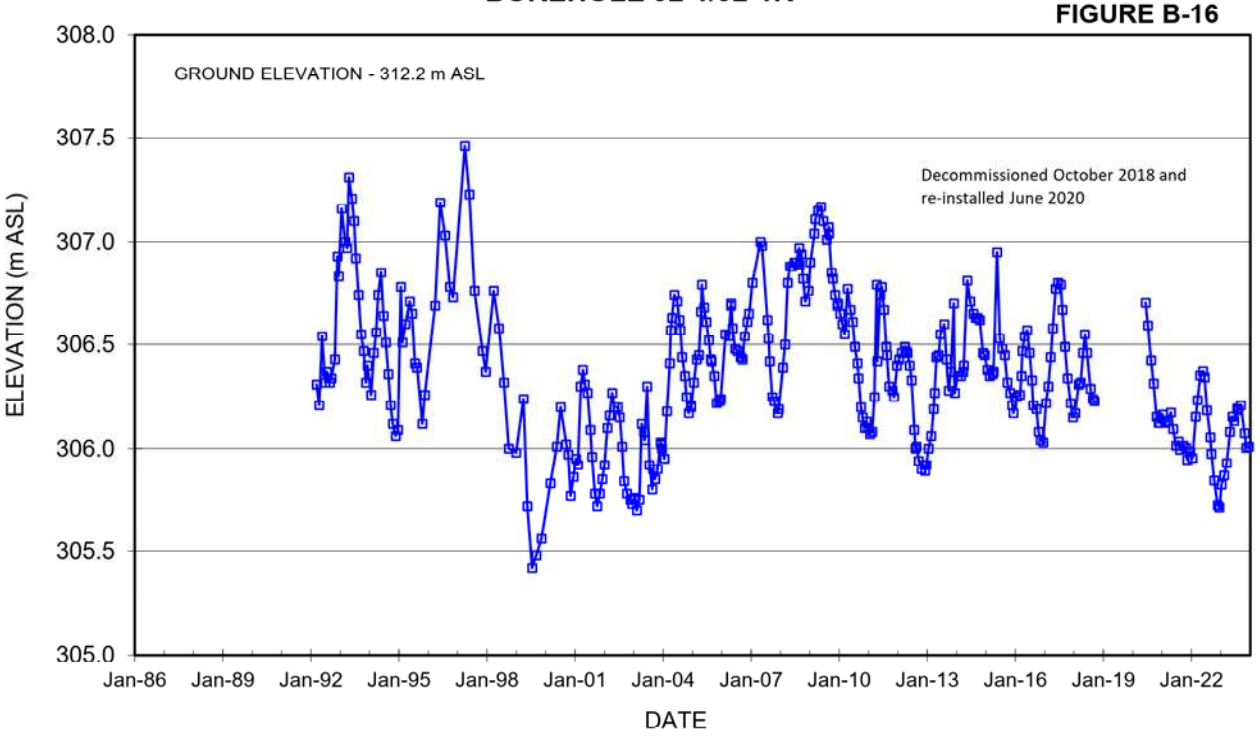
GROUNDWATER HYDROGRAPH
OW5-84

FIGURE B-15



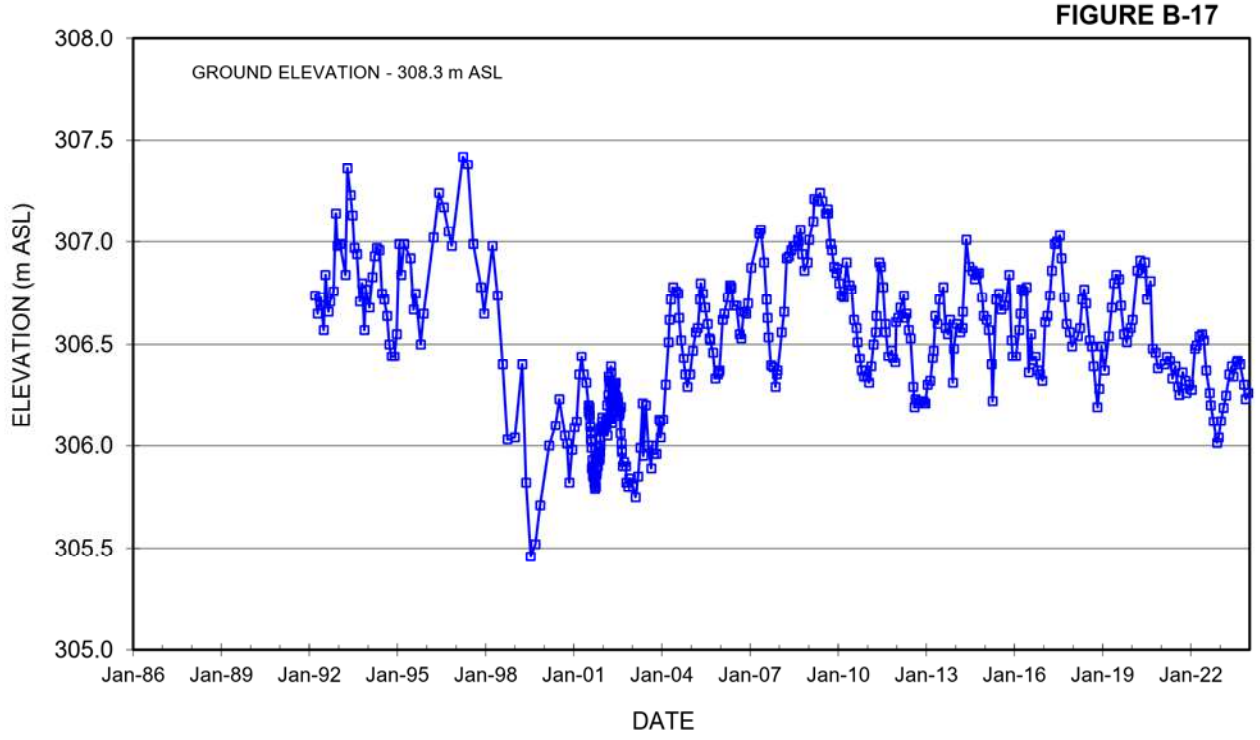
GROUNDWATER HYDROGRAPH
BOREHOLE 92-1/92-1R

FIGURE B-16



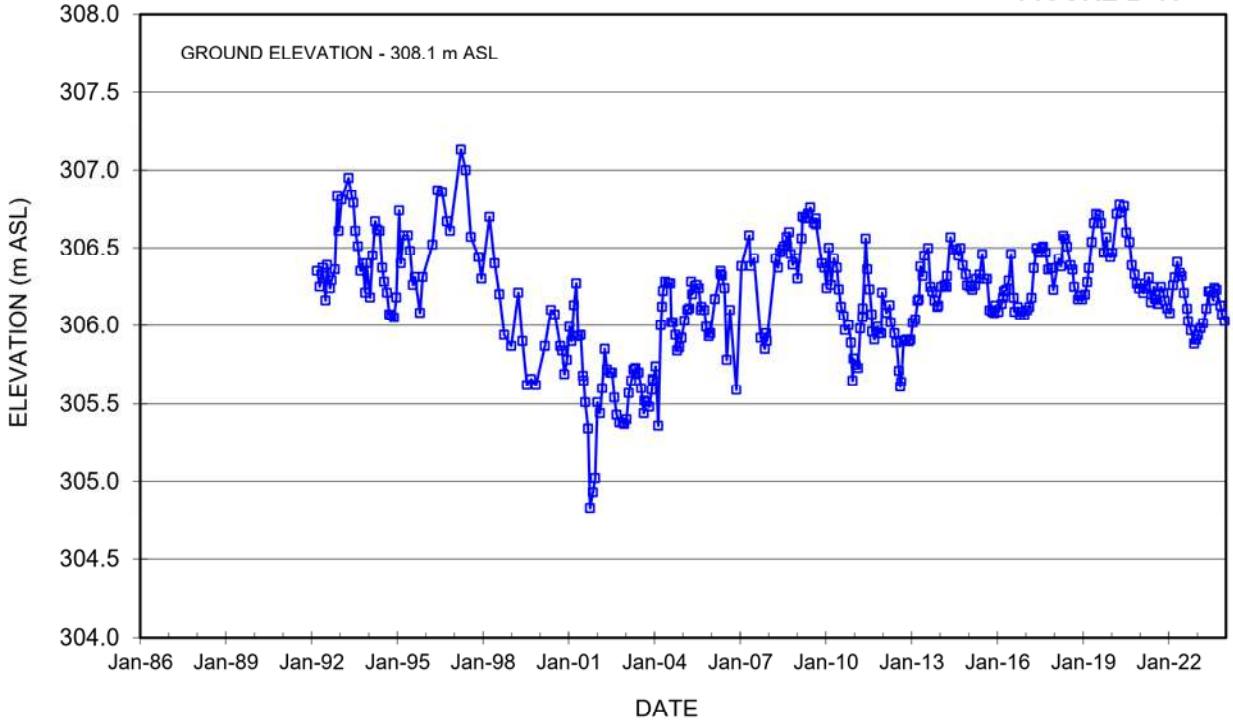
GROUNDWATER HYDROGRAPH
BOREHOLE 92-5

FIGURE B-17



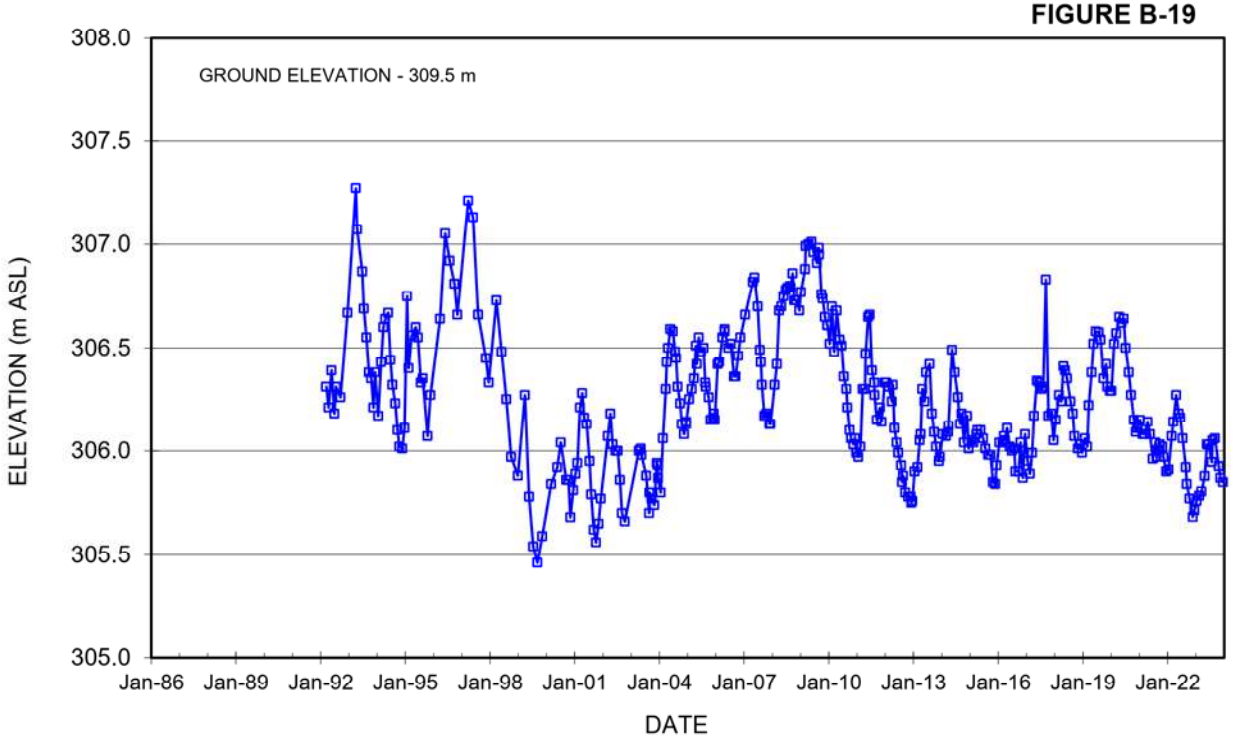
GROUNDWATER HYDROGRAPH
BOREHOLE 92-8

FIGURE B-18



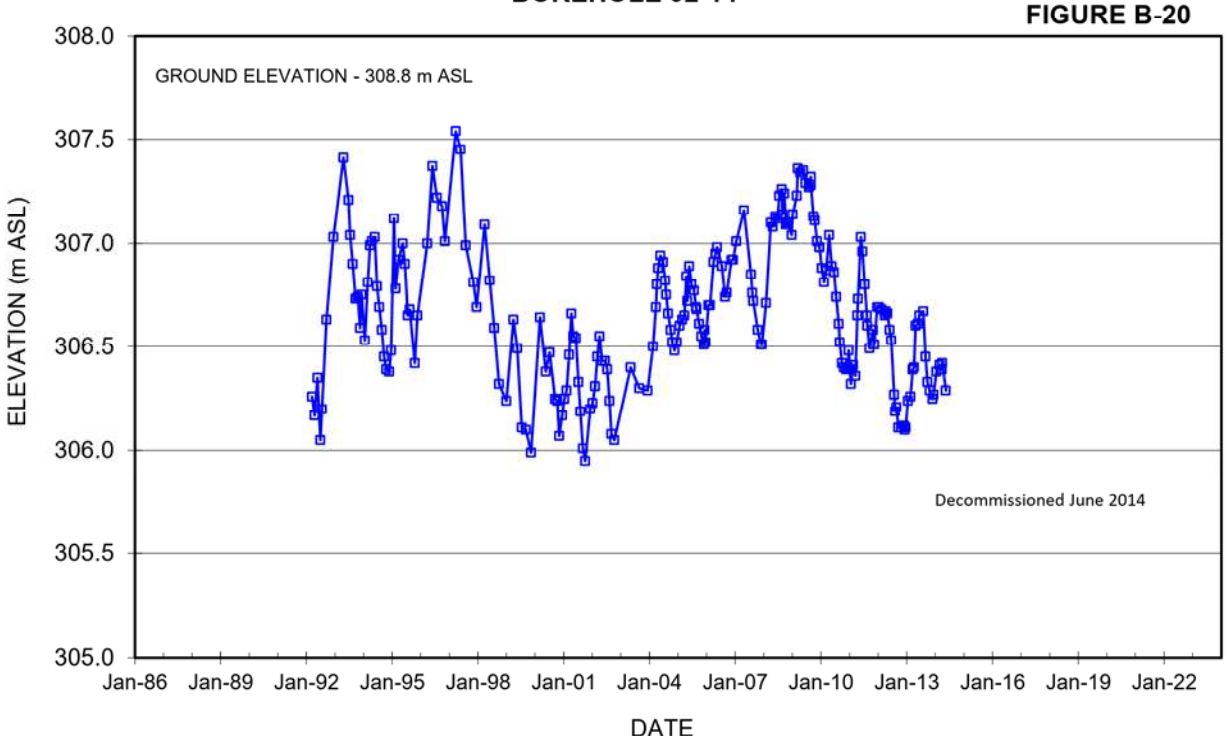
GROUNDWATER HYDROGRAPH
BOREHOLE 92-13

FIGURE B-19



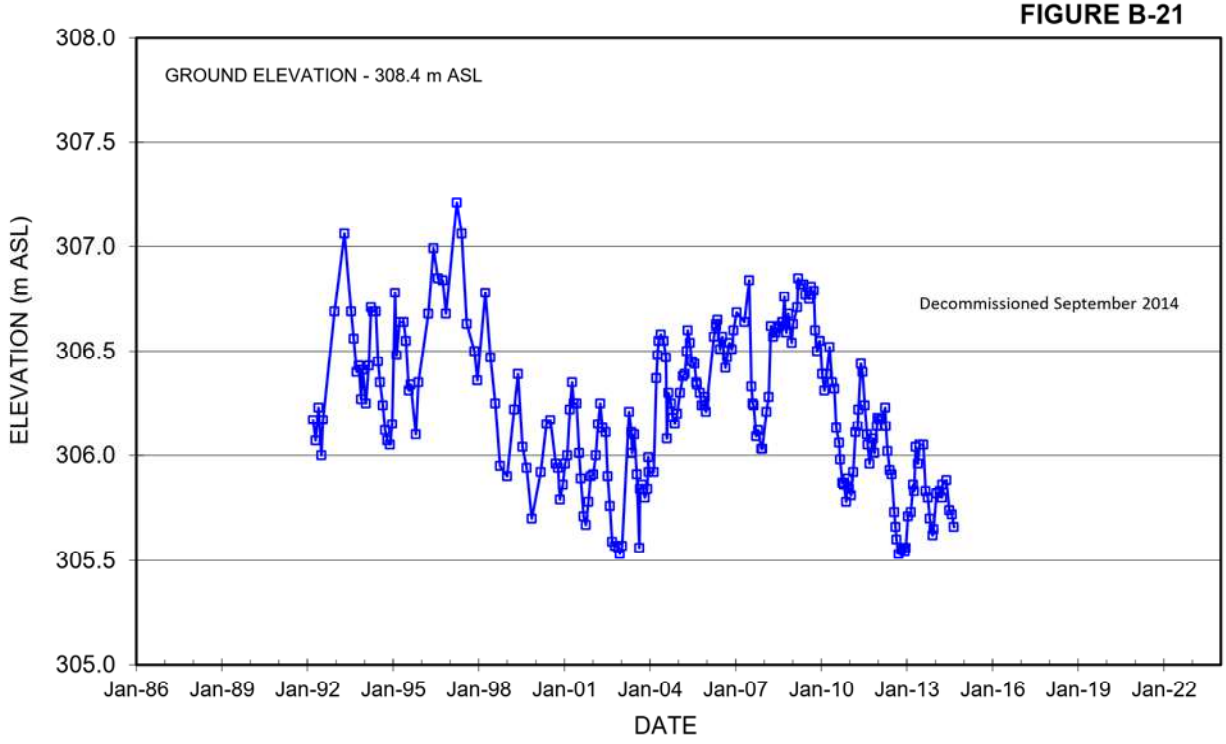
GROUNDWATER HYDROGRAPH
BOREHOLE 92-14

FIGURE B-20



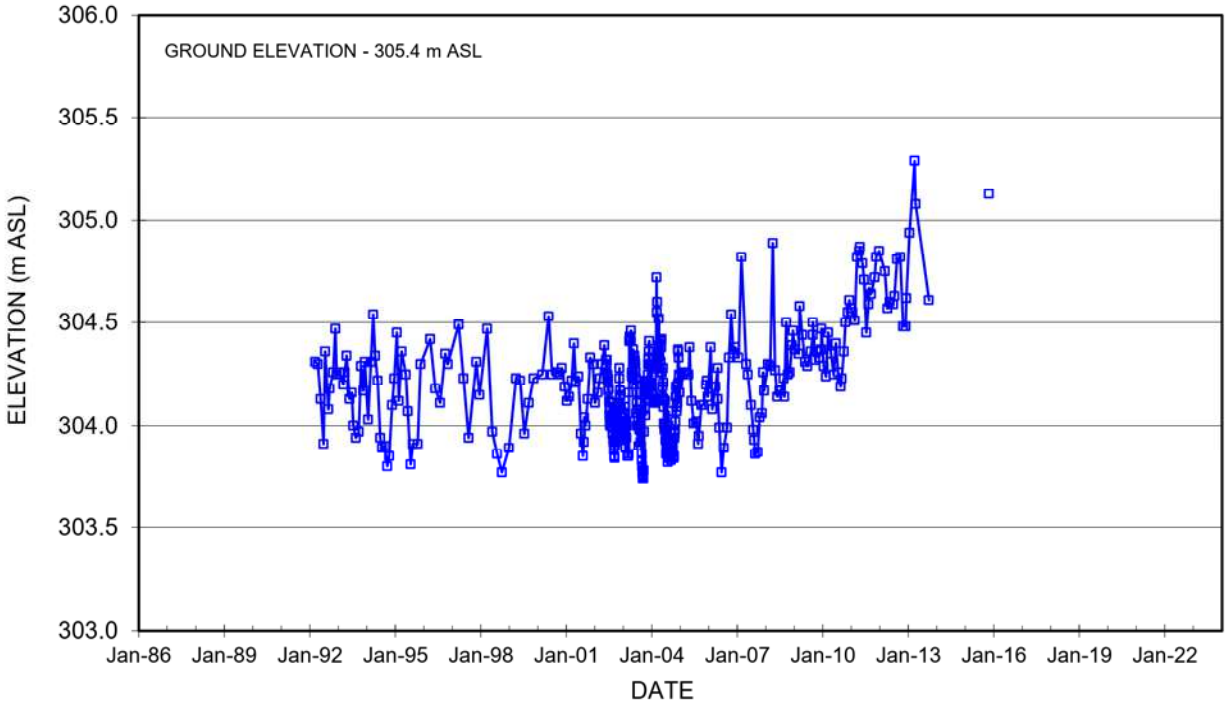
GROUNDWATER HYDROGRAPH
BOREHOLE 92-15

FIGURE B-21



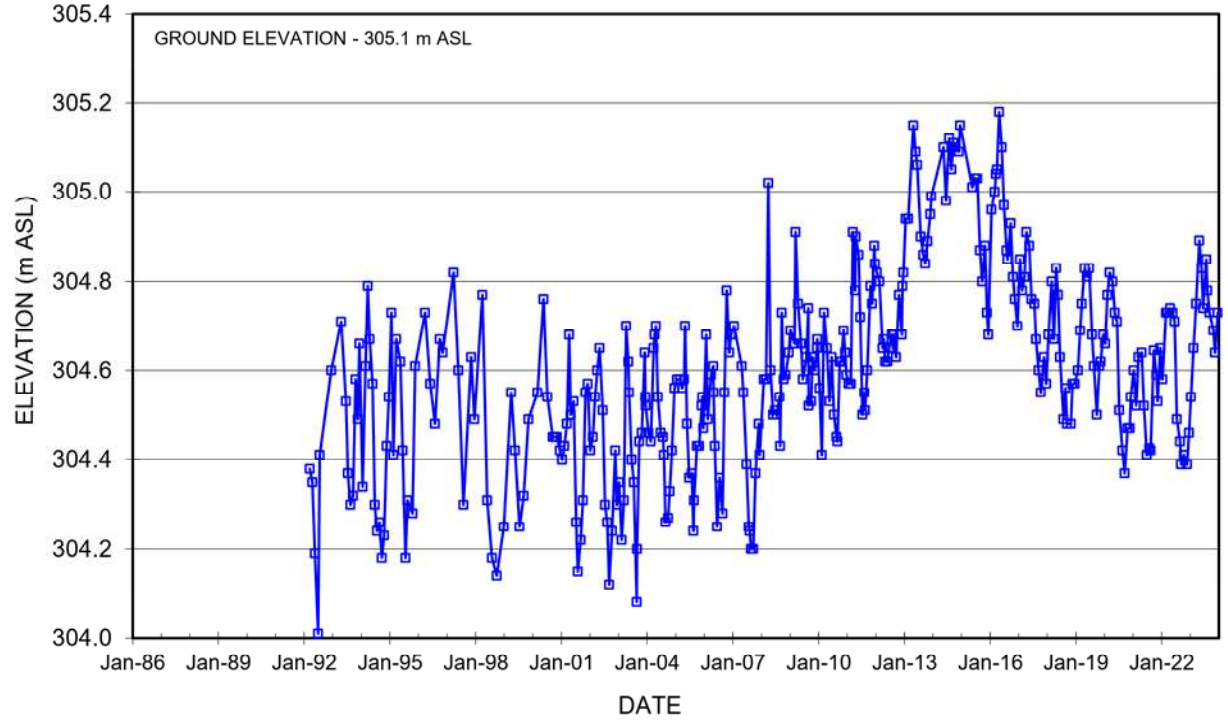
GROUNDWATER HYDROGRAPH
BOREHOLE 92-26

FIGURE B-22



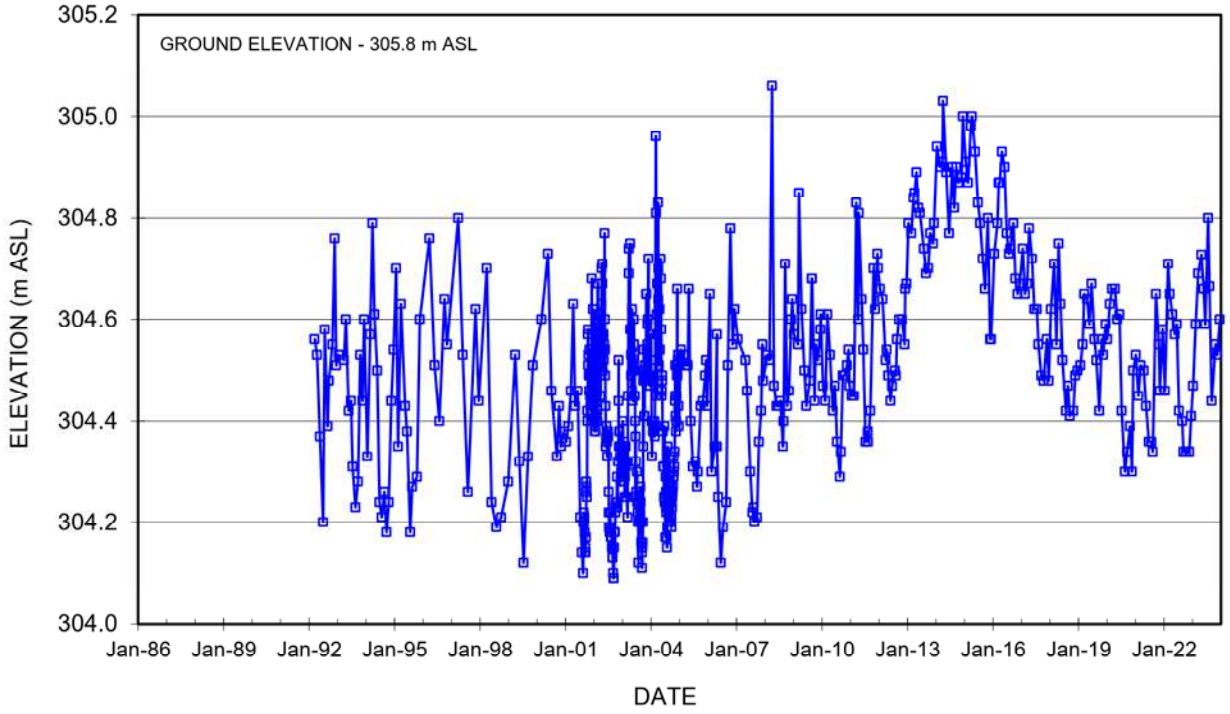
GROUNDWATER HYDROGRAPH
BOREHOLE 92-27

FIGURE B-23



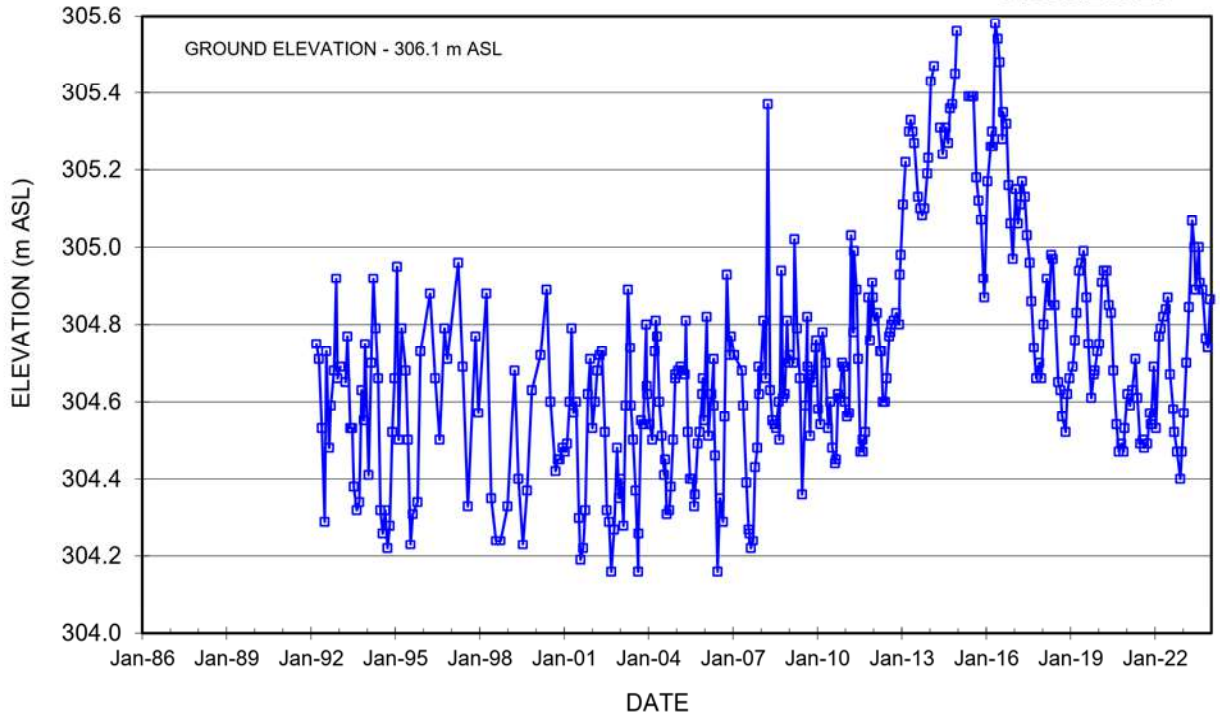
GROUNDWATER HYDROGRAPH
BOREHOLE 92-28

FIGURE B-24



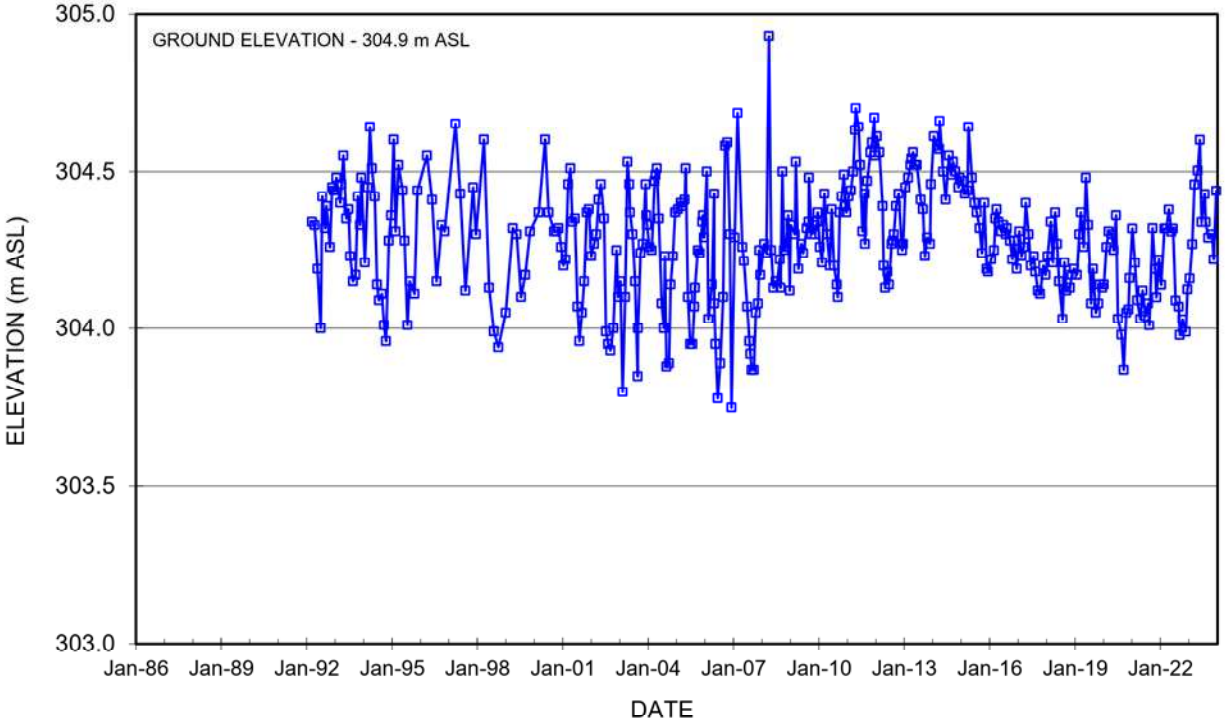
GROUNDWATER HYDROGRAPH
BOREHOLE 92-29

FIGURE B-25



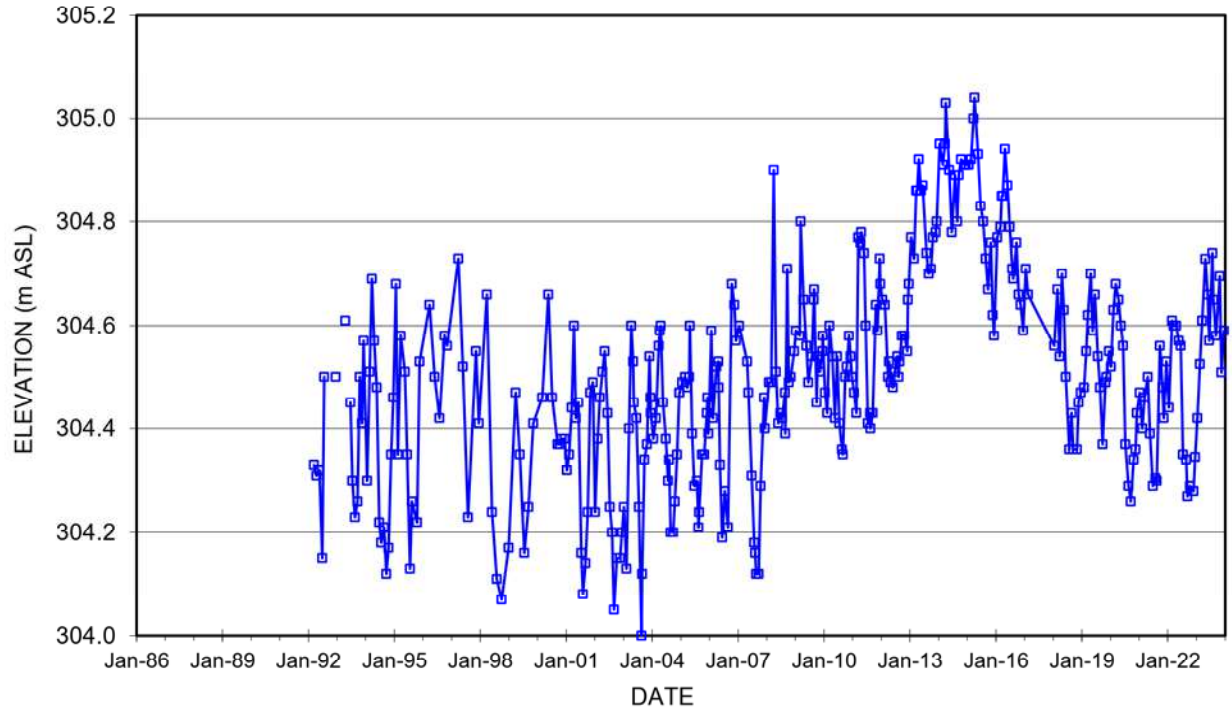
GROUNDWATER HYDROGRAPH
BOREHOLE 92-32

FIGURE B-26



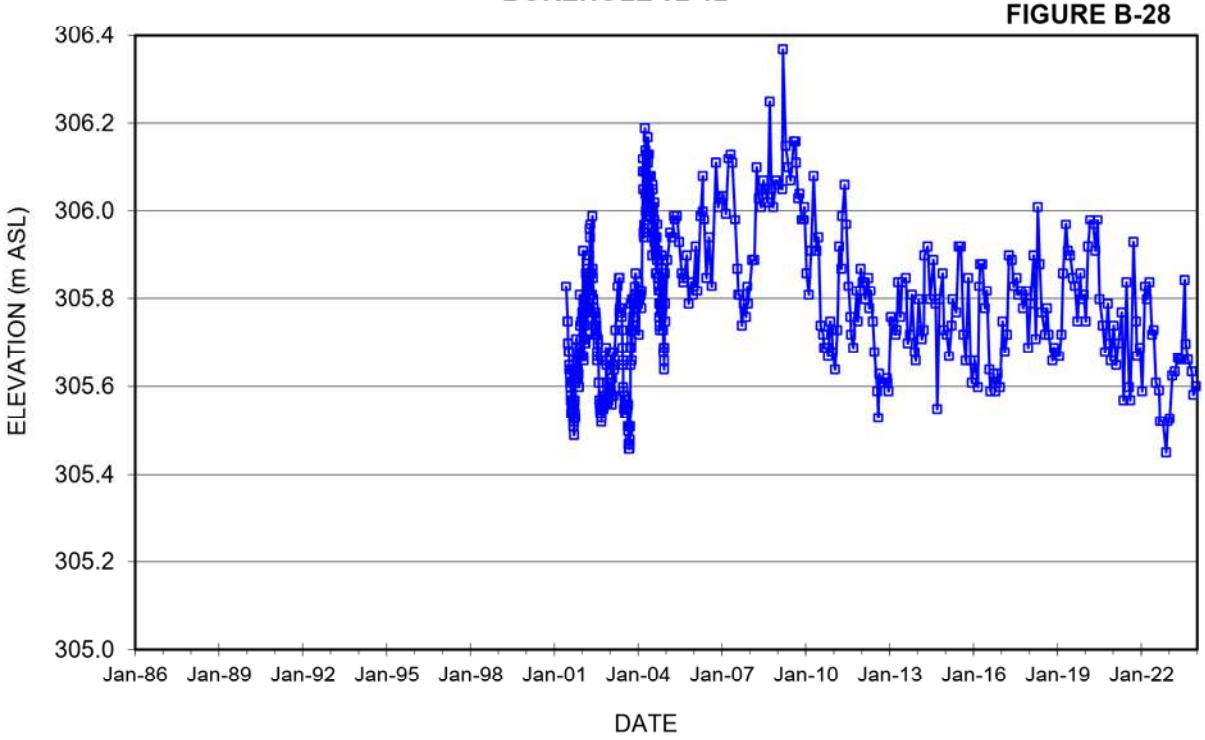
GROUNDWATER HYDROGRAPH
BOREHOLE 92-33

FIGURE B-27



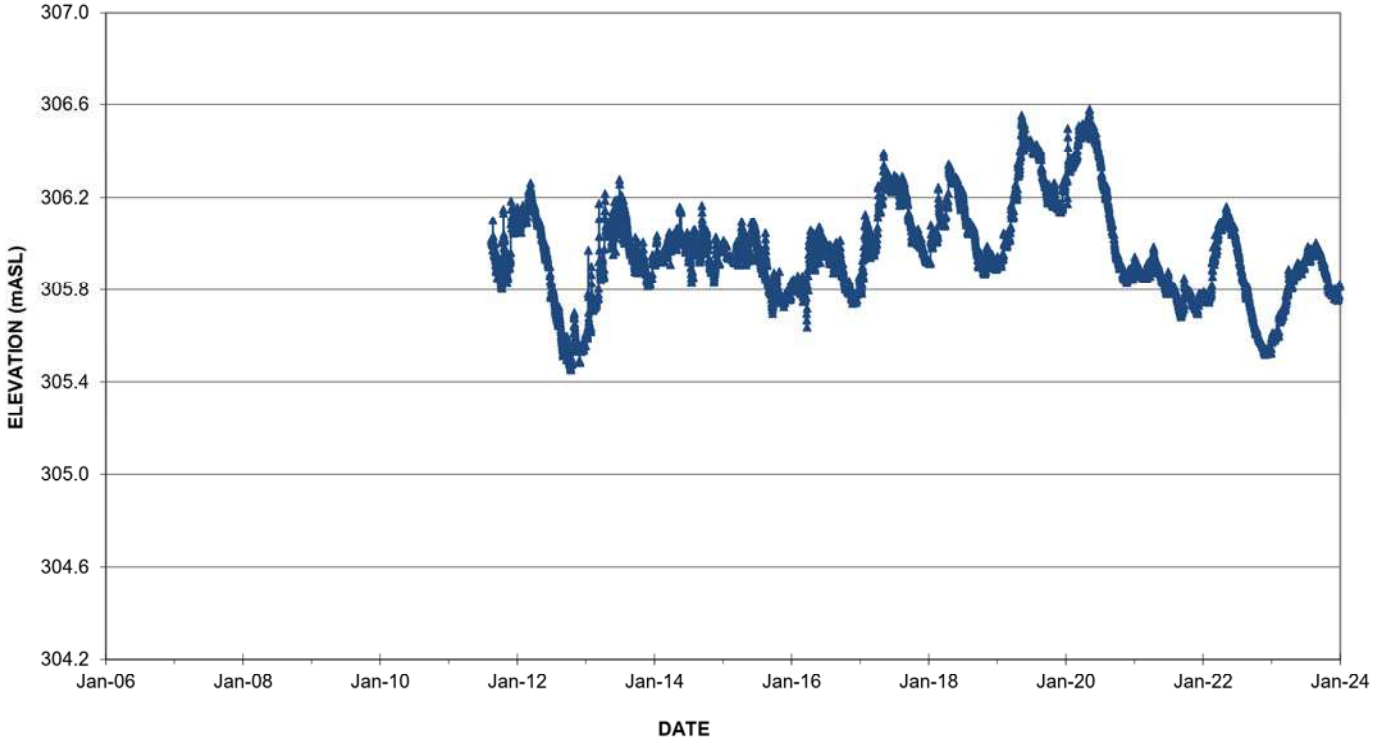
GROUNDWATER HYDROGRAPH
BOREHOLE 92-12

FIGURE B-28



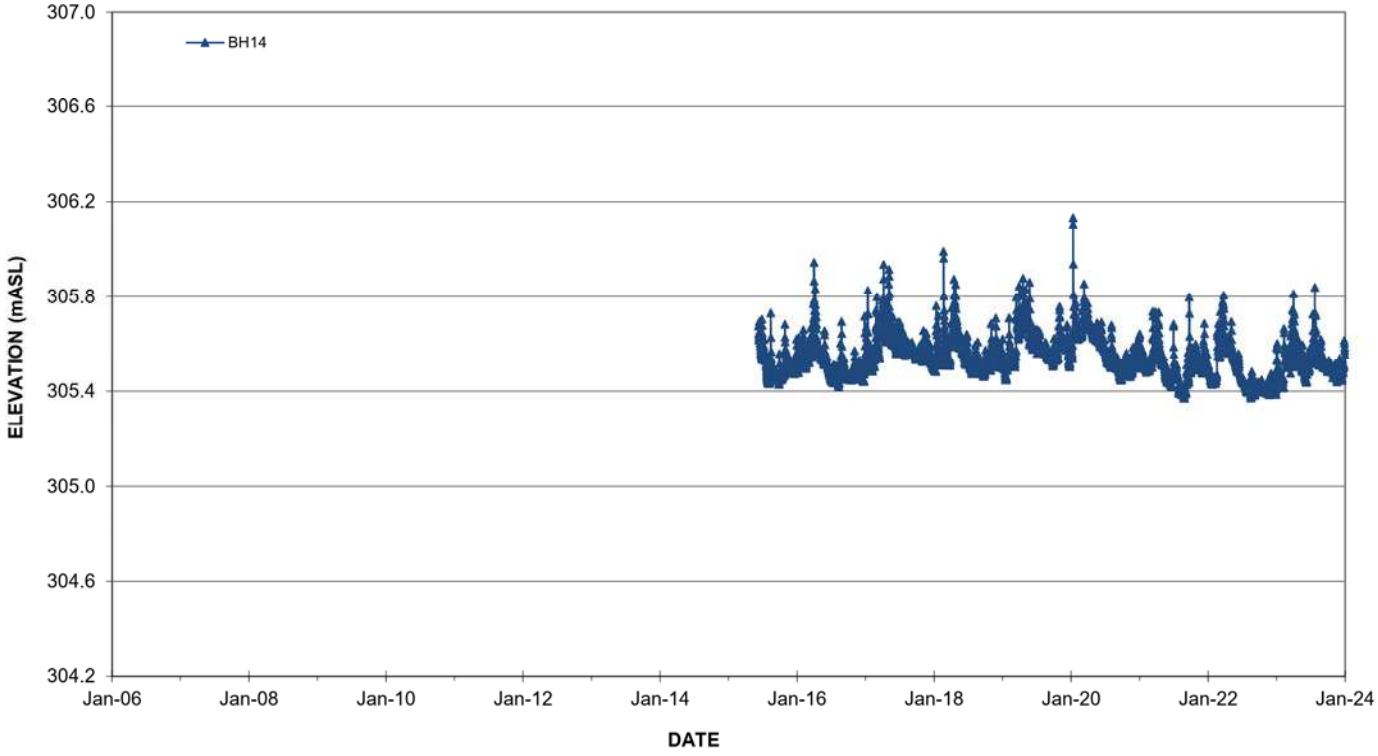
GROUNDWATER HYDROGRAPH
MONITOR BH4

FIGURE B-29



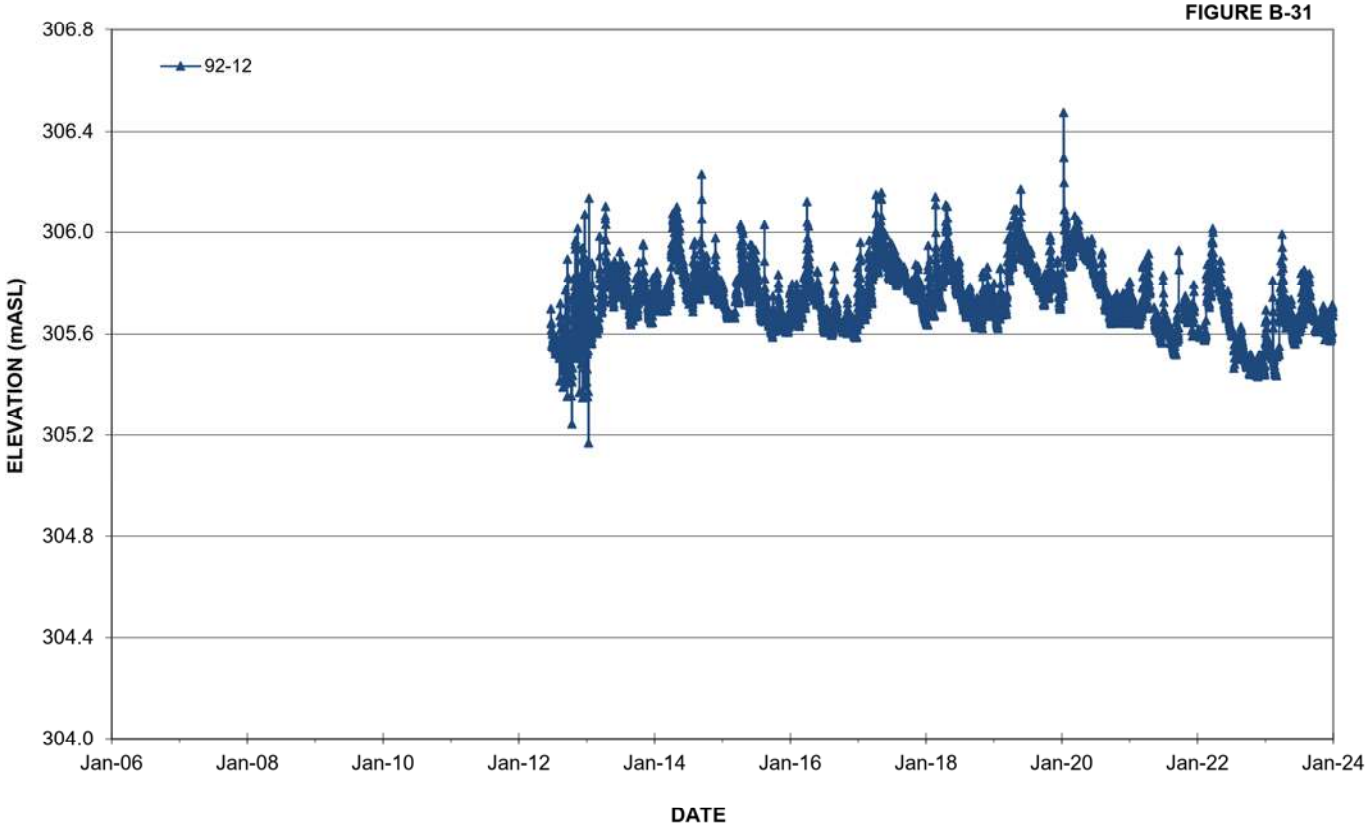
GROUNDWATER HYDROGRAPH
MONITOR BH14

FIGURE B-30



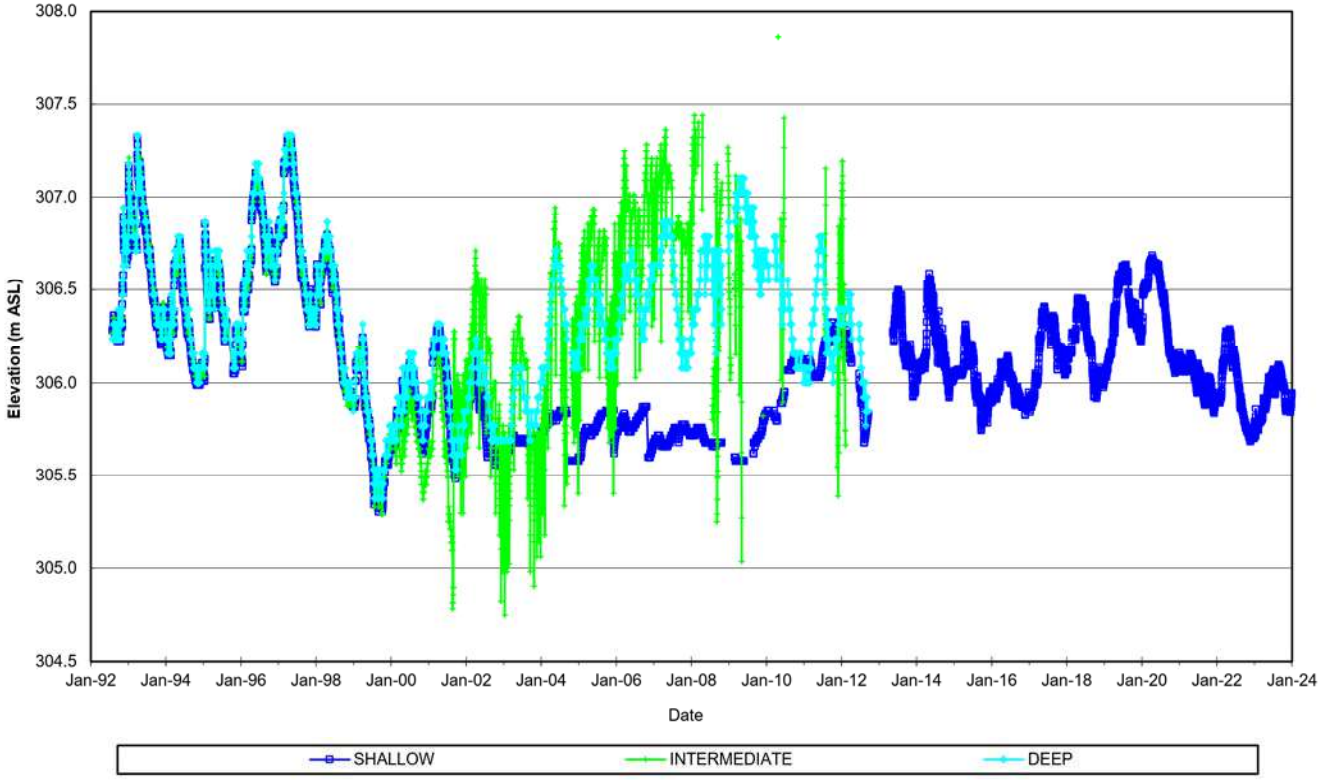
GROUNDWATER HYDROGRAPH
MONITOR 92-12

FIGURE B-31



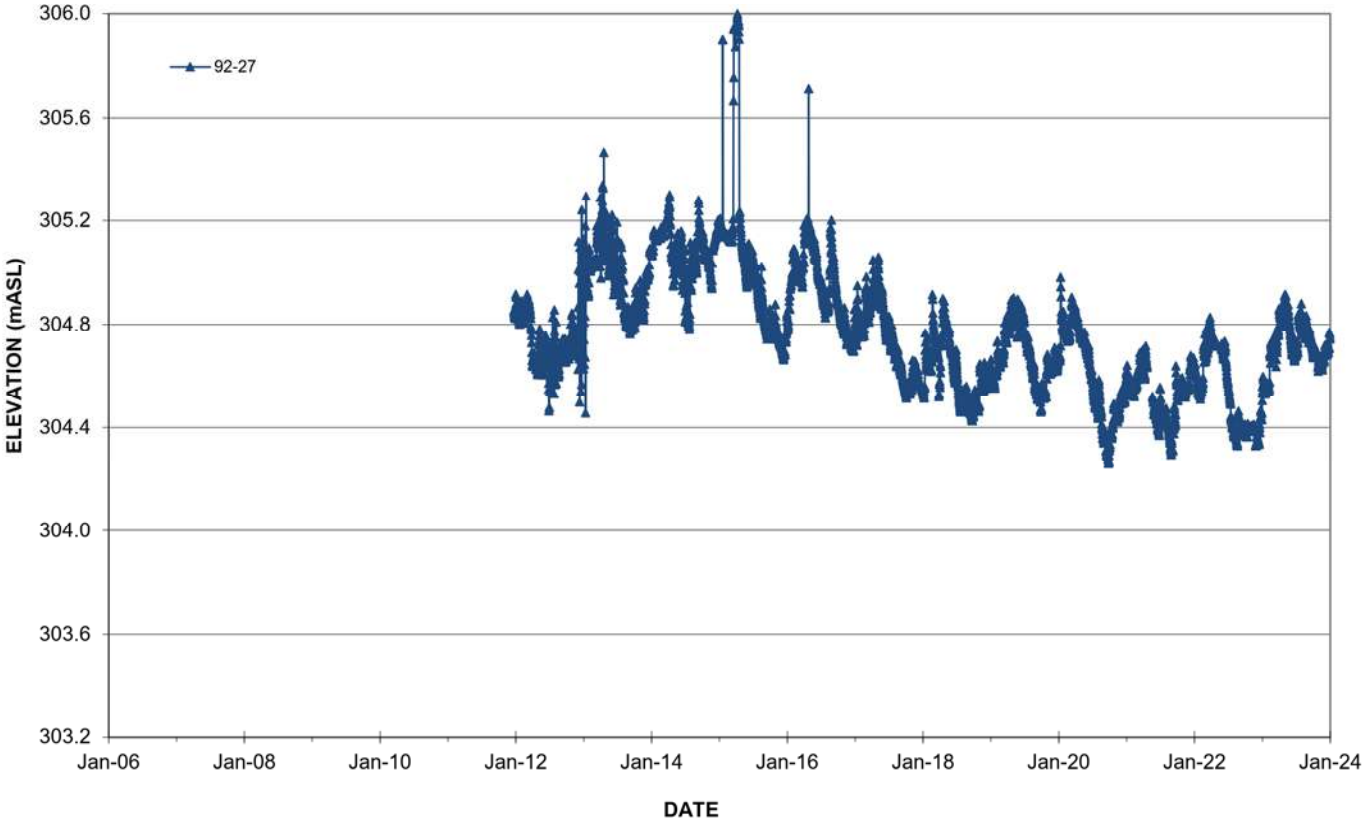
GROUNDWATER HYDROGRAPH
MULTI-LEVEL MONITOR 92-13

FIGURE B-32



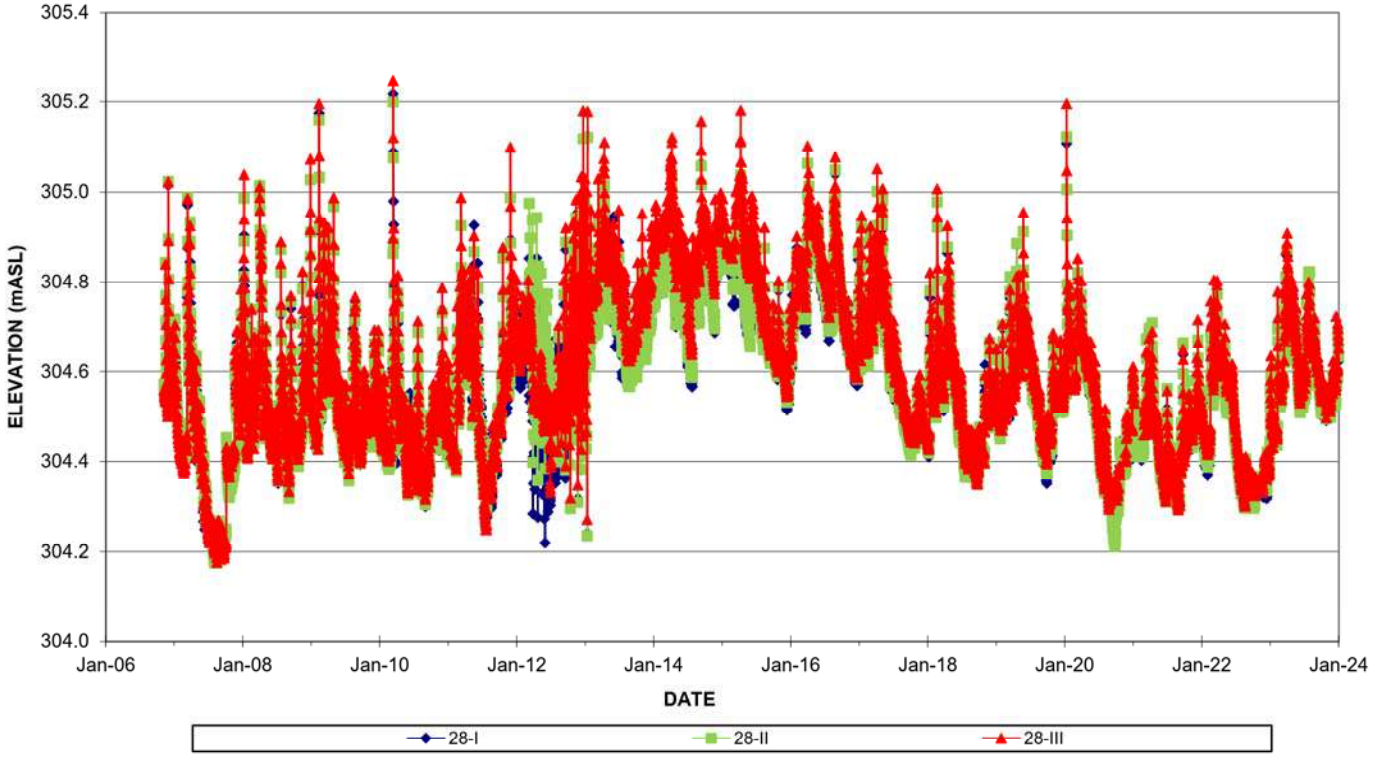
GROUNDWATER HYDROGRAPH
MONITOR 92-27

FIGURE B-33



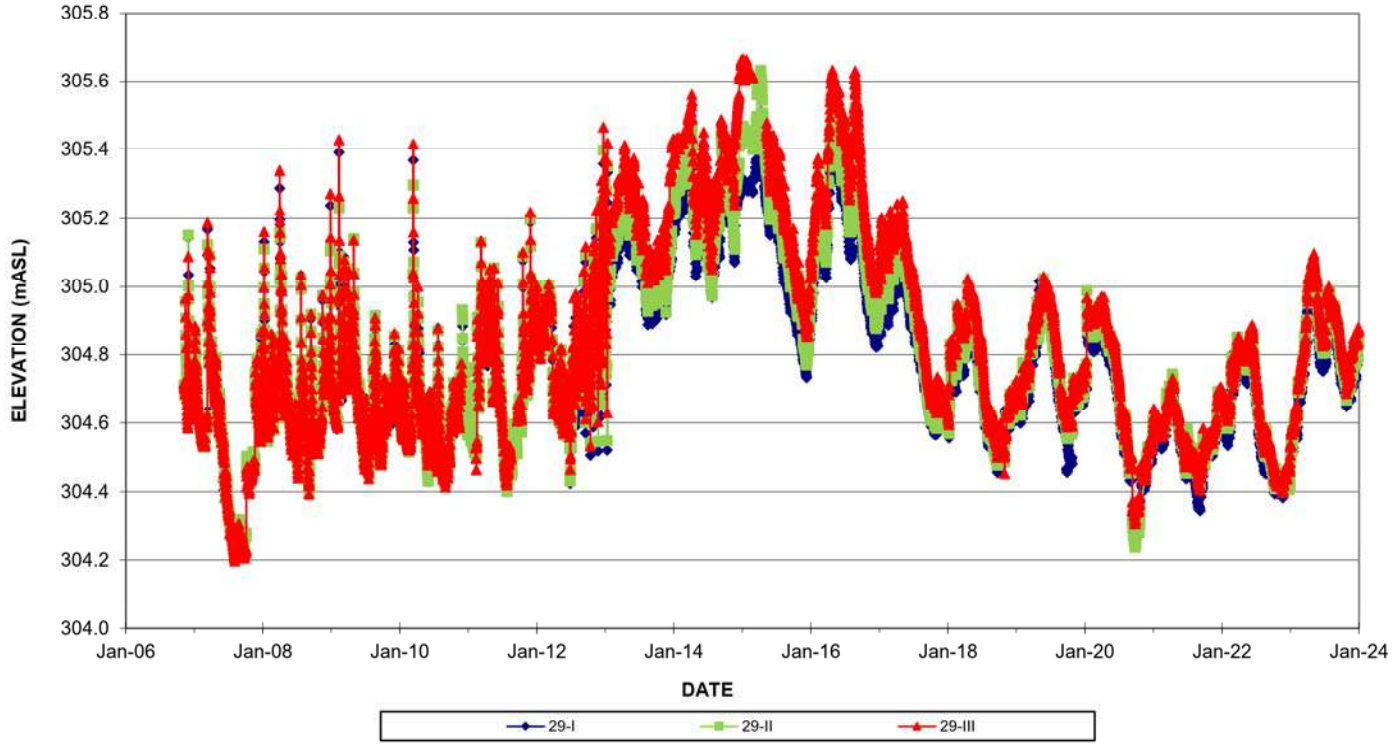
GROUNDWATER HYDROGRAPH
MULTI-LEVEL MONITOR 92-28

FIGURE B-34



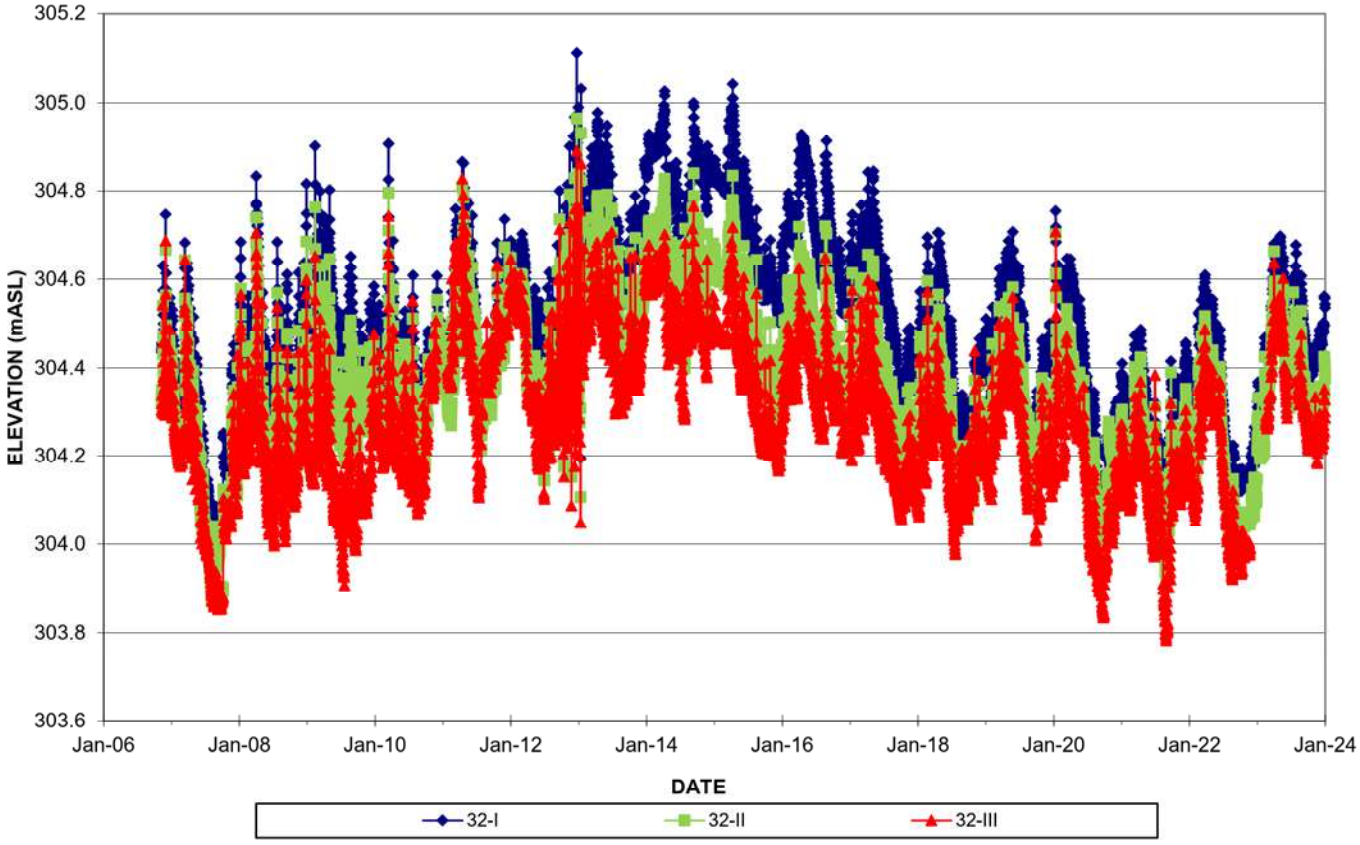
GROUNDWATER HYDROGRAPH
MULTI-LEVEL MONITOR 92-29

FIGURE B-35



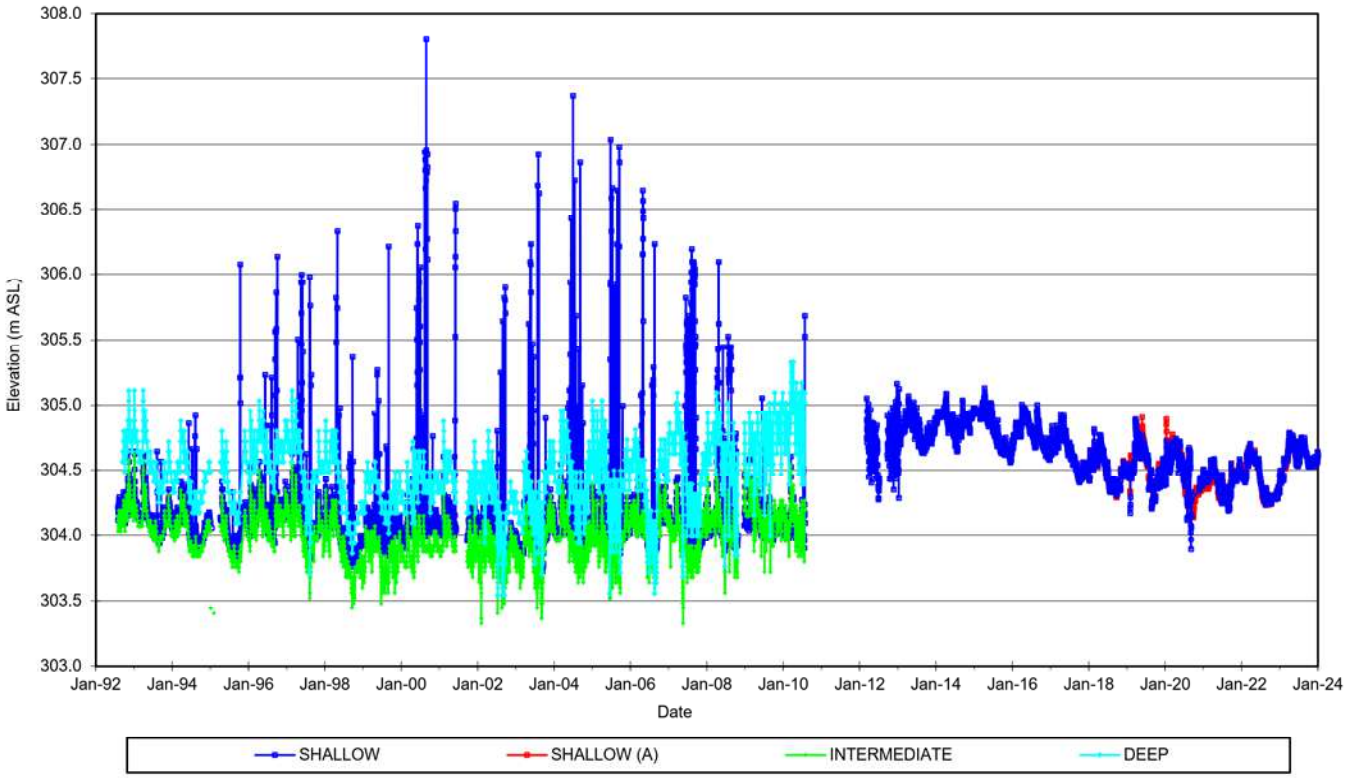
GROUNDWATER HYDROGRAPH
MULTI-LEVEL MONITOR 92-32

FIGURE B-36



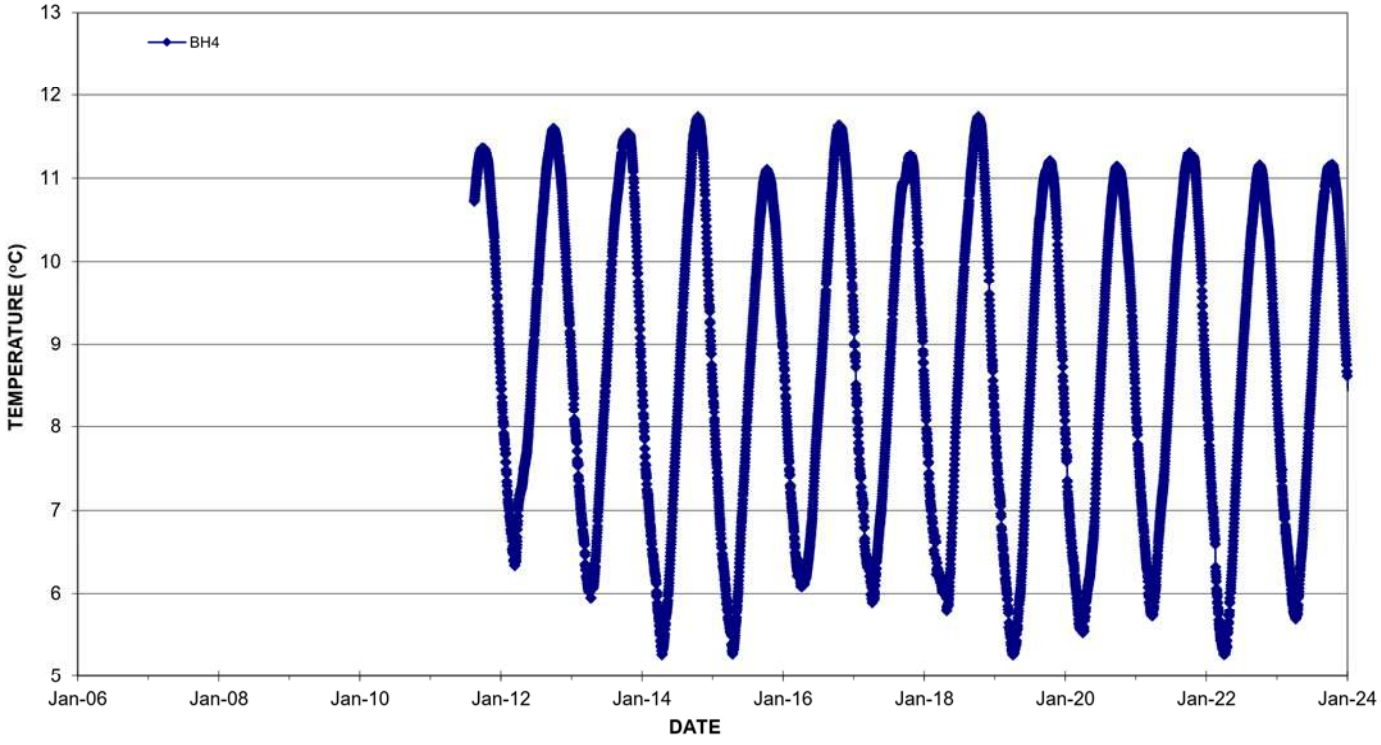
GROUNDWATER HYDROGRAPH
MULTI-LEVEL MONITOR 92-33

FIGURE B-37



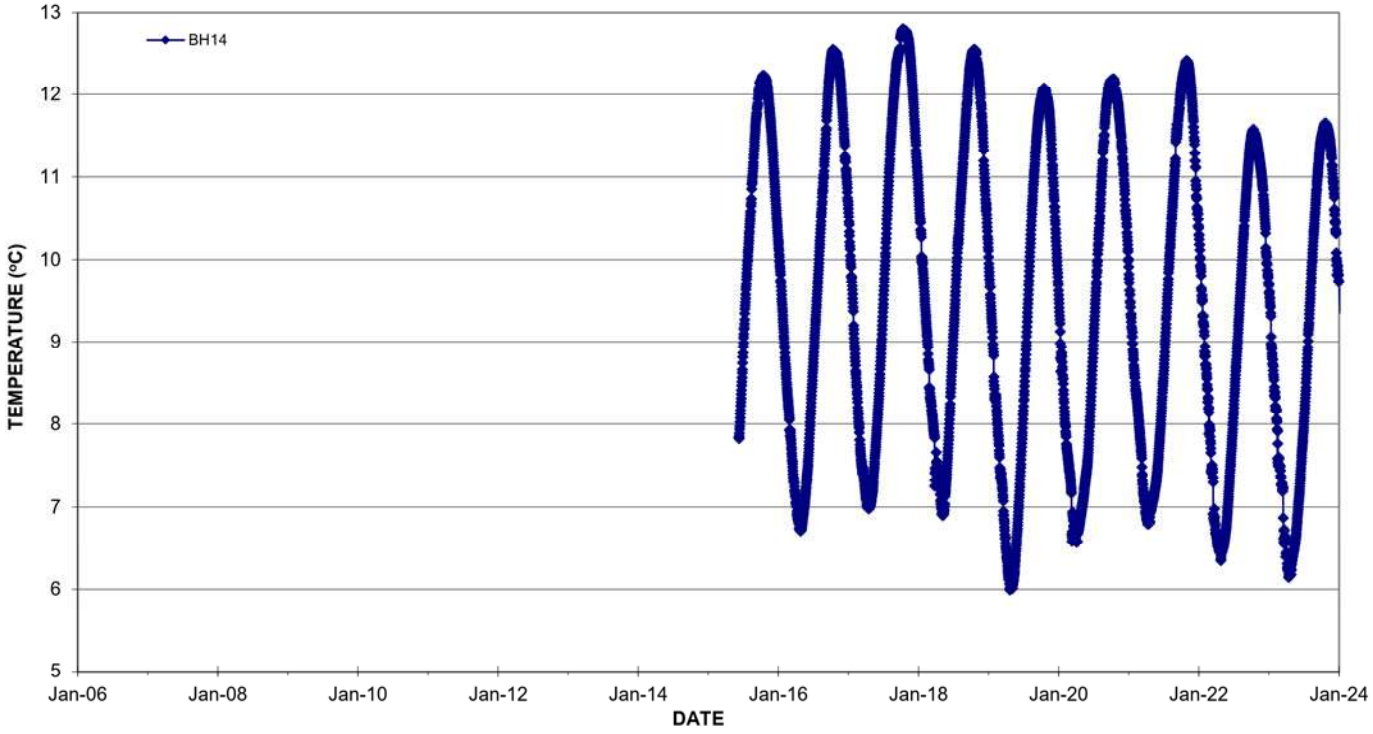
GROUNDWATER THERMOGRAPH
MONITOR BH4

FIGURE B-38



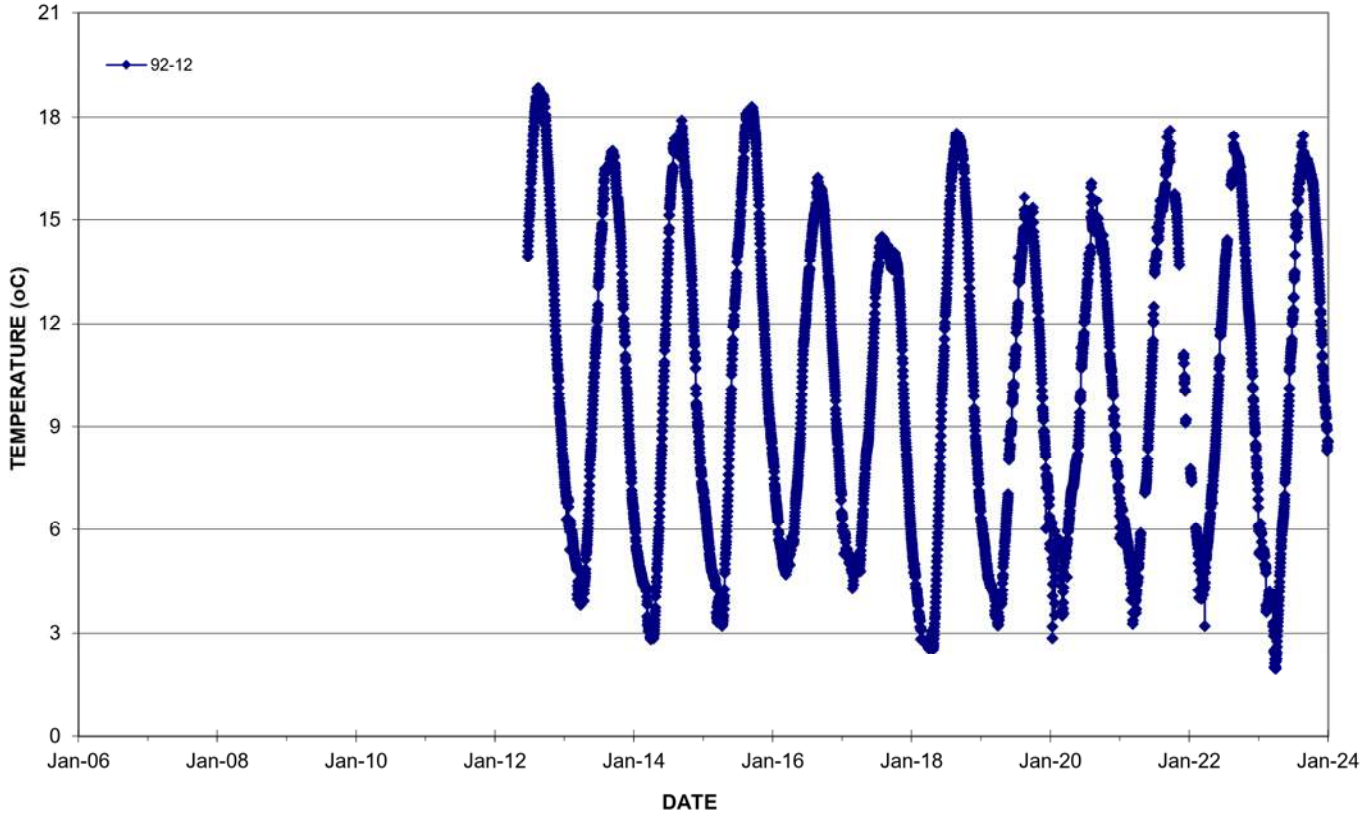
GROUNDWATER THERMOGRAPH
MONITOR BH14

FIGURE B-39



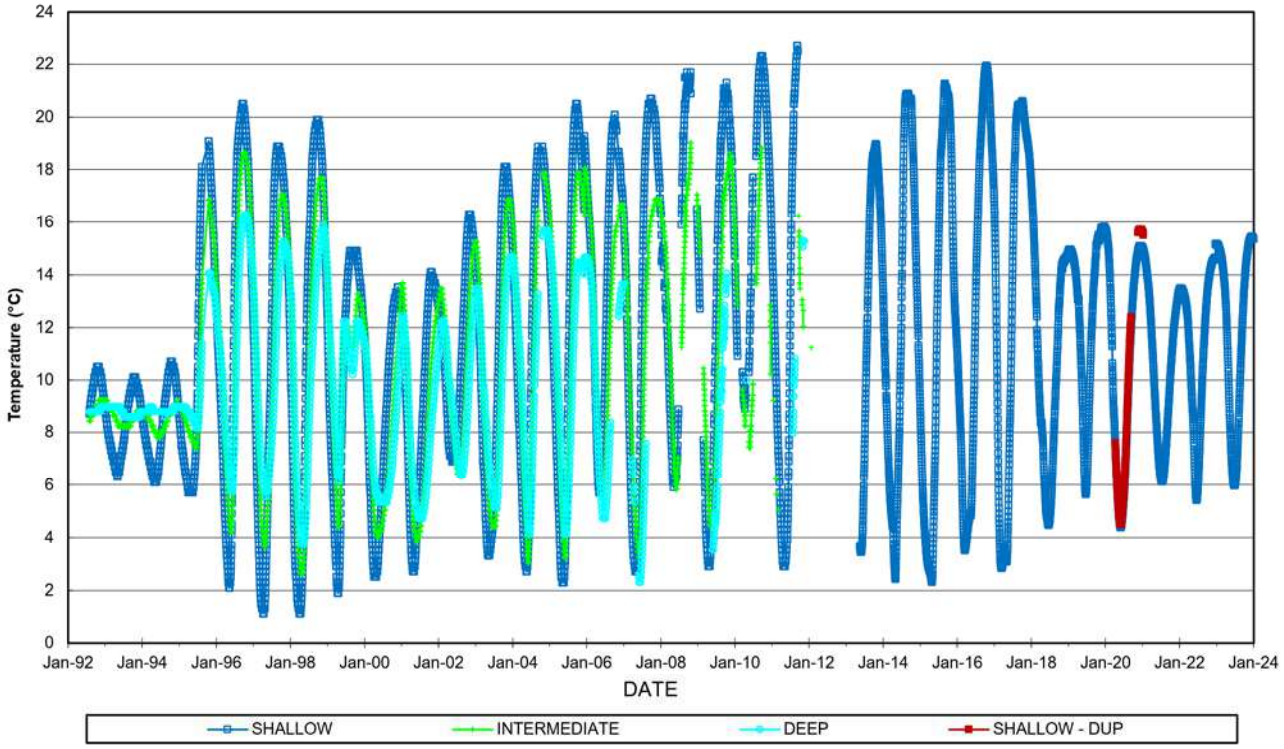
GROUNDWATER THERMOGRAPH
MONITOR 92-12

FIGURE B-40



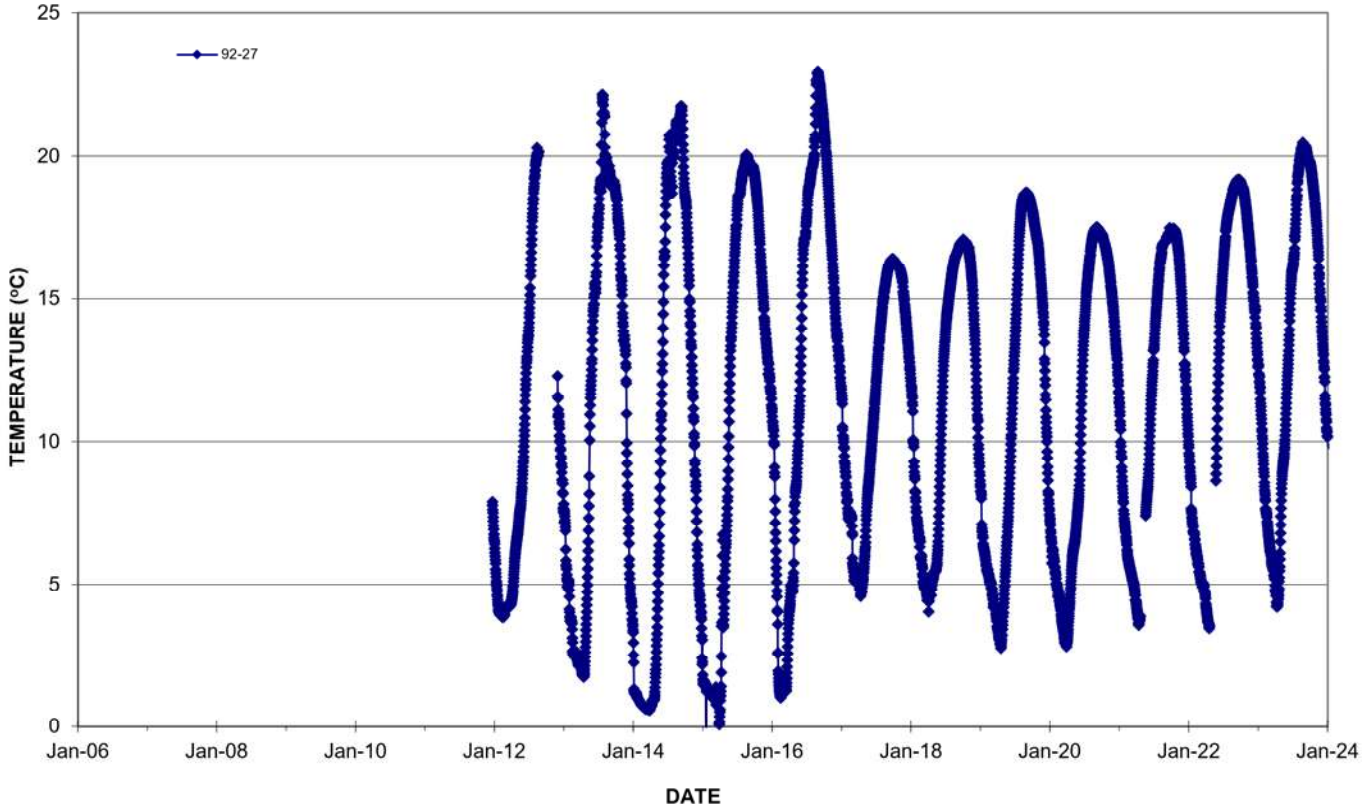
GROUNDWATER THERMOGRAPH
MULTI-LEVEL MONITOR 92-13

FIGURE B-41



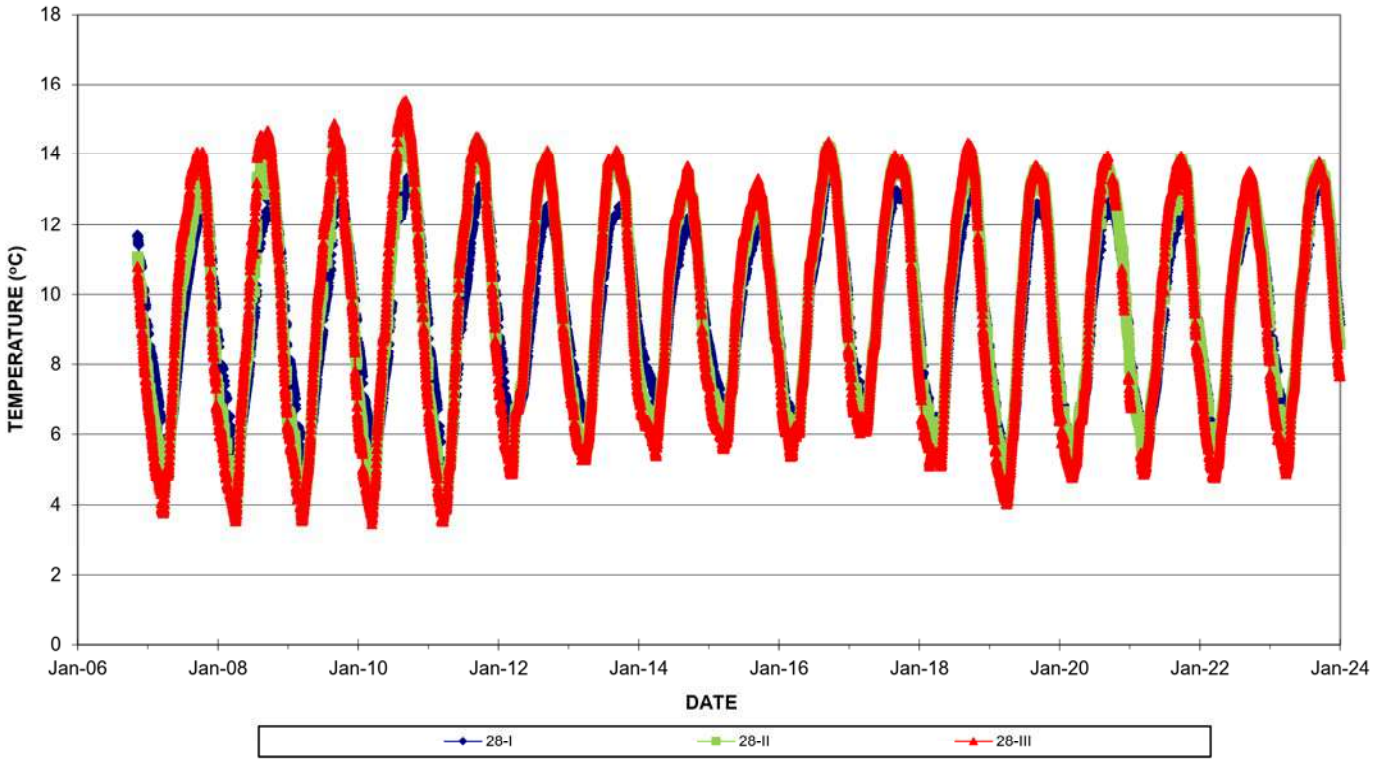
GROUNDWATER THERMOGRAPH
MONITOR 92-27

FIGURE B-42



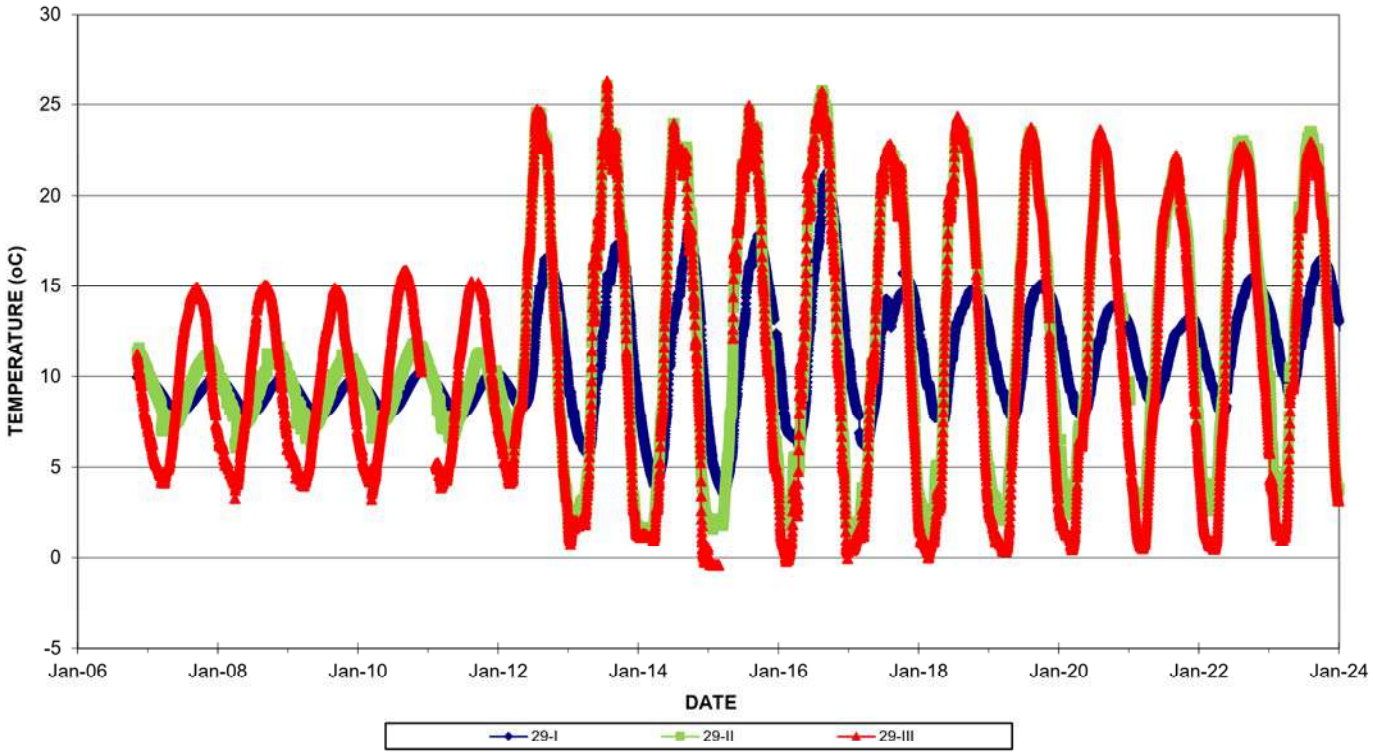
GROUNDWATER THERMOGRAPH
MULTI-LEVEL MONITOR 92-28

FIGURE B-43



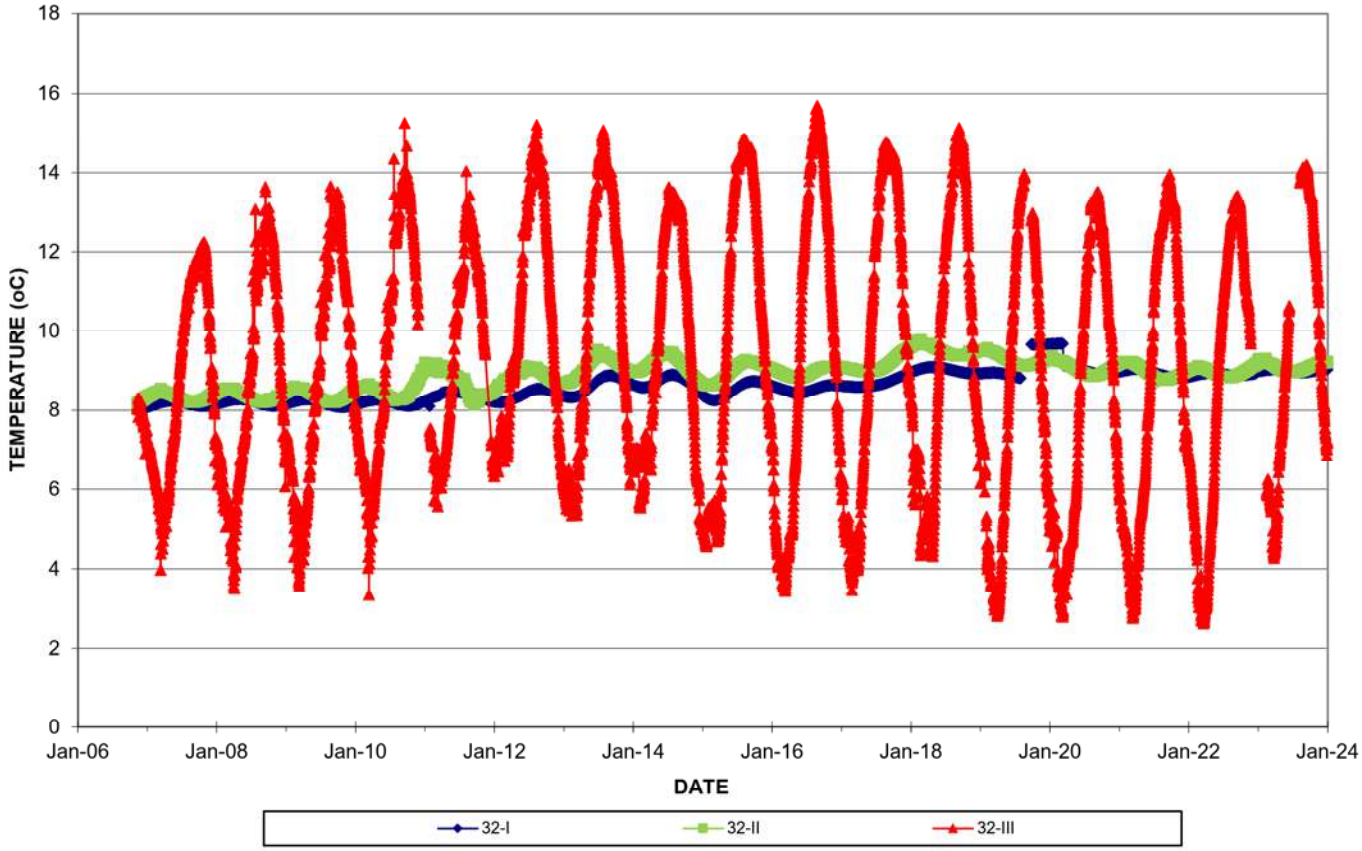
GROUNDWATER THERMOGRAPH
MULTI-LEVEL MONITOR 92-29

FIGURE B-44



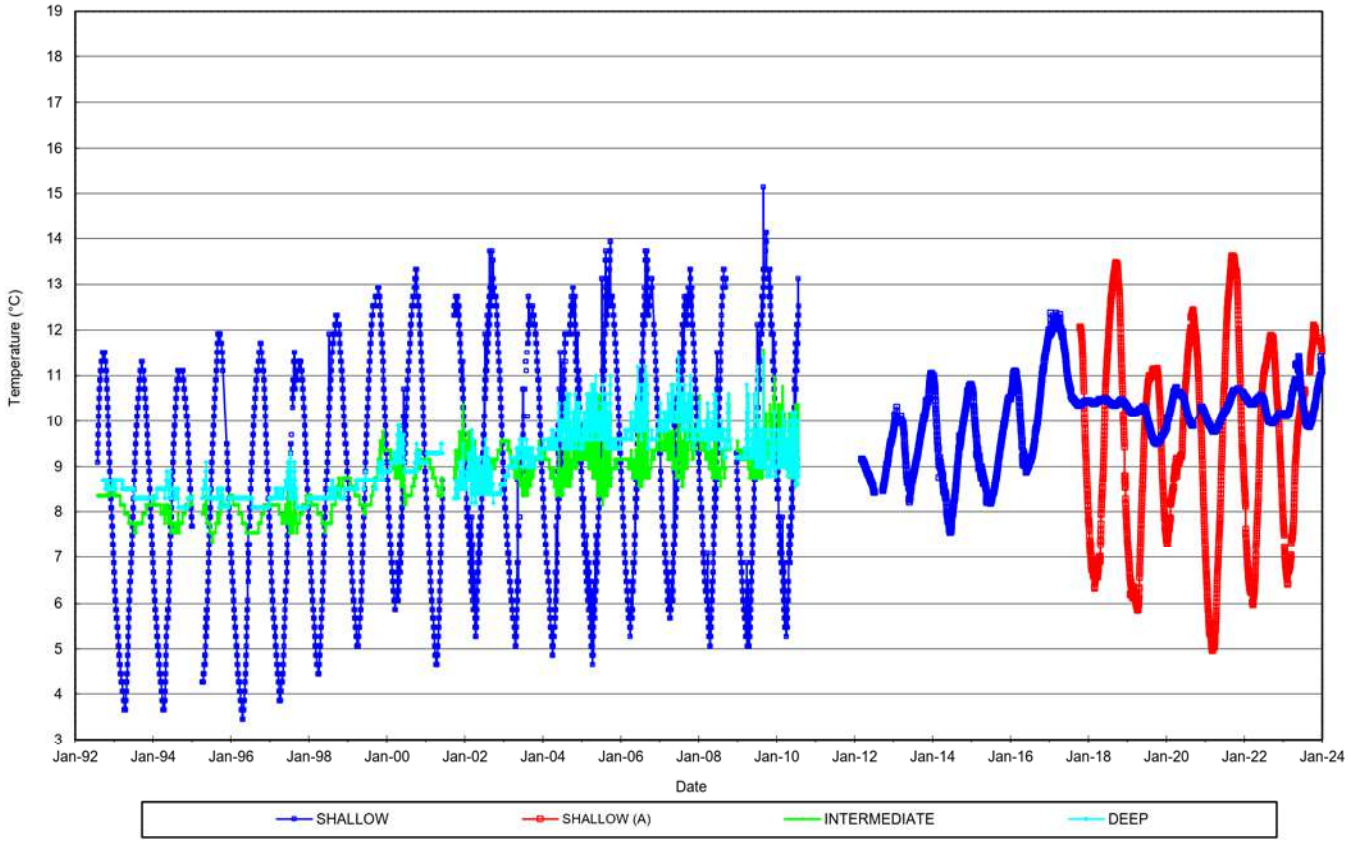
GROUNDWATER THERMOGRAPH
MULTI-LEVEL MONITOR 92-32

FIGURE B-45



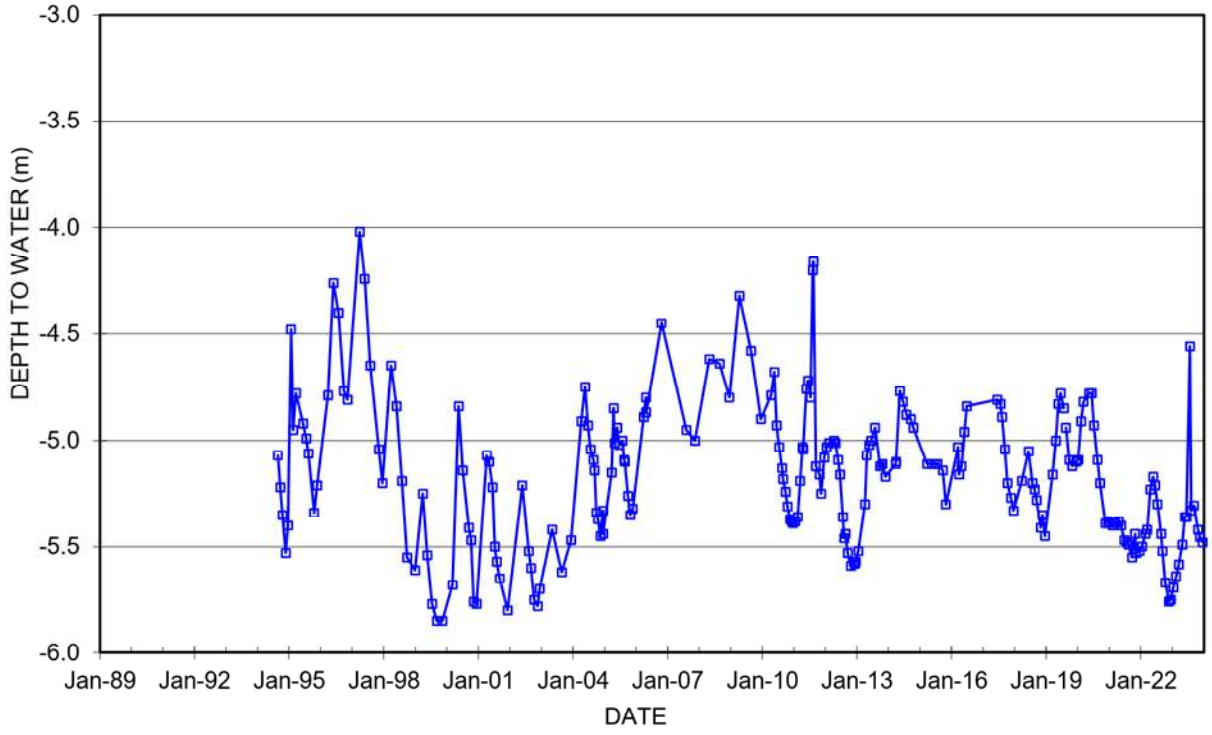
GROUNDWATER THERMOGRAPH
MULTI-LEVEL MONITOR 92-33

FIGURE B-46



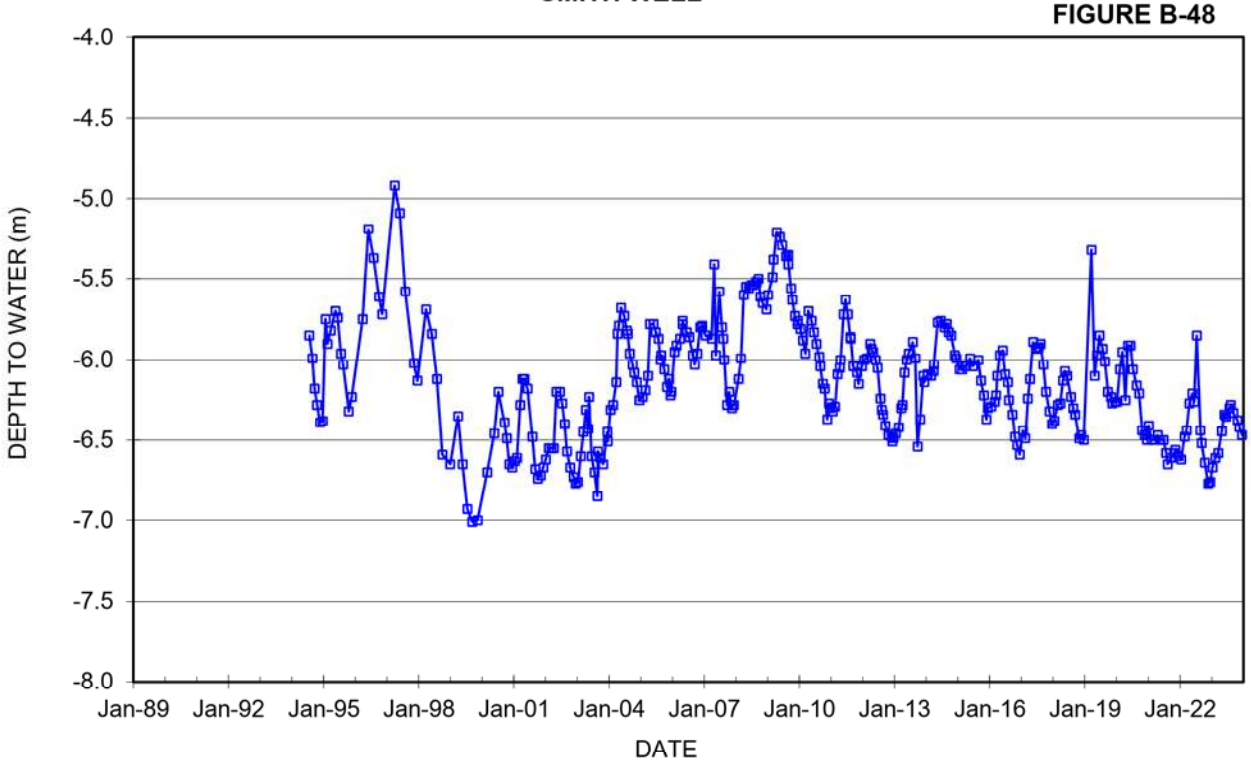
GROUNDWATER HYDROGRAPH
NORTH FARMHOUSE WELL (MOE WELL 4794)

FIGURE B-47



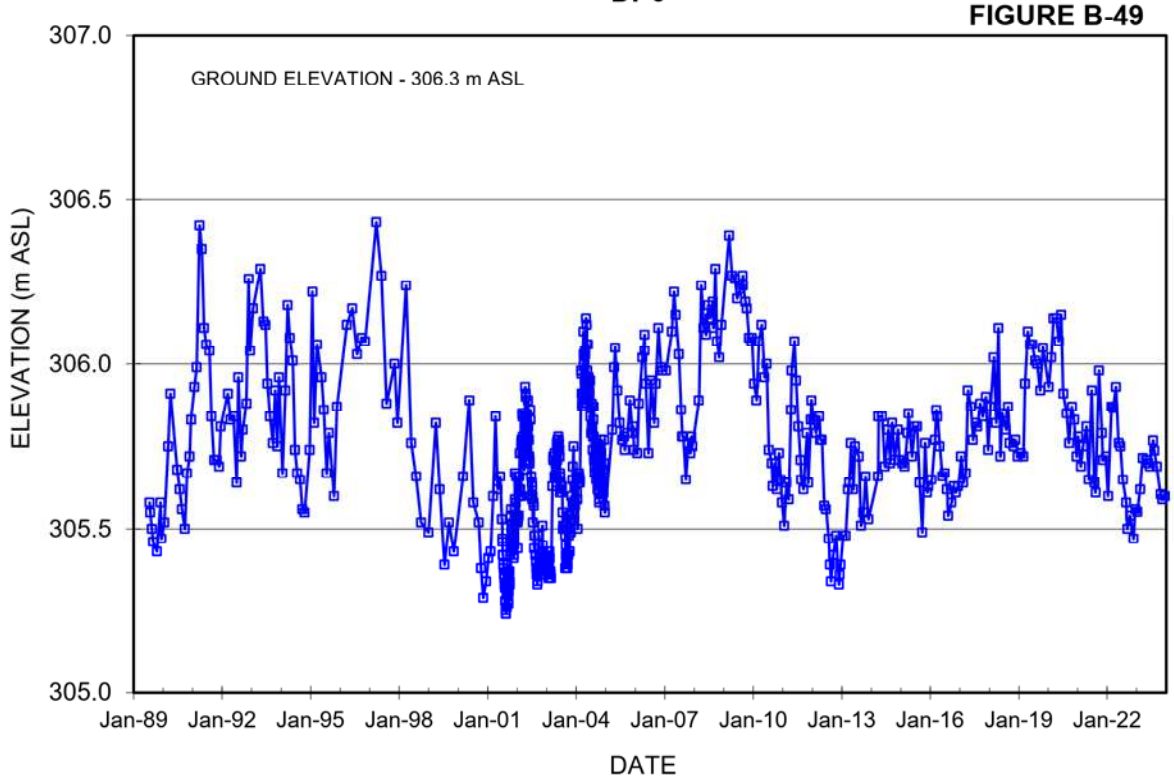
GROUNDWATER HYDROGRAPH
SMITH WELL

FIGURE B-48



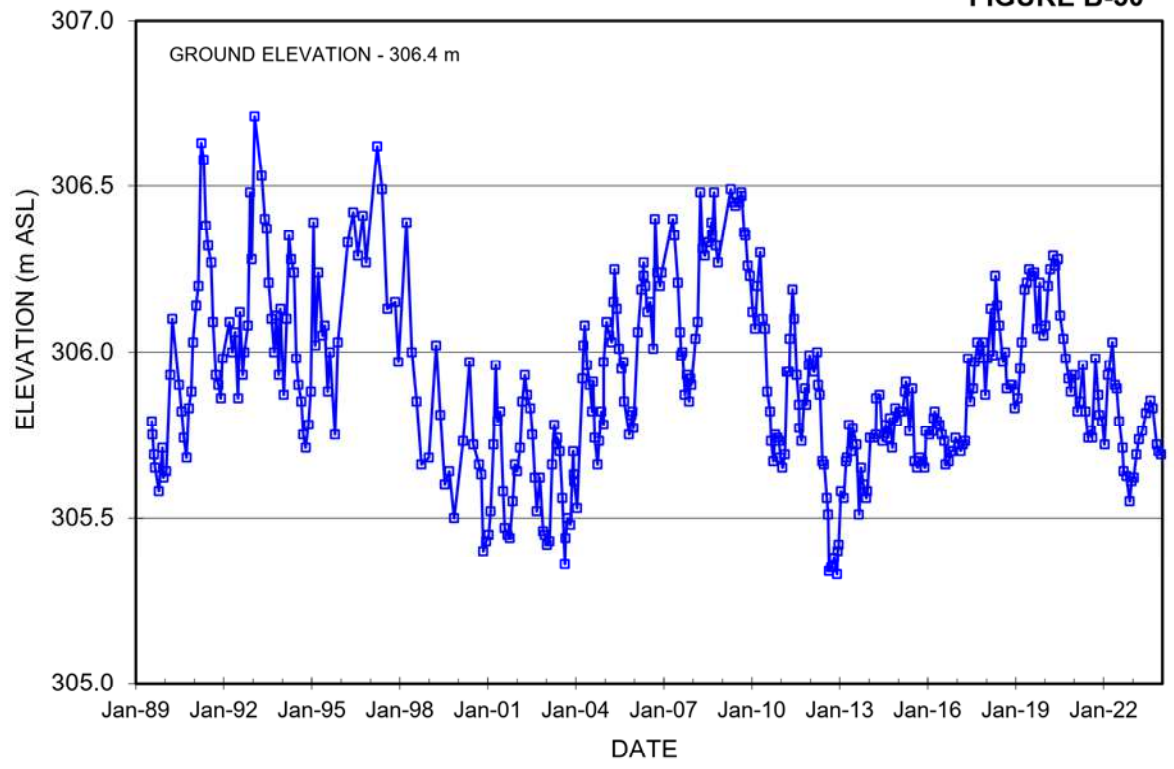
GROUNDWATER HYDROGRAPH
DP6

FIGURE B-49



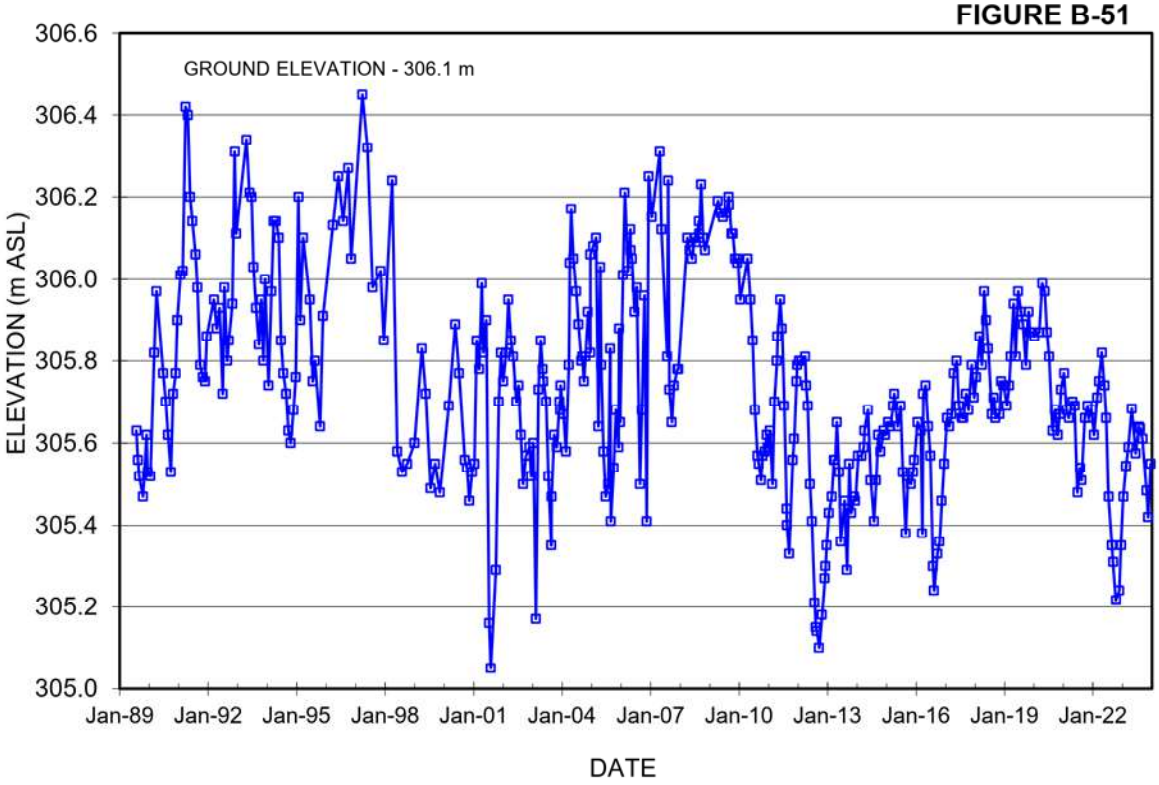
GROUNDWATER HYDROGRAPH
DP7

FIGURE B-50



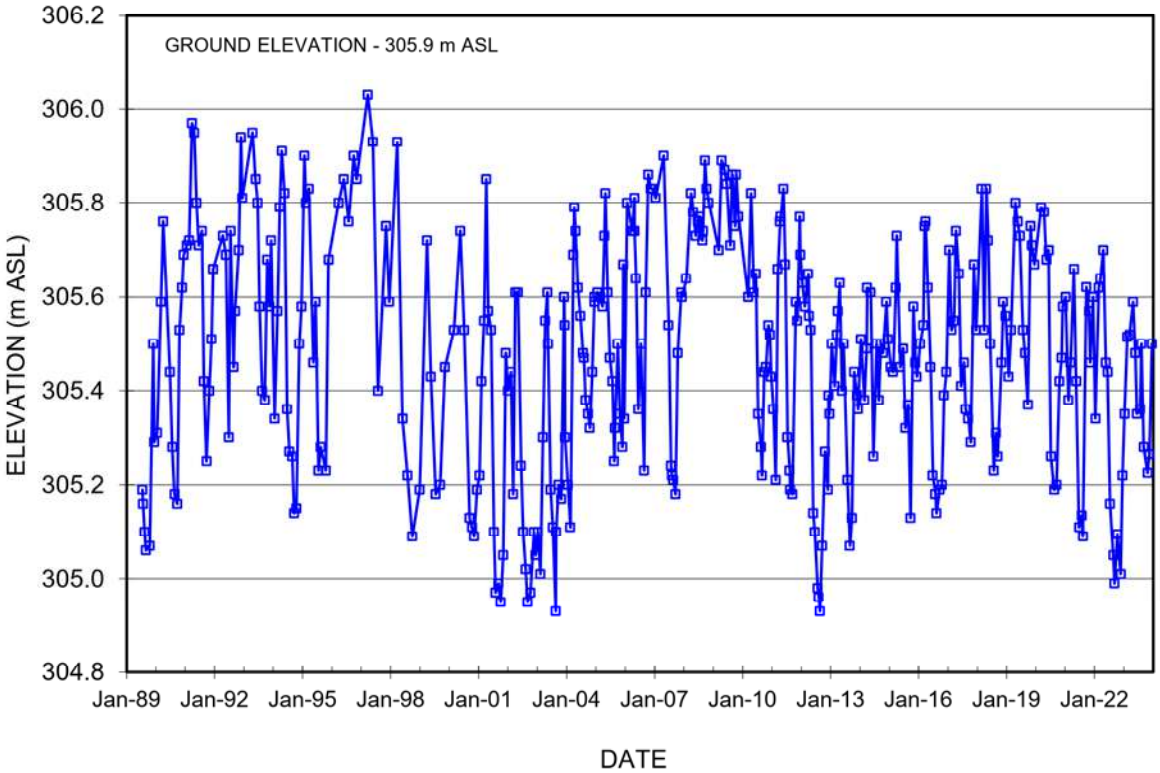
GROUNDWATER HYDROGRAPH
DP8

FIGURE B-51



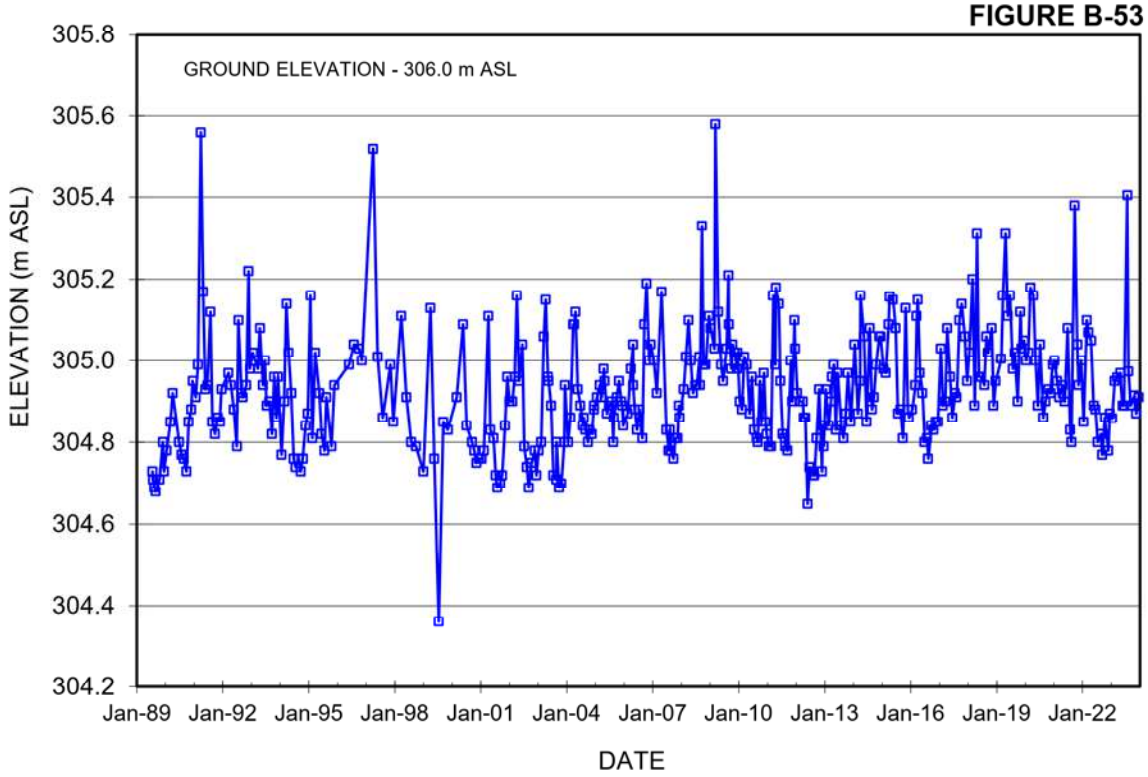
GROUNDWATER HYDROGRAPH
DP9

FIGURE B-52



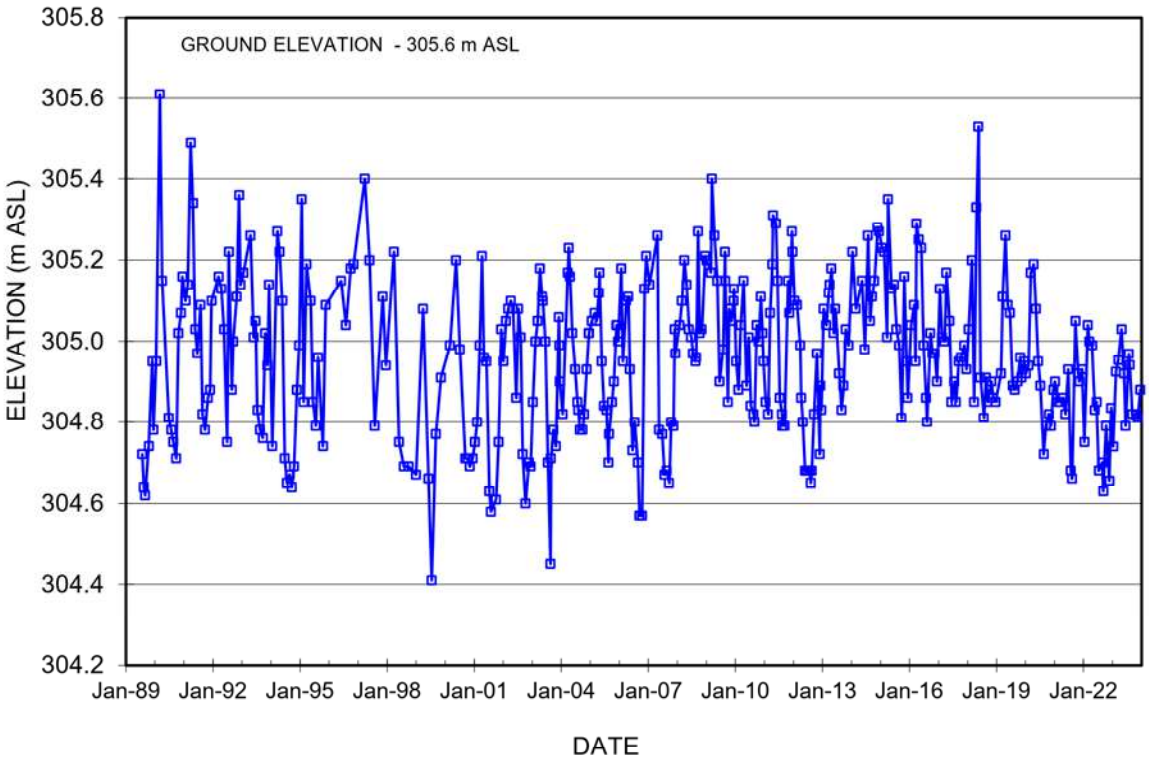
GROUNDWATER HYDROGRAPH
DP10

FIGURE B-53



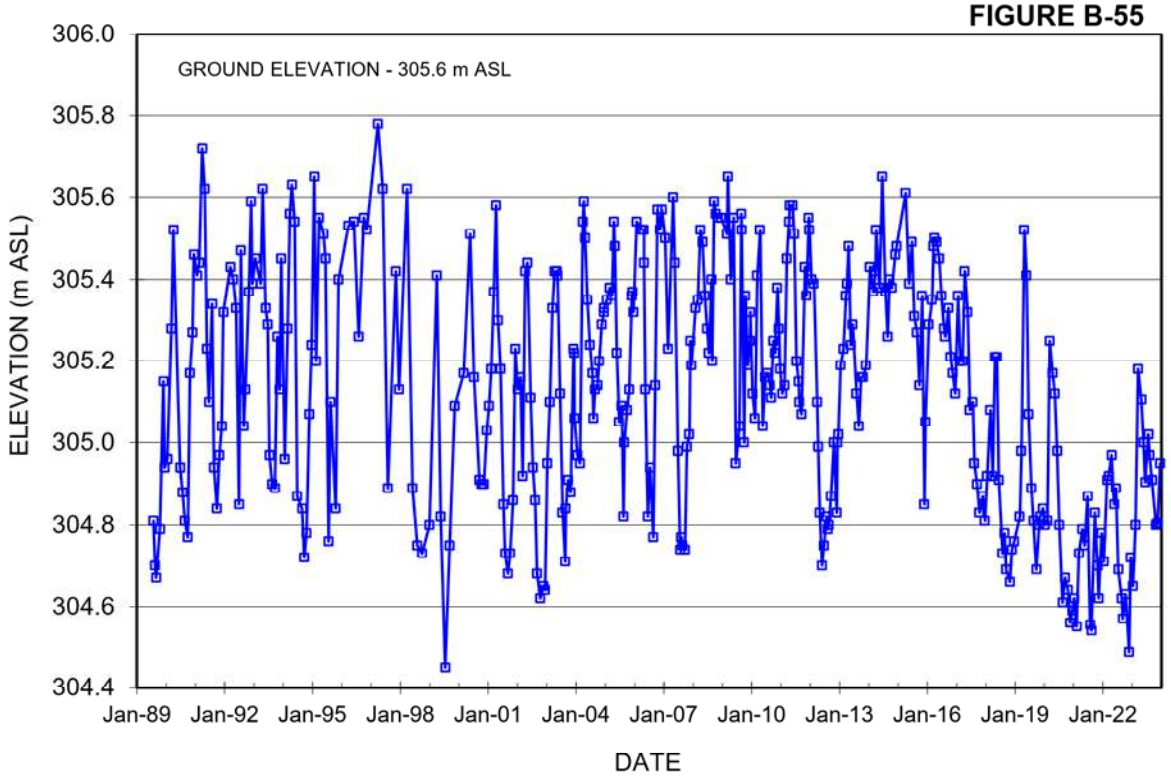
GROUNDWATER HYDROGRAPH
DP11

FIGURE B-54



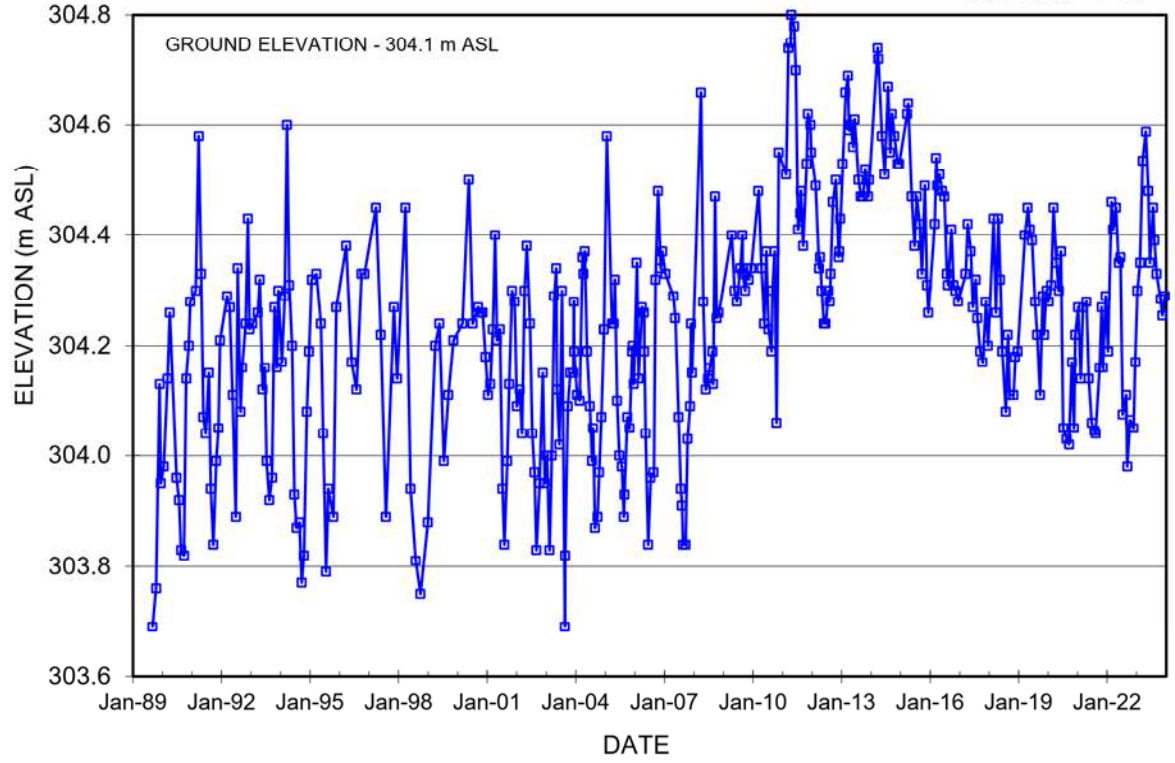
GROUNDWATER HYDROGRAPH
DP12

FIGURE B-55



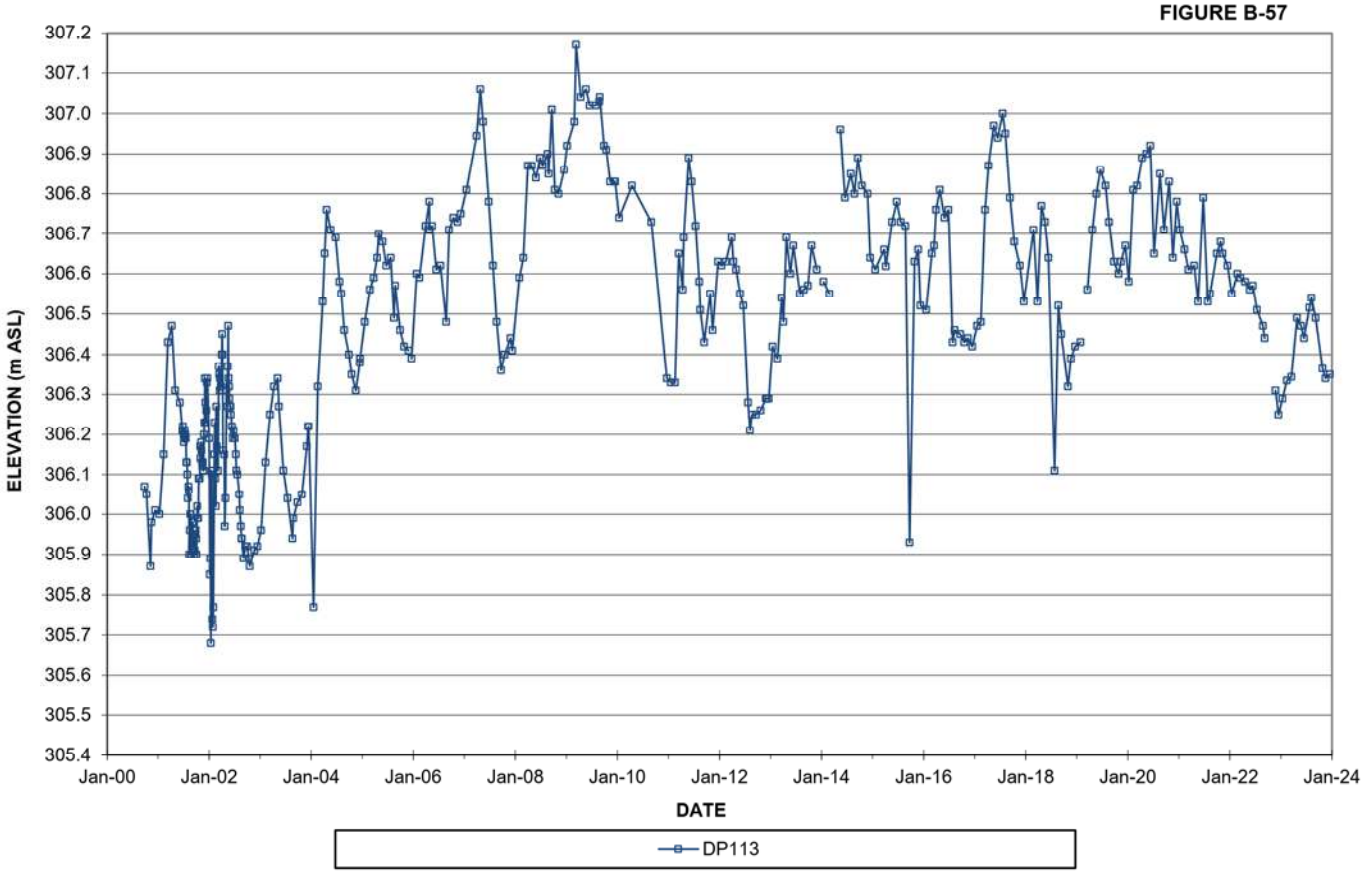
GROUNDWATER HYDROGRAPH
DP16

FIGURE B-56



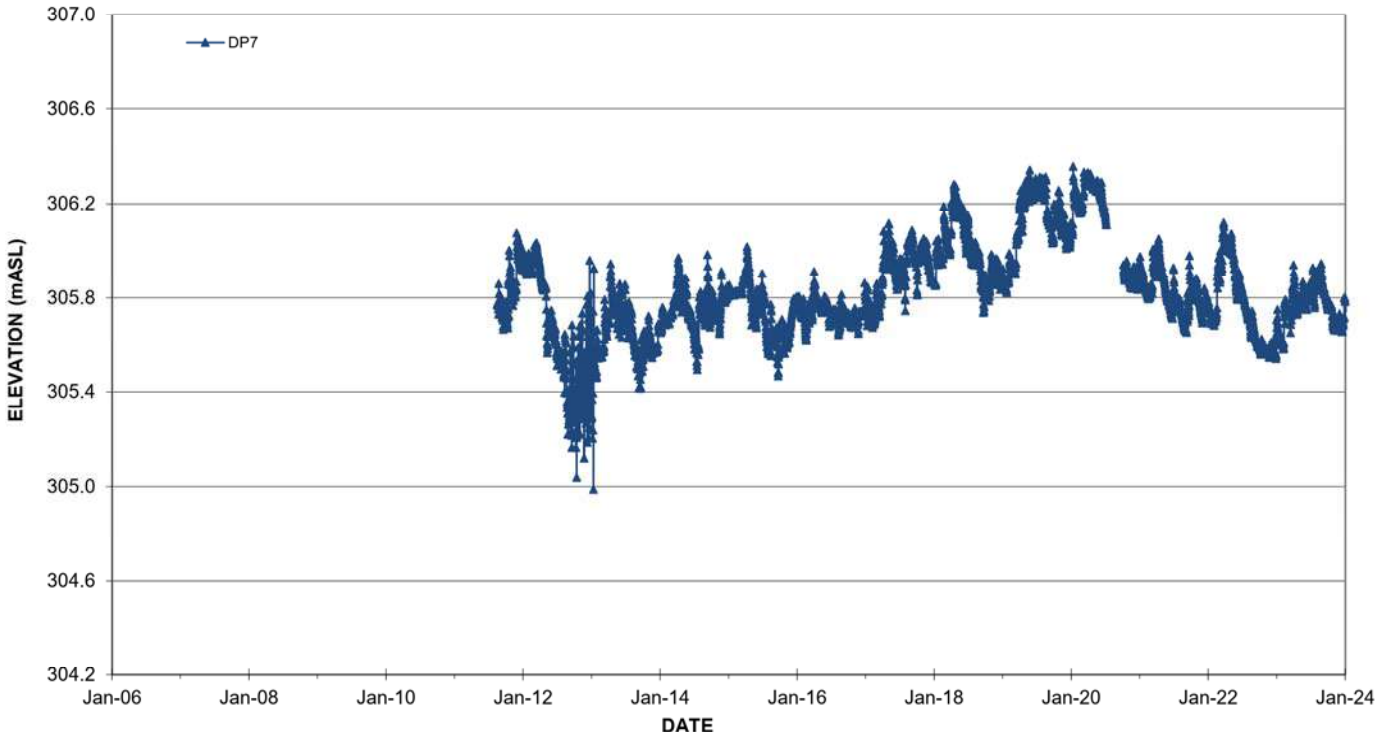
GROUNDWATER HYDROGRAPH
REID MONITOR

FIGURE B-57



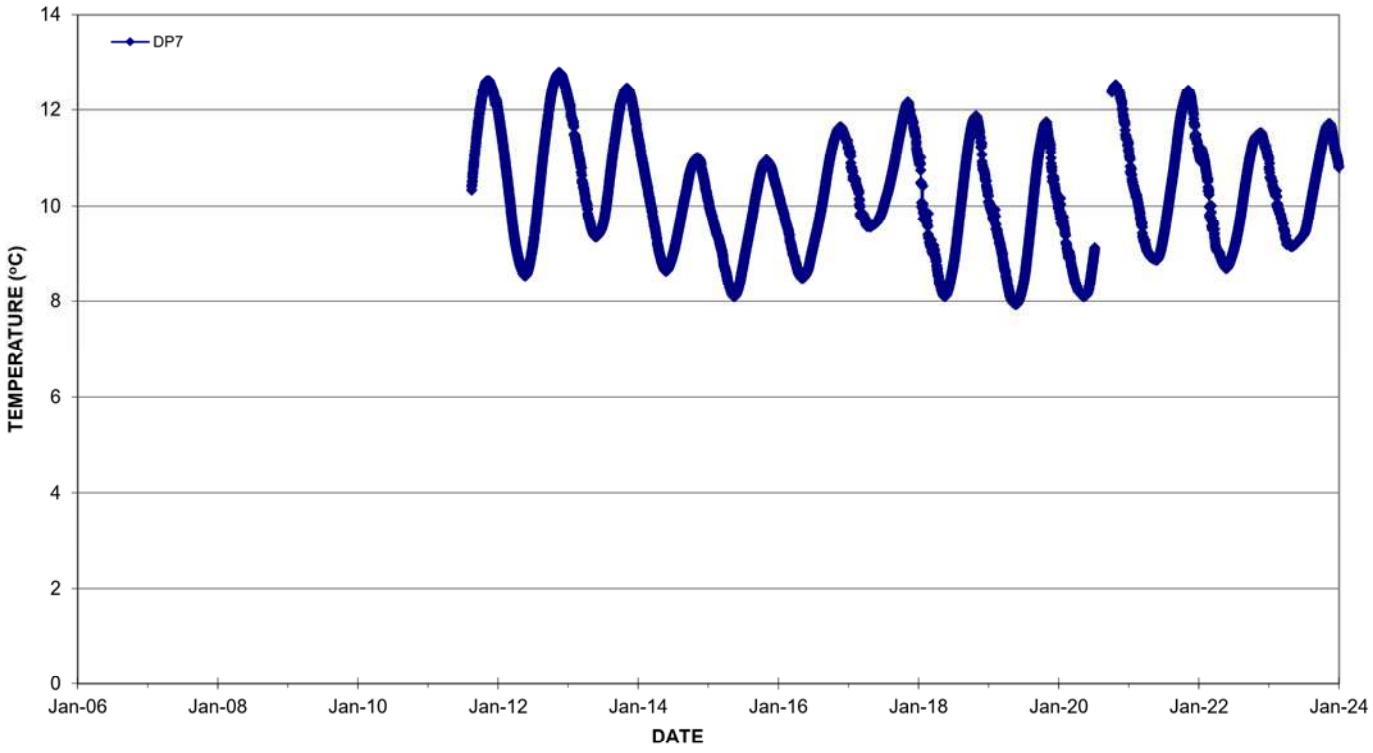
GROUNDWATER HYDROGRAPH
DP7

FIGURE B-58



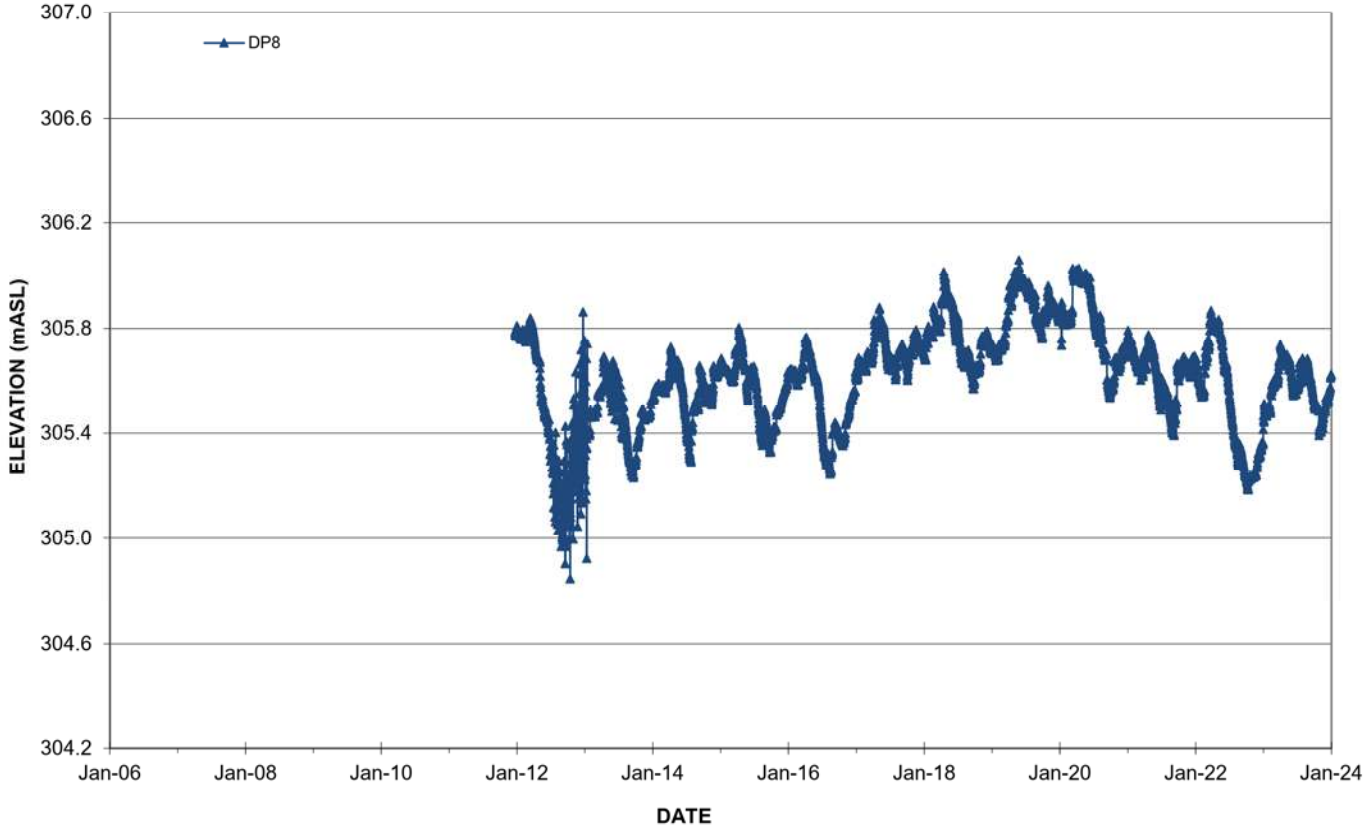
GROUNDWATER THERMOGRAPH
DP7

FIGURE B-59



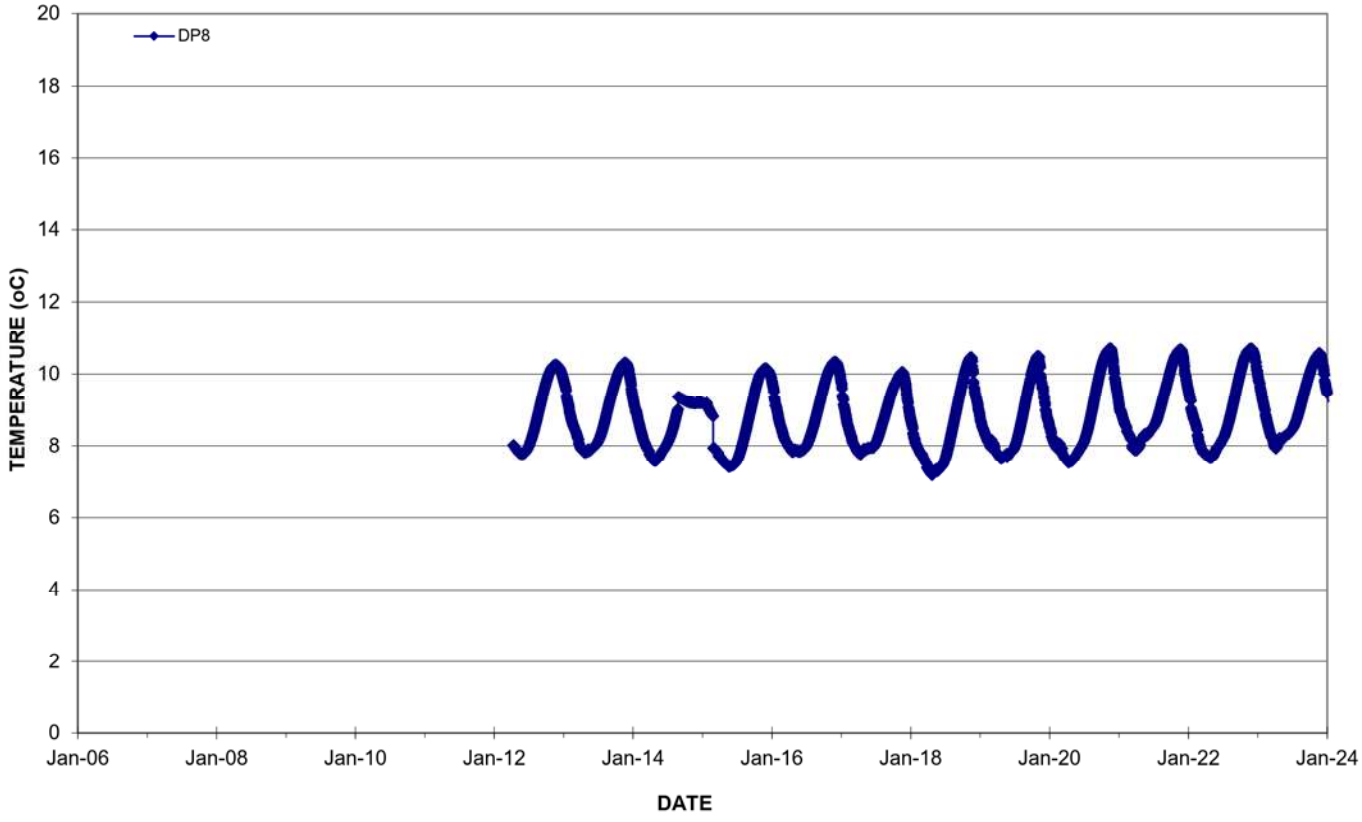
GROUNDWATER HYDROGRAPH
DP8

FIGURE B-60



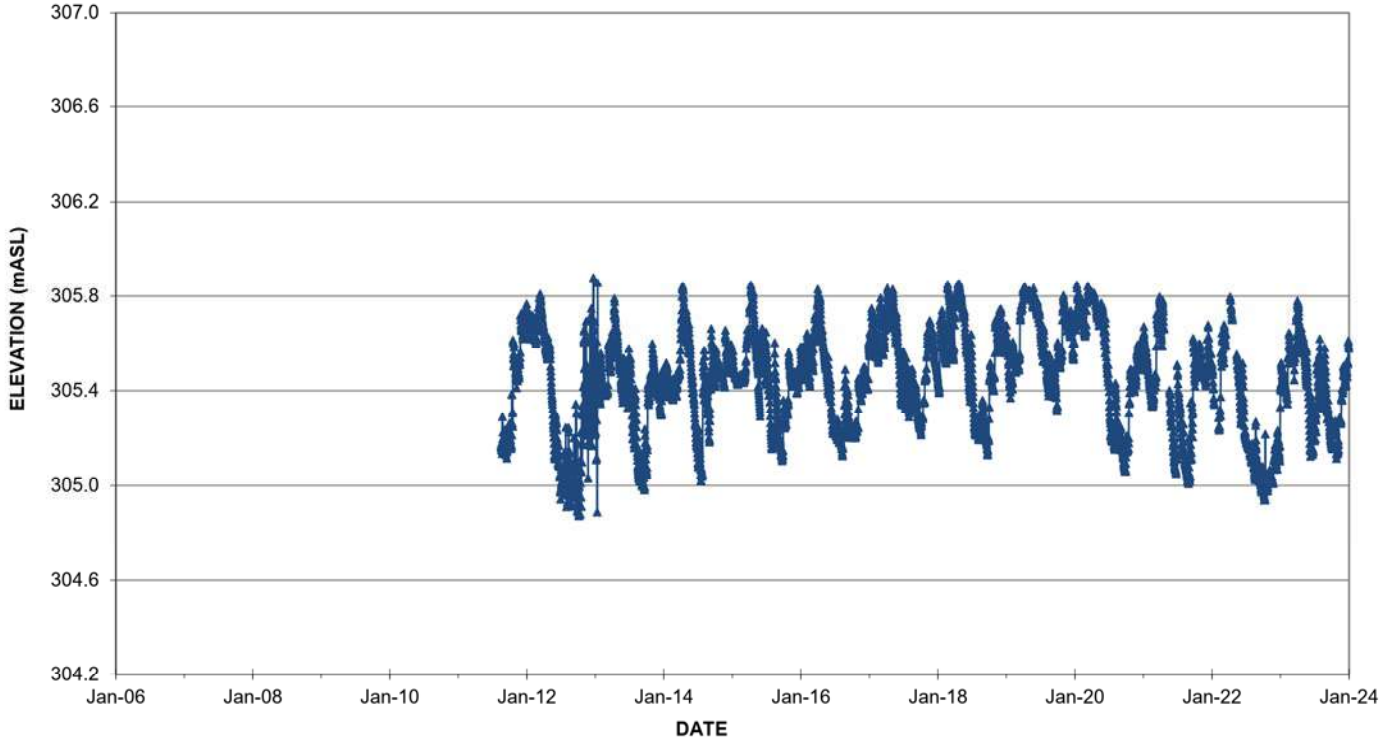
GROUNDWATER THERMOGRAPH
DP8

FIGURE B-61



GROUNDWATER HYDROGRAPH
DP9

FIGURE B-62



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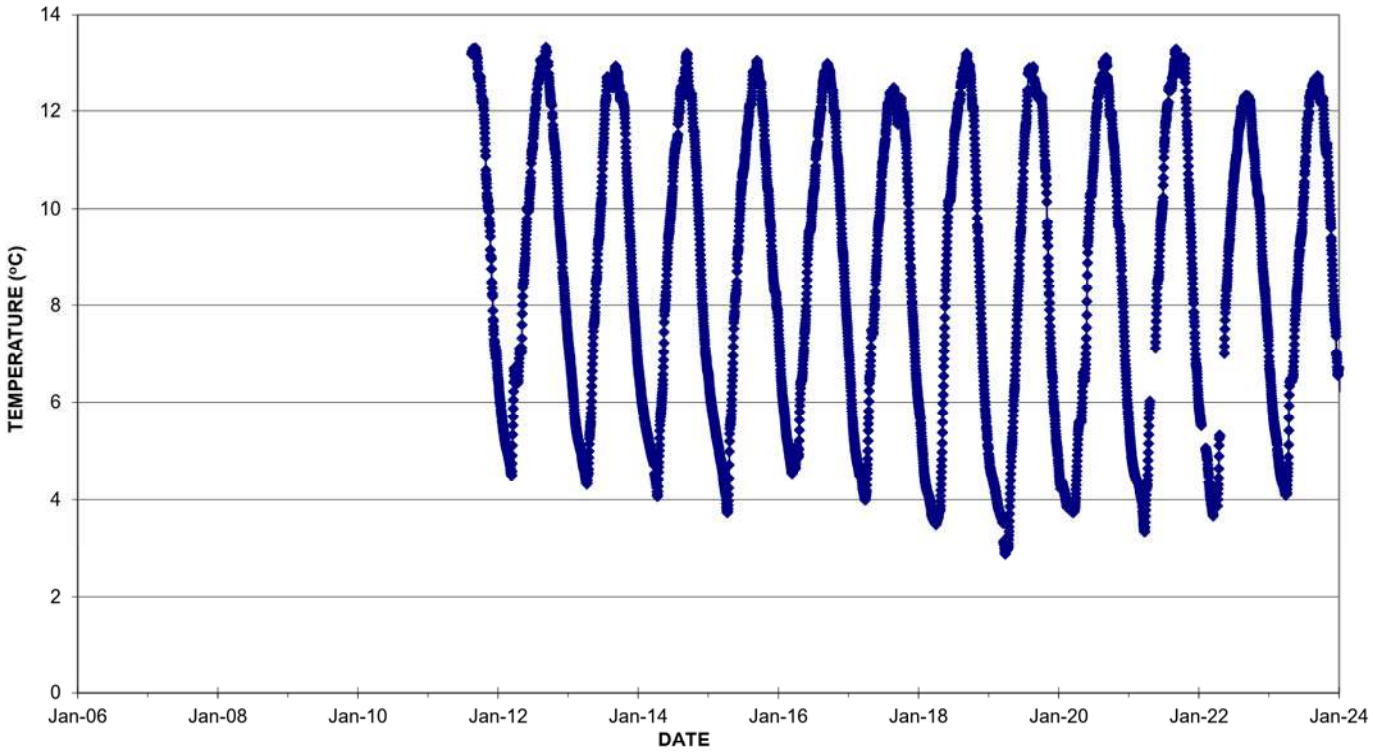
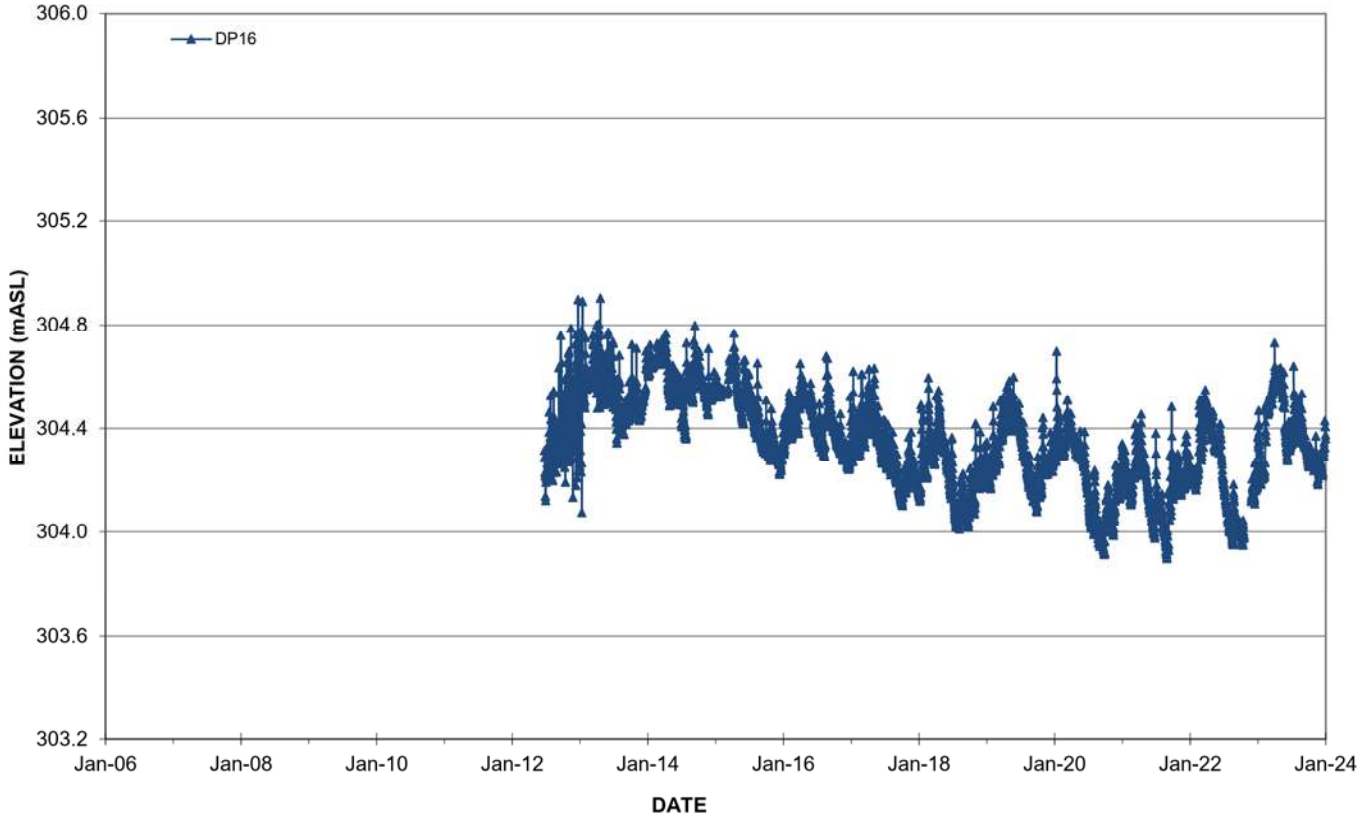
GROUNDWATER THERMOGRAPH
DP9

FIGURE B-63



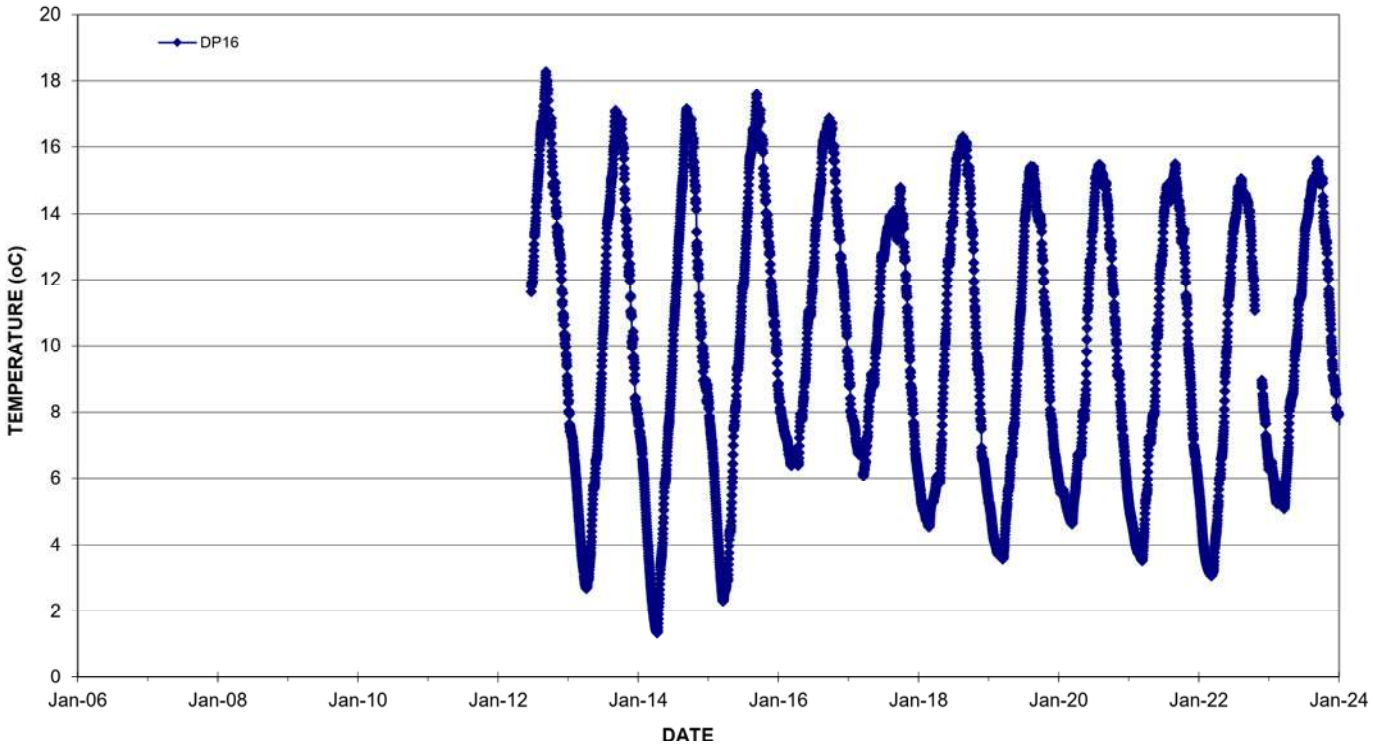
GROUNDWATER HYDROGRAPH
DP16

FIGURE B-64



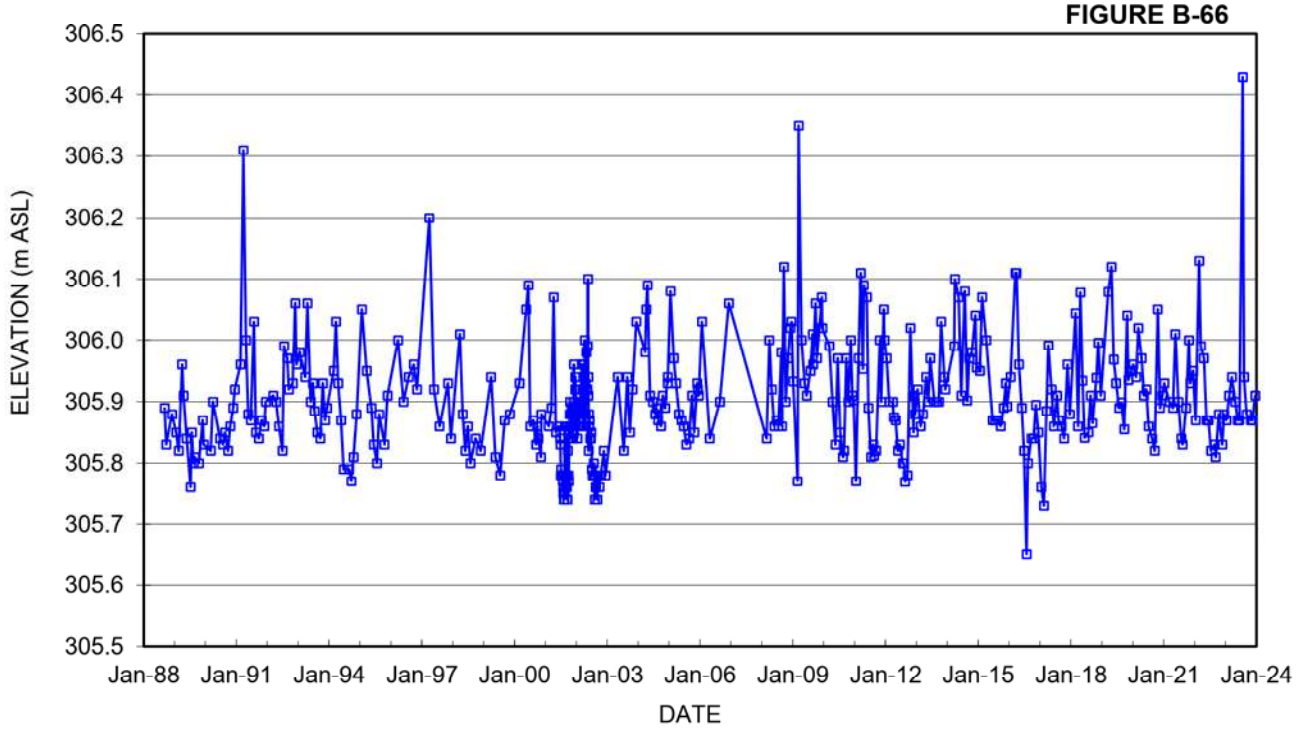
GROUNDWATER THERMOGRAPH
DP16

FIGURE B-65



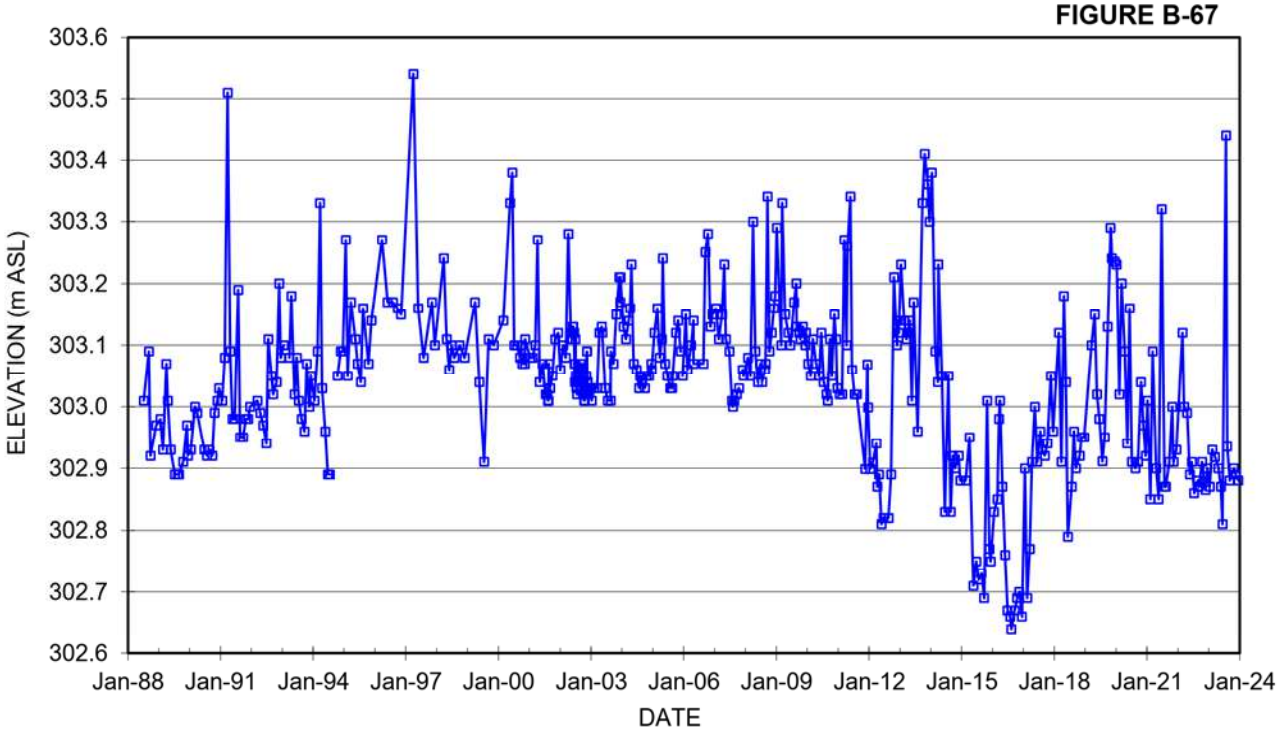
SURFACE WATER HYDROGRAPH
SW1

FIGURE B-66



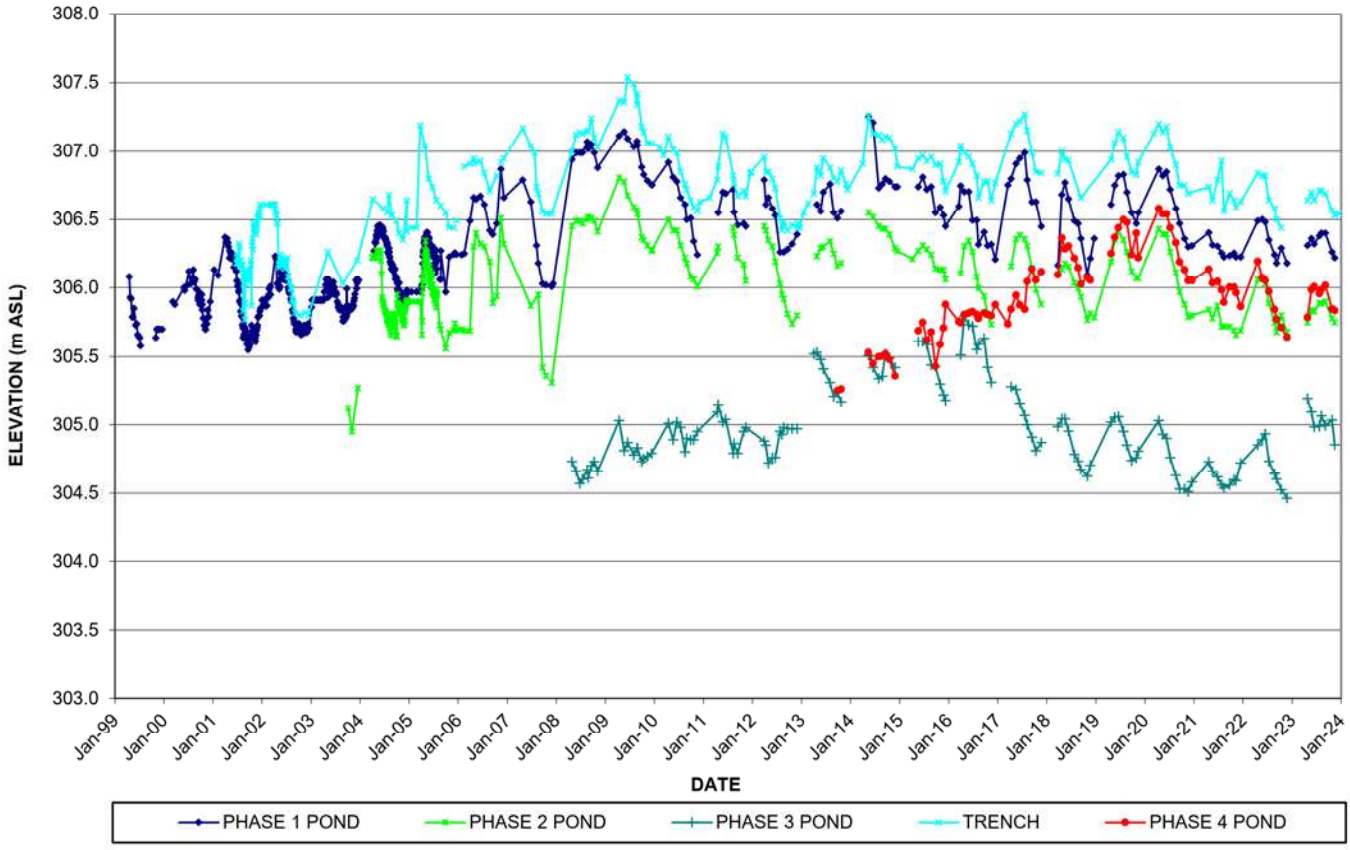
SURFACE WATER HYDROGRAPH
SW2

FIGURE B-67



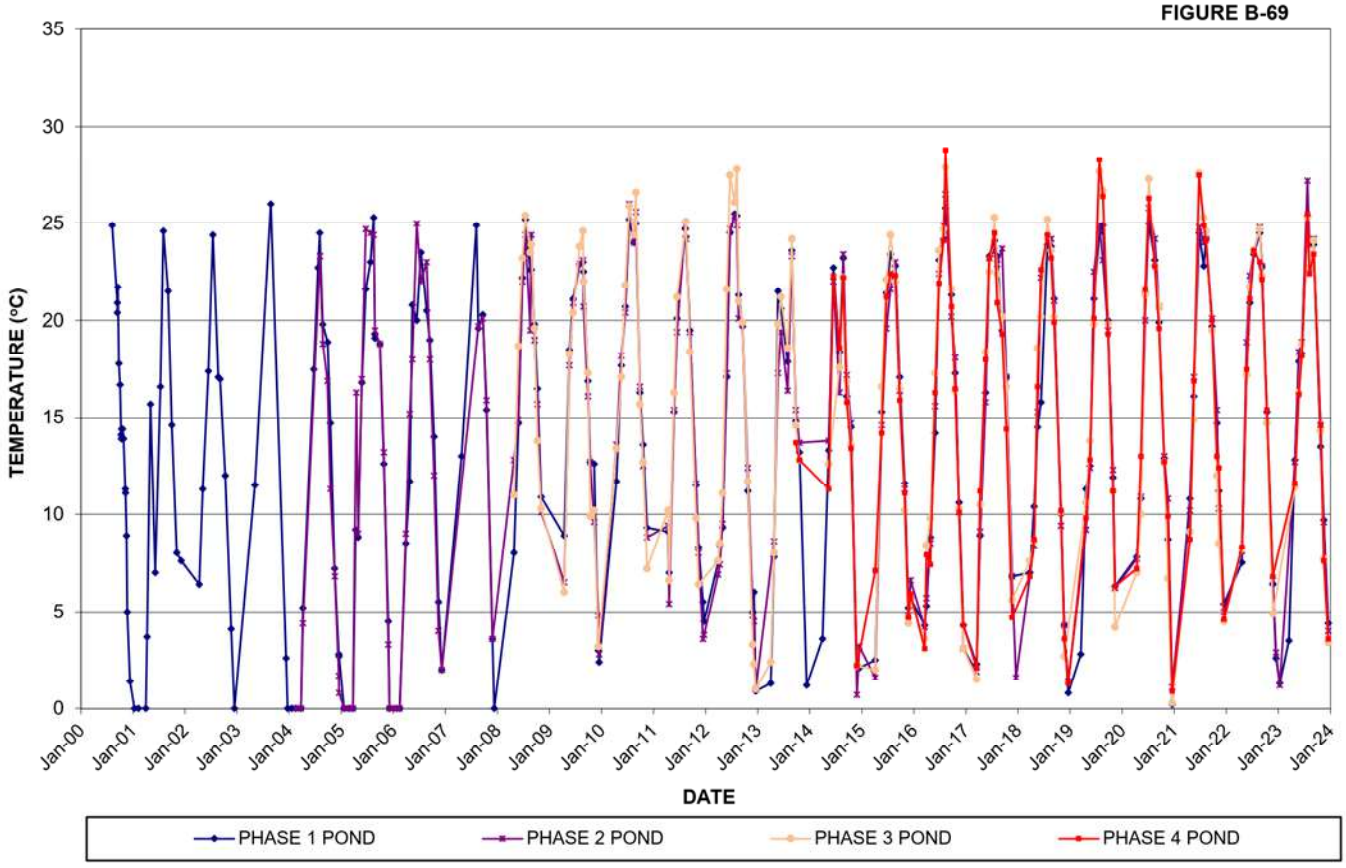
POND HYDROGRAPH

FIGURE B-68



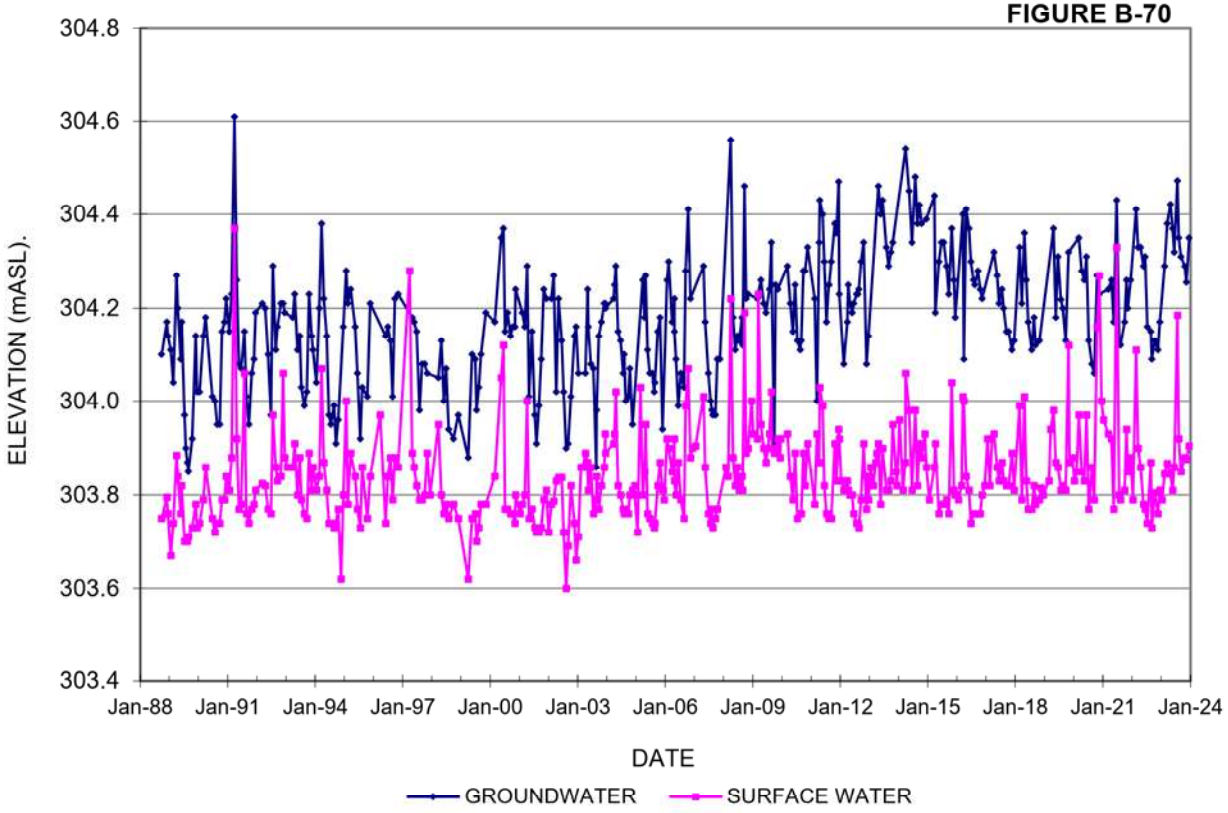
POND THERMOGRAPH

FIGURE B-69



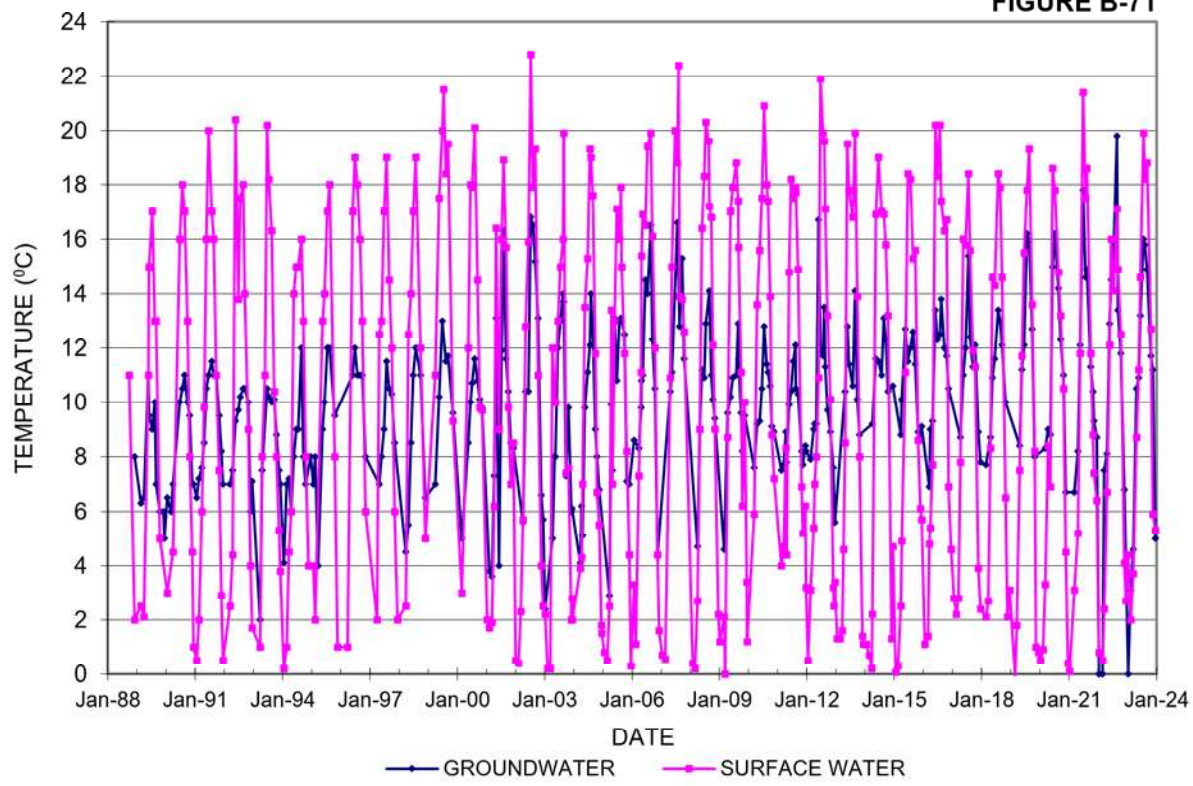
GROUNDWATER/SURFACE WATER HYDROGRAPH
DP1

FIGURE B-70



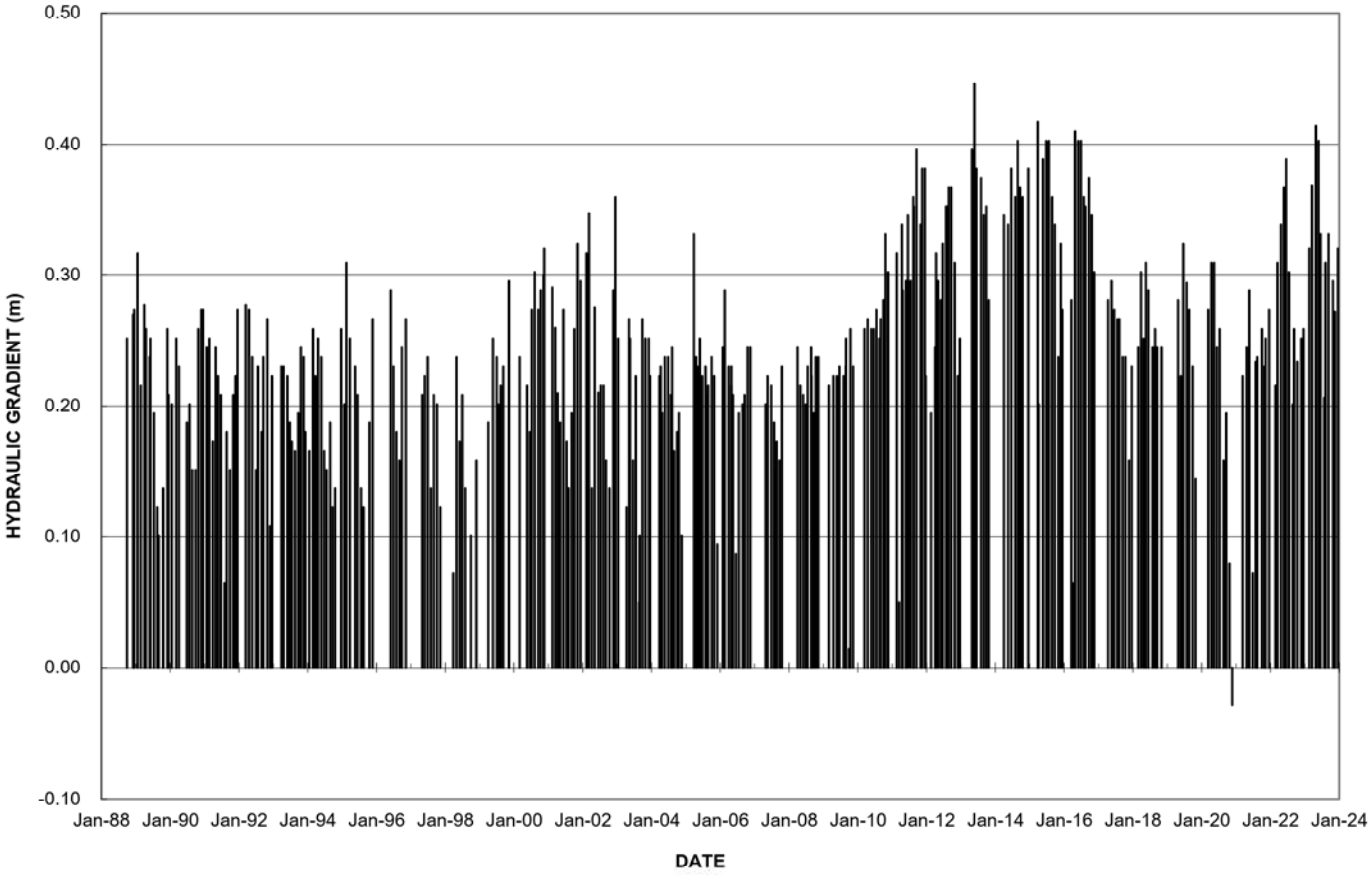
THERMOGRAPH
DP1

FIGURE B-71



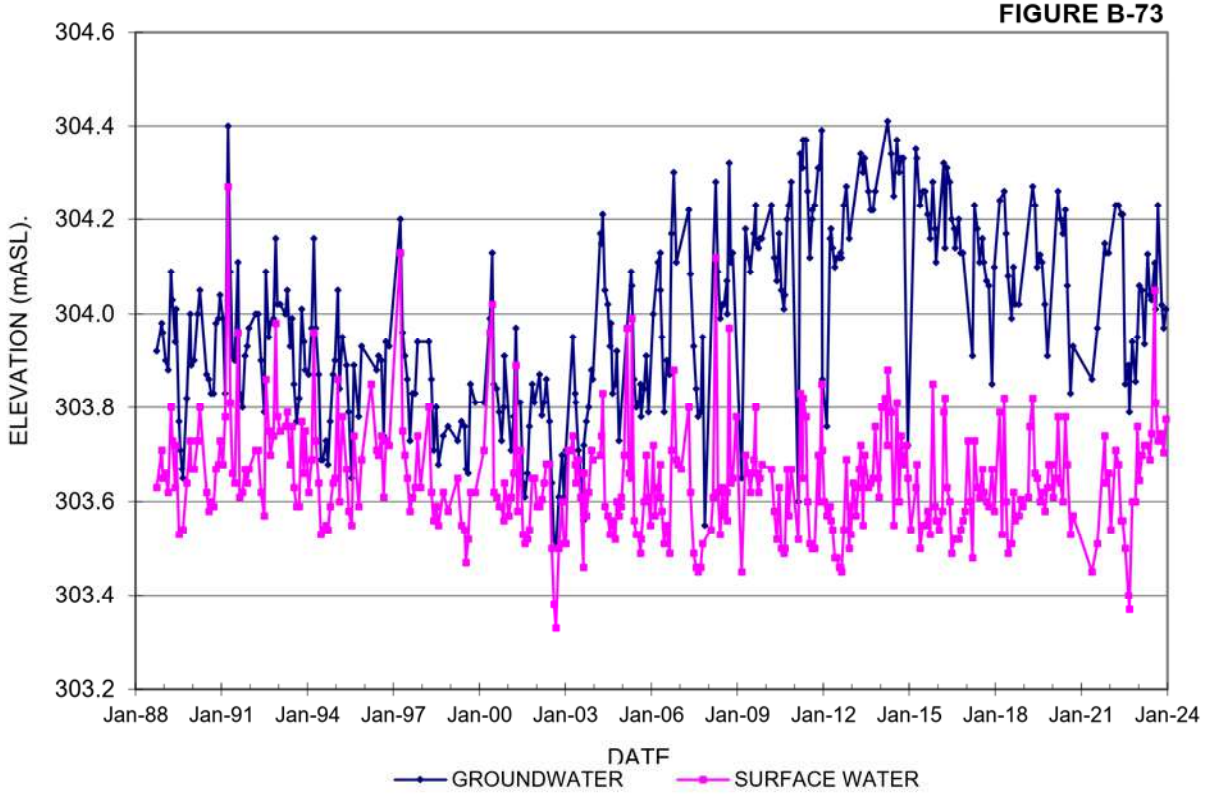
VERTICAL HYDRAULIC GRADIENT
DP1

FIGURE B-72



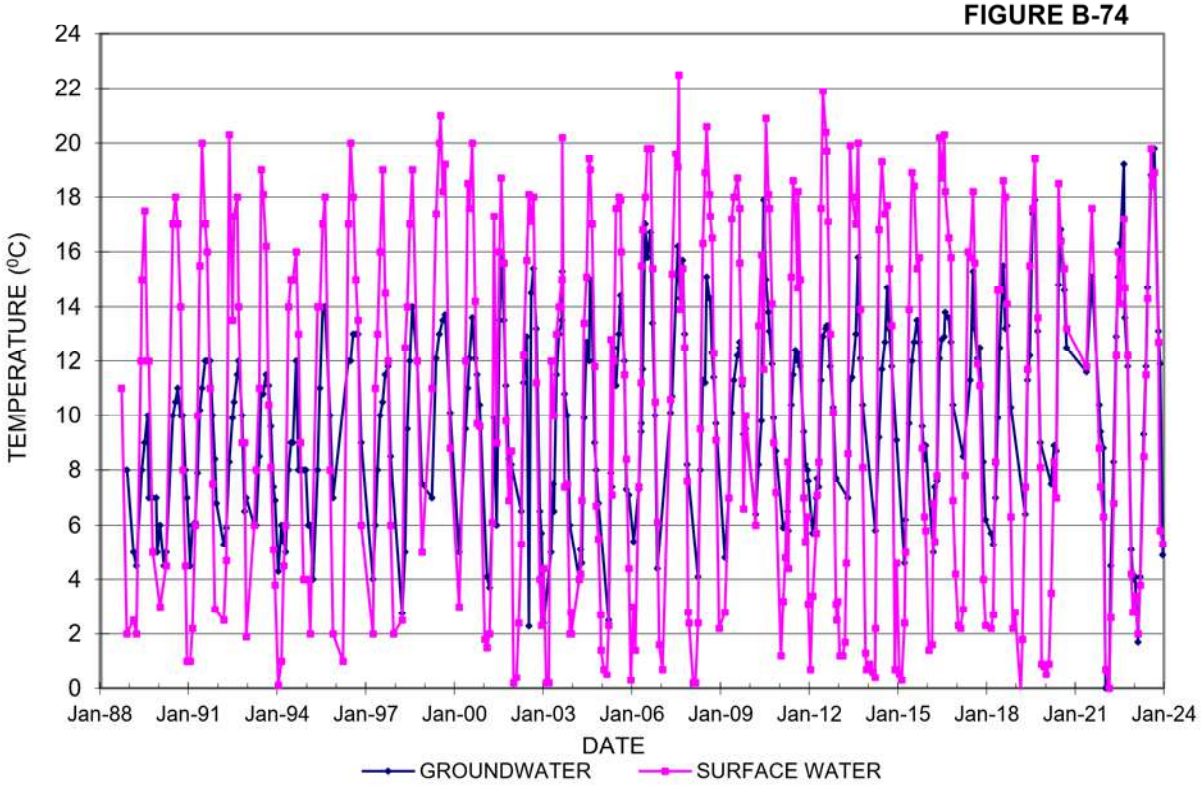
GROUNDWATER/SURFACE WATER HYDROGRAPH
DP2

FIGURE B-73



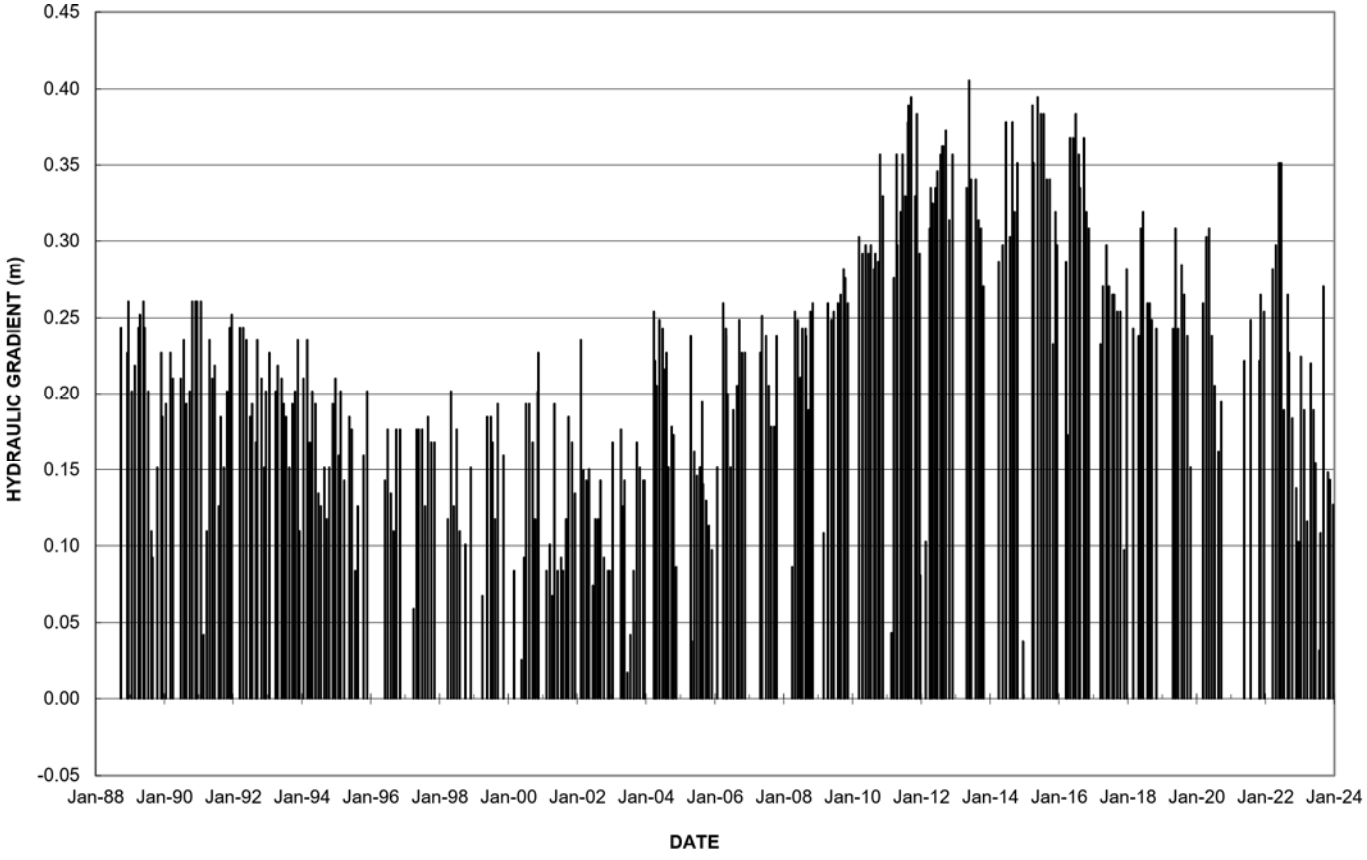
THERMOGRAPH
DP2

FIGURE B-74



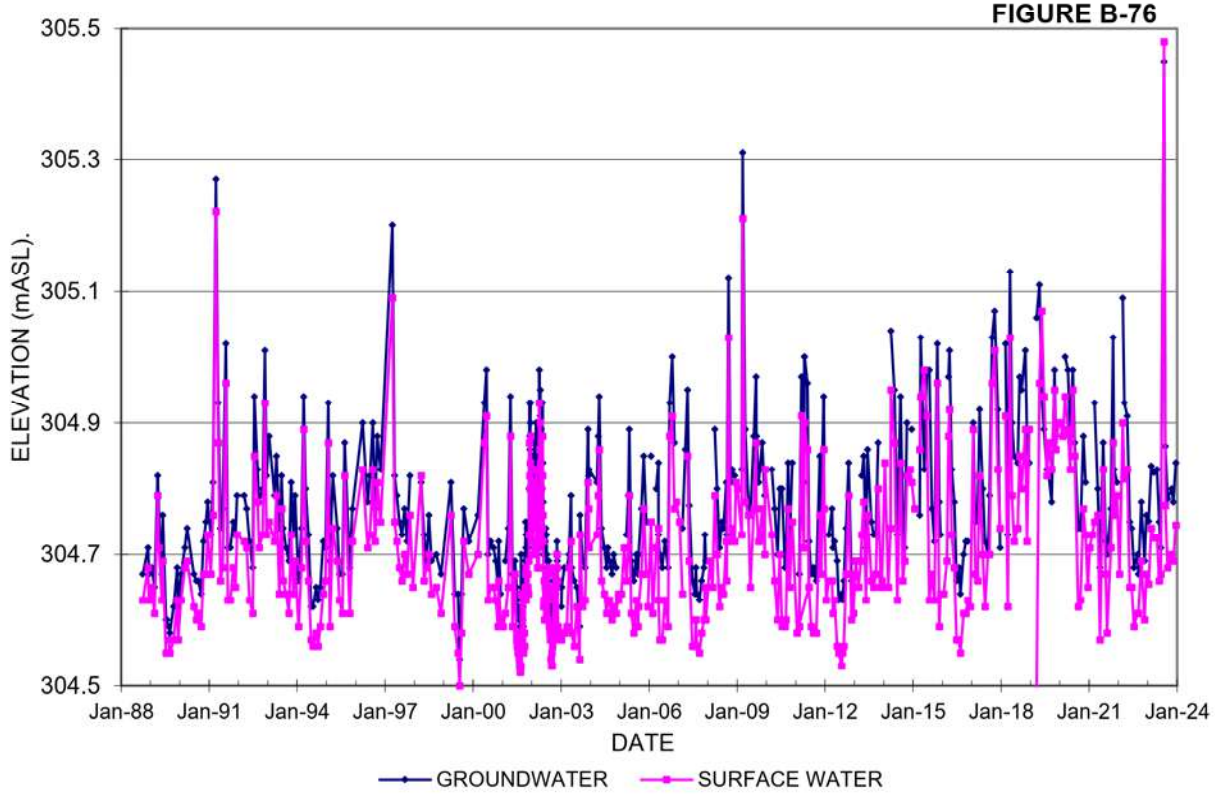
VERTICAL HYDRAULIC GRADIENT
DP2

FIGURE B-75



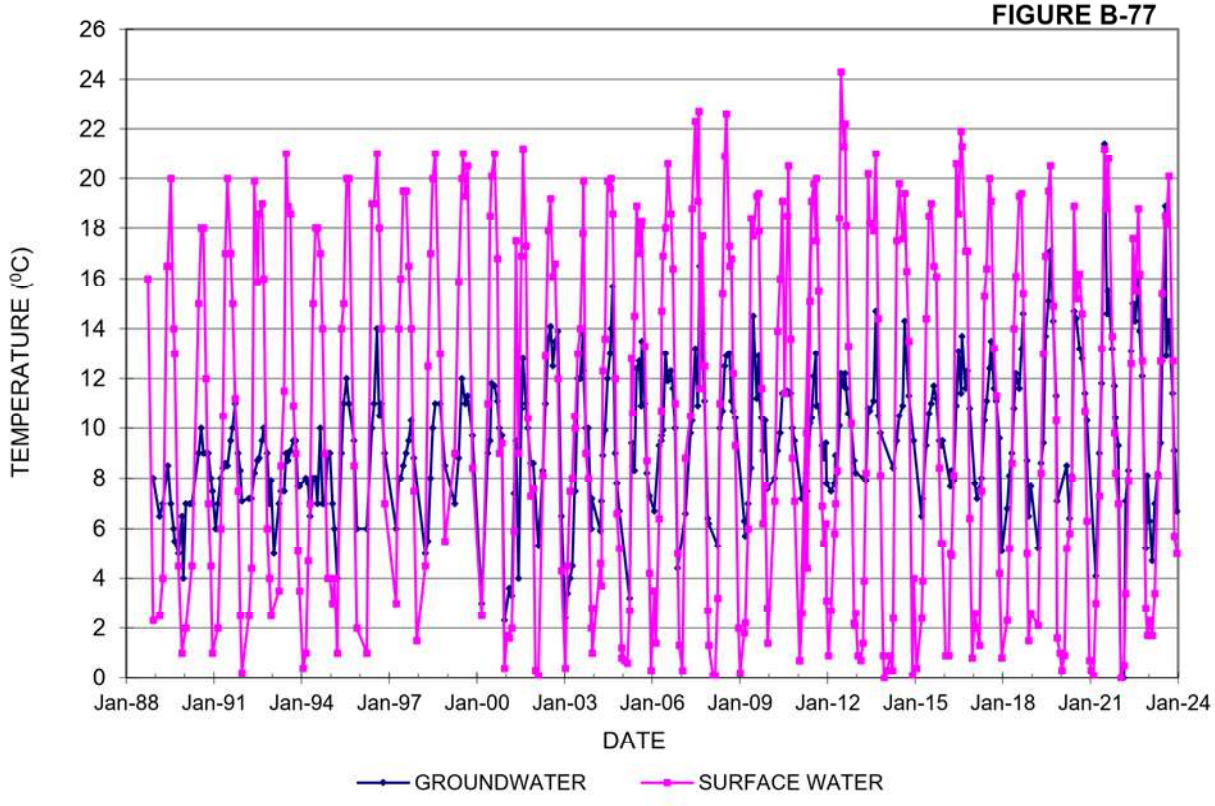
GROUNDWATER/SURFACE WATER HYDROGRAPH
DP3

FIGURE B-76



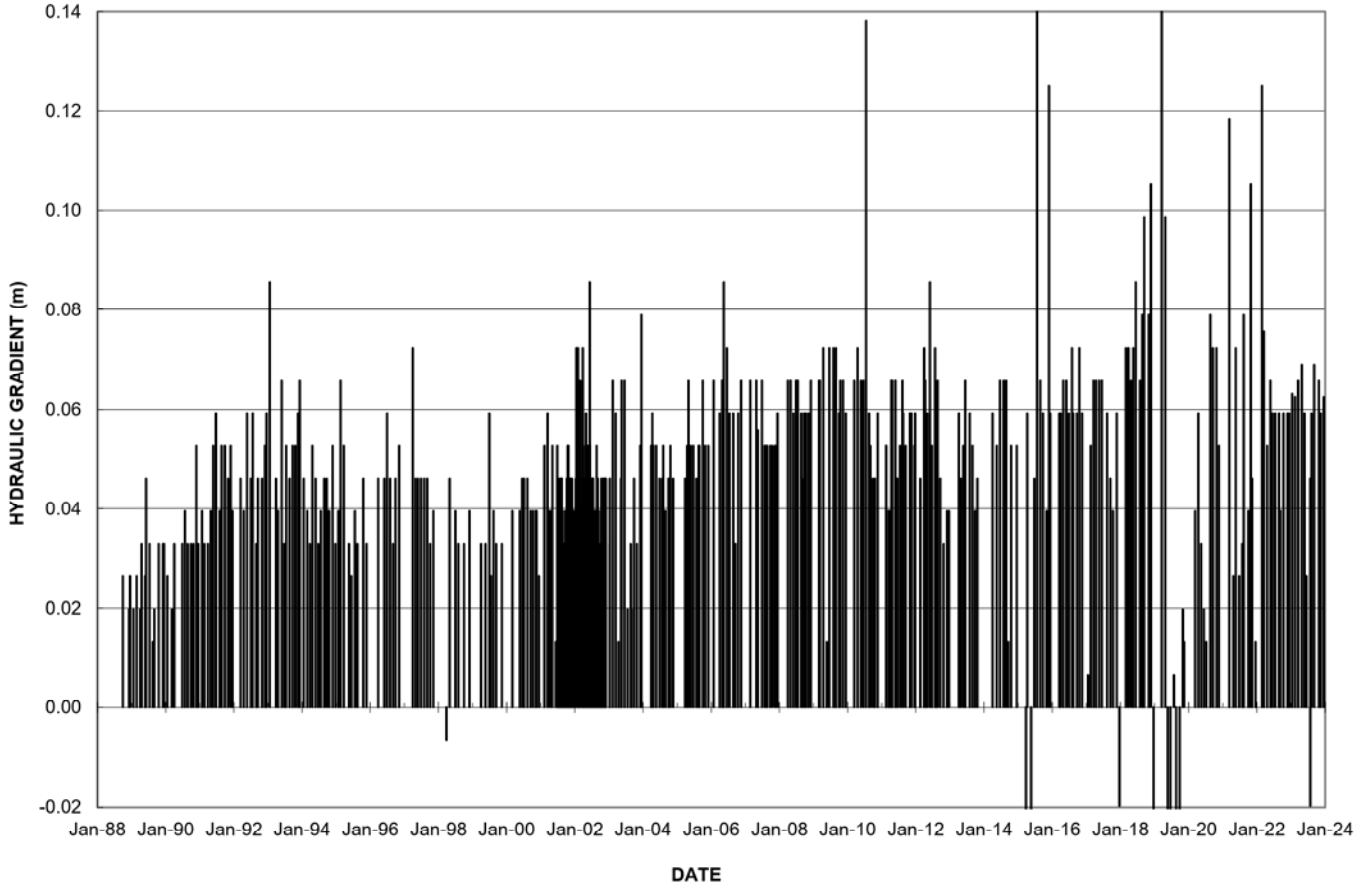
THERMOGRAPH
DP3

FIGURE B-77



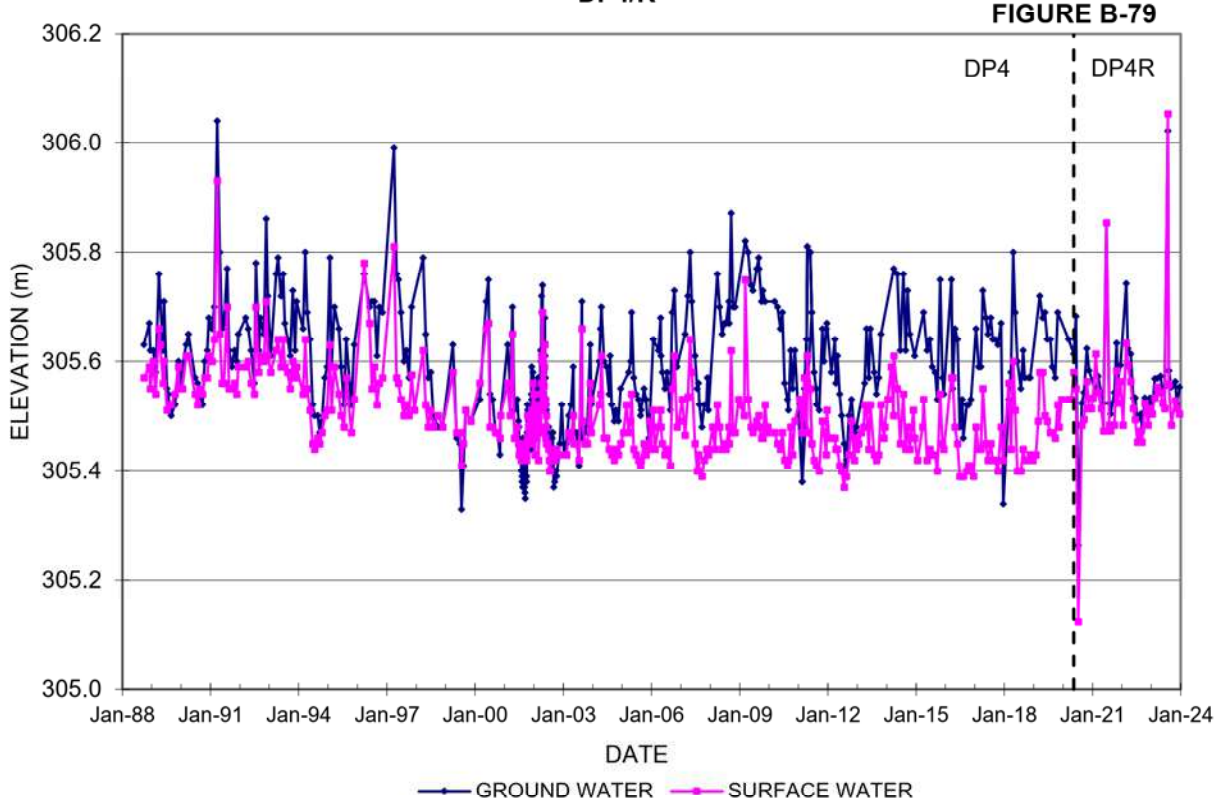
VERTICAL HYDRAULIC GRADIENT
DP3

FIGURE B-78



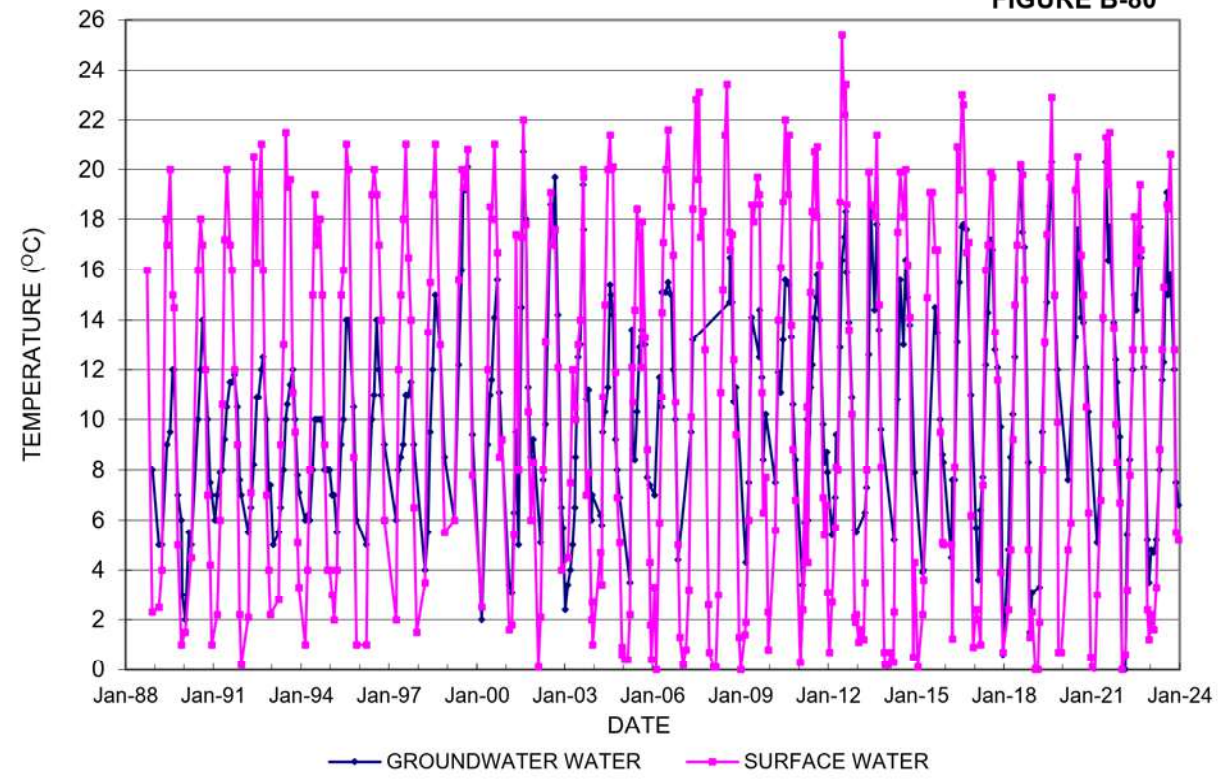
GROUNDWATER/SURFACE WATER HYDROGRAPH
DP4/R

FIGURE B-79



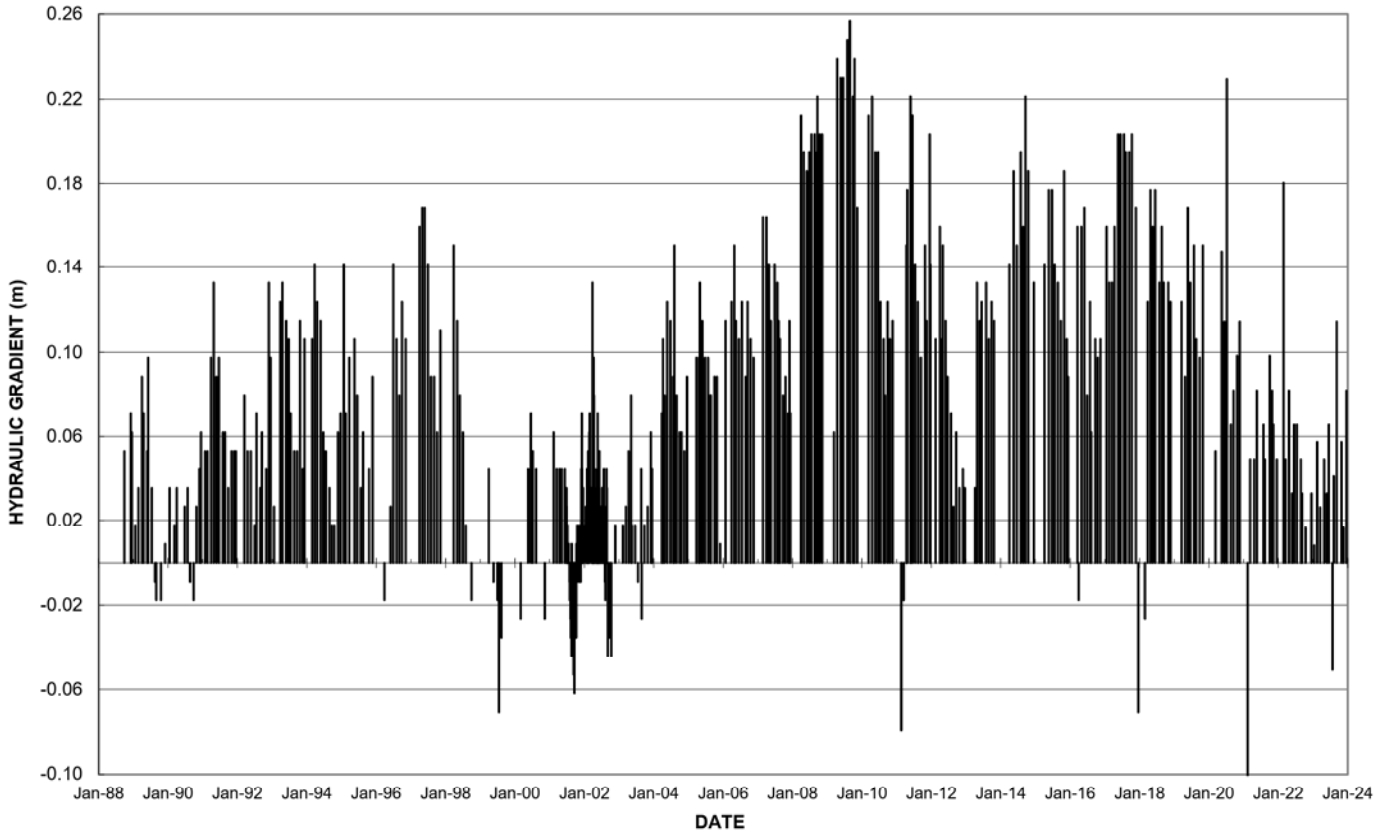
THERMOGRAPH
DP4/R

FIGURE B-80



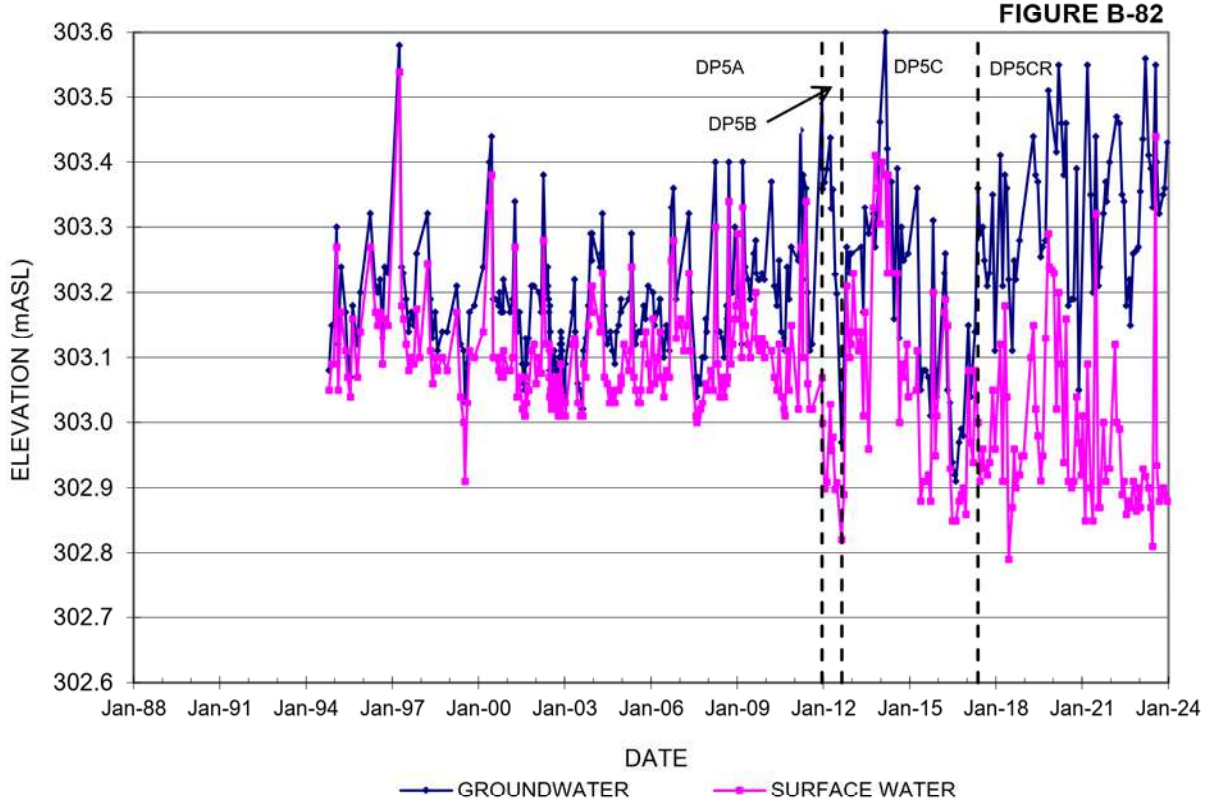
VERTICAL HYDRAULIC GRADIENT
DP4/R

FIGURE B- 81



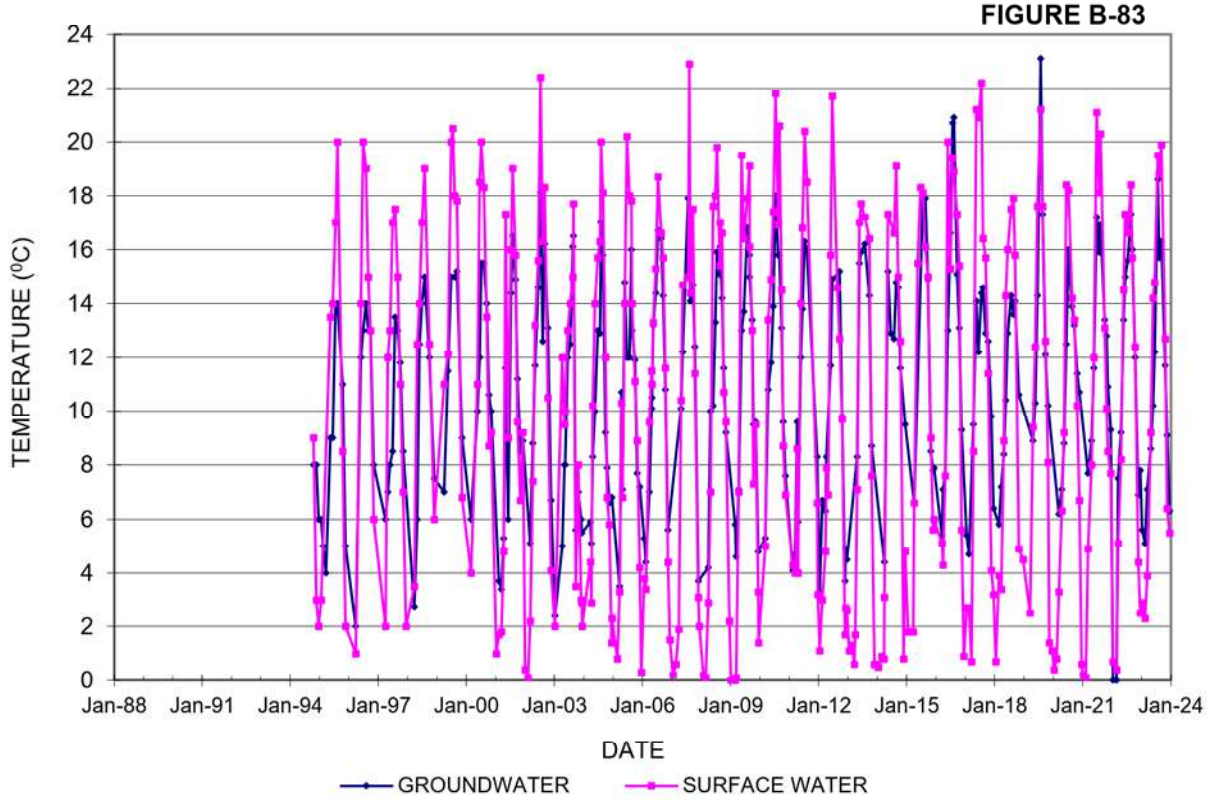
GROUNDWATER/SURFACE WATER HYDROGRAPH
DP5A/B/C/CR

FIGURE B-82



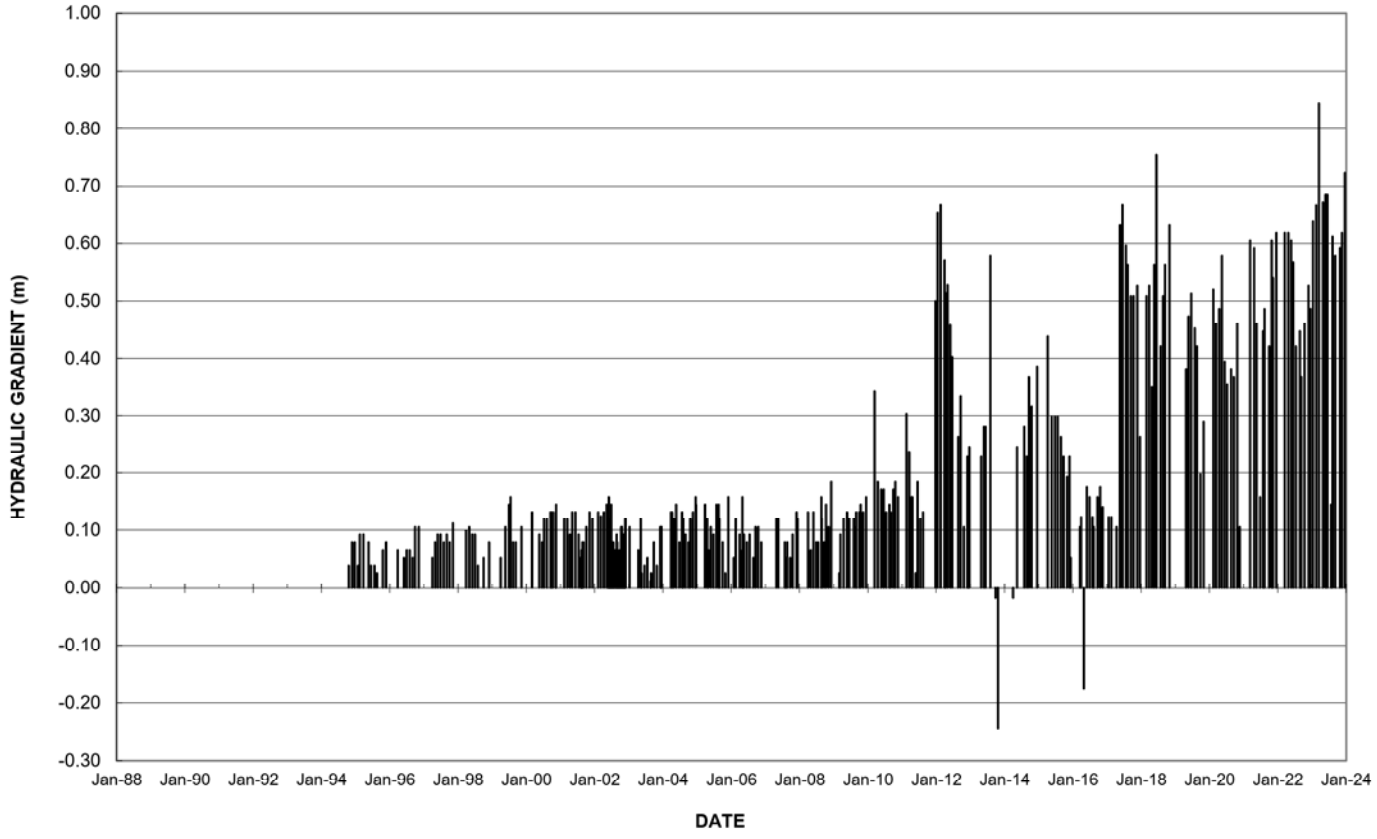
THERMOGRAPH
DP5A/B/C/CR

FIGURE B-83



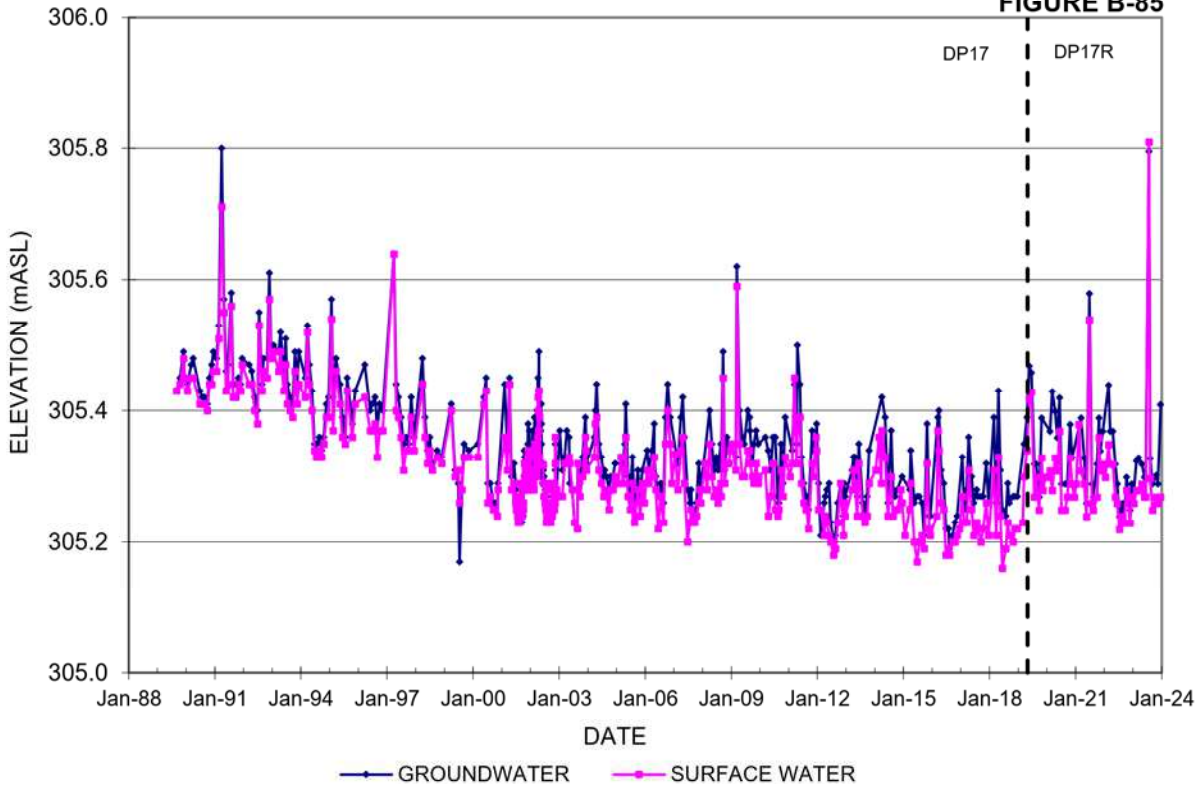
VERTICAL HYDRAULIC GRADIENT
DP5A/B/C/CR

FIGURE B-84



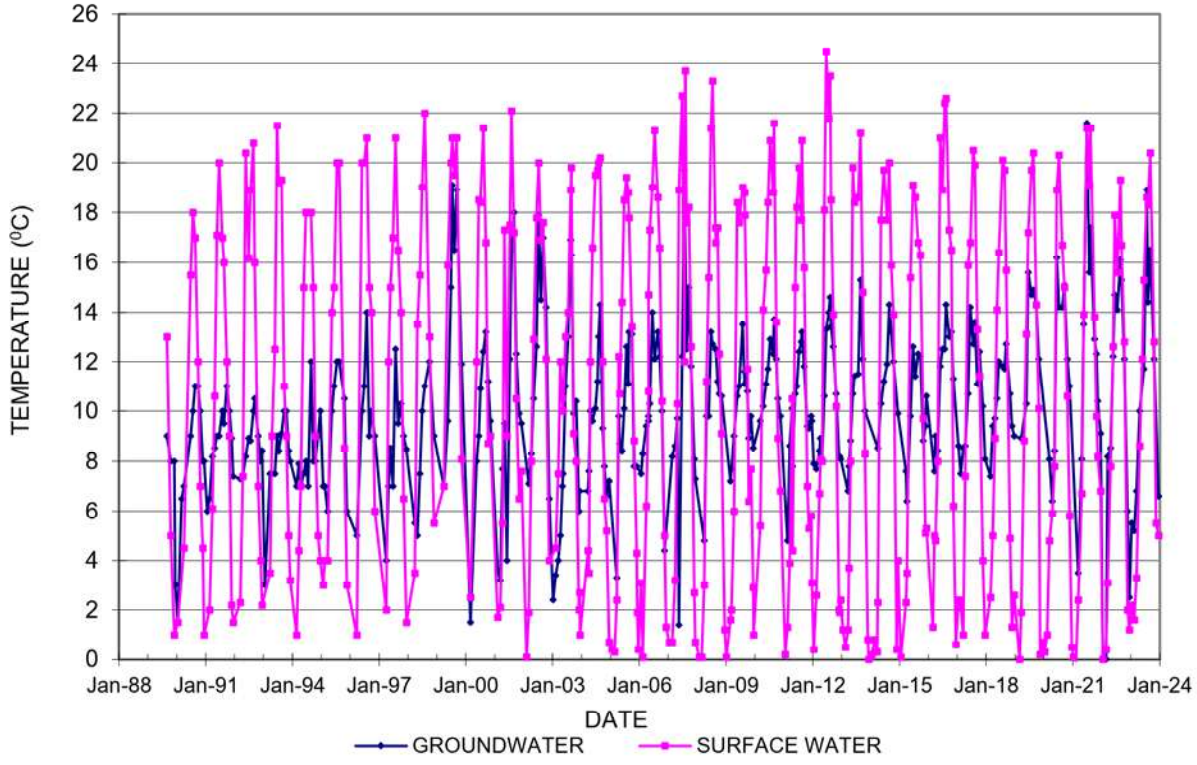
GROUNDWATER/SURFACE WATER HYDROGRAPH
DP17/R

FIGURE B-85



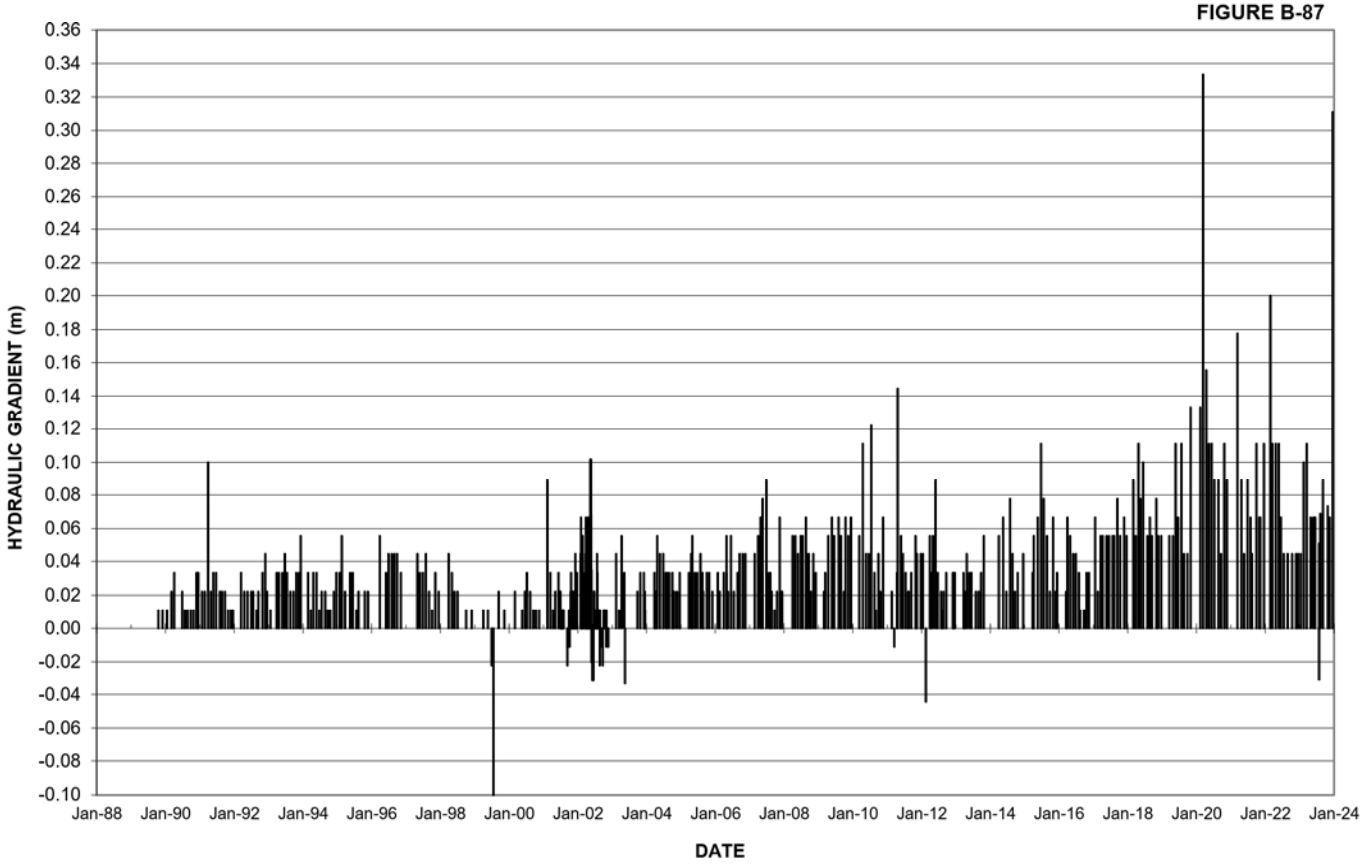
THERMOGRAPH
DP17/R

FIGURE B-86



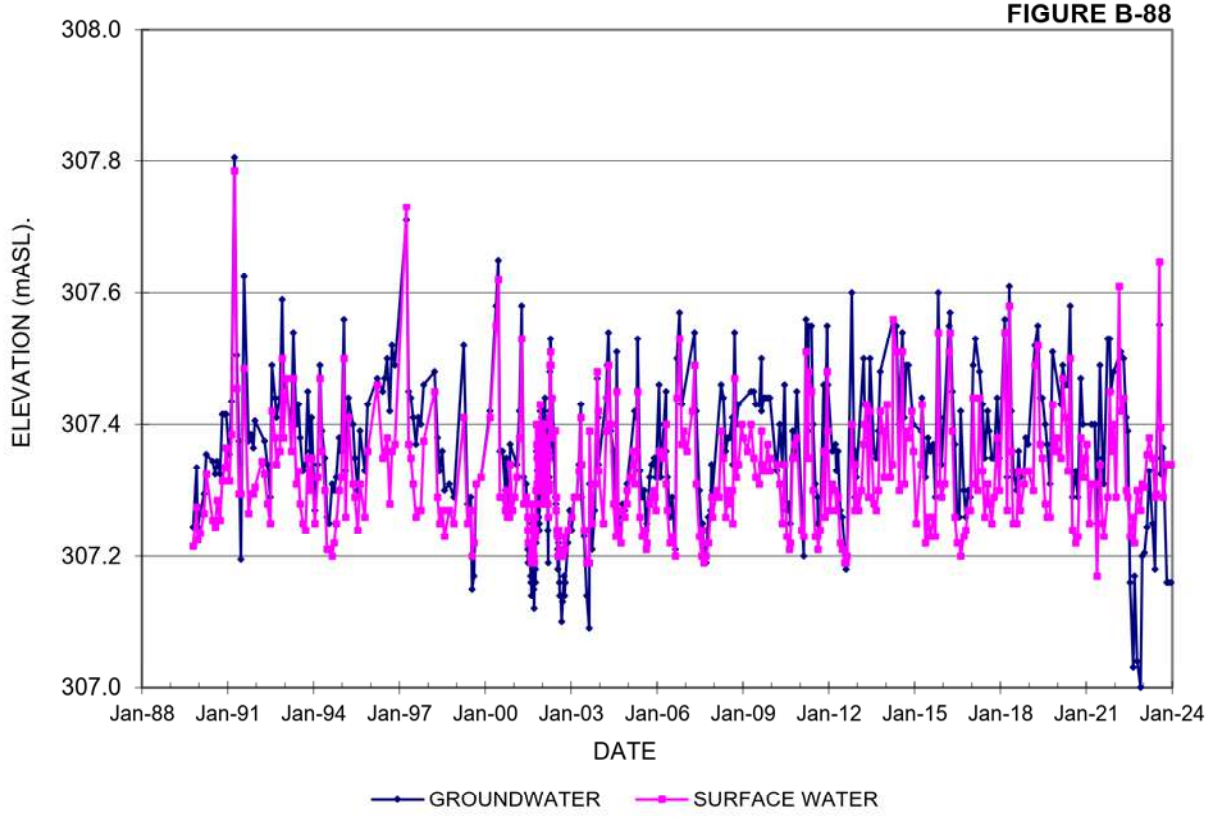
VERTICAL HYDRAULIC GRADIENT
DP17/R

FIGURE B-87



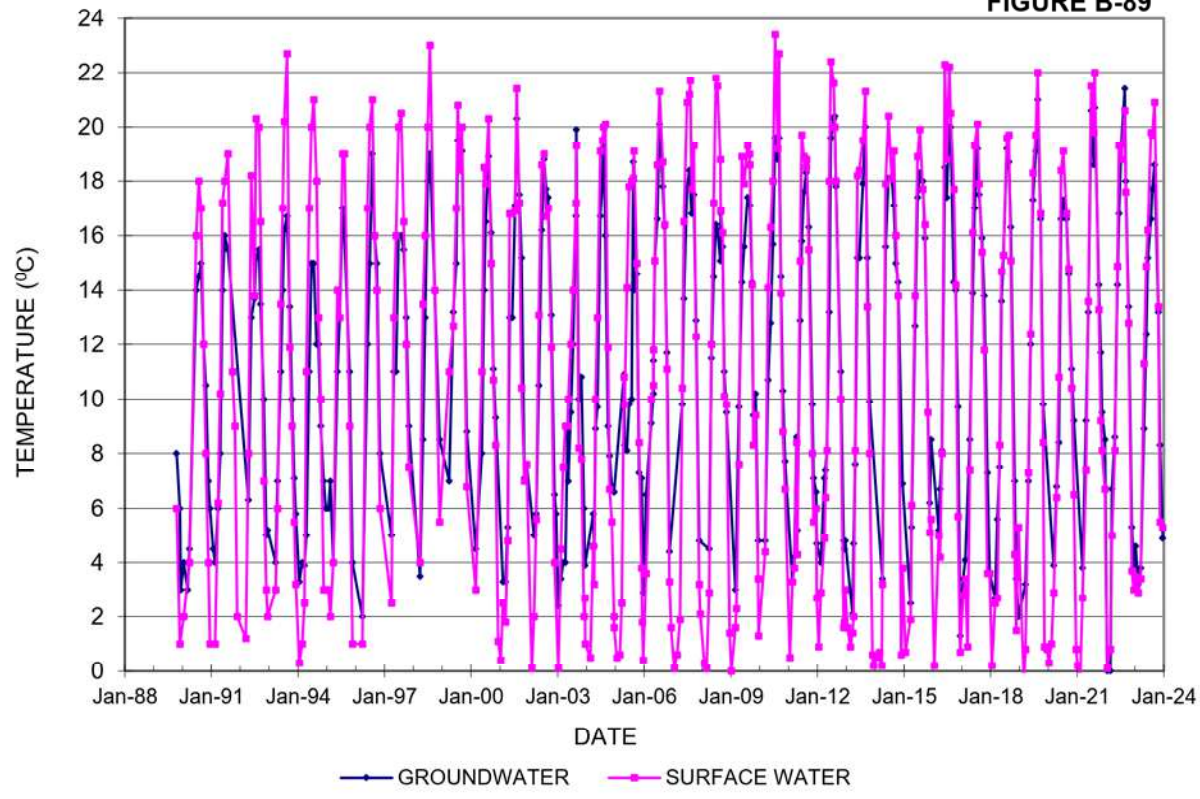
GROUNDWATER/SURFACE WATER HYDROGRAPH
DP18

FIGURE B-88



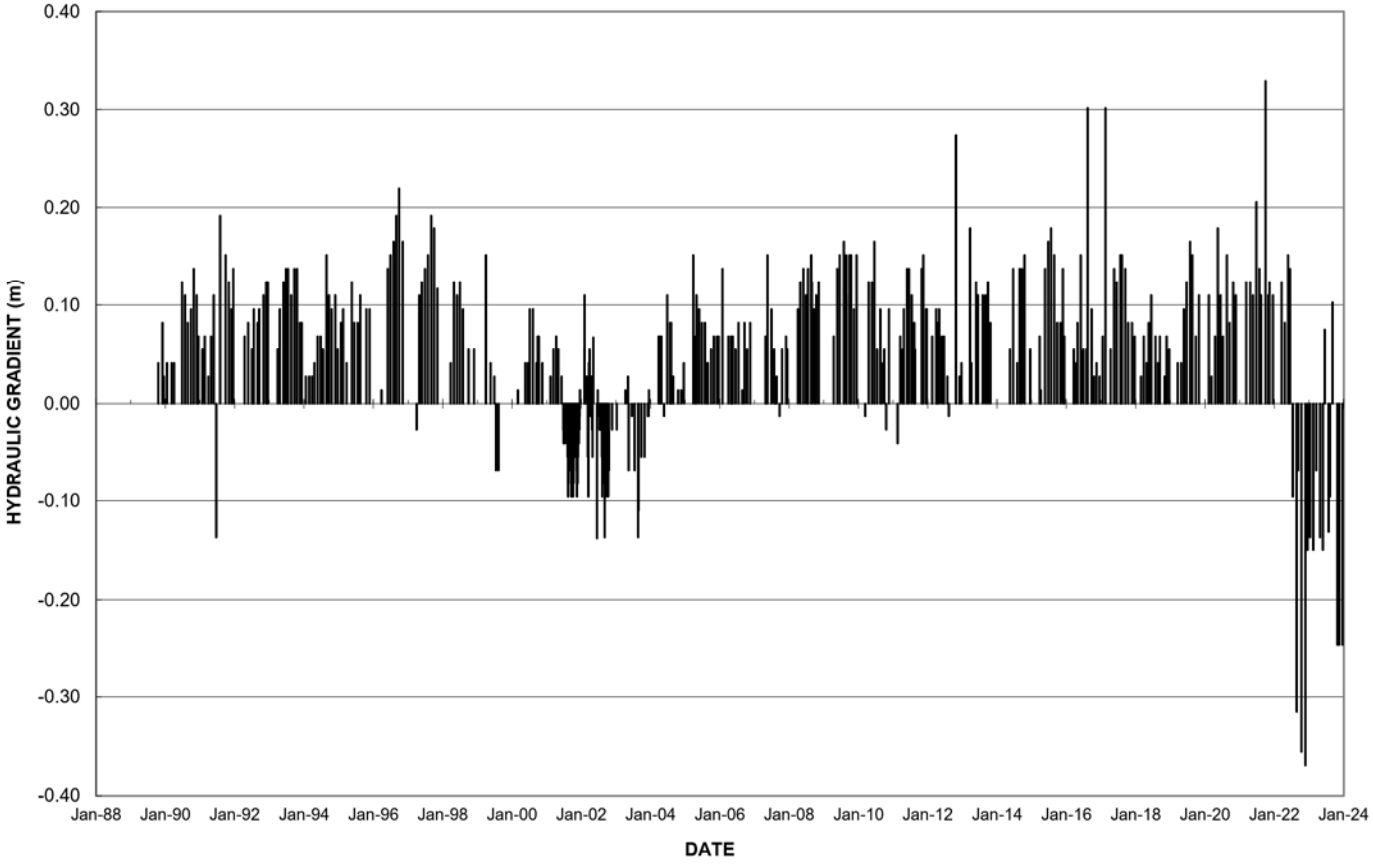
THERMOGRAPH
DP18

FIGURE B-89



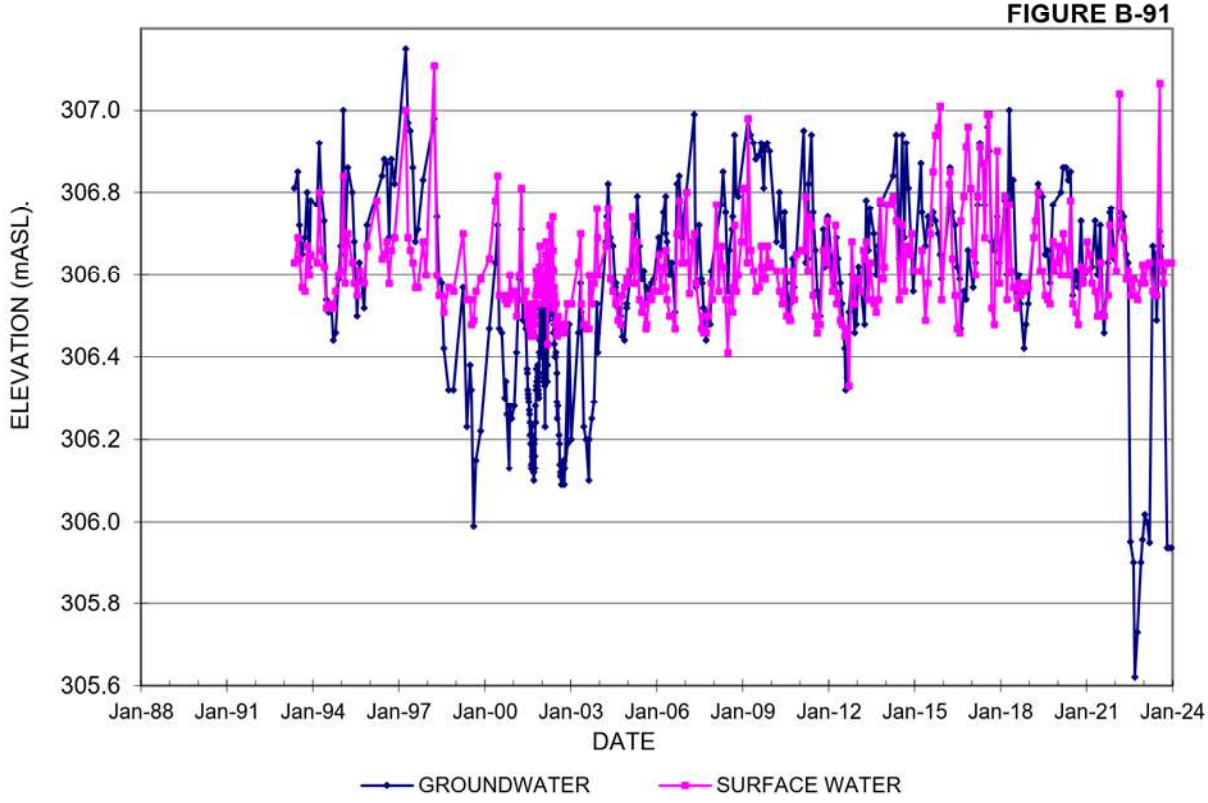
VERTICAL HYDRAULIC GRADIENT
DP18

FIGURE B-90



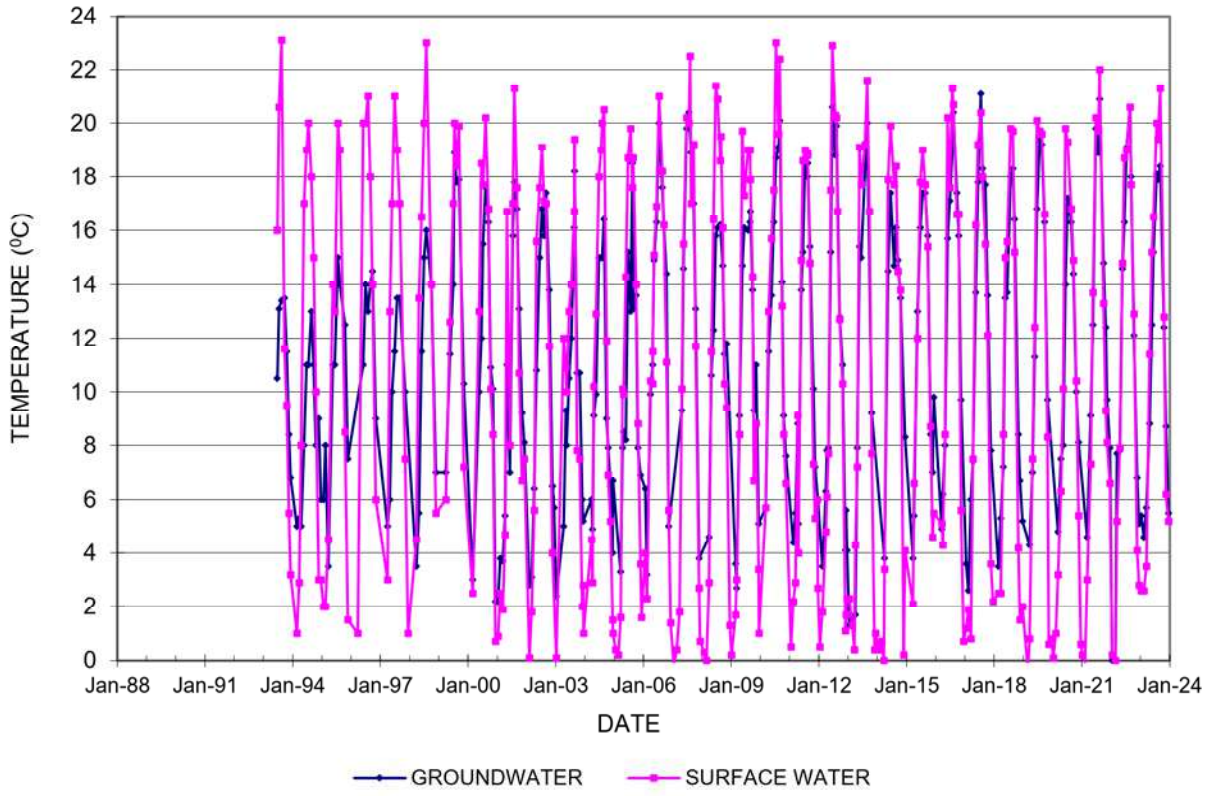
GROUNDWATER/SURFACE WATER HYDROGRAPH
DP19

FIGURE B-91



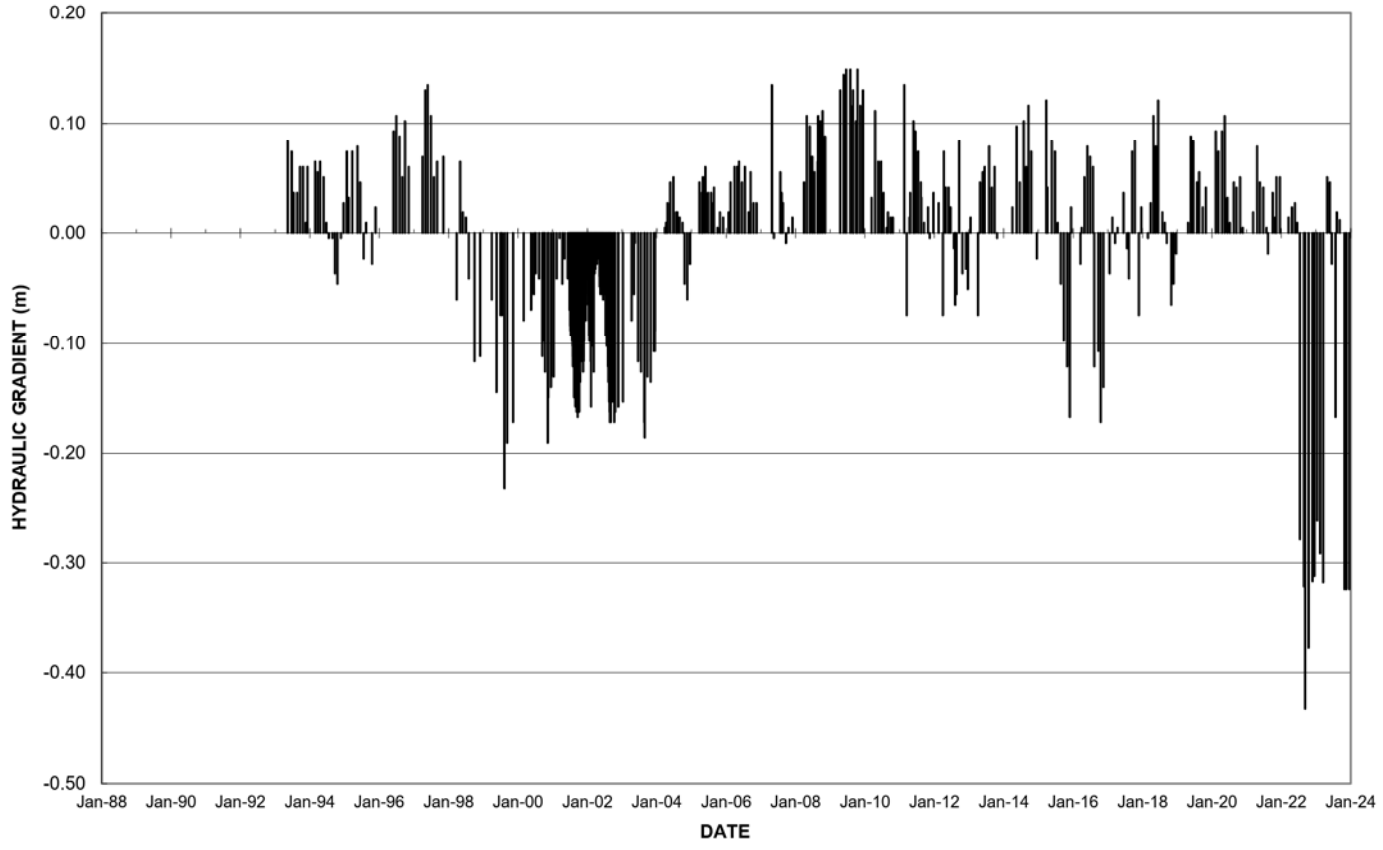
THERMOGRAPH
DP19

FIGURE B-92



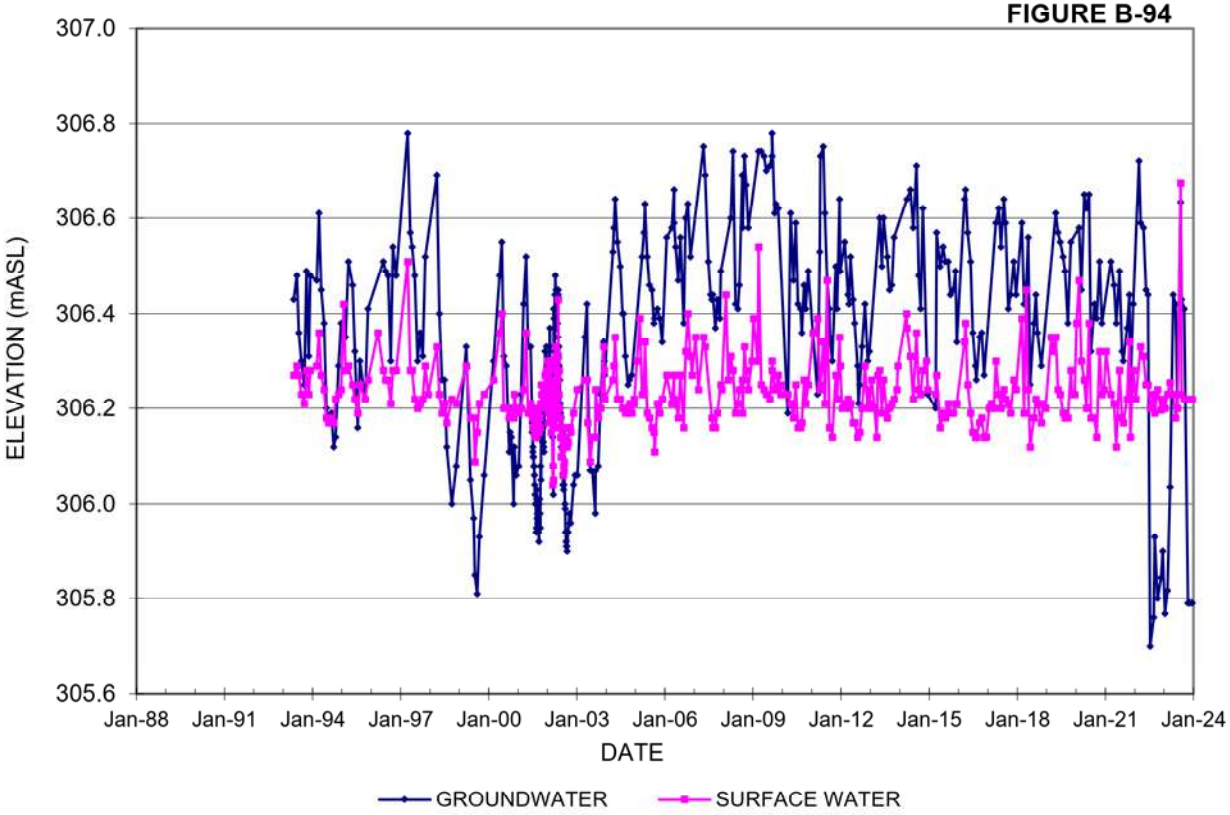
VERTICAL HYDRAULIC GRADIENT
DP19

FIGURE B-93



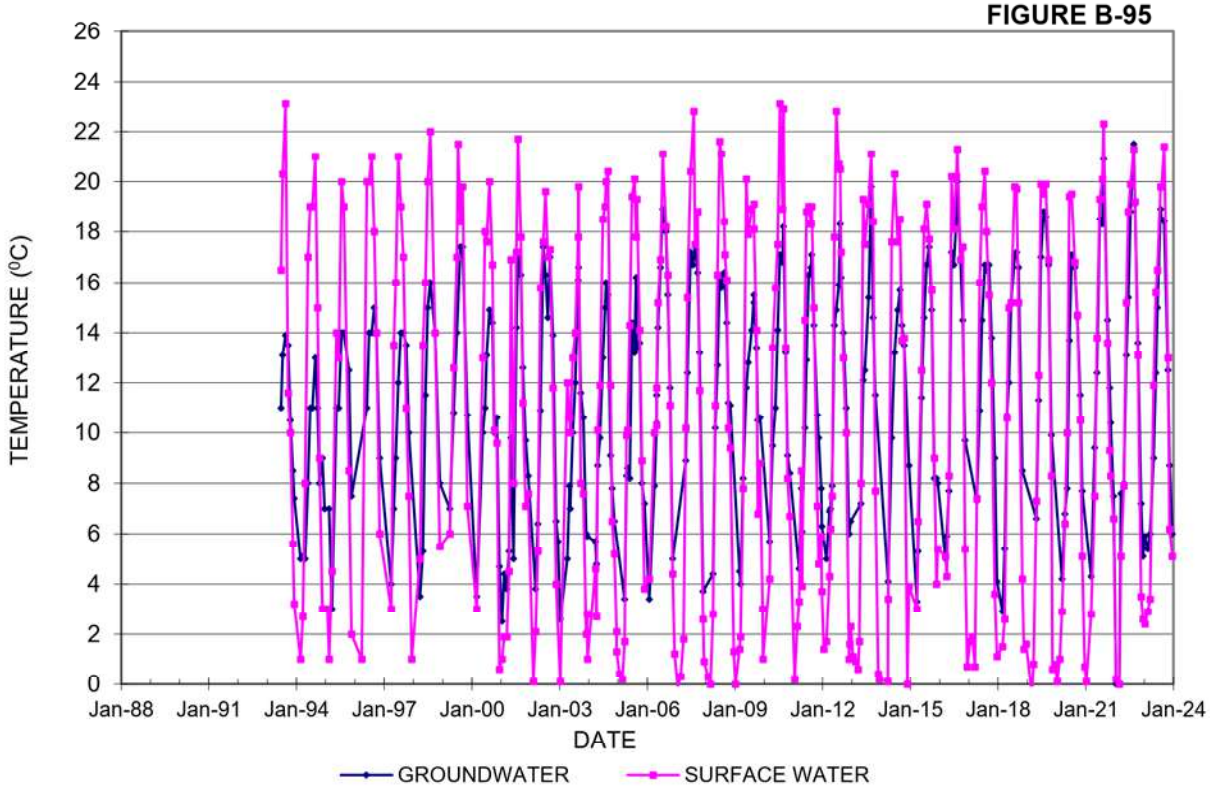
GROUNDWATER/SURFACE WATER HYDROGRAPH
DP20

FIGURE B-94



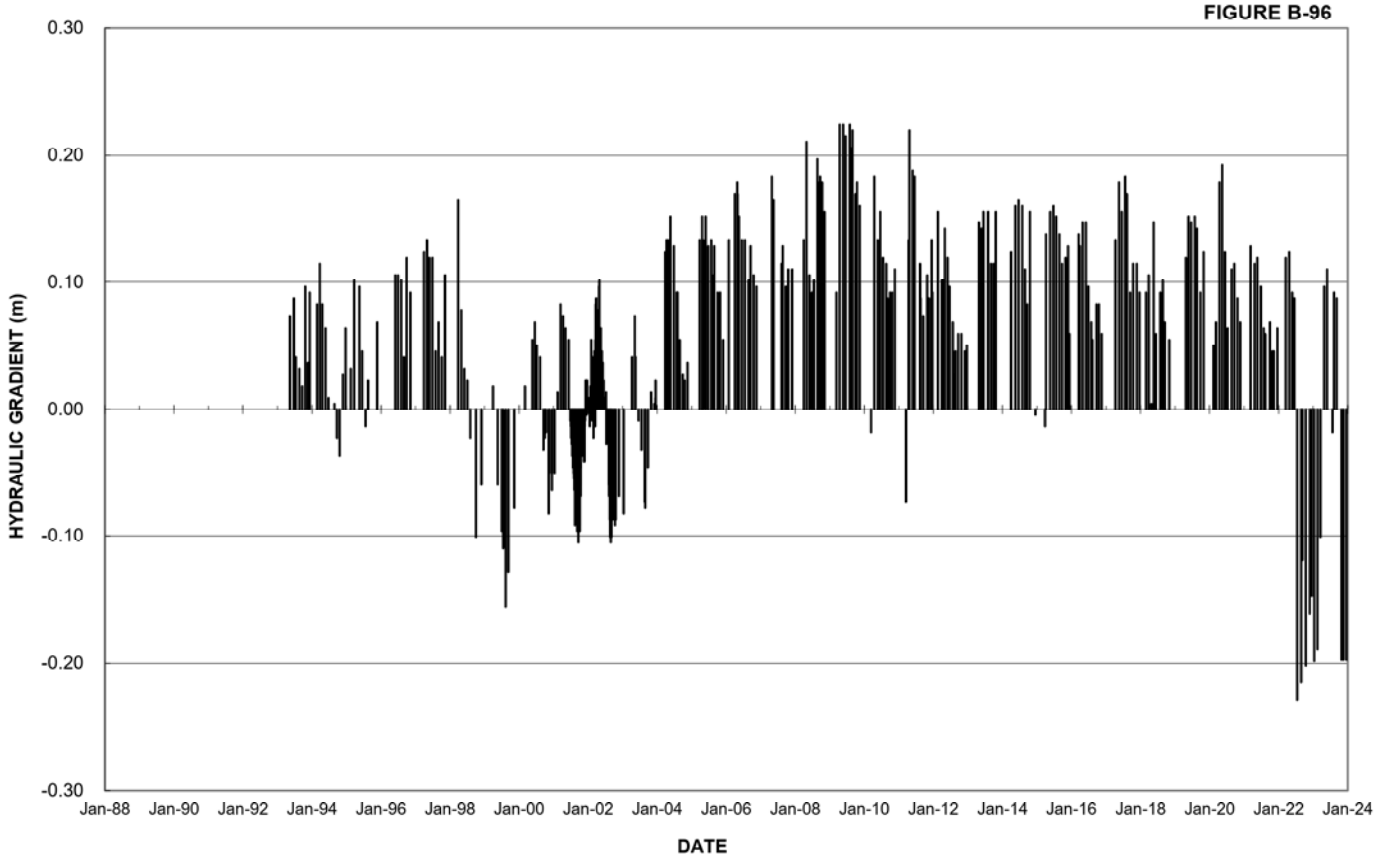
THERMOGRAPH
DP20

FIGURE B-95



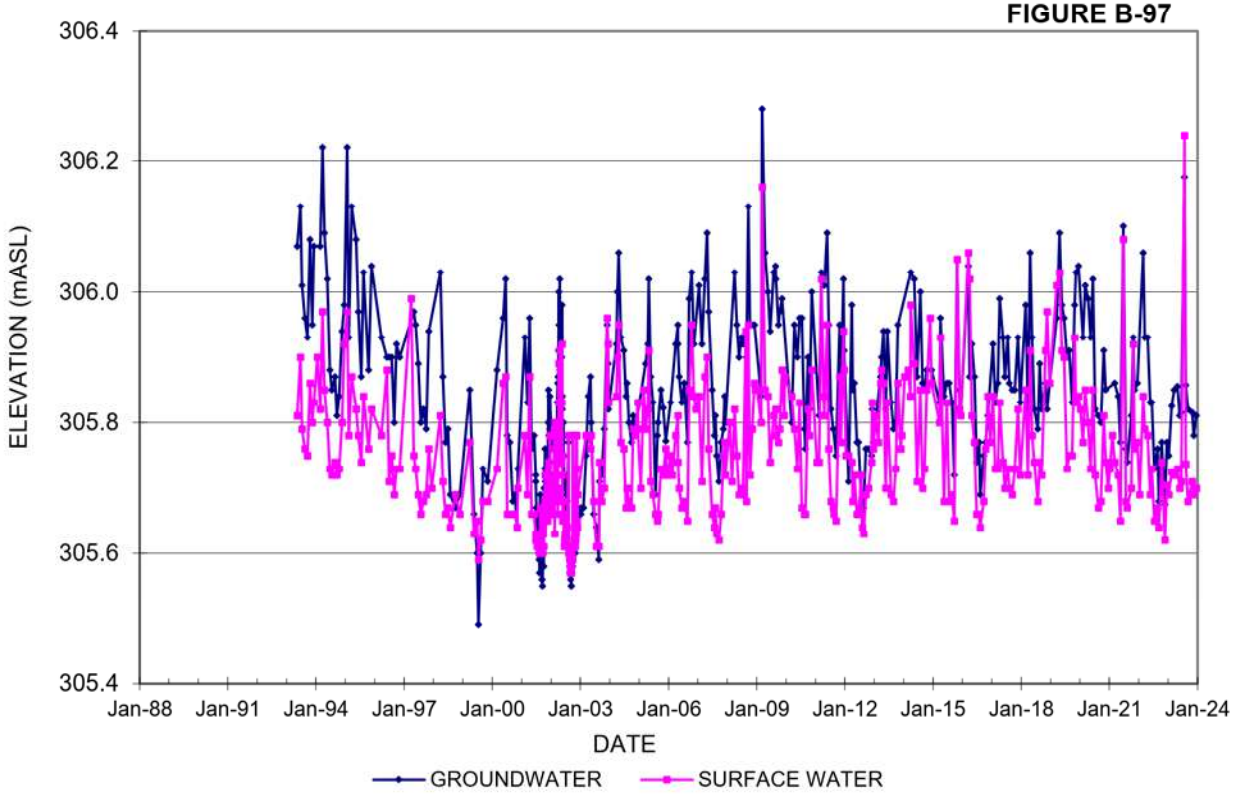
VERTICAL HYDRAULIC GRADIENT
DP20

FIGURE B-96



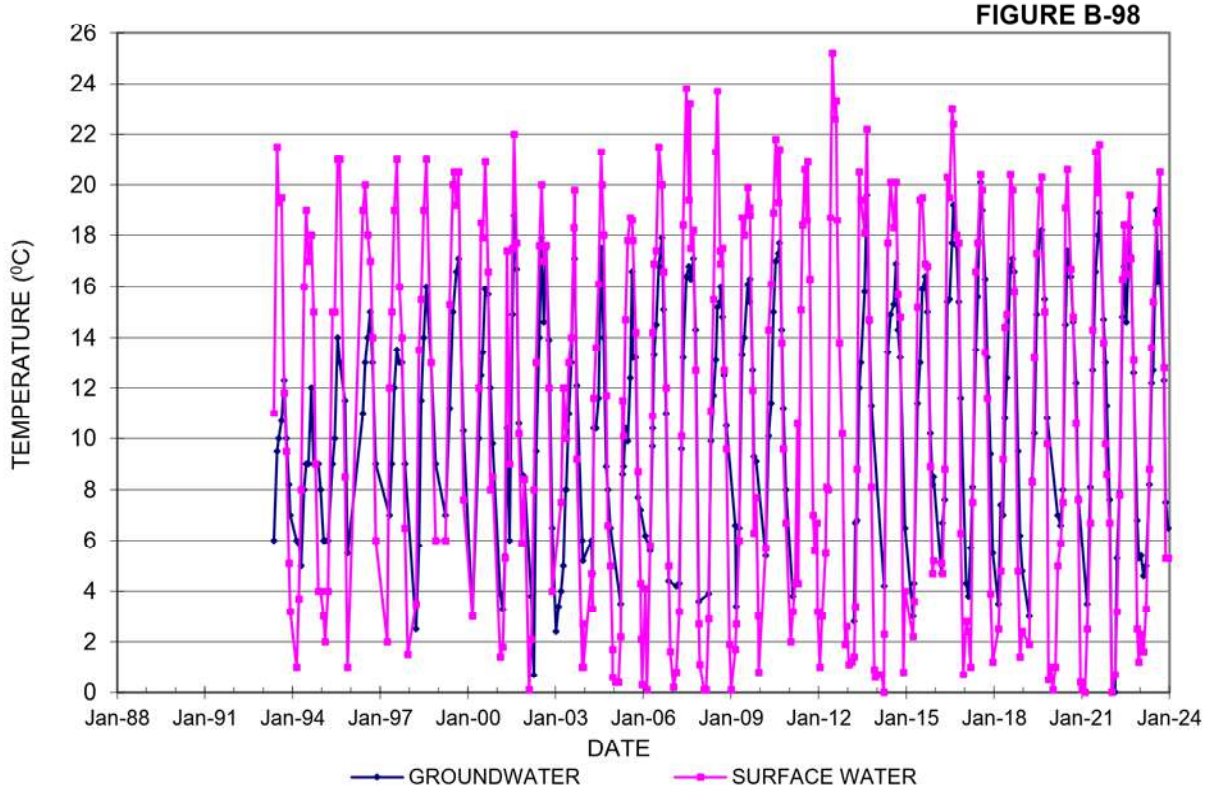
GROUNDWATER/SURFACE WATER HYDROGRAPH
DP21

FIGURE B-97



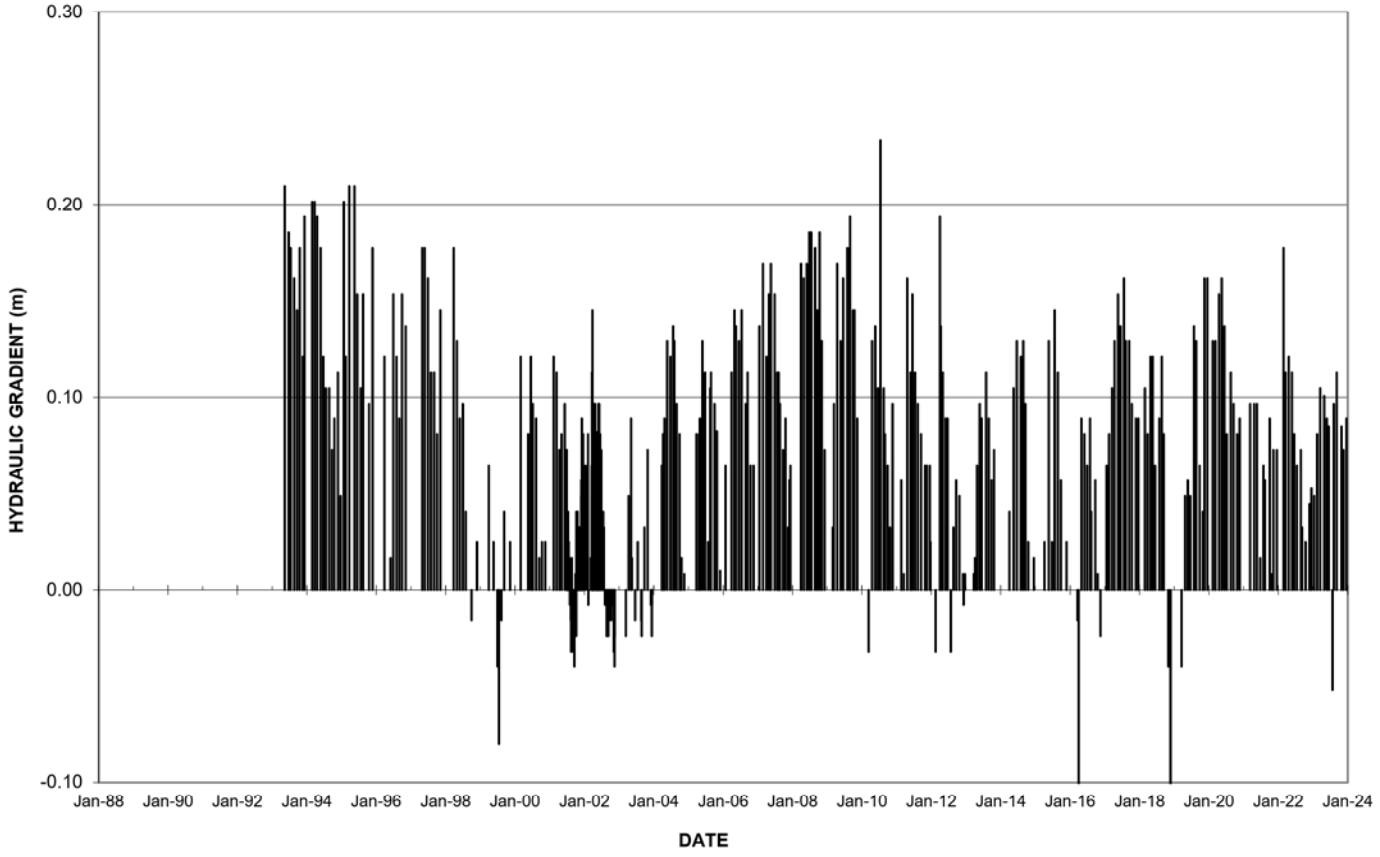
THERMOGRAPH
DP21

FIGURE B-98



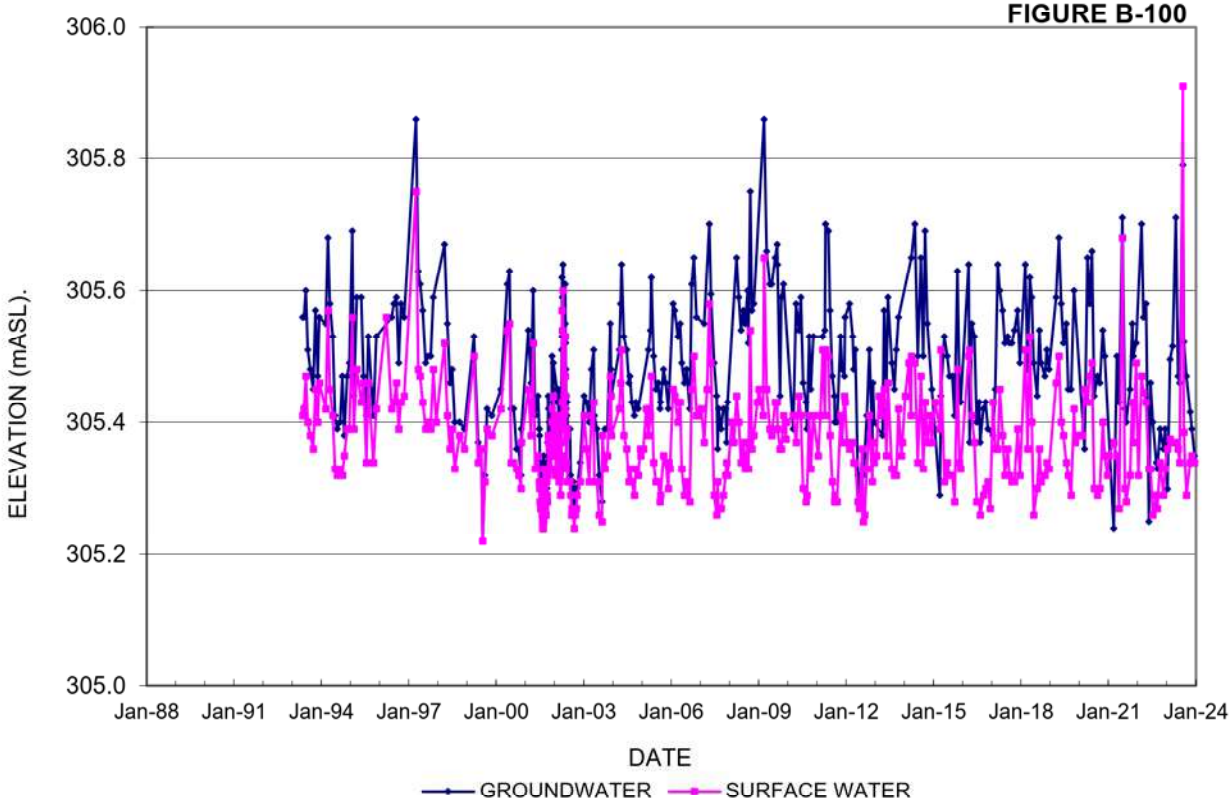
VERTICAL HYDRAULIC GRADIENT
DP21

FIGURE B-99



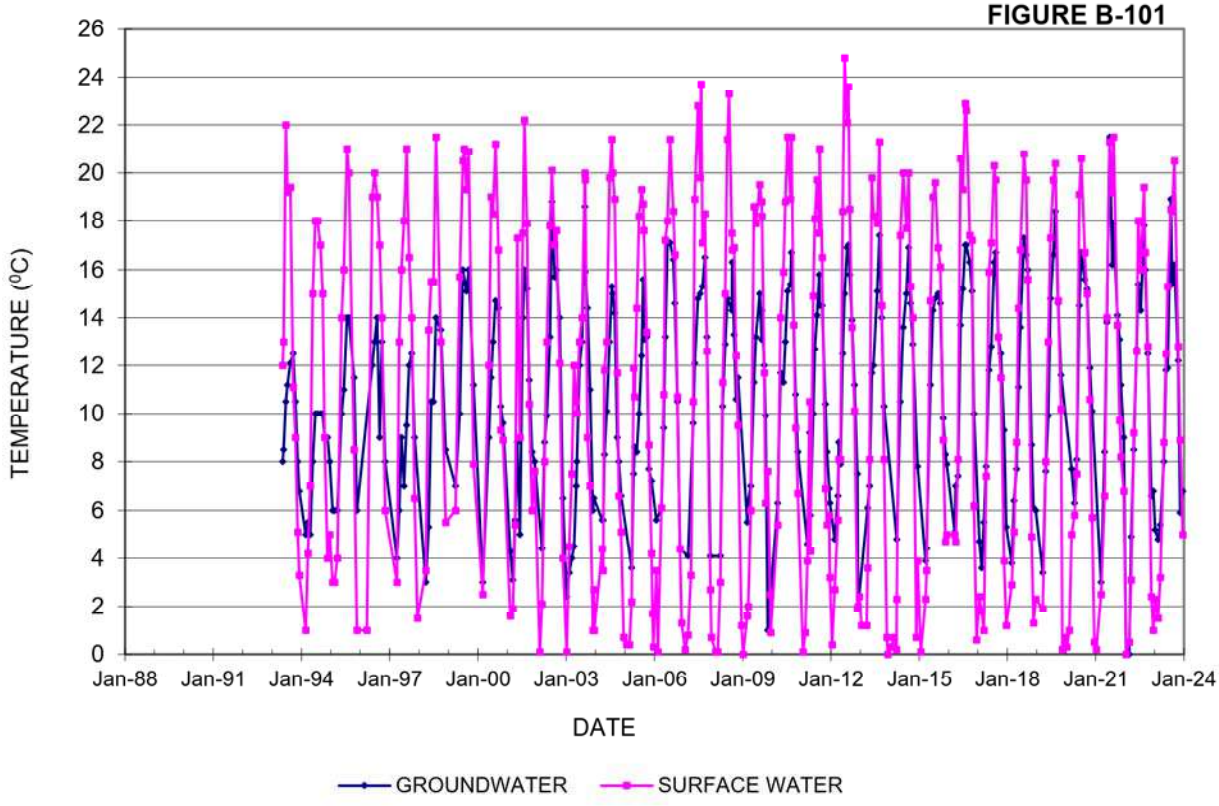
GROUNDWATER/SURFACE WATER HYDROGRAPH
DP22

FIGURE B-100



THERMOGRAPH
DP22

FIGURE B-101



VERTICAL HYDRAULIC GRADIENT
DP22

FIGURE B-102

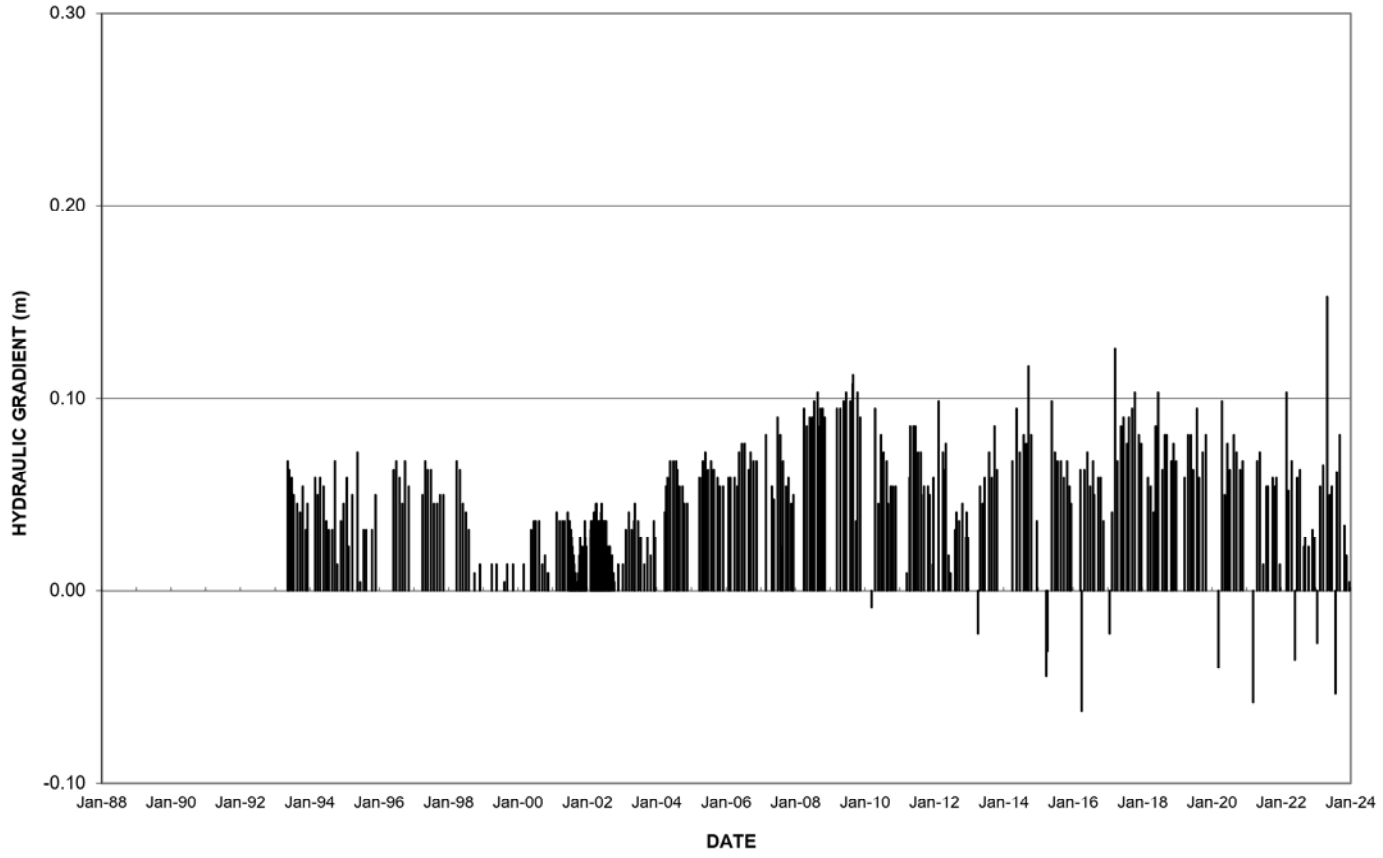


Figure B-103

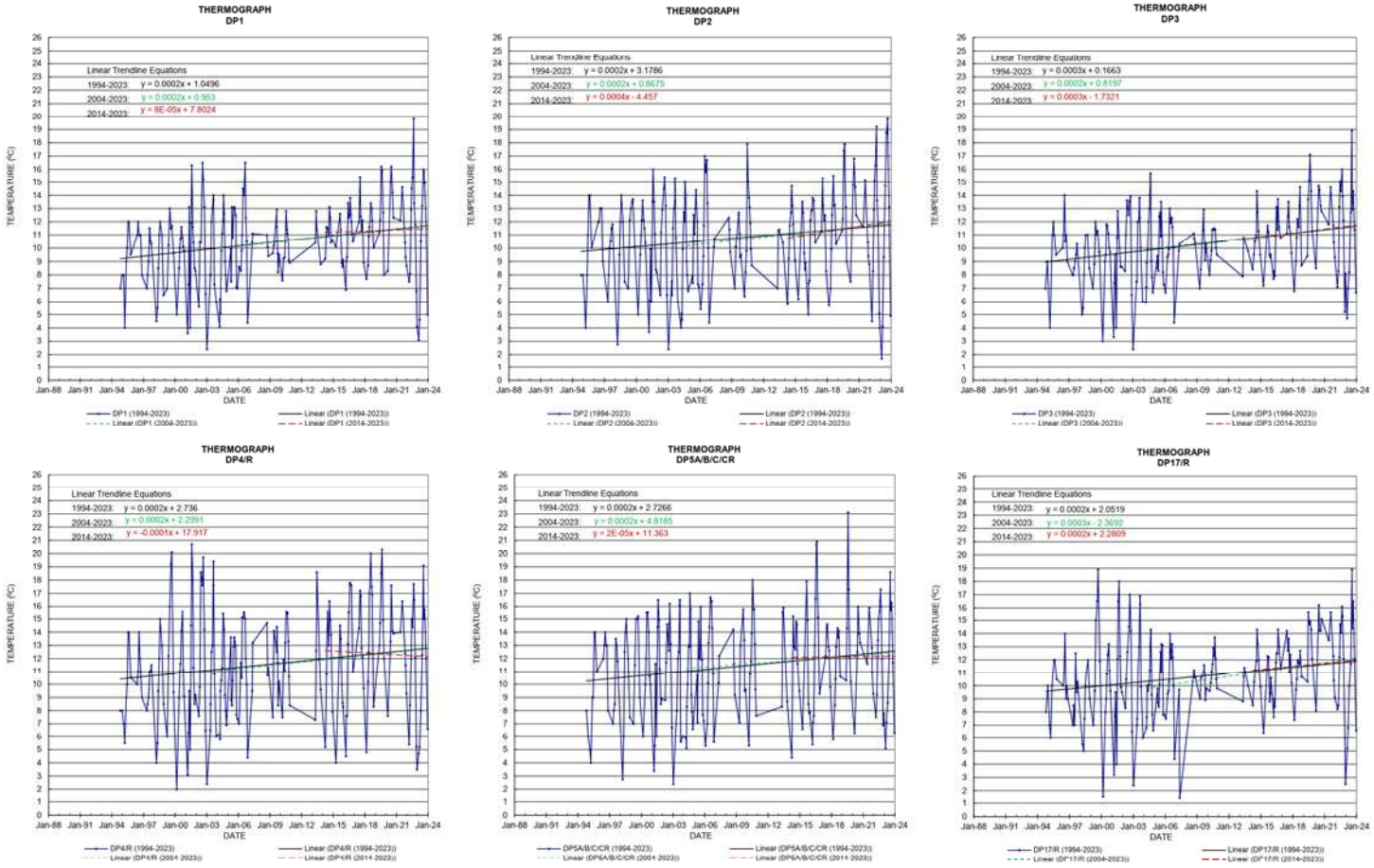
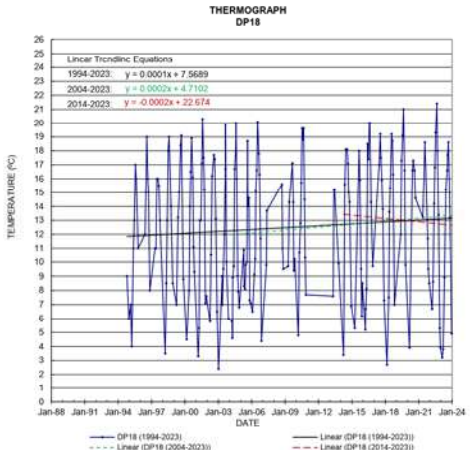
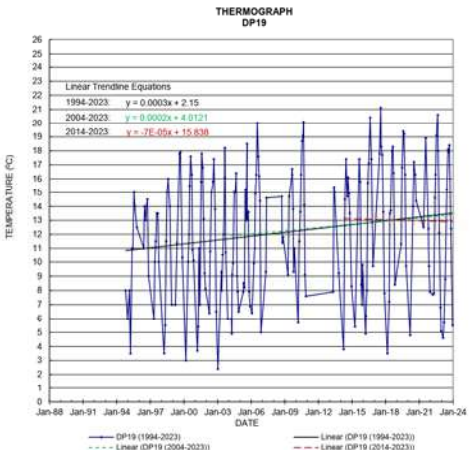
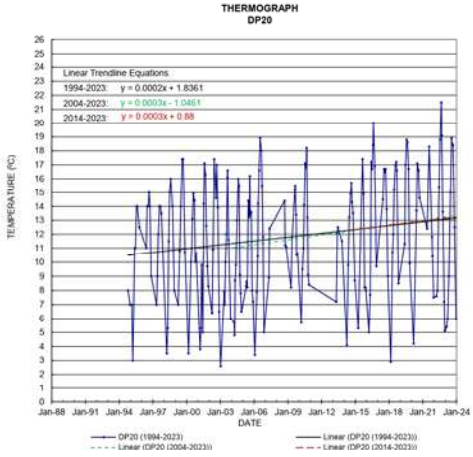
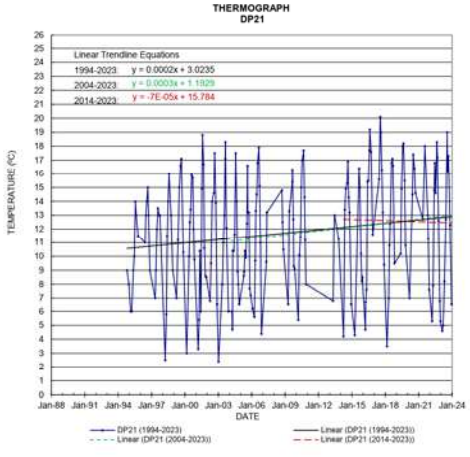

THERMOGRAPH
DP1
Linear Trendline Equations
1994-2023: y = 0.0002x + 1.0496
2004-2023: y = 0.0002x + 0.953
2014-2023: y = 8E-05x + 7.8024
TEMPERATURE (°C)
DATE
DP1 (1994-2023)
Linear (DP1 (1994-2023))
Linear (DP1 (2004-2023))
Linear (DP1 (2014-2023))
THERMOGRAPH
DP2
Linear Trendline Equations
1994-2023: y = 0.0002x + 3.1786
2004-2023: y = 0.0002x + 0.8675
2014-2023: y = 0.0004x - 4.457
TEMPERATURE (°C)
DATE
DP2 (1994-2023)
Linear (DP2 (1994-2023))
Linear (DP2 (2004-2023))
Linear (DP2 (2014-2023))
THERMOGRAPH
DP3
Linear Trendline Equations
1994-2023: y = 0.0003x + 0.1663
2004-2023: y = 0.0002x + 0.8197
2014-2023: y = 0.0003x - 1.7321
TEMPERATURE (°C)
DATE
DP3 (1994-2023)
Linear (DP3 (1994-2023))
Linear (DP3 (2004-2023))
Linear (DP3 (2014-2023))
THERMOGRAPH
DP4/R
Linear Trendline Equations
1994-2023: y = 0.0002x + 2.736
2004-2023: y = 0.0002x + 2.2891
2014-2023: y = -0.0001x + 17.917
TEMPERATURE (°C)
DATE
DP4/R (1994-2023)
Linear (DP4/R (1994-2023))
Linear (DP4/R (2004-2023))
Linear (DP4/R (2014-2023))
THERMOGRAPH
DP5A/B/C/CR
Linear Trendline Equations
1994-2023: y = 0.0002x + 2.7266
2004-2023: y = 0.0002x + 4.8185
2014-2023: y = 2E-05x + 11.363
TEMPERATURE (°C)
DATE
DP5A/B/C/CR (1994-2023)
Linear (DP5A/B/C/CR (1994-2023))
Linear (DP5A/B/C/CR (2004-2023))
Linear (DP5A/B/C/CR (2014-2023))
THERMOGRAPH
DP17/R
Linear Trendline Equations
1994-2023: y = 0.0002x + 2.0519
2004-2023: y = 0.0003x - 2.3692
2014-2023: y = 0.0002x + 2.2809
TEMPERATURE (°C)
DATE
DP17/R (1994-2023)
Linear (DP17/R (1994-2023))
Linear (DP17/R (2004-2023))
Linear (DP17/R (2014-2023))

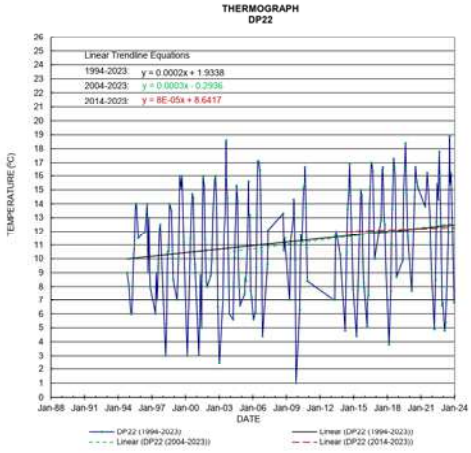
Figure B-104


THERMOGRAPH
DP18
Linear Trendline Equations
1994-2023: y = 0.0001x + 7.5689
2004-2023: y = 0.0002x + 4.7102
2014-2023: y = -0.0002x + 22.674
TEMPERATURE (°C)
DATE
Jan-88 Jan-91 Jan-94 Jan-97 Jan-00 Jan-03 Jan-06 Jan-09 Jan-12 Jan-15 Jan-18 Jan-21 Jan-24
DP18 (1994-2023)
Linear (DP18 (1994-2023))
Linear (DP18 (2004-2023))
Linear (DP18 (2014-2023))


THERMOGRAPH
DP19
Linear Trendline Equations
1994-2023: y = 0.0003x + 2.15
2004-2023: y = 0.0002x + 4.0121
2014-2023: y = .7E-05x + 15.838
TEMPERATURE (°C)
DATE
Jan-88 Jan-91 Jan-94 Jan-97 Jan-00 Jan-03 Jan-06 Jan-09 Jan-12 Jan-15 Jan-18 Jan-21 Jan-24
DP19 (1994-2023)
Linear (DP19 (1994-2023))
Linear (DP19 (2004-2023))
Linear (DP19 (2014-2023))


THERMOGRAPH
DP20
Linear Trendline Equations
1994-2023: y = 0.0002x + 1.8361
2004-2023: y = 0.0003x - 1.0461
2014-2023: y = 0.0003x + 0.88
TEMPERATURE (°C)
DATE
Jan-88 Jan-91 Jan-94 Jan-97 Jan-00 Jan-03 Jan-06 Jan-09 Jan-12 Jan-15 Jan-18 Jan-21 Jan-24
DP20 (1994-2023)
Linear (DP20 (1994-2023))
Linear (DP20 (2004-2023))
Linear (DP20 (2014-2023))


THERMOGRAPH
DP21
Linear Trendline Equations
1994-2023: y = 0.0002x + 3.0235
2004-2023: y = 0.0003x + 1.1929
2014-2023: y = -7E-05x + 15.784
TEMPERATURE (°C)
DATE
Jan-88 Jan-91 Jan-94 Jan-97 Jan-00 Jan-03 Jan-06 Jan-09 Jan-12 Jan-15 Jan-18 Jan-21 Jan-24
DP21 (1994-2023)
Linear (DP21 (1994-2023))
Linear (DP21 (2004-2023))
Linear (DP21 (2014-2023))


THERMOGRAPH
DP22
Linear Trendline Equations
1994-2023: y = 0.0002x + 1.9338
2004-2023: y = 0.0003x - 0.2936
2014-2023: y = 8E-05x + 8.6417
TEMPERATURE (°C)
DATE
Jan-88 Jan-91 Jan-94 Jan-97 Jan-00 Jan-03 Jan-06 Jan-09 Jan-12 Jan-15 Jan-18 Jan-21 Jan-24
DP22 (1994-2023)
Linear (DP22 (1994-2023))
Linear (DP22 (2004-2023))
Linear (DP22 (2014-2023))

APPENDIX C

Groundwater/Surface Water Chemical Results

Technical Appendix B – 2023 Hydrogeology Report

TABLE C-1
WATER CHEMISTRY - FIELD MEASUREMENTS
MILL CREEK AGGREGATES PIT

LOCATION	DATE	TEMPERATURE (°C)	pH (as units)	CONDUCTIVITY (µS/cm)
BH1-I	December, 1992	9.0	7.4	800
	April, 1993	6.0	7.4	590
	December, 1993	9.6	7.7	455
	April, 1994	3.6	7.7	522
	December, 1994	12.0	7.3	NA
	May, 1995	9.3	7.8	570
	November, 1995	11.0	7.8	600
	November, 1996	11.5	7.4	610
	November, 1997	12.0	7.2	NA
	November, 1998	17.6	8.0	625
	November, 1999	12.9	7.9	600
	November, 2000	10.6	7.7	610
	March, 2001	5.1	7.9	NA
	November, 2001	12.5	7.5	618
	April, 2002	12.0	7.2	660
	November, 2002	13.0	7.2	590
	April, 2003	10.7	7.6	643
	November, 2003	11.1	7.2	716
	March, 2004	8.0	7.3	699
	November, 2004	13.6	7.8	655
	March, 2005	5.9	8.0	708
	December, 2005	11.8	7.8	596
	March,2006	4.2	7.9	681
	November, 2006	14.5	7.8	585
	April, 2007	16.4	7.7	511
	November, 2007	11.9	8.0	639
	April, 2008	11.4	7.8	610
	December,2008	11.9	7.2	649
	April, 2009	10.2	8.9	514
	November,2009	14.3	7.8	725
	April, 2010	NA	NA	NA
	November, 2010	13.6	7.6	724
	March, 2011	11.7	8.0	661
	November, 2011	15.1	8.0	663
	April, 2012	12.2	7.8	644
	December, 2012	11.0	8.1	725
	April, 2013	11.9	8.2	705
	December, 2013	9.1	7.7	712
	April, 2014	11.0	8.3	799
	December, 2014	12.5	7.8	820
	April, 2015	9.9	8.2	792
	December, 2015	12.7	7.7	1111 *
	March, 2016	11.9	7.8	776
	November, 2016	14.3	8.0	803
	March, 2017	12.4	8.1	800
	November, 2017	13.2	7.4	730
	March, 2018	11.9	8.0	750
	November, 2018	11.5	7.8	1072
	March, 2019	11.0	7.9	1085
BH1r	November, 2020	12.4	8.4	1020
	March, 2021	2.5	7.4	860
	November, 2021	15.3	8.0	1103
	March, 2022	3.8	8.0	1020
	November, 2022	11.6	8.1	969
	March, 2023	2.5	8.1	908
	November, 2023	13.6	8.0	1005
BH92-5	November, 2019	10.1	7.7	1642
	March, 2020	8.8	8.1	984

LOCATION	DATE	TEMPERATURE (°C)	pH (as units)	CONDUCTIVITY (µS/cm)
BH92-8	December, 1992	9.2	7.3	775
	April, 1993	7.0	7.4	700
	December, 1993	9.1	7.6	466
	April, 1994	6.5	7.4	545
	December, 1994	10.0	7.2	NA
	May, 1995	8.3	7.7	600
	November, 1995	8.0	7.8	640
	November, 1996	9.0	7.3	692
	November, 1997	9.5	7.2	NA
	November, 1998	10.9	7.8	620
	November, 1999	13.3	7.8	700
	November, 2000	11.0	8.2	680
	March, 2001	5.0	8.0	NA
	November, 2001	12.5	7.5	670
	April, 2002	7.9	7.2	610
	November, 2002	12.0	7.2	775
	April, 2003	7.6	7.5	706
	November, 2003	11.5	7.4	770
	March, 2004	7.0	7.3	752
	November, 2004	12.0	8.2	725
	January, 2008	8.5	7.5	498
	April, 2008	7.7	7.9	560
	December, 2008	9.8	7.5	508
	April, 2009	8.3	8.2	450
	November, 2009	10.3	8.2	204
	April, 2010	8.8	7.8	289
	November, 2010	10.6	8.2	292
	March, 2011	9.5	8.0	470
	November, 2011	14.4	8.1	447
	April, 2012	8.2	7.4	657
	December, 2012	12.4	7.8	718
	April, 2013	10.0	8.3	710
	December, 2013	10.0	7.5	713
	April, 2014	8.5	8.1	831
	December, 2014	13.6	7.1	804
	April, 2015	7.4	8.1	805
	December, 2015	13.8	6.7	1036 *
	March, 2016	7.4	6.8	750
	November, 2016	16.3	7.6	800
	March, 2017	9.0	8.0	740
	April, 2017	8.7	8.1	740
	November, 2017	16.1	7.4	650
	March, 2018	10.7	8.1	660
	November 2018	13.1	7.7	959
	March, 2019	8.4	8.1	1048
	November, 2019	12.6	8.0	1003
	March, 2020	9.1	7.4	804
	November, 2020	12.6	8.0	900
	March, 2021	9.6	8.2	780
	November, 2021	14.4	8.3	986
	March, 2022	9.4	7.8	978
	November, 2022	13.3	7.8	918
	March, 2023	9.3	7.8	842
	November, 2023	13.7	7.7	957
BH6	March, 2005	5.0	7.9	762
	November, 2005	11.0	7.9	466
	March, 2006	4.1	7.9	475
	November, 2006	12.9	7.9	466
	April, 2007	13.1	8.0	430

Notes: NA = Reading not available.
' * ' denotes suspected instrument error.

TABLE C-1
WATER CHEMISTRY - FIELD MEASUREMENTS
MILL CREEK AGGREGATES PIT

LOCATION	DATE	TEMPERATURE (°C)	pH (as units)	CONDUCTIVITY (µS/cm)
BH8-I	December, 1992	5.8	8.2	710
	April, 1993	4.5	7.4	550
	December, 1993	5.7	7.4	423
	April, 1994	4.2	7.2	467
	December, 1994	8.0	7.2	NA
	May, 1995	7.3	7.5	450
	November, 1995	7.0	7.6	500
	November, 1996	9.0	7.4	634
	November, 1997	7.5	7.2	NA
	November, 1998	9.4	7.9	460
	November, 1999	10.7	7.5	500
	November, 2000	10.0	7.2	480
	March, 2001	5.1	8.1	NA
	November, 2001	10.0	7.5	560
	April, 2002	6.2	7.3	530
	November, 2002	9.0	7.2	590
	April, 2003	4.5	7.8	553
	November, 2003	9.9	7.2	700
	March, 2004	4.0	7.2	665
	November, 2004	10.8	7.6	598
	March,2005	5.9	7.8	571
	November, 2005	10.8	7.6	616
	March, 2006	4.0	7.7	553
	November, 2006	12.4	8.0	491
	April, 2007	11.5	7.7	515
	November, 2007	11.7	8.1	509
	April, 2008	7.1	7.8	465
	December, 2008	6.9	7.2	610
	April, 2009	7.7	8.7	439
	November, 2009	9.9	7.7	668
	April, 2010	9.1	7.2	634
	November, 2010	9.6	7.2	665
	March, 2011	7.0	8.5	658
BH32-III	November, 2011	10.1	7.5	739
	April, 2012	9.7	7.1	791
	December, 2012	7.5	8.2	935
	April, 2013	8.4	7.6	886
	December, 2013	8.5	7.9	741
	April, 2014	7.1	7.3	987
	December, 2014	5.9	7.7	962
	April, 2015	5.8	7.5	983
	December, 2015	8.5	7.4	1148 *
	March, 2016	5.4	7.8	840
	November, 2016	10.8	7.9	840
	March, 2017	5.2	7.4	1050
	April, 2017	5.3	7.5	1000
	November, 2017	10.7	7.2	680
	March, 2018	6.1	8.3	720
	November, 2018	9.5	7.0	610
	March, 2019	5.3	8.4	931
	November, 2019	10.3	7.7	921
	March, 2020	5.2	8.0	864
	November, 2020	10.9	8.0	848
	March, 2021	8.7	7.9	800
	November, 2021	11.8	7.9	944
	March, 2022	6.2	7.2	1074
	November, 2022	10.5	7.4	814
	March, 2023	5.7	7.0	798
	November, 2023	11.1	7.8	725

LOCATION	DATE	TEMPERATURE (°C)	pH (as units)	CONDUCTIVITY (µS/cm)
PHASE 1 POND	December, 2000	1.4	6.4	320
	April, 2001	3.8	8.5	NA
	November, 2001	10.0	7.8	673
	April, 2002	7.2	7.2	590
	November, 2002	6.0	7.4	540
	April, 2003	9.8	7.9	648
	November, 2003	9.4	8.1	620
	March, 2004	2.7	7.9	179
	November, 2004	10.9	8.4	677
	April, 2005	10.9	7.9	298
	November, 2005	9.3	8.5	677
	April, 2006	9.0	7.9	350
	November, 2006	10	8.1	545
	April, 2007	13.4	8.4	475
	November, 2007	9.9	8.3	605
	April, 2008	12.4	7.0	582
	December, 2008	0.7	7.2	586
	April, 2009	8.9	8.4	497
	November, 2009	8.3	8.4	703
	April, 2010	11.1	7.9	638
	November, 2010	5.3	8.3	670
	April, 2011	9.1	8.8	621
	November, 2011	9.9	8.6	652
	April, 2012	8.0	8.4	626
	December, 2012	6.0	8.3	672
	April, 2013	1.3	7.6	131
	December, 2013	1.2	7.5	930
	April, 2014	3.6	8.4	773
	December, 2014	2.1	8.2	853
	April, 2015	2.5	9.2	325
	December, 2015	5.7	7.7	1078 *
	March, 2016	5.3	7.9	686
	November, 2016	10.6	8.0	1090 *
	March, 2017	2.3	8.5	710
	November, 2017	6.7	7.6	640
	March, 2018	6.8	8.4	650
	November, 2018	4.3	8.2	981
	March, 2019	2.8	8.5	925
	November, 2019	6.1	7.5	1008
	March, 2020	1.6	7.9	711
	November, 2020	8.7	7.9	940
	March, 2021	4.3	7.6	700
	November, 2021	11.2	8.2	916
	March, 2022	4.8	7.9	903
	November, 2022	6.1	8.5	930
	March, 2023	3.5	8.0	868
	November, 2023	8.6	8.4	960

Notes: NA = Reading not available.
' * ' denotes suspected instrument error.

TABLE C-2
GROUNDWATER CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	ODWQS	BH1-I												
Date			16-Dec-92	20-Apr-93	13-Dec-93	20-Apr-94	21-Dec-94	16-May-95	22-Nov-95	7-Nov-96	26-Nov-97	18-Nov-98	9-Nov-99	8-Nov-00	13-Mar-01
Sodium	mg/L	200 [2]	27.6	20.2	29.1	36.9	35.6	37	38.5	39.4	43	49.5	47.8	46.1	45.4
Potassium	mg/L		2.8	2.1	2.2	1.4	2.1	1.6	2	1.6	1.7	2.2	2	2	1
Calcium	mg/L		72.6	73.8	68.2	64.6	69.3	57.5	58	55.7	50.1	48.4	51.8	49.4	48.1
Magnesium	mg/L		30.2	29	26.9	27.9	25.2	20.7	22.6	20.1	23	23.8	25.7	26	25.6
Alkalinity (as CaCO3)	mg/L	30-500 [3]	231	222	215	172	165	156	160	126	145	137	149	171	143
Sulphate	mg/L	500 [2]	42	40	47	57	61	54	54	46	45	49	45	47.7	47.9
Chloride	mg/L	250 [2]	59.1	49.4	53	69.3	74.3	76.1	74.3	67.8	93.4	91.6	90	101	99.4
Orthophosphate (as P)	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.3	<0.3	<0.3
Nitrate and Nitrite (as N)	mg/L	10 [1]	7.2	9.4	7	0.56	0.34	0.53	0.17	0.33	0.48	0.44	0.3	0.6	0.4
Ammonia (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.04	0.08	<0.03
Iron	mg/L	0.3 [2]	0.5	0.49	0.13	2.07	1.61	0.03	0.03	<0.02	<0.02	0.06	0.07	<0.01	<0.01
Manganese	mg/L	0.05 [2]	0.19	0.04	<0.01	0.35	0.26	<0.01	<0.01	<0.01	<0.01	<0.01	0.008	<0.005	<0.005
Copper	mg/L	1 [2]	0.01	<0.01	<0.01	0.01	<0.01	0.02	0.01	<0.01	<0.01	<0.01	<0.003	<0.003	<0.003
Zinc	mg/L	5 [2]	0.18	0.19	0.06	0.15	0.19	0.02	0.02	0.01	<0.01	<0.01	0.012	0.018	0.015
Conductivity	µS/cm		825	762	831	675	711	634	688	537	620	641	680	633	646
pH	Units	6.5-8.5 [3]	7.4	7.7	7.9	7.7	7.7	7.4	7.5	7.8	8.2	8.1	7.95	7.84	7.91
Dissolved Organic Carbon	mg/L	5[2]	1.2	<0.5	<0.5	0.6	0.6	<0.5	<0.5	<0.5	0.8	0.6	0.6	1.6	<0.2
Hardness (as CaCO3)	mg/L	80-100 [3]	306	304	281	276	277	229	238	222	220	219	235	230	226
Bicarbonate (as CaCO3)	mg/L		230	221	213	171	164	156	160	125	143	135	148	170	142
Carbonate (as CaCO3)	mg/L		0.54	1.04	1.59	1	1	<1.00	0.5	<1.00	2	2	1	1	1
Total Dissolved Solids	mg/L	500 [2]	411	395	392	366	NA	NA	NA	312	349	354	357	381	359
Cation Sum	meq/L		7.38	7	6.94	7.16	7.13	6.1	6.39	6.19	6.3	6.58	6.82	6.65	6.52
Anion Sum	meq/L		7.67	7.34	7.27	6.62	6.69	6.43	6.43	5.4	6.49	6.38	6.48	7.3	6.69
Ion Balance	%		1.95	2.33	2.34	3.92	3.23	2.59	0.33	6.8	1.48	1.56	2.61	4.65	1.25
Total Oil and Grease	mg/L		<1	<1	<1	<1	<1	<1	<1					<1	<1

PARAMETER	UNITS	ODWQS	BH1-I												
Date			6-Nov-01	12-Apr-02	20-Nov-02	23-Apr-03	6-Nov-03	10-Mar-04	5-Nov-04	18-Mar-05	7-Dec-05	3-Mar-06	6-Nov-06	30-Apr-07	15-Nov-07
Sodium	mg/L	200 [2]	51.8	47.1	50.5	50.5	51.2	49	54.7	56.6	54	63.2	63.6	65	69.8
Potassium	mg/L		2	2	1	2	2	1	1	2	2.4	2	2	1.8	2
Calcium	mg/L		52.2	53	47.8	51.9	45.9	47.3	47	47	41	58.8	47	47	46.2
Magnesium	mg/L		27.8	28	27.3	27.8	26.6	27.6	27.6	27.5	26	36.1	27.8	31	28.6
Alkalinity (as CaCO3)	mg/L	30-500 [3]	172	179	153	160	169	163	145	140	123	145	171	147	156
Sulphate	mg/L	500 [2]	45.9	48.7	48.4	45.7	37.1	44.4	42.9	44.7	35	53	43	47	42
Chloride	mg/L	250 [2]	89.7	93.3	99.9	95.2	102	99.6	107	118	94	115	132	120	120
Orthophosphate (as P)	mg/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.189	<0.01	<0.01	<0.01	0.03
Nitrate and Nitrite (as N)	mg/L	10 [1]	0.5	0.5	0.5	0.7	<0.2	1	0.6	0.5	2.9	0.4	0.3	0.4	0.3
Ammonia (as N)	mg/L		0.04	<0.03	<0.03	<0.03	4.23	<0.03	0.03	<0.03	<0.05	<0.05	0.22	0.08	0.14
Iron	mg/L	0.3 [2]	<0.01	<0.01	0.02	0.02	0.12	0.07	0.17	<0.01	<0.05	0.54	<0.02	0.14	0.14
Manganese	mg/L	0.05 [2]	0.01	<0.005	0.011	0.005	0.112	0.039	0.031	<0.005	<0.002	<0.01	<0.01	0.02	0.03
Copper	mg/L	1 [2]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.003	<0.02	<0.02	0.002	<0.02
Zinc	mg/L	5 [2]	0.015	0.016	0.013	0.081	<0.005	0.29	0.034	0.017	0.025	0.01	<0.01	0.058	0.03
Conductivity	µS/cm		669	699	660	646	680	656	678	713	571	734	779	751	766
pH	Units	6.5-8.5 [3]	7.74	7.98	8.07	7.93	7.51	8	7.99	7.95	8.1	8.1	8.2	8.2	8.2
Dissolved Organic Carbon	mg/L	5[2]	0.4	0.8	0.6	0.4	10	0.8	1.2	0.8	0.8	0.4	1	0.5	0.5
Hardness (as CaCO3)	mg/L	80-100 [3]	245	247	232	244	224	232	231	231	210	300	230	250	230
Bicarbonate (as CaCO3)	mg/L		171	177	151	159	168	161	144	139	121	143	168	144	154
Carbonate (as CaCO3)	mg/L		<1	2	2	1	<1	2	1	1	1	2	3	2	2
Total Dissolved Solids	mg/L	500 [2]	380	386	373	376	376	375	374	386	326	415	419	405	408
Cation Sum	meq/L		7.21	7.05	6.86	7.12	7.06	6.8	7.03	7.14	6.6	8.72	7.47	7.84	7.77
Anion Sum	meq/L		6.96	7.26	6.92	6.89	7.03	7.06	6.85	7.09	6.02	7.26	8.05	7.26	7.41
Ion Balance	%		1.78	1.46	0.43	1.68	0.22	1.92	1.31	0.3	4.63	9.13	3.78	3.83	2.41
Total Oil and Grease	mg/L		1	<1	<1	<1	22	<1	1	<1	<0.5	<0.5	<0.5	<0.5	1.2

NOTES:
- ODWQS Ontario Drinking Water Quality Standards (2006)
- (1) Maximum Acceptable Concentration
- (2) Aesthetic Objective
- (3) Operational Guideline
- * Concentration considered anomalous

TABLE C-2
GROUNDWATER CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	ODWQS	BH1-I												
Date			29-Apr-08	17-Dec-08	15-Apr-09	25-Nov-09	16-Apr-10	29-Nov-10	29-Mar-11	16-Nov-11	10-Apr-12	6-Dec-12	4-Apr-13	10-Dec-13	1-Apr-14
Sodium	mg/L	200 [2]	64.3	58.1	59.1	62.1	62.4	51	63.4	60	58.9	62.6	61.2	63	60
Potassium	mg/L		2	<1	2	2	2	2.1	2	2.5	1	2	2	2	2
Calcium	mg/L		46.5	41.2	42.3	44	45.2	38.9	46.1	43	44.5	46.5	46.3	45	43
Magnesium	mg/L		28.6	25.6	27.4	29.1	29.7	24.2	29	28	26.6	30.4	31.4	32	30
Alkalinity (as CaCO3)	mg/L	30-500 [3]	99	159	147	153	148	144	143	137	130	160	160	150	160
Sulphate	mg/L	500 [2]	91	39	39	35	37	32	38	35	38	37	38	37	36
Chloride	mg/L	250 [2]	120	120	120	110	130	110	130	120	120	120	130	130	140
Orthophosphate (as P)	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate and Nitrite (as N)	mg/L	10 [1]	0.4	0.4	0.5	0.3	0.4	0.3	0.2	0.2	<0.1	0.2	0.16	0.1	<0.1
Ammonia (as N)	mg/L		<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.072
Iron	mg/L	0.3 [2]	<0.02	<0.02	<0.02	<0.02	<0.02	0.027	<0.02	<0.1	<0.02	<0.02	<0.02	0.04	<0.02
Manganese	mg/L	0.05 [2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	1 [2]	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.001	<0.02	<0.02	<0.02	<0.02	<0.02
Zinc	mg/L	5 [2]	<0.01	0.01	0.01	0.02	0.01	0.012	0.01	0.014	<0.01	0.01	0.01	0.02	0.02
Conductivity	µS/cm		779	771	724	731	770	716	756	740	690	780	770	770	770
pH	Units	6.5-8.5 [3]	7.8	8	7.9	7.9	8.1	8.09	8.05	8.02	8	7.58	8.11	8.06	7.93
Dissolved Organic Carbon	mg/L	5[4]	0.6	0.4	0.5	0.8	0.5	0.8	0.5	0.7	0.36	0.37	0.41	0.36	0.37
Hardness (as CaCO3)	mg/L	80-100 [3]	230	210	220	230	230	200	230	220	220	240	240	250	230
Bicarbonate (as CaCO3)	mg/L		98	157	146	152	146	142	141	135	130	160	150	150	150
Carbonate (as CaCO3)	mg/L		<1	2	1	1	2	2	1	1	1.2	<1	1.9	1.6	1.2
Total Dissolved Solids	mg/L	500 [4]	421	380	381	380	401	353	398	374	369	400	406	400	400
Cation Sum	meq/L		7.53	6.7	6.98	7.35	7.46	6.21	7.5	7.08	7	7.61	7.62	7.7	7.28
Anion Sum	meq/L		7.37	7.28	7.12	6.94	7.45	6.77	7.33	6.85	6.73	7.39	7.55	7.26	7.67
Ion Balance	%		1.12	4.16	0.99	2.85	0.07	4.33	1.18	1.67	1.97	1.47	0.45	2.9	2.62
Total Oil and Grease	mg/L		<0.5	<0.5	<0.5	1.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

PARAMETER	UNITS	ODWQS	BH1-I										BH1-R		
Date			15-Dec-14	6-Apr-15	10-Dec-15	30-Mar-16	14-Nov-16	17-Mar-17	21-Nov-17	26-Mar-18	21-Nov-18	19-Mar-19	19-Nov-20	10-Mar-21	10-Nov-21
Sodium	mg/L	200 [2]	61	65	66	70	75	70	76	73	80	82	95	110	86
Potassium	mg/L		2	2	3	2	3	2.6	2.9	2.7	2.5	2.8	2.6	3.0	2.4
Calcium	mg/L		41	41	44	44	45	42	43	42	42	45	40	48	40
Magnesium	mg/L		30	28	32	32	32	32	32	31	33	32	32	34	29
Alkalinity (as CaCO3)	mg/L	30-500 [3]	140	130	150	150	160	160	160	160	170	140	130	140	130
Sulphate	mg/L	500 [2]	36	36	37	38	36	35	32	35	31	36	35	37	36
Chloride	mg/L	250 [2]	120	150	130	140	140	140	140	150	160	160	180	180	180
Orthophosphate (as P)	mg/L		<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate and Nitrite (as N)	mg/L	10 [1]	0.17	<0.1	<0.1	0.21	<0.10	<0.10	0.17	<0.10	<0.10	0.16	0.11	0.16	0.10
Ammonia (as N)	mg/L		0.058	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	0.12	<0.050	0.056	<0.050	0.19
Iron	mg/L	0.3 [2]	<0.02	0.05	<0.02	<0.02	<0.02	<0.1	<0.1	<0.10	<0.10	<0.1	<0.1	<0.1	0.200
Manganese	mg/L	0.05 [2]	<0.01	<0.01	0.02	<0.01	<0.01	<0.002	0.0069	<0.002	<0.002	<0.002	<0.0020	<0.0020	0.030
Copper	mg/L	1 [2]	<0.02	<0.02	<0.02	<0.02	<0.02	0.0017	<0.001	<0.001	0.0036	0.0015	<0.00090	<0.00090	0.0010
Zinc	mg/L	5 [2]	0.01	0.01	0.01	0.02	0.01	0.011	<0.010	0.011	0.013	0.025	<0.0050	0.0052	0.029
Conductivity	µS/cm		750	800	830	830	860	880	890	900	920	900	940	980	910
pH	Units	6.5-8.5 [3]	7.87	7.81	8.13	8.04	8.12	8.08	8.07	8.01	8.13	7.90	8.09	8.16	7.89
Dissolved Organic Carbon	mg/L	5[2]	0.64	0.42	0.6	0.52	0.99	0.65	0.74	<0.50	0.67	<0.50	0.47	0.74	<0.40
Hardness (as CaCO3)	mg/L	80-100 [3]	230	220	240	240	250	230	240	230	240	240	230	260	220
Bicarbonate (as CaCO3)	mg/L		140	130	150	150	160	160	160	160	160	140	130	140	130
Carbonate (as CaCO3)	mg/L		<1.0	<1.0	1.9	1.5	2.0	1.8	1.8	1.5	2.1	1.0	1.5	1.9	<1.0
Total Dissolved Solids	mg/L	500 [2]	380	400	410	420	430	456	445	395	485	455	520	490	435
Cation Sum	meq/L		7.24	7.23	7.76	7.88	8.25	7.78	8.17	7.93	8.37	8.54	8.8	9.87	8.21
Anion Sum	meq/L		7.11	7.53	7.59	7.63	7.99	7.87	7.93	8.16	8.52	7.97	8.43	8.68	8.33
Ion Balance	%		0.93	2.06	1.11	1.63	1.65	0.540	1.50	1.42	0.88	3.49	2.12	6.43	0.72
Total Oil and Grease	mg/L		0.5	1	<0.5	<0.50	<0.50	0.60	0.70	<0.50	0.80	<0.50	<0.50	<0.50	0.60

NOTES:
- ODWQS Ontario Drinking Water Quality Standards (2006)
- (1) Maximum Acceptable Concentration
- (2) Aesthetic Objective
- (3) Operational Guideline
- * Concentration considered anomalous

TABLE C-2
GROUNDWATER CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	ODWQS	BH1-R				BH92-5		BH6				
Date			17-Mar-22	25-Nov-22	15-Mar-23	17-Nov-23	13-Nov-19	09-Mar-20	18-Mar-05	11-Nov-05	3-Mar-06	6-Nov-06	30-Apr-07
Sodium	mg/L	200 [2]	91	100	110	110	150	88	44	48.9	46.1	23	38
Potassium	mg/L		2.5	2.5	2.8	2.7	2.1	2.1	2	3	2	2	1.8
Calcium	mg/L		44	46	50	46	86	64	72.4	64.2	88.2	43.3	65
Magnesium	mg/L		30	33	34	33	34	37	26.9	41	32.9	17.9	28
Alkalinity (as CaCO3)	mg/L	30-500 [3]	140	140	150	140	260	250	145	135	163	122	154
Sulphate	mg/L	500 [2]	31	36	34	34	33	32	97.1	79	86	49	82
Chloride	mg/L	250 [2]	160	190	190	200	260	140	105	128	90	63	71
Orthophosphate (as P)	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.3	<0.005	<0.01	<0.01	<0.01
Nitrate and Nitrite (as N)	mg/L	10 [1]	0.16	<0.10	0.12	0.12	<0.10	<0.10	<0.2	0.3	<0.1	0.11	<0.1
Ammonia (as N)	mg/L		0.24	0.22	<0.050	<0.050	<0.050	<0.050	0.37	<0.05	<0.05	0.25	0.16
Iron	mg/L	0.3 [2]	0.14	<0.10	<0.10	<0.100	0.32	0.18	0.05	<0.02	0.02	<0.02	<0.05
Manganese	mg/L	0.05 [2]	0.022	<0.0020	0.0026	<0.0020	0.12	0.094	0.174	<0.01	0.04	<0.01	<0.002
Copper	mg/L	1 [2]	0.0056	<0.00090	<0.00090	<0.00090	0.001	<0.001	0.006	<0.02	<0.02	<0.02	<0.001
Zinc	mg/L	5 [2]	0.026	0.0053	<0.0050	<0.0050	0.13	0.11	0.066	0.16	0.78	<0.01	0.43
Conductivity	µS/cm		900	990	1000	1000	1400	1000	785	841	763	511	680
pH	Units	6.5-8.5 [3]	8.13	8.19	8.18	8.20	8.04	7.86	7.76	8.09	8.1	8.2	8.2
Dissolved Organic Carbon	mg/L	5[2]	0.75	0.64	0.69	1.0	0.59	0.55	5	1.1	0.9	2.2	1.5
Hardness (as CaCO3)	mg/L	80-100 [3]	230	250	270	250	350	310	292	330	360	180	280
Bicarbonate (as CaCO3)	mg/L		140	140	140	140	260	250	144	134	161	120	152
Carbonate (as CaCO3)	mg/L		1.7	2.0	2.0	2.0	2.7	1.7	<1	2	2	2	2
Total Dissolved Solids	mg/L	500 [2]	430	455	485	515	710	540	439	445	442	272	383
Cation Sum	meq/L		8.72	9.66	10	9.76	13.9	10.1	7.82	8.78	9.16	4.71	7.29
Anion Sum	meq/L		8.05	8.91	8.86	9.04	13.3	9.68	7.88	7.98	7.56	5.22	6.79
Ion Balance	%		4.02	4.02	6.26	3.88	2.30	2.09	0.4	4.78	9.56	5.19	3.58
Total Oil and Grease	mg/L		1.0	<0.50	<0.50	1.2	0.80	<0.50	1	1.3	<0.5	1.3	<0.5

PARAMETER	UNITS	ODWQS	BH8-I												
Date			16-Dec-92	20-Apr-93	13-Dec-93	20-Apr-94	21-Dec-94	16-May-95	22-Nov-95	7-Nov-96	26-Nov-97	18-Nov-98	9-Nov-99	8-Nov-00	13-Mar-01
Sodium	mg/L	200 [2]	4.1	2.1	2.3	1.6	1.9	2.7	2.2	1.9	1.5	2.0	2.9	4.4	3.6
Potassium	mg/L		2.7	1.2	1.4	1.2	0.9	0.8	0.6	0.7	<0.5	<1	<1	<1	<1
Calcium	mg/L		89.9	77.6	83.9	208	103	85.6	87.5	91.5	85.8	78.4	98.8	79.1	86.4
Magnesium	mg/L		31.7	26.0	32.1	31.0	33.4	26.5	29.5	28.9	29.2	26.1	32.9	28.4	29.6
Alkalinity (as CaCO3)	mg/L	30-500 [3]	305	261	292	575	288	266	270	290	277	262	320	270	280
Sulphate	mg/L	500 [2]	69	50	67	40	66	44	50	39	49	23	43	43.2	36
Chloride	mg/L	250 [2]	7.6	7.0	5.5	2.3	4.1	5.5	5.0	4.2	4.5	4.4	7.4	18.7	14.2
Orthophosphate (as P)	mg/L		<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.3	<0.3	<0.3
Nitrate and Nitrite (as N)	mg/L	10 [1]	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.5	<0.2	0.3	<0.2
Ammonia (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	0.06	<0.05	0.03	0.31	<0.03
Iron	mg/L	0.3 [2]	4.10	4.45	1.27	16.0	2.67	0.14	0.56	0.57	0.61	0.56	0.64	<0.01	<0.01
Manganese	mg/L	0.05 [2]	0.88	1.04	0.36	1.04	0.42	0.20	0.23	0.24	0.25	0.16	0.247	0.176	0.329
Copper	mg/L	1 [2]	0.01	<0.01	<0.01	0.09	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.003	<0.003	<0.003
Zinc	mg/L	5 [2]	2.30	2.63	1.08	1.36	0.88	0.24	<0.01	<0.01	<0.01	0.02	0.006	0.649	0.094
Conductivity	µS/cm		800	634	743	1230	723	670	647	572	581	508	669	553	595
pH	Units	6.5-8.5 [3]	7.1	7.4	7.6	7.4	7.4	7.3	7.7	7.2	7.6	8.1	7.56	7.59	7.7
Dissolved Organic Carbon	mg/L	5 [2]	6.0	2.9	4.7	2.3	4.5	2.6	2.8	3.0	4.4	1.5	3.2	3.4	2.9
Hardness (as CaCO3)	mg/L	80-100 [3]	355	301	342	647	395	323	340	347	334	303	382	315	338
Bicarbonate (as CaCO3)	mg/L		305	260	291	574	287	265	269	290	276	259	319	269	279
Carbonate (as CaCO3)	mg/L		0.36	0.61	1.09	1	1	<1	1.3	<1	1	3	1	<1	1
Total Dissolved Solids	mg/L	500 [2]	393	325	372	633	NA	NA	NA	345	342	299	384	343	343
Cation Sum	meq/L		7.34	6.13	6.96	13.0	7.99	6.49	6.42	7.05	6.76	6.18	7.79	6.51	6.92
Anion Sum	meq/L		7.75	6.46	7.39	12.4	7.25	6.40	6.58	6.72	6.69	5.83	7.50	6.85	6.75
Ion Balance	%		2.70	2.57	2.96	2.49	4.89	0.77	1.23	2.36	0.54	2.85	1.88	2.52	1.27
Total Oil and Grease	mg/L		3.9	<1	<1	<1	<1	<1	<1					1	<1

NOTES:
- ODWQS Ontario Drinking Water Quality Standards (2006)
- (1) Maximum Acceptable Concentration
- (2) Aesthetic Objective
- (3) Operational Guideline
- * Concentration considered anomalous

TABLE C-2
GROUNDWATER CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	ODWQS	BH8-I												
Date			6-Nov-01	12-Apr-02	20-Nov-02	23-Apr-03	6-Nov-03	10-Mar-04	5-Nov-04	18-Mar-05	11-Nov-05	3-Mar-06	6-Nov-06	30-Apr-07	15-Nov-07
Sodium	mg/L	200 [2]	3.8	4.4	4.9	4.0	4.3	4.9	2.6	2.2	3.5	2.8	2.7	6.4	3.8
Potassium	mg/L		<1	1	<1	<1	1	<1	<1	1	<1	<1	<1	1.2	1
Calcium	mg/L		87.6	87.5	99.9	98.6	97.7	97.7	86.7	83.6	88.1	92.7	69.8	89	*265
Magnesium	mg/L		31.4	29.8	35.2	32.0	33.9	34.4	29.9	28.2	30.3	31.5	22.1	32	*70.3
Alkalinity (as CaCO3)	mg/L	30-500 [3]	280	292	272	254	254	300	213	233	224	233	228	261	266
Sulphate	mg/L	500 [2]	48.7	36.8	91.4	83.4	102	64.0	99.1	78	93	50	57	76	36
Chloride	mg/L	250 [2]	26.3	20.5	25.9	21.5	21.6	18.4	17.9	10.4	13	4	4	12	11
Orthophosphate (as P)	mg/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.012	0.06	<0.01	<0.01	<0.01
Nitrate and Nitrite (as N)	mg/L	10 [1]	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (as N)	mg/L		0.16	0.77	<0.03	<0.03	0.05	<0.03	0.04	0.04	<0.05	<0.05	0.2	0.12	0.08
Iron	mg/L	0.3 [2]	0.35	0.57	0.52	0.58	0.52	0.66	0.43	0.47	0.49	0.57	0.33	<0.05	*5.82
Manganese	mg/L	0.05 [2]	0.212	0.229	0.247	0.236	0.249	0.258	0.211	0.201	0.20	0.19	0.17	0.16	*0.71
Copper	mg/L	1 [2]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	<0.02	<0.02	<0.001	*0.04
Zinc	mg/L	5 [2]	<0.005	0.007	<0.005	0.140	0.008	<0.005	<0.005	<0.005	<0.01	<0.01	<0.01	0.47	*1.64
Conductivity	µS/cm		623	614	670	609	683	645	594	600	519	506	507	632	574
pH	Units	6.5-8.5 [3]	7.75	7.36	7.86	7.60	7.79	7.69	8.12	7.6	8.21	8	8.2	8.3	8.1
Dissolved Organic Carbon	mg/L	5 [2]	1.2	23.9	1.6	2.0	2.5	3.2	2.1	2.5	2.3	1.8	2.1	2	2
Hardness (as CaCO3)	mg/L	80-100 [3]	348	341	395	378	384	385	340	325	340	360	270	350	*950
Bicarbonate (as CaCO3)	mg/L		278	291	270	253	253	299	210	232	221	231	224	257	263
Carbonate (as CaCO3)	mg/L		1	<1	2	<1	1	1	3	<1	3	2	3	4	3
Total Dissolved Solids	mg/L	500 [2]	371	361	427	397	418	404	370	347	363	321	293	378	562
Cation Sum	meq/L		7.13	7.10	8.12	7.75	7.89	7.94	6.92	6.62	7.06	7.36	5.45	7.38	19.6
Anion Sum	meq/L		7.35	7.18	8.07	7.42	7.81	7.85	6.83	6.58	6.77	5.81	5.85	7.13	6.37
Ion Balance	%		1.52	0.60	0.29	2.14	0.48	0.55	0.71	0.34	2.08	11.8	3.57	1.74	*51
Total Oil and Grease	mg/L		16	4	<1	<1	<1	<1	<1	<1	0.6	<0.5	<0.5	<0.5	<0.5

PARAMETER	UNITS	ODWQS	BH8-I							BH92-32-III					
Date			29-Apr-08	17-Dec-08	15-Apr-09	25-Nov-09	16-Apr-10	29-Nov-10	29-Mar-11	16-Nov-11	10-Apr-12	6-Dec-12	4-Apr-13	10-Dec-13	1-Apr-14
Sodium	mg/L	200 [2]	6.6	4.1	5	27.3	29.1	42.6	33.9	28.0	39.4	39.2	40.6	43.0	40
Potassium	mg/L		2	<1	<1	1	<1	1.1	<1	0.86	1	<1	<1	<1	<1
Calcium	mg/L		83.5	71.9	88.1	70.2	74.4	76.3	76.3	88.0	99.2	113	110	97	92
Magnesium	mg/L		27.2	24.2	30.8	24.0	24.3	25.7	25.5	33.0	34.9	42.8	41.8	39	38
Alkalinity (as CaCO3)	mg/L	30-500 [3]	249	271	253	157	140	166	173	253	250	320	270	280	310
Sulphate	mg/L	500 [2]	56	40	59	82	99	60	67	50	79	78	91	81	76
Chloride	mg/L	250 [2]	13	6.0	26	65	76	95	79	82	97	88	93	97	89
Orthophosphate (as P)	mg/L		<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate and Nitrite (as N)	mg/L	10 [1]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.18	<0.1	<0.1
Ammonia (as N)	mg/L		<0.05	0.1	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	0.072	<0.05	0.089
Iron	mg/L	0.3 [2]	0.39	0.39	0.52	0.32	0.42	0.45	1.44	<0.1	<0.02	0.04	<0.02	0.2	0.04
Manganese	mg/L	0.05 [2]	0.2	0.2	0.25	0.21	0.22	0.26	0.52	0.16	0.03	0.06	0.05	0.15	0.22
Copper	mg/L	1 [2]	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.001	<0.02	<0.02	<0.02	<0.02	<0.02
Zinc	mg/L	5 [2]	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.098	0.130	0.150	0.190	0.140	0.140
Conductivity	µS/cm		592	579	631	685	694	759	717	823	850	1000	970	980	980
pH	Units	6.5-8.5 [3]	8.20	7.90	7.7	7.8	8.0	8.0	7.91	7.94	7.84	7.88	7.99	7.78	7.63
Dissolved Organic Carbon	mg/L	5 [2]	3.9	1.4	2.3	1.6	1.4	1.5	2.7	2.1	1.2	1.4	1.3	1.2	1.3
Hardness (as CaCO3)	mg/L	80-100 [3]	320	280	350	270	290	300	300	360	390	460	450	400	390
Bicarbonate (as CaCO3)	mg/L		246	269	252	156	139	164	172	251	250	320	260	280	310
Carbonate (as CaCO3)	mg/L		3	2	1	<1	1	2	1	2	2	2	2	2	1
Total Dissolved Solids	mg/L	500 [2]	343	314	366	369	391	406	392	439	505	562	543	530	530
Cation Sum	meq/L		6.76	5.78	7.17	6.71	7.00	7.82	7.43	8.36	9.57	10.9	10.7	9.9	9.5
Anion Sum	meq/L		6.51	6.41	7	6.67	6.99	7.25	7.10	8.40	9.34	10.6	9.85	10.0	10.3
Ion Balance	%		1.88	5.22	1.19	0.26	0.07	3.79	2.28	0.24	1.22	1.45	4.03	0.57	4.36
Total Oil and Grease	mg/L		<0.5	<0.5	<0.5	1.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5

NOTES:
- ODWQS Ontario Drinking Water Quality Standards (2006)
- (1) Maximum Acceptable Concentration
- (2) Aesthetic Objective
- (3) Operational Guideline
- * Concentration considered anomalous

TABLE C-2
GROUNDWATER CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	ODWQS	BH92-32-III												
Date			15-Dec-14	6-Apr-15	10-Dec-15	30-Mar-16	14-Nov-16	17-Mar-17	4-Apr-17	21-Nov-17	26-Mar-18	21-Nov-18	19-Mar-19	13-Nov-19	09-Mar-20
Sodium	mg/L	200 [2]	42	43	41	33	42	28	24	38	34	34	34	32	28
Potassium	mg/L		<1	<1	1	<1	<1	0.90	0.94	0.87	0.76	0.98	0.78	1.0	0.92
Calcium	mg/L		87	100	77	100	82	130	120	78	80	94	92	80	92
Magnesium	mg/L		35	40	31	41	31	57	55	31	33	38	37	34	44
Alkalinity (as CaCO3)	mg/L	30-500 [3]	240	320	220	360	210	430	430	220	260	330	300	240	340
Sulphate	mg/L	500 [2]	81	66	64	50	68	150	120	62	77	50	56	46	58
Chloride	mg/L	250 [2]	99	85	88	62	100	46	39	90	68	74	40	75	48
Orthophosphate (as P)	mg/L		<0.01	0.028	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate and Nitrite (as N)	mg/L	10 [1]	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ammonia (as N)	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.052	<0.050	0.19	0.066	<0.050	0.082
Iron	mg/L	0.3 [2]	0.05	0.15	0.06	0.04	0.04	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1
Manganese	mg/L	0.05 [2]	0.45	0.63	0.48	0.91	0.51	0.93	0.96	0.60	0.60	0.70	0.69	0.62	0.83
Copper	mg/L	1 [2]	<0.02	<0.02	<0.02	<0.02	<0.02	0.0019	<0.001	0.0012	0.0015	<0.001	0.0081	<0.001	0.0012
Zinc	mg/L	5 [2]	0.14	0.180	0.070	0.19	0.06	0.18	0.19	0.063	0.079	0.084	0.092	0.061	0.10
Conductivity	µS/cm		910	970	850	930	830	1200	1100	820	830	890	810	770	890
pH	Units	6.5-8.5 [3]	7.84	7.66	7.93	7.86	8.04	7.70	7.79	7.85	7.84	7.87	7.78	7.98	7.62
Dissolved Organic Carbon	mg/L	5 [2]	1.4	1.7	1.5	2.3	1.6	2.7	2.7	1.3	1.6	1.5	1.7	1.1	1.9
Hardness (as CaCO3)	mg/L	80-100 [3]	360	420	320	430	330	560	540	320	340	390	380	340	410
Bicarbonate (as CaCO3)	mg/L		240	320	220	360	210	430	430	220	250	320	300	230	340
Carbonate (as CaCO3)	mg/L		2	1.4	1.8	2.4	2.2	2.0	2.5	1.5	1.6	2.3	1.7	2.1	1.3
Total Dissolved Solids	mg/L	500 [2]	490	530	440	510	460	692	666	430	395	510	435	390	510
Cation Sum	meq/L		9.04	10.2	8.2	10	8.46	12.5	11.8	8.09	8.21	9.38	8.7	8.25	9.43
Anion Sum	meq/L		9.31	10.1	8.3	9.98	8.53	13.1	12.2	8.27	8.64	9.63	8.38	7.77	9.37
Ion Balance	%		1.51	0.59	0.24	0.19	0.380	2.42	1.62	1.14	2.59	1.28	1.89	2.99	0.32
Total Oil and Grease	mg/L		0.80	1	<0.5	<0.50	<0.50	1.4	<0.50	0.50	<0.50	<0.50	<0.50	1.0	<0.50

PARAMETER	UNITS	ODWQS	BH92-32-III						
Date			19-Nov-20	10-Mar-21	10-Nov-21	17-Mar-22	25-Nov-22	15-Mar-23	17-Nov-23
Sodium	mg/L	200 [2]	29	27	25	21	33	31	37
Potassium	mg/L		1.4	1.3	1.4	1.1	1.4	1.5	1.3
Calcium	mg/L		96	110	96	110	96	110	66
Magnesium	mg/L		40	43	33	41	36	43	27
Alkalinity (as CaCO3)	mg/L	30-500 [3]	310	340	330	400	290	320	180
Sulphate	mg/L	500 [2]	48	46	43	40	34	37	38
Chloride	mg/L	250 [2]	71	57	60	40	80	70	81
Orthophosphate (as P)	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate and Nitrite (as N)	mg/L	10 [1]	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ammonia (as N)	mg/L		0.068	<0.050	0.054	0.24	0.18	<0.050	<0.050
Iron	mg/L	0.3 [2]	<0.1	<0.1	<0.100	<0.1	<0.10	<0.10	<0.100
Manganese	mg/L	0.05 [2]	0.64	0.67	0.66	0.78	0.63	0.61	0.56
Copper	mg/L	1 [2]	0.0023	0.001	<0.00090	0.001	0.0011	<0.00090	<0.00090
Zinc	mg/L	5 [2]	0.11	0.11	0.095	0.13	0.071	0.088	0.028
Conductivity	µS/cm		850	910	840	890	830	880	710
pH	Units	6.5-8.5 [3]	7.99	7.78	7.63	7.86	7.83	7.82	8.03
Dissolved Organic Carbon	mg/L	5 [2]	1.1	1.5	1.5	2.3	1.4	2.0	1.2
Hardness (as CaCO3)	mg/L	80-100 [3]	400	460	380	450	390	440	280
Bicarbonate (as CaCO3)	mg/L		300	340	330	390	290	310	180
Carbonate (as CaCO3)	mg/L		2.8	1.9	1.3	2.7	1.8	2.0	1.9
Total Dissolved Solids	mg/L	500 [2]	475	465	420	470	370	455	350
Cation Sum	meq/L		9.4	10.5	8.65	10.0	9.27	10.2	7.19
Anion Sum	meq/L		9.1	9.37	9.22	9.86	8.73	9.08	6.78
Ion Balance	%		1.63	5.47	3.22	0.81	3.00	5.67	3.00
Total Oil and Grease	mg/L		0.6	<0.50	0.60	<0.50	0.7	<0.50	1.2

NOTES: · ODWQS Ontario Drinking Water Quality Standards (2006) · (1) Maximum Acceptable Concentration · (2) Aesthetic Objective · (3) Operational Guideline
· * Concentration considered anomalous

TABLE C-2
GROUNDWATER CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	ODWQS	BH92-8												
Date			16-Dec-92	20-Apr-93	13-Dec-93	20-Apr-94	21-Dec-94	16-May-95	22-Nov-95	7-Nov-96	26-Nov-97	18-Nov-98	9-Nov-99	8-Nov-00	13-Mar-01
Sodium	mg/L	200 [2]	27.4	26.3	27.3	29.7	27.5	27.8	29.9	28.4	33.2	34.4	43	36.6	36.9
Potassium	mg/L		2.7	2.2	2.3	2.0	2.0	1.8	2.0	1.9	0.8	2.1	2	2	2
Calcium	mg/L		71.9	73.1	74.1	50.0	84.5	74.6	75.1	77	69.9	73.2	93.6	99.2	80.8
Magnesium	mg/L		28.0	27.1	29.3	47.3	30.6	26.1	29.1	27.5	26.4	26.0	33.5	35.8	29.4
Alkalinity (as CaCO3)	mg/L	30-500 [3]	244	234	231	219	219	222	208	196	194	192	175	192	198
Sulphate	mg/L	500 [2]	47	52	67	59	73	57	60	59	58	60	129	179	81.5
Chloride	mg/L	250 [2]	44.7	51.0	48.3	80.0	50.5	57.5	59.6	64.4	75.9	65.8	95	91.5	83.8
Orthophosphate (as P)	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.3	<0.3	<0.3
Nitrate and Nitrite (as N)	mg/L	10 [1]	2.20	1.44	1.45	0.99	0.42	0.26	<0.05	0.69	0.09	<0.5	<0.2	0.6	<0.2
Ammonia (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.12	<0.05	<0.05	0.03	0.10	<0.03
Iron	mg/L	0.3 [2]	7.45	1.15	1.87	9.53	1.61	0.89	<0.02	0.13	0.03	0.5	0.05	<0.01	<0.01
Manganese	mg/L	0.05 [2]	1.45	0.57	0.60	0.44	0.22	0.03	0.05	0.04	0.04	0.05	0.018	<0.005	0.026
Copper	mg/L	1 [2]	0.14	0.05	0.05	0.05	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.003	<0.003	<0.003
Zinc	mg/L	5 [2]	6.12	1.37	1.83	1.67	1.12	0.53	0.39	0.43	0.42	0.22	0.249	0.299	0.43
Conductivity	µS/cm		780	805	823	840	814	724	760	639	663	669	889	829	735
pH	Units	6.5-8.5 [3]	7.4	7.5	8.1	7.5	7.5	8.0	7.7	7.4	8.1	7.9	7.86	7.71	7.88
Dissolved Organic Carbon	mg/L	5 [2]	1.5	2.6	<0.5	1.6	1.0	<0.5	<0.5	<0.5	1.1	1.2	3.5	1.6	1.0
Hardness (as CaCO3)	mg/L	80-100 [3]	295	294	306	320	337	294	307	305	283	290	372	395	323
Bicarbonate (as CaCO3)	mg/L		243	233	228	218	218	220	207	195	192	191	174	191	197
Carbonate (as CaCO3)	mg/L		0.57	0.69	2.7	1	1	2	1	<1	2	1	1	<1	1
Total Dissolved Solids	mg/L	500 [2]	384	384	399	409	NA	NA	NA	385	386	384	506	567	439
Cation Sum	meq/L		7.15	7.08	7.36	7.73	7.98	6.97	7.13	7.40	7.13	7.34	9.34	9.54	8.10
Anion Sum	meq/L		7.28	7.30	7.48	7.93	7.35	7.27	7.09	7.02	7.23	6.94	8.86	10.20	8.02
Ion Balance	%		0.85	1.56	0.83	1.30	4.11	2.04	0.26	2.60	0.68	2.85	2.64	3.26	0.52
Total Oil and Grease	mg/L		<1	<1	<1	<1	<1	<1	<1					<1	<1

PARAMETER	UNITS	ODWQS	BH92-8												
Date			6-Nov-01	12-Apr-02	20-Nov-02	23-Apr-03	6-Nov-03	10-Mar-04	5-Nov-04	23-Jan-08	29-Apr-08	17-Dec-08	15-Apr-09	25-Nov-09	16-Apr-10
Sodium	mg/L	200 [2]	31.8	33.6	38.1	36.5	42.9	52.0	15.1	38.5	50.9	11.6	42.3	7.7	17
Potassium	mg/L		3	3	1	1	2	2	2	3	2	<1	1	1.0	1.0
Calcium	mg/L		85.1	95.8	99.6	85.4	79.1	72.1	37.6	48.9	56.9	26.7	50.9	20.9	32.0
Magnesium	mg/L		29.8	33.4	34.8	30.2	27.0	25.7	10.9	19.3	24	7.19	20.4	6.4	12.9
Alkalinity (as CaCO3)	mg/L	30-500 [3]	198	200	180	180	166	160	91	126	143	81	135	84	104
Sulphate	mg/L	500 [2]	112	126	175	116	96.6	83.4	26.4	52	50	17	44	13	25
Chloride	mg/L	250 [2]	69.1	77.7	70.4	83.1	100	104	29.2	89	100	25.0	98	16	37
Orthophosphate (as P)	mg/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Nitrate and Nitrite (as N)	mg/L	10 [1]	<0.2	0.5	<0.2	<0.2	<0.2	<0.2	0.6	0.1	0.2	0.5	<0.1	0.3	0.3
Ammonia (as N)	mg/L		<0.03	<0.03	<0.03	<0.03	0.11	<0.03	0.03	0.09	0.5	0.15	<0.05	0.17	0.13
Iron	mg/L	0.3 [2]	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.03	0.04	0.03	<0.02	<0.02	<0.02
Manganese	mg/L	0.05 [2]	<0.005	0.019	0.035	0.064	0.095	0.053	<0.005	0.09	0.1	<0.01	0.03	0.02	0.02
Copper	mg/L	1 [2]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Zinc	mg/L	5 [2]	0.115	0.359	0.475	0.494	0.353	0.310	0.025	<0.01	0.03	<0.01	0.03	<0.01	0.01
Conductivity	µS/cm		752	812	826	730	757	727	303	637	708	290	642	238	375
pH	Units	6.5-8.5 [3]	7.80	7.88	7.88	7.83	7.94	7.94	8.18	8.1	8.20	8.00	7.7	7.9	8.2
Dissolved Organic Carbon	mg/L	5 [2]	1.8	2.0	1.2	0.9	2.7	1.3	2.5	2.3	8.0	0.7	0.5	1.1	0.6
Hardness (as CaCO3)	mg/L	80-100 [3]	335	377	392	338	309	286	139	200	240	96	210	79	130
Bicarbonate (as CaCO3)	mg/L		197	199	179	179	165	159	90	125	141	80	134	83	130
Carbonate (as CaCO3)	mg/L		1	1	1	1	1	1	1	2	2	<1	<1	<1	1
Total Dissolved Solids	mg/L	500 [2]	454	497	533	466	453	441	181	331	377	141	340	120	191
Cation Sum	meq/L		8.15	9.06	9.53	8.37	8.10	8.02	3.48	5.77	7.12	2.44	6.09	1.96	3.44
Anion Sum	meq/L		8.24	8.85	9.23	8.36	8.15	7.87	3.24	6.14	6.79	2.73	6.37	2.44	3.67
Ion Balance	%		0.56	1.21	1.6	0.11	0.31	0.97	3.61	3.11	2.36		2.25		3.29
Total Oil and Grease	mg/L		<1	1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	1.4	0.6

NOTES:
- ODWQS Ontario Drinking Water Quality Standards (2006)
- (1) Maximum Acceptable Concentration
- (2) Aesthetic Objective
- (3) Operational Guideline
- * Concentration considered anomalous

TABLE C-2
GROUNDWATER CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	ODWQS	BH92-8												
Date			29-Nov-10	10-Apr-12	29-Mar-11	16-Nov-11	06-Dec-12	04-Apr-13	10-Dec-13	01-Apr-14	15-Dec-14	06-Apr-15	10-Dec-15	30-Mar-16	14-Nov-16
Sodium	mg/L	200 [2]	4.3	52.9	39.1	31	51.2	52.9	51	49	48	51	51	52	56
Potassium	mg/L		1.5	2	2.0	2.5	3	2	3	2	3	2	3	2	3
Calcium	mg/L		26.2	54.6	45.9	46.0	52.8	54.9	54	55	52	58	53	57	56
Magnesium	mg/L		6.3	28.4	19.8	18.0	28.8	31.5	31	32	29	31	30	31	30
Alkalinity (as CaCO3)	mg/L	30-500 [3]	73	150	124	126	150	140	150	140	140	140	140	140	150
Sulphate	mg/L	500 [2]	14	52	39	37	58	75	68	79	75	80	64	77	64
Chloride	mg/L	250 [2]	18	110	79	67	110	120	110	120	110	110	110	110	130
Orthophosphate (as P)	mg/L		0.02	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.066	<0.01	<0.010	<0.010
Nitrate and Nitrite (as N)	mg/L	10 [1]	0.4	<0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10
Ammonia (as N)	mg/L		0.10	<0.05	0.15	0.32	0.19	0.16	0.07	0.15	0.1	<0.050	<0.05	<0.050	<0.050
Iron	mg/L	0.3 [2]	<0.02	<0.02	<0.02	<0.1	0.25	0.17	0.11	0.11	0.04	0.05	0.04	<0.02	0.03
Manganese	mg/L	0.05 [2]	<0.01	0.10	0.06	0.11	0.13	0.15	0.16	0.16	0.16	0.15	0.16	0.14	0.16
Copper	mg/L	1 [2]	<0.02	<0.02	<0.02	<0.001	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Zinc	mg/L	5 [2]	<0.01	<0.01	0.01	0.012	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.04
Conductivity	µS/cm		234	710	579	538	780	780	800	800	780	800	780	800	800
pH	Units	6.5-8.5 [3]	8.1	8.01	8.1	8.1	7.5	8.15	8.01	7.92	7.95	7.77	8.08	7.97	8.10
Dissolved Organic Carbon	mg/L	5 [2]	0.7	0.72	0.7	1.0	0.9	0.66	0.55	0.37	0.7	0.66	0.62	0.62	0.85
Hardness (as CaCO3)	mg/L	80-100 [3]	92	250	200	190	250	270	260	270	250	270	260	270	260
Bicarbonate (as CaCO3)	mg/L		72	150	123	125	150	140	140	140	140	140	140	130	150
Carbonate (as CaCO3)	mg/L		<1	2	1	1	<1	1.9	1.4	1.1	1.2	<1	1.6	1.2	1.8
Total Dissolved Solids	mg/L	500 [2]	119	394	303	282	397	422	410	420	410	430	400	420	430
Cation Sum	meq/L		2.06	7.42	5.68	5.21	7.32	7.71	7.55	7.55	7.17	7.72	7.39	7.71	7.76
Anion Sum	meq/L		2.30	7.18	5.53	5.19	7.27	7.64	7.51	7.78	7.52	7.76	7.3	7.49	7.94
Ion Balance	%			1.61	1.29	0.210	0.33	0.46	0.29	1.5	2.4	0.28	0.60	1.41	1.09
Total Oil and Grease	mg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	1.2	<0.5	<0.50	<0.50

PARAMETER	UNITS	ODWQS	BH92-8												
Date			17-Mar-17	04-Apr-17	Apr-17 (dup)	21-Nov-17	Nov-17 (dup)	26-Mar-18	Mar-18 (dup)	21-Nov-18	Nov-18 (dup)	19-Mar-19	Mar-19 (dup)	13-Nov-19	Nov-19 (dup)
Sodium	mg/L	200 [2]	51			53		52		55		56		62	
Potassium	mg/L		2.4			2.8		2.5		2.6		2.4		3.1	
Calcium	mg/L		54			52		49		50		51		54	
Magnesium	mg/L		31			31		30		31		31		34	
Alkalinity (as CaCO3)	mg/L	30-500 [3]	140			160		150		150		150		150	
Sulphate	mg/L	500 [2]	63			56		57		77		50		54	
Chloride	mg/L	250 [2]	120			130		120		130		120		140	
Orthophosphate (as P)	mg/L		<0.010			<0.010		<0.010		<0.010		<0.010		<0.010	
Nitrate and Nitrite (as N)	mg/L	10 [1]	<0.10			<0.10		<0.10		<0.10		<0.10		<0.10	
Ammonia (as N)	mg/L		<0.050			0.051		0.054		0.19		0.079		<0.050	
Iron	mg/L	0.3 [2]	0.19			0.11		<0.10		<0.10		<0.10		<0.10	
Manganese	mg/L	0.05 [2]	0.14			0.15		0.12		0.16		0.12		0.17	
Copper	mg/L	1 [2]	0.044			<0.001		0.0013		0.0044		<0.001		0.0017	
Zinc	mg/L	5 [2]	0.079			0.023		0.023		0.022		0.026		0.045	
Conductivity	µS/cm		810			810		800		810		810		830	
pH	Units	6.5-8.5 [3]	8.02			8.02		8.01		8.06		8.02		8.14	
Dissolved Organic Carbon	mg/L	5 [2]	0.78			0.67		0.56		0.81		<0.50		<0.50	
Hardness (as CaCO3)	mg/L	80-100 [3]	260			260		250		250		250		280	
Bicarbonate (as CaCO3)	mg/L		140			160		150		150		150		150	
Carbonate (as CaCO3)	mg/L		1.4			1.5		1.4		1.6		1.5		1.9	
Total Dissolved Solids	mg/L	500 [2]	418			395		350		480		415		410	
Cation Sum	meq/L		7.56			7.52		7.26		7.51		7.58		8.31	
Anion Sum	meq/L		7.62			7.84		7.66		8.31		7.57		7.97	
Ion Balance	%		0.36			2.10		2.64		5.06		0.06		2.08	
Total Oil and Grease	mg/L		2.1*	1.0	<0.50	<0.50	0.80	<0.50	<0.50	0.70	0.90	<0.50	<0.50	0.90	0.80

NOTES:
- ODWQS Ontario Drinking Water Quality Standards (2006)
- (1) Maximum Acceptable Concentration
- (2) Aesthetic Objective
- (3) Operational Guideline
- * Concentration considered anomalous

TABLE C-2
GROUNDWATER CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	ODWQS	BH92-8												
Date			09-Mar-20	Mar-20 (dup)	16-Apr-20	19-Nov-20	Nov-20 (dup)	10-Mar-21	Mar-21 (dup)	10-Nov-21	Nov-21 (dup)	17-Mar-22	Mar-22 (dup)	25-Nov-22	Nov-22 (dup)
Sodium	mg/L	200 [2]	60			66		72		64		71		82	
Potassium	mg/L		2.6			3.1		2.8		2.6		2.5		3.0	
Calcium	mg/L		49			53		55		52		52		53	
Magnesium	mg/L		33			34		36		32		33		35	
Alkalinity (as CaCO3)	mg/L	30-500 [3]	150			150		160		150		160		160	
Sulphate	mg/L	500 [2]	50			56		44		54		44		40	
Chloride	mg/L	250 [2]	140			130		130		150		150		160	
Orthophosphate (as P)	mg/L		<0.010			<0.010		<0.010		<0.010		<0.010		0.013	
Nitrate and Nitrite (as N)	mg/L	10 [1]	<0.10			<0.10		<0.10		<0.10		<0.10		<0.10	
Ammonia (as N)	mg/L		<0.050			<0.050		<0.050		<0.050		0.22		<0.050	
Iron	mg/L	0.3 [2]	<0.1			<0.1		<0.1		<0.100		<0.1		<0.10	
Manganese	mg/L	0.05 [2]	0.14			0.13		0.1		0.210		0.12		0.20	
Copper	mg/L	1 [2]	<0.001			<0.00090		0.0011		<0.00090		<0.00090		<0.00090	
Zinc	mg/L	5 [2]	0.04			0.049		0.037		0.040		0.039		0.043	
Conductivity	µS/cm		830			850		880		880		910		940	
pH	Units	6.5-8.5 [3]	8.02			8.09		8.07		7.97		8.02		8.08	
Dissolved Organic Carbon	mg/L	5 [2]	0.53			0.47		0.51		<0.40		0.67		0.56	
Hardness (as CaCO3)	mg/L	80-100 [3]	260			270		280		260		270		280	
Bicarbonate (as CaCO3)	mg/L		150			150		160		150		160		160	
Carbonate (as CaCO3)	mg/L		1.4			1.7		1.7		1.3		1.6		1.8	
Total Dissolved Solids	mg/L	500 [2]	430			475		450		435		415		415	
Cation Sum	meq/L		7.8			8.42		8.88		8.11		8.52		9.17	
Anion Sum	meq/L		7.86			7.89		7.78		8.34		8.35		8.58	
Ion Balance	%		0.38			3.26		6.63		1.41		1.02		3.36	
Total Oil and Grease	mg/L		<0.50	2.9*	<0.50	<0.50	<0.5	<0.50	<0.50	0.5	0.6	0.8	1.5	0.9	<0.50

PARAMETER	UNITS	ODWQS	BH92-8			
Date			15-Mar-23	Mar-23 (dup)	17-Nov-23	Nov-23 (dup)
Sodium	mg/L	200 [2]	88		58	
Potassium	mg/L		2.9		3.3	
Calcium	mg/L		55		66	
Magnesium	mg/L		37		46	
Alkalinity (as CaCO3)	mg/L	30-500 [3]	160		210	
Sulphate	mg/L	500 [2]	46		46	
Chloride	mg/L	250 [2]	160		150	
Orthophosphate (as P)	mg/L		<0.010		<0.010	
Nitrate and Nitrite (as N)	mg/L	10 [1]	<0.10		<0.10	
Ammonia (as N)	mg/L		<0.050		<0.050	
Iron	mg/L	0.3 [2]	<0.10		<0.100	
Manganese	mg/L	0.05 [2]	0.13		0.260	
Copper	mg/L	1 [2]	0.0015		<0.00090	
Zinc	mg/L	5 [2]	0.045		0.078	
Conductivity	µS/cm		940		990	
pH	Units	6.5-8.5 [3]	8.13		8.08	
Dissolved Organic Carbon	mg/L	5 [2]	0.51		0.50	
Hardness (as CaCO3)	mg/L	80-100 [3]	290		350	
Bicarbonate (as CaCO3)	mg/L		160		200	
Carbonate (as CaCO3)	mg/L		2		2.3	
Total Dissolved Solids	mg/L	500 [2]	475		495	
Cation Sum	meq/L		9.71		9.68	
Anion Sum	meq/L		8.57		9.23	
Ion Balance	%		6.23		2.39	
Total Oil and Grease	mg/L		<0.50	<0.50	2.0	<0.50

NOTES:
- ODWQS Ontario Drinking Water Quality Standards (2006)
- (1) Maximum Acceptable Concentration
- (2) Aesthetic Objective
- (3) Operational Guideline
- * Concentration considered anomalous

TABLE C-3
PHASE 1 POND CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	PWQO													
Date			14-Dec-00	10-Apr-01	06-Nov-01	12-Apr-02	20-Nov-02	23-Apr-03	06-Nov-03	10-Mar-04	05-Nov-04	18-Apr-05	11-Nov-05	27-Apr-06	06-Nov-06
Sodium	mg/L		48.1	42.4	48	46.1	50.8	51.2	50.6	11.1	50.6	46.8	53.8	49.9	52
Potassium	mg/L		3	2	2	2	2	2	2	<1	2	2	2	2	2
Calcium	mg/L		51.3	45.6	53.1	55.4	51.9	52.5	46.1	14.7	52.0	43.9	45.1	46.1	43
Magnesium	mg/L		27.3	22.7	25.9	25.4	28.9	28.5	28.9	5.96	32.8	28.1	32	30.2	30
Alkalinity (as CaCO3)	mg/L		146	126	150	158	136	139	129	41	137	140	127	147	140
Sulphate	mg/L		62	58.4	68.9	64.5	69.5	67.4	71.2	16.2	68.4	59.7	55	42	57
Chloride	mg/L		97.8	83.5	97	91.7	99.7	98.1	105	23.3	105	105	105	107	114
Orthophosphate (as P)	mg/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.005	0.01	<0.01
Nitrate and Nitrite (as N)	mg/L		0.3	<0.2	<0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.1	<0.1
Ammonia (as N)	mg/L		<0.05	<0.03	<0.03	0.04	<0.03	<0.03	0.04	0.13	<0.03	<0.03	<0.05	<0.05	0.08
Un-ionized Ammonia	mg/L	0.02	<0.05	<0.03	<0.03	0.001	<0.0009	<0.001	0.002	0.001	<0.001	<0.001	<0.001	<0.001	0.003
Iron	mg/L	0.3	0.01	0.04	0.32	0.48	0.04	0.08	0.05	0.18	0.41	0.04	0.04	0.07	0.02
Manganese	mg/L		<0.005	0.007	0.021	0.025	0.009	0.006	0.006	0.009	0.047	0.005	<0.01	0.01	<0.01
Copper	mg/L	0.005	<0.003	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	<0.02	<0.02
Zinc	mg/L	0.03	0.009	0.006	0.038	0.105	0.018	0.021	0.01	0.019	0.033	0.01	<0.01	0.02	<0.01
Colour	TCU		<3	<3	18	31	<3	<3	4	16	22	<2			
Turbidity	NTU		0.6	0.9	10.2	18.6	3.6	3	0.9	5.9	25	2			
Conductivity	µS/cm		651	571	713	692	683	653	683	185	686	707	606	724	723
pH	Units	6.5-8.5	8.1	8.04	8.13	8.24	8.28	8.25	8.31	7.79	8.35	8.4	8.31	8.3	8.3
Dissolved Organic Carbon	mg/L		0.9	0.7	0.5	0.9	1	0.8	1.1	0.7	1.1	0.9	1.4	1.4	1.8
Hardness (as CaCO3)	mg/L		240	207	239	243	249	249	234	61.2	265	225	240	240	220
Bicarbonate (as CaCO3)	mg/L		144	125	148	155	134	137	126	41	134	137	125	144	138
Carbonate (as CaCO3)	mg/L		2	1	2	3	2	2	2	<1	3	3	2	3	3
Total Dissolved Solids	mg/L		382	333	389	385	389	387	384	99	396	372	370	366	378
Cation Sum	meq/L		6.96	6.03	6.91	6.90	7.23	7.24	6.94	1.73	7.56	6.59	7.29	7.02	6.68
Anion Sum	meq/L		6.99	6.09	7.17	7.11	7	6.97	7.04	1.84	7.15	7.02	6.66	6.83	7.21
% Difference	%		0.2	0.53	1.83	1.46	1.6	1.92	0.76	3.00	2.81	3.2	4.47	1.42	3.85
Animal/Vegetable Oil	mg/L		<1	<1	<1	<1	<1								<0.5
Mineral Oil	mg/L				<1	<1	<1								<0.5
Total Oil and Grease	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.8	<0.5	<0.5
Reactive Silica	mg/L		3.9	3.3	4.1	3.8	3.8	3.1	1.6	1.3	1.1	0.8			

NOTE: PWQO - Provincial Water Quality Objectives (February 1999)

TABLE C-3
PHASE 1 POND CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	PWQO												
Date			30-Apr-07	15-Nov-07	29-Apr-08	17-Dec-08	15-Apr-09	25-Nov-09	16-Apr-10	29-Nov-10	13-Apr-11	16-Nov-11	10-Apr-12	06-Dec-12	04-Apr-13
Sodium	mg/L		53	55	59	42	54.3	57	54	57	60	54	57	56	9.6*
Potassium	mg/L		2.4	2.6	2.5	2.0	2	2.4	2.2	2.6	2.6	2.5	2.5	2.5	<1*
Calcium	mg/L		45	44	46	52	43.9	44.7	44	46	49	45	46	50	9.88*
Magnesium	mg/L		31	32	34	26	29.6	29.7	29	33	33	30	31	31	4.48*
Alkalinity (as CaCO3)	mg/L		142	130	141	185	150	140	141	134	137	134	140	150	28
Sulphate	mg/L		81	64	46	40	45	46	46	48	47	54	52	58	8
Chloride	mg/L		110	120	110	83	110	110	120	110	120	110	110	110	19
Orthophosphate (as P)	mg/L		<0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.013
Nitrate and Nitrite (as N)	mg/L		<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (as N)	mg/L		0.07	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.14
Un-ionized Ammonia	mg/L	0.02	0.004	<0.001	<0.0001	0.0001	<0.0001	<0.0001	0.0004	0.0006		0.001	<0.001	<0.001	<0.001
Iron	mg/L	0.3	<0.05	<0.1	<0.1	<0.02	0.04	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.05*
Manganese	mg/L		0.005	0.007	0.004	<0.01	<0.01	<0.002	0.004	0.005	0.005	0.003	0.0045	0.0047	<0.01*
Copper	mg/L	0.005	0.005	0.001	<0.001	<0.02	<0.02	<0.001	0.001	0.002	0.001	0.001	0.0022	0.0012	<0.02*
Zinc	mg/L	0.03	0.01	0.013	0.01	<0.01	0.01	0.006	0.005	0.010	0.008	0.012	0.012	0.0091	<0.01*
Turbidity	NTU		1.9	2.5	1.2	2.1					1.1	1.3	0.9	1.6	
Conductivity	µS/cm		722	749	723	692	718	736	724	730	725	741	680	780	140
pH	Units	6.5-8.5	8.3	8.1	8.3	8.0	7.8	8.2	8.2	8.3	8.2	8.3	8.2	7.84	7.27
Dissolved Organic Carbon	mg/L						1.4	1.4		1.5					0.31
Total Organic Carbon	mg/L														
Hardness (as CaCO3)	mg/L		230	220	220	240	230	230	220	240	220	230	230	250	43
Bicarbonate (as CaCO3)	mg/L		139	130	138	183	149	138	139	131	134	131	130	150	28
Carbonate (as CaCO3)	mg/L		2	2	3	2	<1	2	2	3	2	2	2	<1.0	<1.0
Total Dissolved Solids	mg/L			389	362	357	379	373	377	377	372		372	404	68.0
Cation Sum	meq/L						7.05	7.09		7.32					1.30
Anion Sum	meq/L						7.11	6.88		6.86					1.27
% Difference	%						0.46	1.5		3.29					
Animal/Vegetable Oil	mg/L		<0.5				<0.5	1.6		<0.5					
Mineral Oil	mg/L		<0.5				<0.5	<0.5		<0.5	<0.5				
Total Oil and Grease	mg/L		<0.5	<0.5	<0.5	<0.5	<0.5	1.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.70

NOTE: PWQO - Provincial Water Quality Objectives (February 1999) * Dissolved concentration

TABLE C-3
PHASE 1 POND CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	PWQO												
Date			10-Dec-13	01-Apr-14	15-Dec-14	06-Apr-15	10-Dec-15	30-Mar-16	14-Nov-16	17-Mar-17	21-Nov-17	26-Mar-18	21-Nov-18	19-Mar-19	13-Nov-19
Sodium	mg/L		55	12	53	1.8	52	58	56	49	56	56	62	55	67
Potassium	mg/L		2.6	0.95	2.7	<0.2	3	3	3	2.6	2.6	2.8	2.8	2.4	3.0
Calcium	mg/L		55	26	53	3.1	46	52	42	45	42	41	40	36	51
Magnesium	mg/L		34	12	32	1.1	32	34	32	31	33	33	35	28	36
Alkalinity (as CaCO3)	mg/L		140	64	140	6.5	130	140	130	140	130	140	140	120	140
Sulphate	mg/L		66	12	64	1	62	60	60	60	50	49	43	39	39
Chloride	mg/L		120	22	110	4	110	110	130	120	130	120	140	130	130
Orthophosphate (as P)	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate and Nitrite (as N)	mg/L		<0.1	0.48	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	0.11
Ammonia (as N)	mg/L		<0.05	0.33	0.056	0.088	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	0.073	0.062	<0.050
Un-ionized Ammonia	mg/L	0.02	<0.001	0.009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002	<0.001
Iron	mg/L	0.3	<0.1	0.75	<0.1	0.17	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	0.41	<0.10	0.2
Manganese	mg/L		0.011	0.042	0.002	0.011	0.003	0.0087	0.0029	0.0097	0.0029	0.0064	0.047	0.0064	0.013
Copper	mg/L	0.005	0.0012	0.0034	0.0011	0.0017	0.0010	0.0011	0.0012	<0.1	<0.001	<0.001	0.0022	<0.0010	0.0026
Zinc	mg/L	0.03	0.032	0.042	0.009	0.026	0.005	0.014	0.0051	0.017	0.0053	0.011	0.048	0.011	0.087
Turbidity	NTU		3.3	23	0.5	0.7	0.5	1.6	0.7	0.7	0.5	0.9	6.3	0.7	3.2
Conductivity	µS/cm		780	220	760	29	760	770	760	780	780	770	790	730	810
pH	Units	6.5-8.5	8.24	7.82	8.09	6.71	8.26	8.17	8.26	8.19	8.26	8.1	8.04	8.16	8.30
Dissolved Organic Carbon	mg/L														
Total Organic Carbon	mg/L		1.3	2.2	1.4	0.28	1.2	1.1	1.4	0.98	1.2	1.1	1.1	1.1	1.2
Hardness (as CaCO3)	mg/L		250	84	260	8.7	260	270	240	240	250	250	260	210	280
Bicarbonate (as CaCO3)	mg/L		140	64	140	6.5	130	140	130	140	130	140	130	120	130
Carbonate (as CaCO3)	mg/L		2.3	<1.0	1.6	<1.0	2.2	1.9	2.2	2.0	2.3	1.6	1.4	1.7	2.5
Total Dissolved Solids	mg/L		400	120	400	14	400	400	400	398	370	360	430	345	395
Cation Sum	meq/L														
Anion Sum	meq/L														
% Difference	%														
Animal/Vegetable Oil	mg/L														
Mineral Oil	mg/L														
Total Oil and Grease	mg/L		<0.5	<0.5	<0.5	0.80	<0.5	<0.50	<0.50	0.90	0.80	<0.50	0.60	<0.50	0.50

NOTE: PWQO - Provincial Water Quality Objectives (February 1999)

TABLE C-3
PHASE 1 POND CHEMICAL RESULTS
MILL CREEK AGGREGATES PIT

PARAMETER	UNITS	PWQO											
Date			09-Mar-20	19-Nov-20	10-Mar-21	10-Nov-21	17-Mar-22	25-Nov-22	16-Dec-22	16-Dec-22 (dup)	15-Mar-23	17-Nov-23	17-Nov-23 (dup)
Sodium	mg/L		13	73	71	75	76	91			89	95	
Potassium	mg/L		0.7	3.2	3.0	3.4	3.1	3.6			3.7	3.5	
Calcium	mg/L		12	44	40	39	40	42			41	42	
Magnesium	mg/L		5	35	33	35	33	38			38	36	
Alkalinity (as CaCO3)	mg/L		36	140	130	130	100	140			140	130	
Sulphate	mg/L		6.9	40	41	42	32	38			44	41	
Chloride	mg/L		30	140	140	150	120	170			170	180	
Orthophosphate (as P)	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010			<0.010	<0.010	
Nitrate and Nitrite (as N)	mg/L		0.15	<0.10	<0.10	<0.10	0.14	<0.10			<0.10	<0.10	
Ammonia (as N)	mg/L		0.18	<0.050	<0.050	<0.050	0.062	<0.050			<0.050	<0.050	
Un-ionized Ammonia	mg/L	0.02	0.001	<0.001	<0.001	<0.002	<0.001	<0.002			<0.001	<0.002	
Iron	mg/L	0.3	0.17	0.66	0.18	0.11	0.12	0.15			<0.1	0.24	
Manganese	mg/L		0.018	0.045	0.015	0.0098	0.013	0.019			0.0073	0.019	
Copper	mg/L	0.005	0.0011	0.0035	0.0014	<0.00090	0.0010	0.0017			0.0013	0.0012	
Zinc	mg/L	0.03	0.026	0.066	0.024	0.016	0.021	0.053			0.028	0.0062	
Turbidity	NTU		3.4	13	3.9	6.2	9.6	3.1			0.5	2.5	
Conductivity	µS/cm		190	870	850	870	690	950			960	960	
pH	Units	6.5-8.5	7.83	8.27	8.30	8.21	8.12	8.32			8.12	8.31	
Dissolved Organic Carbon	mg/L												
Total Organic Carbon	mg/L		1.2	1.0	1.1	0.77	0.86	0.86			1.0	1.0	
Hardness (as CaCO3)	mg/L		46	240	230	240	190	250			250	250	
Bicarbonate (as CaCO3)	mg/L		36	140	130	130	100	140			140	130	
Carbonate (as CaCO3)	mg/L		<1.0	2.4	2.4	2.0	1.3	2.7			1.7	2.5	
Total Dissolved Solids	mg/L		60	495	395	475	360	400			445	470	
Cation Sum	meq/L												
Anion Sum	meq/L												
% Difference	%												
Animal/Vegetable Oil	mg/L												
Mineral Oil	mg/L												
Total Oil and Grease	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50	2.6	<0.50	<0.50	<0.50	1.0	0.60

NOTE: PWQO - Provincial Water Quality Objectives (February 1999)

Your Project #: 111-52958-12-100-1002
Site Location: Mill Creek
Your C.O.C. #: 964866-01-01

Attention: Rebecca Warrack

WSP Canada Inc.
55 King St
Suite 700
St. Catharines, ON
CANADA L2R3H5

Report Date: 2023/11/24
Report #: R7926472
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3AC611
Received: 2023/11/17, 14:39

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	4	N/A	2023/11/23	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide	4	N/A	2023/11/24	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	4	N/A	2023/11/22	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	4	N/A	2023/11/23	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	3	N/A	2023/11/22	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	3	N/A	2023/11/22	CAM SOP 00102/00408/00447	SM 2340 B
Hardness (calculated as CaCO3)	1	N/A	2023/11/23	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Calcium and Magnesium	1	2023/11/21	2023/11/22	CAM SOP-00408	EPA 6010D m
Dissolved Metals by ICPMS	3	N/A	2023/11/22	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	2023/11/22	2023/11/22	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	3	N/A	2023/11/24		
Anion and Cation Sum	3	N/A	2023/11/24		
Total Ammonia-N	4	N/A	2023/11/22	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	4	N/A	2023/11/22	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Total Oil and Grease	6	2023/11/21	2023/11/22	CAM SOP-00326	EPA1664B m,SM5520B m
pH	4	2023/11/21	2023/11/23	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate	4	N/A	2023/11/22	CAM SOP-00461	SM 23 4500-P E m
Sulphate by Automated Turbidimetry	4	N/A	2023/11/22	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	4	2023/11/21	2023/11/22	CAM SOP-00428	SM 23 2540C m
Total Organic Carbon (TOC) (3)	1	N/A	2023/11/22	CAM SOP-00446	SM 24 5310B m
Turbidity	1	N/A	2023/11/22	CAM SOP-00417	SM 24 2130 B

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are

Your Project #: 111-52958-12-100-1002
Site Location: Mill Creek
Your C.O.C. #: 964866-01-01

Attention: Rebecca Warrack

WSP Canada Inc.
55 King St
Suite 700
St. Catharines, ON
CANADA L2R3H5

Report Date: 2023/11/24
Report #: R7926472
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3AC611
Received: 2023/11/17, 14:39

reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(3) Total Organic Carbon (TOC) present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Ashton Gibson, Project Manager
Email: Ashton.Gibson@bureauveritas.com
Phone# (905)817-5765

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3AC611
Report Date: 2023/11/24

WSP Canada Inc.
Client Project #: 111-52958-12-100-1002
Site Location: Mill Creek
Sampler Initials: KB

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XQH610		XQH611			XQH612		
Sampling Date		2023/11/17 09:00		2023/11/17 10:00			2023/11/17 11:00		
COC Number		964866-01-01		964866-01-01			964866-01-01		
	UNITS	92-32-III	QC Batch	92-B	RDL	QC Batch	BH1R	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	6.78	9062901	9.23	N/A	9062901	9.04	N/A	9062901
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	180	9058124	200	1.0	9058124	140	1.0	9058124
Carb. Alkalinity (calc. as CaCO3)	mg/L	1.9	9058124	2.3	1.0	9058124	2.0	1.0	9058124
Cation Sum	me/L	7.19	9062901	9.68	N/A	9062901	9.76	N/A	9062901
Hardness (CaCO3)	mg/L	280	9058129	350	1.0	9058129	250	1.0	9058129
Ion Balance (% Difference)	%	3.00	9062898	2.39	N/A	9062899	3.88	N/A	9062898
Inorganics									
Total Ammonia-N	mg/L	<0.050	9063651	<0.050	0.050	9063651	<0.050	0.050	9063651
Conductivity	umho/cm	710	9063516	990	1.0	9063516	1000	1.0	9063516
Total Dissolved Solids	mg/L	350	9062013	495	10	9062013	515	10	9062013
Dissolved Organic Carbon	mg/L	1.2	9062672	0.50	0.40	9062672	1.0	0.40	9062672
Orthophosphate (P)	mg/L	<0.010	9063531	<0.010	0.010	9063531	<0.010	0.010	9063531
pH	pH	8.03	9063517	8.08		9063517	8.20		9063517
Dissolved Sulphate (SO4)	mg/L	38	9063527	46	1.0	9063527	34	1.0	9063527
Alkalinity (Total as CaCO3)	mg/L	180	9063511	210	1.0	9063511	140	1.0	9063511
Dissolved Chloride (Cl-)	mg/L	81	9063521	150	1.0	9063521	200	2.0	9063521
Nitrite (N)	mg/L	<0.010	9063478	<0.010	0.010	9063478	<0.010	0.010	9063478
Nitrate (N)	mg/L	<0.10	9063478	<0.10	0.10	9063478	0.12	0.10	9063478
Nitrate + Nitrite (N)	mg/L	<0.10	9063478	<0.10	0.10	9063478	0.12	0.10	9063478
Petroleum Hydrocarbons									
Total Oil & Grease	mg/L	1.2	9063477	2.0	0.50	9063477	1.2	0.50	9063477

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C3AC611
Report Date: 2023/11/24

WSP Canada Inc.
Client Project #: 111-52958-12-100-1002
Site Location: Mill Creek
Sampler Initials: KB

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XQH613	XQH614			XQH615		
Sampling Date		2023/11/17	2023/11/17			2023/11/17 10:30		
COC Number		964866-01-01	964866-01-01			964866-01-01		
	UNITS	DUP1	DUP2	RDL	QC Batch	POND 1	RDL	QC Batch
Calculated Parameters								
Bicarb. Alkalinity (calc. as CaCO3)	mg/L					130	1.0	9061878
Carb. Alkalinity (calc. as CaCO3)	mg/L					2.5	1.0	9061878
Hardness (CaCO3)	mg/L					250	1.0	9061879
Inorganics								
Total Ammonia-N	mg/L					<0.050	0.050	9063651
Conductivity	umho/cm					960	1.0	9063516
Total Dissolved Solids	mg/L					470	10	9062013
Total Organic Carbon (TOC)	mg/L					1.0	0.40	9059696
Orthophosphate (P)	mg/L					<0.010	0.010	9063531
pH	pH					8.31		9063517
Dissolved Sulphate (SO4)	mg/L					41	1.0	9063527
Turbidity	NTU					2.5	0.1	9065008
Alkalinity (Total as CaCO3)	mg/L					130	1.0	9063511
Dissolved Chloride (Cl-)	mg/L					180	1.0	9063521
Nitrite (N)	mg/L					<0.010	0.010	9063478
Nitrate (N)	mg/L					<0.10	0.10	9063478
Nitrate + Nitrite (N)	mg/L					<0.10	0.10	9063478
Petroleum Hydrocarbons								
Total Oil & Grease	mg/L	<0.50	0.60	0.50	9063477	1.0	0.50	9063477

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3AC611
Report Date: 2023/11/24

WSP Canada Inc.
Client Project #: 111-52958-12-100-1002
Site Location: Mill Creek
Sampler Initials: KB

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XQH610	XQH611	XQH612			XQH615		
Sampling Date		2023/11/17 09:00	2023/11/17 10:00	2023/11/17 11:00			2023/11/17 10:30		
COC Number		964866-01-01	964866-01-01	964866-01-01			964866-01-01		
	UNITS	92-32-III	92-B	BH1R	RDL	QC Batch	POND 1	RDL	QC Batch
Metals									
Dissolved Calcium (Ca)	mg/L						42	0.050	9063489
Dissolved Magnesium (Mg)	mg/L						35	0.050	9063489
Dissolved Calcium (Ca)	ug/L	66000	66000	46000	200	9064533			
Total Calcium (Ca)	ug/L						42000	200	9064350
Dissolved Copper (Cu)	ug/L	<0.90	<0.90	<0.90	0.90	9064533			
Total Copper (Cu)	ug/L						1.2	0.90	9064350
Dissolved Iron (Fe)	ug/L	<100	<100	<100	100	9064533			
Total Iron (Fe)	ug/L						240	100	9064350
Dissolved Magnesium (Mg)	ug/L	27000	46000	33000	50	9064533			
Total Magnesium (Mg)	ug/L						36000	50	9064350
Dissolved Manganese (Mn)	ug/L	560	260	<2.0	2.0	9064533			
Total Manganese (Mn)	ug/L						19	2.0	9064350
Dissolved Potassium (K)	ug/L	1300	3300	2700	200	9064533			
Total Potassium (K)	ug/L						3500	200	9064350
Dissolved Sodium (Na)	ug/L	37000	58000	110000	100	9064533			
Total Sodium (Na)	ug/L						95000	100	9064350
Dissolved Zinc (Zn)	ug/L	28	78	<5.0	5.0	9064533			
Total Zinc (Zn)	ug/L						6.2	5.0	9064350

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	9.7°C

Results relate only to the items tested.

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Bureau Veritas Job #: C3AC611
Report Date: 2023/11/24

WSP Canada Inc.
Client Project #: 111-52958-12-100-1002
Site Location: Mill Creek
Sampler Initials: KB

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9059696	GID	Matrix Spike	Total Organic Carbon (TOC)	2023/11/22		87	%	80 - 120
9059696	GID	Spiked Blank	Total Organic Carbon (TOC)	2023/11/22		91	%	80 - 120
9059696	GID	Method Blank	Total Organic Carbon (TOC)	2023/11/21	<0.40		mg/L	
9059696	GID	RPD	Total Organic Carbon (TOC)	2023/11/22	0.30		%	20
9062013	RTB	Spiked Blank	Total Dissolved Solids	2023/11/22		97	%	80 - 120
9062013	RTB	Method Blank	Total Dissolved Solids	2023/11/22	<10		mg/L	
9062013	RTB	RPD	Total Dissolved Solids	2023/11/22	5.1		%	20
9062672	GID	Matrix Spike	Dissolved Organic Carbon	2023/11/22		89	%	80 - 120
9062672	GID	Spiked Blank	Dissolved Organic Carbon	2023/11/22		92	%	80 - 120
9062672	GID	Method Blank	Dissolved Organic Carbon	2023/11/22	<0.40		mg/L	
9062672	GID	RPD	Dissolved Organic Carbon	2023/11/22	4.4		%	20
9063477	AW5	Spiked Blank	Total Oil & Grease	2023/11/22		99	%	85 - 115
9063477	AW5	RPD	Total Oil & Grease	2023/11/22	0.51		%	25
9063477	AW5	Method Blank	Total Oil & Grease	2023/11/22	<0.50		mg/L	
9063478	C_N	Matrix Spike [XQH612-02]	Nitrite (N)	2023/11/22		103	%	80 - 120
			Nitrate (N)	2023/11/22		100	%	80 - 120
9063478	C_N	Spiked Blank	Nitrite (N)	2023/11/22		105	%	80 - 120
			Nitrate (N)	2023/11/22		103	%	80 - 120
9063478	C_N	Method Blank	Nitrite (N)	2023/11/22	<0.010		mg/L	
			Nitrate (N)	2023/11/22	<0.10		mg/L	
9063478	C_N	RPD [XQH612-02]	Nitrite (N)	2023/11/22	NC		%	20
			Nitrate (N)	2023/11/22	3.3		%	20
9063489	SUK	Matrix Spike	Dissolved Calcium (Ca)	2023/11/22		NC	%	80 - 120
			Dissolved Magnesium (Mg)	2023/11/22		97	%	80 - 120
9063489	SUK	Spiked Blank	Dissolved Calcium (Ca)	2023/11/22		100	%	80 - 120
			Dissolved Magnesium (Mg)	2023/11/22		99	%	80 - 120
9063489	SUK	Method Blank	Dissolved Calcium (Ca)	2023/11/22	<0.050		mg/L	
			Dissolved Magnesium (Mg)	2023/11/22	<0.050		mg/L	
9063511	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2023/11/23		100	%	85 - 115
9063511	SAU	Method Blank	Alkalinity (Total as CaCO3)	2023/11/23	<1.0		mg/L	
9063511	SAU	RPD	Alkalinity (Total as CaCO3)	2023/11/23	0.55		%	20
9063516	SAU	Spiked Blank	Conductivity	2023/11/23		102	%	85 - 115
9063516	SAU	Method Blank	Conductivity	2023/11/23	<1.0		umho/cm	
9063516	SAU	RPD	Conductivity	2023/11/23	0.45		%	10
9063517	SAU	Spiked Blank	pH	2023/11/23		102	%	98 - 103
9063517	SAU	RPD	pH	2023/11/23	0.49		%	N/A
9063521	ADB	Matrix Spike	Dissolved Chloride (Cl-)	2023/11/22		90	%	80 - 120
9063521	ADB	Spiked Blank	Dissolved Chloride (Cl-)	2023/11/22		97	%	80 - 120
9063521	ADB	Method Blank	Dissolved Chloride (Cl-)	2023/11/22	<1.0		mg/L	
9063521	ADB	RPD	Dissolved Chloride (Cl-)	2023/11/22	0.51		%	20
9063527	ADB	Matrix Spike	Dissolved Sulphate (SO4)	2023/11/22		91	%	75 - 125
9063527	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2023/11/22		97	%	80 - 120
9063527	ADB	Method Blank	Dissolved Sulphate (SO4)	2023/11/22	<1.0		mg/L	
9063527	ADB	RPD	Dissolved Sulphate (SO4)	2023/11/22	3.1		%	20
9063531	ADB	Matrix Spike	Orthophosphate (P)	2023/11/22		94	%	75 - 125
9063531	ADB	Spiked Blank	Orthophosphate (P)	2023/11/22		94	%	80 - 120
9063531	ADB	Method Blank	Orthophosphate (P)	2023/11/22	<0.010		mg/L	
9063531	ADB	RPD	Orthophosphate (P)	2023/11/22	NC		%	20
9063651	VRO	Matrix Spike	Total Ammonia-N	2023/11/22		101	%	75 - 125
9063651	VRO	Spiked Blank	Total Ammonia-N	2023/11/22		100	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9063651	VRO	Method Blank	Total Ammonia-N	2023/11/22	<0.050		mg/L	
9063651	VRO	RPD	Total Ammonia-N	2023/11/22	1.3		%	20
9064350	ADA	Matrix Spike	Total Calcium (Ca)	2023/11/22		NC	%	80 - 120
			Total Copper (Cu)	2023/11/22		91	%	80 - 120
			Total Iron (Fe)	2023/11/22		98	%	80 - 120
			Total Magnesium (Mg)	2023/11/22		NC	%	80 - 120
			Total Manganese (Mn)	2023/11/22		96	%	80 - 120
			Total Potassium (K)	2023/11/22		102	%	80 - 120
			Total Sodium (Na)	2023/11/22		NC	%	80 - 120
			Total Zinc (Zn)	2023/11/22		95	%	80 - 120
9064350	ADA	Spiked Blank	Total Calcium (Ca)	2023/11/22		95	%	80 - 120
			Total Copper (Cu)	2023/11/22		94	%	80 - 120
			Total Iron (Fe)	2023/11/22		98	%	80 - 120
			Total Magnesium (Mg)	2023/11/22		100	%	80 - 120
			Total Manganese (Mn)	2023/11/22		96	%	80 - 120
			Total Potassium (K)	2023/11/22		103	%	80 - 120
			Total Sodium (Na)	2023/11/22		98	%	80 - 120
			Total Zinc (Zn)	2023/11/22		97	%	80 - 120
9064350	ADA	Method Blank	Total Calcium (Ca)	2023/11/22	<200		ug/L	
			Total Copper (Cu)	2023/11/22	<0.90		ug/L	
			Total Iron (Fe)	2023/11/22	<100		ug/L	
			Total Magnesium (Mg)	2023/11/22	<50		ug/L	
			Total Manganese (Mn)	2023/11/22	<2.0		ug/L	
			Total Potassium (K)	2023/11/22	<200		ug/L	
			Total Sodium (Na)	2023/11/22	<100		ug/L	
			Total Zinc (Zn)	2023/11/22	<5.0		ug/L	
9064350	ADA	RPD	Total Calcium (Ca)	2023/11/22	0.19		%	20
			Total Copper (Cu)	2023/11/22	3.3		%	20
			Total Iron (Fe)	2023/11/22	NC		%	20
			Total Magnesium (Mg)	2023/11/22	2.9		%	20
			Total Manganese (Mn)	2023/11/22	NC		%	20
			Total Potassium (K)	2023/11/22	0.65		%	20
			Total Sodium (Na)	2023/11/22	0.76		%	20
			Total Zinc (Zn)	2023/11/22	4.8		%	20
9064533	PBA	Matrix Spike	Dissolved Calcium (Ca)	2023/11/22		NC	%	80 - 120
			Dissolved Copper (Cu)	2023/11/22		102	%	80 - 120
			Dissolved Iron (Fe)	2023/11/22		104	%	80 - 120
			Dissolved Magnesium (Mg)	2023/11/22		100	%	80 - 120
			Dissolved Manganese (Mn)	2023/11/22		101	%	80 - 120
			Dissolved Potassium (K)	2023/11/22		106	%	80 - 120
			Dissolved Sodium (Na)	2023/11/22		104	%	80 - 120
			Dissolved Zinc (Zn)	2023/11/22		100	%	80 - 120
9064533	PBA	Spiked Blank	Dissolved Calcium (Ca)	2023/11/22		104	%	80 - 120
			Dissolved Copper (Cu)	2023/11/22		101	%	80 - 120
			Dissolved Iron (Fe)	2023/11/22		103	%	80 - 120
			Dissolved Magnesium (Mg)	2023/11/22		102	%	80 - 120
			Dissolved Manganese (Mn)	2023/11/22		100	%	80 - 120
			Dissolved Potassium (K)	2023/11/22		103	%	80 - 120
			Dissolved Sodium (Na)	2023/11/22		105	%	80 - 120
			Dissolved Zinc (Zn)	2023/11/22		100	%	80 - 120
9064533	PBA	Method Blank	Dissolved Calcium (Ca)	2023/11/22	<200		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Copper (Cu)	2023/11/22	<0.90		ug/L	
			Dissolved Iron (Fe)	2023/11/22	<100		ug/L	
			Dissolved Magnesium (Mg)	2023/11/22	<50		ug/L	
			Dissolved Manganese (Mn)	2023/11/22	<2.0		ug/L	
			Dissolved Potassium (K)	2023/11/22	<200		ug/L	
			Dissolved Sodium (Na)	2023/11/22	<100		ug/L	
			Dissolved Zinc (Zn)	2023/11/22	<5.0		ug/L	
9064533	PBA	RPD	Dissolved Calcium (Ca)	2023/11/22	1.2		%	20
			Dissolved Copper (Cu)	2023/11/22	NC		%	20
			Dissolved Iron (Fe)	2023/11/22	NC		%	20
			Dissolved Magnesium (Mg)	2023/11/22	0.25		%	20
			Dissolved Manganese (Mn)	2023/11/22	3.5		%	20
			Dissolved Potassium (K)	2023/11/22	0.086		%	20
			Dissolved Sodium (Na)	2023/11/22	0.84		%	20
			Dissolved Zinc (Zn)	2023/11/22	NC		%	20
9065008	LKI	Spiked Blank	Turbidity	2023/11/22		102	%	80 - 120
9065008	LKI	Method Blank	Turbidity	2023/11/22	<0.1		NTU	
9065008	LKI	RPD	Turbidity	2023/11/22	0.70		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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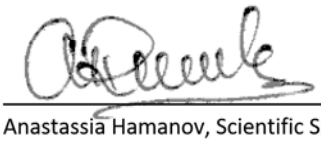
Bureau Veritas Job #: C3AC611
Report Date: 2023/11/24

WSP Canada Inc.
Client Project #: 111-52958-12-100-1002
Site Location: Mill Creek
Sampler Initials: KB

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

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Your Project #: 111-52958-12-100-1003
Site Location: Mill Creek
Your C.O.C. #: 924861-01-01

Attention: Rebecca Warrack

WSP Canada Inc
55 King St
Suite 700
St. Catharines, ON
CANADA L2R3H5

Report Date: 2023/03/23
Report #: R7558181
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C373735
Received: 2023/03/15, 16:41

Sample Matrix: Ground Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	3	N/A	2023/03/18	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	3	N/A	2023/03/20	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	3	N/A	2023/03/20	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	3	N/A	2023/03/18	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	3	N/A	2023/03/17	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	3	N/A	2023/03/20	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	3	N/A	2023/03/20	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	3	N/A	2023/03/20		
Anion and Cation Sum	3	N/A	2023/03/20		
Total Ammonia-N	3	N/A	2023/03/21	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	3	N/A	2023/03/20	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Total Oil and Grease	4	2023/03/20	2023/03/20	CAM SOP-00326	EPA1664B m,SM5520B m
pH	3	2023/03/17	2023/03/18	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	3	N/A	2023/03/20	CAM SOP-00461	SM 23 4500-P E m
Sulphate by Automated Turbidimetry	3	N/A	2023/03/20	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	3	2023/03/21	2023/03/22	CAM SOP-00428	SM 23 2540C m

Sample Matrix: Surface Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2023/03/20	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2023/03/20	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2023/03/20	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	1	N/A	2023/03/20	CAM SOP-00414	SM 23 2510 m
Hardness (calculated as CaCO3)	1	N/A	2023/03/23	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Calcium and Magnesium	1	2023/03/17	2023/03/23	CAM SOP-00408	EPA 6010D m
Total Metals Analysis by ICPMS	1	2023/03/22	2023/03/22	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	1	N/A	2023/03/21	CAM SOP-00441	USGS I-2522-90 m

Your Project #: 111-52958-12-100-1003
Site Location: Mill Creek
Your C.O.C. #: 924861-01-01

Attention: Rebecca Warrack

WSP Canada Inc
55 King St
Suite 700
St. Catharines, ON
CANADA L2R3H5

Report Date: 2023/03/23
Report #: R7558181
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C373735
Received: 2023/03/15, 16:41

Sample Matrix: Surface Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Nitrate & Nitrite as Nitrogen in Water (2)	1	N/A	2023/03/20	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Total Oil and Grease	1	2023/03/20	2023/03/20	CAM SOP-00326	EPA1664B m,SM5520B m
pH	1	2023/03/17	2023/03/20	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	1	N/A	2023/03/20	CAM SOP-00461	SM 23 4500-P E m
Sulphate by Automated Turbidimetry	1	N/A	2023/03/20	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	1	2023/03/21	2023/03/22	CAM SOP-00428	SM 23 2540C m
Total Organic Carbon (TOC) (3)	1	N/A	2023/03/18	CAM SOP-00446	SM 23 5310B m
Turbidity	1	N/A	2023/03/17	CAM SOP-00417	SM 23 2130 B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Your Project #: 111-52958-12-100-1003
Site Location: Mill Creek
Your C.O.C. #: 924861-01-01

Attention: Rebecca Warrack

WSP Canada Inc
55 King St
Suite 700
St. Catharines, ON
CANADA L2R3H5

Report Date: 2023/03/23
Report #: R7558181
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C373735
Received: 2023/03/15, 16:41

(3) Total Organic Carbon (TOC) present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Ashton Gibson, Project Manager
Email: Ashton.Gibson@bureauveritas.com
Phone# (905)817-5765

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Bureau Veritas Job #: C373735
Report Date: 2023/03/23

WSP Canada Inc
Client Project #: 111-52958-12-100-1003
Site Location: Mill Creek
Sampler Initials: KB

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		VHK233		VHK234	VHK235			VHK237		
Sampling Date		2023/03/15 11:00		2023/03/15 03:30	2023/03/15 13:50			2023/03/15		
COC Number		924861-01-01		924861-01-01	924861-01-01			924861-01-01		
	UNITS	BH1R	QC Batch	92-33-111	92-8	RDL	QC Batch	DUP 1	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	8.86	8556048	9.08	8.57	N/A	8556048			
Bicarb. Alkalinity (calc. as CaCO3	mg/L	140	8555711	310	160	1.0	8555711			
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.0	8555711	2.0	2.0	1.0	8555711			
Cation Sum	me/L	10.0	8556048	10.2	9.71	N/A	8556048			
Hardness (CaCO3)	mg/L	270	8555710	440	290	1.0	8555710			
Ion Balance (% Difference)	%	6.26	8556044	5.67	6.23	N/A	8556044			
Inorganics										
Total Ammonia-N	mg/L	<0.050	8559598	<0.050	<0.050	0.050	8559598			
Conductivity	umho/cm	1000	8559200	880	940	1.0	8559200			
Total Dissolved Solids	mg/L	485	8563776	455	475	10	8563776			
Dissolved Organic Carbon	mg/L	0.69	8559712	2.0	0.51	0.40	8559712			
Orthophosphate (P)	mg/L	<0.010	8559116	<0.010	<0.010	0.010	8559116			
pH	pH	8.18	8559197	7.82	8.13		8559197			
Dissolved Sulphate (SO4)	mg/L	34	8559126	37	46	1.0	8559126			
Alkalinity (Total as CaCO3)	mg/L	150	8559193	320	160	1.0	8559193			
Dissolved Chloride (Cl-)	mg/L	190	8559107	70	160	1.0	8559107			
Nitrite (N)	mg/L	<0.010	8559063	<0.010	<0.010	0.010	8559275			
Nitrate (N)	mg/L	0.12	8559063	<0.10	<0.10	0.10	8559275			
Nitrate + Nitrite (N)	mg/L	0.12	8559063	<0.10	<0.10	0.10	8559275			
Petroleum Hydrocarbons										
Total Oil & Grease	mg/L	<0.50	8562262	<0.50	<0.50	0.50	8562262	<0.50	0.50	8562262

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C373735
Report Date: 2023/03/23

WSP Canada Inc
Client Project #: 111-52958-12-100-1003
Site Location: Mill Creek
Sampler Initials: KB

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

Bureau Veritas ID		VHK233	VHK234	VHK235		
Sampling Date		2023/03/15 11:00	2023/03/15 03:30	2023/03/15 13:50		
COC Number		924861-01-01	924861-01-01	924861-01-01		
	UNITS	BH1R	92-33-111	92-8	RDL	QC Batch
Metals						
Dissolved Calcium (Ca)	ug/L	50000	110000	55000	200	8560470
Dissolved Copper (Cu)	ug/L	<0.90	<0.90	1.5	0.90	8560470
Dissolved Iron (Fe)	ug/L	<100	<100	<100	100	8560470
Dissolved Magnesium (Mg)	ug/L	34000	43000	37000	50	8560470
Dissolved Manganese (Mn)	ug/L	2.6	610	130	2.0	8560470
Dissolved Potassium (K)	ug/L	2800	1500	2900	200	8560470
Dissolved Sodium (Na)	ug/L	110000	31000	88000	100	8560470
Dissolved Zinc (Zn)	ug/L	<5.0	88	45	5.0	8560470

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C373735
Report Date: 2023/03/23

WSP Canada Inc
Client Project #: 111-52958-12-100-1003
Site Location: Mill Creek
Sampler Initials: KB

RESULTS OF ANALYSES OF SURFACE WATER

Bureau Veritas ID		VHK236		
Sampling Date		2023/03/15 15:00		
COC Number		924861-01-01		
	UNITS	POND 1	RDL	QC Batch
Calculated Parameters				
Bicarb. Alkalinity (calc. as CaCO3	mg/L	140	1.0	8555711
Carb. Alkalinity (calc. as CaCO3)	mg/L	1.7	1.0	8555711
Hardness (CaCO3)	mg/L	250	1.0	8555710
Inorganics				
Total Ammonia-N	mg/L	<0.050	0.050	8559598
Conductivity	umho/cm	960	1.0	8559826
Total Dissolved Solids	mg/L	445	10	8563776
Total Organic Carbon (TOC)	mg/L	1.0	0.40	8559234
Orthophosphate (P)	mg/L	<0.010	0.010	8559116
pH	pH	8.12		8559835
Dissolved Sulphate (SO4)	mg/L	44	1.0	8559126
Turbidity	NTU	0.5	0.1	8558264
Alkalinity (Total as CaCO3)	mg/L	140	1.0	8559830
Dissolved Chloride (Cl-)	mg/L	170	1.0	8559107
Nitrite (N)	mg/L	<0.010	0.010	8559063
Nitrate (N)	mg/L	<0.10	0.10	8559063
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	8559063
Petroleum Hydrocarbons				
Total Oil & Grease	mg/L	<0.50	0.50	8562262

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ATOMIC SPECTROSCOPY (SURFACE WATER)

Bureau Veritas ID		VHK236		
Sampling Date		2023/03/15 15:00		
COC Number		924861-01-01		
	UNITS	POND 1	RDL	QC Batch
Metals				
Dissolved Calcium (Ca)	mg/L	39	0.050	8560010
Dissolved Magnesium (Mg)	mg/L	37	0.050	8560010
Total Calcium (Ca)	ug/L	41000	200	8566012
Total Copper (Cu)	ug/L	1.3	0.90	8566012
Total Iron (Fe)	ug/L	<100	100	8566012
Total Magnesium (Mg)	ug/L	38000	50	8566012
Total Manganese (Mn)	ug/L	7.3	2.0	8566012
Total Potassium (K)	ug/L	3700	200	8566012
Total Sodium (Na)	ug/L	89000	100	8566012
Total Zinc (Zn)	ug/L	28	5.0	8566012

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8558264	SAU	Spiked Blank	Turbidity	2023/03/17		99	%	80 - 120
8558264	SAU	Method Blank	Turbidity	2023/03/17	<0.1		NTU	
8558264	SAU	RPD	Turbidity	2023/03/17	1.4		%	20
8559063	C_N	Matrix Spike	Nitrite (N)	2023/03/20		102	%	80 - 120
			Nitrate (N)	2023/03/20		72 (1)	%	80 - 120
8559063	C_N	Spiked Blank	Nitrite (N)	2023/03/20		106	%	80 - 120
			Nitrate (N)	2023/03/20		88	%	80 - 120
8559063	C_N	Method Blank	Nitrite (N)	2023/03/20	<0.010		mg/L	
			Nitrate (N)	2023/03/20	<0.10		mg/L	
8559063	C_N	RPD	Nitrite (N)	2023/03/20	6.4		%	20
			Nitrate (N)	2023/03/20	3.0		%	20
8559107	MJ1	Matrix Spike	Dissolved Chloride (Cl-)	2023/03/20		NC	%	80 - 120
8559107	MJ1	Spiked Blank	Dissolved Chloride (Cl-)	2023/03/20		97	%	80 - 120
8559107	MJ1	Method Blank	Dissolved Chloride (Cl-)	2023/03/20	<1.0		mg/L	
8559107	MJ1	RPD	Dissolved Chloride (Cl-)	2023/03/20	0.095		%	20
8559116	MJ1	Matrix Spike	Orthophosphate (P)	2023/03/20		84	%	75 - 125
8559116	MJ1	Spiked Blank	Orthophosphate (P)	2023/03/20		91	%	80 - 120
8559116	MJ1	Method Blank	Orthophosphate (P)	2023/03/20	<0.010		mg/L	
8559116	MJ1	RPD	Orthophosphate (P)	2023/03/20	NC		%	20
8559126	ADB	Matrix Spike	Dissolved Sulphate (SO4)	2023/03/20		NC	%	75 - 125
8559126	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2023/03/20		95	%	80 - 120
8559126	ADB	Method Blank	Dissolved Sulphate (SO4)	2023/03/20	<1.0		mg/L	
8559126	ADB	RPD	Dissolved Sulphate (SO4)	2023/03/20	0.90		%	20
8559193	KIT	Spiked Blank	Alkalinity (Total as CaCO3)	2023/03/17		97	%	85 - 115
8559193	KIT	Method Blank	Alkalinity (Total as CaCO3)	2023/03/17	<1.0		mg/L	
8559193	KIT	RPD	Alkalinity (Total as CaCO3)	2023/03/17	0.44		%	20
8559197	KIT	Spiked Blank	pH	2023/03/17		102	%	98 - 103
8559197	KIT	RPD	pH	2023/03/17	0.27		%	N/A
8559200	KIT	Spiked Blank	Conductivity	2023/03/17		101	%	85 - 115
8559200	KIT	Method Blank	Conductivity	2023/03/17	<1.0		umho/cm	
8559200	KIT	RPD	Conductivity	2023/03/17	0.30		%	25
8559234	GID	Matrix Spike	Total Organic Carbon (TOC)	2023/03/18		96	%	80 - 120
8559234	GID	Spiked Blank	Total Organic Carbon (TOC)	2023/03/18		98	%	80 - 120
8559234	GID	Method Blank	Total Organic Carbon (TOC)	2023/03/18	<0.40		mg/L	
8559234	GID	RPD	Total Organic Carbon (TOC)	2023/03/18	0.57		%	20
8559275	C_N	Matrix Spike	Nitrite (N)	2023/03/20		102	%	80 - 120
			Nitrate (N)	2023/03/20		96	%	80 - 120
8559275	C_N	Spiked Blank	Nitrite (N)	2023/03/20		105	%	80 - 120
			Nitrate (N)	2023/03/20		97	%	80 - 120
8559275	C_N	Method Blank	Nitrite (N)	2023/03/20	<0.010		mg/L	
			Nitrate (N)	2023/03/20	<0.10		mg/L	
8559275	C_N	RPD	Nitrite (N)	2023/03/20	18		%	20
			Nitrate (N)	2023/03/20	NC		%	20
8559598	SSV	Matrix Spike	Total Ammonia-N	2023/03/21		99	%	75 - 125
8559598	SSV	Spiked Blank	Total Ammonia-N	2023/03/21		100	%	80 - 120
8559598	SSV	Method Blank	Total Ammonia-N	2023/03/21	<0.050		mg/L	
8559598	SSV	RPD	Total Ammonia-N	2023/03/21	11		%	20
8559712	GID	Matrix Spike	Dissolved Organic Carbon	2023/03/17		95	%	80 - 120
8559712	GID	Spiked Blank	Dissolved Organic Carbon	2023/03/17		99	%	80 - 120
8559712	GID	Method Blank	Dissolved Organic Carbon	2023/03/17	<0.40		mg/L	
8559712	GID	RPD	Dissolved Organic Carbon	2023/03/17	1.6		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8559826	KIT	Spiked Blank	Conductivity	2023/03/20		100	%	85 - 115
8559826	KIT	Method Blank	Conductivity	2023/03/20	<1.0		umho/cm	
8559826	KIT	RPD [VHK236-03]	Conductivity	2023/03/20	0.41		%	25
8559830	KIT	Spiked Blank	Alkalinity (Total as CaCO3)	2023/03/20		98	%	85 - 115
8559830	KIT	Method Blank	Alkalinity (Total as CaCO3)	2023/03/20	<1.0		mg/L	
8559830	KIT	RPD [VHK236-03]	Alkalinity (Total as CaCO3)	2023/03/20	0.085		%	20
8559835	KIT	Spiked Blank	pH	2023/03/20		102	%	98 - 103
8559835	KIT	RPD [VHK236-03]	pH	2023/03/20	0.98		%	N/A
8560010	SUK	Matrix Spike	Dissolved Calcium (Ca)	2023/03/23		NC	%	80 - 120
			Dissolved Magnesium (Mg)	2023/03/23		NC	%	80 - 120
8560010	SUK	Spiked Blank	Dissolved Calcium (Ca)	2023/03/23		98	%	80 - 120
			Dissolved Magnesium (Mg)	2023/03/23		100	%	80 - 120
8560010	SUK	Method Blank	Dissolved Calcium (Ca)	2023/03/23	<0.050		mg/L	
			Dissolved Magnesium (Mg)	2023/03/23	<0.050		mg/L	
8560470	PBA	Matrix Spike	Dissolved Calcium (Ca)	2023/03/20		NC	%	80 - 120
			Dissolved Copper (Cu)	2023/03/20		109	%	80 - 120
			Dissolved Iron (Fe)	2023/03/20		109	%	80 - 120
			Dissolved Magnesium (Mg)	2023/03/20		NC	%	80 - 120
			Dissolved Manganese (Mn)	2023/03/20		106	%	80 - 120
			Dissolved Potassium (K)	2023/03/20		114	%	80 - 120
			Dissolved Sodium (Na)	2023/03/20		NC	%	80 - 120
			Dissolved Zinc (Zn)	2023/03/20		98	%	80 - 120
8560470	PBA	Spiked Blank	Dissolved Calcium (Ca)	2023/03/20		104	%	80 - 120
			Dissolved Copper (Cu)	2023/03/20		102	%	80 - 120
			Dissolved Iron (Fe)	2023/03/20		101	%	80 - 120
			Dissolved Magnesium (Mg)	2023/03/20		100	%	80 - 120
			Dissolved Manganese (Mn)	2023/03/20		100	%	80 - 120
			Dissolved Potassium (K)	2023/03/20		101	%	80 - 120
			Dissolved Sodium (Na)	2023/03/20		100	%	80 - 120
			Dissolved Zinc (Zn)	2023/03/20		99	%	80 - 120
8560470	PBA	Method Blank	Dissolved Calcium (Ca)	2023/03/20	<200		ug/L	
			Dissolved Copper (Cu)	2023/03/20	<0.90		ug/L	
			Dissolved Iron (Fe)	2023/03/20	<100		ug/L	
			Dissolved Magnesium (Mg)	2023/03/20	<50		ug/L	
			Dissolved Manganese (Mn)	2023/03/20	<2.0		ug/L	
			Dissolved Potassium (K)	2023/03/20	<200		ug/L	
			Dissolved Sodium (Na)	2023/03/20	<100		ug/L	
			Dissolved Zinc (Zn)	2023/03/20	<5.0		ug/L	
8560470	PBA	RPD	Dissolved Copper (Cu)	2023/03/20	5.2		%	20
			Dissolved Sodium (Na)	2023/03/20	5.3		%	20
			Dissolved Zinc (Zn)	2023/03/20	NC		%	20
8562262	RUP	Spiked Blank	Total Oil & Grease	2023/03/20		99	%	85 - 115
8562262	RUP	RPD	Total Oil & Grease	2023/03/20	0.76		%	25
8562262	RUP	Method Blank	Total Oil & Grease	2023/03/20	<0.50		mg/L	
8563776	SHD	QC Standard	Total Dissolved Solids	2023/03/22		98	%	90 - 110
8563776	SHD	Method Blank	Total Dissolved Solids	2023/03/22	<10		mg/L	
8563776	SHD	RPD	Total Dissolved Solids	2023/03/22	9.8		%	20
8566012	N_R	Matrix Spike	Total Calcium (Ca)	2023/03/22		NC	%	80 - 120
			Total Copper (Cu)	2023/03/22		105	%	80 - 120
			Total Iron (Fe)	2023/03/22		101	%	80 - 120
			Total Magnesium (Mg)	2023/03/22		NC	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Manganese (Mn)	2023/03/22		98	%	80 - 120
			Total Potassium (K)	2023/03/22		111	%	80 - 120
			Total Sodium (Na)	2023/03/22		NC	%	80 - 120
			Total Zinc (Zn)	2023/03/22		93	%	80 - 120
8566012	N_R	Spiked Blank	Total Calcium (Ca)	2023/03/22		99	%	80 - 120
			Total Copper (Cu)	2023/03/22		101	%	80 - 120
			Total Iron (Fe)	2023/03/22		101	%	80 - 120
			Total Magnesium (Mg)	2023/03/22		100	%	80 - 120
			Total Manganese (Mn)	2023/03/22		98	%	80 - 120
			Total Potassium (K)	2023/03/22		100	%	80 - 120
			Total Sodium (Na)	2023/03/22		100	%	80 - 120
			Total Zinc (Zn)	2023/03/22		105	%	80 - 120
8566012	N_R	Method Blank	Total Calcium (Ca)	2023/03/22	<200		ug/L	
			Total Copper (Cu)	2023/03/22	<0.90		ug/L	
			Total Iron (Fe)	2023/03/22	<100		ug/L	
			Total Magnesium (Mg)	2023/03/22	<50		ug/L	
			Total Manganese (Mn)	2023/03/22	<2.0		ug/L	
			Total Potassium (K)	2023/03/22	<200		ug/L	
			Total Sodium (Na)	2023/03/22	<100		ug/L	
			Total Zinc (Zn)	2023/03/22	<5.0		ug/L	
8566012	N_R	RPD	Total Calcium (Ca)	2023/03/22	5.4		%	20
			Total Copper (Cu)	2023/03/22	0.74		%	20
			Total Iron (Fe)	2023/03/22	2.8		%	20
			Total Magnesium (Mg)	2023/03/22	5.9		%	20
			Total Manganese (Mn)	2023/03/22	1.6		%	20
			Total Potassium (K)	2023/03/22	5.6		%	20
			Total Sodium (Na)	2023/03/22	2.5		%	20
			Total Zinc (Zn)	2023/03/22	3.6		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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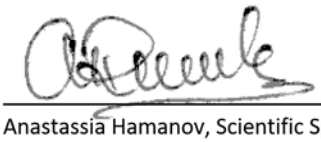
Bureau Veritas Job #: C373735
Report Date: 2023/03/23

WSP Canada Inc
Client Project #: 111-52958-12-100-1003
Site Location: Mill Creek
Sampler Initials: KB

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

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APPENDIX D

Climate Data

Technical Appendix B – 2023 Hydrogeology Report

TABLE D-1
1951 - 1980 WATER BUDGET SUMMARY - GUELPH ARBORETUM
MILL CREEK AGGREGATES PIT

Month	Mean Temperature (°C)	I	E (mm)	Daylight Factor	E adj. (mm)	Total Precipitation (mm)	WHC (mm)	Surplus (mm)	Deficit (mm)
JANUARY	-7.2	0.00	0.00	0.82	0.00	56.3	100.0	56.3	0.0
FEBRUARY	-6.5	0.00	0.00	0.82	0.00	50.5	100.0	50.5	0.0
MARCH	-1.9	0.00	0.00	1.03	0.00	62.5	100.0	62.5	0.0
APRIL	5.8	1.25	27.58	1.12	30.89	73.9	100.0	43.0	0.0
MAY	11.7	3.61	57.43	1.27	72.94	72.7	99.8	0.0	0.0
JUNE	17.4	6.57	86.96	1.28	111.31	70.6	59.0	0.0	0.0
JULY	19.7	7.93	99.02	1.30	128.72	82.4	12.7	0.0	0.0
AUGUST	18.8	7.39	94.29	1.20	113.15	81.5	0.0	0.0	18.9
SEPTEMBER	15	5.25	74.47	1.04	77.44	63.4	0.0	0.0	14.0
OCTOBER	9.2	2.51	44.67	0.95	42.44	73.4	31.0	0.0	0.0
NOVEMBER	2.5	0.35	11.44	0.81	9.27	74.9	96.6	0.0	0.0
DECEMBER	-4.1	0.00	0.00	0.78	0.00	71.2	100.0	67.8	0.0
Total		**34.87**			**586.16**	**833.3**		**280.2**	**33.0**
						Net Water Surplus		**247.2**	**mm**

Notes:
- I - Heat Index
- E - Evaporation
- WHC - Water Holding Capacity
- A value of 100 mm was used for the water holding capacity of the soils
- Data is from the 1951 to 1980 Canadian Climate Normals for the Guelph Arboretum Climatological Station located at 43°31'N 80°14'W, elevation 334 m ASL.

TABLE D-2
1961 - 1990 WATER BUDGET SUMMARY - PRESTON
MILL CREEK AGGREGATES PIT

Month	Mean Temperature (°C)	I	E (mm)	Daylight Factor	E adj. (mm)	Total Precipitation (mm)	WHC (mm)	Surplus (mm)	Deficit (mm)
JANUARY	-7.1	0.00	0.00	0.82	0.00	62.2	100.0	62.2	0.0
FEBRUARY	-6.4	0.00	0.00	0.82	0.00	59.7	100.0	59.7	0.0
MARCH	-1.1	0.00	0.00	1.03	0.00	69.8	100.0	69.8	0.0
APRIL	6.0	1.32	27.84	1.12	31.18	74.8	100.0	43.6	0.0
MAY	12.5	3.99	60.74	1.27	77.14	75.1	98.0	0.0	0.0
JUNE	17.5	6.63	86.86	1.28	111.18	83.9	70.7	0.0	0.0
JULY	20.3	8.30	101.70	1.30	132.21	82.7	21.2	0.0	0.0
AUGUST	19.2	7.63	95.85	1.20	115.02	93.5	0.0	0.0	0.3
SEPTEMBER	15.2	5.36	74.78	1.04	77.77	85.5	7.7	0.0	0.0
OCTOBER	8.9	2.39	42.34	0.95	40.22	73.9	41.4	0.0	0.0
NOVEMBER	2.9	0.44	12.86	0.81	10.41	87.0	100.0	18.0	0.0
DECEMBER	-3.8	0.00	0.00	0.78	0.00	83.6	100.0	83.6	0.0
Total		**36.05**			**595.13**	**931.7**		**336.9**	**0.3**
						Net Water Surplus		**336.6**	**mm**

Notes:
- I - Heat Index
- E - Evaporation
- WHC - Water Holding Capacity
- A value of 100 mm was used for the water holding capacity of the soils
- Data is from the 1951 to 1980 Canadian Climate Normals for the Preston Climatological Station located at 43°24'N 80°25'W, elevation 291 m ASL.

TABLE D-3
1971 - 2000 WATER BUDGET SUMMARY - WATERLOO-WELLINGTON
MILL CREEK AGGREGATES PIT

Month	Mean Temperature (°C)	I	E (mm)	Daylight Factor	E adj. (mm)	Total Precipitation (mm)	WHC (mm)	Surplus (mm)	Deficit (mm)
JANUARY	-7.1	0.00	0.00	0.82	0.00	64.4	100.0	64.4	0.0
FEBRUARY	-6.4	0.00	0.00	0.82	0.00	51.5	100.0	51.5	0.0
MARCH	-1.2	0.00	0.00	1.03	0.00	69.9	100.0	69.9	0.0
APRIL	5.8	1.25	27.88	1.12	31.22	76.9	100.0	45.7	0.0
MAY	12.5	3.99	61.88	1.27	78.58	78.3	99.7	0.0	0.0
JUNE	17.3	6.52	86.71	1.28	110.98	81.3	70.0	0.0	0.0
JULY	19.8	7.99	99.75	1.30	129.67	91.8	32.2	0.0	0.0
AUGUST	18.7	7.33	94.00	1.20	112.80	86.3	5.7	0.0	0.0
SEPTEMBER	14.3	4.89	71.15	1.04	74.00	85.8	17.5	0.0	0.0
OCTOBER	8.2	2.11	39.94	0.95	37.94	65.6	45.1	0.0	0.0
NOVEMBER	2.3	0.31	10.67	0.81	8.64	82.7	100.0	19.2	0.0
DECEMBER	-3.8	0.00	0.00	0.78	0.00	73.6	100.0	73.6	0.0
Total		**34.38**			**583.85**	**908.1**		**324.2**	**0.0**
						Net Water Surplus		**324.2**	**mm**

Notes:
- I - Heat Index
- E - Evaporation
- WHC - Water Holding Capacity
- A value of 100 mm was used for the water holding capacity of the soils
- Data is from Canadian Climate Normals for the Waterloo-Wellington Climatological Station.

TABLE D-4
1983 - 2012 WATER BUDGET SUMMARY - ELORA CLIMATE STATIONS
MILL CREEK AGGREGATES PIT

Month	Mean Temperature (°C)	I	E (mm)	Daylight Factor	E adj. (mm)	Total Precipitation (mm)	WHC (mm)	Surplus (mm)	Deficit (mm)
JANUARY	-7.0	0.00	0.00	0.82	0.00	63.4	100.0	63.4	0.0
FEBRUARY	-6.5	0.00	0.00	0.82	0.00	46.0	100.0	46.0	0.0
MARCH	-1.3	0.00	0.00	1.03	0.00	59.1	100.0	59.1	0.0
APRIL	6.1	1.35	29.51	1.12	33.06	70.0	100.0	36.9	0.0
MAY	12.1	3.80	59.97	1.27	76.16	78.8	100.0	2.6	0.0
JUNE	17.2	6.46	86.30	1.28	110.47	85.1	74.6	0.0	0.0
JULY	19.6	7.87	98.80	1.30	128.44	83.0	29.2	0.0	0.0
AUGUST	18.5	7.21	93.06	1.20	111.68	82.5	0.0	0.0	0.0
SEPTEMBER	14.6	5.04	72.84	1.04	75.75	77.3	1.6	0.0	0.0
OCTOBER	8.2	2.11	40.09	0.95	38.08	74.8	38.3	0.0	0.0
NOVEMBER	2.4	0.33	11.24	0.81	9.10	76.3	100.0	5.5	0.0
DECEMBER	-3.8	0.00	0.00	0.78	0.00	60.5	100.0	60.5	0.0
Total		**34.17**			**582.73**	**856.8**		**274.1**	**0.0**
						Net Water Surplus		**274.1**	**mm**

Notes:
- I - Heat Index
- E - Evaporation
- WHC - Water Holding Capacity
- A value of 100 mm was used for the water holding capacity of the soils
- Data is from the 1983 to 2012 Canadian Climate Normals for the Elora Research Station (1983-1985), Elora Automatic Climate Station (1986-2003) and Elora RCS (2003-2012)
- Climatological Station located at 43°39'N 80°25'W, elevation 376 m ASL.

TABLE D-5
1991 - 2020 WATER BUDGET SUMMARY - SHADE'S MILLS CLIMATE STATION
MILL CREEK AGGREGATES PIT

Month	Mean Temperature (°C)	I	E (mm)	Daylight Factor	E adj. (mm)	Total Precipitation (mm)	WHC (mm)	Surplus (mm)	Deficit (mm)
JANUARY	-5.5	0.00	0.00	0.82	0.00	77.2	100.0	77.2	0.0
FEBRUARY	-4.9	0.00	0.00	0.82	0.00	58.2	100.0	58.2	0.0
MARCH	-0.2	0.00	0.00	1.03	0.00	63.6	100.0	63.6	0.0
APRIL	6.5	1.50	27.57	1.12	30.88	84.2	100.0	53.3	0.0
MAY	13.8	4.66	64.58	1.27	82.01	82.2	100.0	0.2	0.0
JUNE	19.5	7.79	95.14	1.28	121.78	84.7	62.9	0.0	0.0
JULY	21.9	9.31	108.75	1.30	141.38	95.4	16.9	0.0	0.0
AUGUST	20.2	8.24	99.19	1.20	119.02	76.9	0.0	0.0	25.2
SEPTEMBER	16.7	6.18	79.89	1.04	83.09	82.5	0.0	0.0	0.6
OCTOBER	9.8	2.76	43.53	0.95	41.36	81.6	40.2	0.0	0.0
NOVEMBER	3.5	0.58	13.41	0.81	10.86	76.6	100.0	5.9	0.0
DECEMBER	-1.9	0.00	0.00	0.78	0.00	71.4	100.0	71.4	0.0
Total		**41.01**			**630.38**	**934.6**		**330.0**	**25.7**
						Net Water Surplus		**304.2**	**mm**

Notes:
- I - Heat Index
- E - Evaporation
- WHC - Water Holding Capacity
- A value of 100 mm was used for the water holding capacity of the soils
- Data is from the 1991 to 2020 Canadian Climate Normals for the Shade's Mills Climatological Station located at 43°23'N 80°17'W, which was provided by GRCA.

TABLE D-6
2019 WATER BUDGET - SHADE'S MILLS
MILL CREEK AGGREGATES PIT

Month	Mean Temperature (°C)	I	E (mm)	Daylight Factor	E adj. (mm)	Total Precipitation (mm)	WHC (mm)	Surplus (mm)	Deficit (mm)
JANUARY	-6.7	0.00	0.00	0.82	0.0	74.7	100.0	74.7	0.0
FEBRUARY	-4.8	0.00	0.00	0.82	0.0	66.4	100.0	66.4	0.0
MARCH	-1.5	0.00	0.00	1.03	0.0	73.4	100.0	73.4	0.0
APRIL	5.9	1.28	23.85	1.12	26.7	99.3	100.0	72.6	0.0
MAY	12.8	4.13	58.30	1.27	74.0	123.3	100.0	49.3	0.0
JUNE	18.8	7.39	90.84	1.28	116.3	79.8	63.5	0.0	0.0
JULY	23.7	10.48	118.68	1.30	154.3	143.0	52.2	0.0	0.0
AUGUST	21.3	8.92	104.92	1.20	125.9	64.6	0.0	0.0	9.1
SEPTEMBER	17.8	6.80	85.29	1.04	88.7	79.5	0.0	0.0	9.2
OCTOBER	10.6	3.11	46.89	0.95	44.6	141.1	96.5	0.0	0.0
NOVEMBER	0.9	0.08	2.72	0.81	2.2	62.4	100.0	56.7	0.0
DECEMBER	-0.9	0.00	0.00	0.78	0.0	55.6	100.0	55.6	0.0
Total		**42.20**			**632.7**	**1063.1**		**448.7**	**18.3**
						Net Water Surplus		**430.4**	**mm**

Notes:
- I - Heat Index
- E - Evaporation
- WHC - Water Holding Capacity
- A value of 100 mm was used for the water holding capacity of the soils.
- Data from the Shade's Mills Climatological Station.

TABLE D-7
2020 WATER BUDGET - SHADE'S MILLS
MILL CREEK AGGREGATES PIT

Month	Mean Temperature (°C)	I	E (mm)	Daylight Factor	E adj. (mm)	Total Precipitation (mm)	WHC (mm)	Surplus (mm)	Deficit (mm)
JANUARY	-1.4	0.00	0.00	0.82	0.0	130.9	100.0	130.9	0.0
FEBRUARY	-3.6	0.00	0.00	0.82	0.0	38.6	100.0	38.6	0.0
MARCH	2.4	0.33	7.70	1.03	7.9	83.4	100.0	75.5	0.0
APRIL	5.8	1.25	22.05	1.12	24.7	43.3	100.0	18.6	0.0
MAY	12.7	4.09	56.15	1.27	71.3	52.7	81.4	0.0	0.0
JUNE	20.5	8.42	99.39	1.28	127.2	61.7	15.9	0.0	0.0
JULY	25.0	11.36	125.94	1.30	163.7	58.9	0.0	0.0	88.9
AUGUST	22.2	9.50	109.30	1.20	131.2	72.6	0.0	0.0	58.6
SEPTEMBER	16.1	5.85	74.51	1.04	77.5	46.4	0.0	0.0	31.1
OCTOBER	9.3	2.55	38.72	0.95	36.8	91.4	54.6	0.0	0.0
NOVEMBER	6.4	1.45	24.79	0.81	20.1	57.7	92.2	0.0	0.0
DECEMBER	-0.6	0.00	0.00	0.78	0.0	110.0	100.0	102.2	0.0
Total		**44.80**			**660.3**	**847.6**		**365.9**	**178.6**
						Net Water Surplus		**187.3**	**mm**

Notes:
- I - Heat Index
- E - Evaporation
- WHC - Water Holding Capacity
- A value of 100 mm was used for the water holding capacity of the soils.
- Data from the Shade's Mills Climatological Station except for missing temperature data on Janaury 18, which is from Guelph Lake Climatological Station.

TABLE D-8
2021 WATER BUDGET - SHADE'S MILLS
MILL CREEK AGGREGATES PIT

Month	Mean Temperature (°C)	I	E (mm)	Daylight Factor	E adj. (mm)	Total Precipitation (mm)	WHC (mm)	Surplus (mm)	Deficit (mm)
JANUARY	-2.7	0.00	0.00	0.82	0.0	32.6	100.0	32.6	0.0
FEBRUARY	-6.1	0.00	0.00	0.82	0.0	54.2	100.0	54.2	0.0
MARCH	3.4	0.56	10.28	1.03	10.5	53.4	100.0	42.9	0.0
APRIL	8.9	2.38	34.38	1.12	38.5	64.9	100.0	26.4	0.0
MAY	14.1	4.80	61.45	1.27	78.0	33.0	55.0	0.0	0.0
JUNE	22.1	9.45	107.76	1.28	137.9	132.2	49.2	0.0	0.0
JULY	21.3	8.95	102.94	1.30	133.8	95.3	10.7	0.0	0.0
AUGUST	23.8	10.56	118.15	1.20	141.8	83.5	0.0	0.0	47.6
SEPTEMBER	17.5	6.62	80.22	1.04	83.4	222.7	100.0	39.3	0.0
OCTOBER	13.9	4.70	60.37	0.95	57.4	129.7	100.0	72.3	0.0
NOVEMBER	3.6	0.60	10.97	0.81	8.9	46.1	100.0	37.2	0.0
DECEMBER	0.9	0.08	2.00	0.78	1.6	72.4	100.0	70.8	0.0
Total		**48.70**			**691.9**	**1020.0**		**375.7**	**47.6**
						Net Water Surplus		**328.1**	**mm**

Notes:
- I - Heat Index
- E - Evaporation
- WHC - Water Holding Capacity
- A value of 100 mm was used for the water holding capacity of the soils.
- Data from the Shade's Mills Climatological Station

TABLE D-9
2022 WATER BUDGET - SHADE'S MILLS
MILL CREEK AGGREGATES PIT

Month	Mean Temperature (°C)	I	E (mm)	Daylight Factor	E adj. (mm)	Total Precipitation (mm)	WHC (mm)	Surplus (mm)	Deficit (mm)
JANUARY	-8.4	0.00	0.00	0.82	0.0	36.6	100.0	36.6	0.0
FEBRUARY	-5.4	0.00	0.00	0.82	0.0	109.7	100.0	109.7	0.0
MARCH	1.0	0.09	2.61	1.03	2.7	64.4	100.0	61.7	0.0
APRIL	6.9	1.63	26.72	1.12	29.9	36.6	100.0	6.7	0.0
MAY	16.1	5.84	73.99	1.27	94.0	55.1	61.1	0.0	0.0
JUNE	19.8	8.01	95.25	1.28	121.9	57.2	0.0	0.0	3.6
JULY	22.7	9.83	112.11	1.30	145.7	33.0	0.0	0.0	0.0
AUGUST	22.3	9.58	109.81	1.20	131.8	87.2	0.0	0.0	44.6
SEPTEMBER	17.8	6.82	83.76	1.04	87.1	28.2	0.0	0.0	58.9
OCTOBER	10.0	2.83	41.61	0.95	39.5	52.5	13.0	0.0	0.0
NOVEMBER	4.7	0.91	16.87	0.81	13.7	39.7	39.0	0.0	0.0
DECEMBER	-0.9	0.00	0.00	0.78	0.0	82.1	100.0	21.1	0.0
Total		**45.53**			**666.3**	**682.3**		**235.8**	**107.1**
						Net Water Surplus		**128.7**	**mm**

Notes:
- I - Heat Index
- E - Evaporation
- WHC - Water Holding Capacity
- A value of 100 mm was used for the water holding capacity of the soils.
- Data from the Shade's Mills Climatological Station , except for missing air temperature data on January 4, which is from Guelph Lake Climatological Station.

TABLE D-10
2023 WATER BUDGET - SHADE'S MILLS
MILL CREEK AGGREGATES PIT

Month	Mean Temperature (°C)	I	E (mm)	Daylight Factor	E adj. (mm)	Total Precipitation (mm)	WHC (mm)	Surplus (mm)	Deficit (mm)
JANUARY	-2.3	0.00	0.00	0.82	0.0	71.2	100.0	71.2	0.0
FEBRUARY	-2.8	0.00	0.00	0.82	0.0	45.2	100.0	45.2	0.0
MARCH	-0.6	0.00	0.00	1.03	0.0	121.3	100.0	121.3	0.0
APRIL	7.8	1.94	36.41	1.12	40.8	87.2	100.0	46.4	0.0
MAY	12.2	3.86	59.11	1.27	75.1	55.6	80.5	0.0	0.0
JUNE	17.4	6.60	86.41	1.28	110.6	81.1	51.0	0.0	0.0
JULY	19.5	7.80	97.26	1.30	126.4	203.2	100.0	27.8	0.0
AUGUST	17.8	6.82	88.45	1.20	106.1	116.5	100.0	10.4	0.0
SEPTEMBER	16.2	5.92	79.98	1.04	83.2	22.1	38.9	0.0	0.0
OCTOBER	10.2	2.91	48.50	0.95	46.1	61.0	53.8	0.0	0.0
NOVEMBER	2.2	0.28	9.34	0.81	7.6	42.7	89.0	0.0	0.0
DECEMBER	1.8	0.21	7.65	0.78	6.0	75.9	100.0	58.9	0.0
Total		**36.35**			**601.8**	**983.0**		**381.2**	**0.0**
						Net Water Surplus		**381.2**	**mm**

Notes:
- I - Heat Index
- E - Evaporation
- WHC - Water Holding Capacity
- A value of 100 mm was used for the water holding capacity of the soils.
- Precipitation data from the Shade's Mills Climatological Station
- Temperature data from the Kitchener/Waterloo Climatological Station

FIGURE D-1
2019 TEMPERATURE DATA
SHADE'S MILLS CLIMATE STATION

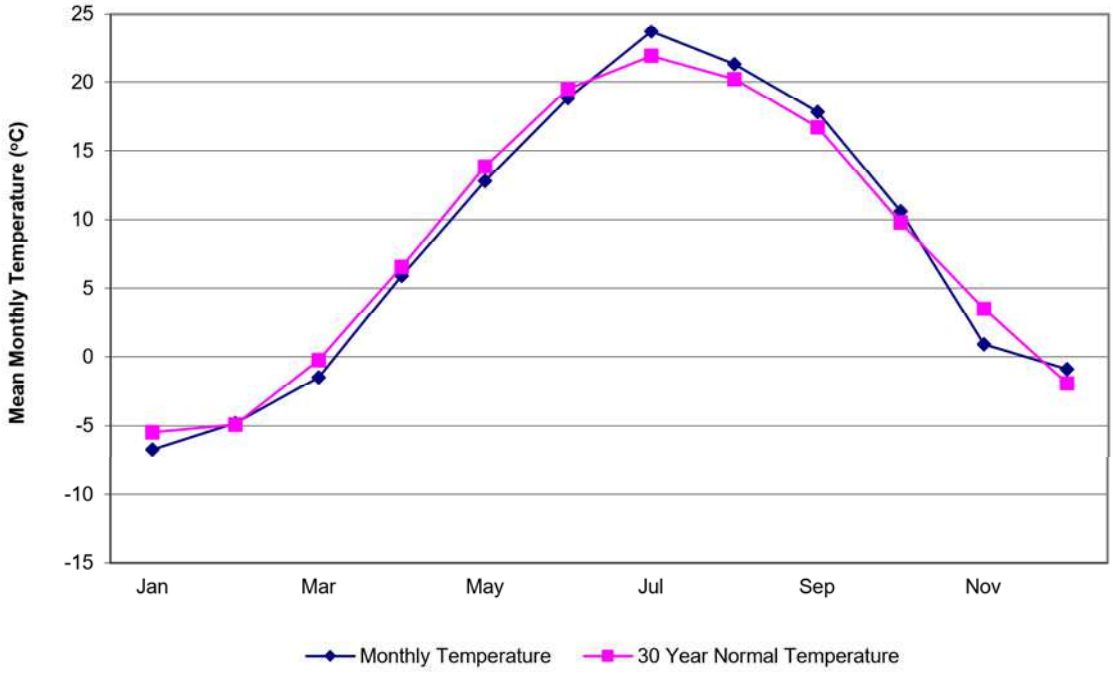


FIGURE D-2
2020 TEMPERATURE DATA
SHADE'S MILLS CLIMATE STATION

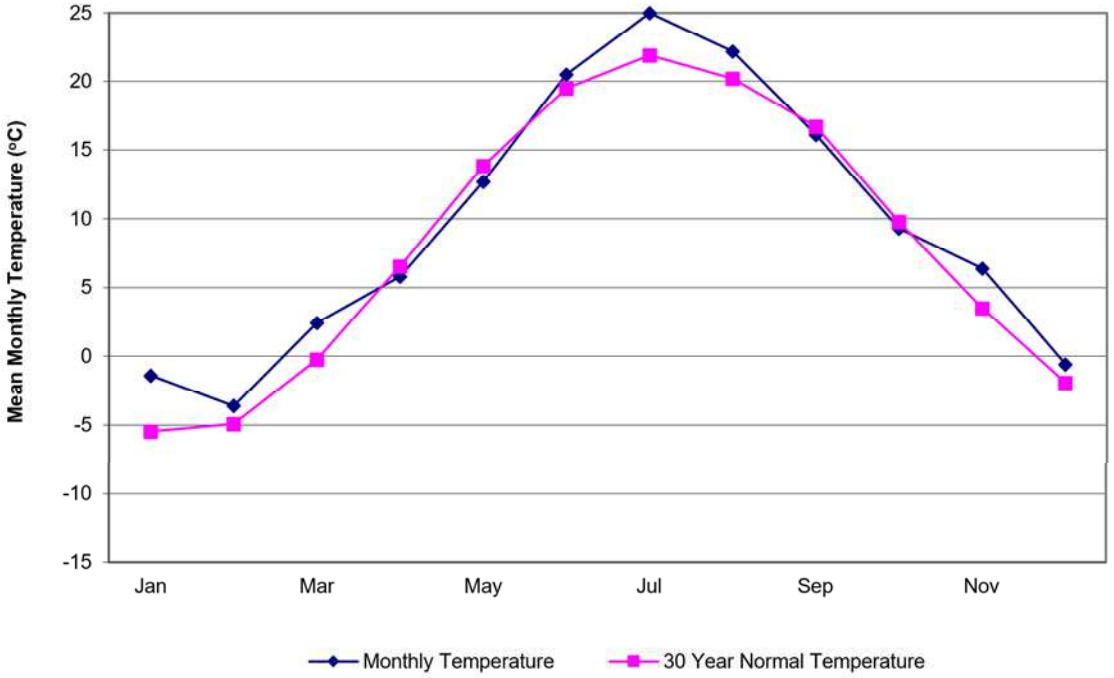


FIGURE D-3
2021 TEMPERATURE DATA
SHADE'S MILLS CLIMATE STATION

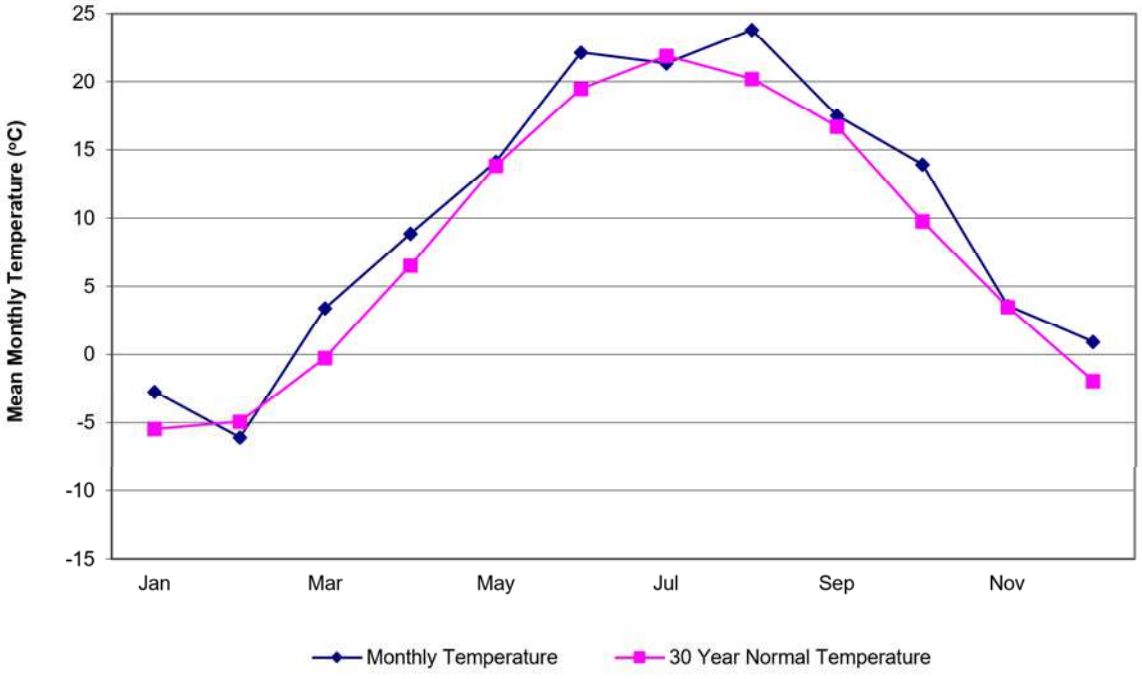


FIGURE D-4
2022 TEMPERATURE DATA
SHADE'S MILLS CLIMATE STATION

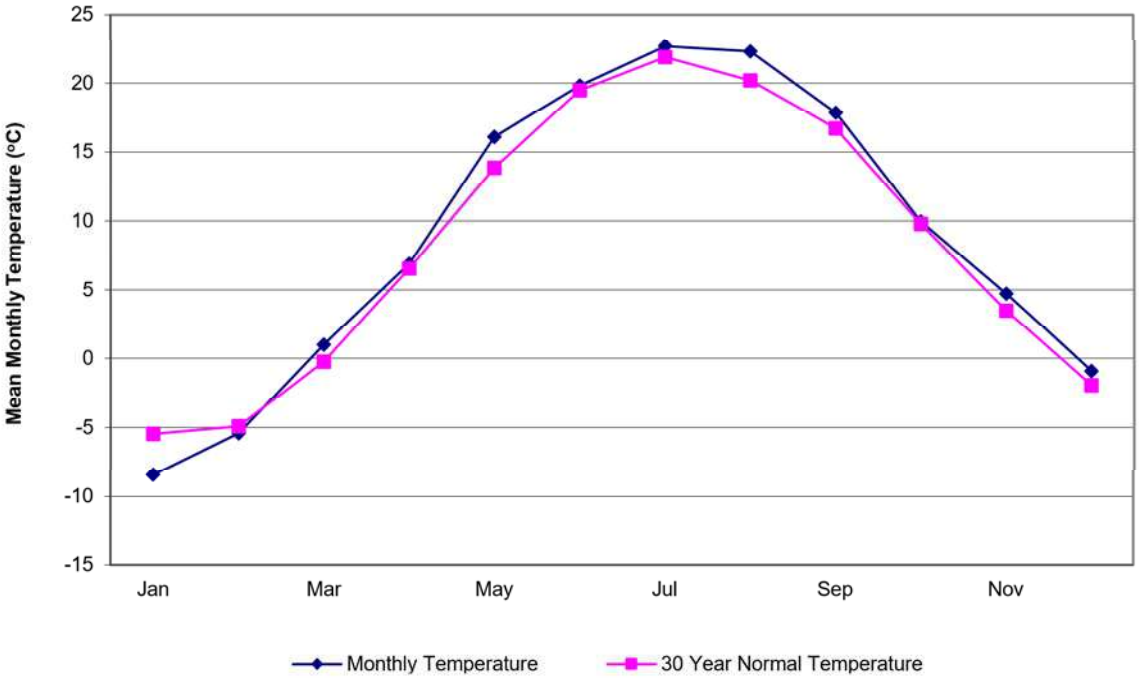


FIGURE D-5
2023 TEMPERATURE DATA
SHADE'S MILLS CLIMATE STATION

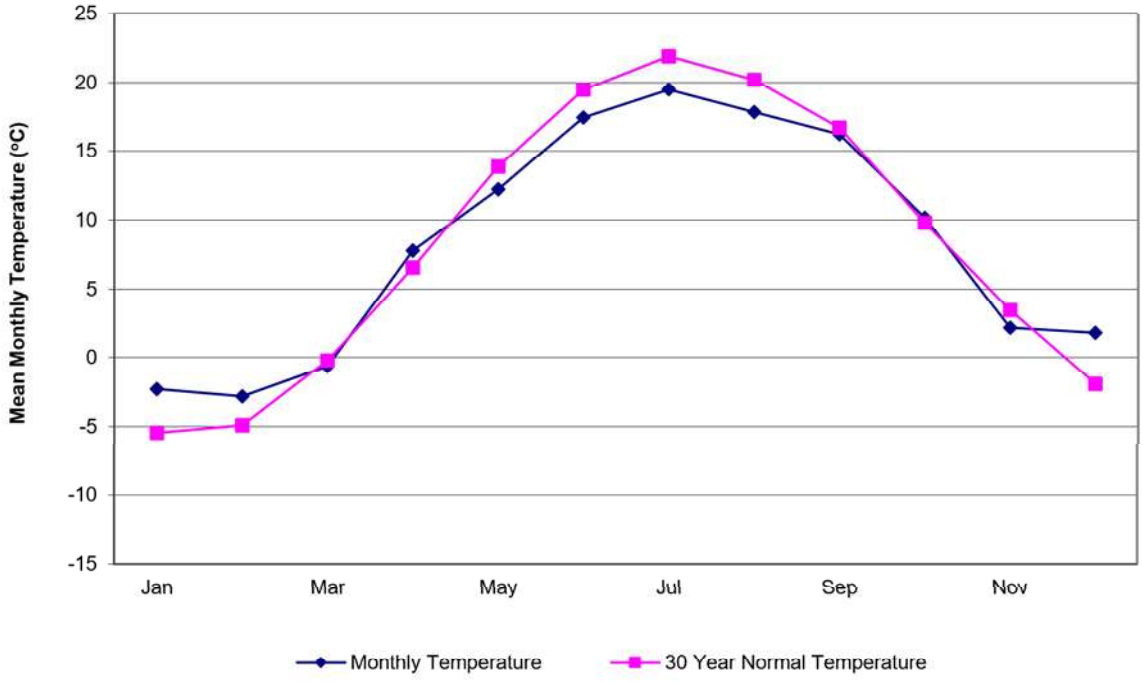


FIGURE D-6
2019 PRECIPITATION DATA
SHADE'S MILLS CLIMATE STATION

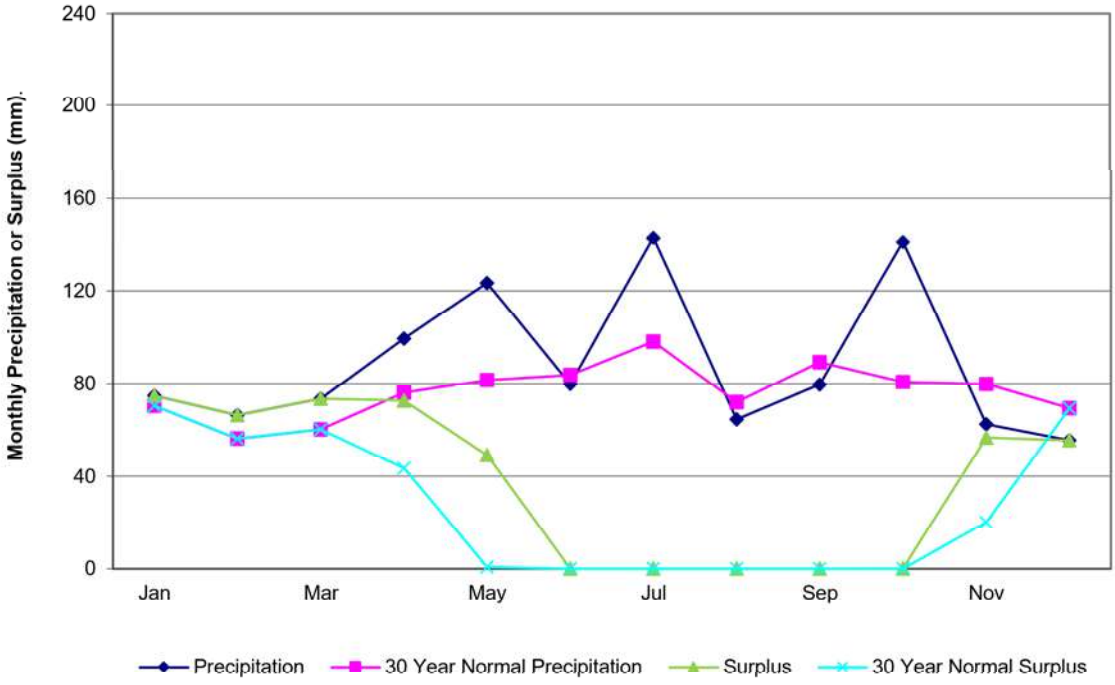


FIGURE D-9
2020 PRECIPITATION DATA
SHADE'S MILLS CLIMATE STATION

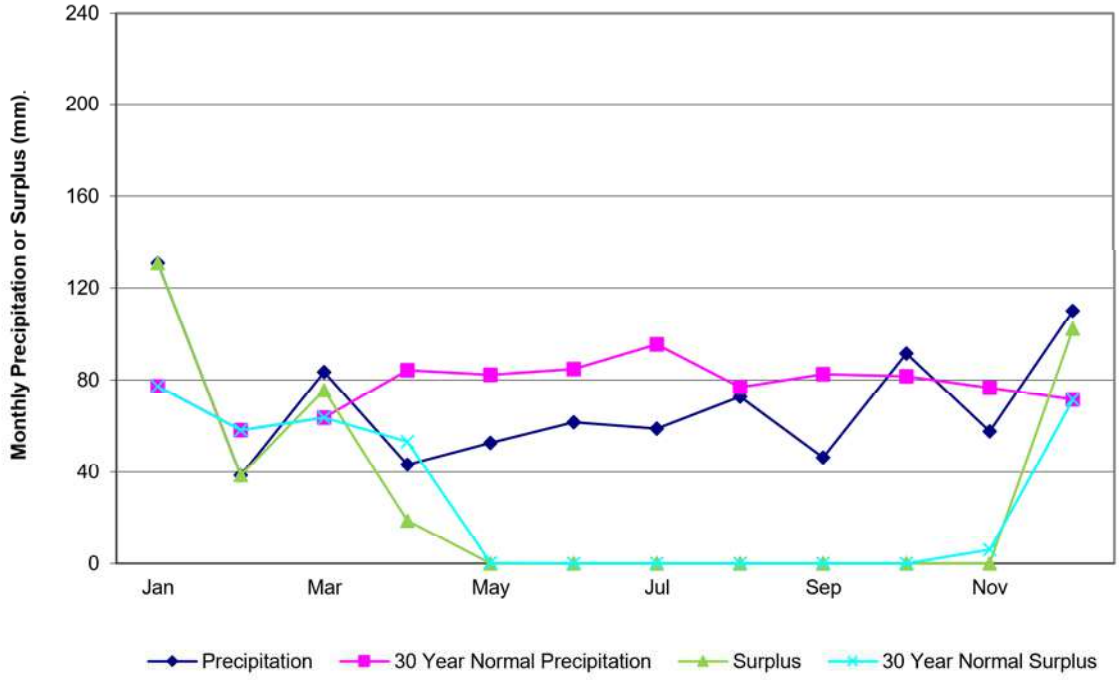


FIGURE D-10
2021 PRECIPITATION DATA
SHADE'S MILLS CLIMATE STATION

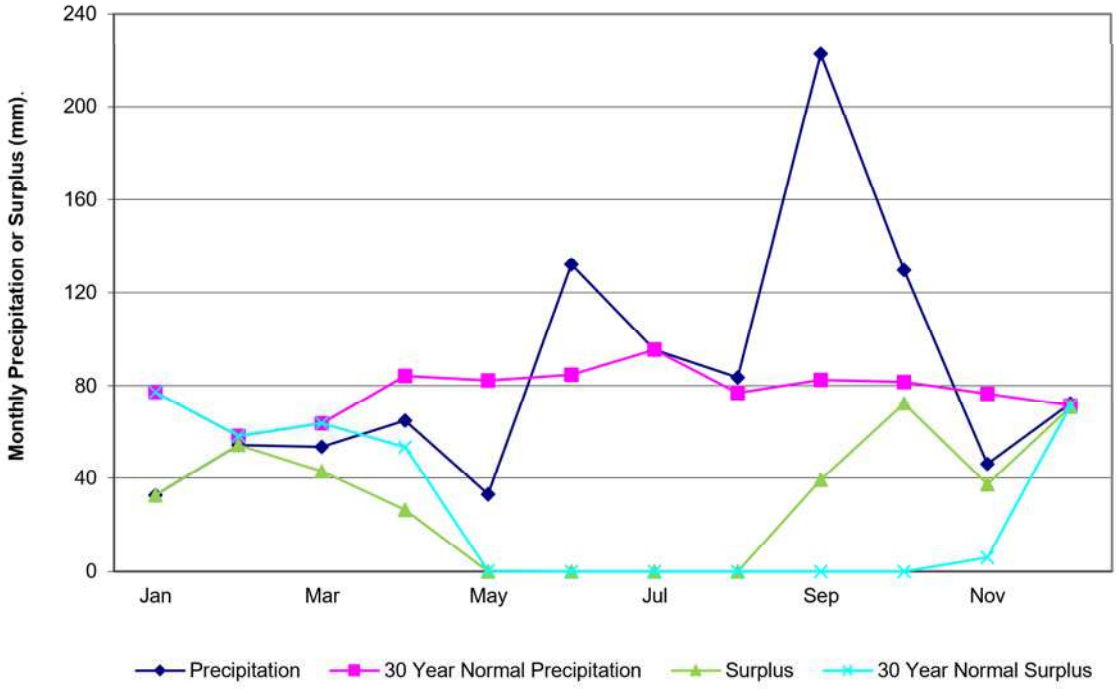


FIGURE D-9
2022 PRECIPITATION DATA
SHADE'S MILLS CLIMATE STATION

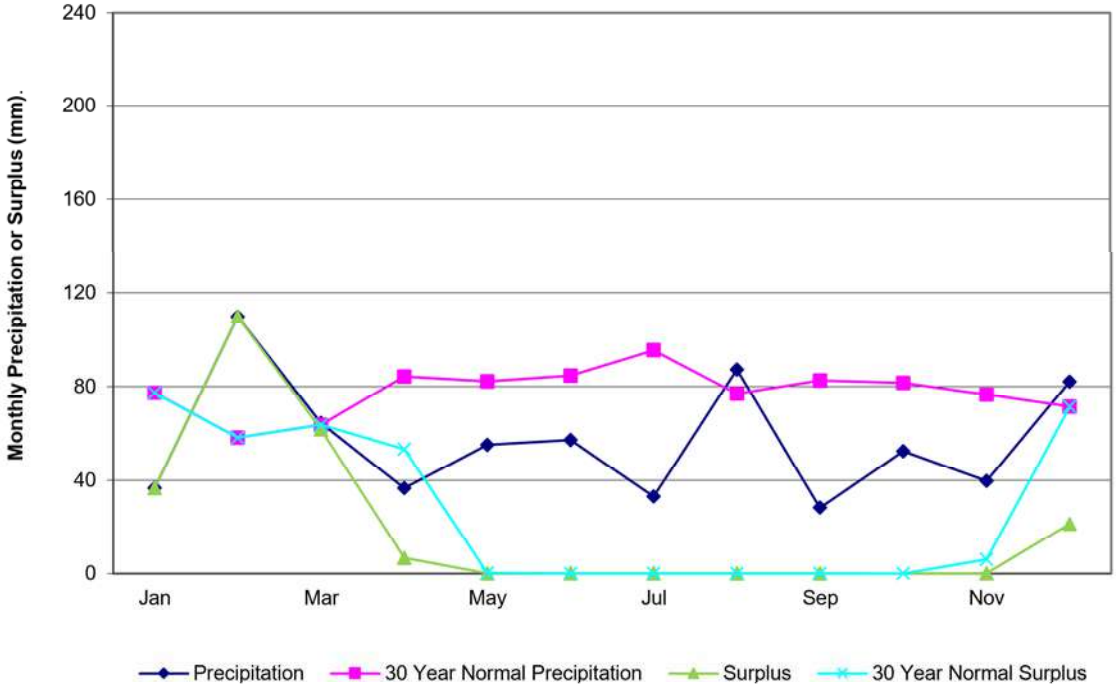
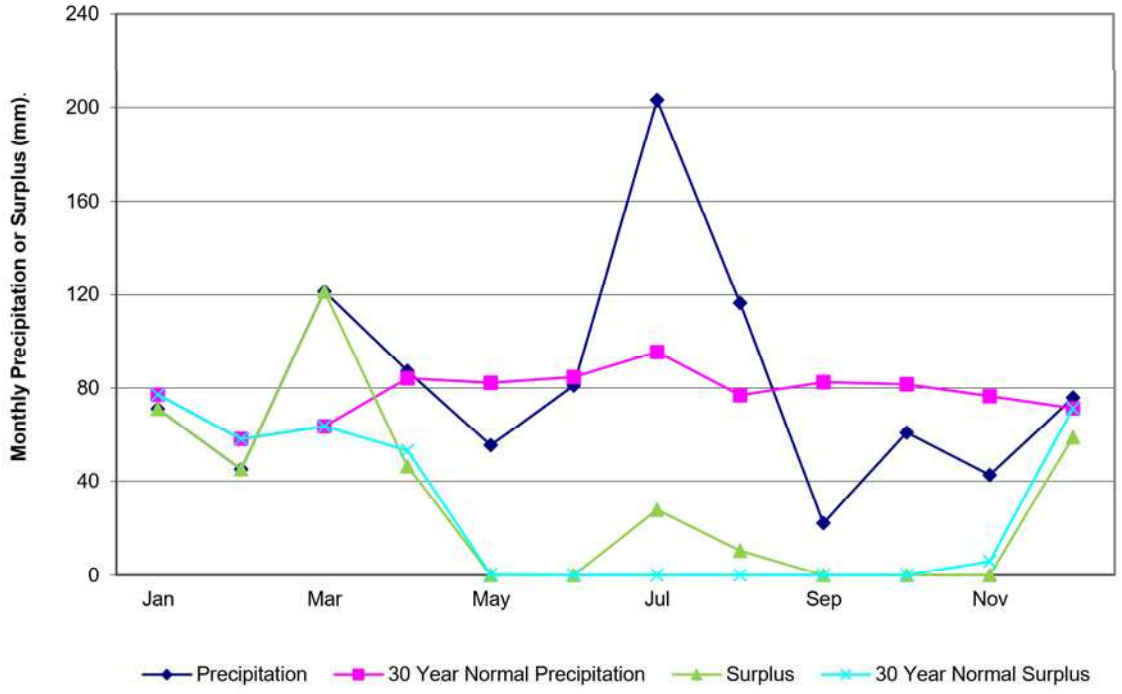


FIGURE D-10
2023 PRECIPITATION DATA
SHADE'S MILLS CLIMATE STATION



APPENDIX E

Pumping Data

Technical Appendix B – 2023 Hydrogeology Report

TABLE E-1
2023 PUMPING DATA - MARCH AND APRIL
MILL CREEK AGGREGATES PIT

Date	From Phase 1 Pond for Washing	Production Losses (5%)	Discharge to Phase 1 Pond	From Phase 4 to Phase 1 Pond	Change in Volume from Processing	
					Phase 1 Pond	Phase 4 Pond
1-Mar-23	0	0	0	0	0	0
2-Mar-23	0	0	0	0	0	0
3-Mar-23	0	0	0	0	0	0
4-Mar-23	0	0	0	0	0	0
5-Mar-23	0	0	0	0	0	0
6-Mar-23	0	0	0	0	0	0
7-Mar-23	0	0	0	0	0	0
8-Mar-23	0	0	0	0	0	0
9-Mar-23	0	0	0	0	0	0
10-Mar-23	0	0	0	0	0	0
11-Mar-23	0	0	0	0	0	0
12-Mar-23	0	0	0	0	0	0
13-Mar-23	0	0	0	0	0	0
14-Mar-23	0	0	0	0	0	0
15-Mar-23	0	0	0	0	0	0
16-Mar-23	0	0	0	0	0	0
17-Mar-23	0	0	0	0	0	0
18-Mar-23	0	0	0	0	0	0
19-Mar-23	0	0	0	0	0	0
20-Mar-23	0	0	0	0	0	0
21-Mar-23	0	0	0	0	0	0
22-Mar-23	0	0	0	0	0	0
23-Mar-23	0	0	0	0	0	0
24-Mar-23	0	0	0	0	0	0
25-Mar-23	0	0	0	0	0	0
26-Mar-23	0	0	0	0	0	0
27-Mar-23	1,794,949	89,747	1,705,202	0	-89,747	0
28-Mar-23	1,404,724	70,236	1,334,487	0	-70,236	0
29-Mar-23	1,675,286	83,764	1,591,522	0	-83,764	0
30-Mar-23	1,616,114	80,806	1,535,308	0	-80,806	0
31-Mar-23	1,755,575	87,779	1,667,796	0	-87,779	0
TOTAL	8,246,647	412,332	7,834,315	0	-412,332	0

Date	From Phase 1 Pond for Washing	Production Losses (5%)	Discharge to Phase 1 Pond	From Phase 4 to Phase 1 Pond	Change in Volume from Processing	
					Phase 1 Pond	Phase 4 Pond
1-Apr-23	0	0	0	0	0	0
2-Apr-23	0	0	0	0	0	0
3-Apr-23	1,657,688	82,884	1,574,804	0	-82,884	0
4-Apr-23	1,662,088	83,104	1,578,983	0	-83,104	0
5-Apr-23	1,557,162	77,858	1,479,304	0	-77,858	0
6-Apr-23	1,792,309	89,615	1,702,694	0	-89,615	0
7-Apr-23	0	0	0	0	0	0
8-Apr-23	0	0	0	0	0	0
9-Apr-23	0	0	0	0	0	0
10-Apr-23	1,744,356	87,218	1,657,138	0	-87,218	0
11-Apr-23	1,745,456	87,273	1,658,183	0	-87,273	0
12-Apr-23	1,739,297	86,965	1,652,332	0	-86,965	0
13-Apr-23	1,789,010	89,450	1,699,559	0	-89,450	0
14-Apr-23	1,799,128	89,956	1,709,172	0	-89,956	0
15-Apr-23	0	0	0	0	0	0
16-Apr-23	0	0	0	0	0	0
17-Apr-23	1,775,812	88,791	1,687,021	0	-88,791	0
18-Apr-23	1,798,249	89,912	1,708,336	0	-89,912	0
19-Apr-23	1,543,744	77,187	1,466,557	0	-77,187	0
20-Apr-23	1,798,029	89,901	1,708,127	0	-89,901	0
21-Apr-23	1,785,050	89,253	1,695,798	0	-89,253	0
22-Apr-23	0	0	0	0	0	0
23-Apr-23	0	0	0	0	0	0
24-Apr-23	1,769,653	88,483	1,681,170	0	-88,483	0
25-Apr-23	1,798,469	89,923	1,708,545	0	-89,923	0
26-Apr-23	1,442,998	72,150	1,370,848	0	-72,150	0
27-Apr-23	1,797,809	89,890	1,707,918	0	-89,890	0
28-Apr-23	1,652,409	82,620	1,569,789	0	-82,620	0
29-Apr-23	0	0	0	0	0	0
30-Apr-23	0	0	0	0	0	0
TOTAL	32,648,716	1,632,436	31,016,280	0	-1,632,436	0

NOTES: 1) All values are imperial gallons.

2) Lost in Production is the estimated volume of water that is carried out with produced material.

TABLE E-1
2023 PUMPING DATA - MAY AND JUNE
MILL CREEK AGGREGATES PIT

Date	From Phase 1 Pond for Washing	Production Losses (5%)	Discharge to Phase 1 Pond	From Phase 4 to Phase 1 Pond	Change in Volume from Processing	
					Phase 1 Pond	Phase 4 Pond
1-May-23	1,320,255	66,013	1,254,243	0	-66,013	0
2-May-23	1,741,936	87,097	1,654,840	0	-87,097	0
3-May-23	1,736,657	86,833	1,649,824	0	-86,833	0
4-May-23	1,756,015	87,801	1,668,214	0	-87,801	0
5-May-23	1,765,473	88,274	1,677,200	0	-88,274	0
6-May-23	0	0	0	0	0	0
7-May-23	0	0	0	0	0	0
8-May-23	1,780,211	89,011	1,691,201	0	-89,011	0
9-May-23	1,754,915	87,746	1,667,169	0	-87,746	0
10-May-23	1,757,334	87,867	1,669,468	0	-87,867	0
11-May-23	1,766,353	88,318	1,678,035	0	-88,318	0
12-May-23	1,655,049	82,752	1,572,296	0	-82,752	0
13-May-23	0	0	0	0	0	0
14-May-23	0	0	0	0	0	0
15-May-23	1,765,033	88,252	1,676,782	0	-88,252	0
16-May-23	1,730,718	86,536	1,644,182	0	-86,536	0
17-May-23	1,764,593	88,230	1,676,364	0	-88,230	0
18-May-23	1,760,854	88,043	1,672,811	0	-88,043	0
19-May-23	1,762,614	88,131	1,674,483	0	-88,131	0
20-May-23	0	0	0	0	0	0
21-May-23	0	0	0	0	0	0
22-May-23	0	0	0	0	0	0
23-May-23	1,776,692	88,835	1,687,857	0	-88,835	0
24-May-23	1,740,617	87,031	1,653,586	0	-87,031	0
25-May-23	1,774,492	88,725	1,685,767	0	-88,725	0
26-May-23	1,446,078	72,304	1,373,774	0	-72,304	0
27-May-23	0	0	0	0	0	0
28-May-23	0	0	0	0	0	0
29-May-23	1,740,177	87,009	1,653,168	0	-87,009	0
30-May-23	1,768,773	88,439	1,680,334	0	-88,439	0
31-May-23	1,766,793	88,340	1,678,453	0	-88,340	0
TOTAL	37,831,631	1,891,582	35,940,050	0	-1,891,582	0

Date	From Phase 1 Pond for Washing	Production Losses (5%)	Discharge to Phase 1 Pond	From Phase 4 to Phase 1 Pond	Change in Volume from Processing	
					Phase 1 Pond	Phase 4 Pond
1-Jun-23	1,772,072	88,604	1,683,469	0	-88,604	0
2-Jun-23	1,736,437	86,822	1,649,615	0	-86,822	0
3-Jun-23	0	0	0	0	0	0
4-Jun-23	0	0	0	0	0	0
5-Jun-23	1,758,874	87,944	1,670,930	0	-87,944	0
6-Jun-23	1,741,057	87,053	1,654,004	0	-87,053	0
7-Jun-23	1,671,766	83,588	1,588,178	0	-83,588	0
8-Jun-23	1,594,777	79,739	1,515,038	0	-79,739	0
9-Jun-23	1,747,436	87,372	1,660,064	0	-87,372	0
10-Jun-23	0	0	0	0	0	0
11-Jun-23	0	0	0	0	0	0
12-Jun-23	1,067,291	53,365	1,013,926	0	-53,365	0
13-Jun-23	1,624,913	81,246	1,543,667	0	-81,246	0
14-Jun-23	1,759,094	87,955	1,671,139	0	-87,955	0
15-Jun-23	1,777,132	88,857	1,688,275	0	-88,857	0
16-Jun-23	1,526,367	76,318	1,450,048	0	-76,318	0
17-Jun-23	0	0	0	0	0	0
18-Jun-23	0	0	0	0	0	0
19-Jun-23	1,741,057	87,053	1,654,004	0	-87,053	0
20-Jun-23	1,761,514	88,076	1,673,438	0	-88,076	0
21-Jun-23	1,751,175	87,559	1,663,616	0	-87,559	0
22-Jun-23	1,548,584	77,429	1,471,154	0	-77,429	0
23-Jun-23	1,704,322	85,216	1,619,106	0	-85,216	0
24-Jun-23	0	0	0	0	0	0
25-Jun-23	0	0	0	0	0	0
26-Jun-23	1,704,542	85,227	1,619,315	0	-85,227	0
27-Jun-23	1,712,241	85,612	1,626,629	0	-85,612	0
28-Jun-23	1,750,075	87,504	1,662,572	0	-87,504	0
29-Jun-23	1,760,634	88,032	1,672,602	0	-88,032	0
30-Jun-23	1,732,918	86,646	1,646,272	0	-86,646	0
TOTAL	36,944,275	1,847,214	35,097,061	0	-1,847,214	0

NOTES: 1) All values are imperial gallons.
2) Lost in Production is the estimated volume of water that is carried out with produced material.

TABLE E-1
2023 PUMPING DATA - JULY AND AUGUST
MILL CREEK AGGREGATES PIT

Date	From Phase 1 Pond for Washing	Production Losses (5%)	Discharge to Phase 1 Pond	From Phase 4 to Phase 1 Pond	Change in Volume from Processing	
					Phase 1 Pond	Phase 4 Pond
1-Jul-23	0	0	0	0	0	0
2-Jul-23	0	0	0	0	0	0
3-Jul-23	0	0	0	0	0	0
4-Jul-23	1,732,258	86,613	1,645,645	0	-86,613	0
5-Jul-23	1,758,874	87,944	1,670,930	0	-87,944	0
6-Jul-23	1,648,010	82,400	1,565,609	0	-82,400	0
7-Jul-23	1,778,451	88,923	1,689,529	0	-88,923	0
8-Jul-23	0	0	0	0	0	0
9-Jul-23	0	0	0	0	0	0
10-Jul-23	1,396,805	69,840	1,326,964	0	-69,840	0
11-Jul-23	1,683,425	84,171	1,599,253	0	-84,171	0
12-Jul-23	1,763,273	88,164	1,675,110	0	-88,164	0
13-Jul-23	1,758,654	87,933	1,670,721	0	-87,933	0
14-Jul-23	1,750,955	87,548	1,663,407	0	-87,548	0
15-Jul-23	0	0	0	0	0	0
16-Jul-23	0	0	0	0	0	0
17-Jul-23	1,742,596	87,130	1,655,467	0	-87,130	0
18-Jul-23	1,426,281	71,314	1,354,967	0	-71,314	0
19-Jul-23	1,137,681	56,884	1,080,797	0	-56,884	0
20-Jul-23	1,778,451	88,923	1,689,529	0	-88,923	0
21-Jul-23	1,265,703	63,285	1,202,418	0	-63,285	0
22-Jul-23	0	0	0	0	0	0
23-Jul-23	0	0	0	0	0	0
24-Jul-23	1,753,595	87,680	1,665,915	0	-87,680	0
25-Jul-23	1,753,595	87,680	1,665,915	0	-87,680	0
26-Jul-23	1,760,634	88,032	1,672,602	0	-88,032	0
27-Jul-23	1,647,130	82,356	1,564,773	0	-82,356	0
28-Jul-23	1,750,075	87,504	1,662,572	0	-87,504	0
29-Jul-23	701,482	35,074	666,408	0	-35,074	0
30-Jul-23	0	0	0	0	0	0
31-Jul-23	1,794,509	89,725	1,704,784	0	-89,725	0
TOTAL	33,782,437	1,689,122	32,093,315	0	-1,689,122	0

Date	From Phase 1 Pond for Washing	Production Losses (5%)	Discharge to Phase 1 Pond	From Phase 4 to Phase 1 Pond	Change in Volume from Processing	
					Phase 1 Pond	Phase 4 Pond
1-Aug-23	1,752,275	87613.75148	1,664,661	0	-87,614	0
2-Aug-23	1,445,198	72,260	1,372,938	0	-72,260	0
3-Aug-23	1,779,771	88,989	1,690,783	0	-88,989	0
4-Aug-23	1,776,252	88,813	1,687,439	0	-88,813	0
5-Aug-23	0	0	0	0	0	0
6-Aug-23	0	0	0	0	0	0
7-Aug-23	0	0	0	0	0	0
8-Aug-23	1,794,949	89,747	1,705,202	0	-89,747	0
9-Aug-23	1,445,858	72,293	1,373,565	0	-72,293	0
10-Aug-23	1,260,424	63,021	1,197,403	0	-63,021	0
11-Aug-23	1,302,218	65,111	1,237,107	0	-65,111	0
12-Aug-23	0	0	0	0	0	0
13-Aug-23	0	0	0	0	0	0
14-Aug-23	1,294,959	64,748	1,230,211	0	-64,748	0
15-Aug-23	1,223,249	61,162	1,162,087	0	-61,162	0
16-Aug-23	1,476,214	73,811	1,402,403	0	-73,811	0
17-Aug-23	1,627,772	81,389	1,546,384	0	-81,389	0
18-Aug-23	1,726,979	86,349	1,640,630	0	-86,349	0
19-Aug-23	703,902	35,195	668,707	0	-35,195	0
20-Aug-23	0	0	0	0	0	0
21-Aug-23	1,716,640	85,832	1,630,808	0	-85,832	0
22-Aug-23	1,749,195	87,460	1,661,736	0	-87,460	0
23-Aug-23	1,753,375	87,669	1,665,706	0	-87,669	0
24-Aug-23	1,724,119	86,206	1,637,913	0	-86,206	0
25-Aug-23	1,729,838	86,492	1,643,346	0	-86,492	0
26-Aug-23	698,622	34,931	663,691	0	-34,931	0
27-Aug-23	0	0	0	0	0	0
28-Aug-23	1,367,549	68,377	1,299,171	0	-68,377	0
29-Aug-23	1,626,893	81,345	1,545,548	0	-81,345	0
30-Aug-23	1,717,300	85,865	1,631,435	0	-85,865	0
31-Aug-23	1,711,141	85,557	1,625,584	0	-85,557	0
TOTAL	36,404,691	1,820,235	34,584,456	0	-1,820,235	0

NOTES: 1) All values are imperial gallons.
2) Lost in Production is the estimated volume of water that is carried out with produced material.

TABLE E-1
2023 PUMPING DATA - SEPTEMBER AND OCTOBER
MILL CREEK AGGREGATES PIT

Date	From Phase 1 Pond for Washing	Production Losses (5%)	Discharge to Phase 1 Pond	From Phase 4 to Phase 1 Pond	Change in Volume from Processing	
					Phase 1 Pond	Phase 4 Pond
1-Sep-23	1,692,223	84,611	1,607,612	0	-84,611	0
2-Sep-23	714,460	35,723	678,737	0	-35,723	0
3-Sep-23	0	0	0	0	0	0
4-Sep-23	0	0	0	0	0	0
5-Sep-23	1,718,840	85,942	1,632,898	0	-85,942	0
6-Sep-23	1,445,638	72,282	1,373,356	0	-72,282	0
7-Sep-23	1,461,696	73,085	1,388,611	0	-73,085	0
8-Sep-23	1,685,404	84,270	1,601,134	0	-84,270	0
9-Sep-23	710,061	35,503	674,558	0	-35,503	0
10-Sep-23	0	0	0	0	0	0
11-Sep-23	1,715,980	85,799	1,630,181	0	-85,799	0
12-Sep-23	1,335,433	66,772	1,268,662	0	-66,772	0
13-Sep-23	1,704,542	85,227	1,619,315	0	-85,227	0
14-Sep-23	1,668,687	83,434	1,585,252	0	-83,434	0
15-Sep-23	1,697,503	84,875	1,612,628	0	-84,875	0
16-Sep-23	726,558	36,328	690,231	0	-36,328	0
17-Sep-23	0	0	0	0	0	0
18-Sep-23	1,705,862	85,293	1,620,568	0	-85,293	0
19-Sep-23	1,699,042	84,952	1,614,090	0	-84,952	0
20-Sep-23	1,687,164	84,358	1,602,806	0	-84,358	0
21-Sep-23	1,197,073	59,854	1,137,219	0	-59,854	0
22-Sep-23	1,709,161	85,458	1,623,703	0	-85,458	0
23-Sep-23	745,256	37,263	707,993	0	-37,263	0
24-Sep-23	0	0	0	0	0	0
25-Sep-23	1,726,539	86,327	1,640,212	0	-86,327	0
26-Sep-23	1,707,621	85,381	1,622,240	0	-85,381	0
27-Sep-23	1,707,841	85,392	1,622,449	0	-85,392	0
28-Sep-23	1,726,319	86,316	1,640,003	0	-86,316	0
29-Sep-23	1,704,762	85,238	1,619,524	0	-85,238	0
30-Sep-23	0	0	0	0	0	0
TOTAL	35,593,664	1,779,683	33,813,981	0	-1,779,683	0

Date	From Phase 1 Pond for Washing	Production Losses (5%)	Discharge to Phase 1 Pond	From Phase 4 to Phase 1 Pond	Change in Volume from Processing	
					Phase 1 Pond	Phase 4 Pond
1-Oct-23	0	0	0	0	0	0
2-Oct-23	1,788,570	89,428	1,699,141	0	-89,428	0
3-Oct-23	1,673,086	83,654	1,589,432	0	-83,654	0
4-Oct-23	1,707,401	85,370	1,622,031	0	-85,370	0
5-Oct-23	1,712,461	85,623	1,626,838	0	-85,623	0
6-Oct-23	1,298,918	64,946	1,233,972	0	-64,946	0
7-Oct-23	0	0	0	0	0	0
8-Oct-23	0	0	0	0	0	0
9-Oct-23	0	0	0	0	0	0
10-Oct-23	1,732,038	86,602	1,645,436	0	-86,602	0
11-Oct-23	1,699,922	84,996	1,614,926	0	-84,996	0
12-Oct-23	1,680,565	84,028	1,596,537	0	-84,028	0
13-Oct-23	1,771,412	88,571	1,682,842	0	-88,571	0
14-Oct-23	661,448	33,072	628,375	0	-33,072	0
15-Oct-23	0	0	0	0	0	0
16-Oct-23	1,703,222	85,161	1,618,061	0	-85,161	0
17-Oct-23	1,711,581	85,579	1,626,002	0	-85,579	0
18-Oct-23	1,689,144	84,457	1,604,687	0	-84,457	0
19-Oct-23	1,673,746	83,687	1,590,059	0	-83,687	0
20-Oct-23	1,659,008	82,950	1,576,058	0	-82,950	0
21-Oct-23	732,938	36,647	696,291	0	-36,647	0
22-Oct-23	0	0	0	0	0	0
23-Oct-23	1,709,381	85,469	1,623,912	0	-85,469	0
24-Oct-23	1,716,860	85,843	1,631,017	0	-85,843	0
25-Oct-23	1,653,289	82,664	1,570,624	0	-82,664	0
26-Oct-23	1,699,042	84,952	1,614,090	0	-84,952	0
27-Oct-23	1,275,382	63,769	1,211,613	0	-63,769	0
28-Oct-23	738,217	36,911	701,306	0	-36,911	0
29-Oct-23	0	0	0	0	0	0
30-Oct-23	1,765,473	88,274	1,677,200	0	-88,274	0
31-Oct-23	1,787,030	89,352	1,697,679	0	-89,352	0
TOTAL	37,240,134	1,862,007	35,378,127	0	-1,862,007	0

NOTES: 1) All values are imperial gallons.

2) Lost in Production is the estimated volume of water that is carried out with produced material.

TABLE E-1
2023 PUMPING DATA - NOVEMBER AND DECEMBER
MILL CREEK AGGREGATES PIT

Date	From Phase 1 Pond for Washing	Production Losses (5%)	Discharge to Phase 1 Pond	From Phase 4 to Phase 1 Pond	Change in Volume from Processing	
					Phase 1 Pond	Phase 4 Pond
1-Nov-23	1,659,228	82,961	1,576,267	0	-82,961	0
2-Nov-23	1,498,650	74,933	1,423,718	0	-74,933	0
3-Nov-23	1,665,167	83,258	1,581,909	0	-83,258	0
4-Nov-23	0	0	0	0	0	0
5-Nov-23	0	0	0	0	0	0
6-Nov-23	1,678,805	83,940	1,594,865	0	-83,940	0
7-Nov-23	1,696,403	84,820	1,611,583	0	-84,820	0
8-Nov-23	1,704,982	85,249	1,619,733	0	-85,249	0
9-Nov-23	1,432,440	71,622	1,360,818	0	-71,622	0
10-Nov-23	1,704,102	85,205	1,618,897	0	-85,205	0
11-Nov-23	734,037	36,702	697,336	0	-36,702	0
12-Nov-23	0	0	0	0	0	0
13-Nov-23	1,718,180	85,909	1,632,271	0	-85,909	0
14-Nov-23	1,723,899	86,195	1,637,704	0	-86,195	0
15-Nov-23	1,710,041	85,502	1,624,539	0	-85,502	0
16-Nov-23	1,706,961	85,348	1,621,613	0	-85,348	0
17-Nov-23	1,713,340	85,667	1,627,673	0	-85,667	0
18-Nov-23	727,658	36,383	691,275	0	-36,383	0
19-Nov-23	0	0	0	0	0	0
20-Nov-23	1,689,364	84,468	1,604,896	0	-84,468	0
21-Nov-23	1,684,525	84,226	1,600,298	0	-84,226	0
22-Nov-23	1,675,946	83,797	1,592,148	0	-83,797	0
23-Nov-23	1,642,070	82,104	1,559,967	0	-82,104	0
24-Nov-23	1,755,135	87,757	1,667,378	0	-87,757	0
25-Nov-23	0	0	0	0	0	0
26-Nov-23	0	0	0	0	0	0
27-Nov-23	1,796,049	89,802	1,706,246	0	-89,802	0
28-Nov-23	1,796,929	89,846	1,707,082	0	-89,846	0
29-Nov-23	1,181,455	59,073	1,122,382	0	-59,073	0
30-Nov-23	1,433,980	71,699	1,362,281	0	-71,699	0
TOTAL	37,729,345	1,886,467	35,842,878	0	-1,886,467	0

Date	From Phase 1 Pond for Washing	Production Losses (5%)	Discharge to Phase 1 Pond	From Phase 4 to Phase 1 Pond	Change in Volume from Processing	
					Phase 1 Pond	Phase 4 Pond
1-Dec-23	1,750,955	87,548	1,663,407	0	-87,548	0
2-Dec-23	0	0	0	0	0	0
3-Dec-23	0	0	0	0	0	0
4-Dec-23	1,744,576	87,229	1,657,347	0	-87,229	0
5-Dec-23	1,778,231	88,912	1,689,320	0	-88,912	0
6-Dec-23	1,759,534	87,977	1,671,557	0	-87,977	0
7-Dec-23	1,547,704	77,385	1,470,318	0	-77,385	0
8-Dec-23	1,733,138	86,657	1,646,481	0	-86,657	0
9-Dec-23	0	0	0	0	0	0
10-Dec-23	0	0	0	0	0	0
11-Dec-23	0	0	0	0	0	0
12-Dec-23	0	0	0	0	0	0
13-Dec-23	0	0	0	0	0	0
14-Dec-23	0	0	0	0	0	0
15-Dec-23	0	0	0	0	0	0
16-Dec-23	0	0	0	0	0	0
17-Dec-23	0	0	0	0	0	0
18-Dec-23	0	0	0	0	0	0
19-Dec-23	0	0	0	0	0	0
20-Dec-23	0	0	0	0	0	0
21-Dec-23	0	0	0	0	0	0
22-Dec-23	0	0	0	0	0	0
23-Dec-23	0	0	0	0	0	0
24-Dec-23	0	0	0	0	0	0
25-Dec-23	0	0	0	0	0	0
26-Dec-23	0	0	0	0	0	0
27-Dec-23	0	0	0	0	0	0
28-Dec-23	0	0	0	0	0	0
29-Dec-23	0	0	0	0	0	0
30-Dec-23	0	0	0	0	0	0
31-Dec-23	0	0	0	0	0	0
TOTAL	10,314,138	515,707	9,798,431	0	-515,707	0

NOTES: 1) All values are imperial gallons.
2) Lost in Production is the estimated volume of water that is carried out with produced material.

TABLE E-2
2023 PUMPING DATA - MONTHLY TOTALS
MILL CREEK AGGREGATES PIT

Month	Units	From Phase 1 Pond for Washing	Production Losses (5%)	Discharge to Phase 1 Pond	From Phase 4 to Phase 1 Pond	Change in Volume from Processing	
						Phase 1 Pond	Phase 4 Pond
March	Imperial Gallons	8,246,647	412,332	7,834,315	0	-412,332	0
	Cubic Metres	37,490	1,875	35,616	0	-1,875	0
April	Imperial Gallons	32,648,716	1,632,436	31,016,280	0	-1,632,436	0
	Cubic Metres	148,424	7,421	141,003	0	-7,421	0
May	Imperial Gallons	37,831,631	1,891,582	35,940,050	0	-1,891,582	0
	Cubic Metres	171,986	8,599	163,387	0	-8,599	0
June	Imperial Gallons	36,944,275	1,847,214	35,097,061	0	-1,847,214	0
	Cubic Metres	167,952	8,398	159,554	0	-8,398	0
July	Imperial Gallons	33,782,437	1,689,122	32,093,315	0	-1,689,122	0
	Cubic Metres	153,578	7,679	145,899	0	-7,679	0
August	Imperial Gallons	36,404,691	1,820,235	34,584,456	0	-1,820,235	0
	Cubic Metres	165,499	8,275	157,224	0	-8,275	0
September	Imperial Gallons	35,593,664	1,779,683	33,813,981	0	-1,779,683	0
	Cubic Metres	161,812	8,091	153,721	0	-8,091	0
October	Imperial Gallons	37,240,134	1,862,007	35,378,127	0	-1,862,007	0
	Cubic Metres	169,297	8,465	160,832	0	-8,465	0
November	Imperial Gallons	37,729,345	1,886,467	35,842,878	0	-1,886,467	0
	Cubic Metres	171,521	8,576	162,945	0	-8,576	0
December	Imperial Gallons	10,314,138	515,707	9,798,431	0	-515,707	0
	Cubic Metres	46,889	2,344	44,545	0	-2,344	0
TOTAL	Imperial Gallons	306,735,678	15,336,784	291,398,894	0	-15,336,784	0
	Cubic Metres	1,394,449	69,722	1,324,726	0	-69,722	0

NOTES: * Water was pumped from Phase 4 to water trucks and ultimately discharged to Phase 1 pond

APPENDIX F

Correspondence

Technical Appendix B – 2023 Hydrogeology Report

Warrack, Rebecca

From: Pettenuzzo, Jennah (CRH Canada Group Inc.) <Jennah.Pettenuzzo@ca.crh.com>
Sent: October 6, 2023 10:34 AM
To: Warrack, Rebecca; Siiskonen, Greg
Cc: Mitchell, Kevin (CRH Canada Group Inc.); Bradley, Martin (CRH Canada Group Inc.); Diab, Bader (CRH Canada Group Inc.); Michalicha, Peter (CRH Canada Group Inc.)
Subject: FW: [EXT] RE: Dufferin Aggregates Mill Creek Pit - 2022 Ecological Monitoring Report

Follow Up Flag: Follow up
Flag Status: Completed

Hi Rebecca and Greg,

Hope you are both doing well. We received the comments below from GRCA regarding the combined annual monitoring report for Mill Creek. Please keep note of this for the 2023 monitoring reports.

Thank you,
Jennah

--
Jennah Pettenuzzo, M.EnvSc
Environmental Specialist

Dufferin Aggregates, a CRH Company
2300 Steeles Avenue West, 4th Floor
Concord, Ontario L4K 5X6
M: (416) 602-3422
Jennah.Pettenuzzo@ca.crh.com

From: Chris Lorenz <clorenz@grandriver.ca>
Sent: Monday, September 25, 2023 9:41 PM
To: Pettenuzzo, Jennah (CRH Canada Group Inc.) <Jennah.Pettenuzzo@ca.crh.com>; Richardson, Seana (NDMNRF) <seana.richardson@ontario.ca>; Cornelisse, Ken (MNRF) <ken.cornelisse@ontario.ca>
Cc: Meagan Ferris <meaganf@wellington.ca>; Courtenay Hoytfox <choytfox@puslinch.ca>
Subject: [EXT] RE: Dufferin Aggregates Mill Creek Pit - 2022 Ecological Monitoring Report

Good evening,

Please find below GRCA comments for the 2022 ecological monitoring report:

1. A '100-period' moving average was plotted against the raw data to facilitate interpretation of groundwater temperatures. Unfortunately, the actual time period for the moving average was not specified. It is recommended that the time period be specified as it will make a difference in the slope of the trend line.

2. The continued temperature increase at drivepoints further downstream (e.g. DP5CR) in recent years is noteworthy and it is recommended that this be investigated further to better understand possible causes for this trend. Additional analysis of the moving averages for various time periods (i.e. short- vs. long-term averages) and regression analysis may help determine if observed temperature increases have been exacerbated by below water extraction.

Thanks,

Chris

Chris Lorenz, M.Sc.
Resource Planner
Grand River Conservation Authority
519-621-2763 ext. 2236

From: Pettenuzzo, Jennah (CRH Canada Group Inc.) <Jennah.Pettenuzzo@ca.crh.com>
Sent: Tuesday, June 27, 2023 10:29 AM
To: Richardson, Seana (NDMNRF) <seana.richardson@ontario.ca>; Cornelisse, Ken (MNRF) <ken.cornelisse@ontario.ca>
Cc: Sarah Wilhelm <sarahw@wellington.ca>; Courtenay Hoytfox <choytfox@puslinch.ca>; Chris Lorenz <clorenz@grandriver.ca>
Subject: Dufferin Aggregates Mill Creek Pit - 2022 Ecological Monitoring Report

Good morning,

Please find attached a copy of the 2022 Ecological Monitoring Report for the Dufferin Aggregates Mill Creek Pit, Licence ID No. 5738. This report satisfies the site plan requirement for Mill Creek's Phase 6 to submit an Ecological Monitoring Report by June 30 each year.

Please do not hesitate to reach out should you have any questions.

Thank you,
Jennah

--

Jennah Pettenuzzo, M.EnvSc
Environmental Specialist

Dufferin Aggregates, a CRH Company
2300 Steeles Avenue West, 4th Floor
Concord, Ontario L4K 5X6
M: (416) 602-3422
Jennah.Pettenuzzo@ca.crh.com

Harden Environmental Services Ltd.
4622 Nassagaweya-Puslinch Townline Road
Moffat, Ontario, L0P 1J0
Phone: (519) 826-0099 Fax: (519) 826-9099

Our File: 0004

August 9, 2023

Township of Puslinch
7404 Wellington Road 34
Guelph, ON, N1H 6H9

Attention: Mr. Glenn Schwendinger
CAO

Dear Glenn;

Re: Mill Creek Aggregates Pit –Review of 2022 Monitoring Data
Part Lot 24, Concession 1, and
Part Lots 21, 22, 23, and 24, Concession 2

Background

This 188.4-hectare property is owned by the University of Guelph and operated by Dufferin Aggregates. Extraction at the Mill Creek Aggregates Pit ("the Site") commenced in 1995 and there are presently four large open water bodies where aggregate was extracted below the water table. The Site is adjacent to Provincially Significant Wetlands and Mill Creek flows along the northern and western extents of the property. Mill Creek is a cold-water fishery with healthy brook and brown trout populations. Brown trout spawn in the creek in sections of Mill Creek along the Site. Groundwater discharges into Mill Creek from the site providing both water temperature and water quantity conditions favourable for spawning conditions. Groundwater and surface water monitoring are conditions of the aggregate license and there are specific water level thresholds designed to ensure that groundwater quantity and quality to Mill Creek is not significantly affected.

We are pleased to provide a review of the 2022 monitoring data and their relationship to threshold levels. We have reviewed the following documents.

Mill Creek Aggregates Pit Hydrogeology, Appendix B of the Coordinated Monitoring Report, WSP March 29, 2023

Mill Creek Aggregates Pit Surface Water, Appendix A of the

Coordinated Monitoring Report, WSP March 29, 2023

Mill Creek Aggregates Pit Fisheries, Appendix C of the Coordinated Monitoring Report, WSP March 29, 2023

Extractive Activity 2022

In 2022 the extractive activity that occurred was above water table and below water table extraction in Phase 2,5 and 6 (see attached figure) as well as in Silt Pond 4. Aggregate processing also occurred which involves pumping water from Phase 1 through an aggregate sorting plant and discharge of effluent into Silt Pond 4 and in Phase 1to allow for settlement and containment of non-marketable fine-grained materials. This silt pond is located between the main Phase 1 pond and Mill Creek.

2022 Monitoring Report

Our comments on the 2022 report are as follows.

1) 2022 had 27% less precipitation than the 30-year average.

2) Flowing artesian conditions occurred throughout the year from the bedrock aquifer in the southwest corner of the site adjacent to Mill Creek. The monitoring location is TW16-78. The original farmhouse well is also monitored for bedrock water levels and historically low water levels in the bedrock aquifer were noted at this location.

3) In 2022, all groundwater levels measured at the monitors were within their maximum and minimum historical range. There is a trend toward lower water levels in groundwater monitors adjacent to Pond 3. The water levels in monitoring wells DP12, DP16, 92-27, 92-28, 92-29, 92-32 and 92-33 declined between 2014 and 2020. In 2021 and 2022 there was a stabilization of water levels in these monitors, despite the noted lack of groundwater recharge early in the year. We see this as a positive outcome and likely due to stabilized water levels in the Phase 3 Pond.

4) Wetland monitoring stations DP6, DP7 and DP8 are within historical range in 2022. This area of the site is influenced by water levels in Pond 3.

5) A review of the Mill Creek drive point monitors shows that there are significant changes in hydraulic gradients within Mill Creek occurring in 2022. These drive point monitors have been valuable in showing the potential for groundwater discharge to Mill Creek. In 2022 it is observed that historically significant downward gradients occurred in Mill Creek between the Hanlon Expressway off

ramp from Hwy 401 to Concession Road 7. The report states that the "sudden change in gradient is due to upgradient activities".

6) The temperature plots of groundwater and surface water (thermographs) do not indicate changing conditions compared to the previous five years. The development of open water bodies at the site has increased groundwater temperature immediately adjacent to the ponds and temperatures have increased in groundwater between Mill Creek and the ponds. The temperature does trend toward background groundwater temperatures as distance from the ponds increases. The coordinated report states that the cold-water fishery has not been affected by observed temperature changes.

7) Groundwater discharge volume to Mill Creek is within the historical range and in 2022 is similar to the long-term average.

8) There were threshold breaches between BH92-27-DP2 and OW5-84-DP5CR. These gradient pairs were chosen to determine if groundwater flow is being maintained to Mill Creek. It is our observation that groundwater flow between the site and Mill Creek around BH92-27 and OW5-84 depends on the water level in Pond 3. Since 2017 as the water level in Pond 3 has decreased, the hydraulic gradient between Pond 3 and Mill Creek also decreased resulting in the registered warning level breach and threshold breach. Figures G7, G9 and G11 show how the hydraulic gradients west of Pond 3 are hovering near their minimum allowable levels and on occasion fall below those levels.

Discussion

Aggregate extractive activities at this Site have had an impact on groundwater levels and temperature. The impact on groundwater levels occurs within tens of metres of the ponds as seen in groundwater monitors located close to Pond 3. As a result of changing operations at the site, the water levels in Pond 3 have stabilized.

The rate of groundwater discharge to Mill Creek remained within historical range.

Groundwater temperatures adjacent to the ponds reflect the seasonal temperature variation in the ponds. Whereas groundwater temperature is generally 8 to 12 ºC it is possible to find groundwater temperature ranges from 0 to 25 ºC adjacent to one of the pit ponds. Groundwater temperatures trend back to ambient groundwater temperatures with increasing distance from the pond. However, Mill Creek is located near enough to the ponds to have a small temperature change occur.

The vertical hydraulic gradient data available for several drive points show that groundwater discharges to Mill Creek south of Hwy 401, but at three locations north of Hwy 401 a reversal has occurred and the stream contributed to the groundwater system in 2022.

The following is a quote from the conclusions of the 2022 Fisheries Study. *The results from 2022 provide further evidence that aggregate extraction below the water table (beginning in 1995) has had no measurable impact on the level of Brown trout spawning activity. Therefore, Dufferin Aggregates continues to be in compliance with License Condition #23, which states there must be no "net loss of the productive capacity of fish habitat in Mill Creek or its tributaries."*

The threshold breaches in monitoring pairs BH92-29/DP1 and OW5-84/DP5CR are concerning insofar as the artificial water level in Phase 3 pond strongly influences the hydraulic gradient between these monitoring pairs. Temporary responses to storm events that trigger the observed breaches and Figures G7, G9 and G11 show that the hydraulic gradient is riding close to the threshold. These breaches did not occur with a higher Phase 3 Pond water level. Continued monitoring during active and post extraction phase will be necessary to confirm that water levels have stabilized at an elevation favourable for continued groundwater discharge to Mill Creek.

Recommendations

The lower Pond 3 water level is influencing groundwater flow to Mill Creek west of Pond 3. Groundwater flow is hovering around the minimum allowable. We recommend a review of Pond 3 levels and the factors that influence the Pond level in hopes of identifying methods to stabilize the Pond level with more favourable groundwater flow to Mill Creek in an important fishery area.

The Township in collaboration with the aggregate industry and other water users in the area should identify the root cause for the reversal of groundwater flow to Mill Creek as indicated by monitors DP18, DP19 and DP20 between Hwy 401 and Concession Road 7.

Sincerely,

Harden Environmental Services Ltd.

[redacted]

Stan Denhoed, P.Eng., M.Sc.
Senior Hydrogeologist

Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

PERMIT TO TAKE WATER
Ground Water

NUMBER 5557-B93NZ5

Reference Number 0850-B7EKR6

Pursuant to Section 34.1 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:

CRH Canada Group Inc.
Floor 4 - 2300 Steeles Ave W
Concord, Ontario, L4K 5X6
Canada

For the water taking from: Phase 1 Pond, Pond 4 Pond or Silt Pond SP4

Located at: Lot 22-24, Concession 2, Geographic Township of Puslinch
Puslinch, County of Wellington

For the purposes of this Permit, and the terms and conditions specified below, the following definitions apply:

DEFINITIONS

(a) "Director" means any person appointed in writing as a Director pursuant to section 5 of the OWRA for the purposes of section 34.1, OWRA.

(b) "Provincial Officer" means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the OWRA.

(c) "Ministry" means Ontario Ministry of the Environment, Conservation and Parks.

(d) "District Office" means the Guelph District Office.

(e) "Permit" means this Permit to Take Water No. 5557-B93NZ5 including its Schedules, if any, issued in accordance with Section 34.1 of the OWRA.

(f) "Permit Holder" means CRH Canada Group Inc..

(g) "OWRA " means the *Ontario Water Resources Act,* R.S.O. 1990, c. O. 40, as amended.

You are hereby notified that this Permit is issued subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. Compliance with Permit

1.1 Except where modified by this Permit, the water taking shall be in accordance with the application for this Permit To Take Water, dated December 4, 2018 and signed by Maria Topalovic, and all Schedules included in this Permit.

1.2 The Permit Holder shall ensure that any person authorized by the Permit Holder to take water under this Permit is provided with a copy of this Permit and shall take all reasonable measures to ensure that any such person complies with the conditions of this Permit.

1.3 Any person authorized by the Permit Holder to take water under this Permit shall comply with the conditions of this Permit.

1.4 This Permit is not transferable to another person.

1.5 This Permit provides the Permit Holder with permission to take water in accordance with the conditions of this Permit, up to the date of the expiry of this Permit. This Permit does not constitute a legal right, vested or otherwise, to a water allocation, and the issuance of this Permit does not guarantee that, upon its expiry, it will be renewed.

1.6 The Permit Holder shall keep this Permit available at all times at or near the site of the taking, and shall produce this Permit immediately for inspection by a Provincial Officer upon his or her request.

1.7 The Permit Holder shall report any changes of address to the Director within thirty days of any such change. The Permit Holder shall report any change of ownership of the property for which this Permit is issued within thirty days of any such change. A change in ownership in the property shall cause this Permit to be cancelled.

2. General Conditions and Interpretation

2.1 Inspections
The Permit Holder must forthwith, upon presentation of credentials, permit a Provincial Officer to carry out any and all inspections authorized by the OWRA, the *Environmental Protection Act*, R.S.O. 1990, the *Pesticides Act*, R.S.O. 1990, or the *Safe Drinking Water Act,* S. O. 2002.

2.2 Other Approvals
The issuance of, and compliance with this Permit, does not:

(a) relieve the Permit Holder or any other person from any obligation to comply with any other applicable

legal requirements, including the provisions of the *Ontario Water Resources Act*, and the *Environmental Protection Act*, and any regulations made thereunder; or

(b) limit in any way any authority of the Ministry, a Director, or a Provincial Officer, including the authority to require certain steps be taken or to require the Permit Holder to furnish any further information related to this Permit.

2.3 Information
The receipt of any information by the Ministry, the failure of the Ministry to take any action or require any person to take any action in relation to the information, or the failure of a Provincial Officer to prosecute any person in relation to the information, shall not be construed as:

(a) an approval, waiver or justification by the Ministry of any act or omission of any person that contravenes this Permit or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

2.4 Rights of Action
The issuance of, and compliance with this Permit shall not be construed as precluding or limiting any legal claims or rights of action that any person, including the Crown in right of Ontario or any agency thereof, has or may have against the Permit Holder, its officers, employees, agents, and contractors.

2.5 Severability
The requirements of this Permit are severable. If any requirements of this Permit, or the application of any requirements of this Permit to any circumstance, is held invalid or unenforceable, the application of such requirements to other circumstances and the remainder of this Permit shall not be affected thereby.

2.6 Conflicts
Where there is a conflict between a provision of any submitted document referred to in this Permit, including its Schedules, and the conditions of this Permit, the conditions in this Permit shall take precedence.

3. Water Takings Authorized by This Permit

3.1 **Expiry**
This Permit expires on **February 6, 2029**. No water shall be taken under authority of this Permit after the expiry date.

3.2 Amounts of Taking Permitted
The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized only for the purposes specified in Table A.

Table A

	Source Name / Description:	Source: Type:	Taking Specific Purpose:	Taking Major Category:	Max. Taken per Minute (litres):	Max. Num. of Hrs Taken per Day:	Max. Taken per Day (litres):	Max. Num. of Days Taken per Year:	Zone/ Easting/ Northing:
1	Phase 1 Pond	Pond Dugout	Aggregate Washing	Industrial	11,366	12	8,183,000	275	17 567290 4810630
2	Phase 4 Pond or Silt Pond SP4	Pond Dugout	Other - Industrial	Industrial	11,806	24	17,000,000	364	17 566820 4810150
						Total Taking:	17,000,000		

3.3 Notwithstanding Table A, the purpose of the water taking from Phase 4 Pond or Silt Pond SP4 is to maintain the water level elevation of Phase 4 Pond or Silt Pond SP4 to an elevation between that of Phase 1 and Phase 3 Ponds. The water taking from the Phase 4 Pond or Silt Pond SP4 shall be discharged to the Phase 1 Pond. The Permit Holder shall maintain the average monthly pumping rate from the Phase 4 Pond or Silt Pond SP4 at 8,183,000 Litres per day or less.

3.4 The Permit Holder shall ensure that aggregate washing occurs annually between March and December from date of issue to December 31, 2028, but the maximum number of days taken per year shall not exceed 275 as outlined in Table A.

3.5 This Permit is issued for the sole purpose of washing gravel in a closed system where the majority of the water is recirculated.

4. Monitoring

4.1 Under section 9 of O. Reg. 387/04, and as authorized by subsection 34(6) of the *Ontario Water Resources Act*, the Permit Holder shall, on each day water is taken under the authorization of this Permit, record the date, the volume of water taken on that date and the rate at which it was taken. The daily volume of water taken shall be measured by a flow meter or calculated in accordance with the method described in the application for this Permit, or as otherwise accepted by the Director. A separate record shall be maintained for each source. The Permit Holder shall keep all records required by this condition current and available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon his or her request. The Permit Holder, unless otherwise required by the Director, shall submit, on or before March 31st in every year, the records required by this condition to the ministry's Water Taking Reporting System.

5. Impacts of the Water Taking

5.1 Notification
The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at 1-800-268-6060.

5.2 For Groundwater Takings
If the taking of water is observed to cause any negative impact to other water supplies obtained from any adequate sources that were in use prior to initial issuance of a Permit for this water taking, the Permit Holder shall take such action necessary to make available to those affected, a supply of water equivalent in quantity and quality to their normal takings, or shall compensate such persons for their reasonable costs of so doing, or shall reduce the rate and amount of taking to prevent or alleviate the observed negative impact. Pending permanent restoration of the affected supplies, the Permit Holder shall provide, to those affected, temporary water supplies adequate to meet their normal requirements, or shall compensate such persons for their reasonable costs of doing so.

If permanent interference is caused by the water taking, the Permit Holder shall restore the water supplies of those permanently affected.

6. Director May Amend Permit

The Director may amend this Permit by letter requiring the Permit Holder to suspend or reduce the taking to an amount or threshold specified by the Director in the letter. The suspension or reduction in taking shall be effective immediately and may be revoked at any time upon notification by the Director. This condition does not affect your right to appeal the suspension or reduction in taking to the Environmental Review Tribunal under the *Ontario Water Resources Act*, Section 100 (4).

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is included to ensure that the conditions in this Permit are complied with and can be enforced.

2. Condition 2 is included to clarify the legal interpretation of aspects of this Permit.

3. Conditions 3 through 6 are included to protect the quality of the natural environment so as to safeguard the ecosystem and human health and foster efficient use and conservation of waters. These conditions allow for the beneficial use of waters while ensuring the fair sharing, conservation and sustainable use of the waters of Ontario. The conditions also specify the water takings that are authorized by this Permit and the scope of this Permit.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, you may by written notice served upon me, the Environmental Review Tribunal and the Environmental Commissioner,

***Environmental Bill of Rights**, R.S.O. 1993, Chapter 28, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 101 of the Ontario Water Resources Act, as amended provides that the Notice requiring a hearing shall state:*

1. The portions of the Permit or each term or condition in the Permit in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

In addition to these legal requirements, the Notice should also include:

a. The name of the appellant;
b. The address of the appellant;
c. The Permit to Take Water number;
d. The date of the Permit to Take Water;
e. The name of the Director;
f. The municipality within which the works are located;

This notice must be served upon:

The Secretary
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto ON
M5G 1E5
Fax: (416) 326-5370
ERTTribunalsecretary@ontario.ca

AND

The Environmental Commissioner
1075 Bay Street
6th Floor, Suite 605
Toronto, Ontario M5S 2W5

AND

The Director, Section 34.1,
Ministry of the Environment, Conservation and Parks
12th Floor
119 King St W
Hamilton ON L8P 4Y7
Fax: (905) 521-7820

Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:

by Telephone at
(416) 212-6349
Toll Free 1(866) 448-2248

by Fax at
(416) 326-5370
Toll Free 1(844) 213-3474

by e-mail at
www.ert.gov.on.ca

*This instrument is subject to Section 38 of the **Environmental Bill of Rights** that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek to appeal for 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry, you can determine when the leave to appeal period ends.*

This Permit cancels and replaces Permit Number 8520-A48LDY, issued on 2015/11/16.

Dated at Hamilton this 7th day of February, 2019.

Cynthia Doughty

Cynthia Doughty
Director, Section 34.1
Ontario Water Resources Act, R.S.O. 1990

Schedule A

This Schedule "A" forms part of Permit To Take Water 5557-B93NZ5, dated February 7, 2019.

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

February 7, 2023

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – January 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of January 2023 for those monitoring wells that could be measured. There were no exceedances to report.

If you have any questions, please do not hesitate to call.

Sincerely,

Martin Bradley
Site Manager

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
January 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
6-Jan-23	305.87	305.66	NO
12-Jan-23	305.75	305.66	NO
18-Jan-23	305.76	305.66	NO
25-Jan-23	305.74	305.66	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jan-23	306.10	305.87	0.23	0.11	NO
12-Jan-23	306.00	305.75	0.25	0.11	NO
18-Jan-23	306.03	305.76	0.27	0.11	NO
25-Jan-23	306.005	305.74	0.26	0.11	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
6-Jan-23	305.37	305.17	NO
12-Jan-23	305.28	305.17	NO
18-Jan-23	305.29	305.17	NO
25-Jan-23	305.28	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jan-23	305.66	305.37	0.29	0.07	NO
12-Jan-23	305.53	305.28	0.25	0.07	NO
18-Jan-23	305.54	305.29	0.26	0.07	NO
25-Jan-23	305.53	305.28	0.25	0.07	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
6-Jan-23	304.92	304.54	NO
12-Jan-23	304.75	304.54	NO
18-Jan-23	304.77	304.54	NO
25-Jan-23	304.74	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jan-23	305.70	304.92	0.78	0.57	NO
12-Jan-23	305.55	304.75	0.80	0.57	NO
18-Jan-23	305.55	304.77	0.78	0.57	NO
25-Jan-23	305.54	304.74	0.80	0.57	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
6-Jan-23	303.95	303.65	NO
12-Jan-23	304.06	303.65	NO
18-Jan-23	303.95	303.65	NO
25-Jan-23	Frozen	303.65	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jan-23	304.58	303.95	0.63	0.43	NO
12-Jan-23	304.54	304.06	0.48	0.43	NO
18-Jan-23	304.53	303.95	0.57	0.43	NO
25-Jan-23	304.54	Frozen	-	0.43	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
6-Jan-23	Frozen	303.88	NO
12-Jan-23	Frozen	303.88	NO
18-Jan-23	304.23	303.88	NO
25-Jan-23	Frozen	303.88	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jan-23	304.65	Frozen	-	0.29	NO
12-Jan-23	304.57	Frozen	-	0.29	NO
18-Jan-23	304.59	304.23	0.36	0.29	NO
25-Jan-23	304.61	Frozen	-	0.29	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
6-Jan-23	303.45	302.88	NO
12-Jan-23	303.36	302.88	NO
18-Jan-23	303.41	302.88	NO
25-Jan-23	Frozen	302.88	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jan-23	303.72	303.45	0.27	0.20	NO
12-Jan-23	303.62	303.36	0.27	0.20	NO
18-Jan-23	303.67	303.41	0.26	0.20	NO
25-Jan-23	303.61	Frozen	-	0.20	NO

Note: No exceedances to report for the month of January.

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
January 2023

			Max. Allowable as per PTTW- Main Pond				Max. Allowable as per PTTW- Silt Pond		
			(Imperial Gallons)		(Litres)		(Imperial Gallons)		(Litres)
Total Monthly Precipitation (mm):	38.2	Kitchener/Waterloo (Actual)	2,500	per minute	11,365		2,597	per minute	11,806
Total Monthly Normal Precipitation (mm):	65.2	Waterloo-Wellington A (30-year Normal)	1,800,000	per day	8,183,000		3,739,477	per day	17,000,000

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 6	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Jan-23	-	-	-	-	-	-	-	-	-	-	-	-
2-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
3-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
4-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
5-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
6-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
7-Jan-23	-	-	-	-	-	-	-	-	-	-	-	-
8-Jan-23	-	-	-	-	-	-	-	-	-	-	-	-
9-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
10-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
11-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
12-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
13-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
14-Jan-23	-	-	-	-	-	-	-	-	-	-	-	-
15-Jan-23	-	-	-	-	-	-	-	-	-	-	-	-
16-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
17-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
18-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
19-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
20-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
21-Jan-23	-	-	-	-	-	-	-	-	-	-	-	-
22-Jan-23	-	-	-	-	-	-	-	-	-	-	-	-
23-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
24-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
25-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
26-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
27-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
28-Jan-23	-	-	-	-	-	-	-	-	-	-	-	-
29-Jan-23	-	-	-	-	-	-	-	-	-	-	-	-
30-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
31-Jan-23	0	0	0	0	-	-	-	-	-	-	-	-
Total	0	0	0	0	-	-	-	-	-	-	-	-

Note: No exceedances to report. All ponds are frozen

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

March 9, 2023

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – February 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of February 2023 for those monitoring wells that could be measured. There were no exceedances to report.

If you have any questions, please do not hesitate to call.

Sincerely,

Bader Diab
Superintendent

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
February 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
2-Feb-23	Frozen	305.66	NO
10-Feb-23	305.97	305.66	NO
14-Feb-23	305.83	305.66	NO
24-Feb-23	Frozen	305.66	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Feb-23	306.00	Frozen	-	0.11	NO
10-Feb-23	306.23	305.97	0.26	0.11	NO
14-Feb-23	306.07	305.83	0.25	0.11	NO
24-Feb-23	306.0425	Frozen	-	0.11	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
2-Feb-23	Frozen	305.17	NO
10-Feb-23	305.45	305.17	NO
14-Feb-23	305.33	305.17	NO
24-Feb-23	Frozen	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Feb-23	305.51	Frozen	-	0.07	NO
10-Feb-23	305.81	305.45	0.37	0.07	NO
14-Feb-23	305.62	305.33	0.30	0.07	NO
24-Feb-23	305.55	Frozen	-	0.07	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
2-Feb-23	Frozen	304.54	NO
10-Feb-23	305.09	304.54	NO
14-Feb-23	304.84	304.54	NO
24-Feb-23	Frozen	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Feb-23	305.52	Frozen	-	0.57	NO
10-Feb-23	305.71	305.09	0.62	0.57	NO
14-Feb-23	305.62	304.84	0.79	0.57	NO
24-Feb-23	305.48	Frozen	-	0.57	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
2-Feb-23	Frozen	303.65	NO
10-Feb-23	304.08	303.65	NO
14-Feb-23	304.05	303.65	NO
24-Feb-23	Frozen	303.65	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Feb-23	304.55	Frozen	-	0.43	NO
10-Feb-23	304.74	304.08	0.66	0.43	NO
14-Feb-23	304.65	304.05	0.60	0.43	NO
24-Feb-23	304.66	Frozen	-	0.43	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
2-Feb-23	Frozen	303.88	NO
10-Feb-23	304.42	303.88	NO
14-Feb-23	304.29	303.88	NO
24-Feb-23	Frozen	303.88	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Feb-23	304.63	Frozen	-	0.29	NO
10-Feb-23	304.72	304.42	0.29	0.29	NO
14-Feb-23	304.70	304.29	0.41	0.29	NO
24-Feb-23	304.74	Frozen	-	0.29	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
2-Feb-23	Frozen	302.88	NO
10-Feb-23	303.56	302.88	NO
14-Feb-23	303.44	302.88	NO
24-Feb-23	Frozen	302.88	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Feb-23	303.61	Frozen	-	0.20	NO
10-Feb-23	303.82	303.56	0.26	0.20	NO
14-Feb-23	Frozen	303.44	-	0.20	NO
24-Feb-23	Frozen	Frozen	-	0.20	NO

Note: No exceedances to report for the month of February.

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
February 2023

			Max. Allowable as per PTTW- Main Pond			Max. Allowable as per PTTW- Silt Pond		
			(Imperial Gallons)		(Litres)	(Imperial Gallons)		(Litres)
Total Monthly Precipitation (mm):	58.4	Kitchener/Waterloo (Actual)	2,500	per minute	11,365	2,597	per minute	11,806
Total Monthly Normal Precipitation (mm):	54.9	Waterloo-Wellington A (30-year Normal)	1,800,000	per day	8,183,000	3,739,477	per day	17,000,000

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 6	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
2-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
3-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
4-Feb-23	-	-	-	-	-	-	-	-	-	-	-	-
5-Feb-23	-	-	-	-	-	-	-	-	-	-	-	-
6-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
7-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
8-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
9-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
10-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
11-Feb-23	-	-	-	-	-	-	-	-	-	-	-	-
12-Feb-23	-	-	-	-	-	-	-	-	-	-	-	-
13-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
14-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
15-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
16-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
17-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
18-Feb-23	-	-	-	-	-	-	-	-	-	-	-	-
19-Feb-23	-	-	-	-	-	-	-	-	-	-	-	-
20-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
21-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
22-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
23-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
24-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
25-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
26-Feb-23	-	-	-	-	-	-	-	-	-	-	-	-
27-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
28-Feb-23	0	0	0	0	-	-	-	-	-	-	-	-
Total	0	0	0	0	-	-	-	-	-	-	-	-

Note: No exceedances to report. All ponds are frozen

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

April 13th, 2023

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – March 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of March 2023 for those monitoring wells that could be measured. There were no exceedances to report.

If you have any questions, please do not hesitate to call.

Sincerely,

Jonathan Clark
Superintendent

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
March 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
2-Mar-23	305.75	305.66	NO
9-Mar-23	305.78	305.66	NO
17-Mar-23	305.85	305.66	NO
24-Mar-23	305.94	305.66	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Mar-23	306.00	305.75	0.25	0.11	NO
9-Mar-23	306.02	305.78	0.25	0.11	NO
17-Mar-23	306.19	305.85	0.34	0.11	NO
24-Mar-23	306.202	305.94	0.27	0.11	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
2-Mar-23	305.28	305.17	NO
9-Mar-23	305.32	305.17	NO
17-Mar-23	305.33	305.17	NO
24-Mar-23	305.42	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Mar-23	305.54	305.28	0.26	0.07	NO
9-Mar-23	305.55	305.32	0.24	0.07	NO
17-Mar-23	305.63	305.33	0.30	0.07	NO
24-Mar-23	305.77	305.42	0.35	0.07	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
2-Mar-23	304.75	304.54	NO
9-Mar-23	304.77	304.54	NO
17-Mar-23	304.83	304.54	NO
24-Mar-23	305.03	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Mar-23	305.45	304.75	0.70	0.57	NO
9-Mar-23	305.48	304.77	0.71	0.57	NO
17-Mar-23	305.72	304.83	0.89	0.57	NO
24-Mar-23	305.73	305.03	0.70	0.57	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
2-Mar-23	304.02	303.65	NO
9-Mar-23	304.03	303.65	NO
17-Mar-23	303.94	303.65	NO
24-Mar-23	304.11	303.65	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Mar-23	304.66	304.02	0.64	0.43	NO
9-Mar-23	304.70	304.03	0.67	0.43	NO
17-Mar-23	304.75	303.94	0.81	0.43	NO
24-Mar-23	304.85	304.11	0.74	0.43	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
2-Mar-23	304.29	303.88	NO
9-Mar-23	304.30	303.88	NO
17-Mar-23	304.38	303.88	NO
24-Mar-23	304.43	303.88	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Mar-23	304.75	304.29	0.46	0.29	NO
9-Mar-23	304.77	304.30	0.47	0.29	NO
17-Mar-23	304.85	304.38	0.46	0.29	NO
24-Mar-23	304.87	304.43	0.44	0.29	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
2-Mar-23	303.36	302.88	NO
9-Mar-23	303.38	302.88	NO
17-Mar-23	303.56	302.88	NO
24-Mar-23	303.53	302.88	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Mar-23	Frozen	303.36	-	0.20	NO
9-Mar-23	Frozen	303.38	-	0.20	NO
17-Mar-23	303.82	303.56	0.26	0.20	NO
24-Mar-23	303.80	303.53	0.27	0.20	NO

Note: No exceedances to report for the month of March.

Monthly Reporting
Mill Creek Aggregates Pit
March 2023

				Max. Allowable as per PTTW- Main Pond				*Max. Allowable as per PTTW- Silt Pond*				
				(Imperial Gallons)		(Litres)		(Imperial Gallons)		(Litres)		
Total Monthly Precipitation (mm):	69.9	Kitchener/Waterloo (Actual)		2,500	per minute	11,365		2,597	per minute	11,806		
Total Monthly Normal Precipitation (mm):	61	Waterloo-Wellington A (30-year Normal)		1,800,000	per day	8,183,000		3,739,477	per day	17,000,000		

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 2	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
2-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
3-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
4-Mar-23	-	-	-	-	-	-	-	-	-	-	-	-
5-Mar-23	-	-	-	-	-	-	-	-	-	-	-	-
6-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
7-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
8-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
9-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
10-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
11-Mar-23	-	-	-	-	-	-	-	-	-	-	-	-
12-Mar-23	-	-	-	-	-	-	-	-	-	-	-	-
13-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
14-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
15-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
16-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
17-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
18-Mar-23	-	-	-	-	-	-	-	-	-	-	-	-
19-Mar-23	-	-	-	-	-	-	-	-	-	-	-	-
20-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
21-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
22-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
23-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
24-Mar-23	0	0	0	0	-	-	-	-	-	-	-	-
25-Mar-23	-	-	-	-	-	-	-	-	-	-	-	-
26-Mar-23	-	-	-	-	-	-	-	-	-	-	-	-
27-Mar-23	0	3,600	1,794,949	0	-	-	-	-	-	-	-	-
28-Mar-23	0	3,450	1,404,724	0	-	-	-	-	-	-	-	-
29-Mar-23	0	3,600	1,675,286	0	-	-	-	-	-	-	-	-
30-Mar-23	0	1,800	1,616,114	0	-	-	-	-	-	-	-	-
31-Mar-23	0	1,800	1,755,575	0	-	-	-	-	-	-	-	-
Total	0	14,250	8,246,647	0	-	-	-	-	-	-	-	-

Note: No exceedances to report. Large ice patches remained in ponds throughout the month and prevented the placement of staff guages.

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

May 12th, 2023

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – April 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of April 2023 for those monitoring wells that could be measured. There were no exceedances to report.

If you have any questions, please do not hesitate to call.

Sincerely,

Jonathan Clark
Superintendent

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

Monthly Reporting
Mill Creek Aggregates Pit
April 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
3-Apr-23	305.99	305.60	NO
14-Apr-23	305.83	305.60	NO
20-Apr-23	305.82	305.60	NO
27-Apr-23	305.86	305.60	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Apr-23	306.26	305.99	0.28	0.11	NO
14-Apr-23	306.16	305.83	0.33	0.11	NO
20-Apr-23	306.15	305.82	0.33	0.11	NO
27-Apr-23	306.17	305.86	0.31	0.11	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
3-Apr-23	305.46	305.17	NO
14-Apr-23	305.31	305.17	NO
20-Apr-23	305.31	305.17	NO
27-Apr-23	305.32	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Apr-23	305.83	305.46	0.37	0.14	NO
14-Apr-23	305.66	305.31	0.35	0.14	NO
20-Apr-23	305.64	305.31	0.33	0.14	NO
27-Apr-23	305.67	305.32	0.35	0.14	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
3-Apr-23	305.02	304.54	NO
14-Apr-23	304.80	304.54	NO
20-Apr-23	304.81	304.54	NO
27-Apr-23	304.83	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Apr-23	305.80	305.02	0.78	0.73	NO
14-Apr-23	305.65	304.80	0.85	0.73	NO
20-Apr-23	305.71	304.81	0.90	0.73	NO
27-Apr-23	305.71	304.83	0.88	0.73	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
3-Apr-23	304.14	303.69	NO
14-Apr-23	304.09	303.69	NO
20-Apr-23	304.07	303.69	NO
27-Apr-23	304.13	303.69	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Apr-23	304.95	304.14	0.81	0.34	NO
14-Apr-23	305.00	304.09	0.92	0.34	NO
20-Apr-23	304.99	304.07	0.91	0.34	NO
27-Apr-23	304.89	304.13	0.76	0.34	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
3-Apr-23	304.48	303.97	NO
14-Apr-23	304.40	303.97	NO
20-Apr-23	304.40	303.97	NO
27-Apr-23	304.42	303.97	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Apr-23	304.98	304.48	0.49	0.17	NO
14-Apr-23	305.07	304.40	0.67	0.17	NO
20-Apr-23	305.04	304.40	0.63	0.17	NO
27-Apr-23	305.07	304.42	0.65	0.17	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
3-Apr-23	303.53	302.86	NO
14-Apr-23	303.41	302.86	NO
20-Apr-23	303.41	302.86	NO
27-Apr-23	303.41	302.86	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Apr-23	303.80	303.53	0.27	0.18	NO
14-Apr-23	303.71	303.41	0.30	0.18	NO
20-Apr-23	303.70	303.41	0.29	0.18	NO
27-Apr-23	303.73	303.41	0.32	0.18	NO

Note: No exceedances to report for the month of April.

Monthly Reporting
Mill Creek Aggregates Pit
April 2023

			Max. Allowable as per PTTW- Main Pond				*Max. Allowable as per PTTW- Silt Pond*		
			(Imperial Gallons)		(Litres)		(Imperial Gallons)		(Litres)
Total Monthly Precipitation (mm):	85.5	Kitchener/Waterloo (Actual)	2,500	per minute	11,365		2,597	per minute	11,806
Total Monthly Normal Precipitation (mm):	74.5	Waterloo-Wellington A (30-year Normal)	1,800,000	per day	8,183,000		3,739,477	per day	17,000,000

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 2	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Apr-23	-	-	-	-	-	-	-	-	-	-	-	-
2-Apr-23	-	-	-	-	-	-	-	-	-	-	-	-
3-Apr-23	0	3,600	1,657,688	0	306.28	N	305.70	N	305.03	N	305.86	N
4-Apr-23	0	3,600	1,662,088	0	306.29	N	305.70	N	305.05	N	305.76	N
5-Apr-23	0	3,450	1,557,162	0	306.30	N	305.71	N	305.05	N	305.77	N
6-Apr-23	0	3,600	1,792,309	0	306.31	N	305.71	N	305.08	N	305.77	N
7-Apr-23	-	-	-	-	-	-	-	-	-	-	-	-
8-Apr-23	-	-	-	-	-	-	-	-	-	-	-	-
9-Apr-23	-	-	-	-	-	-	-	-	-	-	-	-
10-Apr-23	0	3,150	1,744,356	0	306.30	N	305.71	N	305.11	N	305.78	N
11-Apr-23	0	3,600	1,745,456	0	306.30	N	305.72	N	305.11	N	305.79	N
12-Apr-23	0	3,600	1,739,297	0	306.30	N	305.72	N	305.11	N	305.79	N
13-Apr-23	0	3,600	1,789,010	0	306.30	N	305.72	N	305.11	N	305.79	N
14-Apr-23	0	1,800	1,799,128	0	306.30	N	305.72	N	305.11	N	305.79	N
15-Apr-23	-	-	-	-	-	-	-	-	-	-	-	-
16-Apr-23	-	-	-	-	-	-	-	-	-	-	-	-
17-Apr-23	0	3,600	1,775,812	0	306.29	N	305.72	N	305.12	N	305.79	N
18-Apr-23	0	3,150	1,798,249	0	306.29	N	305.72	N	305.12	N	305.79	N
19-Apr-23	0	2,400	1,543,744	0	306.29	N	305.72	N	305.12	N	305.79	N
20-Apr-23	0	1,950	1,798,029	0	306.28	N	305.73	N	305.12	N	305.79	N
21-Apr-23	0	1,800	1,785,050	0	306.28	N	305.73	N	305.12	N	305.79	N
22-Apr-23	-	-	-	-	-	-	-	-	-	-	-	-
23-Apr-23	-	-	-	-	-	-	-	-	-	-	-	-
24-Apr-23	0	3,600	1,769,653	0	306.31	N	305.76	N	305.11	N	305.79	N
25-Apr-23	0	3,600	1,798,469	0	306.31	N	305.75	N	305.11	N	305.79	N
26-Apr-23	0	3,600	1,442,998	0	306.30	N	305.77	N	305.13	N	305.79	N
27-Apr-23	0	3,450	1,797,809	0	306.31	N	305.76	N	305.13	N	305.79	N
28-Apr-23	0	1,500	1,652,409	0	306.31	N	305.76	N	305.11	N	305.79	N
29-Apr-23	-	-	-	-	-	-	-	-	-	-	-	-
30-Apr-23	-	-	-	-	-	-	-	-	-	-	-	-
Total	0	58,650	32,648,716	0	-	-	-	-	-	-	-	-

Note: No exceedances to report.

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

June 12th, 2023

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – June 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of June 2023 for those monitoring wells that could be measured. There were no exceedances to report.

If you have any questions, please do not hesitate to call.

Sincerely,

Martin Bradley
Site Manager

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
May 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
5-May-23	305.90	305.60	NO
12-May-23	305.76	305.60	NO
17-May-23	305.78	305.60	NO
26-May-23	305.81	305.60	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-May-23	306.23	305.90	0.33	0.11	NO
12-May-23	306.13	305.76	0.37	0.11	NO
17-May-23	306.14	305.78	0.36	0.11	NO
26-May-23	306.17	305.81	0.36	0.11	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
5-May-23	305.36	305.17	NO
12-May-23	305.29	305.17	NO
17-May-23	305.29	305.17	NO
26-May-23	305.30	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-May-23	305.73	305.36	0.36	0.14	NO
12-May-23	305.50	305.29	0.21	0.14	NO
17-May-23	305.63	305.29	0.34	0.14	NO
26-May-23	305.66	305.30	0.36	0.14	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
5-May-23	304.92	304.54	NO
12-May-23	304.76	304.54	NO
17-May-23	304.75	304.54	NO
26-May-23	304.75	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-May-23	305.77	304.92	0.85	0.73	NO
12-May-23	305.64	304.76	0.88	0.73	NO
17-May-23	305.67	304.75	0.92	0.73	NO
26-May-23	305.70	304.75	0.95	0.73	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
5-May-23	304.12	303.69	NO
12-May-23	304.08	303.69	NO
17-May-23	304.07	303.69	NO
26-May-23	304.04	303.69	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-May-23	305.12	304.12	1.00	0.34	NO
12-May-23	304.99	304.08	0.91	0.34	NO
17-May-23	304.97	304.07	0.90	0.34	NO
26-May-23	304.83	304.04	0.79	0.34	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
5-May-23	304.46	303.97	NO
12-May-23	304.37	303.97	NO
17-May-23	304.38	303.97	NO
26-May-23	304.37	303.97	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-May-23	305.11	304.46	0.65	0.17	NO
12-May-23	304.98	304.37	0.61	0.17	NO
17-May-23	305.02	304.38	0.64	0.17	NO
26-May-23	305.00	304.37	0.63	0.17	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
5-May-23	303.48	302.86	NO
12-May-23	303.35	302.86	NO
17-May-23	303.36	302.86	NO
26-May-23	303.39	302.86	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-May-23	303.76	303.48	0.28	0.18	NO
12-May-23	303.63	303.35	0.28	0.18	NO
17-May-23	303.64	303.36	0.28	0.18	NO
26-May-23	303.67	303.39	0.28	0.18	NO

Note: No exceedances to report for the month of May.

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
May 2023

				Max. Allowable as per PTTW- Main Pond				*Max. Allowable as per PTTW- Silt Pond*				
				(Imperial Gallons)		(Litres)		(Imperial Gallons)		(Litres)		
Total Monthly Precipitation (mm):	47.0	Kitchener/Waterloo (Actual)		2,500	per minute	11,365		2,597	per minute	11,806		
Total Monthly Normal Precipitation (mm):	82.3	Waterloo-Wellington A (30-year Normal)		1,800,000	per day	8,183,000		3,739,477	per day	17,000,000		

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 2	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-May-23	0	3,600	1,320,255	0	306.33	N	305.78	N	305.11	N	305.81	N
2-May-23	0	3,600	1,741,936	0	306.33	N	305.77	N	305.11	N	305.81	N
3-May-23	0	2,850	1,736,657	0	306.33	N	305.75	N	305.11	N	305.85	N
4-May-23	0	3,300	1,756,015	0	306.34	N	305.75	N	305.16	N	305.82	N
5-May-23	0	2,400	1,765,473	0	306.34	N	305.75	N	305.16	N	305.84	N
6-May-23	-	-	-	-	-	-	-	-	-	-	-	-
7-May-23	-	-	-	-	-	-	-	-	-	-	-	-
8-May-23	0	0	1,780,211	0	306.33	N	305.81	N	305.16	N	305.85	N
9-May-23	0	3,300	1,754,915	0	306.35	N	305.80	N	305.18	N	305.87	N
10-May-23	0	3,300	1,757,334	0	306.33	N	305.79	N	305.18	N	305.88	N
11-May-23	0	3,300	1,766,353	0	306.35	N	305.80	N	305.18	N	305.89	N
12-May-23	0	2,400	1,655,049	0	306.34	N	305.80	N	305.15	N	305.90	N
13-May-23	-	-	-	-	-	-	-	-	-	-	-	-
14-May-23	-	-	-	-	-	-	-	-	-	-	-	-
15-May-23	0	3,300	1,765,033	0	306.34	N	305.80	N	305.13	N	305.93	N
16-May-23	0	0	1,730,718	0	306.34	N	305.80	N	305.13	N	305.92	N
17-May-23	0	0	1,764,593	0	306.34	N	305.80	N	305.12	N	305.92	N
18-May-23	0	-	1,760,854	0	306.33	N	305.80	N	305.10	N	305.92	N
19-May-23	0	0	1,762,614	0	306.33	N	305.80	N	305.09	N	305.92	N
20-May-23	-	-	-	-	-	-	-	-	-	-	-	-
21-May-23	-	-	-	-	-	-	-	-	-	-	-	-
22-May-23	-	-	-	-	-	-	-	-	-	-	-	-
23-May-23	0	0	1,776,692	0	306.37	N	305.83	N	305.10	N	305.98	N
24-May-23	0	0	1,740,617	0	306.37	N	305.84	N	305.10	N	305.99	N
25-May-23	0	0	1,774,492	0	306.36	N	305.85	N	305.10	N	305.99	N
26-May-23	0	0	1,446,078	0	306.36	N	305.84	N	305.06	N	305.98	N
27-May-23	-	-	-	-	-	-	-	-	-	-	-	-
28-May-23	-	-	-	-	-	-	-	-	-	-	-	-
29-May-23	0	0	1,740,177	0	306.35	N	305.84	N	305.04	N	305.98	N
30-May-23	0	0	1,768,773	0	306.35	N	305.84	N	305.04	N	305.98	N
31-May-23	0	0	1,766,793	0	306.34	N	305.82	N	305.04	N	305.98	N
Total	0	31,350	36,064,838	0	-	-	-	-	-	-	-	-

Note: No exceedances to report. The Township of Puslinch pumped a total of approximately 79,494 L from Pond 4 this month.

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

July 14th, 2023

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – June 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of June 2023 for those monitoring wells that could be measured. There were no exceedances to report.

If you have any questions, please do not hesitate to call.

Sincerely,

Jonathan Clark
Site Superintendent

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
June 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
2-Jun-23	305.73	305.60	NO
9-Jun-23	305.70	305.60	NO
15-Jun-23	305.82	305.60	NO
22-Jun-23	305.71	305.60	NO
30-Jun-23	305.79	305.60	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Jun-23	306.11	305.73	0.39	0.11	NO
9-Jun-23	306.09	305.70	0.39	0.11	NO
15-Jun-23	306.15	305.82	0.33	0.11	NO
22-Jun-23	306.08	305.71	0.37	0.11	NO
30-Jun-23	306.113	305.79	0.33	0.11	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
2-Jun-23	305.25	305.17	NO
9-Jun-23	305.25	305.17	NO
15-Jun-23	305.30	305.17	NO
22-Jun-23	305.24	305.17	NO
30-Jun-23	305.28	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Jun-23	305.61	305.25	0.36	0.14	NO
9-Jun-23	305.59	305.25	0.34	0.14	NO
15-Jun-23	305.66	305.30	0.36	0.14	NO
22-Jun-23	305.60	305.24	0.36	0.14	NO
30-Jun-23	305.66	305.28	0.38	0.14	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
2-Jun-23	304.69	304.54	NO
9-Jun-23	304.69	304.54	NO
15-Jun-23	304.71	304.54	NO
22-Jun-23	304.69	304.54	NO
30-Jun-23	304.74	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Jun-23	305.59	304.69	0.90	0.73	NO
9-Jun-23	305.59	304.69	0.90	0.73	NO
15-Jun-23	305.69	304.71	0.98	0.73	NO
22-Jun-23	305.64	304.69	0.95	0.73	NO
30-Jun-23	305.70	304.74	0.95	0.73	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
2-Jun-23	304.02	303.69	NO
9-Jun-23	304.00	303.69	NO
15-Jun-23	304.03	303.69	NO
22-Jun-23	304.02	303.69	NO
30-Jun-23	304.05	303.69	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Jun-23	304.88	304.02	0.86	0.34	NO
9-Jun-23	304.85	304.00	0.84	0.34	NO
15-Jun-23	304.74	304.03	0.71	0.34	NO
22-Jun-23	304.80	304.02	0.79	0.34	NO
30-Jun-23	304.75	304.05	0.70	0.34	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
2-Jun-23	304.31	303.97	NO
9-Jun-23	304.29	303.97	NO
15-Jun-23	304.32	303.97	NO
22-Jun-23	304.29	303.97	NO
30-Jun-23	304.30	303.97	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Jun-23	304.95	304.31	0.63	0.17	NO
9-Jun-23	304.92	304.29	0.63	0.17	NO
15-Jun-23	304.89	304.32	0.57	0.17	NO
22-Jun-23	304.88	304.29	0.59	0.17	NO
30-Jun-23	304.86	304.30	0.56	0.17	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
2-Jun-23	303.26	302.86	NO
9-Jun-23	303.25	302.86	NO
15-Jun-23	303.33	302.86	NO
22-Jun-23	303.30	302.86	NO
30-Jun-23	303.29	302.86	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
2-Jun-23	303.59	303.26	0.33	0.18	NO
9-Jun-23	303.58	303.25	0.33	0.18	NO
15-Jun-23	303.65	303.33	0.32	0.18	NO
22-Jun-23	303.61	303.30	0.31	0.18	NO
30-Jun-23	303.65	303.29	0.36	0.18	NO

Note: No exceedances to report for the month of June.

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
June 2023

			Max. Allowable as per PTTW- Main Pond			Max. Allowable as per PTTW- Silt Pond		
			(Imperial Gallons)		(Litres)	(Imperial Gallons)		(Litres)
Total Monthly Precipitation (mm):	59.5	Kitchener/Waterloo (Actual)	2,500	per minute	11,365	2,597	per minute	11,806
Total Monthly Normal Precipitation (mm):	82.4	Waterloo-Wellington A (30-year Normal)	1,800,000	per day	8,183,000	3,739,477	per day	17,000,000

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 2	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Jun-23	0	0	1,772,072	0	306.34	N	305.82	N	305.01	N	305.99	N
2-Jun-23	0	0	1,736,437	0	306.34	N	305.82	N	305.03	N	305.98	N
3-Jun-23	-	-	-	-	-	-		-		-		-
4-Jun-23	-	-	-	-	-	-		-		-		-
5-Jun-23	0	0	1,758,874	0	306.32	N	305.82	N	305.00	N	305.98	N
6-Jun-23	0	0	1,741,057	0	306.32	N	305.82	N	305.00	N	305.98	N
7-Jun-23	0	0	1,671,766	0	306.31	N	305.82	N	304.99	N	305.98	N
8-Jun-23	0	0	1,594,777	0	306.31	N	305.82	N	304.97	N	305.98	N
9-Jun-23	0	0	1,747,436	0	306.31	N	305.82	N	304.99	N	305.98	N
10-Jun-23	-	-	-	-	-	-		-		-		-
11-Jun-23	-	-	-	-	-	-		-		-		-
12-Jun-23	0	0	1,067,291	0	306.32	N	305.80	N	304.97	N	305.99	N
13-Jun-23	0	0	1,624,913	0	306.32	N	305.83	N	304.98	N	306.00	N
14-Jun-23	0	0	1,759,094	0	306.32	N	305.83	N	304.98	N	306.01	N
15-Jun-23	0	0	1,777,132	0	306.32	N	305.82	N	304.98	N	306.01	N
16-Jun-23	0	0	1,526,367	0	306.33	N	305.84	N	304.98	N	306.02	N
17-Jun-23	-	-	-	-	-	-		-		-		-
18-Jun-23	-	-	-	-	-	-		-		-		-
19-Jun-23	0	0	1,741,057	0	306.32	N	305.82	N	304.96	N	306.00	N
20-Jun-23	0	0	1,761,514	0	306.32	N	305.82	N	304.96	N	306.01	N
21-Jun-23	0	0	1,751,175	0	306.31	N	305.81	N	304.93	N	306.02	N
22-Jun-23	0	0	1,548,584	0	306.31	N	305.82	N	304.93	N	306.02	N
23-Jun-23	0	0	1,704,322	0	306.30	N	305.82	N	304.91	N	305.99	N
24-Jun-23	-	-	-	-	-	-		-		-		-
25-Jun-23	-	-	-	-	-	-		-		-		-
26-Jun-23	0	0	1,704,542	0	306.32	N	305.82	N	304.91	N	305.99	N
27-Jun-23	0	0	1,712,241	0	306.32	N	305.85	N	304.99	N	306.02	N
28-Jun-23	0	0	1,750,075	0	306.33	N	305.86	N	304.95	N	306.03	N
29-Jun-23	0	0	1,760,634	0	306.33	N	305.86	N	304.95	N	306.03	N
30-Jun-23	0	0	1,732,918	0	306.32	N	305.85	N	304.97	N	306.02	N
Total	0	0	36,944,275	0	-	-	-	-	-	-	-	-

Note: No exceedances to report. The Township of Puslinch pumped a total of approximately 90,850 L from Pond 4 this month.

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

August 11th, 2023

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – July 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of July 2023 for those monitoring wells that could be measured. Threshold value exceedances related to the head differences at two well pairs (92-12 to DP17R, and DP6 to DP3) occurred on July 25. The exceedances are attributed to 75 mm of rainfall recorded in the area between July 11 and July 25. It is interpreted that a more rapid groundwater level increase occurred at the creek drive point locations (DP17R and DP3) following the rainfall than at the locations located farther from the creek (92-12 and DP6), which temporarily reduced the head differences at the pairs. Similar occurrences have been observed at the site in previous years. The July 26 groundwater level measurements confirmed that the head differences had returned to values greater than the threshold values at both pairs.

If you have any questions, please do not hesitate to call.

Sincerely,

Jonathan Clark
Site Superintendent

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
July 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
5-Jul-23	305.78	305.49	NO
12-Jul-23	305.82	305.49	NO
21-Jul-23	305.83	305.49	NO
25-Jul-23	306.18	305.49	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-Jul-23	306.10	305.78	0.32	0.10	NO
12-Jul-23	306.18	305.82	0.35	0.10	NO
21-Jul-23	306.19	305.83	0.36	0.10	NO
25-Jul-23	306.33	306.18	0.15	0.10	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
5-Jul-23	305.26	305.17	NO
12-Jul-23	305.30	305.17	NO
21-Jul-23	305.29	305.17	NO
25-Jul-23	305.80	305.17	NO
26-Jul-23	305.45	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-Jul-23	305.63	305.26	0.37	0.06	NO
12-Jul-23	305.67	305.30	0.38	0.06	NO
21-Jul-23	305.64	305.29	0.35	0.06	NO
25-Jul-23	305.84	305.80	0.04	0.06	YES
26-Jul-23	305.81	305.45	0.36	0.06	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
5-Jul-23	304.75	304.54	NO
12-Jul-23	304.78	304.54	NO
21-Jul-23	304.78	304.54	NO
25-Jul-23	305.45	304.54	NO
26-Jul-23	305.12	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-Jul-23	305.67	304.75	0.92	0.58	NO
12-Jul-23	305.60	304.78	0.82	0.58	NO
21-Jul-23	305.79	304.78	1.01	0.58	NO
25-Jul-23	305.77	305.45	0.32	0.58	YES
26-Jul-23	305.74	305.12	0.62	0.58	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
5-Jul-23	304.03	303.50	NO
12-Jul-23	304.12	303.50	NO
21-Jul-23	304.19	303.50	NO
25-Jul-23	304.11	303.50	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-Jul-23	304.77	304.03	0.74	0.32	NO
12-Jul-23	304.76	304.12	0.64	0.32	NO
21-Jul-23	304.91	304.19	0.72	0.32	NO
25-Jul-23	304.85	304.11	0.74	0.32	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
5-Jul-23	304.29	303.91	NO
12-Jul-23	304.34	303.91	NO
21-Jul-23	304.37	303.91	NO
25-Jul-23	304.47	303.91	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-Jul-23	304.87	304.29	0.58	0.23	NO
12-Jul-23	304.89	304.34	0.55	0.23	NO
21-Jul-23	305.00	304.37	0.63	0.23	NO
25-Jul-23	305.00	304.47	0.53	0.23	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
5-Jul-23	303.28	302.79	NO
12-Jul-23	303.41	302.79	NO
21-Jul-23	303.39	302.79	NO
25-Jul-23	303.55	302.79	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
5-Jul-23	303.63	303.28	0.35	0.15	NO
12-Jul-23	303.69	303.41	0.28	0.15	NO
21-Jul-23	303.66	303.39	0.27	0.15	NO
25-Jul-23	303.74	303.55	0.19	0.15	NO

Note: Threshold value exceedances related to the head differences at two well pairs (92-12 to DP17R, and DP6 to DP3) occurred on July 25. The exceedances are attributed to 75 mm of rainfall recorded in the area between July 11 and July 25. It is interpreted that a more rapid groundwater level increase occurred at the creek drive point locations (DP17R and DP3) following the rainfall than at the locations located farther from the creek (92-12 and DP6), which temporarily reduced the head differences at the pairs. Similar occurrences have been observed at the site in previous years. The July 26 groundwater level measurements confirmed that the head differences had returned to values greater than the threshold values at both pairs.

Monthly Reporting
Mill Creek Aggregates Pit
July 2023

			Max. Allowable as per PTTW- Main Pond			Max. Allowable as per PTTW- Silt Pond		
			(Imperial Gallons)		(Litres)	(Imperial Gallons)		(Litres)
Total Monthly Precipitation (mm):	166.4	Kitchener/Waterloo (Actual)	2,500	per minute	11,365	2,597	per minute	11,806
Total Monthly Normal Precipitation (mm):	98.6	Waterloo-Wellington A (30-year Normal)	1,800,000	per day	8,183,000	3,739,477	per day	17,000,000

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 2	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Jul-23	-	-	-	-	-	-	-	-	-	-	-	-
2-Jul-23	-	-	-	-	-	-	-	-	-	-	-	-
3-Jul-23	-	-	-	-	-	-	-	-	-	-	-	-
4-Jul-23	0	0	1,732,258	0	306.34	N	305.87	N	304.94	N	306.04	N
5-Jul-23	0	0	1,758,874	0	306.34	N	305.87	N	304.93	N	306.03	N
6-Jul-23	0	0	1,648,010	0	306.33	N	305.87	N	304.92	N	306.02	N
7-Jul-23	0	0	1,778,451	0	306.36	N	305.89	N	304.95	N	306.05	N
8-Jul-23	-	-	-	-	-	-	-	-	-	-	-	-
9-Jul-23	-	-	-	-	-	-	-	-	-	-	-	-
10-Jul-23	0	0	1,396,805	0	306.35	N	305.87	N	304.91	N	306.04	N
11-Jul-23	0	0	1,683,425	0	306.34	N	305.85	N	304.95	N	305.99	N
12-Jul-23	0	0	1,763,273	0	306.34	N	305.87	N	304.95	N	305.97	N
13-Jul-23	0	0	1,758,654	0	306.39	N	305.88	N	304.98	N	305.99	N
14-Jul-23	0	0	1,750,955	0	306.38	N	305.91	N	305.01	N	305.96	N
15-Jul-23	-	-	-	-	-	-	-	-	-	-	-	-
16-Jul-23	-	-	-	-	-	-	-	-	-	-	-	-
17-Jul-23	0	0	1,742,596	0	306.39	N	305.91	N	305.07	N	305.90	N
18-Jul-23	0	0	1,426,281	0	306.39	N	305.90	N	305.10	N	305.90	N
19-Jul-23	0	0	1,137,681	0	306.39	N	305.90	N	305.08	N	305.88	N
20-Jul-23	0	0	1,778,451	0	306.41	N	305.90	N	305.08	N	305.87	N
21-Jul-23	0	0	1,265,703	0	306.38	N	305.90	N	305.08	N	305.87	N
22-Jul-23	-	-	-	-	-	-	-	-	-	-	-	-
23-Jul-23	-	-	-	-	-	-	-	-	-	-	-	-
24-Jul-23	0	0	1,753,595	0	306.37	N	305.90	N	305.07	N	305.85	N
25-Jul-23	0	0	1,753,595	0	306.38	N	305.89	N	305.08	N	305.91	N
26-Jul-23	0	0	1,760,634	0	306.37	N	305.88	N	305.04	N	305.90	N
27-Jul-23	0	0	1,647,130	0	306.38	N	305.90	N	305.09	N	305.90	N
28-Jul-23	0	0	1,750,075	0	306.39	N	305.90	N	305.09	N	305.90	N
29-Jul-23	0	0	701,482	0	306.39	N	305.90	N	305.09	N	305.90	N
30-Jul-23	-	-	-	-	-	-	-	-	-	-	-	-
31-Jul-23	0	0	1,794,509	0	306.42	N	305.91	N	305.08	N	305.96	N
Total	0	0	31,987,928	0	-	-	-	-	-	-	-	-

Note: No exceedances to report for the month of July.

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

September 11th, 2023

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – August 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of August 2023 for those monitoring wells that could be measured. There were no exceedances to report.

If you have any questions, please do not hesitate to call.

Sincerely,

Martin Bradley
Site Manager

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin
Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
August 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
3-Aug-23	305.83	305.49	NO
8-Aug-23	305.86	305.49	NO
14-Aug-23	305.95	305.49	NO
31-Aug-23	305.84	305.49	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Aug-23	306.23	305.83	0.40	0.10	NO
8-Aug-23	306.21	305.86	0.36	0.10	NO
14-Aug-23	306.27	305.95	0.32	0.10	NO
31-Aug-23	306.22	305.84	0.38	0.10	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
3-Aug-23	305.34	305.17	NO
8-Aug-23	305.33	305.17	NO
14-Aug-23	305.38	305.17	NO
31-Aug-23	305.30	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Aug-23	305.72	305.34	0.38	0.06	NO
8-Aug-23	305.70	305.33	0.37	0.06	NO
14-Aug-23	305.75	305.38	0.37	0.06	NO
31-Aug-23	305.71	305.30	0.41	0.06	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
3-Aug-23	304.89	304.54	NO
8-Aug-23	304.87	304.54	NO
14-Aug-23	304.95	304.54	NO
31-Aug-23	304.77	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Aug-23	305.67	304.89	0.78	0.58	NO
8-Aug-23	305.60	304.87	0.74	0.58	NO
14-Aug-23	305.79	304.95	0.85	0.58	NO
31-Aug-23	305.77	304.77	1.00	0.58	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
3-Aug-23	304.00	303.50	NO
8-Aug-23	304.01	303.50	NO
14-Aug-23	304.05	303.50	NO
31-Aug-23	304.01	303.50	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Aug-23	304.75	304.00	0.76	0.32	NO
8-Aug-23	304.78	304.01	0.77	0.32	NO
14-Aug-23	304.78	304.05	0.73	0.32	NO
31-Aug-23	304.76	304.01	0.75	0.32	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
3-Aug-23	304.34	303.91	NO
8-Aug-23	304.35	303.91	NO
14-Aug-23	304.37	303.91	NO
31-Aug-23	304.33	303.91	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Aug-23	304.84	304.34	0.50	0.23	NO
8-Aug-23	304.91	304.35	0.56	0.23	NO
14-Aug-23	304.89	304.37	0.52	0.23	NO
31-Aug-23	304.91	304.33	0.58	0.23	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
3-Aug-23	303.37	302.79	NO
8-Aug-23	303.40	302.79	NO
14-Aug-23	303.43	302.79	NO
31-Aug-23	303.36	302.79	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Aug-23	303.68	303.37	0.31	0.15	NO
8-Aug-23	303.67	303.40	0.27	0.15	NO
14-Aug-23	303.72	303.43	0.29	0.15	NO
31-Aug-23	303.63	303.36	0.27	0.15	NO

Note: No exceedances to report for the month of August.

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
August 2023

			Max. Allowable as per PTTW- Main Pond				Max. Allowable as per PTTW- Silt Pond		
			(Imperial Gallons)		(Litres)		(Imperial Gallons)		(Litres)
Total Monthly Precipitation (mm):	83.9	Kitchener/Waterloo (Actual)	2,500	per minute	11,365		2,597	per minute	11,806
Total Monthly Normal Precipitation (mm):	98.1	Waterloo-Wellington A (30-year Normal)	1,800,000	per day	8,183,000		3,739,477	per day	17,000,000

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 2	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Aug-23	0	0	1,752,275	0	306.4	N	305.91	N	305.07	N	305.96	N
2-Aug-23	0	0	1,445,198	0	306.39	N	305.90	N	305.08	N	305.96	N
3-Aug-23	0	0	1,779,771	0	306.39	N	305.90	N	305.08	N	305.97	N
4-Aug-23	0	0	1,776,252	0	306.39	N	305.90	N	305.06	N	305.98	N
5-Aug-23	-	-	-	-	-	-	-	-	-	-	-	-
6-Aug-23	-	-	-	-	-	-	-	-	-	-	-	-
7-Aug-23	-	-	-	-	-	-	-	-	-	-	-	-
8-Aug-23	0	0	1,794,949	0	306.41	N	305.90	N	305.01	N	305.99	N
9-Aug-23	0	0	1,445,858	0	306.38	N	305.89	N	305.01	N	305.99	N
10-Aug-23	0	0	1,260,424	0	306.38	N	305.89	N	305.01	N	305.99	N
11-Aug-23	0	0	1,302,218	0	306.39	N	305.89	N	305.01	N	305.99	N
12-Aug-23	-	-	-	-	-	-	-	-	-	-	-	-
13-Aug-23	-	-	-	-	-	-	-	-	-	-	-	-
14-Aug-23	0	0	1,294,959	0	306.38	N	305.89	N	305.01	N	306.09	N
15-Aug-23	0	0	1,223,249	0	306.38	N	305.90	N	305.01	N	306.00	N
16-Aug-23	0	0	1,476,214	0	306.39	N	305.90	N	305.01	N	306.02	N
17-Aug-23	0	0	1,627,772	0	306.39	N	305.90	N	305.01	N	306.02	N
18-Aug-23	0	0	1,726,979	0	306.41	N	305.92	N	305.03	N	306.03	N
19-Aug-23	0	0	703,902	0	306.41	N	305.92	N	305.03	N	306.03	N
20-Aug-23	-	-	-	-	-	-	-	-	-	-	-	-
21-Aug-23	0	0	1,716,640	0	306.4	N	305.90	N	305.02	N	306.03	N
22-Aug-23	0	0	1,749,195	0	306.4	N	305.90	N	305.02	N	306.03	N
23-Aug-23	0	0	1,753,375	0	306.39	N	305.90	N	305.00	N	306.02	N
24-Aug-23	0	0	1,724,119	0	306.4	N	305.90	N	305.02	N	306.02	N
25-Aug-23	0	0	1,729,838	0	306.42	N	305.92	N	305.03	N	306.05	N
26-Aug-23	0	0	698,622	0	306.41	N	305.92	N	305.02	N	306.02	N
27-Aug-23	-	-	-	-	-	-	-	-	-	-	-	-
28-Aug-23	0	0	1,367,549	0	306.41	N	305.91	N	305.01	N	306.05	N
29-Aug-23	0	0	1,626,893	0	306.42	N	305.92	N	305.01	N	306.04	N
30-Aug-23	0	0	1,717,300	0	306.41	N	305.92	N	305.01	N	306.08	N
31-Aug-23	0	0	1,711,141	0	306.4	N	305.91	N	305.01	N	306.03	N
Total	0	0	36,404,691	0	-	-	-	-	-	-	-	-

Note: No exceedances to report for the month of August.

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

October 13th, 2023

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – September 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of September 2023 for those monitoring wells that could be measured. There were no exceedances to report.

If you have any questions, please do not hesitate to call.

Sincerely,

Bader Diab
Site Superintendent

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
September 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
7-Sep-23	305.82	305.49	NO
15-Sep-23	305.83	305.49	NO
20-Sep-23	305.80	305.49	NO
25-Sep-23	305.78	305.49	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
7-Sep-23	306.18	305.82	0.36	0.10	NO
15-Sep-23	306.20	305.83	0.37	0.10	NO
20-Sep-23	306.16	305.80	0.36	0.10	NO
25-Sep-23	306.13	305.78	0.35	0.10	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
7-Sep-23	305.29	305.17	NO
15-Sep-23	305.30	305.17	NO
20-Sep-23	305.28	305.17	NO
25-Sep-23	305.26	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
7-Sep-23	305.66	305.29	0.37	0.06	NO
15-Sep-23	305.68	305.30	0.38	0.06	NO
20-Sep-23	305.65	305.28	0.36	0.06	NO
25-Sep-23	305.60	305.26	0.34	0.06	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
7-Sep-23	304.79	304.54	NO
15-Sep-23	304.77	304.54	NO
20-Sep-23	304.76	304.54	NO
25-Sep-23	304.74	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
7-Sep-23	305.69	304.79	0.90	0.58	NO
15-Sep-23	305.73	304.77	0.95	0.58	NO
20-Sep-23	305.64	304.76	0.88	0.58	NO
25-Sep-23	305.63	304.74	0.88	0.58	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
7-Sep-23	304.23	303.50	NO
15-Sep-23	304.00	303.50	NO
20-Sep-23	303.96	303.50	NO
25-Sep-23	303.93	303.50	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
7-Sep-23	304.73	304.23	0.50	0.32	NO
15-Sep-23	304.71	304.00	0.71	0.32	NO
20-Sep-23	304.67	303.96	0.70	0.32	NO
25-Sep-23	304.63	303.93	0.71	0.32	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
7-Sep-23	304.31	303.91	NO
15-Sep-23	304.33	303.91	NO
20-Sep-23	304.30	303.91	NO
25-Sep-23	304.26	303.91	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
7-Sep-23	304.89	304.31	0.58	0.23	NO
15-Sep-23	304.90	304.33	0.57	0.23	NO
20-Sep-23	304.86	304.30	0.56	0.23	NO
25-Sep-23	304.79	304.26	0.53	0.23	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
7-Sep-23	303.32	302.79	NO
15-Sep-23	303.34	302.79	NO
20-Sep-23	303.31	302.79	NO
25-Sep-23	303.27	302.79	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
7-Sep-23	303.58	303.32	0.25	0.15	NO
15-Sep-23	303.61	303.34	0.28	0.15	NO
20-Sep-23	303.54	303.31	0.23	0.15	NO
25-Sep-23	303.52	303.27	0.25	0.15	NO

Note: No exceedances to report for the month of September.

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
September 2023

			Max. Allowable as per PTTW- Main Pond			Max. Allowable as per PTTW- Silt Pond		
			(Imperial Gallons)		(Litres)	(Imperial Gallons)		(Litres)
Total Monthly Precipitation (mm):	21.2	Kitchener/Waterloo (Actual)	2,500	per minute	11,365	2,597	per minute	11,806
Total Monthly Normal Precipitation (mm):	87.8	Waterloo-Wellington A (30-year Normal)	1,800,000	per day	8,183,000	3,739,477	per day	17,000,000

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 2	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Sep-23	0	0	1,692,223	0	306.39	N	305.89	N	305.00	N	306.02	N
2-Sep-23	0	0	714,460	0	306.39	N	305.89	N	305.00	N	306.03	N
3-Sep-23	-	-	-	-	-	-	-	-	-	-	-	-
4-Sep-23	-	-	-	-	-	-	-	-	-	-	-	-
5-Sep-23	0	0	1,718,840	0	306.39	N	305.90	N	304.99	N	306.02	N
6-Sep-23	0	0	1,445,638	0	306.39	N	305.91	N	304.99	N	306.01	N
7-Sep-23	0	0	1,461,696	0	306.4	N	305.91	N	305.00	N	306.02	N
8-Sep-23	0	0	1,685,404	0	306.4	N	305.90	N	304.99	N	306.00	N
9-Sep-23	0	0	710,061	0	306.4	N	305.90	N	304.99	N	306.00	N
10-Sep-23	-	-	-	-	-	-	-	-	-	-	-	-
11-Sep-23	0	0	1,715,980	0	306.37	N	305.89	N	304.95	N	306.09	N
12-Sep-23	0	0	1,335,433	0	306.37	N	305.89	N	304.98	N	306.02	N
13-Sep-23	0	0	1,704,542	0	306.38	N	305.89	N	304.95	N	305.99	N
14-Sep-23	0	0	1,668,687	0	306.38	N	305.89	N	304.96	N	305.99	N
15-Sep-23	0	0	1,697,503	0	306.37	N	305.89	N	304.93	N	305.99	N
16-Sep-23	0	0	726,558	0	306.37	N	305.89	N	304.93	N	305.99	N
17-Sep-23	-	-	-	-	-	-	-	-	-	-	-	-
18-Sep-23	0	0	1,705,862	0	306.36	N	305.90	N	304.94	N	305.99	N
19-Sep-23	0	0	1,699,042	0	306.35	N	305.89	N	304.94	N	305.99	N
20-Sep-23	0	0	1,687,164	0	306.35	N	305.88	N	304.93	N	305.99	N
21-Sep-23	0	0	1,197,073	0	306.36	N	305.88	N	304.95	N	305.99	N
22-Sep-23	0	0	1,709,161	0	306.37	N	305.88	N	304.95	N	305.99	N
23-Sep-23	0	0	745,256	0	306.37	N	305.88	N	304.95	N	305.99	N
24-Sep-23	-	-	-	-	-	-	-	-	-	-	-	-
25-Sep-23	0	0	1,726,539	0	306.33	N	305.87	N	304.90	N	305.95	N
26-Sep-23	0	0	1,707,621	0	306.36	N	305.87	N	304.89	N	305.95	N
27-Sep-23	0	0	1,707,841	0	306.35	N	305.87	N	304.88	N	305.96	N
28-Sep-23	0	0	1,726,319	0	306.33	N	305.85	N	304.89	N	305.95	N
29-Sep-23	0	0	1,704,762	0	306.33	N	305.85	N	304.87	N	305.94	N
30-Sep-23	-	-	-	-	-	-	-	-	-	-	-	-
Total	0	0	35,593,664	0	-	-	-	-	-	-	-	-

Note: No exceedances to report for the month of September.

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

November 10th, 2023

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – October 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of October 2023 for those monitoring wells that could be measured. There were no exceedances to report.

If you have any questions, please do not hesitate to call.

Sincerely,

Martin Bradley
Site Manager

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
October 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
4-Oct-23	305.76	305.58	NO
12-Oct-23	305.78	305.58	NO
20-Oct-23	305.79	305.58	NO
26-Oct-23	305.82	305.58	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Oct-23	306.11	305.76	0.35	0.09	NO
12-Oct-23	306.12	305.78	0.34	0.09	NO
20-Oct-23	306.11	305.79	0.32	0.09	NO
26-Oct-23	306.12	305.82	0.30	0.09	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
4-Oct-23	305.23	305.17	NO
12-Oct-23	305.27	305.17	NO
20-Oct-23	305.28	305.17	NO
26-Oct-23	305.30	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Oct-23	305.59	305.23	0.36	0.04	NO
12-Oct-23	305.61	305.27	0.34	0.04	NO
20-Oct-23	305.60	305.28	0.33	0.04	NO
26-Oct-23	305.63	305.30	0.33	0.04	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
4-Oct-23	304.72	304.54	NO
12-Oct-23	304.75	304.54	NO
20-Oct-23	304.77	304.54	NO
26-Oct-23	304.80	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Oct-23	305.64	304.72	0.92	0.55	NO
12-Oct-23	305.69	304.75	0.94	0.55	NO
20-Oct-23	305.66	304.77	0.89	0.55	NO
26-Oct-23	305.61	304.80	0.81	0.55	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
4-Oct-23	303.93	303.55	NO
12-Oct-23	303.94	303.55	NO
20-Oct-23	303.97	303.55	NO
26-Oct-23	304.02	303.55	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Oct-23	304.59	303.93	0.66	0.34	NO
12-Oct-23	304.62	303.94	0.67	0.34	NO
20-Oct-23	304.58	303.97	0.62	0.34	NO
26-Oct-23	304.69	304.02	0.67	0.34	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
4-Oct-23	304.24	303.96	NO
12-Oct-23	304.26	303.96	NO
20-Oct-23	304.25	303.96	NO
26-Oct-23	304.29	303.96	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Oct-23	304.74	304.24	0.49	0.19	NO
12-Oct-23	304.76	304.26	0.50	0.19	NO
20-Oct-23	304.71	304.25	0.46	0.19	NO
26-Oct-23	304.77	304.29	0.47	0.19	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
4-Oct-23	303.26	302.84	NO
12-Oct-23	303.31	302.84	NO
20-Oct-23	303.33	302.84	NO
26-Oct-23	303.35	302.84	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Oct-23	303.49	303.26	0.23	0.15	NO
12-Oct-23	303.55	303.31	0.24	0.15	NO
20-Oct-23	303.59	303.33	0.26	0.15	NO
26-Oct-23	303.62	303.35	0.27	0.15	NO

Note: No exceedances to report for the month of October.

Monthly Reporting
Mill Creek Aggregates Pit
October 2023

			Max. Allowable as per PTTW- Main Pond				Max. Allowable as per PTTW- Silt Pond		
			(Imperial Gallons)		(Litres)		(Imperial Gallons)		(Litres)
Total Monthly Precipitation (mm):	49.3	Kitchener/Waterloo (Actual)	2,500	per minute	11,365		2,597	per minute	11,806
Total Monthly Normal Precipitation (mm):	67.4	Waterloo-Wellington A (30-year Normal)	1,800,000	per day	8,183,000		3,739,477	per day	17,000,000

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 2	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Oct-23	-	-	-	-	-	-	-	-	-	-	-	-
2-Oct-23	0	0	1,788,570	0	306.33	N	305.84	N	304.88	N	305.94	N
3-Oct-23	0	0	1,673,086	0	306.31	N	305.83	N	304.86	N	305.94	N
4-Oct-23	0	0	1,707,401	0	306.31	N	305.82	N	304.86	N	305.94	N
5-Oct-23	0	0	1,712,461	0	306.32	N	305.83	N	304.85	N	305.93	N
6-Oct-23	0	0	1,298,918	0	306.32	N	305.85	N	304.88	N	305.94	N
7-Oct-23	-	-	-	-	-	-	-	-	-	-	-	-
8-Oct-23	-	-	-	-	-	-	-	-	-	-	-	-
9-Oct-23	-	-	-	-	-	-	-	-	-	-	-	-
10-Oct-23	0	0	1,732,038	0	306.33	N	305.86	N	304.82	N	305.90	N
11-Oct-23	0	0	1,699,922	0	306.32	N	305.82	N	304.84	N	305.92	N
12-Oct-23	0	0	1,680,565	0	306.29	N	305.82	N	304.83	N	305.91	N
13-Oct-23	0	0	1,771,412	0	306.28	N	305.82	N	304.82	N	305.91	N
14-Oct-23	0	0	661,448	0	306.28	N	305.82	N	304.82	N	305.91	N
15-Oct-23	-	-	-	-	-	-		-		-		-
16-Oct-23	0	0	1,703,222	0	306.28	N	305.81	N	304.83	N	305.92	N
17-Oct-23	0	0	1,711,581	0	306.28	N	305.81	N	304.83	N	305.93	N
18-Oct-23	0	0	1,689,144	0	306.27	N	305.81	N	304.82	N	305.92	N
19-Oct-23	0	0	1,673,746	0	306.27	N	305.80	N	304.81	N	305.91	N
20-Oct-23	0	0	1,659,008	0	306.27	N	305.80	N	304.81	N	305.92	N
21-Oct-23	0	0	732,938	0	306.27	N	305.80	N	304.81	N	305.92	N
22-Oct-23	-	-	-	-	-	-		-		-		-
23-Oct-23	0	0	1,709,381	0	306.25	N	305.80	N	304.79	N	305.90	N
24-Oct-23	0	0	1,716,860	0	306.23	N	305.80	N	304.80	N	305.89	N
25-Oct-23	0	0	1,653,289	0	306.24	N	305.79	N	304.81	N	305.86	N
26-Oct-23	0	0	1,699,042	0	306.25	N	305.79	N	304.82	N	305.85	N
27-Oct-23	0	0	1,275,382	0	306.26	N	305.80	N	304.84	N	305.84	N
28-Oct-23	0	0	738,217	0	306.26	N	305.80	N	304.84	N	305.87	N
29-Oct-23	-	-	-	-	-	-		-		-		-
30-Oct-23	0	0	1,765,473	0	306.26	N	305.79	N	304.87	N	305.82	N
31-Oct-23	0	0	1,787,030	0	306.25	N	305.79	N	304.86	N	305.80	N
Total	0	0	35,453,104	0	-	-	-	-	-	-	-	-

Note: No exceedances to report for the month of October.

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

December 11th, 2023

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – November 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of November 2023 for those monitoring wells that could be measured. There were no exceedances to report.

If you have any questions, please do not hesitate to call.

Sincerely,

Martin Bradley
Site Manager

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
November 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
3-Nov-23	305.85	305.58	NO
16-Nov-23	305.78	305.58	NO
20-Nov-23	305.74	305.58	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Nov-23	306.14	305.85	0.29	0.09	NO
16-Nov-23	306.07	305.78	0.29	0.09	NO
20-Nov-23	306.06	305.74	0.32	0.09	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
3-Nov-23	305.33	305.17	NO
16-Nov-23	305.29	305.17	NO
20-Nov-23	FROZEN	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Nov-23	305.53	305.33	0.20	0.04	NO
16-Nov-23	305.58	305.29	0.29	0.04	NO
20-Nov-23	305.55	FROZEN	-	0.04	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
3-Nov-23	304.81	304.54	NO
16-Nov-23	304.78	304.54	NO
20-Nov-23	304.81	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Nov-23	305.60	304.81	0.79	0.55	NO
16-Nov-23	305.59	304.78	0.81	0.55	NO
20-Nov-23	305.57	304.81	0.75	0.55	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
3-Nov-23	304.03	303.55	NO
16-Nov-23	303.97	303.55	NO
20-Nov-23	303.94	303.55	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Nov-23	304.70	304.03	0.66	0.34	NO
16-Nov-23	304.64	303.97	0.67	0.34	NO
20-Nov-23	304.63	303.94	0.69	0.34	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
3-Nov-23	304.27	303.96	NO
16-Nov-23	304.26	303.96	NO
20-Nov-23	FROZEN	303.96	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Nov-23	304.75	304.27	0.49	0.19	NO
16-Nov-23	304.74	304.26	0.48	0.19	NO
20-Nov-23	304.71	FROZEN	-	0.19	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
3-Nov-23	303.34	302.84	NO
16-Nov-23	303.36	302.84	NO
20-Nov-23	303.34	302.84	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
3-Nov-23	303.62	303.34	0.28	0.15	NO
16-Nov-23	303.61	303.36	0.25	0.15	NO
20-Nov-23	303.59	303.34	0.25	0.15	NO

Note: No exceedances to report for the month of November.

Monthly Reporting
Mill Creek Aggregates Pit
November 2023

			Max. Allowable as per PTTW- Main Pond			Max. Allowable as per PTTW- Silt Pond		
			(Imperial Gallons)		(Litres)	(Imperial Gallons)		(Litres)
Total Monthly Precipitation (mm):	41.1	Kitchener/Waterloo (Actual)	2,500	per minute	11,365	2,597	per minute	11,806
Total Monthly Normal Precipitation (mm):	87.1	Waterloo-Wellington A (30-year Normal)	1,800,000	per day	8,183,000	3,739,477	per day	17,000,000

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 2	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Nov-23	0	0	1,659,228	0	306.23	N	305.77	N	304.87	N	305.79	N
2-Nov-23	0	0	1,498,650	0	306.23	N	305.77	N	304.87	N	305.79	N
3-Nov-23	0	0	1,665,167	0	306.23	N	305.79	N	304.86	N	305.79	N
4-Nov-23	-	-	-	-	-	-	-	-	-	-	-	-
5-Nov-23	-	-	-	-	-	-	-	-	-	-	-	-
6-Nov-23	0	0	1,678,805	0	306.21	N	305.79	N	304.85	N	305.80	N
7-Nov-23	0	0	1,696,403	0	306.21	N	305.79	N	304.85	N	305.80	N
8-Nov-23	0	0	1,704,982	0	306.21	N	305.79	N	304.85	N	305.79	N
9-Nov-23	0	0	1,432,440	0	306.21	-	305.79	-	304.85	-	305.79	-
10-Nov-23	0	0	1,704,102	0	306.21	N	305.77	N	304.86	N	305.82	N
11-Nov-23	0	0	734,037	0	306.22	N	305.77	N	304.86	N	305.82	N
12-Nov-23	-	-	-	-	-	-	-	-	-	-	-	-
13-Nov-23	0	0	1,718,180	0	306.22	N	305.77	N	304.86	N	305.85	N
14-Nov-23	0	0	1,723,899	0	306.23	N	305.76	N	304.86	N	305.85	N
15-Nov-23	0	0	1,710,041	0	306.22	N	305.76	N	304.86	N	305.86	N
16-Nov-23	0	0	1,706,961	0	306.22	N	305.76	N	304.87	N	305.84	N
17-Nov-23	0	0	1,713,340	0	306.22	N	305.76	N	304.87	N	305.83	N
18-Nov-23	0	0	727,658	0	306.22	N	305.75	N	304.86	N	305.83	N
19-Nov-23	-	-	-	-	-	-	-	-	-	-	-	-
20-Nov-23	0	0	1,689,364	0	306.21	N	305.76	N	304.86	N	305.81	N
21-Nov-23	0	0	1,684,525	0	306.21	N	305.76	N	304.85	N	305.80	N
22-Nov-23	0	0	1,675,946	0	306.21	N	305.75	N	304.87	N	305.80	N
23-Nov-23	0	0	1,642,070	0	306.21	N	305.74	N	304.87	N	305.79	N
24-Nov-23	0	0	1,755,135	0	306.21	N	305.74	N	304.87	N	305.79	N
25-Nov-23	-	-	-	-	-	-	-	-	-	-	-	-
26-Nov-23	-	-	-	-	-	-	-	-	-	-	-	-
27-Nov-23	0	0	1,796,049	0	306.23	N	305.73	N	304.89	N	305.79	N
28-Nov-23	0	0	1,796,929	0	306.22	N	305.73	N	304.89	N	305.79	N
29-Nov-23	0	0	1,181,455	0	306.22	N	305.73	N	304.89	N	305.78	N
30-Nov-23	0	0	1,433,980	0	306.22	N	305.73	N	304.90	N	305.79	N
Total	0	0	37,729,345	0	-	-	-	-	-	-	-	-

Note: No exceedances to report for the month of November.

Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

January 11, 2024

Seana Richardson
Aggregates Technical Specialist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Attention: Ms. Richardson

Re: Monthly Monitoring Report – December 2023
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County

Please find enclosed the required monitoring data for the month of December 2023 for those monitoring wells that could be measured. There were no exceedances to report.

If you have any questions, please do not hesitate to call.

Sincerely,

Jonathan Clark
Site Superintendent

CC: Township of Puslinch
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Dufferin Aggregates

Monthly Reporting
Mill Creek Aggregates Pit
December 2023

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
1-Dec-23	305.78	305.58	NO
7-Dec-23	305.80	305.58	NO
14-Dec-23	305.78	305.58	NO
18-Dec-23	305.81	305.58	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
1-Dec-23	306.12	305.78	0.34	0.09	NO
7-Dec-23	306.10	305.80	0.30	0.09	NO
14-Dec-23	306.14	305.78	0.36	0.09	NO
18-Dec-23	306.11	305.81	0.29	0.09	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
1-Dec-23	305.36	305.17	NO
7-Dec-23	305.39	305.17	NO
14-Dec-23	305.35	305.17	NO
18-Dec-23	305.41	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
1-Dec-23	305.56	305.36	0.20	0.04	NO
7-Dec-23	305.59	305.39	0.20	0.04	NO
14-Dec-23	305.57	305.35	0.23	0.04	NO
18-Dec-23	305.60	305.41	0.19	0.04	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
1-Dec-23	304.80	304.54	NO
7-Dec-23	304.84	304.54	NO
14-Dec-23	304.81	304.54	NO
18-Dec-23	304.84	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
1-Dec-23	305.60	304.80	0.80	0.55	NO
7-Dec-23	305.65	304.84	0.81	0.55	NO
14-Dec-23	305.62	304.81	0.81	0.55	NO
18-Dec-23	305.60	304.84	0.76	0.55	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
1-Dec-23	303.97	303.55	NO
7-Dec-23	304.02	303.55	NO
14-Dec-23	304.02	303.55	NO
18-Dec-23	304.01	303.55	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
1-Dec-23	304.65	303.97	0.68	0.34	NO
7-Dec-23	304.68	304.02	0.66	0.34	NO
14-Dec-23	304.71	304.02	0.69	0.34	NO
18-Dec-23	304.73	304.01	0.72	0.34	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
1-Dec-23	304.30	303.96	NO
14-Dec-23	304.32	303.96	NO
18-Dec-23	304.34	303.96	NO
18-Dec-23	304.35	303.96	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
1-Dec-23	304.75	304.30	0.45	0.19	NO
14-Dec-23	304.78	304.32	0.46	0.19	NO
18-Dec-23	304.81	304.34	0.47	0.19	NO
18-Dec-23	304.87	304.35	0.51	0.19	NO

Date	DP5CR (mASL)	Threshold Value (mASL)	Exceedance
1-Dec-23	303.38	302.84	NO
14-Dec-23	303.39	302.84	NO
18-Dec-23	303.39	302.84	NO
18-Dec-23	303.43	302.84	NO

Date	OW5-84 (mASL)	DP5CR (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
1-Dec-23	303.66	303.38	0.28	0.15	NO
14-Dec-23	303.66	303.39	0.27	0.15	NO
18-Dec-23	303.67	303.39	0.28	0.15	NO
18-Dec-23	303.69	303.43	0.25	0.15	NO

Note: No exceedances to report for the month of December.

Monthly Reporting
Mill Creek Aggregates Pit
December 2023

			Max. Allowable as per PTTW- Main Pond				Max. Allowable as per PTTW- Silt Pond		
			(Imperial Gallons)		(Litres)		(Imperial Gallons)		(Litres)
Total Monthly Precipitation (mm):	67.3	Kitchener/Waterloo (Actual)	2,500	per minute	11,365		2,597	per minute	11,806
Total Monthly Normal Precipitation (mm):	71.2	Waterloo-Wellington A (30-year Normal)	1,800,000	per day	8,183,000		3,739,477	per day	17,000,000

Date	Below Water Table Extraction Phase 5	Below Water Table Extraction Phase 2	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Dec-23	0	0	1,750,955	0	306.21	N	305.73	N	304.90	N	305.79	N
2-Dec-23	-	-	-	-		-		-		-		-
3-Dec-23	-	-	-	-		-		-		-		-
4-Dec-23	0	0	1,744,576	0	306.22	N	305.73	N	304.94	N	305.79	N
5-Dec-23	0	0	1,778,231	0	306.23	N	305.73	N	304.91	N	305.79	N
6-Dec-23	0	0	1,759,534	0	306.23	N	305.73	N	304.94	N	305.79	N
7-Dec-23	0	0	1,547,704	0	306.23	N	305.73	N	304.94	N	305.79	N
8-Dec-23	0	0	1,733,138	0	306.23	N	305.73	N	304.94	N	305.79	N
9-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
10-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
11-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
12-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
13-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
14-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
15-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
17-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
18-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
19-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
20-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
21-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
22-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
23-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
24-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
25-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
26-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
27-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
28-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
29-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
31-Dec-23	-	-	-	-	-	-	-	-	-	-	-	-
Total	0	0	10,314,138	0	-	-	-	-	-	-	-	-

Note: No exceedances to report for the month of December.

APPENDIX G

Threshold Compliance Results

Technical Appendix B – 2023 Hydrogeology Report

Table G-1
Threshold Summary - BH13 to DP21
Mill Creek Aggregates Pit

			BH13 to DP21					DP21	
Date	Water Elevation BH 13 (m ASL)	Water Elevation DP21 (m ASL)	Head Difference (m)	Early Warning Value (m)	Exceedance of Early Warning Value	Threshold Value (m)	Exceedance of Threshold Value	Threshold Value (m ASL)	Exceedance of Threshold Value
6-Jan-22	306.09			0.13		0.11		305.66	
14-Jan-22	306.06			0.13		0.11		305.66	
21-Jan-22	306.08			0.13		0.11		305.66	
26-Jan-22	306.09			0.13		0.11		305.66	
2-Feb-22	306.07	305.76	0.31	0.13	no	0.11	no	305.66	no
11-Feb-22	306.11			0.13		0.11		305.66	
16-Feb-22	306.25			0.13		0.11		305.66	
24-Feb-22	306.33	306.06	0.27	0.13	no	0.11	no	305.66	no
4-Mar-22	306.21			0.13		0.11		305.66	
17-Mar-22	306.30	305.93	0.37	0.13	no	0.11	no	305.66	no
24-Mar-22	306.42	306.08	0.34	0.13	no	0.11	no	305.66	no
31-Mar-22	306.29	305.91	0.38	0.13	no	0.11	no	305.66	no
7-Apr-22	306.29	305.91	0.38	0.13	no	0.11	no	305.60	no
14-Apr-22	306.26	305.90	0.36	0.13	no	0.11	no	305.60	no
21-Apr-22	306.34	305.93	0.41	0.13	no	0.11	no	305.60	no
28-Apr-22	306.28	305.87	0.41	0.13	no	0.11	no	305.60	no
5-May-22	306.35	305.95	0.40	0.13	no	0.11	no	305.60	no
12-May-22	306.31	305.86	0.45	0.13	no	0.11	no	305.60	no
19-May-22	306.24	305.83	0.41	0.13	no	0.11	no	305.60	no
24-May-22	306.25	305.83	0.42	0.13	no	0.11	no	305.60	no
3-Jun-22	306.22	305.78	0.44	0.13	no	0.11	no	305.60	no
10-Jun-22	306.20	305.80	0.40	0.13	no	0.11	no	305.60	no
15-Jun-22	306.25	305.83	0.42	0.13	no	0.11	no	305.60	no
23-Jun-22	306.09	305.75	0.34	0.13	no	0.11	no	305.60	no
29-Jun-22	306.15	305.77	0.38	0.13	no	0.11	no	305.60	no
6-Jul-22	306.14	305.75	0.39	0.12	no	0.10	no	305.49	no
14-Jul-22	306.12	305.73	0.39	0.12	no	0.10	no	305.49	no
22-Jul-22	306.08	305.71	0.37	0.12	no	0.10	no	305.49	no
26-Jul-22	306.06	305.70	0.36	0.12	no	0.10	no	305.49	no
3-Aug-22	306.05	305.70	0.35	0.12	no	0.10	no	305.49	no
11-Aug-22	306.05	305.70	0.35	0.12	no	0.10	no	305.49	no
18-Aug-22	306.04	305.68	0.36	0.12	no	0.10	no	305.49	no
25-Aug-22	306.08	305.76	0.32	0.12	no	0.10	no	305.49	no
1-Sep-22	306.04	305.68	0.36	0.12	no	0.10	no	305.49	no
8-Sep-22	306.01	305.68	0.33	0.12	no	0.10	no	305.49	no
15-Sep-22	305.98	305.67	0.31	0.12	no	0.10	no	305.49	no
22-Sep-22	305.99	305.66	0.33	0.12	no	0.10	no	305.49	no
30-Sep-22	305.99	305.64	0.35	0.12	no	0.10	no	305.49	no
6-Oct-22	305.99	305.67	0.32	0.11	no	0.09	no	305.58	no
13-Oct-22	306.01	305.77	0.24	0.11	no	0.09	no	305.58	no
21-Oct-22	305.95	305.64	0.31	0.11	no	0.09	no	305.58	no
25-Oct-22	305.94	305.64	0.30	0.11	no	0.09	no	305.58	no
4-Nov-22	305.89	305.64	0.25	0.11	no	0.09	no	305.58	no
10-Nov-22	305.92	305.67	0.25	0.11	no	0.09	no	305.58	no
17-Nov-22	305.93	305.70	0.23	0.11	no	0.09	no	305.58	no
24-Nov-22	305.92	305.68	0.25	0.11	no	0.09	no	305.58	no
2-Dec-22	305.93	305.72	0.21	0.11	no	0.09	no	305.58	no
9-Dec-22	305.90			0.11		0.09		305.58	
16-Dec-22	305.99	305.77	0.21	0.11	no	0.09	no	305.58	no
19-Dec-22	305.94			0.11		0.09		305.58	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-1
Threshold Summary - BH13 to DP21
Mill Creek Aggregates Pit

			BH13 to DP21					DP21	
Date	Water Elevation BH 13 (m ASL)	Water Elevation DP21 (m ASL)	Head Difference (m)	Early Warning Value (m)	Exceedance of Early Warning Value	Threshold Value (m)	Exceedance of Threshold Value	Threshold Value (m ASL)	Exceedance of Threshold Value
6-Jan-23	306.10	305.87	0.23	0.13	no	0.11	no	305.66	no
12-Jan-23	306.00	305.75	0.25	0.13	no	0.11	no	305.66	no
18-Jan-23	306.03	305.76	0.27	0.13	no	0.11	no	305.66	no
25-Jan-23	306.005	305.74	0.26	0.13	no	0.11	no	305.66	no
2-Feb-23	306.00			0.13		0.11		305.66	
10-Feb-23	306.23	305.97	0.26	0.13	no	0.11	no	305.66	no
14-Feb-23	306.07	305.83	0.25	0.13	no	0.11	no	305.66	no
24-Feb-23	306.04			0.13		0.11		305.66	
2-Mar-23	306.00	305.75	0.25	0.13	no	0.11	no	305.66	no
9-Mar-23	306.02	305.78	0.25	0.13	no	0.11	no	305.66	no
17-Mar-23	306.192	305.85	0.34	0.13	no	0.11	no	305.66	no
24-Mar-23	306.20	305.94	0.27	0.13	no	0.11	no	305.66	no
3-Apr-23	306.26	305.99	0.28	0.13	no	0.11	no	305.60	no
14-Apr-23	306.16	305.83	0.33	0.13	no	0.11	no	305.60	no
20-Apr-23	306.145	305.82	0.33	0.13	no	0.11	no	305.60	no
27-Apr-23	306.17	305.86	0.31	0.13	no	0.11	no	305.60	no
5-May-23	306.23	305.90	0.33	0.13	no	0.11	no	305.60	no
12-May-23	306.13	305.76	0.37	0.13	no	0.11	no	305.60	no
17-May-23	306.135	305.78	0.36	0.13	no	0.11	no	305.60	no
26-May-23	306.17	305.81	0.36	0.13	no	0.11	no	305.60	no
2-Jun-23	306.11	305.73	0.39	0.13	no	0.11	no	305.60	no
9-Jun-23	306.09	305.70	0.39	0.13	no	0.11	no	305.60	no
15-Jun-23	306.15	305.82	0.33	0.13	no	0.11	no	305.60	no
22-Jun-23	306.08	305.71	0.37	0.13	no	0.11	no	305.60	no
30-Jun-23	306.11	305.79	0.33	0.13	no	0.11	no	305.60	no
5-Jul-23	306.10	305.78	0.32	0.12	no	0.10	no	305.49	no
12-Jul-23	306.18	305.82	0.35	0.12	no	0.10	no	305.49	no
21-Jul-23	306.188	305.83	0.36	0.12	no	0.10	no	305.49	no
25-Jul-23	306.33	306.18	0.15	0.12	no	0.10	no	305.49	no
3-Aug-23	306.23	305.83	0.40	0.12	no	0.10	no	305.49	no
8-Aug-23	306.21	305.86	0.36	0.12	no	0.10	no	305.49	no
14-Aug-23	306.27	305.95	0.32	0.12	no	0.10	no	305.49	no
31-Aug-23	306.22	305.84	0.38	0.12	no	0.10	no	305.49	no
7-Sep-23	306.18	305.82	0.36	0.12	no	0.10	no	305.49	no
15-Sep-23	306.20	305.83	0.37	0.12	no	0.10	no	305.49	no
20-Sep-23	306.16	305.80	0.36	0.12	no	0.10	no	305.49	no
25-Sep-23	306.13	305.78	0.35	0.12	no	0.10	no	305.49	no
4-Oct-23	306.11	305.76	0.35	0.11	no	0.09	no	305.58	no
12-Oct-23	306.12	305.78	0.34	0.11	no	0.09	no	305.58	no
20-Oct-23	306.11	305.79	0.32	0.11	no	0.09	no	305.58	no
26-Oct-23	306.12	305.82	0.30	0.11	no	0.09	no	305.58	no
3-Nov-23	306.14	305.85	0.29	0.11	no	0.09	no	305.58	no
16-Nov-23	306.07	305.78	0.29	0.11	no	0.09	no	305.58	no
20-Nov-23	306.06	305.74	0.32	0.11	no	0.09	no	305.58	no
1-Dec-23	306.12	305.78	0.34	0.11	no	0.09	no	305.58	no
7-Dec-23	306.10	305.80	0.30	0.11	no	0.09	no	305.58	no
14-Dec-23	306.14	305.78	0.36	0.11	no	0.09	no	305.58	no
18-Dec-23	306.11	305.81	0.29	0.11	no	0.09	no	305.58	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-2
Threshold Summary - BH92-12A to DP17R
Mill Creek Aggregates Pit

			BH92-12A to DP17R					DP17R	
Date	Water Elevation BH92-12 (m ASL)	Water Elevation DP17R (m ASL)	Head Difference (m)	Early Warning Value (m)	Exceedance of Early Warning Value	Threshold Value (m)	Exceedance of Threshold Value	Threshold Value (m ASL)	Exceedance of Threshold Value
6-Jan-22	305.63			0.13		0.07		305.17	
14-Jan-22	305.59			0.13		0.07		305.17	
21-Jan-22	305.57			0.13		0.07		305.17	
26-Jan-22	305.60			0.13		0.07		305.17	
2-Feb-22	305.57			0.13		0.07		305.17	
11-Feb-22	305.58			0.13		0.07		305.17	
16-Feb-22	305.65			0.13		0.07		305.17	
24-Feb-22	305.83	305.44	0.39	0.13	no	0.07	no	305.17	no
4-Mar-22	305.70			0.13		0.07		305.17	
17-Mar-22	305.80	305.37	0.43	0.13	no	0.07	no	305.17	no
24-Mar-22	305.96	305.52	0.44	0.13	no	0.07	no	305.17	no
31-Mar-22	305.79	305.36	0.43	0.13	no	0.07	no	305.17	no
7-Apr-22	305.79	305.37	0.42	0.19	no	0.14	no	305.17	no
14-Apr-22	305.77	305.35	0.42	0.19	no	0.14	no	305.17	no
21-Apr-22	305.84	305.37	0.47	0.19	no	0.14	no	305.17	no
28-Apr-22	305.77	305.32	0.45	0.19	no	0.14	no	305.17	no
5-May-22	305.86	305.40	0.46	0.19	no	0.14	no	305.17	no
12-May-22	305.74	305.30	0.44	0.19	no	0.14	no	305.17	no
19-May-22	305.74	305.30	0.44	0.19	no	0.14	no	305.17	no
24-May-22	305.72	305.32	0.40	0.19	no	0.14	no	305.17	no
3-Jun-22	305.70	305.27	0.43	0.19	no	0.14	no	305.17	no
10-Jun-22	305.68	305.29	0.39	0.19	no	0.14	no	305.17	no
15-Jun-22	305.73	305.34	0.39	0.19	no	0.14	no	305.17	no
23-Jun-22	305.65	305.25	0.40	0.19	no	0.14	no	305.17	no
29-Jun-22	305.63	305.24	0.39	0.19	no	0.14	no	305.17	no
6-Jul-22	305.62	305.22	0.40	0.12	no	0.06	no	305.17	no
14-Jul-22	305.61	305.24	0.37	0.12	no	0.06	no	305.17	no
22-Jul-22	305.53	305.23	0.30	0.12	no	0.06	no	305.17	no
26-Jul-22		305.23		0.12		0.06		305.17	no
3-Aug-22		305.23		0.12		0.06		305.17	no
11-Aug-22	305.56	305.23	0.33	0.12	no	0.06	no	305.17	no
18-Aug-22	305.51	305.21	0.30	0.12	no	0.06	no	305.17	no
25-Aug-22	305.59	305.26	0.33	0.12	no	0.06	no	305.17	no
1-Sep-22	305.51	305.21	0.30	0.12	no	0.06	no	305.17	no
8-Sep-22	305.52	305.23	0.29	0.12	no	0.06	no	305.17	no
15-Sep-22	305.50	305.22	0.28	0.12	no	0.06	no	305.17	no
22-Sep-22	305.48	305.21	0.27	0.12	no	0.06	no	305.17	no
30-Sep-22	305.48	305.24	0.24	0.12	no	0.06	no	305.17	no
6-Oct-22	305.47	305.22	0.25	0.09	no	0.04	no	305.17	no
13-Oct-22	305.52	305.30	0.22	0.09	no	0.04	no	305.17	no
21-Oct-22	305.48	305.31	0.17	0.09	no	0.04	no	305.17	no
25-Oct-22	305.48	305.31	0.17	0.09	no	0.04	no	305.17	no
4-Nov-22	305.47	305.32	0.15	0.09	no	0.04	no	305.17	no
10-Nov-22	305.48	305.30	0.18	0.09	no	0.04	no	305.17	no
17-Nov-22	305.47	305.29	0.18	0.09	no	0.04	no	305.17	no
24-Nov-22	305.45	305.25	0.20	0.09	no	0.04	no	305.17	no
2-Dec-22	305.50	305.26	0.24	0.09	no	0.04	no	305.17	no
9-Dec-22	305.47			0.09		0.04		305.17	
16-Dec-22	305.52	305.29	0.23	0.09	no	0.04	no	305.17	no
19-Dec-22	305.48			0.09		0.04		305.17	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-2
Threshold Summary - BH92-12A to DP17R
Mill Creek Aggregates Pit

			BH92-12A to DP17R					DP17R	
Date	Water Elevation BH92-12 (m ASL)	Water Elevation DP17R (m ASL)	Head Difference (m)	Early Warning Value (m)	Exceedance of Early Warning Value	Threshold Value (m)	Exceedance of Threshold Value	Threshold Value (m ASL)	Exceedance of Threshold Value
6-Jan-23	305.66	305.37	0.29	0.13	no	0.07	no	305.17	no
12-Jan-23	305.53	305.28	0.25	0.13	no	0.07	no	305.17	no
18-Jan-23	305.54	305.29	0.26	0.13	no	0.07	no	305.17	no
25-Jan-23	305.53	305.28	0.25	0.13	no	0.07	no	305.17	no
2-Feb-23	305.51			0.13		0.07		305.17	
10-Feb-23	305.81	305.45	0.37	0.13	no	0.07	no	305.17	no
14-Feb-23	305.62	305.33	0.30	0.13	no	0.07	no	305.17	no
24-Feb-23	305.55			0.13		0.07		305.17	
2-Mar-23	305.54	305.28	0.26	0.13	no	0.07	no	305.17	no
9-Mar-23	305.56	305.32	0.24	0.13	no	0.07	no	305.17	no
17-Mar-23	305.63	305.33	0.30	0.13	no	0.07	no	305.17	no
24-Mar-23	305.77	305.42	0.35	0.13	no	0.07	no	305.17	no
3-Apr-23	305.83	305.46	0.37	0.19	no	0.14	no	305.17	no
14-Apr-23	305.66	305.31	0.35	0.19	no	0.14	no	305.17	no
20-Apr-23	305.64	305.31	0.33	0.19	no	0.14	no	305.17	no
27-Apr-23	305.67	305.32	0.35	0.19	no	0.14	no	305.17	no
5-May-23	305.73	305.36	0.36	0.19	no	0.14	no	305.17	no
12-May-23	305.70	305.29	0.41	0.19	no	0.14	no	305.17	no
17-May-23	305.63	305.29	0.34	0.19	no	0.14	no	305.17	no
26-May-23	305.66	305.30	0.36	0.19	no	0.14	no	305.17	no
2-Jun-23	305.61	305.25	0.36	0.19	no	0.14	no	305.17	no
9-Jun-23	305.59	305.25	0.34	0.19	no	0.14	no	305.17	no
15-Jun-23	305.66	305.30	0.36	0.19	no	0.14	no	305.17	no
22-Jun-23	305.60	305.24	0.36	0.19	no	0.14	no	305.17	no
30-Jun-23	305.66	305.28	0.38	0.19	no	0.14	no	305.17	no
5-Jul-23	305.63	305.26	0.37	0.12	no	0.06	no	305.17	no
12-Jul-23	305.67	305.30	0.38	0.12	no	0.06	no	305.17	no
21-Jul-23	305.64	305.29	0.35	0.12	no	0.06	no	305.17	no
25-Jul-23	305.84	305.80	0.04	0.12	yes	0.06	yes	305.17	no
26-Jul-23	305.81	305.45	0.36	0.12	no	0.06	no	305.17	no
3-Aug-23	305.72	305.34	0.38	0.12	no	0.06	no	305.17	no
8-Aug-23	305.70	305.33	0.37	0.12	no	0.06	no	305.17	no
14-Aug-23	305.75	305.38	0.37	0.12	no	0.06	no	305.17	no
31-Aug-23	305.71	305.30	0.41	0.12	no	0.06	no	305.17	no
7-Sep-23	305.66	305.29	0.37	0.12	no	0.06	no	305.17	no
15-Sep-23	305.68	305.30	0.38	0.12	no	0.06	no	305.17	no
20-Sep-23	305.65	305.28	0.36	0.12	no	0.06	no	305.17	no
25-Sep-23	305.60	305.26	0.34	0.12	no	0.06	no	305.17	no
4-Oct-23	305.59	305.23	0.36	0.09	no	0.04	no	305.17	no
12-Oct-23	305.61	305.27	0.34	0.09	no	0.04	no	305.17	no
20-Oct-23	305.60	305.28	0.33	0.09	no	0.04	no	305.17	no
26-Oct-23	305.63	305.30	0.33	0.09	no	0.04	no	305.17	no
3-Nov-23	305.53	305.33	0.20	0.09	no	0.04	no	305.17	no
16-Nov-23	305.58	305.29	0.29	0.09	no	0.04	no	305.17	no
20-Nov-23	305.55			0.09		0.04		305.17	
1-Dec-23	305.56	305.36	0.20	0.09	no	0.04	no	305.17	no
7-Dec-23	305.59	305.39	0.20	0.09	no	0.04	no	305.17	no
14-Dec-23	305.57	305.35	0.23	0.09	no	0.04	no	305.17	no
18-Dec-23	305.60	305.41	0.19	0.09	no	0.04	no	305.17	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-3
Threshold Summary - DP6 to DP3
Mill Creek Aggregates Pit

			DP6 to DP3					DP3	
Date	Water Elevation DP6 (m ASL)	Water Elevation DP3 (m ASL)	Head Difference (m)	Early Warning Value (m)	Exceedance of Early Warning Value	Threshold Value (m)	Exceedance of Threshold Value	Threshold Value (m ASL)	Exceedance of Threshold Value
6-Jan-22	305.69			0.69		0.57		304.54	
14-Jan-22	305.60			0.69		0.57		304.54	
21-Jan-22	305.60			0.69		0.57		304.54	
26-Jan-22	305.62			0.69		0.57		304.54	
2-Feb-22	305.60	304.70	0.90	0.69	no	0.57	no	304.54	no
11-Feb-22	305.61			0.69		0.57		304.54	
16-Feb-22	305.69			0.69		0.57		304.54	
24-Feb-22	305.87	305.09	0.78	0.69	no	0.57	no	304.54	no
4-Mar-22	305.73			0.69		0.57		304.54	
17-Mar-22	305.87	304.93	0.94	0.69	no	0.57	no	304.54	no
24-Mar-22	306.05	304.82	1.23	0.69	no	0.57	no	304.54	no
31-Mar-22	305.94	304.90	1.04	0.69	no	0.57	no	304.54	no
7-Apr-22	305.91	304.91	1.00	0.84	no	0.73	no	304.54	no
14-Apr-22	305.88	304.85	1.03	0.84	no	0.73	no	304.54	no
21-Apr-22	305.93	304.91	1.02	0.84	no	0.73	no	304.54	no
28-Apr-22	305.88	304.83	1.05	0.84	no	0.73	no	304.54	no
5-May-22	305.96	304.96	1.00	0.84	no	0.73	no	304.54	no
12-May-22	305.85	304.88	0.97	0.84	no	0.73	no	304.54	no
19-May-22	305.82	304.75	1.07	0.84	no	0.73	no	304.54	no
24-May-22	305.76	304.75	1.01	0.84	no	0.73	no	304.54	no
3-Jun-22	305.69	304.72	0.97	0.84	no	0.73	no	304.54	no
10-Jun-22	305.74	304.73	1.01	0.84	no	0.73	no	304.54	no
15-Jun-22	305.75	304.74	1.01	0.84	no	0.73	no	304.54	no
23-Jun-22	305.69	304.67	1.02	0.84	no	0.73	no	304.54	no
29-Jun-22	305.68	304.68	1.00	0.84	no	0.73	no	304.54	no
6-Jul-22	305.65	304.67	0.98	0.76	no	0.58	no	304.54	no
14-Jul-22	305.65	304.68	0.97	0.76	no	0.58	no	304.54	no
22-Jul-22	305.62	304.66	0.96	0.76	no	0.58	no	304.54	no
26-Jul-22	305.59	304.67	0.92	0.76	no	0.58	no	304.54	no
3-Aug-22	305.59	304.67	0.92	0.76	no	0.58	no	304.54	no
11-Aug-22	305.59	304.67	0.92	0.76	no	0.58	no	304.54	no
18-Aug-22	305.52	304.65	0.87	0.76	no	0.58	no	304.54	no
25-Aug-22	305.58	304.70	0.88	0.76	no	0.58	no	304.54	no
1-Sep-22	305.52	304.65	0.87	0.76	no	0.58	no	304.54	no
8-Sep-22	305.50	304.67	0.83	0.76	no	0.58	no	304.54	no
15-Sep-22	305.50	304.65	0.85	0.76	no	0.58	no	304.54	no
22-Sep-22	305.48	304.63	0.85	0.76	no	0.58	no	304.54	no
30-Sep-22	305.49	304.64	0.85	0.76	no	0.58	no	304.54	no
6-Oct-22	305.45	304.64	0.81	0.73	no	0.55	no	304.54	no
13-Oct-22	305.54	304.78	0.76	0.73	no	0.55	no	304.54	no
21-Oct-22	305.51	304.70	0.81	0.73	no	0.55	no	304.54	no
25-Oct-22	305.49	304.69	0.80	0.73	no	0.55	no	304.54	no
4-Nov-22	305.48	304.70	0.78	0.73	no	0.55	no	304.54	no
10-Nov-22	305.48	304.70	0.78	0.73	no	0.55	no	304.54	no
17-Nov-22	305.47	304.70	0.77	0.73	no	0.55	no	304.54	no
24-Nov-22	305.47	304.69	0.78	0.73	no	0.55	no	304.54	no
2-Dec-22	305.51	304.72	0.79	0.73	no	0.55	no	304.54	no
9-Dec-22	305.48			0.73		0.55		304.54	
16-Dec-22	305.56	304.76	0.80	0.73	no	0.55	no	304.54	no
19-Dec-22	305.48			0.73		0.55		304.54	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-3
Threshold Summary - DP6 to DP3
Mill Creek Aggregates Pit

			DP6 to DP3					DP3	
Date	Water Elevation DP6 (m ASL)	Water Elevation DP3 (m ASL)	Head Difference (m)	Early Warning Value (m)	Exceedance of Early Warning Value	Threshold Value (m)	Exceedance of Threshold Value	Threshold Value (m ASL)	Exceedance of Threshold Value
6-Jan-23	305.70	304.92	0.78	0.69	no	0.57	no	304.54	no
12-Jan-23	305.55	304.75	0.80	0.69	no	0.57	no	304.54	no
18-Jan-23	305.55	304.77	0.78	0.69	no	0.57	no	304.54	no
25-Jan-23	305.54	304.74	0.80	0.69	no	0.57	no	304.54	no
2-Feb-23	305.52			0.69		0.57		304.54	
10-Feb-23	305.71	305.09	0.62	0.69	yes	0.57	no	304.54	no
14-Feb-23	305.62	304.84	0.79	0.69	no	0.57	no	304.54	no
24-Feb-23	305.48			0.69		0.57		304.54	
2-Mar-23	305.45	304.75	0.70	0.69	no	0.57	no	304.54	no
9-Mar-23	305.48	304.77	0.71	0.69	no	0.57	no	304.54	no
17-Mar-23	305.72	304.83	0.89	0.69	no	0.57	no	304.54	no
24-Mar-23	305.73	305.03	0.70	0.69	no	0.57	no	304.54	no
3-Apr-23	305.80	305.02	0.78	0.84	yes	0.73	no	304.54	no
14-Apr-23	305.65	304.80	0.85	0.84	no	0.73	no	304.54	no
20-Apr-23	305.71	304.81	0.90	0.84	no	0.73	no	304.54	no
27-Apr-23	305.71	304.83	0.88	0.84	no	0.73	no	304.54	no
5-May-23	305.77	304.92	0.85	0.84	no	0.73	no	304.54	no
12-May-23	305.64	304.76	0.88	0.84	no	0.73	no	304.54	no
17-May-23	305.67	304.75	0.92	0.84	no	0.73	no	304.54	no
26-May-23	305.70	304.75	0.95	0.84	no	0.73	no	304.54	no
2-Jun-23	305.59	304.69	0.90	0.84	no	0.73	no	304.54	no
9-Jun-23	305.59	304.69	0.90	0.84	no	0.73	no	304.54	no
15-Jun-23	305.69	304.71	0.98	0.84	no	0.73	no	304.54	no
22-Jun-23	305.64	304.69	0.95	0.84	no	0.73	no	304.54	no
30-Jun-23	305.70	304.74	0.95	0.84	no	0.73	no	304.54	no
5-Jul-23	305.67	304.75	0.92	0.76	no	0.58	no	304.54	no
12-Jul-23	305.60	304.78	0.82	0.76	no	0.58	no	304.54	no
21-Jul-23	305.79	304.78	1.01	0.76	no	0.58	no	304.54	no
25-Jul-23	305.77	305.45	0.32	0.76	yes	0.58	yes	304.54	no
26-Jul-23	305.74	305.12	0.62	0.76	yes	0.58	no	304.54	no
3-Aug-23	305.74	304.89	0.85	0.76	no	0.58	no	304.54	no
8-Aug-23	305.74	304.87	0.87	0.76	no	0.58	no	304.54	no
14-Aug-23	305.81	304.95	0.86	0.76	no	0.58	no	304.54	no
31-Aug-23	305.77	304.77	1.00	0.76	no	0.58	no	304.54	no
7-Sep-23	305.69	304.79	0.90	0.76	no	0.58	no	304.54	no
15-Sep-23	305.73	304.77	0.95	0.76	no	0.58	no	304.54	no
20-Sep-23	305.64	304.76	0.88	0.76	no	0.58	no	304.54	no
25-Sep-23	305.63	304.74	0.88	0.76	no	0.58	no	304.54	no
4-Oct-23	305.64	304.72	0.92	0.73	no	0.55	no	304.54	no
12-Oct-23	305.69	304.75	0.94	0.73	no	0.55	no	304.54	no
20-Oct-23	305.66	304.77	0.89	0.73	no	0.55	no	304.54	no
26-Oct-23	305.61	304.80	0.81	0.73	no	0.55	no	304.54	no
3-Nov-23	305.60	304.81	0.79	0.73	no	0.55	no	304.54	no
16-Nov-23	305.59	304.78	0.81	0.73	no	0.55	no	304.54	no
20-Nov-23	305.57	304.81	0.75	0.73	no	0.55	no	304.54	no
1-Dec-23	305.60	304.80	0.80	0.73	no	0.55	no	304.54	no
7-Dec-23	305.65	304.84	0.81	0.73	no	0.55	no	304.54	no
14-Dec-23	305.62	304.81	0.81	0.73	no	0.55	no	304.54	no
18-Dec-23	305.60	304.84	0.76	0.73	no	0.55	no	304.54	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-4
Threshold Summary - BH92-29 to DP1
Mill Creek Aggregates Pit

			BH92-29 to DP1					DP1	
Date	Water Elevation BH92-29 (m ASL)	Water Elevation DP1 (m ASL)	Head Difference (m)	Early Warning Value (m)	Exceedance of Early Warning Value	Threshold Value (m)	Exceedance of Threshold Value	Threshold Value (m ASL)	Exceedance of Threshold Value
6-Jan-22	304.69			0.34		0.29		303.88	
14-Jan-22	304.53			0.34		0.29		303.88	
21-Jan-22	304.61			0.34		0.29		303.88	
26-Jan-22	304.63			0.34		0.29		303.88	
2-Feb-22	304.59			0.34		0.29		303.88	
11-Feb-22	304.60			0.34		0.29		303.88	
16-Feb-22	304.65			0.34		0.29		303.88	
24-Feb-22	304.77	304.41	0.36	0.34	no	0.29	no	303.88	no
4-Mar-22	304.73			0.34		0.29		303.88	
17-Mar-22	304.79	304.33	0.46	0.34	no	0.29	no	303.88	no
24-Mar-22	304.82	304.45	0.37	0.34	no	0.29	no	303.88	no
31-Mar-22	304.82	304.33	0.49	0.34	no	0.29	no	303.88	no
7-Apr-22	304.82	304.32	0.50	0.22	no	0.17	no	303.97	no
14-Apr-22	304.80	304.30	0.50	0.22	no	0.17	no	303.97	no
21-Apr-22	304.82	304.33	0.49	0.22	no	0.17	no	303.97	no
28-Apr-22	304.80	304.29	0.51	0.22	no	0.17	no	303.97	no
5-May-22	304.81	304.36	0.45	0.22	no	0.17	no	303.97	no
12-May-22	304.77	304.28	0.49	0.22	no	0.17	no	303.97	no
19-May-22	304.78	304.27	0.51	0.22	no	0.17	no	303.97	no
24-May-22	304.84	304.29	0.55	0.22	no	0.17	no	303.97	no
3-Jun-22	304.86	304.29	0.57	0.22	no	0.17	no	303.97	no
10-Jun-22	304.85	304.30	0.55	0.22	no	0.17	no	303.97	no
15-Jun-22	304.87	304.31	0.56	0.22	no	0.17	no	303.97	no
23-Jun-22	304.78	304.23	0.55	0.22	no	0.17	no	303.97	no
29-Jun-22	304.74	304.21	0.53	0.22	no	0.17	no	303.97	no
6-Jul-22	304.71	304.19	0.52	0.28	no	0.23	no	303.91	no
14-Jul-22	304.67	304.16	0.51	0.28	no	0.23	no	303.91	no
22-Jul-22	304.61	304.15	0.46	0.28	no	0.23	no	303.91	no
26-Jul-22	304.61	304.11	0.50	0.28	no	0.23	no	303.91	no
3-Aug-22	304.61	304.11	0.50	0.28	no	0.23	no	303.91	no
11-Aug-22	304.55	304.09	0.46	0.28	no	0.23	no	303.91	no
18-Aug-22	304.52	304.07	0.45	0.28	no	0.23	no	303.91	no
25-Aug-22	304.58	304.15	0.43	0.28	no	0.23	no	303.91	no
1-Sep-22	304.52	304.07	0.45	0.28	no	0.23	no	303.91	no
8-Sep-22	304.52	304.09	0.43	0.28	no	0.23	no	303.91	no
15-Sep-22	304.53	304.08	0.45	0.28	no	0.23	no	303.91	no
22-Sep-22	304.52	304.07	0.45	0.28	no	0.23	no	303.91	no
30-Sep-22	304.52	304.08	0.44	0.28	no	0.23	no	303.91	no
6-Oct-22	304.51	304.06	0.45	0.24	no	0.19	no	303.96	no
13-Oct-22	304.47	304.13	0.34	0.24	no	0.19	no	303.96	no
21-Oct-22	304.45	304.10	0.35	0.24	no	0.19	no	303.96	no
25-Oct-22	304.42	304.10	0.32	0.24	no	0.19	no	303.96	no
4-Nov-22	304.43	304.11	0.32	0.24	no	0.19	no	303.96	no
10-Nov-22	304.44	304.12	0.32	0.24	no	0.19	no	303.96	no
17-Nov-22	304.45	304.12	0.33	0.24	no	0.19	no	303.96	no
24-Nov-22	304.40	304.11	0.29	0.24	no	0.19	no	303.96	no
2-Dec-22	304.45	304.13	0.32	0.24	no	0.19	no	303.96	no
9-Dec-22	304.45			0.24		0.19		303.96	
16-Dec-22	304.47	304.17	0.30	0.24	no	0.19	no	303.96	no
19-Dec-22	304.45			0.24		0.19		303.96	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-4
Threshold Summary - BH92-29 to DP1
Mill Creek Aggregates Pit

			BH92-29 to DP1					DP1	
Date	Water Elevation BH92-29 (m ASL)	Water Elevation DP1 (m ASL)	Head Difference (m)	Early Warning Value (m)	Exceedance of Early Warning Value	Threshold Value (m)	Exceedance of Threshold Value	Threshold Value (m ASL)	Exceedance of Threshold Value
6-Jan-23	304.65			0.34		0.29		303.88	
12-Jan-23	304.57			0.34		0.29		303.88	
18-Jan-23	304.59	304.23	0.36	0.34	no	0.29	no	303.88	no
25-Jan-23	304.61			0.34		0.29		303.88	
2-Feb-23	304.63			0.34		0.29		303.88	
10-Feb-23	304.72	304.42	0.29	0.34	yes	0.29	no	303.88	no
14-Feb-23	304.70	304.29	0.41	0.34	no	0.29	no	303.88	no
24-Feb-23	304.74			0.34		0.29		303.88	
2-Mar-23	304.75	304.29	0.46	0.34	no	0.29	no	303.88	no
9-Mar-23	304.77	304.30	0.47	0.34	no	0.29	no	303.88	no
17-Mar-23	304.85	304.38	0.46	0.34	no	0.29	no	303.88	no
24-Mar-23	304.87	304.43	0.44	0.34	no	0.29	no	303.88	no
3-Apr-23	304.98	304.48	0.49	0.22	no	0.17	no	303.97	no
14-Apr-23	305.07	304.40	0.67	0.22	no	0.17	no	303.97	no
20-Apr-23	305.04	304.40	0.63	0.22	no	0.17	no	303.97	no
27-Apr-23	305.07	304.42	0.65	0.22	no	0.17	no	303.97	no
5-May-23	305.11	304.46	0.65	0.22	no	0.17	no	303.97	no
12-May-23	304.98	304.37	0.61	0.22	no	0.17	no	303.97	no
17-May-23	305.02	304.38	0.64	0.22	no	0.17	no	303.97	no
26-May-23	305.00	304.37	0.63	0.22	no	0.17	no	303.97	no
2-Jun-23	304.95	304.31	0.63	0.22	no	0.17	no	303.97	no
9-Jun-23	304.92	304.29	0.63	0.22	no	0.17	no	303.97	no
15-Jun-23	304.89	304.32	0.57	0.22	no	0.17	no	303.97	no
22-Jun-23	304.88	304.29	0.59	0.22	no	0.17	no	303.97	no
30-Jun-23	304.86	304.30	0.56	0.22	no	0.17	no	303.97	no
5-Jul-23	304.87	304.29	0.58	0.28	no	0.23	no	303.91	no
12-Jul-23	304.89	304.34	0.55	0.28	no	0.23	no	303.91	no
21-Jul-23	305.00	304.37	0.63	0.28	no	0.23	no	303.91	no
25-Jul-23	305.00	304.47	0.53	0.28	no	0.23	no	303.91	no
3-Aug-23	304.84	304.34	0.50	0.28	no	0.23	no	303.91	no
8-Aug-23	304.91	304.35	0.56	0.28	no	0.23	no	303.91	no
14-Aug-23	304.89	304.37	0.52	0.28	no	0.23	no	303.91	no
31-Aug-23	304.91	304.33	0.58	0.28	no	0.23	no	303.91	no
7-Sep-23	304.89	304.31	0.58	0.28	no	0.23	no	303.91	no
15-Sep-23	304.90	304.33	0.57	0.28	no	0.23	no	303.91	no
20-Sep-23	304.86	304.30	0.56	0.28	no	0.23	no	303.91	no
25-Sep-23	304.79	304.26	0.53	0.28	no	0.23	no	303.91	no
4-Oct-23	304.74	304.24	0.49	0.24	no	0.19	no	303.96	no
12-Oct-23	304.76	304.26	0.50	0.24	no	0.19	no	303.96	no
20-Oct-23	304.71	304.25	0.46	0.24	no	0.19	no	303.96	no
26-Oct-23	304.77	304.29	0.47	0.24	no	0.19	no	303.96	no
3-Nov-23	304.75	304.27	0.49	0.24	no	0.19	no	303.96	no
16-Nov-23	304.74	304.26	0.48	0.24	no	0.19	no	303.96	no
20-Nov-23	304.71			0.24		0.19		303.96	
1-Dec-23	304.75	304.30	0.45	0.24	no	0.19	no	303.96	no
7-Dec-23	304.78	304.32	0.46	0.24	no	0.19	no	303.96	no
14-Dec-23	304.81	304.34	0.47	0.24	no	0.19	no	303.96	no
18-Dec-23	304.87	304.35	0.51	0.24	no	0.19	no	303.96	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-5
Threshold Summary - BH92-27 to DP2
Mill Creek Aggregates Pit

			BH92-27 to DP2					DP2	
Date	Water Elevation BH92-27 (m ASL)	Water Elevation DP2 (m ASL)	Head Difference (m)	Early Warning Value (m)	Exceedance of Early Warning Value	Threshold Value (m)	Exceedance of Threshold Value	Threshold Value (m ASL)	Exceedance of Threshold Value
6-Jan-22	304.60			0.48		0.43		303.65	
14-Jan-22	304.58			0.48		0.43		303.65	
21-Jan-22	304.54			0.48		0.43		303.65	
26-Jan-22	304.55			0.48		0.43		303.65	
2-Feb-22	304.50	304.06	0.44	0.48	yes	0.43	no	303.65	no
11-Feb-22	304.50			0.48		0.43		303.65	
16-Feb-22	304.62			0.48		0.43		303.65	
24-Feb-22	304.73			0.48		0.43		303.65	
4-Mar-22	304.62			0.48		0.43		303.65	
17-Mar-22	304.73	304.23	0.50	0.48	no	0.43	no	303.65	no
24-Mar-22	304.81	304.32	0.49	0.48	no	0.43	no	303.65	no
31-Mar-22	304.77	304.24	0.53	0.48	no	0.43	no	303.65	no
7-Apr-22	304.76	304.25	0.51	0.39	no	0.34	no	303.69	no
14-Apr-22	304.73	304.24	0.49	0.39	no	0.34	no	303.69	no
21-Apr-22	304.74	304.23	0.51	0.39	no	0.34	no	303.69	no
28-Apr-22	304.74	304.25	0.49	0.39	no	0.34	no	303.69	no
5-May-22	304.79	304.27	0.52	0.39	no	0.34	no	303.69	no
12-May-22	304.71	304.27	0.44	0.39	no	0.34	no	303.69	no
19-May-22	304.72	304.21	0.51	0.39	no	0.34	no	303.69	no
24-May-22	304.73	304.21	0.52	0.39	no	0.34	no	303.69	no
3-Jun-22	304.79	304.21	0.58	0.39	no	0.34	no	303.69	no
10-Jun-22	304.78	304.23	0.55	0.39	no	0.34	no	303.69	no
15-Jun-22	304.71	304.21	0.50	0.39	no	0.34	no	303.69	no
23-Jun-22	304.69	304.21	0.48	0.39	no	0.34	no	303.69	no
29-Jun-22	304.65	304.12	0.53	0.39	no	0.34	no	303.69	no
6-Jul-22	304.60	304.06	0.54	0.37	no	0.32	no	303.50	no
14-Jul-22	304.49	303.85	0.64	0.37	no	0.32	no	303.50	no
22-Jul-22	304.49	304.00	0.49	0.37	no	0.32	no	303.50	no
26-Jul-22	304.47	303.95	0.52	0.37	no	0.32	no	303.50	no
3-Aug-22	304.47	303.95	0.52	0.37	no	0.32	no	303.50	no
11-Aug-22	304.45	303.91	0.54	0.37	no	0.32	no	303.50	no
18-Aug-22	304.38	303.86	0.52	0.37	no	0.32	no	303.50	no
25-Aug-22	304.44	303.89	0.55	0.37	no	0.32	no	303.50	no
1-Sep-22	304.38	303.86	0.52	0.37	no	0.32	no	303.50	no
8-Sep-22	304.39	303.79	0.60	0.37	no	0.32	no	303.50	no
15-Sep-22	304.38	303.92	0.46	0.37	no	0.32	no	303.50	no
22-Sep-22	304.36	303.88	0.48	0.37	no	0.32	no	303.50	no
30-Sep-22	304.36	303.88	0.48	0.37	no	0.32	no	303.50	no
6-Oct-22	304.31	303.89	0.42	0.39	no	0.34	no	303.55	no
13-Oct-22	304.41	303.94	0.47	0.39	no	0.34	no	303.55	no
21-Oct-22	304.35	303.98	0.37	0.39	yes	0.34	no	303.55	no
25-Oct-22	304.37	303.99	0.38	0.39	yes	0.34	no	303.55	no
4-Nov-22	304.35	304.00	0.35	0.39	yes	0.34	no	303.55	no
10-Nov-22	304.34	303.92	0.42	0.39	no	0.34	no	303.55	no
17-Nov-22	304.33	303.87	0.46	0.39	no	0.34	no	303.55	no
24-Nov-22	304.39	303.86	0.54	0.39	no	0.34	no	303.55	no
2-Dec-22	304.37			0.39		0.34		303.55	
9-Dec-22	304.35			0.39		0.34		303.55	
16-Dec-22	304.34	303.95	0.39	0.39	no	0.34	no	303.55	no
19-Dec-22	304.39			0.39		0.34		303.55	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-5
Threshold Summary - BH92-27 to DP2
Mill Creek Aggregates Pit

			BH92-27 to DP2					DP2	
Date	Water Elevation BH92-27 (m ASL)	Water Elevation DP2 (m ASL)	Head Difference (m)	Early Warning Value (m)	Exceedance of Early Warning Value	Threshold Value (m)	Exceedance of Threshold Value	Threshold Value (m ASL)	Exceedance of Threshold Value
6-Jan-23	304.58	303.95	0.63	0.48	no	0.43	no	303.65	no
12-Jan-23	304.54	304.06	0.48	0.48	no	0.43	no	303.65	no
18-Jan-23	304.53	303.95	0.57	0.48	no	0.43	no	303.65	no
25-Jan-23	304.54			0.48		0.43		303.65	
2-Feb-23	304.55			0.48		0.43		303.65	
10-Feb-23	304.74	304.08	0.66	0.48	no	0.43	no	303.65	no
14-Feb-23	304.65	304.05	0.60	0.48	no	0.43	no	303.65	no
24-Feb-23	304.66			0.48		0.43		303.65	
2-Mar-23	304.66	304.02	0.64	0.48	no	0.43	no	303.65	no
9-Mar-23	304.70	304.03	0.67	0.48	no	0.43	no	303.65	no
17-Mar-23	304.75	303.94	0.81	0.48	no	0.43	no	303.65	no
24-Mar-23	304.85	304.11	0.74	0.48	no	0.43	no	303.65	no
3-Apr-23	304.95	304.14	0.81	0.39	no	0.34	no	303.69	no
14-Apr-23	305.00	304.09	0.92	0.39	no	0.34	no	303.69	no
20-Apr-23	304.99	304.07	0.91	0.39	no	0.34	no	303.69	no
27-Apr-23	304.89	304.13	0.76	0.39	no	0.34	no	303.69	no
5-May-23	305.12	304.12	1.00	0.39	no	0.34	no	303.69	no
12-May-23	304.99	304.08	0.91	0.39	no	0.34	no	303.69	no
17-May-23	304.97	304.07	0.90	0.39	no	0.34	no	303.69	no
26-May-23	304.83	304.04	0.79	0.39	no	0.34	no	303.69	no
2-Jun-23	304.88	304.02	0.86	0.39	no	0.34	no	303.69	no
9-Jun-23	304.85	304.00	0.84	0.39	no	0.34	no	303.69	no
15-Jun-23	304.74	304.03	0.71	0.39	no	0.34	no	303.69	no
22-Jun-23	304.80	304.02	0.79	0.39	no	0.34	no	303.69	no
30-Jun-23	304.75	304.05	0.70	0.39	no	0.34	no	303.69	no
5-Jul-23	304.77	304.03	0.74	0.39	no	0.32	no	303.5	no
12-Jul-23	304.76	304.12	0.64	0.39	no	0.32	no	303.5	no
21-Jul-23	304.91	304.19	0.72	0.39	no	0.32	no	303.5	no
25-Jul-23	304.85	304.11	0.74	0.39	no	0.32	no	303.5	no
3-Aug-23	304.75	304.00	0.76	0.39	no	0.32	no	303.5	no
8-Aug-23	304.78	304.01	0.77	0.39	no	0.32	no	303.5	no
14-Aug-23	304.78	304.05	0.73	0.39	no	0.32	no	303.5	no
31-Aug-23	304.76	304.01	0.75	0.39	no	0.32	no	303.5	no
7-Sep-23	304.73	304.23	0.50	0.39	no	0.32	no	303.5	no
15-Sep-23	304.71	304.00	0.71	0.39	no	0.32	no	303.5	no
20-Sep-23	304.67	303.96	0.70	0.39	no	0.32	no	303.5	no
25-Sep-23	304.63	303.93	0.71	0.39	no	0.32	no	303.5	no
4-Oct-23	304.59	303.93	0.66	0.39	no	0.34	no	303.55	no
12-Oct-23	304.62	303.94	0.67	0.39	no	0.34	no	303.55	no
20-Oct-23	304.58	303.97	0.62	0.39	no	0.34	no	303.55	no
26-Oct-23	304.69	304.02	0.67	0.39	no	0.34	no	303.55	no
3-Nov-23	304.70	304.03	0.66	0.39	no	0.34	no	303.55	no
16-Nov-23	304.64	303.97	0.67	0.39	no	0.34	no	303.55	no
20-Nov-23	304.63	303.94	0.69	0.39	no	0.34	no	303.55	no
1-Dec-23	304.65	303.97	0.68	0.39	no	0.34	no	303.55	no
7-Dec-23	304.68	304.02	0.66	0.39	no	0.34	no	303.55	no
14-Dec-23	304.71	304.02	0.69	0.39	no	0.34	no	303.55	no
18-Dec-23	304.73	304.01	0.72	0.39	no	0.34	no	303.55	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-6
Threshold Summary - OW5-84 to DP5CR
Mill Creek Aggregates Pit

			OW5-84 to DP5CR					DP5CR	
Date	Water Elevation OW5-84 (m ASL)	Water Elevation DP5CR (m ASL)	Head Difference (m)	Early Warning Value (Min) (m)	Exceedance of Early Warning Value	Threshold Value (Min) (m)	Exceedance of Threshold Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
6-Jan-22	303.59			0.23		0.20		302.88	
14-Jan-22	303.53			0.23		0.20		302.88	
21-Jan-22	303.58			0.23		0.20		302.88	
26-Jan-22	303.60			0.23		0.20		302.88	
2-Feb-22	303.58			0.23		0.20		302.88	
11-Feb-22	303.60			0.23		0.20		302.88	
16-Feb-22	303.63			0.23		0.20		302.88	
24-Feb-22	303.65			0.23		0.20		302.88	
4-Mar-22				0.23		0.20		302.88	
17-Mar-22	303.67	303.47	0.20	0.23	yes	0.20	no	302.88	no
24-Mar-22	303.82	303.51	0.31	0.23	no	0.20	no	302.88	no
31-Mar-22	303.80	303.49	0.31	0.23	no	0.20	no	302.88	no
7-Apr-22	303.70	303.49	0.21	0.21	no	0.18	no	302.86	no
14-Apr-22	303.66	303.41	0.25	0.21	no	0.18	no	302.86	no
21-Apr-22	303.79	303.46	0.33	0.21	no	0.18	no	302.86	no
28-Apr-22	303.67	303.43	0.24	0.21	no	0.18	no	302.86	no
5-May-22	303.73	303.45	0.28	0.21	no	0.18	no	302.86	no
12-May-22	303.65	303.44	0.21	0.21	no	0.18	no	302.86	no
19-May-22	303.60	303.36	0.24	0.21	no	0.18	no	302.86	no
24-May-22	303.61	303.35	0.26	0.21	no	0.18	no	302.86	no
3-Jun-22	303.54	303.30	0.24	0.21	no	0.18	no	302.86	no
10-Jun-22	303.53	303.28	0.25	0.21	no	0.18	no	302.86	no
15-Jun-22	303.60	303.34	0.26	0.21	no	0.18	no	302.86	no
23-Jun-22	303.43	303.24	0.19	0.21	yes	0.18	no	302.86	no
29-Jun-22	303.44	303.25	0.19	0.21	yes	0.18	no	302.86	no
6-Jul-22	303.43	303.22	0.21	0.18	no	0.15	no	302.79	no
14-Jul-22	303.39	303.18	0.20	0.18	no	0.15	no	302.79	no
22-Jul-22	303.36	303.15	0.21	0.18	no	0.15	no	302.79	no
26-Jul-22	303.33	303.13	0.19	0.18	no	0.15	no	302.79	no
3-Aug-22	303.33	303.13	0.19	0.18	no	0.15	no	302.79	no
11-Aug-22	303.32	303.13	0.19	0.18	no	0.15	no	302.79	no
18-Aug-22	303.29	303.08	0.21	0.18	no	0.15	no	302.79	no
25-Aug-22	303.45	303.22	0.23	0.18	no	0.15	no	302.79	no
1-Sep-22	303.29	303.08	0.21	0.18	no	0.15	no	302.79	no
8-Sep-22	303.35	303.15	0.20	0.18	no	0.15	no	302.79	no
15-Sep-22	303.33	303.16	0.17	0.18	yes	0.15	no	302.79	no
22-Sep-22	303.32	303.17	0.15	0.18	yes	0.15	no	302.79	no
30-Sep-22	303.34	303.20	0.14	0.18	yes	0.15	yes	302.79	no
6-Oct-22	303.35	303.16	0.19	0.18	no	0.15	no	302.79	no
13-Oct-22	303.48	303.26	0.22	0.18	no	0.15	no	302.79	no
21-Oct-22	303.45	303.23	0.22	0.18	no	0.15	no	302.79	no
25-Oct-22	303.44	303.23	0.21	0.18	no	0.15	no	302.79	no
4-Nov-22	303.47	303.26	0.21	0.18	no	0.15	no	302.79	no
10-Nov-22	303.48	303.27	0.21	0.18	no	0.15	no	302.79	no
17-Nov-22	303.49	303.28	0.21	0.18	no	0.15	no	302.79	no
24-Nov-22	303.50	303.27	0.23	0.18	no	0.15	no	302.79	no
2-Dec-22	303.53	303.30	0.23	0.18	no	0.15	no	302.79	no
9-Dec-22	303.51			0.18		0.15		302.79	
16-Dec-22	303.54	303.27	0.27	0.18	no	0.15	no	302.79	no
19-Dec-22	303.56			0.18		0.15		302.79	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-6
Threshold Summary - OW5-84 to DP5CR
Mill Creek Aggregates Pit

			OW5-84 to DP5CR					DP5CR	
Date	Water Elevation OW5-84 (m ASL)	Water Elevation DP5CR (m ASL)	Head Difference (m)	Early Warning Value (Min) (m)	Exceedance of Early Warning Value	Threshold Value (Min) (m)	Exceedance of Threshold Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
6-Jan-23	303.72	303.45	0.27	0.23	no	0.20	no	302.88	no
12-Jan-23	303.62	303.36	0.27	0.23	no	0.20	no	302.88	no
18-Jan-23	303.67	303.41	0.26	0.23	no	0.20	no	302.88	no
25-Jan-23	303.61			0.23		0.20		302.88	
2-Feb-23	303.61			0.23		0.20		302.88	
10-Feb-23	303.82	303.56	0.26	0.23	no	0.20	no	302.88	no
14-Feb-23		303.44		0.23		0.20		302.88	no
24-Feb-23				0.23		0.20		302.88	
2-Mar-23		303.36		0.23		0.20		302.88	no
9-Mar-23		303.38		0.23		0.20		302.88	no
17-Mar-23	303.82	303.56	0.26	0.23	no	0.20	no	302.88	no
24-Mar-23	303.80	303.53	0.27	0.23	no	0.20	no	302.88	no
3-Apr-23	303.80	303.53	0.27	0.21	no	0.18	no	302.86	no
14-Apr-23	303.71	303.41	0.30	0.21	no	0.18	no	302.86	no
20-Apr-23	303.70	303.41	0.29	0.21	no	0.18	no	302.86	no
27-Apr-23	303.73	303.41	0.32	0.21	no	0.18	no	302.86	no
5-May-23	303.76	303.48	0.28	0.21	no	0.18	no	302.86	no
12-May-23	303.63	303.35	0.28	0.21	no	0.18	no	302.86	no
17-May-23	303.64	303.36	0.28	0.21	no	0.18	no	302.86	no
26-May-23	303.67	303.39	0.28	0.21	no	0.18	no	302.86	no
2-Jun-23	303.59	303.26	0.33	0.21	no	0.18	no	302.86	no
9-Jun-23	303.58	303.25	0.33	0.21	no	0.18	no	302.86	no
15-Jun-23	303.65	303.33	0.32	0.21	no	0.18	no	302.86	no
22-Jun-23	303.61	303.30	0.31	0.21	no	0.18	no	302.86	no
30-Jun-23	303.65	303.29	0.36	0.21	no	0.18	no	302.86	no
5-Jul-23	303.63	303.28	0.35	0.18	no	0.15	no	302.79	no
12-Jul-23	303.69	303.41	0.28	0.18	no	0.15	no	302.79	no
21-Jul-23	303.66	303.39	0.27	0.18	no	0.15	no	302.79	no
25-Jul-23	303.74	303.55	0.19	0.18	no	0.15	no	302.79	no
3-Aug-23	303.68	303.37	0.31	0.18	no	0.15	no	302.79	no
8-Aug-23	303.67	303.40	0.27	0.18	no	0.15	no	302.79	no
14-Aug-23	303.72	303.43	0.29	0.18	no	0.15	no	302.79	no
31-Aug-23	303.63	303.36	0.27	0.18	no	0.15	no	302.79	no
7-Sep-23	303.58	303.32	0.25	0.18	no	0.15	no	302.79	no
15-Sep-23	303.61	303.34	0.28	0.18	no	0.15	no	302.79	no
20-Sep-23	303.54	303.31	0.23	0.18	no	0.15	no	302.79	no
25-Sep-23	303.52	303.27	0.25	0.18	no	0.15	no	302.79	no
4-Oct-23	303.49	303.26	0.23	0.18	no	0.15	no	302.84	no
12-Oct-23	303.55	303.31	0.24	0.18	no	0.15	no	302.84	no
20-Oct-23	303.59	303.33	0.26	0.18	no	0.15	no	302.84	no
26-Oct-23	303.62	303.35	0.27	0.18	no	0.15	no	302.84	no
3-Nov-23	303.62	303.34	0.28	0.18	no	0.15	no	302.84	no
16-Nov-23	303.61	303.36	0.25	0.18	no	0.15	no	302.84	no
20-Nov-23	303.59	303.34	0.25	0.18	no	0.15	no	302.84	no
1-Dec-23	303.66	303.38	0.28	0.18	no	0.15	no	302.84	no
7-Dec-23	303.66	303.39	0.27	0.18	no	0.15	no	302.84	no
14-Dec-23	303.67	303.39	0.28	0.18	no	0.15	no	302.84	no
18-Dec-23	303.69	303.43	0.25	0.18	no	0.15	no	302.84	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-7
Threshold Summary - Phase 1 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 1 Pond (m)	Water Elevation Phase 1 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jan-22			305.75		305.50	
2-Jan-22			305.75		305.50	
3-Jan-22			305.75		305.50	
4-Jan-22			305.75		305.50	
5-Jan-22			305.75		305.50	
6-Jan-22			305.75		305.50	
7-Jan-22			305.75		305.50	
8-Jan-22			305.75		305.50	
9-Jan-22			305.75		305.50	
10-Jan-22			305.75		305.50	
11-Jan-22			305.75		305.50	
12-Jan-22			305.75		305.50	
13-Jan-22			305.75		305.50	
14-Jan-22			305.75		305.50	
15-Jan-22			305.75		305.50	
16-Jan-22			305.75		305.50	
17-Jan-22			305.75		305.50	
18-Jan-22			305.75		305.50	
19-Jan-22			305.75		305.50	
20-Jan-22			305.75		305.50	
21-Jan-22			305.75		305.50	
22-Jan-22			305.75		305.50	
23-Jan-22			305.75		305.50	
24-Jan-22			305.75		305.50	
25-Jan-22			305.75		305.50	
26-Jan-22			305.75		305.50	
27-Jan-22			305.75		305.50	
28-Jan-22			305.75		305.50	
29-Jan-22			305.75		305.50	
30-Jan-22			305.75		305.50	
31-Jan-22			305.75		305.50	
1-Feb-22			305.75		305.50	
2-Feb-22			305.75		305.50	
3-Feb-22			305.75		305.50	
4-Feb-22			305.75		305.50	
5-Feb-22			305.75		305.50	
6-Feb-22			305.75		305.50	
7-Feb-22			305.75		305.50	
8-Feb-22			305.75		305.50	
9-Feb-22			305.75		305.50	
10-Feb-22			305.75		305.50	
11-Feb-22			305.75		305.50	
12-Feb-22			305.75		305.50	
13-Feb-22			305.75		305.50	
14-Feb-22			305.75		305.50	
15-Feb-22			305.75		305.50	
16-Feb-22			305.75		305.50	
17-Feb-22			305.75		305.50	
18-Feb-22			305.75		305.50	
19-Feb-22			305.75		305.50	
20-Feb-22			305.75		305.50	
21-Feb-22			305.75		305.50	
22-Feb-22			305.75		305.50	
23-Feb-22			305.75		305.50	
24-Feb-22			305.75		305.50	
25-Feb-22			305.75		305.50	
26-Feb-22			305.75		305.50	
27-Feb-22			305.75		305.50	
28-Feb-22			305.75		305.50	
1-Mar-22			305.75		305.50	
2-Mar-22			305.75		305.50	
3-Mar-22			305.75		305.50	
4-Mar-22			305.75		305.50	
5-Mar-22			305.75		305.50	
6-Mar-22			305.75		305.50	
7-Mar-22			305.75		305.50	
8-Mar-22			305.75		305.50	
9-Mar-22			305.75		305.50	
10-Mar-22			305.75		305.50	
11-Mar-22			305.75		305.50	
12-Mar-22			305.75		305.50	
13-Mar-22			305.75		305.50	
14-Mar-22			305.75		305.50	
15-Mar-22			305.75		305.50	
16-Mar-22			305.75		305.50	
17-Mar-22			305.75		305.50	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-7
Threshold Summary - Phase 1 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 1 Pond (m)	Water Elevation Phase 1 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
18-Mar-22			305.75		305.50	
19-Mar-22			305.75		305.50	
20-Mar-22			305.75		305.50	
21-Mar-22			305.75		305.50	
22-Mar-22			305.75		305.50	
23-Mar-22			305.75		305.50	
24-Mar-22			305.75		305.50	
25-Mar-22			305.75		305.50	
26-Mar-22			305.75		305.50	
27-Mar-22			305.75		305.50	
28-Mar-22			305.75		305.50	
29-Mar-22			305.75		305.50	
30-Mar-22			305.75		305.50	
31-Mar-22			305.75		305.50	
1-Apr-22	0.62	306.47	305.75	no	305.50	no
2-Apr-22			305.75		305.50	
3-Apr-22			305.75		305.50	
4-Apr-22	0.60	306.45	305.75	no	305.50	no
5-Apr-22	0.62	306.47	305.75	no	305.50	no
6-Apr-22	0.62	306.47	305.75	no	305.50	no
7-Apr-22	0.64	306.49	305.75	no	305.50	no
8-Apr-22	0.62	306.47	305.75	no	305.50	no
9-Apr-22			305.75		305.50	
10-Apr-22			305.75		305.50	
11-Apr-22	0.61	306.46	305.75	no	305.50	no
12-Apr-22	0.62	306.47	305.75	no	305.50	no
13-Apr-22	0.61	306.46	305.75	no	305.50	no
14-Apr-22	0.61	306.46	305.75	no	305.50	no
15-Apr-22			305.75		305.50	
16-Apr-22			305.75		305.50	
17-Apr-22			305.75		305.50	
18-Apr-22	0.63	306.48	305.75	no	305.50	no
19-Apr-22	0.64	306.49	305.75	no	305.50	no
20-Apr-22	0.62	306.47	305.75	no	305.50	no
21-Apr-22	0.63	306.48	305.75	no	305.50	no
22-Apr-22	0.64	306.49	305.75	no	305.50	no
23-Apr-22			305.75		305.50	
24-Apr-22			305.75		305.50	
25-Apr-22	0.63	306.48	305.75	no	305.50	no
26-Apr-22	0.65	306.50	305.75	no	305.50	no
27-Apr-22	0.64	306.49	305.75	no	305.50	no
28-Apr-22	0.64	306.49	305.75	no	305.50	no
29-Apr-22	0.64	306.49	305.75	no	305.50	no
30-Apr-22			305.75		305.50	
1-May-22			305.75		305.50	
2-May-22	0.64	306.49	305.75	no	305.50	no
3-May-22	0.64	306.49	305.75	no	305.50	no
4-May-22	0.65	306.50	305.75	no	305.50	no
5-May-22	0.65	306.50	305.75	no	305.50	no
6-May-22	0.65	306.50	305.75	no	305.50	no
7-May-22			305.75		305.50	
8-May-22			305.75		305.50	
9-May-22	0.66	306.51	305.75	no	305.50	no
10-May-22	0.66	306.51	305.75	no	305.50	no
11-May-22	0.65	306.50	305.75	no	305.50	no
12-May-22	0.65	306.50	305.75	no	305.50	no
13-May-22	0.65	306.50	305.75	no	305.50	no
14-May-22	0.62	306.47	305.75	no	305.50	no
15-May-22			305.75		305.50	
16-May-22	0.65	306.50	305.75	no	305.50	no
17-May-22	0.65	306.50	305.75	no	305.50	no
18-May-22	0.65	306.50	305.75	no	305.50	no
19-May-22	0.65	306.50	305.75	no	305.50	no
20-May-22	0.65	306.50	305.75	no	305.50	no
21-May-22	0.65	306.50	305.75	no	305.50	no
22-May-22			305.75		305.50	
23-May-22			305.75		305.50	
24-May-22	0.64	306.49	305.75	no	305.50	no
25-May-22	0.63	306.48	305.75	no	305.50	no
26-May-22	0.64	306.49	305.75	no	305.50	no
27-May-22	0.64	306.49	305.75	no	305.50	no
28-May-22	0.64	306.49	305.75	no	305.50	no
29-May-22			305.75		305.50	
30-May-22	0.64	306.49	305.75	no	305.50	no
31-May-22	0.64	306.49	305.75	no	305.50	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-7
Threshold Summary - Phase 1 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 1 Pond (m)	Water Elevation Phase 1 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jun-22	0.63	306.48	305.75	no	305.50	no
2-Jun-22	0.62	306.47	305.75	no	305.50	no
3-Jun-22	0.62	306.47	305.75	no	305.50	no
4-Jun-22			305.75		305.50	
5-Jun-22			305.75		305.50	
6-Jun-22	0.60	306.45	305.75	no	305.50	no
7-Jun-22	0.59	306.44	305.75	no	305.50	no
8-Jun-22	0.59	306.44	305.75	no	305.50	no
9-Jun-22	0.60	306.45	305.75	no	305.50	no
10-Jun-22	0.60	306.45	305.75	no	305.50	no
11-Jun-22			305.75		305.50	
12-Jun-22			305.75		305.50	
13-Jun-22	0.64	306.49	305.75	no	305.50	no
14-Jun-22	0.63	306.48	305.75	no	305.50	no
15-Jun-22	0.63	306.48	305.75	no	305.50	no
16-Jun-22	0.63	306.48	305.75	no	305.50	no
17-Jun-22	0.62	306.47	305.75	no	305.50	no
18-Jun-22			305.75		305.50	
19-Jun-22			305.75		305.50	
20-Jun-22	0.58	306.43	305.75	no	305.50	no
21-Jun-22	0.57	306.42	305.75	no	305.50	no
22-Jun-22	0.57	306.42	305.75	no	305.50	no
23-Jun-22	0.57	306.42	305.75	no	305.50	no
24-Jun-22	0.57	306.42	305.75	no	305.50	no
25-Jun-22			305.75		305.50	
26-Jun-22			305.75		305.50	
27-Jun-22	0.56	306.41	305.75	no	305.50	no
28-Jun-22	0.56	306.41	305.75	no	305.50	no
29-Jun-22	0.53	306.38	305.75	no	305.50	no
30-Jun-22	0.55	306.40	305.75	no	305.50	no
1-Jul-22			305.75		305.50	
2-Jul-22			305.75		305.50	
3-Jul-22			305.75		305.50	
4-Jul-22	0.53	306.38	305.75	no	305.50	no
5-Jul-22	0.51	306.36	305.75	no	305.50	no
6-Jul-22	0.51	306.36	305.75	no	305.50	no
7-Jul-22	0.51	306.36	305.75	no	305.50	no
8-Jul-22	0.52	306.37	305.75	no	305.50	no
9-Jul-22			305.75		305.50	
10-Jul-22			305.75		305.50	
11-Jul-22	0.51	306.36	305.75	no	305.50	no
12-Jul-22	0.51	306.36	305.75	no	305.50	no
13-Jul-22	0.51	306.36	305.75	no	305.50	no
14-Jul-22	0.50	306.35	305.75	no	305.50	no
15-Jul-22	0.48	306.33	305.75	no	305.50	no
16-Jul-22			305.75		305.50	
17-Jul-22			305.75		305.50	
18-Jul-22	0.48	306.33	305.75	no	305.50	no
19-Jul-22	0.48	306.33	305.75	no	305.50	no
20-Jul-22	0.48	306.33	305.75	no	305.50	no
21-Jul-22	0.47	306.32	305.75	no	305.50	no
22-Jul-22	0.48	306.33	305.75	no	305.50	no
23-Jul-22			305.75		305.50	
24-Jul-22			305.75		305.50	
25-Jul-22	0.46	306.31	305.75	no	305.50	no
26-Jul-22	0.45	306.30	305.75	no	305.50	no
27-Jul-22	0.45	306.30	305.75	no	305.50	no
28-Jul-22	0.45	306.30	305.75	no	305.50	no
29-Jul-22	0.44	306.29	305.75	no	305.50	no
30-Jul-22			305.75		305.50	
31-Jul-22			305.75		305.50	
1-Aug-22			305.75		305.50	
2-Aug-22	0.42	306.27	305.75	no	305.50	no
3-Aug-22	0.41	306.26	305.75	no	305.50	no
4-Aug-22	0.41	306.26	305.75	no	305.50	no
5-Aug-22	0.41	306.26	305.75	no	305.50	no
6-Aug-22			305.75		305.50	
7-Aug-22			305.75		305.50	
8-Aug-22	0.41	306.26	305.75	no	305.50	no
9-Aug-22	0.41	306.26	305.75	no	305.50	no
10-Aug-22	0.41	306.26	305.75	no	305.50	no
11-Aug-22	0.39	306.24	305.75	no	305.50	no
12-Aug-22	0.38	306.23	305.75	no	305.50	no
13-Aug-22			305.75		305.50	
14-Aug-22			305.75		305.50	
15-Aug-22	0.36	306.21	305.75	no	306.50	yes

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-7
Threshold Summary - Phase 1 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 1 Pond (m)	Water Elevation Phase 1 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
16-Aug-22	0.36	306.21	305.75	no	305.50	no
17-Aug-22	0.34	306.19	305.75	no	305.50	no
18-Aug-22	0.34	306.19	305.75	no	305.50	no
19-Aug-22	0.34	306.19	305.75	no	305.50	no
20-Aug-22			305.75		305.50	
21-Aug-22			305.75		305.50	
22-Aug-22	0.38	306.23	305.75	no	305.50	no
23-Aug-22	0.40	306.25	305.75	no	305.50	no
24-Aug-22	0.40	306.25	305.75	no	305.50	no
25-Aug-22	0.39	306.24	305.75	no	305.50	no
26-Aug-22	0.38	306.23	305.75	no	305.50	no
27-Aug-22			305.75		305.50	
28-Aug-22			305.75		305.50	
29-Aug-22	0.37	306.22	305.75	no	305.50	no
30-Aug-22	0.34	306.19	305.75	no	305.50	no
31-Aug-22	0.37	306.22	305.75	no	305.50	no
1-Sep-22	0.36	306.21	305.75	no	305.50	no
2-Sep-22	0.35	306.20	305.75	no	305.50	no
3-Sep-22			305.75		305.50	
4-Sep-22			305.75		305.50	
5-Sep-22			305.75		305.50	
6-Sep-22	0.33	306.18	305.75	no	305.50	no
7-Sep-22	0.33	306.18	305.75	no	305.50	no
8-Sep-22	0.33	306.18	305.75	no	305.50	no
9-Sep-22	0.32	306.17	305.75	no	305.50	no
10-Sep-22			305.75		305.50	
11-Sep-22			305.75		305.50	
12-Sep-22	0.30	306.15	305.75	no	305.50	no
13-Sep-22	0.30	306.15	305.75	no	305.50	no
14-Sep-22	0.29	306.14	305.75	no	305.50	no
15-Sep-22	0.30	306.15	305.75	no	305.50	no
16-Sep-22	0.29	306.14	305.75	no	305.50	no
17-Sep-22			305.75		305.50	
18-Sep-22			305.75		305.50	
19-Sep-22	0.29	306.14	305.75	no	305.50	no
20-Sep-22	0.28	306.13	305.75	no	305.50	no
21-Sep-22	0.28	306.13	305.75	no	305.50	no
22-Sep-22	0.27	306.12	305.75	no	305.50	no
23-Sep-22	0.27	306.12	305.75	no	305.50	no
24-Sep-22			305.75		305.50	
25-Sep-22			305.75		305.50	
26-Sep-22	0.25	306.10	305.75	no	305.50	no
27-Sep-22	0.24	306.09	305.75	no	305.50	no
28-Sep-22	0.24	306.09	305.75	no	305.50	no
29-Sep-22	0.27	306.12	305.75	no	305.50	no
30-Sep-22	0.27	306.12	305.75	no	305.50	no
1-Oct-22			305.75		305.50	
2-Oct-22			305.75		305.50	
3-Oct-22	0.26	306.11	305.75	no	305.50	no
4-Oct-22	0.26	306.11	305.75	no	305.50	no
5-Oct-22	0.26	306.11	305.75	no	305.50	no
6-Oct-22	0.26	306.11	305.75	no	305.50	no
7-Oct-22	0.25	306.10	305.75	no	305.50	no
8-Oct-22			305.75		305.50	
9-Oct-22			305.75		305.50	
10-Oct-22			305.75		305.50	
11-Oct-22	0.23	306.08	305.75	no	305.50	no
12-Oct-22	0.23	306.08	305.75	no	305.50	no
13-Oct-22	0.17	306.02	305.75	no	305.50	no
14-Oct-22	0.17	306.02	305.75	no	305.50	no
15-Oct-22			305.75		305.50	
16-Oct-22			305.75		305.50	
17-Oct-22	0.19	306.04	305.75	no	305.50	no
18-Oct-22	0.19	306.04	305.75	no	305.50	no
19-Oct-22	0.18	306.03	305.75	no	305.50	no
20-Oct-22	0.18	306.03	305.75	no	305.50	no
21-Oct-22	0.18	306.03	305.75	no	305.50	no
22-Oct-22			305.75		305.50	
23-Oct-22			305.75		305.50	
24-Oct-22	0.17	306.02	305.75	no	305.50	no
25-Oct-22	0.17	306.02	305.75	no	305.50	no
26-Oct-22	0.17	306.02	305.75	no	305.50	no
27-Oct-22	0.16	306.01	305.75	no	305.50	no
28-Oct-22	0.16	306.01	305.75	no	305.50	no
29-Oct-22			305.75		305.50	
30-Oct-22			305.75		305.50	
31-Oct-22	0.16	306.01	305.75	no	306.50	yes

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-7
Threshold Summary - Phase 1 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 1 Pond (m)	Water Elevation Phase 1 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Nov-22	0.16	306.01	305.75	no	305.50	no
2-Nov-22	0.16	306.01	305.75	no	305.50	no
3-Nov-22	0.16	306.01	305.75	no	305.50	no
4-Nov-22	0.16	306.01	305.75	no	305.50	no
5-Nov-22			305.75		305.50	
6-Nov-22			305.75		305.50	
7-Nov-22	0.14	305.99	305.75	no	305.50	no
8-Nov-22	0.13	305.98	305.75	no	305.50	no
9-Nov-22	0.13	305.98	305.75	no	305.50	no
10-Nov-22	0.12	305.97	305.75	no	305.50	no
11-Nov-22	0.12	305.97	305.75	no	305.50	no
12-Nov-22			305.75		305.50	
13-Nov-22			305.75		305.50	
14-Nov-22	0.13	305.98	305.75	no	305.50	no
15-Nov-22	0.13	305.98	305.75	no	305.50	no
16-Nov-22	0.12	305.97	305.75	no	305.50	no
17-Nov-22	0.12	305.97	305.75	no	305.50	no
18-Nov-22	0.12	305.97	305.75	no	305.50	no
19-Nov-22			305.75		305.50	
20-Nov-22			305.75		305.50	
21-Nov-22	0.08	305.93	305.75	no	305.50	no
22-Nov-22	0.07	305.92	305.75	no	305.50	no
23-Nov-22	0.07	305.92	305.75	no	305.50	no
24-Nov-22	0.06	305.91	305.75	no	305.50	no
25-Nov-22	0.06	305.91	305.75	no	305.50	no
26-Nov-22			305.75		305.50	
27-Nov-22			305.75		305.50	
28-Nov-22	0.10	305.95	305.75	no	305.50	no
29-Nov-22	0.09	305.94	305.75	no	305.50	no
30-Nov-22	0.09	305.94	305.75	no	305.50	no
1-Dec-22	0.11	305.96	305.75	no	305.50	no
2-Dec-22	0.09	305.94	305.75	no	305.50	no
3-Dec-22			305.75		305.50	
4-Dec-22			305.75		305.50	
5-Dec-22	0.08	305.93	305.75	no	305.50	no
6-Dec-22	0.07	305.92	305.75	no	305.50	no
7-Dec-22	0.07	305.92	305.75	no	305.50	no
8-Dec-22	0.08	305.93	305.75	no	305.50	no
9-Dec-22			305.75		305.50	
10-Dec-22			305.75		305.50	
11-Dec-22			305.75		305.50	
12-Dec-22			305.75		305.50	
13-Dec-22			305.75		305.50	
14-Dec-22			305.75		305.50	
15-Dec-22			305.75		305.50	
16-Dec-22			305.75		305.50	
17-Dec-22			305.75		305.50	
18-Dec-22			305.75		305.50	
19-Dec-22			305.75		305.50	
20-Dec-22			305.75		305.50	
21-Dec-22			305.75		305.50	
22-Dec-22			305.75		305.50	
23-Dec-22			305.75		305.50	
24-Dec-22			305.75		305.50	
25-Dec-22			305.75		305.50	
26-Dec-22			305.75		305.50	
27-Dec-22			305.75		305.50	
28-Dec-22			305.75		305.50	
29-Dec-22			305.75		305.50	
30-Dec-22			305.75		305.50	
31-Dec-22			305.75		305.50	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-7
Threshold Summary - Phase 1 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 1 Pond (m)	Water Elevation Phase 1 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jan-23			305.75		305.50	
2-Jan-23			305.75		305.50	
3-Jan-23			305.75		305.50	
4-Jan-23			305.75		305.50	
5-Jan-23			305.75		305.50	
6-Jan-23			305.75		305.50	
7-Jan-23			305.75		305.50	
8-Jan-23			305.75		305.50	
9-Jan-23			305.75		305.50	
10-Jan-23			305.75		305.50	
11-Jan-23			305.75		305.50	
12-Jan-23			305.75		305.50	
13-Jan-23			305.75		305.50	
14-Jan-23			305.75		305.50	
15-Jan-23			305.75		305.50	
16-Jan-23			305.75		305.50	
17-Jan-23			305.75		305.50	
18-Jan-23			305.75		305.50	
19-Jan-23			305.75		305.50	
20-Jan-23			305.75		305.50	
21-Jan-23			305.75		305.50	
22-Jan-23			305.75		305.50	
23-Jan-23			305.75		305.50	
24-Jan-23			305.75		305.50	
25-Jan-23			305.75		305.50	
26-Jan-23			305.75		305.50	
27-Jan-23			305.75		305.50	
28-Jan-23			305.75		305.50	
29-Jan-23			305.75		305.50	
30-Jan-23			305.75		305.50	
31-Jan-23			305.75		305.50	
1-Feb-23			305.75		305.50	
2-Feb-23			305.75		305.50	
3-Feb-23			305.75		305.50	
4-Feb-23			305.75		305.50	
5-Feb-23			305.75		305.50	
6-Feb-23			305.75		305.50	
7-Feb-23			305.75		305.50	
8-Feb-23			305.75		305.50	
9-Feb-23			305.75		305.50	
10-Feb-23			305.75		305.50	
11-Feb-23			305.75		305.50	
12-Feb-23			305.75		305.50	
13-Feb-23			305.75		305.50	
14-Feb-23			305.75		305.50	
15-Feb-23			305.75		305.50	
16-Feb-23			305.75		305.50	
17-Feb-23			305.75		305.50	
18-Feb-23			305.75		305.50	
19-Feb-23			305.75		305.50	
20-Feb-23			305.75		305.50	
21-Feb-23			305.75		305.50	
22-Feb-23			305.75		305.50	
23-Feb-23			305.75		305.50	
24-Feb-23			305.75		305.50	
25-Feb-23			305.75		305.50	
26-Feb-23			305.75		305.50	
27-Feb-23			305.75		305.50	
28-Feb-23			305.75		305.50	
1-Mar-23			305.75		305.50	
2-Mar-23			305.75		305.50	
3-Mar-23			305.75		305.50	
4-Mar-23			305.75		305.50	
5-Mar-23			305.75		305.50	
6-Mar-23			305.75		305.50	
7-Mar-23			305.75		305.50	
8-Mar-23			305.75		305.50	
9-Mar-23			305.75		305.50	
10-Mar-23			305.75		305.50	
11-Mar-23			305.75		305.50	
12-Mar-23			305.75		305.50	
13-Mar-23			305.75		305.50	
14-Mar-23			305.75		305.50	
15-Mar-23			305.75		305.50	
16-Mar-23			305.75		305.50	
17-Mar-23			305.75		305.50	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-7
Threshold Summary - Phase 1 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 1 Pond (m)	Water Elevation Phase 1 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
18-Mar-23			305.75		305.50	
19-Mar-23			305.75		305.50	
20-Mar-23			305.75		305.50	
21-Mar-23			305.75		305.50	
22-Mar-23			305.75		305.50	
23-Mar-23			305.75		305.50	
24-Mar-23			305.75		305.50	
25-Mar-23			305.75		305.50	
26-Mar-23			305.75		305.50	
27-Mar-23			305.75		305.50	
28-Mar-23			305.75		305.50	
29-Mar-23			305.75		305.50	
30-Mar-23			305.75		305.50	
31-Mar-23			305.75		305.50	
1-Apr-23			305.75		305.50	
2-Apr-23			305.75		305.50	
3-Apr-23	0.65	306.28	305.75	no	305.50	no
4-Apr-23	0.66	306.29	305.75	no	305.50	no
5-Apr-23	0.67	306.30	305.75	no	305.50	no
6-Apr-23	0.68	306.31	305.75	no	305.50	no
7-Apr-23			305.75		305.50	
8-Apr-23			305.75		305.50	
9-Apr-23			305.75		305.50	
10-Apr-23	0.67	306.30	305.75	no	305.50	no
11-Apr-23	0.67	306.30	305.75	no	305.50	no
12-Apr-23	0.67	306.30	305.75	no	305.50	no
13-Apr-23	0.67	306.30	305.75	no	305.50	no
14-Apr-23	0.67	306.30	305.75	no	305.50	no
15-Apr-23			305.75		305.50	
16-Apr-23			305.75		305.50	
17-Apr-23	0.66	306.29	305.75	no	305.50	no
18-Apr-23	0.66	306.29	305.75	no	305.50	no
19-Apr-23	0.66	306.29	305.75	no	305.50	no
20-Apr-23	0.65	306.28	305.75	no	305.50	no
21-Apr-23	0.65	306.28	305.75	no	305.50	no
22-Apr-23			305.75		305.50	
23-Apr-23			305.75		305.50	
24-Apr-23	0.68	306.31	305.75	no	305.50	no
25-Apr-23	0.68	306.31	305.75	no	305.50	no
26-Apr-23	0.67	306.30	305.75	no	305.50	no
27-Apr-23	0.68	306.31	305.75	no	305.50	no
28-Apr-23	0.68	306.31	305.75	no	305.50	no
29-Apr-23			305.75		305.50	
30-Apr-23			305.75		305.50	
1-May-23	0.70	306.33	305.75	no	305.50	no
2-May-23	0.70	306.33	305.75	no	305.50	no
3-May-23	0.70	306.33	305.75	no	305.50	no
4-May-23	0.71	306.34	305.75	no	305.50	no
5-May-23	0.71	306.34	305.75	no	305.50	no
6-May-23			305.75		305.50	
7-May-23			305.75		305.50	
8-May-23	0.70	306.33	305.75	no	305.50	no
9-May-23	0.72	306.35	305.75	no	305.50	no
10-May-23	0.70	306.33	305.75	no	305.50	no
11-May-23	0.72	306.35	305.75	no	305.50	no
12-May-23	0.71	306.34	305.75	no	305.50	no
13-May-23			305.75		305.50	
14-May-23			305.75		305.50	
15-May-23	0.71	306.34	305.75	no	305.50	no
16-May-23	0.71	306.34	305.75	no	305.50	no
17-May-23	0.71	306.34	305.75	no	305.50	no
18-May-23	0.70	306.33	305.75	no	305.50	no
19-May-23	0.70	306.33	305.75	no	305.50	no
20-May-23			305.75		305.50	
21-May-23			305.75		305.50	
22-May-23			305.75		305.50	
23-May-23	0.74	306.37	305.75	no	305.50	no
24-May-23	0.74	306.37	305.75	no	305.50	no
25-May-23	0.73	306.36	305.75	no	305.50	no
26-May-23	0.73	306.36	305.75	no	305.50	no
27-May-23			305.75		305.50	
28-May-23			305.75		305.50	
29-May-23	0.72	306.35	305.75	no	305.50	no
30-May-23	0.72	306.35	305.75	no	305.50	no
31-May-23	0.71	306.34	305.75	no	305.50	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-7
Threshold Summary - Phase 1 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 1 Pond (m)	Water Elevation Phase 1 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jun-23	0.71	306.34	305.75	no	305.50	no
2-Jun-23	0.71	306.34	305.75	no	305.50	no
3-Jun-23			305.75		305.50	
4-Jun-23			305.75		305.50	
5-Jun-23	0.69	306.32	305.75	no	305.50	no
6-Jun-23	0.69	306.32	305.75	no	305.50	no
7-Jun-23	0.68	306.31	305.75	no	305.50	no
8-Jun-23	0.68	306.31	305.75	no	305.50	no
9-Jun-23	0.68	306.31	305.75	no	305.50	no
10-Jun-23			305.75		305.50	
11-Jun-23			305.75		305.50	
12-Jun-23	0.69	306.32	305.75	no	305.50	no
13-Jun-23	0.69	306.32	305.75	no	305.50	no
14-Jun-23	0.69	306.32	305.75	no	305.50	no
15-Jun-23	0.69	306.32	305.75	no	305.50	no
16-Jun-23	0.70	306.33	305.75	no	305.50	no
17-Jun-23			305.75		305.50	
18-Jun-23			305.75		305.50	
19-Jun-23	0.69	306.32	305.75	no	305.50	no
20-Jun-23	0.69	306.32	305.75	no	305.50	no
21-Jun-23	0.68	306.31	305.75	no	305.50	no
22-Jun-23	0.68	306.31	305.75	no	305.50	no
23-Jun-23	0.67	306.30	305.75	no	305.50	no
24-Jun-23			305.75		305.50	
25-Jun-23			305.75		305.50	
26-Jun-23	0.69	306.32	305.75	no	305.50	no
27-Jun-23	0.69	306.32	305.75	no	305.50	no
28-Jun-23	0.70	306.33	305.75	no	305.50	no
29-Jun-23	0.70	306.33	305.75	no	305.50	no
30-Jun-23	0.69	306.32	305.75	no	305.50	no
1-Jul-23			305.75		305.50	
2-Jul-23			305.75		305.50	
3-Jul-23			305.75		305.50	
4-Jul-23	0.71	306.34	305.75	no	305.50	no
5-Jul-23	0.71	306.34	305.75	no	305.50	no
6-Jul-23	0.70	306.33	305.75	no	305.50	no
7-Jul-23	0.73	306.36	305.75	no	305.50	no
8-Jul-23			305.75		305.50	
9-Jul-23			305.75		305.50	
10-Jul-23	0.72	306.35	305.75	no	305.50	no
11-Jul-23	0.71	306.34	305.75	no	305.50	no
12-Jul-23	0.71	306.34	305.75	no	305.50	no
13-Jul-23	0.76	306.39	305.75	no	305.50	no
14-Jul-23	0.75	306.38	305.75	no	305.50	no
15-Jul-23			305.75		305.50	
16-Jul-23			305.75		305.50	
17-Jul-23	0.76	306.39	305.75	no	305.50	no
18-Jul-23	0.76	306.39	305.75	no	305.50	no
19-Jul-23	0.76	306.39	305.75	no	305.50	no
20-Jul-23	0.78	306.41	305.75	no	305.50	no
21-Jul-23	0.75	306.38	305.75	no	305.50	no
22-Jul-23			305.75		305.50	
23-Jul-23			305.75		305.50	
24-Jul-23	0.74	306.37	305.75	no	305.50	no
25-Jul-23	0.75	306.38	305.75	no	305.50	no
26-Jul-23	0.74	306.37	305.75	no	305.50	no
27-Jul-23	0.75	306.38	305.75	no	305.50	no
28-Jul-23	0.76	306.39	305.75	no	305.50	no
29-Jul-23	0.76	306.39	305.75	no	305.50	no
30-Jul-23			305.75		305.50	
31-Jul-23	0.79	306.42	305.75	no	305.50	no
1-Aug-23	0.77	306.40	305.75	no	305.50	no
2-Aug-23	0.76	306.39	305.75	no	305.50	no
3-Aug-23	0.76	306.39	305.75	no	305.50	no
4-Aug-23	0.76	306.39	305.75	no	305.50	no
5-Aug-23			305.75		305.50	
6-Aug-23			305.75		305.50	
7-Aug-23			305.75		305.50	
8-Aug-23	0.78	306.41	305.75	no	305.50	no
9-Aug-23	0.75	306.38	305.75	no	305.50	no
10-Aug-23	0.75	306.38	305.75	no	305.50	no
11-Aug-23	0.76	306.39	305.75	no	305.50	no
12-Aug-23			305.75		305.50	
13-Aug-23			305.75		305.50	
14-Aug-23	0.75	306.38	305.75	no	305.50	no
15-Aug-23	0.75	306.38	305.75	no	305.50	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-7
Threshold Summary - Phase 1 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 1 Pond (m)	Water Elevation Phase 1 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
16-Aug-23	0.76	306.39	305.75	no	305.50	no
17-Aug-23	0.76	306.39	305.75	no	305.50	no
18-Aug-23	0.78	306.41	305.75	no	305.50	no
19-Aug-23	0.78	306.41	305.75	no	305.50	no
20-Aug-23			305.75		305.50	
21-Aug-23	0.77	306.40	305.75	no	305.50	no
22-Aug-23	0.77	306.40	305.75	no	305.50	no
23-Aug-23	0.76	306.39	305.75	no	305.50	no
24-Aug-23	0.77	306.40	305.75	no	305.50	no
25-Aug-23	0.79	306.42	305.75	no	305.50	no
26-Aug-23	0.78	306.41	305.75	no	305.50	no
27-Aug-23			305.75		305.50	
28-Aug-23	0.78	306.41	305.75	no	305.50	no
29-Aug-23	0.79	306.42	305.75	no	305.50	no
30-Aug-23	0.78	306.41	305.75	no	305.50	no
31-Aug-23	0.77	306.40	305.75	no	305.50	no
1-Sep-23	0.76	306.39	305.75	no	305.50	no
2-Sep-23	0.76	306.39	305.75	no	305.50	no
3-Sep-23			305.75		305.50	
4-Sep-23			305.75		305.50	
5-Sep-23	0.76	306.39	305.75	no	305.50	no
6-Sep-23	0.76	306.39	305.75	no	305.50	no
7-Sep-23	0.77	306.40	305.75	no	305.50	no
8-Sep-23	0.77	306.40	305.75	no	305.50	no
9-Sep-23	0.77	306.40	305.75	no	305.50	no
10-Sep-23			305.75		305.50	
11-Sep-23	0.74	306.37	305.75	no	305.50	no
12-Sep-23	0.74	306.37	305.75	no	305.50	no
13-Sep-23	0.75	306.38	305.75	no	305.50	no
14-Sep-23	0.75	306.38	305.75	no	305.50	no
15-Sep-23	0.74	306.37	305.75	no	305.50	no
16-Sep-23	0.74	306.37	305.75	no	305.50	no
17-Sep-23			305.75		305.50	
18-Sep-23	0.73	306.36	305.75	no	305.50	no
19-Sep-23	0.72	306.35	305.75	no	305.50	no
20-Sep-23	0.72	306.35	305.75	no	305.50	no
21-Sep-23	0.73	306.36	305.75	no	305.50	no
22-Sep-23	0.74	306.37	305.75	no	305.50	no
23-Sep-23	0.74	306.37	305.75	no	305.50	no
24-Sep-23			305.75		305.50	
25-Sep-23	0.70	306.33	305.75	no	305.50	no
26-Sep-23	0.73	306.36	305.75	no	305.50	no
27-Sep-23	0.72	306.35	305.75	no	305.50	no
28-Sep-23	0.70	306.33	305.75	no	305.50	no
29-Sep-23	0.70	306.33	305.75	no	305.50	no
30-Sep-23			305.75		305.50	
1-Oct-23			305.75		305.50	
2-Oct-23	0.70	306.33	305.75	no	305.50	no
3-Oct-23	0.68	306.31	305.75	no	305.50	no
4-Oct-23	0.68	306.31	305.75	no	305.50	no
5-Oct-23	0.69	306.32	305.75	no	305.50	no
6-Oct-23	0.69	306.32	305.75	no	305.50	no
7-Oct-23			305.75		305.50	
8-Oct-23			305.75		305.50	
9-Oct-23			305.75		305.50	
10-Oct-23	0.70	306.33	305.75	no	305.50	no
11-Oct-23	0.69	306.32	305.75	no	305.50	no
12-Oct-23	0.66	306.29	305.75	no	305.50	no
13-Oct-23	0.65	306.28	305.75	no	305.50	no
14-Oct-23	0.65	306.28	305.75	no	305.50	no
15-Oct-23			305.75		305.50	
16-Oct-23	0.65	306.28	305.75	no	305.50	no
17-Oct-23	0.65	306.28	305.75	no	305.50	no
18-Oct-23	0.64	306.27	305.75	no	305.50	no
19-Oct-23	0.64	306.27	305.75	no	305.50	no
20-Oct-23	0.64	306.27	305.75	no	305.50	no
21-Oct-23	0.64	306.27	305.75	no	305.50	no
22-Oct-23			305.75		305.50	
23-Oct-23	0.62	306.25	305.75	no	305.50	no
24-Oct-23	0.60	306.23	305.75	no	305.50	no
25-Oct-23	0.61	306.24	305.75	no	305.50	no
26-Oct-23	0.62	306.25	305.75	no	305.50	no
27-Oct-23	0.63	306.26	305.75	no	305.50	no
28-Oct-23	0.63	306.26	305.75	no	305.50	no
29-Oct-23			305.75		305.50	
30-Oct-23	0.63	306.26	305.75	no	305.50	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-7
Threshold Summary - Phase 1 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 1 Pond (m)	Water Elevation Phase 1 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
31-Oct-23	0.62	306.25	305.75	no	305.50	no
1-Nov-23	0.60	306.23	305.75	no	305.50	no
2-Nov-23	0.60	306.23	305.75	no	305.50	no
3-Nov-23	0.60	306.23	305.75	no	305.50	no
4-Nov-23			305.75		305.50	
5-Nov-23			305.75		305.50	
6-Nov-23	0.58	306.21	305.75	no	305.50	no
7-Nov-23	0.58	306.21	305.75	no	305.50	no
8-Nov-23	0.58	306.21	305.75	no	305.50	no
9-Nov-23	0.58	306.21	305.75	no	305.50	no
10-Nov-23	0.58	306.21	305.75	no	305.50	no
11-Nov-23	0.59	306.22	305.75	no	305.50	no
12-Nov-23			305.75		305.50	
13-Nov-23	0.59	306.22	305.75	no	305.50	no
14-Nov-23	0.60	306.23	305.75	no	305.50	no
15-Nov-23	0.59	306.22	305.75	no	305.50	no
16-Nov-23	0.59	306.22	305.75	no	305.50	no
17-Nov-23	0.59	306.22	305.75	no	305.50	no
18-Nov-23	0.59	306.22	305.75	no	305.50	no
19-Nov-23			305.75		305.50	
20-Nov-23	0.58	306.21	305.75	no	305.50	no
21-Nov-23	0.58	306.21	305.75	no	305.50	no
22-Nov-23	0.58	306.21	305.75	no	305.50	no
23-Nov-23	0.58	306.21	305.75	no	305.50	no
24-Nov-23	0.58	306.21	305.75	no	305.50	no
25-Nov-23			305.75		305.50	
26-Nov-23			305.75		305.50	
27-Nov-23	0.60	306.23	305.75	no	305.50	no
28-Nov-23	0.59	306.22	305.75	no	305.50	no
29-Nov-23	0.59	306.22	305.75	no	305.50	no
30-Nov-23	0.59	306.22	305.75	no	305.50	no
1-Dec-23	0.58	306.21	305.75	no	305.50	no
2-Dec-23			305.75		305.50	
3-Dec-23			305.75		305.50	
4-Dec-23	0.59	306.22	305.75	no	305.50	no
5-Dec-23	0.60	306.23	305.75	no	305.50	no
6-Dec-23	0.60	306.23	305.75	no	305.50	no
7-Dec-23	0.60	306.23	305.75	no	305.50	no
8-Dec-23	0.60	306.23	305.75	no	305.50	no
9-Dec-23			305.75		305.50	
10-Dec-23			305.75		305.50	
11-Dec-23			305.75		305.50	
12-Dec-23			305.75		305.50	
13-Dec-23			305.75		305.50	
14-Dec-23			305.75		305.50	
15-Dec-23			305.75		305.50	
16-Dec-23			305.75		305.50	
17-Dec-23			305.75		305.50	
18-Dec-23			305.75		305.50	
19-Dec-23			305.75		305.50	
20-Dec-23			305.75		305.50	
21-Dec-23			305.75		305.50	
22-Dec-23			305.75		305.50	
23-Dec-23			305.75		305.50	
24-Dec-23			305.75		305.50	
25-Dec-23			305.75		305.50	
26-Dec-23			305.75		305.50	
27-Dec-23			305.75		305.50	
28-Dec-23			305.75		305.50	
29-Dec-23			305.75		305.50	
30-Dec-23			305.75		305.50	
31-Dec-23			305.75		305.50	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-8
Threshold Summary - Phase 2 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 2 Pond (m)	Water Elevation Phase 2 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jan-22			305.30		305.00	
2-Jan-22			305.30		305.00	
3-Jan-22			305.30		305.00	
4-Jan-22			305.30		305.00	
5-Jan-22			305.30		305.00	
6-Jan-22			305.30		305.00	
7-Jan-22			305.30		305.00	
8-Jan-22			305.30		305.00	
9-Jan-22			305.30		305.00	
10-Jan-22			305.30		305.00	
11-Jan-22			305.30		305.00	
12-Jan-22			305.30		305.00	
13-Jan-22			305.30		305.00	
14-Jan-22			305.30		305.00	
15-Jan-22			305.30		305.00	
16-Jan-22			305.30		305.00	
17-Jan-22			305.30		305.00	
18-Jan-22			305.30		305.00	
19-Jan-22			305.30		305.00	
20-Jan-22			305.30		305.00	
21-Jan-22			305.30		305.00	
22-Jan-22			305.30		305.00	
23-Jan-22			305.30		305.00	
24-Jan-22			305.30		305.00	
25-Jan-22			305.30		305.00	
26-Jan-22			305.30		305.00	
27-Jan-22			305.30		305.00	
28-Jan-22			305.30		305.00	
29-Jan-22			305.30		305.00	
30-Jan-22			305.30		305.00	
31-Jan-22			305.30		305.00	
1-Feb-22			305.30		305.00	
2-Feb-22			305.30		305.00	
3-Feb-22			305.30		305.00	
4-Feb-22			305.30		305.00	
5-Feb-22			305.30		305.00	
6-Feb-22			305.30		305.00	
7-Feb-22			305.30		305.00	
8-Feb-22			305.30		305.00	
9-Feb-22			305.30		305.00	
10-Feb-22			305.30		305.00	
11-Feb-22			305.30		305.00	
12-Feb-22			305.30		305.00	
13-Feb-22			305.30		305.00	
14-Feb-22			305.30		305.00	
15-Feb-22			305.30		305.00	
16-Feb-22			305.30		305.00	
17-Feb-22			305.30		305.00	
18-Feb-22			305.30		305.00	
19-Feb-22			305.30		305.00	
20-Feb-22			305.30		305.00	
21-Feb-22			305.30		305.00	
22-Feb-22			305.30		305.00	
23-Feb-22			305.30		305.00	
24-Feb-22			305.30		305.00	
25-Feb-22			305.30		305.00	
26-Feb-22			305.30		305.00	
27-Feb-22			305.30		305.00	
28-Feb-22			305.30		305.00	
1-Mar-22			305.30		305.00	
2-Mar-22			305.30		305.00	
3-Mar-22			305.30		305.00	
4-Mar-22			305.30		305.00	
5-Mar-22			305.30		305.00	
6-Mar-22			305.30		305.00	
7-Mar-22			305.30		305.00	
8-Mar-22			305.30		305.00	
9-Mar-22			305.30		305.00	
10-Mar-22			305.30		305.00	
11-Mar-22			305.30		305.00	
12-Mar-22			305.30		305.00	
13-Mar-22			305.30		305.00	
14-Mar-22			305.30		305.00	
15-Mar-22			305.30		305.00	
16-Mar-22			305.30		305.00	
17-Mar-22			305.30		305.00	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-8
Threshold Summary - Phase 2 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 2 Pond (m)	Water Elevation Phase 2 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
18-Mar-22			305.30		305.00	
19-Mar-22			305.30		305.00	
20-Mar-22			305.30		305.00	
21-Mar-22			305.30		305.00	
22-Mar-22			305.30		305.00	
23-Mar-22			305.30		305.00	
24-Mar-22			305.30		305.00	
25-Mar-22			305.30		305.00	
26-Mar-22			305.30		305.00	
27-Mar-22			305.30		305.00	
28-Mar-22			305.30		305.00	
29-Mar-22			305.30		305.00	
30-Mar-22			305.30		305.00	
31-Mar-22			305.30		305.00	
1-Apr-22	0.73	305.99	305.30	no	305.00	no
2-Apr-22			305.30		305.00	
3-Apr-22			305.30		305.00	
4-Apr-22	0.73	305.99	305.30	no	305.00	no
5-Apr-22	0.74	306.00	305.30	no	305.00	no
6-Apr-22	0.74	306.00	305.30	no	305.00	no
7-Apr-22	0.75	306.01	305.30	no	305.00	no
8-Apr-22	0.75	306.01	305.30	no	305.00	no
9-Apr-22			305.30		305.00	
10-Apr-22			305.30		305.00	
11-Apr-22	0.75	306.01	305.30	no	305.00	no
12-Apr-22	0.76	306.02	305.30	no	305.00	no
13-Apr-22	0.76	306.02	305.30	no	305.00	no
14-Apr-22	0.76	306.02	305.30	no	305.00	no
15-Apr-22			305.30		305.00	
16-Apr-22			305.30		305.00	
17-Apr-22			305.30		305.00	
18-Apr-22	0.75	306.01	305.30	no	305.00	no
19-Apr-22	0.78	306.04	305.30	no	305.00	no
20-Apr-22	0.77	306.03	305.30	no	305.00	no
21-Apr-22	0.78	306.04	305.30	no	305.00	no
22-Apr-22	0.79	306.05	305.30	no	305.00	no
23-Apr-22			305.30		305.00	
24-Apr-22			305.30		305.00	
25-Apr-22	0.79	306.05	305.30	no	305.00	no
26-Apr-22	0.80	306.06	305.30	no	305.00	no
27-Apr-22	0.80	306.06	305.30	no	305.00	no
28-Apr-22	0.80	306.06	305.30	no	305.00	no
29-Apr-22	0.80	306.06	305.30	no	305.00	no
30-Apr-22			305.30		305.00	
1-May-22			305.30		305.00	
2-May-22	0.81	306.07	305.30	no	305.00	no
3-May-22	0.81	306.07	305.30	no	305.00	no
4-May-22	0.82	306.08	305.30	no	305.00	no
5-May-22	0.82	306.08	305.30	no	305.00	no
6-May-22	0.81	306.07	305.30	no	305.00	no
7-May-22			305.30		305.00	
8-May-22			305.30		305.00	
9-May-22	0.82	306.08	305.30	no	305.00	no
10-May-22	0.82	306.08	305.30	no	305.00	no
11-May-22	0.81	306.07	305.30	no	305.00	no
12-May-22	0.81	306.07	305.30	no	305.00	no
13-May-22	0.81	306.07	305.30	no	305.00	no
14-May-22	0.81	306.07	305.30	no	305.00	no
15-May-22			305.30		305.00	
16-May-22	0.81	306.07	305.30	no	305.00	no
17-May-22	0.81	306.07	305.30	no	305.00	no
18-May-22	0.80	306.06	305.30	no	305.00	no
19-May-22	0.81	306.07	305.30	no	305.00	no
20-May-22	0.81	306.07	305.30	no	305.00	no
21-May-22	0.81	306.07	305.30	no	305.00	no
22-May-22			305.30		305.00	
23-May-22			305.30		305.00	
24-May-22	0.80	306.06	305.30	no	305.00	no
25-May-22	0.80	306.06	305.30	no	305.00	no
26-May-22	0.80	306.06	305.30	no	305.00	no
27-May-22	0.80	306.06	305.30	no	305.00	no
28-May-22	0.80	306.06	305.30	no	305.00	no
29-May-22			305.30		305.00	
30-May-22	0.80	306.06	305.30	no	305.00	no
31-May-22	0.79	306.05	305.30	no	305.00	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-8
Threshold Summary - Phase 2 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 2 Pond (m)	Water Elevation Phase 2 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jun-22	0.79	306.05	305.30	no	305.00	no
2-Jun-22	0.79	306.05	305.30	no	305.00	no
3-Jun-22	0.79	306.05	305.30	no	305.00	no
4-Jun-22			305.30		305.00	
5-Jun-22			305.30		305.00	
6-Jun-22	0.78	306.04	305.30	no	305.00	no
7-Jun-22	0.78	306.04	305.30	no	305.00	no
8-Jun-22	0.77	306.03	305.30	no	305.00	no
9-Jun-22	0.77	306.03	305.30	no	305.00	no
10-Jun-22	0.77	306.03	305.30	no	305.00	no
11-Jun-22			305.30		305.00	
12-Jun-22			305.30		305.00	
13-Jun-22	0.79	306.05	305.30	no	305.00	no
14-Jun-22	0.78	306.04	305.30	no	305.00	no
15-Jun-22	0.77	306.03	305.30	no	305.00	no
16-Jun-22	0.77	306.03	305.30	no	305.00	no
17-Jun-22	0.77	306.03	305.30	no	305.00	no
18-Jun-22			305.30		305.00	
19-Jun-22			305.30		305.00	
20-Jun-22	0.77	306.03	305.30	no	305.00	no
21-Jun-22	0.77	306.03	305.30	no	305.00	no
22-Jun-22	0.77	306.03	305.30	no	305.00	no
23-Jun-22	0.77	306.03	305.30	no	305.00	no
24-Jun-22	0.76	306.02	305.30	no	305.00	no
25-Jun-22			305.30		305.00	
26-Jun-22			305.30		305.00	
27-Jun-22	0.76	306.02	305.30	no	305.00	no
28-Jun-22	0.76	306.02	305.30	no	305.00	no
29-Jun-22	0.65	305.91	305.30	no	305.00	no
30-Jun-22	0.65	305.91	305.30	no	305.00	no
1-Jul-22						
2-Jul-22			305.30		305.00	
3-Jul-22			305.30		305.00	
4-Jul-22	0.68	305.94	305.30	no	305.00	no
5-Jul-22	0.67	305.93	305.30	no	305.00	no
6-Jul-22	0.66	305.92	305.30	no	305.00	no
7-Jul-22	0.66	305.92	305.30	no	305.00	no
8-Jul-22	0.65	305.91	305.30	no	305.00	no
9-Jul-22			305.30		305.00	
10-Jul-22			305.30		305.00	
11-Jul-22	0.65	305.91	305.30	no	305.00	no
12-Jul-22	0.65	305.91	305.30	no	305.00	no
13-Jul-22	0.63	305.89	305.30	no	305.00	no
14-Jul-22	0.63	305.89	305.30	no	305.00	no
15-Jul-22	0.63	305.89	305.30	no	305.00	no
16-Jul-22			305.30		305.00	
17-Jul-22			305.30		305.00	
18-Jul-22	0.63	305.89	305.30	no	305.00	no
19-Jul-22	0.62	305.88	305.30	no	305.00	no
20-Jul-22	0.62	305.88	305.30	no	305.00	no
21-Jul-22	0.61	305.87	305.30	no	305.00	no
22-Jul-22	0.61	305.87	305.30	no	305.00	no
23-Jul-22			305.30		305.00	
24-Jul-22			305.30		305.00	
25-Jul-22	0.61	305.87	305.30	no	305.00	no
26-Jul-22	0.59	305.85	305.30	no	305.00	no
27-Jul-22	0.58	305.84	305.30	no	305.00	no
28-Jul-22	0.58	305.84	305.30	no	305.00	no
29-Jul-22	0.56	305.82	305.30	no	305.00	no
30-Jul-22			305.30		305.00	
31-Jul-22			305.30		305.00	
1-Aug-22			305.30		305.00	
2-Aug-22	0.56	305.82	305.30	no	305.00	no
3-Aug-22	0.55	305.81	305.30	no	305.00	no
4-Aug-22	0.56	305.82	305.30	no	305.00	no
5-Aug-22	0.57	305.83	305.30	no	305.00	no
6-Aug-22			305.30		305.00	
7-Aug-22			305.30		305.00	
8-Aug-22	0.57	305.83	305.30	no	305.00	no
9-Aug-22	0.55	305.81	305.30	no	305.00	no
10-Aug-22	0.54	305.80	305.30	no	305.00	no
11-Aug-22	0.53	305.79	305.30	no	305.00	no
12-Aug-22	0.51	305.77	305.30	no	305.00	no
13-Aug-22			305.30		305.00	
14-Aug-22			305.30		305.00	
15-Aug-22	0.50	305.76	305.30	no	305.00	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-8
Threshold Summary - Phase 2 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 2 Pond (m)	Water Elevation Phase 2 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
16-Aug-22	0.49	305.75	305.30	no	305.00	no
17-Aug-22	0.47	305.73	305.30	no	305.00	no
18-Aug-22	0.48	305.74	305.30	no	305.00	no
19-Aug-22	0.48	305.74	305.30	no	305.00	no
20-Aug-22			305.30		305.00	
21-Aug-22			305.30		305.00	
22-Aug-22	0.52	305.78	305.30	no	305.00	no
23-Aug-22	0.53	305.79	305.30	no	305.00	no
24-Aug-22	0.51	305.77	305.30	no	305.00	no
25-Aug-22	0.50	305.76	305.30	no	305.00	no
26-Aug-22	0.50	305.76	305.30	no	305.00	no
27-Aug-22			305.30		305.00	
28-Aug-22			305.30		305.00	
29-Aug-22	0.49	305.75	305.30	no	305.00	no
30-Aug-22	0.48	305.74	305.30	no	305.00	no
31-Aug-22	0.48	305.74	305.30	no	305.00	no
1-Sep-22	0.45	305.71	305.30	no	305.00	no
2-Sep-22	0.43	305.69	305.30	no	305.00	no
3-Sep-22			305.30		305.00	
4-Sep-22			305.30		305.00	
5-Sep-22			305.30		305.00	
6-Sep-22	0.43	305.69	305.30	no	305.00	no
7-Sep-22	0.43	305.69	305.30	no	305.00	no
8-Sep-22	0.42	305.68	305.30	no	305.00	no
9-Sep-22	0.42	305.68	305.30	no	305.00	no
10-Sep-22			305.30		305.00	
11-Sep-22			305.30		305.00	
12-Sep-22	0.42	305.68	305.30	no	305.00	no
13-Sep-22	0.41	305.67	305.30	no	305.00	no
14-Sep-22	0.40	305.66	305.30	no	305.00	no
15-Sep-22	0.41	305.67	305.30	no	305.00	no
16-Sep-22	0.39	305.65	305.30	no	305.00	no
17-Sep-22			305.30		305.00	
18-Sep-22			305.30		305.00	
19-Sep-22	0.39	305.65	305.30	no	305.00	no
20-Sep-22	0.38	305.64	305.30	no	305.00	no
21-Sep-22	0.38	305.64	305.30	no	305.00	no
22-Sep-22	0.37	305.63	305.30	no	305.00	no
23-Sep-22	0.35	305.61	305.30	no	305.00	no
24-Sep-22			305.30		305.00	
25-Sep-22			305.30		305.00	
26-Sep-22	0.35	305.61	305.30	no	305.00	no
27-Sep-22	0.35	305.61	305.30	no	305.00	no
28-Sep-22	0.35	305.61	305.30	no	305.00	no
29-Sep-22	0.31	305.57	305.30	no	305.00	no
30-Sep-22	0.32	305.58	305.30	no	305.00	no
1-Oct-22			305.30		305.00	
2-Oct-22			305.30		305.00	
3-Oct-22	0.29	305.55	305.30	no	305.00	no
4-Oct-22	0.29	305.55	305.30	no	305.00	no
5-Oct-22	0.29	305.55	305.30	no	305.00	no
6-Oct-22	0.28	305.54	305.30	no	305.00	no
7-Oct-22	0.26	305.52	305.30	no	305.00	no
8-Oct-22			305.30		305.00	
9-Oct-22			305.30		305.00	
10-Oct-22			305.30		305.00	
11-Oct-22	0.25	305.51	305.30	no	305.00	no
12-Oct-22	0.23	305.49	305.30	no	305.00	no
13-Oct-22	0.28	305.54	305.30	no	305.00	no
14-Oct-22	0.28	305.54	305.30	no	305.00	no
15-Oct-22			305.30		305.00	
16-Oct-22			305.30		305.00	
17-Oct-22	0.28	305.54	305.30	no	305.00	no
18-Oct-22	0.26	305.52	305.30	no	305.00	no
19-Oct-22	0.26	305.52	305.30	no	305.00	no
20-Oct-22	0.26	305.52	305.30	no	305.00	no
21-Oct-22	0.26	305.52	305.30	no	305.00	no
22-Oct-22			305.30		305.00	
23-Oct-22			305.30		305.00	
24-Oct-22	0.25	305.51	305.30	no	305.00	no
25-Oct-22	0.24	305.50	305.30	no	305.00	no
26-Oct-22	0.24	305.50	305.30	no	305.00	no
27-Oct-22	0.24	305.50	305.30	no	305.00	no
28-Oct-22	0.24	305.50	305.30	no	305.00	no
29-Oct-22			305.30		305.00	
30-Oct-22			305.30		305.00	
31-Oct-22	0.23	305.49	305.30	no	306.00	yes

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-8
Threshold Summary - Phase 2 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 2 Pond (m)	Water Elevation Phase 2 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Nov-22	0.23	305.49	305.30	no	305.00	no
2-Nov-22	0.23	305.49	305.30	no	305.00	no
3-Nov-22	0.21	305.47	305.30	no	305.00	no
4-Nov-22	0.23	305.49	305.30	no	305.00	no
5-Nov-22			305.30		305.00	
6-Nov-22			305.30		305.00	
7-Nov-22	0.23	305.49	305.30	no	305.00	no
8-Nov-22	0.23	305.49	305.30	no	305.00	no
9-Nov-22	0.23	305.49	305.30	no	305.00	no
10-Nov-22	0.23	305.49	305.30	no	305.00	no
11-Nov-22	0.21	305.47	305.30	no	305.00	no
12-Nov-22			305.30		305.00	
13-Nov-22			305.30		305.00	
14-Nov-22	0.19	305.45	305.30	no	305.00	no
15-Nov-22	0.21	305.47	305.30	no	305.00	no
16-Nov-22	0.17	305.43	305.30	no	305.00	no
17-Nov-22	0.20	305.46	305.30	no	305.00	no
18-Nov-22	0.20	305.46	305.30	no	305.00	no
19-Nov-22			305.30		305.00	
20-Nov-22			305.30		305.00	
21-Nov-22	0.19	305.45	305.30	no	305.00	no
22-Nov-22	0.18	305.44	305.30	no	305.00	no
23-Nov-22	0.18	305.44	305.30	no	305.00	no
24-Nov-22	0.19	305.45	305.30	no	305.00	no
25-Nov-22	0.17	305.43	305.30	no	305.00	no
26-Nov-22			305.30		305.00	
27-Nov-22			305.30		305.00	
28-Nov-22	0.16	305.42	305.30	no	305.00	no
29-Nov-22	0.16	305.42	305.30	no	305.00	no
30-Nov-22	0.16	305.42	305.30	no	305.00	no
1-Dec-22	0.18	305.44	305.30	no	305.00	no
2-Dec-22	0.18	305.44	305.30	no	305.00	no
3-Dec-22			305.30		305.00	
4-Dec-22			305.30		305.00	
5-Dec-22	0.18	305.44	305.30	no	305.00	no
6-Dec-22	0.17	305.43	305.30	no	305.00	no
7-Dec-22	0.18	305.44	305.30	no	305.00	no
8-Dec-22	0.16	305.42	305.30	no	305.00	no
9-Dec-22			305.30		305.00	
10-Dec-22			305.30		305.00	
11-Dec-22			305.30		305.00	
12-Dec-22			305.30		305.00	
13-Dec-22			305.30		305.00	
14-Dec-22			305.30		305.00	
15-Dec-22			305.30		305.00	
16-Dec-22			305.30		305.00	
17-Dec-22			305.30		305.00	
18-Dec-22			305.30		305.00	
19-Dec-22			305.30		305.00	
20-Dec-22			305.30		305.00	
21-Dec-22			305.30		305.00	
22-Dec-22			305.30		305.00	
23-Dec-22			305.30		305.00	
24-Dec-22			305.30		305.00	
25-Dec-22			305.30		305.00	
26-Dec-22			305.30		305.00	
27-Dec-22			305.30		305.00	
28-Dec-22			305.30		305.00	
29-Dec-22			305.30		305.00	
30-Dec-22			305.30		305.00	
31-Dec-22			305.30		305.00	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-8
Threshold Summary - Phase 2 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 2 Pond (m)	Water Elevation Phase 2 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jan-23			305.30		305.00	
2-Jan-23			305.30		305.00	
3-Jan-23			305.30		305.00	
4-Jan-23			305.30		305.00	
5-Jan-23			305.30		305.00	
6-Jan-23			305.30		305.00	
7-Jan-23			305.30		305.00	
8-Jan-23			305.30		305.00	
9-Jan-23			305.30		305.00	
10-Jan-23			305.30		305.00	
11-Jan-23			305.30		305.00	
12-Jan-23			305.30		305.00	
13-Jan-23			305.30		305.00	
14-Jan-23			305.30		305.00	
15-Jan-23			305.30		305.00	
16-Jan-23			305.30		305.00	
17-Jan-23			305.30		305.00	
18-Jan-23			305.30		305.00	
19-Jan-23			305.30		305.00	
20-Jan-23			305.30		305.00	
21-Jan-23			305.30		305.00	
22-Jan-23			305.30		305.00	
23-Jan-23			305.30		305.00	
24-Jan-23			305.30		305.00	
25-Jan-23			305.30		305.00	
26-Jan-23			305.30		305.00	
27-Jan-23			305.30		305.00	
28-Jan-23			305.30		305.00	
29-Jan-23			305.30		305.00	
30-Jan-23			305.30		305.00	
31-Jan-23			305.30		305.00	
1-Feb-23			305.30		305.00	
2-Feb-23			305.30		305.00	
3-Feb-23			305.30		305.00	
4-Feb-23			305.30		305.00	
5-Feb-23			305.30		305.00	
6-Feb-23			305.30		305.00	
7-Feb-23			305.30		305.00	
8-Feb-23			305.30		305.00	
9-Feb-23			305.30		305.00	
10-Feb-23			305.30		305.00	
11-Feb-23			305.30		305.00	
12-Feb-23			305.30		305.00	
13-Feb-23			305.30		305.00	
14-Feb-23			305.30		305.00	
15-Feb-23			305.30		305.00	
16-Feb-23			305.30		305.00	
17-Feb-23			305.30		305.00	
18-Feb-23			305.30		305.00	
19-Feb-23			305.30		305.00	
20-Feb-23			305.30		305.00	
21-Feb-23			305.30		305.00	
22-Feb-23			305.30		305.00	
23-Feb-23			305.30		305.00	
24-Feb-23			305.30		305.00	
25-Feb-23			305.30		305.00	
26-Feb-23			305.30		305.00	
27-Feb-23			305.30		305.00	
28-Feb-23			305.30		305.00	
1-Mar-23			305.30		305.00	
2-Mar-23			305.30		305.00	
3-Mar-23			305.30		305.00	
4-Mar-23			305.30		305.00	
5-Mar-23			305.30		305.00	
6-Mar-23			305.30		305.00	
7-Mar-23			305.30		305.00	
8-Mar-23			305.30		305.00	
9-Mar-23			305.30		305.00	
10-Mar-23			305.30		305.00	
11-Mar-23			305.30		305.00	
12-Mar-23			305.30		305.00	
13-Mar-23			305.30		305.00	
14-Mar-23			305.30		305.00	
15-Mar-23			305.30		305.00	
16-Mar-23			305.30		305.00	
17-Mar-23			305.30		305.00	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-8
Threshold Summary - Phase 2 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 2 Pond (m)	Water Elevation Phase 2 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
18-Mar-23			305.30		305.00	
19-Mar-23			305.30		305.00	
20-Mar-23			305.30		305.00	
21-Mar-23			305.30		305.00	
22-Mar-23			305.30		305.00	
23-Mar-23			305.30		305.00	
24-Mar-23			305.30		305.00	
25-Mar-23			305.30		305.00	
26-Mar-23			305.30		305.00	
27-Mar-23			305.30		305.00	
28-Mar-23			305.30		305.00	
29-Mar-23			305.30		305.00	
30-Mar-23			305.30		305.00	
31-Mar-23			305.30		305.00	
1-Apr-23			305.30		305.00	
2-Apr-23			305.30		305.00	
3-Apr-23	0.70	305.70	305.30	no	305.00	no
4-Apr-23	0.70	305.70	305.30	no	305.00	no
5-Apr-23	0.70	305.71	305.30	no	305.00	no
6-Apr-23	0.70	305.71	305.30	no	305.00	no
7-Apr-23			305.30		305.00	
8-Apr-23			305.30		305.00	
9-Apr-23			305.30		305.00	
10-Apr-23	0.70	305.71	305.30	no	305.00	no
11-Apr-23	0.70	305.72	305.30	no	305.00	no
12-Apr-23	0.70	305.72	305.30	no	305.00	no
13-Apr-23	0.70	305.72	305.30	no	305.00	no
14-Apr-23	0.70	305.72	305.30	no	305.00	no
15-Apr-23			305.30		305.00	
16-Apr-23			305.30		305.00	
17-Apr-23	0.70	305.72	305.30	no	305.00	no
18-Apr-23	0.70	305.72	305.30	no	305.00	no
19-Apr-23	0.70	305.72	305.30	no	305.00	no
20-Apr-23	0.71	305.73	305.30	no	305.00	no
21-Apr-23	0.71	305.73	305.30	no	305.00	no
22-Apr-23			305.30		305.00	
23-Apr-23			305.30		305.00	
24-Apr-23	0.74	305.76	305.30	no	305.00	no
25-Apr-23	0.73	305.75	305.30	no	305.00	no
26-Apr-23	0.75	305.77	305.30	no	305.00	no
27-Apr-23	0.74	305.76	305.30	no	305.00	no
28-Apr-23	0.74	305.76	305.30	no	305.00	no
29-Apr-23			305.30		305.00	
30-Apr-23			305.30		305.00	
1-May-23	0.76	305.78	305.30	no	305.00	no
2-May-23	0.75	305.77	305.30	no	305.00	no
3-May-23	0.73	305.75	305.30	no	305.00	no
4-May-23	0.73	305.75	305.30	no	305.00	no
5-May-23	0.73	305.75	305.30	no	305.00	no
6-May-23			305.30		305.00	
7-May-23			305.30		305.00	
8-May-23			305.30		305.00	
9-May-23	0.78	305.80	305.30	no	305.00	no
10-May-23	0.77	305.79	305.30	no	305.00	no
11-May-23	0.78	305.80	305.30	no	305.00	no
12-May-23	0.78	305.80	305.30	no	305.00	no
13-May-23			305.30		305.00	
14-May-23			305.30		305.00	
15-May-23	0.78	305.80	305.30	no	305.00	no
16-May-23	0.78	305.80	305.30	no	305.00	no
17-May-23	0.78	305.80	305.30	no	305.00	no
18-May-23	0.78	305.80	305.30	no	305.00	no
19-May-23	0.78	305.80	305.30	no	305.00	no
20-May-23			305.30		305.00	
21-May-23			305.30		305.00	
22-May-23			305.30		305.00	
23-May-23			305.30		305.00	
24-May-23	0.82	305.84	305.30	no	305.00	no
25-May-23	0.83	305.85	305.30	no	305.00	no
26-May-23	0.82	305.84	305.30	no	305.00	no
27-May-23			305.30		305.00	
28-May-23			305.30		305.00	
29-May-23	0.82	305.84	305.30	no	305.00	no
30-May-23	0.82	305.84	305.30	no	305.00	no
31-May-23	0.80	305.82	305.30	no	305.00	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-8
Threshold Summary - Phase 2 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 2 Pond (m)	Water Elevation Phase 2 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jun-23	0.80	305.82	305.30	no	305.00	no
2-Jun-23	0.80	305.82	305.30	no	305.00	no
3-Jun-23			305.30		305.00	
4-Jun-23			305.30		305.00	
5-Jun-23	0.80	305.82	305.30	no	305.00	no
6-Jun-23	0.80	305.82	305.30	no	305.00	no
7-Jun-23	0.80	305.82	305.30	no	305.00	no
8-Jun-23	0.80	305.82	305.30	no	305.00	no
9-Jun-23	0.80	305.82	305.30	no	305.00	no
10-Jun-23			305.30		305.00	
11-Jun-23			305.30		305.00	
12-Jun-23	0.78	305.80	305.30	no	305.00	no
13-Jun-23	0.81	305.83	305.30	no	305.00	no
14-Jun-23	0.81	305.83	305.30	no	305.00	no
15-Jun-23	0.80	305.82	305.30	no	305.00	no
16-Jun-23	0.82	305.84	305.30	no	305.00	no
17-Jun-23			305.30		305.00	
18-Jun-23			305.30		305.00	
19-Jun-23	0.80	305.82	305.30	no	305.00	no
20-Jun-23	0.80	305.82	305.30	no	305.00	no
21-Jun-23	0.79	305.81	305.30	no	305.00	no
22-Jun-23	0.80	305.82	305.30	no	305.00	no
23-Jun-23	0.80	305.82	305.30	no	305.00	no
24-Jun-23			305.30		305.00	
25-Jun-23			305.30		305.00	
26-Jun-23	0.80	305.82	305.30	no	305.00	no
27-Jun-23	0.83	305.85	305.30	no	305.00	no
28-Jun-23	0.84	305.86	305.30	no	305.00	no
29-Jun-23	0.84	305.86	305.30	no	305.00	no
30-Jun-23	0.83	305.85	305.30	no	305.00	no
1-Jul-23			305.30		305.00	
2-Jul-23			305.30		305.00	
3-Jul-23			305.30		305.00	
4-Jul-23	0.85	305.87	305.30	no	305.00	no
5-Jul-23	0.85	305.87	305.30	no	305.00	no
6-Jul-23	0.85	305.87	305.30	no	305.00	no
7-Jul-23	0.87	305.89	305.30	no	305.00	no
8-Jul-23			305.30		305.00	
9-Jul-23			305.30		305.00	
10-Jul-23	0.85	305.87	305.30	no	305.00	no
11-Jul-23	0.83	305.85	305.30	no	305.00	no
12-Jul-23	0.85	305.87	305.30	no	305.00	no
13-Jul-23	0.86	305.88	305.30	no	305.00	no
14-Jul-23	0.89	305.91	305.30	no	305.00	no
15-Jul-23			305.30		305.00	
16-Jul-23			305.30		305.00	
17-Jul-23	0.89	305.91	305.30	no	305.00	no
18-Jul-23	0.88	305.90	305.30	no	305.00	no
19-Jul-23	0.88	305.90	305.30	no	305.00	no
20-Jul-23	0.88	305.90	305.30	no	305.00	no
21-Jul-23	0.88	305.90	305.30	no	305.00	no
22-Jul-23			305.30		305.00	
23-Jul-23			305.30		305.00	
24-Jul-23	0.88	305.90	305.30	no	305.00	no
25-Jul-23	0.87	305.89	305.30	no	305.00	no
26-Jul-23	0.86	305.88	305.30	no	305.00	no
27-Jul-23	0.88	305.90	305.30	no	305.00	no
28-Jul-23	0.88	305.90	305.30	no	305.00	no
29-Jul-23	0.88	305.90	305.30	no	305.00	no
30-Jul-23			305.30		305.00	
31-Jul-23	0.89	305.91	305.30	no	305.00	no
1-Aug-23	0.89	305.91	305.30	no	305.00	no
2-Aug-23	0.88	305.90	305.30	no	305.00	no
3-Aug-23	0.88	305.90	305.30	no	305.00	no
4-Aug-23	0.88	305.90	305.30	no	305.00	no
5-Aug-23			305.30		305.00	
6-Aug-23			305.30		305.00	
7-Aug-23			305.30		305.00	
8-Aug-23	0.88	305.90	305.30	no	305.00	no
9-Aug-23	0.87	305.89	305.30	no	305.00	no
10-Aug-23	0.87	305.89	305.30	no	305.00	no
11-Aug-23	0.87	305.89	305.30	no	305.00	no
12-Aug-23			305.30		305.00	
13-Aug-23			305.30		305.00	
14-Aug-23	0.87	305.89	305.30	no	305.00	no
15-Aug-23	0.88	305.90	305.30	no	305.00	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-8
Threshold Summary - Phase 2 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 2 Pond (m)	Water Elevation Phase 2 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
16-Aug-23	0.88	305.90	305.30	no	305.00	no
17-Aug-23	0.88	305.90	305.30	no	305.00	no
18-Aug-23	0.90	305.92	305.30	no	305.00	no
19-Aug-23	0.90	305.92	305.30	no	305.00	no
20-Aug-23			305.30		305.00	
21-Aug-23	0.88	305.90	305.30	no	305.00	no
22-Aug-23	0.88	305.90	305.30	no	305.00	no
23-Aug-23	0.88	305.90	305.30	no	305.00	no
24-Aug-23	0.88	305.90	305.30	no	305.00	no
25-Aug-23	0.90	305.92	305.30	no	305.00	no
26-Aug-23	0.90	305.92	305.30	no	305.00	no
27-Aug-23			305.30		305.00	
28-Aug-23	0.89	305.91	305.30	no	305.00	no
29-Aug-23	0.90	305.92	305.30	no	305.00	no
30-Aug-23	0.90	305.92	305.30	no	305.00	no
31-Aug-23	0.89	305.91	305.30	no	305.00	no
1-Sep-23	0.87	305.89	305.30	no	305.00	no
2-Sep-23	0.87	305.89	305.30	no	305.00	no
3-Sep-23			305.30		305.00	
4-Sep-23			305.30		305.00	
5-Sep-23	0.88	305.90	305.30	no	305.00	no
6-Sep-23	0.89	305.91	305.30	no	305.00	no
7-Sep-23	0.89	305.91	305.30	no	305.00	no
8-Sep-23	0.88	305.90	305.30	no	305.00	no
9-Sep-23	0.88	305.90	305.30	no	305.00	no
10-Sep-23			305.30		305.00	
11-Sep-23	0.87	305.89	305.30	no	305.00	no
12-Sep-23	0.87	305.89	305.30	no	305.00	no
13-Sep-23	0.87	305.89	305.30	no	305.00	no
14-Sep-23	0.87	305.89	305.30	no	305.00	no
15-Sep-23	0.87	305.89	305.30	no	305.00	no
16-Sep-23	0.87	305.89	305.30	no	305.00	no
17-Sep-23			305.30		305.00	
18-Sep-23	0.88	305.90	305.30	no	305.00	no
19-Sep-23	0.87	305.89	305.30	no	305.00	no
20-Sep-23	0.86	305.88	305.30	no	305.00	no
21-Sep-23	0.86	305.88	305.30	no	305.00	no
22-Sep-23	0.86	305.88	305.30	no	305.00	no
23-Sep-23	0.86	305.88	305.30	no	305.00	no
24-Sep-23			305.30		305.00	
25-Sep-23	0.85	305.87	305.30	no	305.00	no
26-Sep-23	0.85	305.87	305.30	no	305.00	no
27-Sep-23	0.85	305.87	305.30	no	305.00	no
28-Sep-23	0.83	305.85	305.30	no	305.00	no
29-Sep-23	0.83	305.85	305.30	no	305.00	no
30-Sep-23			305.30		305.00	
1-Oct-23			305.30		305.00	
2-Oct-23	0.82	305.84	305.30	no	305.00	no
3-Oct-23	0.81	305.83	305.30	no	305.00	no
4-Oct-23	0.80	305.82	305.30	no	305.00	no
5-Oct-23	0.81	305.83	305.30	no	305.00	no
6-Oct-23	0.83	305.85	305.30	no	305.00	no
7-Oct-23			305.30		305.00	
8-Oct-23			305.30		305.00	
9-Oct-23			305.30		305.00	
10-Oct-23	0.84	305.86	305.30	no	305.00	no
11-Oct-23	0.80	305.82	305.30	no	305.00	no
12-Oct-23	0.80	305.82	305.30	no	305.00	no
13-Oct-23	0.80	305.82	305.30	no	305.00	no
14-Oct-23	0.80	305.82	305.30	no	305.00	no
15-Oct-23			305.30		305.00	
16-Oct-23	0.79	305.81	305.30	no	305.00	no
17-Oct-23	0.79	305.81	305.30	no	305.00	no
18-Oct-23	0.79	305.81	305.30	no	305.00	no
19-Oct-23	0.78	305.80	305.30	no	305.00	no
20-Oct-23	0.78	305.80	305.30	no	305.00	no
21-Oct-23	0.78	305.80	305.30	no	305.00	no
22-Oct-23			305.30		305.00	
23-Oct-23	0.78	305.80	305.30	no	305.00	no
24-Oct-23	0.78	305.80	305.30	no	305.00	no
25-Oct-23	0.77	305.79	305.30	no	305.00	no
26-Oct-23	0.77	305.79	305.30	no	305.00	no
27-Oct-23	0.78	305.80	305.30	no	305.00	no
28-Oct-23	0.78	305.80	305.30	no	305.00	no
29-Oct-23			305.30		305.00	
30-Oct-23	0.77	305.79	305.30	no	305.00	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-8
Threshold Summary - Phase 2 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 2 Pond (m)	Water Elevation Phase 2 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
31-Oct-23	0.77	305.79	305.30	no	305.00	no
1-Nov-23	0.75	305.77	305.30	no	305.00	no
2-Nov-23	0.75	305.77	305.30	no	305.00	no
3-Nov-23	0.77	305.79	305.30	no	305.00	no
4-Nov-23			305.30		305.00	
5-Nov-23			305.30		305.00	
6-Nov-23	0.77	305.79	305.30	no	305.00	no
7-Nov-23	0.77	305.79	305.30	no	305.00	no
8-Nov-23	0.77	305.79	305.30	no	305.00	no
9-Nov-23	0.77	305.79	305.30	no	305.00	no
10-Nov-23	0.75	305.77	305.30	no	305.00	no
11-Nov-23	0.75	305.77	305.30	no	305.00	no
12-Nov-23			305.30		305.00	
13-Nov-23	0.75	305.77	305.30	no	305.00	no
14-Nov-23	0.74	305.76	305.30	no	305.00	no
15-Nov-23	0.74	305.76	305.30	no	305.00	no
16-Nov-23	0.74	305.76	305.30	no	305.00	no
17-Nov-23	0.74	305.76	305.30	no	305.00	no
18-Nov-23	0.73	305.75	305.30	no	305.00	no
19-Nov-23			305.30		305.00	
20-Nov-23	0.74	305.76	305.30	no	305.00	no
21-Nov-23	0.74	305.76	305.30	no	305.00	no
22-Nov-23	0.73	305.75	305.30	no	305.00	no
23-Nov-23	0.72	305.74	305.30	no	305.00	no
24-Nov-23	0.72	305.74	305.30	no	305.00	no
25-Nov-23			305.30		305.00	
26-Nov-23			305.30		305.00	
27-Nov-23	0.71	305.73	305.30	no	305.00	no
28-Nov-23	0.71	305.73	305.30	no	305.00	no
29-Nov-23	0.71	305.73	305.30	no	305.00	no
30-Nov-23	0.71	305.73	305.30	no	305.00	no
1-Dec-23	0.71	305.73	305.30	no	305.00	no
2-Dec-23			305.30		305.00	
3-Dec-23			305.30		305.00	
4-Dec-23	0.71	305.73	305.30	no	305.00	no
5-Dec-23	0.71	305.73	305.30	no	305.00	no
6-Dec-23	0.71	305.73	305.30	no	305.00	no
7-Dec-23	0.71	305.73	305.30	no	305.00	no
8-Dec-23	0.71	305.73	305.30	no	305.00	no
9-Dec-23			305.30		305.00	
10-Dec-23			305.30		305.00	
11-Dec-23			305.30		305.00	
12-Dec-23			305.30		305.00	
13-Dec-23			305.30		305.00	
14-Dec-23			305.30		305.00	
15-Dec-23			305.30		305.00	
16-Dec-23			305.30		305.00	
17-Dec-23			305.30		305.00	
18-Dec-23			305.30		305.00	
19-Dec-23			305.30		305.00	
20-Dec-23			305.30		305.00	
21-Dec-23			305.30		305.00	
22-Dec-23			305.30		305.00	
23-Dec-23			305.30		305.00	
24-Dec-23			305.30		305.00	
25-Dec-23			305.30		305.00	
26-Dec-23			305.30		305.00	
27-Dec-23			305.30		305.00	
28-Dec-23			305.30		305.00	
29-Dec-23			305.30		305.00	
30-Dec-23			305.30		305.00	
31-Dec-23			305.30		305.00	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-9
Threshold Summary - Phase 3 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 3 Pond (m)	Water Elevation Phase 3 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jan-22			304.10		303.85	
2-Jan-22			304.10		303.85	
3-Jan-22			304.10		303.85	
4-Jan-22			304.10		303.85	
5-Jan-22			304.10		303.85	
6-Jan-22			304.10		303.85	
7-Jan-22			304.10		303.85	
8-Jan-22			304.10		303.85	
9-Jan-22			304.10		303.85	
10-Jan-22			304.10		303.85	
11-Jan-22			304.10		303.85	
12-Jan-22			304.10		303.85	
13-Jan-22			304.10		303.85	
14-Jan-22			304.10		303.85	
15-Jan-22			304.10		303.85	
16-Jan-22			304.10		303.85	
17-Jan-22			304.10		303.85	
18-Jan-22			304.10		303.85	
19-Jan-22			304.10		303.85	
20-Jan-22			304.10		303.85	
21-Jan-22			304.10		303.85	
22-Jan-22			304.10		303.85	
23-Jan-22			304.10		303.85	
24-Jan-22			304.10		303.85	
25-Jan-22			304.10		303.85	
26-Jan-22			304.10		303.85	
27-Jan-22			304.10		303.85	
28-Jan-22			304.10		303.85	
29-Jan-22			304.10		303.85	
30-Jan-22			304.10		303.85	
31-Jan-22			304.10		303.85	
1-Feb-22			304.10		303.85	
2-Feb-22			304.10		303.85	
3-Feb-22			304.10		303.85	
4-Feb-22			304.10		303.85	
5-Feb-22			304.10		303.85	
6-Feb-22			304.10		303.85	
7-Feb-22			304.10		303.85	
8-Feb-22			304.10		303.85	
9-Feb-22			304.10		303.85	
10-Feb-22			304.10		303.85	
11-Feb-22			304.10		303.85	
12-Feb-22			304.10		303.85	
13-Feb-22			304.10		303.85	
14-Feb-22			304.10		303.85	
15-Feb-22			304.10		303.85	
16-Feb-22			304.10		303.85	
17-Feb-22			304.10		303.85	
18-Feb-22			304.10		303.85	
19-Feb-22			304.10		303.85	
20-Feb-22			304.10		303.85	
21-Feb-22			304.10		303.85	
22-Feb-22			304.10		303.85	
23-Feb-22			304.10		303.85	
24-Feb-22			304.10		303.85	
25-Feb-22			304.10		303.85	
26-Feb-22			304.10		303.85	
27-Feb-22			304.10		303.85	
28-Feb-22			304.10		303.85	
1-Mar-22			304.10		303.85	
2-Mar-22			304.10		303.85	
3-Mar-22			304.10		303.85	
4-Mar-22			304.10		303.85	
5-Mar-22			304.10		303.85	
6-Mar-22			304.10		303.85	
7-Mar-22			304.10		303.85	
8-Mar-22			304.10		303.85	
9-Mar-22			304.10		303.85	
10-Mar-22			304.10		303.85	
11-Mar-22			304.10		303.85	
12-Mar-22			304.10		303.85	
13-Mar-22			304.10		303.85	
14-Mar-22			304.10		303.85	
15-Mar-22			304.10		303.85	
16-Mar-22			304.10		303.85	
17-Mar-22			304.10		303.85	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-9
Threshold Summary - Phase 3 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 3 Pond (m)	Water Elevation Phase 3 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
18-Mar-22			304.10		303.85	
19-Mar-22			304.10		303.85	
20-Mar-22			304.10		303.85	
21-Mar-22			304.10		303.85	
22-Mar-22			304.10		303.85	
23-Mar-22			304.10		303.85	
24-Mar-22			304.10		303.85	
25-Mar-22			304.10		303.85	
26-Mar-22			304.10		303.85	
27-Mar-22			304.10		303.85	
28-Mar-22			304.10		303.85	
29-Mar-22			304.10		303.85	
30-Mar-22			304.10		303.85	
31-Mar-22			304.10		303.85	
1-Apr-22	0.64	304.87	304.10	no	303.85	no
2-Apr-22			304.10		303.85	
3-Apr-22			304.10		303.85	
4-Apr-22	0.63	304.86	304.10	no	303.85	no
5-Apr-22	0.63	304.86	304.10	no	303.85	no
6-Apr-22	0.64	304.87	304.10	no	303.85	no
7-Apr-22	0.64	304.87	304.10	no	303.85	no
8-Apr-22	0.63	304.86	304.10	no	303.85	no
9-Apr-22			304.10		303.85	
10-Apr-22			304.10		303.85	
11-Apr-22	0.63	304.86	304.10	no	303.85	no
12-Apr-22	0.62	304.85	304.10	no	303.85	no
13-Apr-22	0.62	304.85	304.10	no	303.85	no
14-Apr-22	0.62	304.85	304.10	no	303.85	no
15-Apr-22			304.10		303.85	
16-Apr-22			304.10		303.85	
17-Apr-22			304.10		303.85	
18-Apr-22	0.62	304.85	304.10	no	303.85	no
19-Apr-22	0.62	304.85	304.10	no	303.85	no
20-Apr-22	0.62	304.85	304.10	no	303.85	no
21-Apr-22	0.62	304.85	304.10	no	303.85	no
22-Apr-22	0.63	304.86	304.10	no	303.85	no
23-Apr-22			304.10		303.85	
24-Apr-22			304.10		303.85	
25-Apr-22	0.63	304.86	304.10	no	303.85	no
26-Apr-22	0.63	304.86	304.10	no	303.85	no
27-Apr-22	0.63	304.86	304.10	no	303.85	no
28-Apr-22	0.62	304.85	304.10	no	303.85	no
29-Apr-22	0.62	304.85	304.10	no	303.85	no
30-Apr-22			304.10		303.85	
1-May-22			304.10		303.85	
2-May-22	0.61	304.84	304.10	no	303.85	no
3-May-22	0.61	304.84	304.10	no	303.85	no
4-May-22	0.62	304.85	304.10	no	303.85	no
5-May-22	0.63	304.86	304.10	no	303.85	no
6-May-22	0.63	304.86	304.10	no	303.85	no
7-May-22			304.10		303.85	
8-May-22			304.10		303.85	
9-May-22	0.62	304.85	304.10	no	303.85	no
10-May-22	0.62	304.85	304.10	no	303.85	no
11-May-22	0.60	304.83	304.10	no	303.85	no
12-May-22	0.61	304.84	304.10	no	303.85	no
13-May-22	0.60	304.83	304.10	no	303.85	no
14-May-22	0.60	304.83	304.10	no	303.85	no
15-May-22			304.10		303.85	
16-May-22	0.60	304.83	304.10	no	303.85	no
17-May-22	0.59	304.82	304.10	no	303.85	no
18-May-22	0.60	304.83	304.10	no	303.85	no
19-May-22	0.61	304.84	304.10	no	303.85	no
20-May-22	0.62	304.85	304.10	no	303.85	no
21-May-22	0.64	304.87	304.10	no	303.85	no
22-May-22			304.10		303.85	
23-May-22			304.10		303.85	
24-May-22	0.66	304.89	304.10	no	303.85	no
25-May-22	0.66	304.89	304.10	no	303.85	no
26-May-22	0.67	304.90	304.10	no	303.85	no
27-May-22	0.68	304.91	304.10	no	303.85	no
28-May-22	0.68	304.91	304.10	no	303.85	no
29-May-22			304.10		303.85	
30-May-22	0.69	304.92	304.10	no	303.85	no
31-May-22	0.70	304.93	304.10	no	303.85	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-9
Threshold Summary - Phase 3 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 3 Pond (m)	Water Elevation Phase 3 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jun-22	0.70	304.93	304.10	no	303.85	no
2-Jun-22	0.70	304.93	304.10	no	303.85	no
3-Jun-22	0.71	304.94	304.10	no	303.85	no
4-Jun-22			304.10		303.85	
5-Jun-22			304.10		303.85	
6-Jun-22	0.71	304.94	304.10	no	303.85	no
7-Jun-22	0.70	304.93	304.10	no	303.85	no
8-Jun-22	0.70	304.93	304.10	no	303.85	no
9-Jun-22	0.70	304.93	304.10	no	303.85	no
10-Jun-22	0.69	304.92	304.10	no	303.85	no
11-Jun-22			304.10		303.85	
12-Jun-22			304.10		303.85	
13-Jun-22	0.70	304.93	304.10	no	303.85	no
14-Jun-22	0.70	304.93	304.10	no	303.85	no
15-Jun-22	0.70	304.93	304.10	no	303.85	no
16-Jun-22	0.70	304.93	304.10	no	303.85	no
17-Jun-22	0.70	304.93	304.10	no	303.85	no
18-Jun-22			304.10		303.85	
19-Jun-22			304.10		303.85	
20-Jun-22	0.65	304.88	304.10	no	303.85	no
21-Jun-22	0.65	304.88	304.10	no	303.85	no
22-Jun-22	0.64	304.87	304.10	no	303.85	no
23-Jun-22	0.64	304.87	304.10	no	303.85	no
24-Jun-22	0.63	304.86	304.10	no	303.85	no
25-Jun-22			304.10		303.85	
26-Jun-22			304.10		303.85	
27-Jun-22	0.58	304.81	304.10	no	303.85	no
28-Jun-22	0.58	304.81	304.10	no	303.85	no
29-Jun-22	0.58	304.81	304.10	no	303.85	no
30-Jun-22	0.58	304.81	304.10	no	303.85	no
1-Jul-22			304.10		303.85	
2-Jul-22			304.10		303.85	
3-Jul-22			304.10		303.85	
4-Jul-22	0.56	304.79	304.10	no	303.85	no
5-Jul-22	0.56	304.79	304.10	no	303.85	no
6-Jul-22	0.56	304.79	304.10	no	303.85	no
7-Jul-22	0.55	304.78	304.10	no	303.85	no
8-Jul-22	0.55	304.78	304.10	no	303.85	no
9-Jul-22			304.10		303.85	
10-Jul-22			304.10		303.85	
11-Jul-22	0.52	304.75	304.10	no	303.85	no
12-Jul-22	0.51	304.74	304.10	no	303.85	no
13-Jul-22	0.50	304.73	304.10	no	303.85	no
14-Jul-22	0.50	304.73	304.10	no	303.85	no
15-Jul-22	0.50	304.73	304.10	no	303.85	no
16-Jul-22			304.10		303.85	
17-Jul-22			304.10		303.85	
18-Jul-22	0.49	304.72	304.10	no	303.85	no
19-Jul-22	0.49	304.72	304.10	no	303.85	no
20-Jul-22	0.49	304.72	304.10	no	303.85	no
21-Jul-22	0.48	304.71	304.10	no	303.85	no
22-Jul-22	0.47	304.70	304.10	no	303.85	no
23-Jul-22			304.10		303.85	
24-Jul-22			304.10		303.85	
25-Jul-22	0.44	304.67	304.10	no	303.85	no
26-Jul-22	0.44	304.67	304.10	no	303.85	no
27-Jul-22	0.44	304.67	304.10	no	303.85	no
28-Jul-22	0.44	304.67	304.10	no	303.85	no
29-Jul-22	0.42	304.65	304.10	no	303.85	no
30-Jul-22			304.10		303.85	
31-Jul-22			304.10		303.85	
1-Aug-22			304.10		303.85	
2-Aug-22	0.42	304.65	304.10	no	303.85	no
3-Aug-22	0.41	304.64	304.10	no	303.85	no
4-Aug-22	0.40	304.63	304.10	no	303.85	no
5-Aug-22	0.40	304.63	304.10	no	303.85	no
6-Aug-22			304.10		303.85	
7-Aug-22			304.10		303.85	
8-Aug-22	0.40	304.63	304.10	no	303.85	no
9-Aug-22	0.39	304.62	304.10	no	303.85	no
10-Aug-22	0.39	304.62	304.10	no	303.85	no
11-Aug-22	0.39	304.62	304.10	no	303.85	no
12-Aug-22	0.38	304.61	304.10	no	303.85	no
13-Aug-22			304.10		303.85	
14-Aug-22			304.10		303.85	
15-Aug-22	0.38	304.61	304.10	no	303.85	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-9
Threshold Summary - Phase 3 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 3 Pond (m)	Water Elevation Phase 3 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
16-Aug-22	0.38	304.61	304.10	no	303.85	no
17-Aug-22	0.38	304.61	304.10	no	303.85	no
18-Aug-22	0.38	304.61	304.10	no	303.85	no
19-Aug-22	0.38	304.61	304.10	no	303.85	no
20-Aug-22			304.10		303.85	
21-Aug-22			304.10		303.85	
22-Aug-22	0.40	304.63	304.10	no	303.85	no
23-Aug-22	0.41	304.64	304.10	no	303.85	no
24-Aug-22	0.42	304.65	304.10	no	303.85	no
25-Aug-22	0.41	304.64	304.10	no	303.85	no
26-Aug-22	0.41	304.64	304.10	no	303.85	no
27-Aug-22			304.10		303.85	
28-Aug-22			304.10		303.85	
29-Aug-22	0.41	304.64	304.10	no	303.85	no
30-Aug-22	0.40	304.63	304.10	no	303.85	no
31-Aug-22	0.40	304.63	304.10	no	303.85	no
1-Sep-22	0.40	304.63	304.10	no	303.85	no
2-Sep-22	0.39	304.62	304.10	no	303.85	no
3-Sep-22			304.10		303.85	
4-Sep-22			304.10		303.85	
5-Sep-22			304.10		303.85	
6-Sep-22	0.38	304.61	304.10	no	303.85	no
7-Sep-22	0.37	304.60	304.10	no	303.85	no
8-Sep-22	0.37	304.60	304.10	no	303.85	no
9-Sep-22	0.38	304.61	304.10	no	303.85	no
10-Sep-22			304.10		303.85	
11-Sep-22			304.10		303.85	
12-Sep-22	0.36	304.59	304.10	no	303.85	no
13-Sep-22	0.37	304.60	304.10	no	303.85	no
14-Sep-22	0.36	304.59	304.10	no	303.85	no
15-Sep-22	0.37	304.60	304.10	no	303.85	no
16-Sep-22	0.35	304.58	304.10	no	303.85	no
17-Sep-22			304.10		303.85	
18-Sep-22			304.10		303.85	
19-Sep-22	0.35	304.58	304.10	no	303.85	no
20-Sep-22	0.34	304.57	304.10	no	303.85	no
21-Sep-22	0.34	304.57	304.10	no	303.85	no
22-Sep-22	0.33	304.56	304.10	no	303.85	no
23-Sep-22	0.33	304.56	304.10	no	303.85	no
24-Sep-22			304.10		303.85	
25-Sep-22			304.10		303.85	
26-Sep-22	0.32	304.55	304.10	no	303.85	no
27-Sep-22	0.31	304.54	304.10	no	303.85	no
28-Sep-22	0.32	304.55	304.10	no	303.85	no
29-Sep-22	0.32	304.55	304.10	no	303.85	no
30-Sep-22	0.31	304.54	304.10	no	303.85	no
1-Oct-22			304.10		303.85	
2-Oct-22			304.10		303.85	
3-Oct-22	0.30	304.53	304.10	no	303.85	no
4-Oct-22	0.29	304.52	304.10	no	303.85	no
5-Oct-22	0.29	304.52	304.10	no	303.85	no
6-Oct-22	0.29	304.52	304.10	no	303.85	no
7-Oct-22	0.29	304.52	304.10	no	303.85	no
8-Oct-22			304.10		303.85	
9-Oct-22			304.10		303.85	
10-Oct-22			304.10		303.85	
11-Oct-22	0.26	304.49	304.10	no	303.85	no
12-Oct-22	0.26	304.49	304.10	no	303.85	no
13-Oct-22	0.26	304.49	304.10	no	303.85	no
14-Oct-22	0.28	304.51	304.10	no	303.85	no
15-Oct-22			304.10		303.85	
16-Oct-22			304.10		303.85	
17-Oct-22	0.27	304.50	304.10	no	303.85	no
18-Oct-22	0.27	304.50	304.10	no	303.85	no
19-Oct-22	0.26	304.49	304.10	no	303.85	no
20-Oct-22	0.27	304.50	304.10	no	303.85	no
21-Oct-22	0.27	304.50	304.10	no	303.85	no
22-Oct-22			304.10		303.85	
23-Oct-22			304.10		303.85	
24-Oct-22	0.26	304.49	304.10	no	303.85	no
25-Oct-22	0.26	304.49	304.10	no	303.85	no
26-Oct-22	0.26	304.49	304.10	no	303.85	no
27-Oct-22	0.26	304.49	304.10	no	303.85	no
28-Oct-22	0.26	304.49	304.10	no	303.85	no
29-Oct-22			304.10		303.85	
30-Oct-22			304.10		303.85	
31-Oct-22	0.25	304.48	304.10	no	304.85	yes

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-9
Threshold Summary - Phase 3 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 3 Pond (m)	Water Elevation Phase 3 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Nov-22	0.25	304.48	304.10	no	303.85	no
2-Nov-22	0.24	304.47	304.10	no	303.85	no
3-Nov-22	0.26	304.49	304.10	no	303.85	no
4-Nov-22	0.25	304.48	304.10	no	303.85	no
5-Nov-22			304.10		303.85	
6-Nov-22			304.10		303.85	
7-Nov-22	0.26	304.49	304.10	no	303.85	no
8-Nov-22	0.25	304.48	304.10	no	303.85	no
9-Nov-22	0.26	304.49	304.10	no	303.85	no
10-Nov-22	0.26	304.49	304.10	no	303.85	no
11-Nov-22	0.25	304.48	304.10	no	303.85	no
12-Nov-22			304.10		303.85	
13-Nov-22			304.10		303.85	
14-Nov-22	0.25	304.48	304.10	no	303.85	no
15-Nov-22	0.24	304.47	304.10	no	303.85	no
16-Nov-22	0.25	304.48	304.10	no	303.85	no
17-Nov-22	0.25	304.48	304.10	no	303.85	no
18-Nov-22	0.24	304.47	304.10	no	303.85	no
19-Nov-22			304.10		303.85	
20-Nov-22			304.10		303.85	
21-Nov-22	0.22	304.45	304.10	no	303.85	no
22-Nov-22	0.23	304.46	304.10	no	303.85	no
23-Nov-22	0.23	304.46	304.10	no	303.85	no
24-Nov-22	0.23	304.46	304.10	no	303.85	no
25-Nov-22	0.22	304.45	304.10	no	303.85	no
26-Nov-22			304.10		303.85	
27-Nov-22			304.10		303.85	
28-Nov-22	0.24	304.47	304.10	no	303.85	no
29-Nov-22	0.23	304.46	304.10	no	303.85	no
30-Nov-22	0.23	304.46	304.10	no	303.85	no
1-Dec-22	0.23	304.46	304.10	no	303.85	no
2-Dec-22	0.25	304.48	304.10	no	303.85	no
3-Dec-22			304.10		303.85	
4-Dec-22			304.10		303.85	
5-Dec-22	0.25	304.48	304.10	no	303.85	no
6-Dec-22	0.24	304.47	304.10	no	303.85	no
7-Dec-22	0.25	304.48	304.10	no	303.85	no
8-Dec-22	0.25	304.48	304.10	no	303.85	no
9-Dec-22			304.10		303.85	
10-Dec-22			304.10		303.85	
11-Dec-22			304.10		303.85	
12-Dec-22			304.10		303.85	
13-Dec-22			304.10		303.85	
14-Dec-22			304.10		303.85	
15-Dec-22			304.10		303.85	
16-Dec-22			304.10		303.85	
17-Dec-22			304.10		303.85	
18-Dec-22			304.10		303.85	
19-Dec-22			304.10		303.85	
20-Dec-22			304.10		303.85	
21-Dec-22			304.10		303.85	
22-Dec-22			304.10		303.85	
23-Dec-22			304.10		303.85	
24-Dec-22			304.10		303.85	
25-Dec-22			304.10		303.85	
26-Dec-22			304.10		303.85	
27-Dec-22			304.10		303.85	
28-Dec-22			304.10		303.85	
29-Dec-22			304.10		303.85	
30-Dec-22			304.10		303.85	
31-Dec-22			304.10		303.85	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-9
Threshold Summary - Phase 3 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 3 Pond (m)	Water Elevation Phase 3 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jan-23			304.10		303.85	
2-Jan-23			304.10		303.85	
3-Jan-23			304.10		303.85	
4-Jan-23			304.10		303.85	
5-Jan-23			304.10		303.85	
6-Jan-23			304.10		303.85	
7-Jan-23			304.10		303.85	
8-Jan-23			304.10		303.85	
9-Jan-23			304.10		303.85	
10-Jan-23			304.10		303.85	
11-Jan-23			304.10		303.85	
12-Jan-23			304.10		303.85	
13-Jan-23			304.10		303.85	
14-Jan-23			304.10		303.85	
15-Jan-23			304.10		303.85	
16-Jan-23			304.10		303.85	
17-Jan-23			304.10		303.85	
18-Jan-23			304.10		303.85	
19-Jan-23			304.10		303.85	
20-Jan-23			304.10		303.85	
21-Jan-23			304.10		303.85	
22-Jan-23			304.10		303.85	
23-Jan-23			304.10		303.85	
24-Jan-23			304.10		303.85	
25-Jan-23			304.10		303.85	
26-Jan-23			304.10		303.85	
27-Jan-23			304.10		303.85	
28-Jan-23			304.10		303.85	
29-Jan-23			304.10		303.85	
30-Jan-23			304.10		303.85	
31-Jan-23			304.10		303.85	
1-Feb-23			304.10		303.85	
2-Feb-23			304.10		303.85	
3-Feb-23			304.10		303.85	
4-Feb-23			304.10		303.85	
5-Feb-23			304.10		303.85	
6-Feb-23			304.10		303.85	
7-Feb-23			304.10		303.85	
8-Feb-23			304.10		303.85	
9-Feb-23			304.10		303.85	
10-Feb-23			304.10		303.85	
11-Feb-23			304.10		303.85	
12-Feb-23			304.10		303.85	
13-Feb-23			304.10		303.85	
14-Feb-23			304.10		303.85	
15-Feb-23			304.10		303.85	
16-Feb-23			304.10		303.85	
17-Feb-23			304.10		303.85	
18-Feb-23			304.10		303.85	
19-Feb-23			304.10		303.85	
20-Feb-23			304.10		303.85	
21-Feb-23			304.10		303.85	
22-Feb-23			304.10		303.85	
23-Feb-23			304.10		303.85	
24-Feb-23			304.10		303.85	
25-Feb-23			304.10		303.85	
26-Feb-23			304.10		303.85	
27-Feb-23			304.10		303.85	
28-Feb-23			304.10		303.85	
1-Mar-23			304.10		303.85	
2-Mar-23			304.10		303.85	
3-Mar-23			304.10		303.85	
4-Mar-23			304.10		303.85	
5-Mar-23			304.10		303.85	
6-Mar-23			304.10		303.85	
7-Mar-23			304.10		303.85	
8-Mar-23			304.10		303.85	
9-Mar-23			304.10		303.85	
10-Mar-23			304.10		303.85	
11-Mar-23			304.10		303.85	
12-Mar-23			304.10		303.85	
13-Mar-23			304.10		303.85	
14-Mar-23			304.10		303.85	
15-Mar-23			304.10		303.85	
16-Mar-23			304.10		303.85	
17-Mar-23			304.10		303.85	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-9
Threshold Summary - Phase 3 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 3 Pond (m)	Water Elevation Phase 3 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
18-Mar-23			304.10		303.85	
19-Mar-23			304.10		303.85	
20-Mar-23			304.10		303.85	
21-Mar-23			304.10		303.85	
22-Mar-23			304.10		303.85	
23-Mar-23			304.10		303.85	
24-Mar-23			304.10		303.85	
25-Mar-23			304.10		303.85	
26-Mar-23			304.10		303.85	
27-Mar-23			304.10		303.85	
28-Mar-23			304.10		303.85	
29-Mar-23			304.10		303.85	
30-Mar-23			304.10		303.85	
31-Mar-23			304.10		303.85	
1-Apr-23			304.10		303.85	
2-Apr-23			304.10		303.85	
3-Apr-23	0.82	305.03	304.10	no	303.85	no
4-Apr-23	0.84	305.05	304.10	no	303.85	no
5-Apr-23	0.84	305.05	304.10	no	303.85	no
6-Apr-23	0.87	305.08	304.10	no	303.85	no
7-Apr-23			304.10		303.85	
8-Apr-23			304.10		303.85	
9-Apr-23			304.10		303.85	
10-Apr-23	0.90	305.11	304.10	no	303.85	no
11-Apr-23	0.90	305.11	304.10	no	303.85	no
12-Apr-23	0.90	305.11	304.10	no	303.85	no
13-Apr-23	0.90	305.11	304.10	no	303.85	no
14-Apr-23	0.90	305.11	304.10	no	303.85	no
15-Apr-23			304.10		303.85	
16-Apr-23			304.10		303.85	
17-Apr-23	0.91	305.12	304.10	no	303.85	no
18-Apr-23	0.91	305.12	304.10	no	303.85	no
19-Apr-23	0.91	305.12	304.10	no	303.85	no
20-Apr-23	0.91	305.12	304.10	no	303.85	no
21-Apr-23	0.91	305.12	304.10	no	303.85	no
22-Apr-23			304.10		303.85	
23-Apr-23			304.10		303.85	
24-Apr-23	0.90	305.11	304.10	no	303.85	no
25-Apr-23	0.90	305.11	304.10	no	303.85	no
26-Apr-23	0.92	305.13	304.10	no	303.85	no
27-Apr-23	0.92	305.13	304.10	no	303.85	no
28-Apr-23	0.90	305.11	304.10	no	303.85	no
29-Apr-23			304.10		303.85	
30-Apr-23			304.10		303.85	
1-May-23	0.90	305.11	304.10	no	303.85	no
2-May-23	0.90	305.11	304.10	no	303.85	no
3-May-23	0.90	305.11	304.10	no	303.85	no
4-May-23	0.95	305.16	304.10	no	303.85	no
5-May-23	0.95	305.16	304.10	no	303.85	no
6-May-23			304.10		303.85	
7-May-23			304.10		303.85	
8-May-23	0.95	305.16	304.10	no	303.85	no
9-May-23	0.97	305.18	304.10	no	303.85	no
10-May-23	0.97	305.18	304.10	no	303.85	no
11-May-23	0.97	305.18	304.10	no	303.85	no
12-May-23	0.94	305.15	304.10	no	303.85	no
13-May-23			304.10		303.85	
14-May-23			304.10		303.85	
15-May-23	0.92	305.13	304.10	no	303.85	no
16-May-23	0.92	305.13	304.10	no	303.85	no
17-May-23	0.91	305.12	304.10	no	303.85	no
18-May-23	0.89	305.10	304.10	no	303.85	no
19-May-23	0.88	305.09	304.10	no	303.85	no
20-May-23			304.10		303.85	
21-May-23			304.10		303.85	
22-May-23			304.10		303.85	
23-May-23	0.89	305.10	304.10	no	303.85	no
24-May-23	0.89	305.10	304.10	no	303.85	no
25-May-23	0.89	305.10	304.10	no	303.85	no
26-May-23	0.85	305.06	304.10	no	303.85	no
27-May-23			304.10		303.85	
28-May-23			304.10		303.85	
29-May-23	0.83	305.04	304.10	no	303.85	no
30-May-23	0.83	305.04	304.10	no	303.85	no
31-May-23	0.83	305.04	304.10	no	303.85	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-9
Threshold Summary - Phase 3 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 3 Pond (m)	Water Elevation Phase 3 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jun-23	0.80	305.01	304.10	no	303.85	no
2-Jun-23	0.82	305.03	304.10	no	303.85	no
3-Jun-23			304.10		303.85	
4-Jun-23			304.10		303.85	
5-Jun-23	0.79	305.00	304.10	no	303.85	no
6-Jun-23	0.79	305.00	304.10	no	303.85	no
7-Jun-23	0.78	304.99	304.10	no	303.85	no
8-Jun-23	0.76	304.97	304.10	no	303.85	no
9-Jun-23	0.78	304.99	304.10	no	303.85	no
10-Jun-23			304.10		303.85	
11-Jun-23			304.10		303.85	
12-Jun-23	0.76	304.97	304.10	no	303.85	no
13-Jun-23	0.77	304.98	304.10	no	303.85	no
14-Jun-23	0.77	304.98	304.10	no	303.85	no
15-Jun-23	0.77	304.98	304.10	no	303.85	no
16-Jun-23	0.77	304.98	304.10	no	303.85	no
17-Jun-23			304.10		303.85	
18-Jun-23			304.10		303.85	
19-Jun-23	0.75	304.96	304.10	no	303.85	no
20-Jun-23	0.75	304.96	304.10	no	303.85	no
21-Jun-23	0.72	304.93	304.10	no	303.85	no
22-Jun-23	0.72	304.93	304.10	no	303.85	no
23-Jun-23	0.70	304.91	304.10	no	303.85	no
24-Jun-23			304.10		303.85	
25-Jun-23			304.10		303.85	
26-Jun-23	0.70	304.91	304.10	no	303.85	no
27-Jun-23	0.78	304.99	304.10	no	303.85	no
28-Jun-23	0.74	304.95	304.10	no	303.85	no
29-Jun-23	0.74	304.95	304.10	no	303.85	no
30-Jun-23	0.76	304.97	304.10	no	303.85	no
1-Jul-23			304.10		303.85	
2-Jul-23			304.10		303.85	
3-Jul-23			304.10		303.85	
4-Jul-23	0.73	304.94	304.10	no	303.85	no
5-Jul-23	0.72	304.93	304.10	no	303.85	no
6-Jul-23	0.71	304.92	304.10	no	303.85	no
7-Jul-23	0.74	304.95	304.10	no	303.85	no
8-Jul-23			304.10		303.85	
9-Jul-23			304.10		303.85	
10-Jul-23	0.70	304.91	304.10	no	303.85	no
11-Jul-23	0.74	304.95	304.10	no	303.85	no
12-Jul-23	0.74	304.95	304.10	no	303.85	no
13-Jul-23	0.77	304.98	304.10	no	303.85	no
14-Jul-23	0.80	305.01	304.10	no	303.85	no
15-Jul-23			304.10		303.85	
16-Jul-23			304.10		303.85	
17-Jul-23	0.86	305.07	304.10	no	303.85	no
18-Jul-23	0.89	305.10	304.10	no	303.85	no
19-Jul-23	0.87	305.08	304.10	no	303.85	no
20-Jul-23	0.87	305.08	304.10	no	303.85	no
21-Jul-23	0.87	305.08	304.10	no	303.85	no
22-Jul-23			304.10		303.85	
23-Jul-23			304.10		303.85	
24-Jul-23	0.86	305.07	304.10	no	303.85	no
25-Jul-23	0.87	305.08	304.10	no	303.85	no
26-Jul-23	0.83	305.04	304.10	no	303.85	no
27-Jul-23	0.88	305.09	304.10	no	303.85	no
28-Jul-23	0.88	305.09	304.10	no	303.85	no
29-Jul-23	0.88	305.09	304.10	no	303.85	no
30-Jul-23			304.10		303.85	
31-Jul-23	0.87	305.08	304.10	no	303.85	no
1-Aug-23	0.86	305.07	304.10	no	303.85	no
2-Aug-23	0.87	305.08	304.10	no	303.85	no
3-Aug-23	0.87	305.08	304.10	no	303.85	no
4-Aug-23	0.85	305.06	304.10	no	303.85	no
5-Aug-23			304.10		303.85	
6-Aug-23			304.10		303.85	
7-Aug-23			304.10		303.85	
8-Aug-23	0.80	305.01	304.10	no	303.85	no
9-Aug-23	0.80	305.01	304.10	no	303.85	no
10-Aug-23	0.80	305.01	304.10	no	303.85	no
11-Aug-23	0.80	305.01	304.10	no	303.85	no
12-Aug-23			304.10		303.85	
13-Aug-23			304.10		303.85	
14-Aug-23	0.80	305.01	304.10	no	303.85	no
15-Aug-23	0.80	305.01	304.10	no	303.85	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-9
Threshold Summary - Phase 3 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 3 Pond (m)	Water Elevation Phase 3 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
16-Aug-23	0.80	305.01	304.10	no	303.85	no
17-Aug-23	0.80	305.01	304.10	no	303.85	no
18-Aug-23	0.82	305.03	304.10	no	303.85	no
19-Aug-23	0.82	305.03	304.10	no	303.85	no
20-Aug-23			304.10		303.85	
21-Aug-23	0.81	305.02	304.10	no	303.85	no
22-Aug-23	0.81	305.02	304.10	no	303.85	no
23-Aug-23	0.79	305.00	304.10	no	303.85	no
24-Aug-23	0.81	305.02	304.10	no	303.85	no
25-Aug-23	0.82	305.03	304.10	no	303.85	no
26-Aug-23	0.81	305.02	304.10	no	303.85	no
27-Aug-23			304.10		303.85	
28-Aug-23	0.80	305.01	304.10	no	303.85	no
29-Aug-23	0.80	305.01	304.10	no	303.85	no
30-Aug-23	0.80	305.01	304.10	no	303.85	no
31-Aug-23	0.80	305.01	304.10	no	303.85	no
1-Sep-23	0.79	305.00	304.10	no	303.85	no
2-Sep-23	0.79	305.00	304.10	no	303.85	no
3-Sep-23			304.10		303.85	
4-Sep-23			304.10		303.85	
5-Sep-23	0.78	304.99	304.10	no	303.85	no
6-Sep-23	0.78	304.99	304.10	no	303.85	no
7-Sep-23	0.79	305.00	304.10	no	303.85	no
8-Sep-23	0.78	304.99	304.10	no	303.85	no
9-Sep-23	0.78	304.99	304.10	no	303.85	no
10-Sep-23			304.10		303.85	
11-Sep-23	0.74	304.95	304.10	no	303.85	no
12-Sep-23	0.77	304.98	304.10	no	303.85	no
13-Sep-23	0.74	304.95	304.10	no	303.85	no
14-Sep-23	0.75	304.96	304.10	no	303.85	no
15-Sep-23	0.72	304.93	304.10	no	303.85	no
16-Sep-23	0.72	304.93	304.10	no	303.85	no
17-Sep-23			304.10		303.85	
18-Sep-23	0.73	304.94	304.10	no	303.85	no
19-Sep-23	0.73	304.94	304.10	no	303.85	no
20-Sep-23	0.72	304.93	304.10	no	303.85	no
21-Sep-23	0.74	304.95	304.10	no	303.85	no
22-Sep-23	0.74	304.95	304.10	no	303.85	no
23-Sep-23	0.74	304.95	304.10	no	303.85	no
24-Sep-23			304.10		303.85	
25-Sep-23	0.69	304.90	304.10	no	303.85	no
26-Sep-23	0.68	304.89	304.10	no	303.85	no
27-Sep-23	0.67	304.88	304.10	no	303.85	no
28-Sep-23	0.68	304.89	304.10	no	303.85	no
29-Sep-23	0.66	304.87	304.10	no	303.85	no
30-Sep-23			304.10		303.85	
1-Oct-23			304.10		303.85	
2-Oct-23	0.67	304.88	304.10	no	303.85	no
3-Oct-23	0.65	304.86	304.10	no	303.85	no
4-Oct-23	0.65	304.86	304.10	no	303.85	no
5-Oct-23	0.64	304.85	304.10	no	303.85	no
6-Oct-23	0.67	304.88	304.10	no	303.85	no
7-Oct-23			304.10		303.85	
8-Oct-23			304.10		303.85	
9-Oct-23			304.10		303.85	
10-Oct-23	0.61	304.82	304.10	no	303.85	no
11-Oct-23	0.63	304.84	304.10	no	303.85	no
12-Oct-23	0.62	304.83	304.10	no	303.85	no
13-Oct-23	0.61	304.82	304.10	no	303.85	no
14-Oct-23	0.61	304.82	304.10	no	303.85	no
15-Oct-23			304.10		303.85	
16-Oct-23	0.62	304.83	304.10	no	303.85	no
17-Oct-23	0.62	304.83	304.10	no	303.85	no
18-Oct-23	0.61	304.82	304.10	no	303.85	no
19-Oct-23	0.60	304.81	304.10	no	303.85	no
20-Oct-23	0.60	304.81	304.10	no	303.85	no
21-Oct-23	0.60	304.81	304.10	no	303.85	no
22-Oct-23			304.10		303.85	
23-Oct-23	0.58	304.79	304.10	no	303.85	no
24-Oct-23	0.59	304.80	304.10	no	303.85	no
25-Oct-23	0.60	304.81	304.10	no	303.85	no
26-Oct-23	0.61	304.82	304.10	no	303.85	no
27-Oct-23	0.63	304.84	304.10	no	303.85	no
28-Oct-23	0.63	304.84	304.10	no	303.85	no
29-Oct-23			304.10		303.85	
30-Oct-23	0.66	304.87	304.10	no	303.85	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-9
Threshold Summary - Phase 3 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 3 Pond (m)	Water Elevation Phase 3 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
31-Oct-23	0.65	304.86	304.10	no	303.85	no
1-Nov-23	0.66	304.87	304.10	no	303.85	no
2-Nov-23	0.66	304.87	304.10	no	303.85	no
3-Nov-23	0.65	304.86	304.10	no	303.85	no
4-Nov-23			304.10		303.85	
5-Nov-23			304.10		303.85	
6-Nov-23	0.64	304.85	304.10	no	303.85	no
7-Nov-23	0.64	304.85	304.10	no	303.85	no
8-Nov-23	0.64	304.85	304.10	no	303.85	no
9-Nov-23	0.64	304.85	304.10	no	303.85	no
10-Nov-23	0.65	304.86	304.10	no	303.85	no
11-Nov-23	0.65	304.86	304.10	no	303.85	no
12-Nov-23			304.10		303.85	
13-Nov-23	0.65	304.86	304.10	no	303.85	no
14-Nov-23	0.65	304.86	304.10	no	303.85	no
15-Nov-23	0.65	304.86	304.10	no	303.85	no
16-Nov-23	0.66	304.87	304.10	no	303.85	no
17-Nov-23	0.66	304.87	304.10	no	303.85	no
18-Nov-23	0.65	304.86	304.10	no	303.85	no
19-Nov-23			304.10		303.85	
20-Nov-23	0.65	304.86	304.10	no	303.85	no
21-Nov-23	0.64	304.85	304.10	no	303.85	no
22-Nov-23	0.66	304.87	304.10	no	303.85	no
23-Nov-23	0.66	304.87	304.10	no	303.85	no
24-Nov-23	0.66	304.87	304.10	no	303.85	no
25-Nov-23			304.10		303.85	
26-Nov-23			304.10		303.85	
27-Nov-23	0.68	304.89	304.10	no	303.85	no
28-Nov-23	0.68	304.89	304.10	no	303.85	no
29-Nov-23	0.68	304.89	304.10	no	303.85	no
30-Nov-23	0.69	304.90	304.10	no	303.85	no
1-Dec-23	0.69	304.90	304.10	no	303.85	no
2-Dec-23			304.10		303.85	
3-Dec-23			304.10		303.85	
4-Dec-23	0.73	304.94	304.10	no	303.85	no
5-Dec-23	0.70	304.91	304.10	no	303.85	no
6-Dec-23	0.73	304.94	304.10	no	303.85	no
7-Dec-23	0.73	304.94	304.10	no	303.85	no
8-Dec-23	0.73	304.94	304.10	no	303.85	no
9-Dec-23			304.10		303.85	
10-Dec-23			304.10		303.85	
11-Dec-23			304.10		303.85	
12-Dec-23			304.10		303.85	
13-Dec-23			304.10		303.85	
14-Dec-23			304.10		303.85	
15-Dec-23			304.10		303.85	
16-Dec-23			304.10		303.85	
17-Dec-23			304.10		303.85	
18-Dec-23			304.10		303.85	
19-Dec-23			304.10		303.85	
20-Dec-23			304.10		303.85	
21-Dec-23			304.10		303.85	
22-Dec-23			304.10		303.85	
23-Dec-23			304.10		303.85	
24-Dec-23			304.10		303.85	
25-Dec-23			304.10		303.85	
26-Dec-23			304.10		303.85	
27-Dec-23			304.10		303.85	
28-Dec-23			304.10		303.85	
29-Dec-23			304.10		303.85	
30-Dec-23			304.10		303.85	
31-Dec-23			304.10		303.85	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-10
Threshold Summary - Phase 4 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 4 Pond (m)	Water Elevation Phase 4 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jan-22			305.10		304.50	
2-Jan-22			305.10		304.50	
3-Jan-22			305.10		304.50	
4-Jan-22			305.10		304.50	
5-Jan-22			305.10		304.50	
6-Jan-22			305.10		304.50	
7-Jan-22			305.10		304.50	
8-Jan-22			305.10		304.50	
9-Jan-22			305.10		304.50	
10-Jan-22			305.10		304.50	
11-Jan-22			305.10		304.50	
12-Jan-22			305.10		304.50	
13-Jan-22			305.10		304.50	
14-Jan-22			305.10		304.50	
15-Jan-22			305.10		304.50	
16-Jan-22			305.10		304.50	
17-Jan-22			305.10		304.50	
18-Jan-22			305.10		304.50	
19-Jan-22			305.10		304.50	
20-Jan-22			305.10		304.50	
21-Jan-22			305.10		304.50	
22-Jan-22			305.10		304.50	
23-Jan-22			305.10		304.50	
24-Jan-22			305.10		304.50	
25-Jan-22			305.10		304.50	
26-Jan-22			305.10		304.50	
27-Jan-22			305.10		304.50	
28-Jan-22			305.10		304.50	
29-Jan-22			305.10		304.50	
30-Jan-22			305.10		304.50	
31-Jan-22			305.10		304.50	
1-Feb-22			305.10		304.50	
2-Feb-22			305.10		304.50	
3-Feb-22			305.10		304.50	
4-Feb-22			305.10		304.50	
5-Feb-22			305.10		304.50	
6-Feb-22			305.10		304.50	
7-Feb-22			305.10		304.50	
8-Feb-22			305.10		304.50	
9-Feb-22			305.10		304.50	
10-Feb-22			305.10		304.50	
11-Feb-22			305.10		304.50	
12-Feb-22			305.10		304.50	
13-Feb-22			305.10		304.50	
14-Feb-22			305.10		304.50	
15-Feb-22			305.10		304.50	
16-Feb-22			305.10		304.50	
17-Feb-22			305.10		304.50	
18-Feb-22			305.10		304.50	
19-Feb-22			305.10		304.50	
20-Feb-22			305.10		304.50	
21-Feb-22			305.10		304.50	
22-Feb-22			305.10		304.50	
23-Feb-22			305.10		304.50	
24-Feb-22			305.10		304.50	
25-Feb-22			305.10		304.50	
26-Feb-22			305.10		304.50	
27-Feb-22			305.10		304.50	
28-Feb-22			305.10		304.50	
1-Mar-22			305.10		304.50	
2-Mar-22			305.10		304.50	
3-Mar-22			305.10		304.50	
4-Mar-22			305.10		304.50	
5-Mar-22			305.10		304.50	
6-Mar-22			305.10		304.50	
7-Mar-22			305.10		304.50	
8-Mar-22			305.10		304.50	
9-Mar-22			305.10		304.50	
10-Mar-22			305.10		304.50	
11-Mar-22			305.10		304.50	
12-Mar-22			305.10		304.50	
13-Mar-22			305.10		304.50	
14-Mar-22			305.10		304.50	
15-Mar-22			305.10		304.50	
16-Mar-22			305.10		304.50	
17-Mar-22			305.10		304.50	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-10
Threshold Summary - Phase 4 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 4 Pond (m)	Water Elevation Phase 4 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
18-Mar-22			305.10		304.50	
19-Mar-22			305.10		304.50	
20-Mar-22			305.10		304.50	
21-Mar-22			305.10		304.50	
22-Mar-22			305.10		304.50	
23-Mar-22			305.10		304.50	
24-Mar-22			305.10		304.50	
25-Mar-22			305.10		304.50	
26-Mar-22			305.10		304.50	
27-Mar-22			305.10		304.50	
28-Mar-22			305.10		304.50	
29-Mar-22			305.10		304.50	
30-Mar-22			305.10		304.50	
31-Mar-22			305.10		304.50	
1-Apr-22	0.59	306.20	305.10	no	304.50	no
2-Apr-22			305.10		304.50	
3-Apr-22			305.10		304.50	
4-Apr-22	0.57	306.18	305.10	no	304.50	no
5-Apr-22	0.57	306.18	305.10	no	304.50	no
6-Apr-22	0.57	306.18	305.10	no	304.50	no
7-Apr-22	0.56	306.17	305.10	no	304.50	no
8-Apr-22	0.56	306.17	305.10	no	304.50	no
9-Apr-22			305.10		304.50	
10-Apr-22			305.10		304.50	
11-Apr-22	0.57	306.18	305.10	no	304.50	no
12-Apr-22	0.57	306.18	305.10	no	304.50	no
13-Apr-22	0.57	306.18	305.10	no	304.50	no
14-Apr-22	0.57	306.18	305.10	no	304.50	no
15-Apr-22			305.10		304.50	
16-Apr-22			305.10		304.50	
17-Apr-22			305.10		304.50	
18-Apr-22	0.55	306.16	305.10	no	304.50	no
19-Apr-22	0.55	306.16	305.10	no	304.50	no
20-Apr-22	0.56	306.17	305.10	no	304.50	no
21-Apr-22	0.57	306.18	305.10	no	304.50	no
22-Apr-22	0.59	306.20	305.10	no	304.50	no
23-Apr-22			305.10		304.50	
24-Apr-22			305.10		304.50	
25-Apr-22	0.58	306.19	305.10	no	304.50	no
26-Apr-22	0.60	306.21	305.10	no	304.50	no
27-Apr-22	0.59	306.20	305.10	no	304.50	no
28-Apr-22	0.60	306.21	305.10	no	304.50	no
29-Apr-22	0.58	306.19	305.10	no	304.50	no
30-Apr-22			305.10		304.50	
1-May-22			305.10		304.50	
2-May-22	0.58	306.19	305.10	no	304.50	no
3-May-22	0.59	306.20	305.10	no	304.50	no
4-May-22	0.61	306.22	305.10	no	304.50	no
5-May-22	0.62	306.23	305.10	no	304.50	no
6-May-22	0.62	306.23	305.10	no	304.50	no
7-May-22			305.10		304.50	
8-May-22			305.10		304.50	
9-May-22	0.61	306.22	305.10	no	304.50	no
10-May-22	0.61	306.22	305.10	no	304.50	no
11-May-22	0.60	306.21	305.10	no	304.50	no
12-May-22	0.60	306.21	305.10	no	304.50	no
13-May-22	0.60	306.21	305.10	no	304.50	no
14-May-22	0.60	306.21	305.10	no	304.50	no
15-May-22			305.10		304.50	
16-May-22	0.59	306.20	305.10	no	304.50	no
17-May-22	0.59	306.20	305.10	no	304.50	no
18-May-22	0.58	306.19	305.10	no	304.50	no
19-May-22	0.55	306.16	305.10	no	304.50	no
20-May-22	0.53	306.14	305.10	no	304.50	no
21-May-22	0.50	306.11	305.10	no	304.50	no
22-May-22			305.10		304.50	
23-May-22			305.10		304.50	
24-May-22	0.48	306.09	305.10	no	304.50	no
25-May-22	0.46	306.07	305.10	no	304.50	no
26-May-22	0.45	306.06	305.10	no	304.50	no
27-May-22	0.43	306.04	305.10	no	304.50	no
28-May-22	0.42	306.03	305.10	no	304.50	no
29-May-22			305.10		304.50	
30-May-22	0.40	306.01	305.10	no	304.50	no
31-May-22	0.38	305.99	305.10	no	304.50	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-10
Threshold Summary - Phase 4 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 4 Pond (m)	Water Elevation Phase 4 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jun-22	0.37	305.98	305.10	no	304.50	no
2-Jun-22	0.36	305.97	305.10	no	304.50	no
3-Jun-22	0.35	305.96	305.10	no	304.50	no
4-Jun-22			305.10		304.50	
5-Jun-22			305.10		304.50	
6-Jun-22	0.34	305.95	305.10	no	304.50	no
7-Jun-22	0.34	305.95	305.10	no	304.50	no
8-Jun-22	0.34	305.95	305.10	no	304.50	no
9-Jun-22	0.34	305.95	305.10	no	304.50	no
10-Jun-22	0.35	305.96	305.10	no	304.50	no
11-Jun-22			305.10		304.50	
12-Jun-22			305.10		304.50	
13-Jun-22	0.37	305.98	305.10	no	304.50	no
14-Jun-22	0.38	305.99	305.10	no	304.50	no
15-Jun-22	0.40	306.01	305.10	no	304.50	no
16-Jun-22	0.42	306.03	305.10	no	304.50	no
17-Jun-22	0.44	306.05	305.10	no	304.50	no
18-Jun-22			305.10		304.50	
19-Jun-22			305.10		304.50	
20-Jun-22	0.44	306.05	305.10	no	304.50	no
21-Jun-22	0.44	306.05	305.10	no	304.50	no
22-Jun-22	0.44	306.05	305.10	no	304.50	no
23-Jun-22	0.44	306.05	305.10	no	304.50	no
24-Jun-22	0.43	306.04	305.10	no	304.50	no
25-Jun-22			305.10		304.50	
26-Jun-22			305.10		304.50	
27-Jun-22	0.43	306.04	305.10	no	304.50	no
28-Jun-22	0.43	306.04	305.10	no	304.50	no
29-Jun-22	0.43	306.04	305.10	no	304.50	no
30-Jun-22	0.43	306.04	305.10	no	304.50	no
1-Jul-22			305.10		304.50	
2-Jul-22			305.10		304.50	
3-Jul-22			305.10		304.50	
4-Jul-22	0.41	306.02	305.10	no	304.50	no
5-Jul-22	0.41	306.02	305.10	no	304.50	no
6-Jul-22	0.40	306.01	305.10	no	304.50	no
7-Jul-22	0.40	306.01	305.10	no	304.50	no
8-Jul-22	0.40	306.01	305.10	no	304.50	no
9-Jul-22			305.10		304.50	
10-Jul-22			305.10		304.50	
11-Jul-22	0.38	305.99	305.10	no	304.50	no
12-Jul-22	0.37	305.98	305.10	no	304.50	no
13-Jul-22	0.36	305.97	305.10	no	304.50	no
14-Jul-22	0.37	305.98	305.10	no	304.50	no
15-Jul-22	0.36	305.97	305.10	no	304.50	no
16-Jul-22			305.10		304.50	
17-Jul-22			305.10		304.50	
18-Jul-22	0.36	305.97	305.10	no	304.50	no
19-Jul-22	0.36	305.97	305.10	no	304.50	no
20-Jul-22	0.36	305.97	305.10	no	304.50	no
21-Jul-22	0.35	305.96	305.10	no	304.50	no
22-Jul-22	0.36	305.97	305.10	no	304.50	no
23-Jul-22			305.10		304.50	
24-Jul-22			305.10		304.50	
25-Jul-22	0.33	305.94	305.10	no	304.50	no
26-Jul-22	0.33	305.94	305.10	no	304.50	no
27-Jul-22	0.33	305.94	305.10	no	304.50	no
28-Jul-22	0.33	305.94	305.10	no	304.50	no
29-Jul-22	0.31	305.92	305.10	no	304.50	no
30-Jul-22			305.10		304.50	
31-Jul-22			305.10		304.50	
1-Aug-22			305.10		304.50	
2-Aug-22	0.31	305.92	305.10	no	304.50	no
3-Aug-22	0.30	305.91	305.10	no	304.50	no
4-Aug-22	0.30	305.91	305.10	no	304.50	no
5-Aug-22	0.30	305.91	305.10	no	304.50	no
6-Aug-22			305.10		304.50	
7-Aug-22			305.10		304.50	
8-Aug-22	0.29	305.90	305.10	no	304.50	no
9-Aug-22	0.29	305.90	305.10	no	304.50	no
10-Aug-22	0.28	305.89	305.10	no	304.50	no
11-Aug-22	0.28	305.89	305.10	no	304.50	no
12-Aug-22	0.26	305.87	305.10	no	304.50	no
13-Aug-22			305.10		304.50	
14-Aug-22			305.10		304.50	
15-Aug-22	0.21	305.82	305.10	no	304.50	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-10
Threshold Summary - Phase 4 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 4 Pond (m)	Water Elevation Phase 4 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
16-Aug-22	0.20	305.81	305.10	no	304.50	no
17-Aug-22	0.19	305.80	305.10	no	304.50	no
18-Aug-22	0.19	305.80	305.10	no	304.50	no
19-Aug-22	0.19	305.80	305.10	no	304.50	no
20-Aug-22			305.10		304.50	
21-Aug-22			305.10		304.50	
22-Aug-22	0.23	305.84	305.10	no	304.50	no
23-Aug-22	0.24	305.85	305.10	no	304.50	no
24-Aug-22	0.24	305.85	305.10	no	304.50	no
25-Aug-22	0.23	305.84	305.10	no	304.50	no
26-Aug-22	0.23	305.84	305.10	no	304.50	no
27-Aug-22			305.10		304.50	
28-Aug-22			305.10		304.50	
29-Aug-22	0.21	305.82	305.10	no	304.50	no
30-Aug-22	0.21	305.82	305.10	no	304.50	no
31-Aug-22	0.20	305.81	305.10	no	304.50	no
1-Sep-22	0.20	305.81	305.10	no	304.50	no
2-Sep-22	0.19	305.80	305.10	no	304.50	no
3-Sep-22			305.10		304.50	
4-Sep-22			305.10		304.50	
5-Sep-22			305.10		304.50	
6-Sep-22	0.17	305.78	305.10	no	304.50	no
7-Sep-22	0.16	305.77	305.10	no	304.50	no
8-Sep-22	0.16	305.77	305.10	no	304.50	no
9-Sep-22	0.15	305.76	305.10	no	304.50	no
10-Sep-22			305.10		304.50	
11-Sep-22			305.10		304.50	
12-Sep-22	0.14	305.75	305.10	no	304.50	no
13-Sep-22	0.16	305.77	305.10	no	304.50	no
14-Sep-22	0.13	305.74	305.10	no	304.50	no
15-Sep-22	0.14	305.75	305.10	no	304.50	no
16-Sep-22	0.12	305.73	305.10	no	304.50	no
17-Sep-22			305.10		304.50	
18-Sep-22			305.10		304.50	
19-Sep-22	0.12	305.73	305.10	no	304.50	no
20-Sep-22	0.12	305.73	305.10	no	304.50	no
21-Sep-22	0.11	305.72	305.10	no	304.50	no
22-Sep-22	0.10	305.71	305.10	no	304.50	no
23-Sep-22	0.11	305.72	305.10	no	304.50	no
24-Sep-22			305.10		304.50	
25-Sep-22			305.10		304.50	
26-Sep-22	0.11	305.72	305.10	no	304.50	no
27-Sep-22	0.11	305.72	305.10	no	304.50	no
28-Sep-22	0.11	305.72	305.10	no	304.50	no
29-Sep-22	0.11	305.72	305.10	no	304.50	no
30-Sep-22	0.11	305.72	305.10	no	304.50	no
1-Oct-22			305.10		304.50	
2-Oct-22			305.10		304.50	
3-Oct-22	0.09	305.70	305.10	no	304.50	no
4-Oct-22	0.08	305.69	305.10	no	304.50	no
5-Oct-22	0.09	305.70	305.10	no	304.50	no
6-Oct-22	0.09	305.70	305.10	no	304.50	no
7-Oct-22	0.09	305.70	305.10	no	304.50	no
8-Oct-22			305.10		304.50	
9-Oct-22			305.10		304.50	
10-Oct-22			305.10		304.50	
11-Oct-22	0.08	305.69	305.10	no	304.50	no
12-Oct-22	0.07	305.68	305.10	no	304.50	no
13-Oct-22	0.08	305.69	305.10	no	304.50	no
14-Oct-22	0.07	305.68	305.10	no	304.50	no
15-Oct-22			305.10		304.50	
16-Oct-22			305.10		304.50	
17-Oct-22	0.09	305.70	305.10	no	304.50	no
18-Oct-22	0.08	305.69	305.10	no	304.50	no
19-Oct-22	0.08	305.69	305.10	no	304.50	no
20-Oct-22	0.10	305.71	305.10	no	304.50	no
21-Oct-22	0.10	305.71	305.10	no	304.50	no
22-Oct-22			305.10		304.50	
23-Oct-22			305.10		304.50	
24-Oct-22	0.09	305.70	305.10	no	304.50	no
25-Oct-22	0.08	305.69	305.10	no	304.50	no
26-Oct-22	0.07	305.68	305.10	no	304.50	no
27-Oct-22	0.07	305.68	305.10	no	304.50	no
28-Oct-22	0.07	305.68	305.10	no	304.50	no
29-Oct-22			305.10		304.50	
30-Oct-22			305.10		304.50	
31-Oct-22	0.08	305.69	305.10	no	304.50	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-10
Threshold Summary - Phase 4 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 4 Pond (m)	Water Elevation Phase 4 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Nov-22	0.09	305.70	305.10	no	304.50	no
2-Nov-22	0.08	305.69	305.10	no	304.50	no
3-Nov-22	0.08	305.69	305.10	no	304.50	no
4-Nov-22	0.08	305.69	305.10	no	304.50	no
5-Nov-22			305.10		304.50	
6-Nov-22			305.10		304.50	
7-Nov-22	0.07	305.68	305.10	no	304.50	no
8-Nov-22	0.07	305.68	305.10	no	304.50	no
9-Nov-22	0.07	305.68	305.10	no	304.50	no
10-Nov-22	0.07	305.68	305.10	no	304.50	no
11-Nov-22	0.06	305.67	305.10	no	304.50	no
12-Nov-22			305.10		304.50	
13-Nov-22			305.10		304.50	
14-Nov-22	0.06	305.67	305.10	no	304.50	no
15-Nov-22	0.06	305.67	305.10	no	304.50	no
16-Nov-22	0.06	305.67	305.10	no	304.50	no
17-Nov-22	0.06	305.67	305.10	no	304.50	no
18-Nov-22	0.05	305.66	305.10	no	304.50	no
19-Nov-22			305.10		304.50	
20-Nov-22			305.10		304.50	
21-Nov-22	0.04	305.65	305.10	no	304.50	no
22-Nov-22	0.04	305.65	305.10	no	304.50	no
23-Nov-22	0.04	305.65	305.10	no	304.50	no
24-Nov-22	0.04	305.65	305.10	no	304.50	no
25-Nov-22	0.04	305.65	305.10	no	304.50	no
26-Nov-22			305.10		304.50	
27-Nov-22			305.10		304.50	
28-Nov-22	0.05	305.66	305.10	no	304.50	no
29-Nov-22	0.04	305.65	305.10	no	304.50	no
30-Nov-22	0.04	305.65	305.10	no	304.50	no
1-Dec-22	0.06	305.67	305.10	no	304.50	no
2-Dec-22	0.06	305.67	305.10	no	304.50	no
3-Dec-22			305.10		304.50	
4-Dec-22			305.10		304.50	
5-Dec-22	0.06	305.67	305.10	no	304.50	no
6-Dec-22	0.05	305.66	305.10	no	304.50	no
7-Dec-22	0.06	305.67	305.10	no	304.50	no
8-Dec-22	0.06	305.67	305.10	no	304.50	no
9-Dec-22			305.10		304.50	
10-Dec-22			305.10		304.50	
11-Dec-22			305.10		304.50	
12-Dec-22			305.10		304.50	
13-Dec-22			305.10		304.50	
14-Dec-22			305.10		304.50	
15-Dec-22			305.10		304.50	
16-Dec-22			305.10		304.50	
17-Dec-22			305.10		304.50	
18-Dec-22			305.10		304.50	
19-Dec-22			305.10		304.50	
20-Dec-22			305.10		304.50	
21-Dec-22			305.10		304.50	
22-Dec-22			305.10		304.50	
23-Dec-22			305.10		304.50	
24-Dec-22			305.10		304.50	
25-Dec-22			305.10		304.50	
26-Dec-22			305.10		304.50	
27-Dec-22			305.10		304.50	
28-Dec-22			305.10		304.50	
29-Dec-22			305.10		304.50	
30-Dec-22			305.10		304.50	
31-Dec-22			305.10		304.50	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-10
Threshold Summary - Phase 4 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 4 Pond (m)	Water Elevation Phase 4 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jan-23			305.10		304.50	
2-Jan-23			305.10		304.50	
3-Jan-23			305.10		304.50	
4-Jan-23			305.10		304.50	
5-Jan-23			305.10		304.50	
6-Jan-23			305.10		304.50	
7-Jan-23			305.10		304.50	
8-Jan-23			305.10		304.50	
9-Jan-23			305.10		304.50	
10-Jan-23			305.10		304.50	
11-Jan-23			305.10		304.50	
12-Jan-23			305.10		304.50	
13-Jan-23			305.10		304.50	
14-Jan-23			305.10		304.50	
15-Jan-23			305.10		304.50	
16-Jan-23			305.10		304.50	
17-Jan-23			305.10		304.50	
18-Jan-23			305.10		304.50	
19-Jan-23			305.10		304.50	
20-Jan-23			305.10		304.50	
21-Jan-23			305.10		304.50	
22-Jan-23			305.10		304.50	
23-Jan-23			305.10		304.50	
24-Jan-23			305.10		304.50	
25-Jan-23			305.10		304.50	
26-Jan-23			305.10		304.50	
27-Jan-23			305.10		304.50	
28-Jan-23			305.10		304.50	
29-Jan-23			305.10		304.50	
30-Jan-23			305.10		304.50	
31-Jan-23			305.10		304.50	
1-Feb-23			305.10		304.50	
2-Feb-23			305.10		304.50	
3-Feb-23			305.10		304.50	
4-Feb-23			305.10		304.50	
5-Feb-23			305.10		304.50	
6-Feb-23			305.10		304.50	
7-Feb-23			305.10		304.50	
8-Feb-23			305.10		304.50	
9-Feb-23			305.10		304.50	
10-Feb-23			305.10		304.50	
11-Feb-23			305.10		304.50	
12-Feb-23			305.10		304.50	
13-Feb-23			305.10		304.50	
14-Feb-23			305.10		304.50	
15-Feb-23			305.10		304.50	
16-Feb-23			305.10		304.50	
17-Feb-23			305.10		304.50	
18-Feb-23			305.10		304.50	
19-Feb-23			305.10		304.50	
20-Feb-23			305.10		304.50	
21-Feb-23			305.10		304.50	
22-Feb-23			305.10		304.50	
23-Feb-23			305.10		304.50	
24-Feb-23			305.10		304.50	
25-Feb-23			305.10		304.50	
26-Feb-23			305.10		304.50	
27-Feb-23			305.10		304.50	
28-Feb-23			305.10		304.50	
1-Mar-23			305.10		304.50	
2-Mar-23			305.10		304.50	
3-Mar-23			305.10		304.50	
4-Mar-23			305.10		304.50	
5-Mar-23			305.10		304.50	
6-Mar-23			305.10		304.50	
7-Mar-23			305.10		304.50	
8-Mar-23			305.10		304.50	
9-Mar-23			305.10		304.50	
10-Mar-23			305.10		304.50	
11-Mar-23			305.10		304.50	
12-Mar-23			305.10		304.50	
13-Mar-23			305.10		304.50	
14-Mar-23			305.10		304.50	
15-Mar-23			305.10		304.50	
16-Mar-23			305.10		304.50	
17-Mar-23			305.10		304.50	

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-10
Threshold Summary - Phase 4 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 4 Pond (m)	Water Elevation Phase 4 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
18-Mar-23			305.10		304.50	
19-Mar-23			305.10		304.50	
20-Mar-23			305.10		304.50	
21-Mar-23			305.10		304.50	
22-Mar-23			305.10		304.50	
23-Mar-23			305.10		304.50	
24-Mar-23			305.10		304.50	
25-Mar-23			305.10		304.50	
26-Mar-23			305.10		304.50	
27-Mar-23			305.10		304.50	
28-Mar-23			305.10		304.50	
29-Mar-23			305.10		304.50	
30-Mar-23			305.10		304.50	
31-Mar-23			305.10		304.50	
1-Apr-23			305.10		304.50	
2-Apr-23			305.10		304.50	
3-Apr-23	0.72	305.86	305.10	no	304.50	no
4-Apr-23	0.72	305.76	305.10	no	304.50	no
5-Apr-23	0.72	305.77	305.10	no	304.50	no
6-Apr-23	0.72	305.77	305.10	no	304.50	no
7-Apr-23			305.10		304.50	
8-Apr-23			305.10		304.50	
9-Apr-23			305.10		304.50	
10-Apr-23	0.72	305.78	305.10	no	304.50	no
11-Apr-23	0.72	305.79	305.10	no	304.50	no
12-Apr-23	0.72	305.79	305.10	no	304.50	no
13-Apr-23	0.72	305.79	305.10	no	304.50	no
14-Apr-23	0.72	305.79	305.10	no	304.50	no
15-Apr-23			305.10		304.50	
16-Apr-23			305.10		304.50	
17-Apr-23	0.72	305.79	305.10	no	304.50	no
18-Apr-23	0.72	305.79	305.10	no	304.50	no
19-Apr-23	0.72	305.79	305.10	no	304.50	no
20-Apr-23	0.72	305.79	305.10	no	304.50	no
21-Apr-23	0.72	305.79	305.10	no	304.50	no
22-Apr-23			305.10		304.50	
23-Apr-23			305.10		304.50	
24-Apr-23	0.72	305.79	305.10	no	304.50	no
25-Apr-23	0.72	305.79	305.10	no	304.50	no
26-Apr-23	0.72	305.79	305.10	no	304.50	no
27-Apr-23	0.72	305.79	305.10	no	304.50	no
28-Apr-23	0.72	305.79	305.10	no	304.50	no
29-Apr-23			305.10		304.50	
30-Apr-23			305.10		304.50	
1-May-23	0.72	305.81	305.10	no	304.50	no
2-May-23	0.72	305.81	305.10	no	304.50	no
3-May-23	0.76	305.85	305.10	no	304.50	no
4-May-23	0.73	305.82	305.10	no	304.50	no
5-May-23	0.75	305.84	305.10	no	304.50	no
6-May-23			305.10		304.50	
7-May-23			305.10		304.50	
8-May-23	0.76	305.85	305.10	no	304.50	no
9-May-23	0.78	305.87	305.10	no	304.50	no
10-May-23	0.79	305.88	305.10	no	304.50	no
11-May-23	0.80	305.89	305.10	no	304.50	no
12-May-23	0.81	305.90	305.10	no	304.50	no
13-May-23			305.10		304.50	
14-May-23			305.10		304.50	
15-May-23	0.84	305.93	305.10	no	304.50	no
16-May-23	0.83	305.92	305.10	no	304.50	no
17-May-23	0.83	305.92	305.10	no	304.50	no
18-May-23	0.83	305.92	305.10	no	304.50	no
19-May-23	0.83	305.92	305.10	no	304.50	no
20-May-23			305.10		304.50	
21-May-23			305.10		304.50	
22-May-23			305.10		304.50	
23-May-23	0.89	305.98	305.10	no	304.50	no
24-May-23	0.90	305.99	305.10	no	304.50	no
25-May-23	0.90	305.99	305.10	no	304.50	no
26-May-23	0.89	305.98	305.10	no	304.50	no
27-May-23			305.10		304.50	
28-May-23			305.10		304.50	
29-May-23	0.89	305.98	305.10	no	304.50	no
30-May-23	0.89	305.98	305.10	no	304.50	no
31-May-23	0.89	305.98	305.10	no	304.50	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-10
Threshold Summary - Phase 4 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 4 Pond (m)	Water Elevation Phase 4 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
1-Jun-23	0.90	305.99	305.10	no	304.50	no
2-Jun-23	0.89	305.98	305.10	no	304.50	no
3-Jun-23			305.10		304.50	
4-Jun-23			305.10		304.50	
5-Jun-23	0.89	305.98	305.10	no	304.50	no
6-Jun-23	0.89	305.98	305.10	no	304.50	no
7-Jun-23	0.89	305.98	305.10	no	304.50	no
8-Jun-23	0.89	305.98	305.10	no	304.50	no
9-Jun-23	0.89	305.98	305.10	no	304.50	no
10-Jun-23			305.10		304.50	
11-Jun-23			305.10		304.50	
12-Jun-23	0.90	305.99	305.10	no	304.50	no
13-Jun-23	0.91	306.00	305.10	no	304.50	no
14-Jun-23	0.92	306.01	305.10	no	304.50	no
15-Jun-23	0.92	306.01	305.10	no	304.50	no
16-Jun-23	0.93	306.02	305.10	no	304.50	no
17-Jun-23			305.10		304.50	
18-Jun-23			305.10		304.50	
19-Jun-23	0.91	306.00	305.10	no	304.50	no
20-Jun-23	0.92	306.01	305.10	no	304.50	no
21-Jun-23	0.93	306.02	305.10	no	304.50	no
22-Jun-23	0.93	306.02	305.10	no	304.50	no
23-Jun-23	0.90	305.99	305.10	no	304.50	no
24-Jun-23			305.10		304.50	
25-Jun-23			305.10		304.50	
26-Jun-23	0.90	305.99	305.10	no	304.50	no
27-Jun-23	0.93	306.02	305.10	no	304.50	no
28-Jun-23	0.94	306.03	305.10	no	304.50	no
29-Jun-23	0.94	306.03	305.10	no	304.50	no
30-Jun-23	0.93	306.02	305.10	no	304.50	no
1-Jul-23			305.10		304.50	
2-Jul-23			305.10		304.50	
3-Jul-23			305.10		304.50	
4-Jul-23	0.95	306.04	305.10	no	304.50	no
5-Jul-23	0.94	306.03	305.10	no	304.50	no
6-Jul-23	0.93	306.02	305.10	no	304.50	no
7-Jul-23	0.96	306.05	305.10	no	304.50	no
8-Jul-23			305.10		304.50	
9-Jul-23			305.10		304.50	
10-Jul-23	0.95	306.04	305.10	no	304.50	no
11-Jul-23	0.90	305.99	305.10	no	304.50	no
12-Jul-23	0.88	305.97	305.10	no	304.50	no
13-Jul-23	0.90	305.99	305.10	no	304.50	no
14-Jul-23	0.87	305.96	305.10	no	304.50	no
15-Jul-23			305.10		304.50	
16-Jul-23			305.10		304.50	
17-Jul-23	0.81	305.90	305.10	no	304.50	no
18-Jul-23	0.81	305.90	305.10	no	304.50	no
19-Jul-23	0.79	305.88	305.10	no	304.50	no
20-Jul-23	0.78	305.87	305.10	no	304.50	no
21-Jul-23	0.78	305.87	305.10	no	304.50	no
22-Jul-23			305.10		304.50	
23-Jul-23			305.10		304.50	
24-Jul-23	0.76	305.85	305.10	no	304.50	no
25-Jul-23	0.82	305.91	305.10	no	304.50	no
26-Jul-23	0.81	305.90	305.10	no	304.50	no
27-Jul-23	0.81	305.90	305.10	no	304.50	no
28-Jul-23	0.81	305.90	305.10	no	304.50	no
29-Jul-23	0.81	305.90	305.10	no	304.50	no
30-Jul-23			305.10		304.50	
31-Jul-23	0.87	305.96	305.10	no	304.50	no
1-Aug-23	0.87	305.96	305.10	no	304.50	no
2-Aug-23	0.87	305.96	305.10	no	304.50	no
3-Aug-23	0.88	305.97	305.10	no	304.50	no
4-Aug-23	0.89	305.98	305.10	no	304.50	no
5-Aug-23			305.10		304.50	
6-Aug-23			305.10		304.50	
7-Aug-23			305.10		304.50	
8-Aug-23	0.90	305.99	305.10	no	304.50	no
9-Aug-23	0.90	305.99	305.10	no	304.50	no
10-Aug-23	0.90	305.99	305.10	no	304.50	no
11-Aug-23	0.90	305.99	305.10	no	304.50	no
12-Aug-23			305.10		304.50	
13-Aug-23			305.10		304.50	
14-Aug-23	1.00	306.09	305.10	no	304.50	no
15-Aug-23	0.91	306.00	305.10	no	304.50	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-10
Threshold Summary - Phase 4 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 4 Pond (m)	Water Elevation Phase 4 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
16-Aug-23	0.93	306.02	305.10	no	304.50	no
17-Aug-23	0.93	306.02	305.10	no	304.50	no
18-Aug-23	0.94	306.03	305.10	no	304.50	no
19-Aug-23	0.94	306.03	305.10	no	304.50	no
20-Aug-23			305.10		304.50	
21-Aug-23	0.94	306.03	305.10	no	304.50	no
22-Aug-23	0.94	306.03	305.10	no	304.50	no
23-Aug-23	0.93	306.02	305.10	no	304.50	no
24-Aug-23	0.93	306.02	305.10	no	304.50	no
25-Aug-23	0.96	306.05	305.10	no	304.50	no
26-Aug-23	0.94	306.02	305.10	no	304.50	no
27-Aug-23			305.10		304.50	
28-Aug-23	0.96	306.05	305.10	no	304.50	no
29-Aug-23	0.95	306.04	305.10	no	304.50	no
30-Aug-23	0.99	306.08	305.10	no	304.50	no
31-Aug-23	0.94	306.03	305.10	no	304.50	no
1-Sep-23	0.93	306.02	305.10	no	304.50	no
2-Sep-23	0.94	306.03	305.10	no	304.50	no
3-Sep-23			305.10		304.50	
4-Sep-23			305.10		304.50	
5-Sep-23	0.93	306.02	305.10	no	304.50	no
6-Sep-23	0.92	306.01	305.10	no	304.50	no
7-Sep-23	0.93	306.02	305.10	no	304.50	no
8-Sep-23	0.91	306.00	305.10	no	304.50	no
9-Sep-23	0.91	306.00	305.10	no	304.50	no
10-Sep-23			305.10		304.50	
11-Sep-23	1.00	306.09	305.10	no	304.50	no
12-Sep-23	0.93	306.02	305.10	no	304.50	no
13-Sep-23	0.90	305.99	305.10	no	304.50	no
14-Sep-23	0.90	305.99	305.10	no	304.50	no
15-Sep-23	0.90	305.99	305.10	no	304.50	no
16-Sep-23	0.90	305.99	305.10	no	304.50	no
17-Sep-23			305.10		304.50	
18-Sep-23	0.90	305.99	305.10	no	304.50	no
19-Sep-23	0.90	305.99	305.10	no	304.50	no
20-Sep-23	0.90	305.99	305.10	no	304.50	no
21-Sep-23	0.90	305.99	305.10	no	304.50	no
22-Sep-23	0.90	305.99	305.10	no	304.50	no
23-Sep-23	0.90	305.99	305.10	no	304.50	no
24-Sep-23			305.10		304.50	
25-Sep-23	0.86	305.95	305.10	no	304.50	no
26-Sep-23	0.86	305.95	305.10	no	304.50	no
27-Sep-23	0.87	305.96	305.10	no	304.50	no
28-Sep-23	0.86	305.95	305.10	no	304.50	no
29-Sep-23	0.85	305.94	305.10	no	304.50	no
30-Sep-23			305.10		304.50	
1-Oct-23			305.10		304.50	
2-Oct-23	0.85	305.94	305.10	no	304.50	no
3-Oct-23	0.85	305.94	305.10	no	304.50	no
4-Oct-23	0.85	305.94	305.10	no	304.50	no
5-Oct-23	0.84	305.93	305.10	no	304.50	no
6-Oct-23	0.85	305.94	305.10	no	304.50	no
7-Oct-23			305.10		304.50	
8-Oct-23			305.10		304.50	
9-Oct-23			305.10		304.50	
10-Oct-23	0.81	305.90	305.10	no	304.50	no
11-Oct-23	0.83	305.92	305.10	no	304.50	no
12-Oct-23	0.82	305.91	305.10	no	304.50	no
13-Oct-23	0.82	305.91	305.10	no	304.50	no
14-Oct-23	0.82	305.91	305.10	no	304.50	no
15-Oct-23			305.10		304.50	
16-Oct-23	0.83	305.92	305.10	no	304.50	no
17-Oct-23	0.84	305.93	305.10	no	304.50	no
18-Oct-23	0.83	305.92	305.10	no	304.50	no
19-Oct-23	0.82	305.91	305.10	no	304.50	no
20-Oct-23	0.83	305.92	305.10	no	304.50	no
21-Oct-23	0.83	305.92	305.10	no	304.50	no
22-Oct-23			305.10		304.50	
23-Oct-23	0.81	305.90	305.10	no	304.50	no
24-Oct-23	0.80	305.89	305.10	no	304.50	no
25-Oct-23	0.77	305.86	305.10	no	304.50	no
26-Oct-23	0.76	305.85	305.10	no	304.50	no
27-Oct-23	0.75	305.84	305.10	no	304.50	no
28-Oct-23	0.78	305.87	305.10	no	304.50	no
29-Oct-23			305.10		304.50	
30-Oct-23	0.73	305.82	305.10	no	304.50	no

Note: Water elevations are left blank when frozen conditions are encountered.

Table G-10
Threshold Summary - Phase 4 Pond
Mill Creek Aggregates Pit

Date	Gauge Reading Phase 4 Pond (m)	Water Elevation Phase 4 Pond (m ASL)	Early Warning Value (Min) (m ASL)	Exceedance of Early Warning Value	Threshold Value (Min) (m ASL)	Exceedance of Threshold Value
31-Oct-23	0.71	305.80	305.10	no	304.50	no
1-Nov-23	0.70	305.79	305.10	no	304.50	no
2-Nov-23	0.70	305.79	305.10	no	304.50	no
3-Nov-23	0.70	305.79	305.10	no	304.50	no
4-Nov-23			305.10		304.50	
5-Nov-23			305.10		304.50	
6-Nov-23	0.71	305.80	305.10	no	304.50	no
7-Nov-23	0.71	305.80	305.10	no	304.50	no
8-Nov-23	0.70	305.79	305.10	no	304.50	no
9-Nov-23	0.70	305.79	305.10	no	304.50	no
10-Nov-23	0.73	305.82	305.10	no	304.50	no
11-Nov-23	0.73	305.82	305.10	no	304.50	no
12-Nov-23			305.10		304.50	
13-Nov-23	0.76	305.85	305.10	no	304.50	no
14-Nov-23	0.76	305.85	305.10	no	304.50	no
15-Nov-23	0.77	305.86	305.10	no	304.50	no
16-Nov-23	0.75	305.84	305.10	no	304.50	no
17-Nov-23	0.74	305.83	305.10	no	304.50	no
18-Nov-23	0.74	305.83	305.10	no	304.50	no
19-Nov-23			305.10		304.50	
20-Nov-23	0.72	305.81	305.10	no	304.50	no
21-Nov-23	0.71	305.80	305.10	no	304.50	no
22-Nov-23	0.71	305.80	305.10	no	304.50	no
23-Nov-23	0.70	305.79	305.10	no	304.50	no
24-Nov-23	0.70	305.79	305.10	no	304.50	no
25-Nov-23			305.10		304.50	
26-Nov-23			305.10		304.50	
27-Nov-23	0.70	305.79	305.10	no	304.50	no
28-Nov-23	0.70	305.79	305.10	no	304.50	no
29-Nov-23	0.69	305.78	305.10	no	304.50	no
30-Nov-23	0.70	305.79	305.10	no	304.50	no
1-Dec-23	0.70	305.79	305.10	no	304.50	no
2-Dec-23			305.10		304.50	
3-Dec-23			305.10		304.50	
4-Dec-23	0.70	305.79	305.10	no	304.50	no
5-Dec-23	0.70	305.79	305.10	no	304.50	no
6-Dec-23	0.70	305.79	305.10	no	304.50	no
7-Dec-23	0.70	305.79	305.10	no	304.50	no
8-Dec-23	0.70	305.79	305.10	no	304.50	no
9-Dec-23			305.10		304.50	
10-Dec-23			305.10		304.50	
11-Dec-23			305.10		304.50	
12-Dec-23			305.10		304.50	
13-Dec-23			305.10		304.50	
14-Dec-23			305.10		304.50	
15-Dec-23			305.10		304.50	
16-Dec-23			305.10		304.50	
17-Dec-23			305.10		304.50	
18-Dec-23			305.10		304.50	
19-Dec-23			305.10		304.50	
20-Dec-23			305.10		304.50	
21-Dec-23			305.10		304.50	
22-Dec-23			305.10		304.50	
23-Dec-23			305.10		304.50	
24-Dec-23			305.10		304.50	
25-Dec-23			305.10		304.50	
26-Dec-23			305.10		304.50	
27-Dec-23			305.10		304.50	
28-Dec-23			305.10		304.50	
29-Dec-23			305.10		304.50	
30-Dec-23			305.10		304.50	
31-Dec-23			305.10		304.50	

Note: Water elevations are left blank when frozen conditions are encountered.

MILL CREEK AGGREGATES

TABLE G-11: SUMMARY OF THRESHOLDS AND ACTION RESPONSE PROTOCOL GROUNDWATER AND SURFACE WATER

Monitor Pair/Location	Seasonal Threshold Values	Seasonal Early Warning Values	Action Response Protocol
(1) BH13to DP21$_{in}$ east of Hanlon Interchange to Mill Creek	Spring: 0.11 m head difference (305.60) Summer: 0.10 m head difference (305.49) Fall: 0.09 m head difference (305.58) Winter: 0.11 m head difference (305.66)	0.13 m head difference 0.12 m head difference 0.11 m head difference 0.13 m head difference	***Typical Response Protocol*** **A: Early Warning Value Exceedance** (1) In the event that an early warning level is breached, verify water level(s) at monitor pair(s) within two days. (2) Inform Dufferin by phone and in writing. Increase monitoring frequency to twice per week in vicinity of monitoring pair. (3) Review extraction and processing operations with Dufferin staff. Rectify any obvious cause of low water levels. Continue assessment and monitoring at high frequency to establish trend in water levels, cause of low water levels, and degree of impact likely to ensue from an exceedance of a threshold. Groundwater discharge conditions at the creek will be included in the assessment. (4) If water levels continue to decline and approach the threshold value, mitigation measures, such as a recharge trench, will be prepared and implemented if necessary. MNR will be informed in writing that this process is underway. Relocation of the extraction operation to another phase is also considered an acceptable form of mitigation. Other mitigation measures may be appropriate for specific conditions, and these would be discussed and agreed with MNR prior to implementation. (5) MNR will be informed in writing, and shall be in agreement with the proposed mitigation measures, prior to the implementation of mitigation measures. Initial results of the mitigation shall be submitted to MNR within one month of implementation. **B. Threshold Exceedance** If mitigation is unsuccessful while extraction is occurring, extraction in that phase will cease. Operations will relocate to another phase, if one is available. If the exceedance continues for a period of one month, then another more rigorous, and possibly permanent, method of mitigation will be implemented in consultation with MNR. If any working threshold is continually being exceeded for more than seven consecutive days, then below water table extraction will cease at that Phase and not begin again until the groundwater/pond level elevation is above the threshold value for seven consecutive days.
(2) BH92-12 to DP17R$_{in}$ East of Hanlon interchange to Mill Creek	Spring: 0.14 m head difference (305.17) Summer: 0.06 m head difference (305.17) Fall: 0.04 m head difference (305.17) Winter: 0.07 m head difference (305.17)	0.19 m head difference 0.12 m head difference 0.09 m head difference 0.13 m head difference	
(3) DP6 $_{in}$ to DP3$_{in}$ South of Hanlon Interchange to Mill Creek	Spring: 0.73 m head difference (304.54) Summer: 0.58 m head difference (304.54) Fall: 0.55 m head difference (304.54) Winter: 0.57 m head difference (304.54)	0.84 m head difference 0.76 m head difference 0.73 m head difference 0.69 m head difference	
(4) BH92-29 to DP1$_{in}$ Northwest corner of site; west of approved Phase 3 extraction area	Spring: 0.17 m head difference (303.97) Summer: 0.23 m head difference (303.91) Fall: 0.19 m head difference (303.96) Winter: 0.29 m head difference (303.88)	0.22 m head difference 0.28 m head difference 0.24 m head difference 0.34 m head difference	
(5) BH92-27 to DP2$_{in}$ West of approved Phase 3 extraction area	Spring: 0.34 m head difference (303.69) Summer: 0.32 m head difference (303.50) Fall: 0.34 m head difference (303.55) Winter: 0.43 m head difference (303.65)	0.39 m head difference 0.37 m head difference 0.39 m head difference 0.48 m head difference	
(6) OW5-84 to DP5CR$_{in}$ Southwest corner of site downgradient from silt pond SP1 to Mill Creek	Spring: 0.30 m head difference (302.86) *Revised: 0.18 m head difference (302.86)** Summer: 0.25 m head difference (302.79) *Revised: 0.15 m head difference (302.79)** Fall: 0.25 m head difference (302.84) *Revised: 0.15 m head difference (302.84)** Winter: 0.30 m head difference (302.88) *Revised: 0.20 m head difference (302.88)**	0.34 m head difference *0.21 m head difference** 0.28 m head difference *0.18 m head difference** 0.28 m head difference *0.18 m head difference** 0.34 m head difference *0.23 m head difference**	
(7) Phase 1 Pond	305.5 mASL	305.75 mASL	
(8) Phase 2 Pond	305.0 mASL	305.30 mASL	
(9) Phase 3 Pond	303.85 mASL	304.10 mASL	
(10) Phase 4 Pond	304.50 mASL	305.10 mASL	
(11) Silt Pond SP3	Maximum: 307.1 mASL Minimum: 304.85 mASL	Maximum: 306.85 mASL Minimum: 305.10 mASL	

Notes:

(1) Thresholds and action response plan came into effect on June 30, 2001. New thresholds added July 31, 2002, October 2004, December 2005, April 2011, December 2011, May 2012, and October 2012.

(2) Values in brackets refer to minimum water level elevations (metres above sea level) at monitors DP21$_{in}$, DP17R$_{in}$, DP3$_{in}$, DP1$_{in}$, DP2$_{in}$ and DP5CR$_{in}$, respectively.

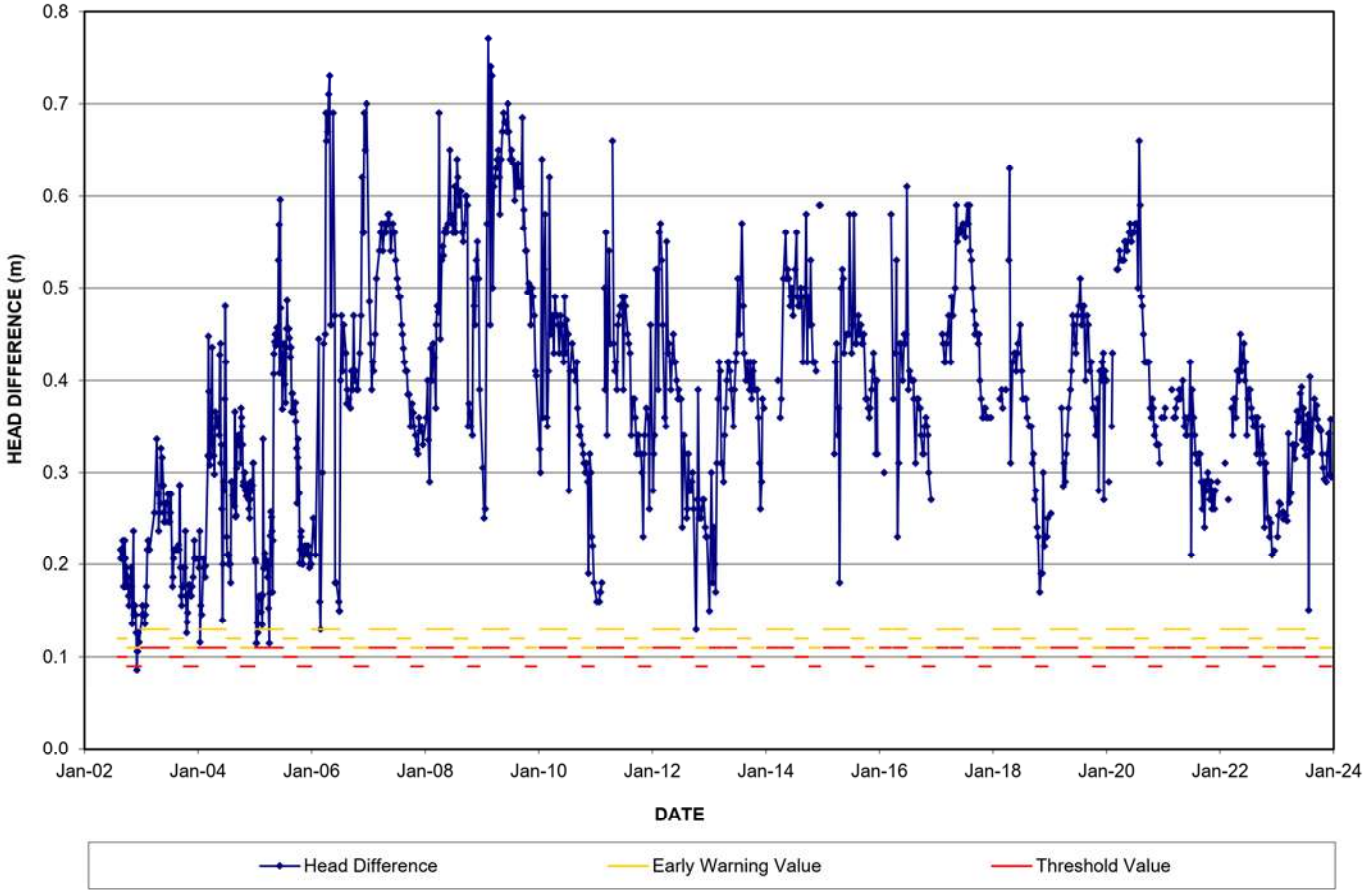
(3) Seasons are defined as follows:
Winter = January to March inclusive
Spring = April to June inclusive
Summer = July to September inclusive
Fall = October to December inclusive

(4) (in) indicates that the water levels are measured inside the drive point.

*(5) * indicates revised thresholds approved on June 30, 2022*

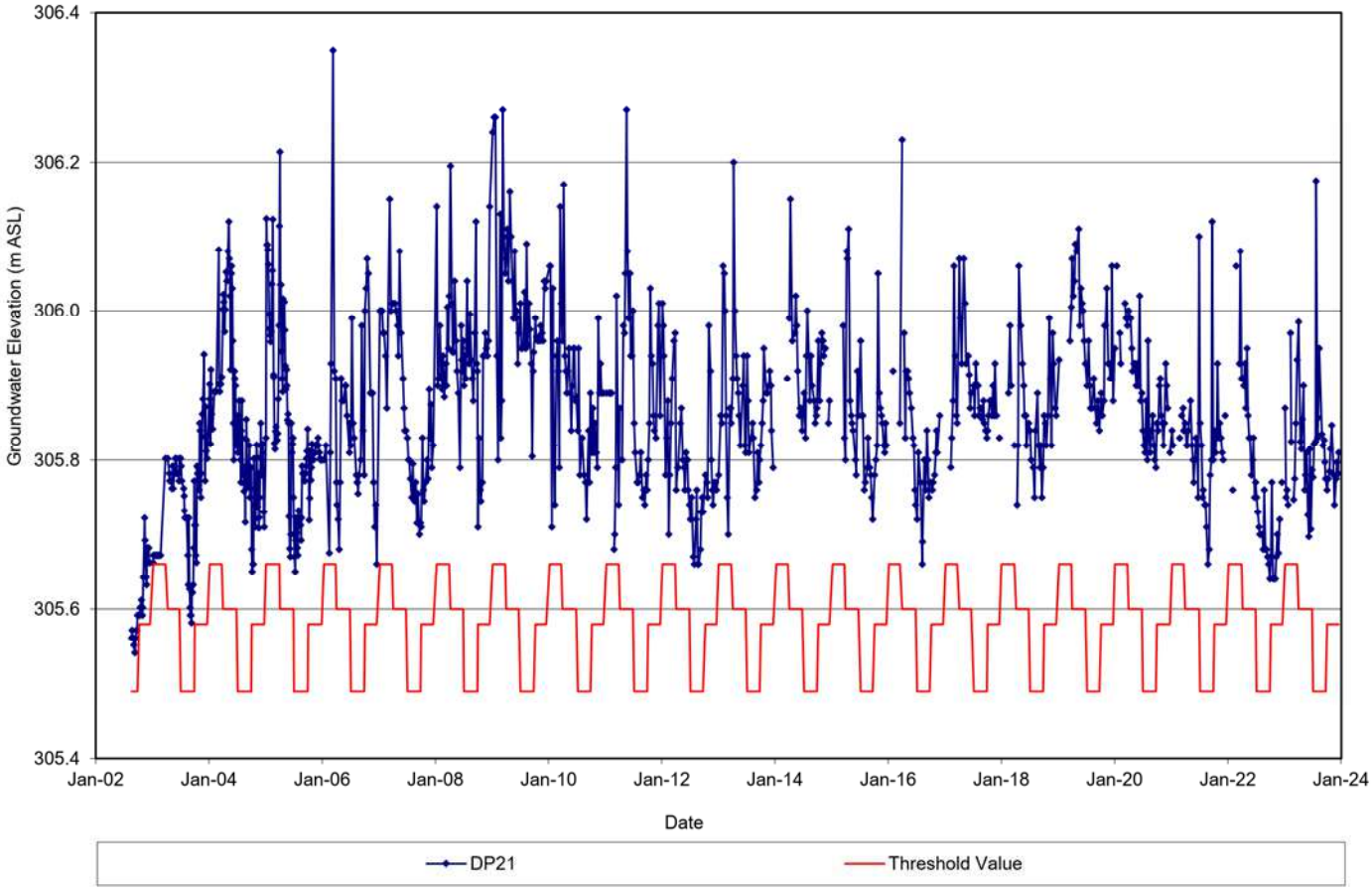
BH13 to DP21
HEAD DIFFERENCE

FIGURE G-1



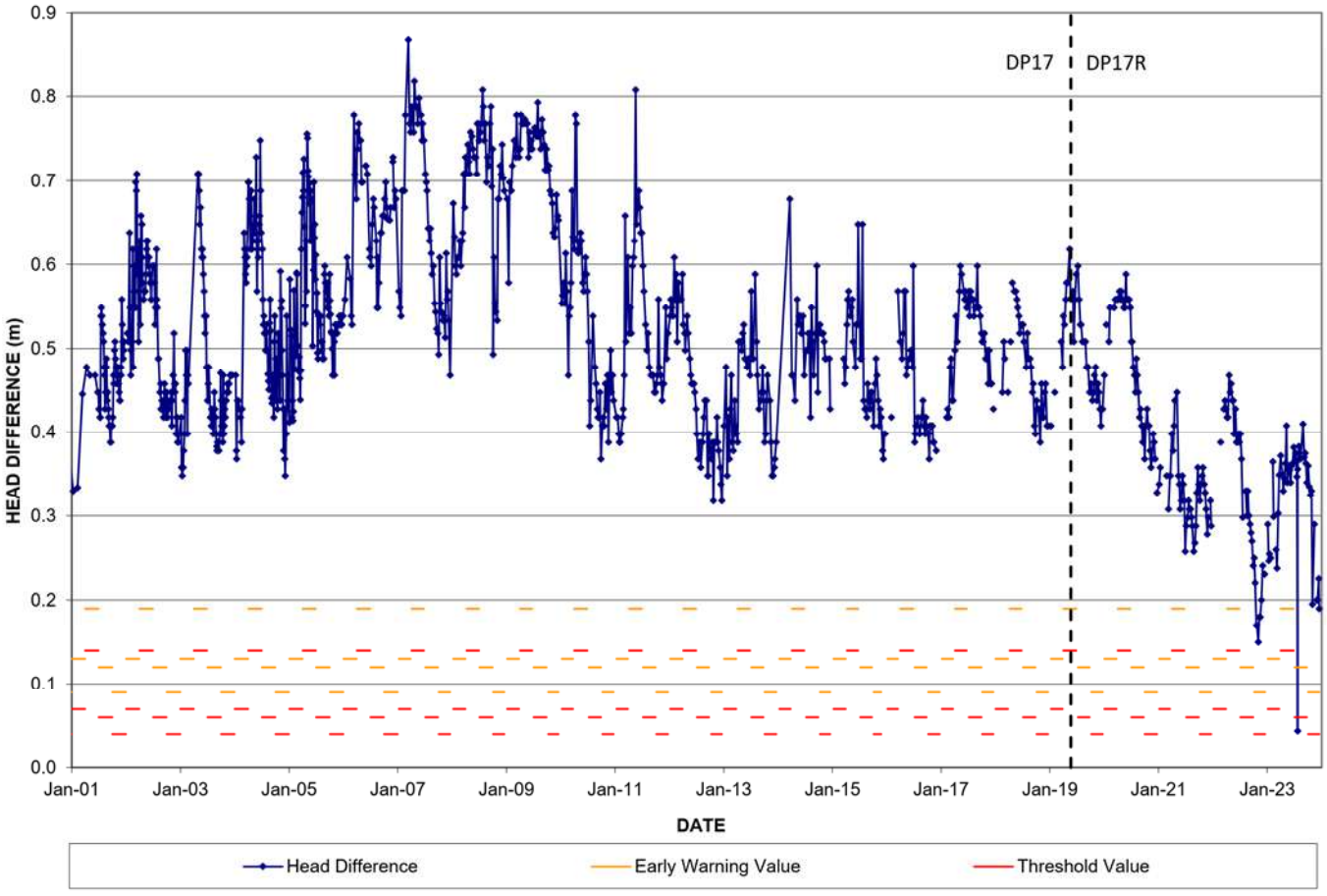
DP21 Thresholds

FIGURE G-2



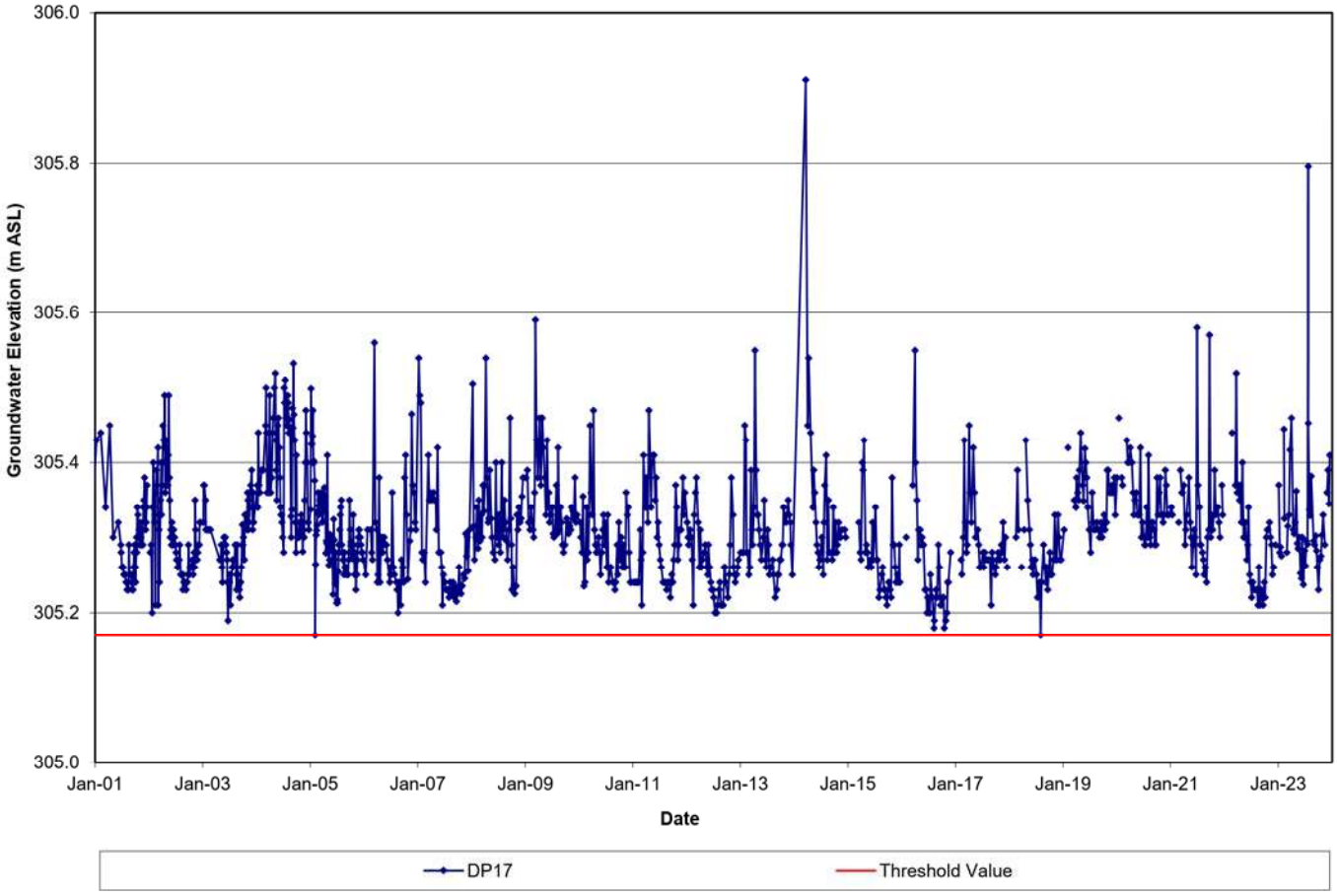
BH92-12 TO DP17/R
HEAD DIFFERENCE

FIGURE G-3



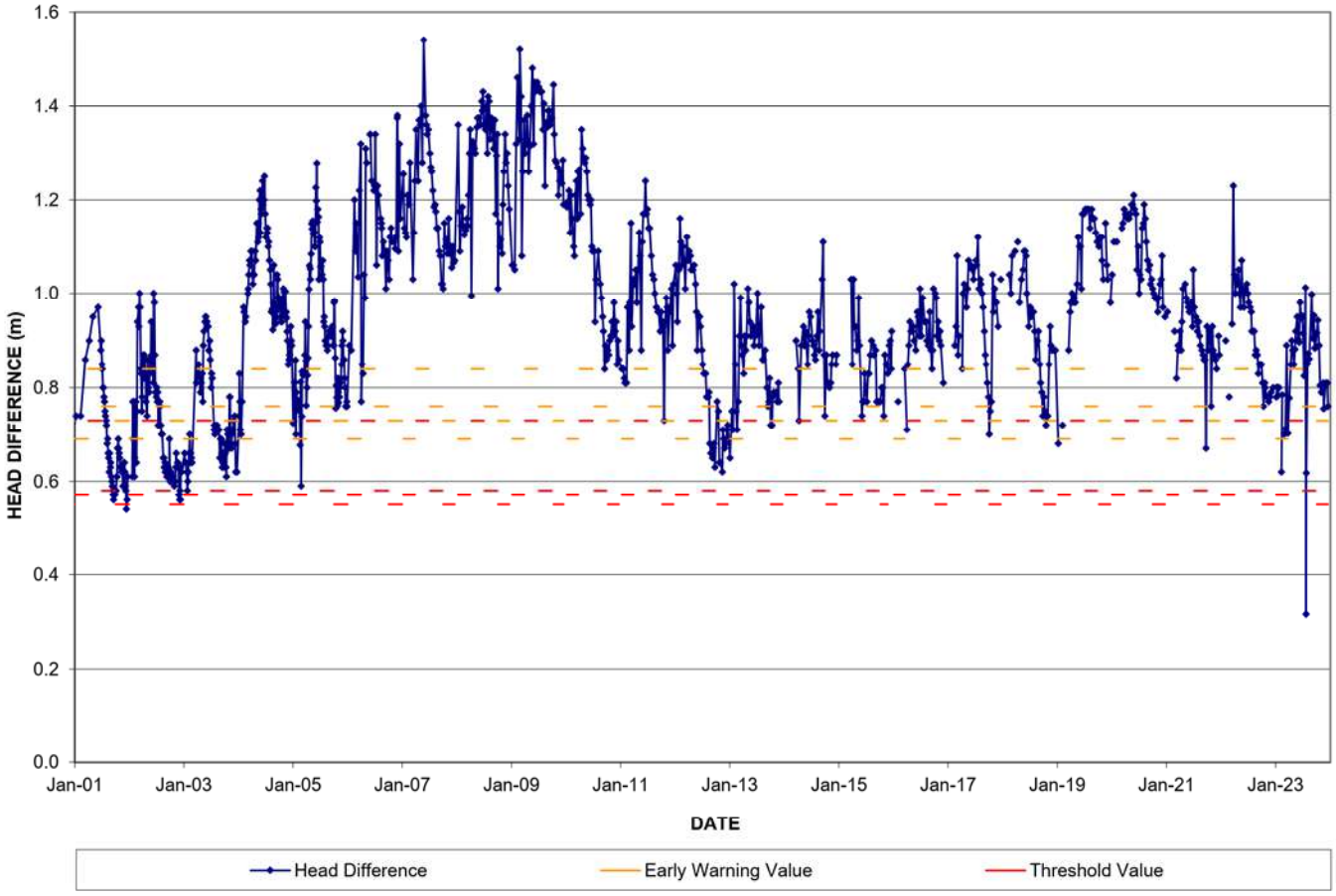
DP17/R Threshold

FIGURE G-4



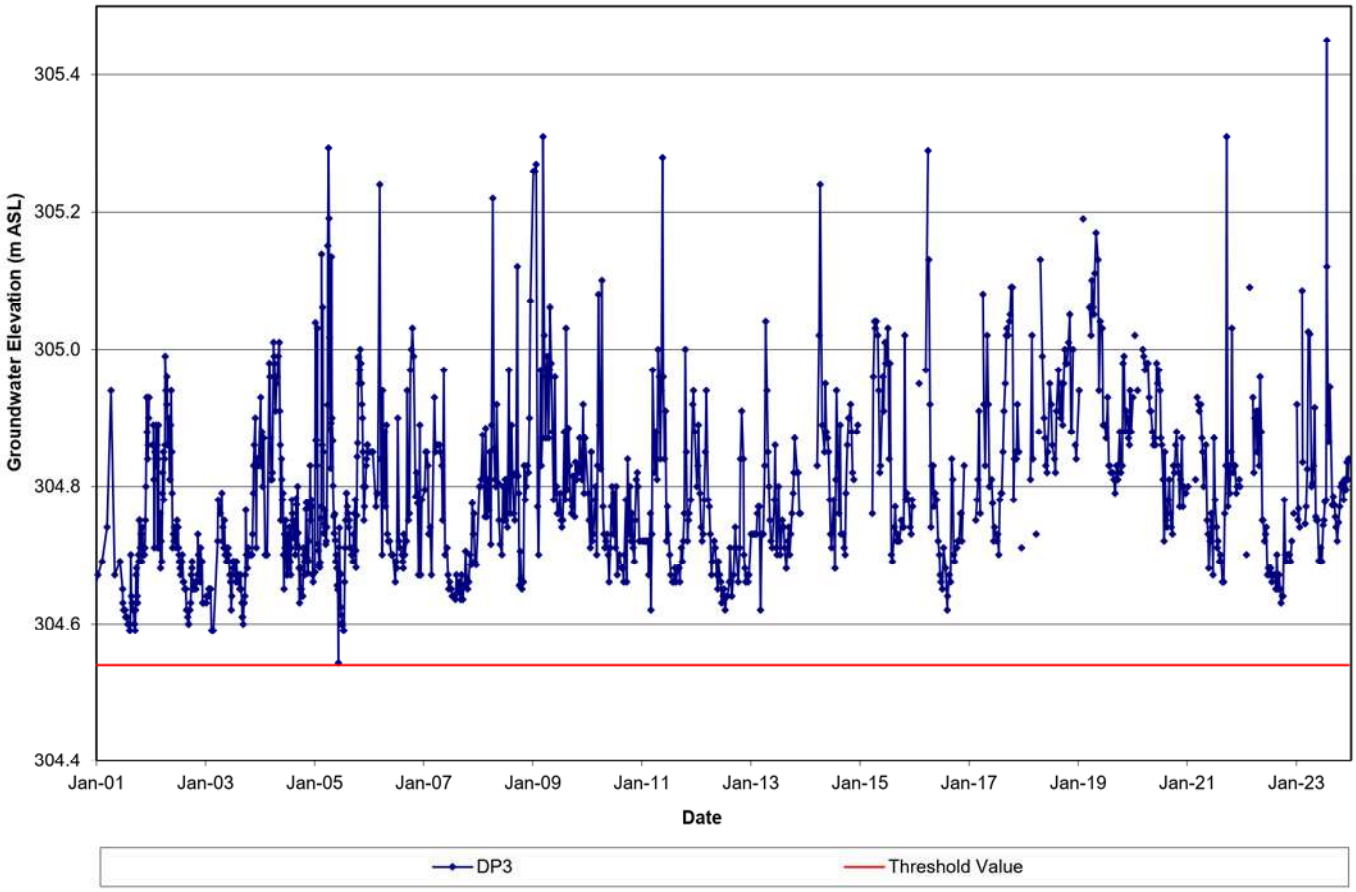
DP6 TO DP3
HEAD DIFFERENCE

FIGURE G-5



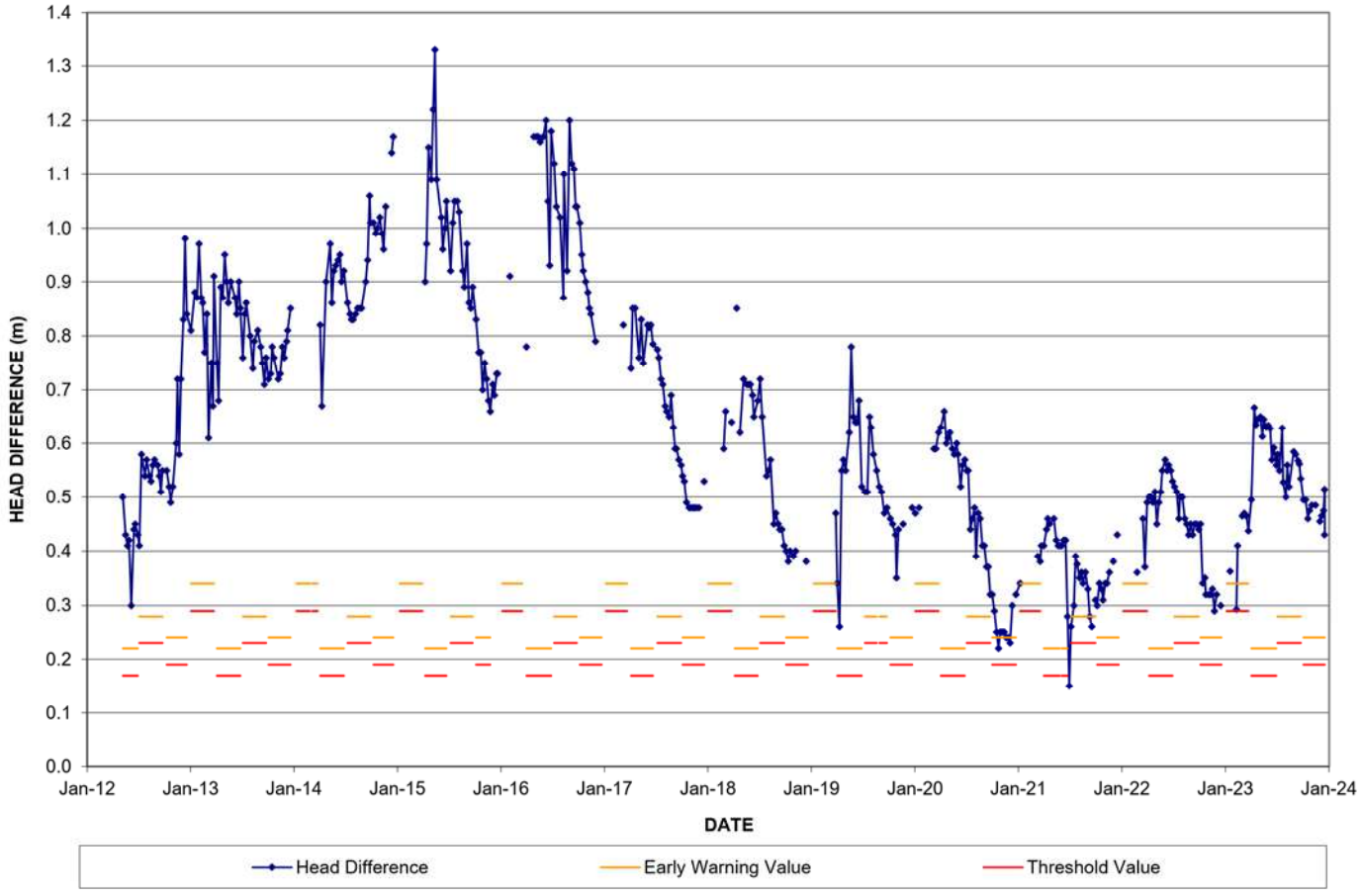
DP3 Threshold

FIGURE G-6



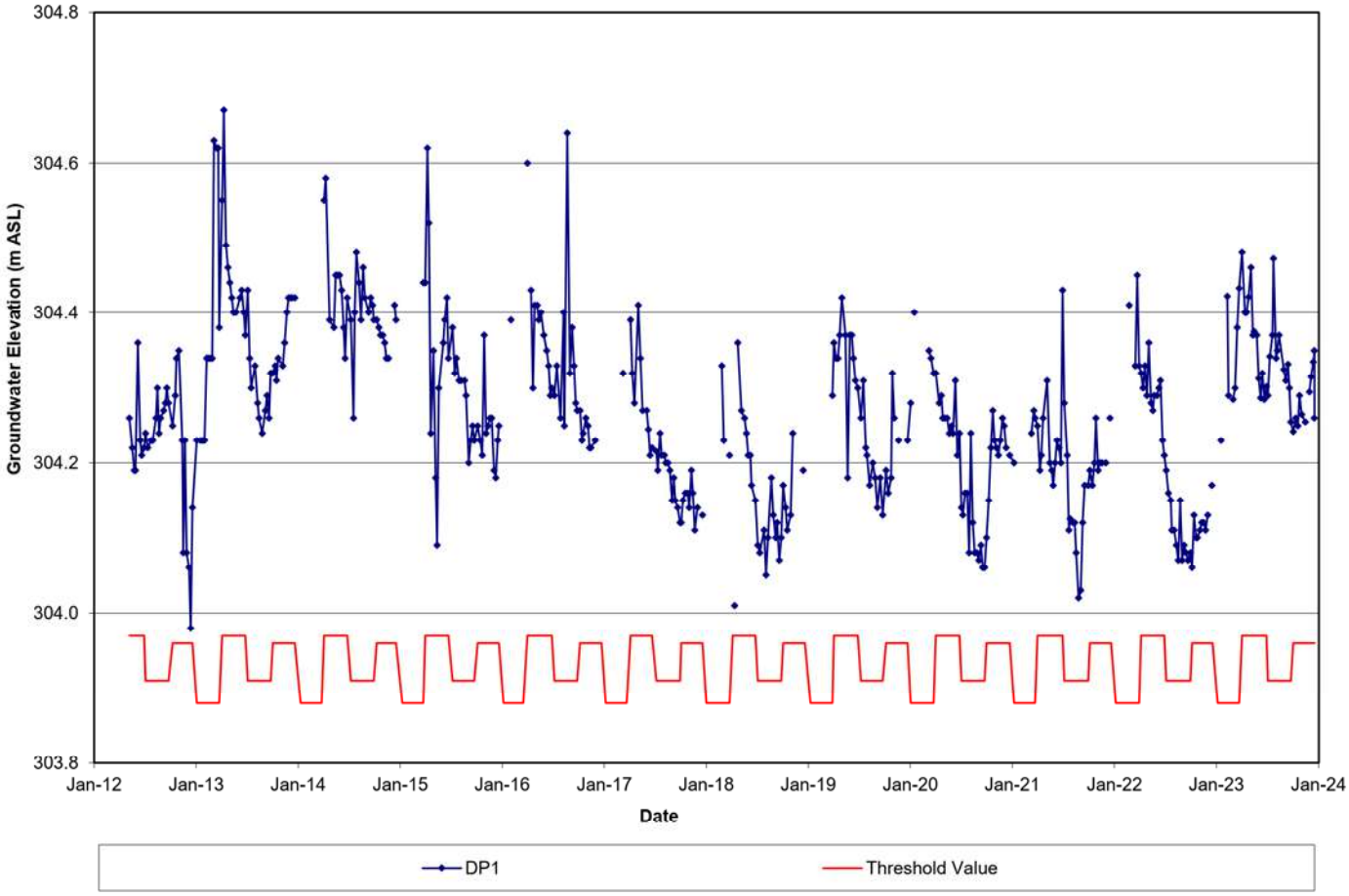
BH92-29 TO DP1
HEAD DIFFERENCE

FIGURE G-7



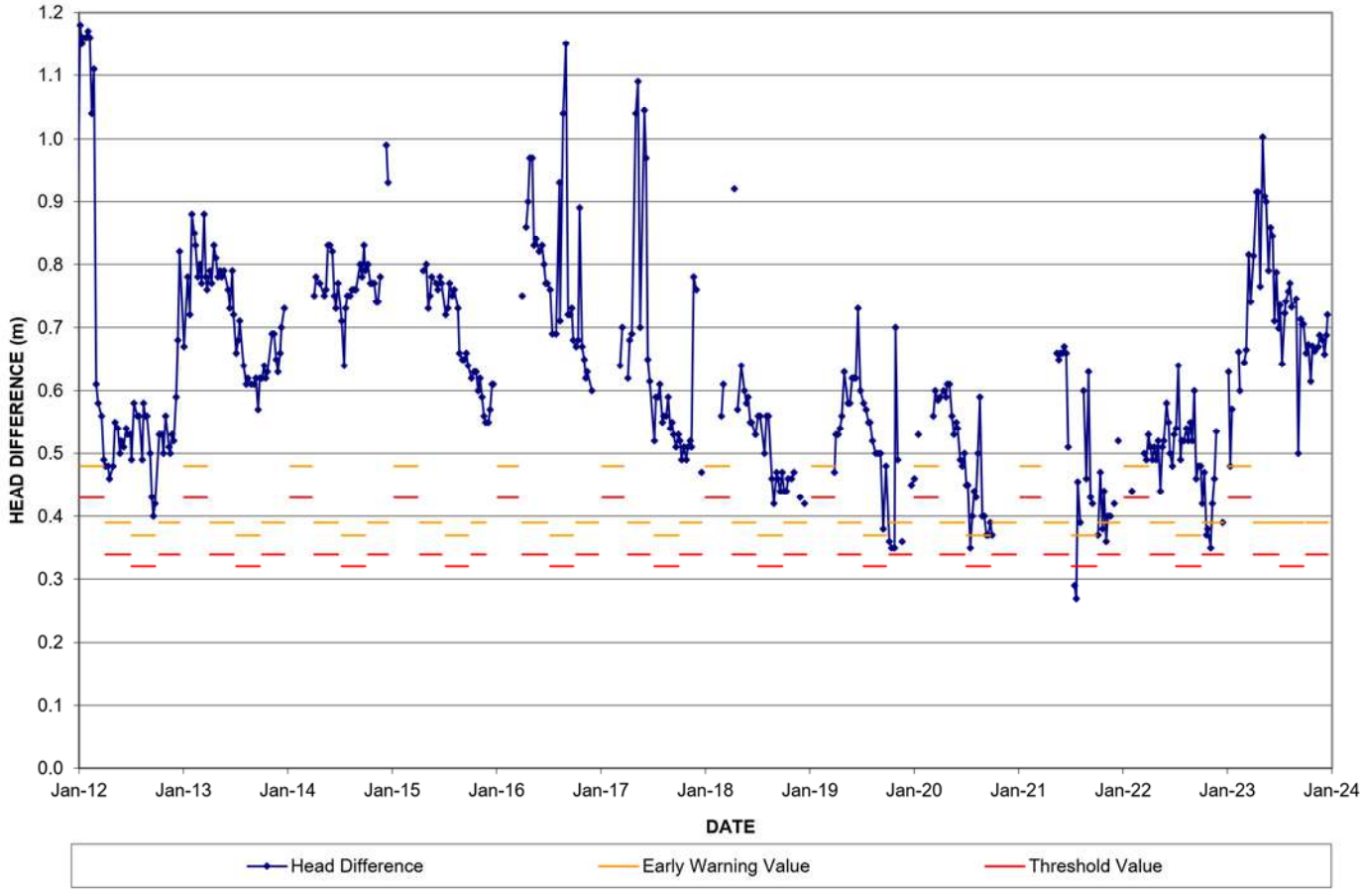
DP1 Thresholds

FIGURE G-8



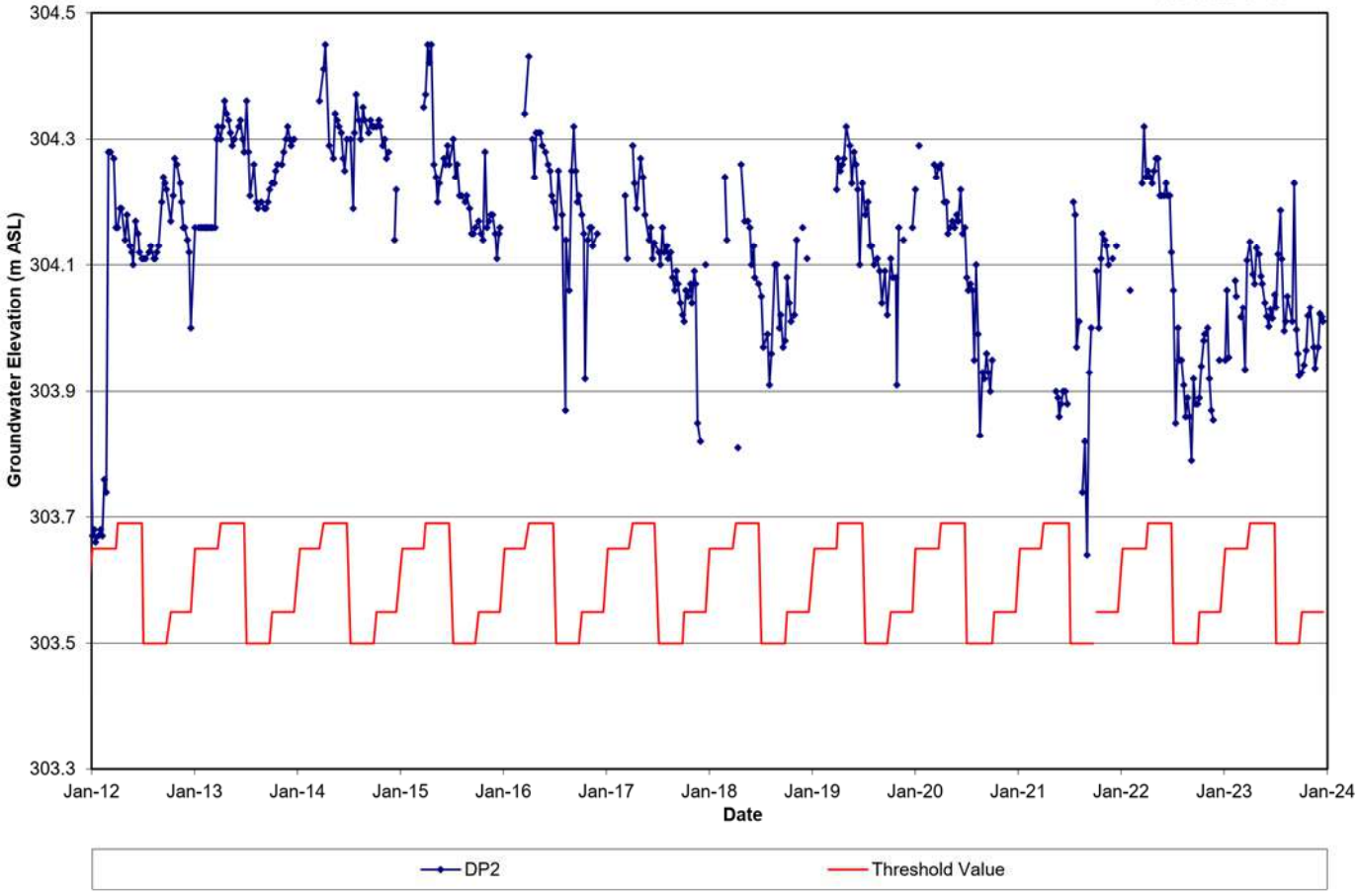
BH92-27 TO DP2
HEAD DIFFERENCE

FIGURE G-9



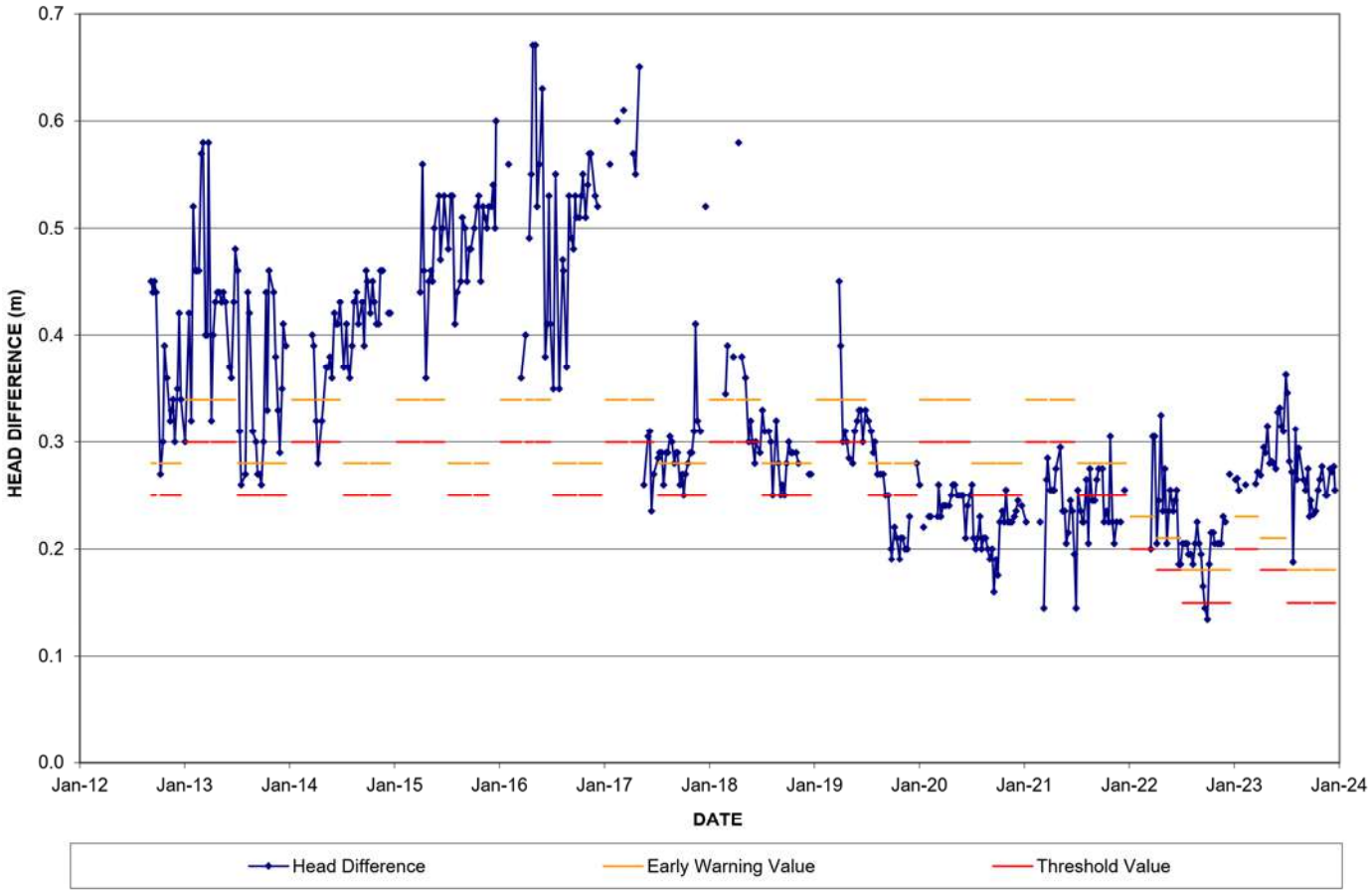
DP2 Thresholds

FIGURE G-10



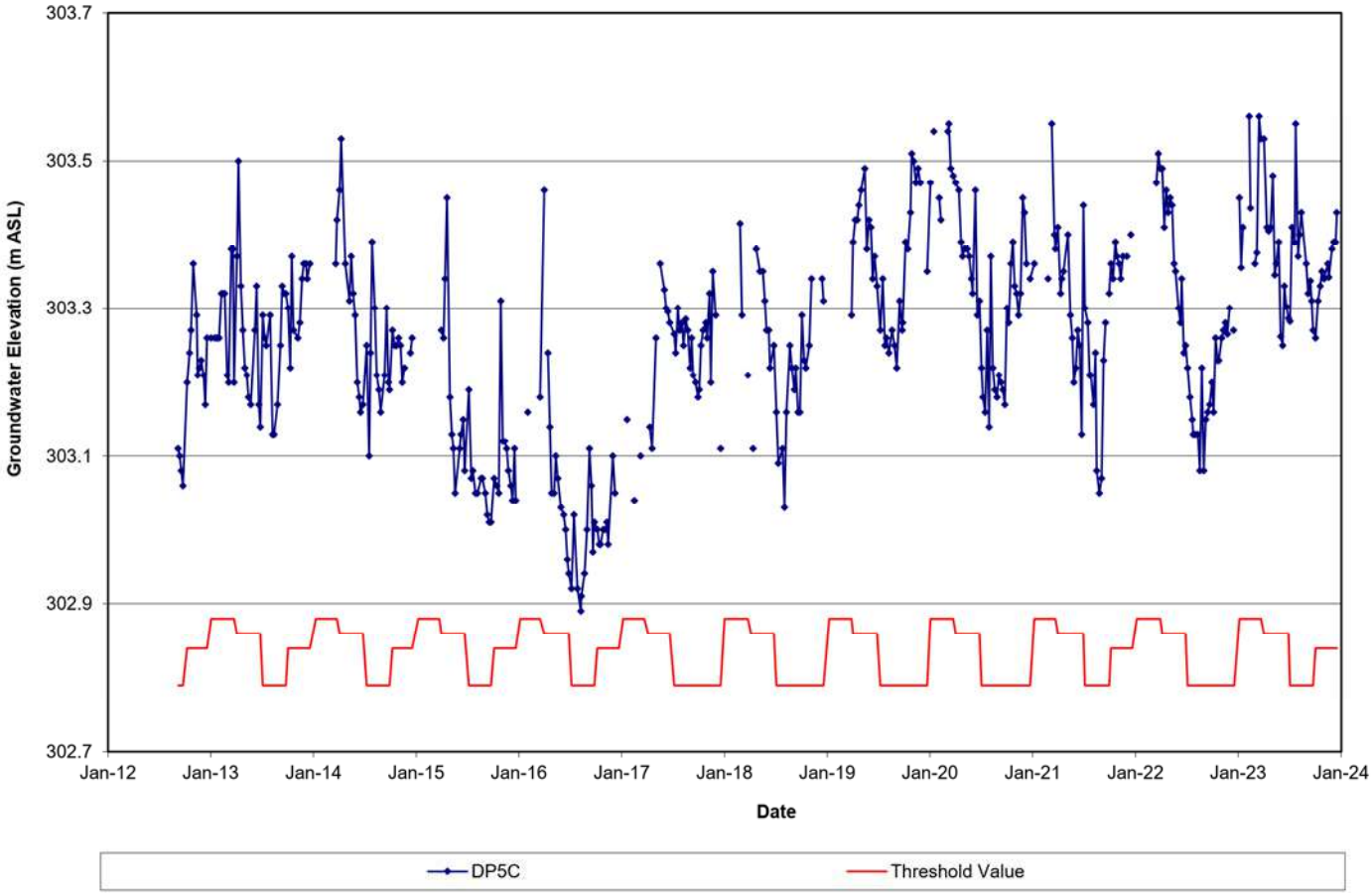
OW5-84 TO DP5C/CR
HEAD DIFFERENCE

FIGURE G-11



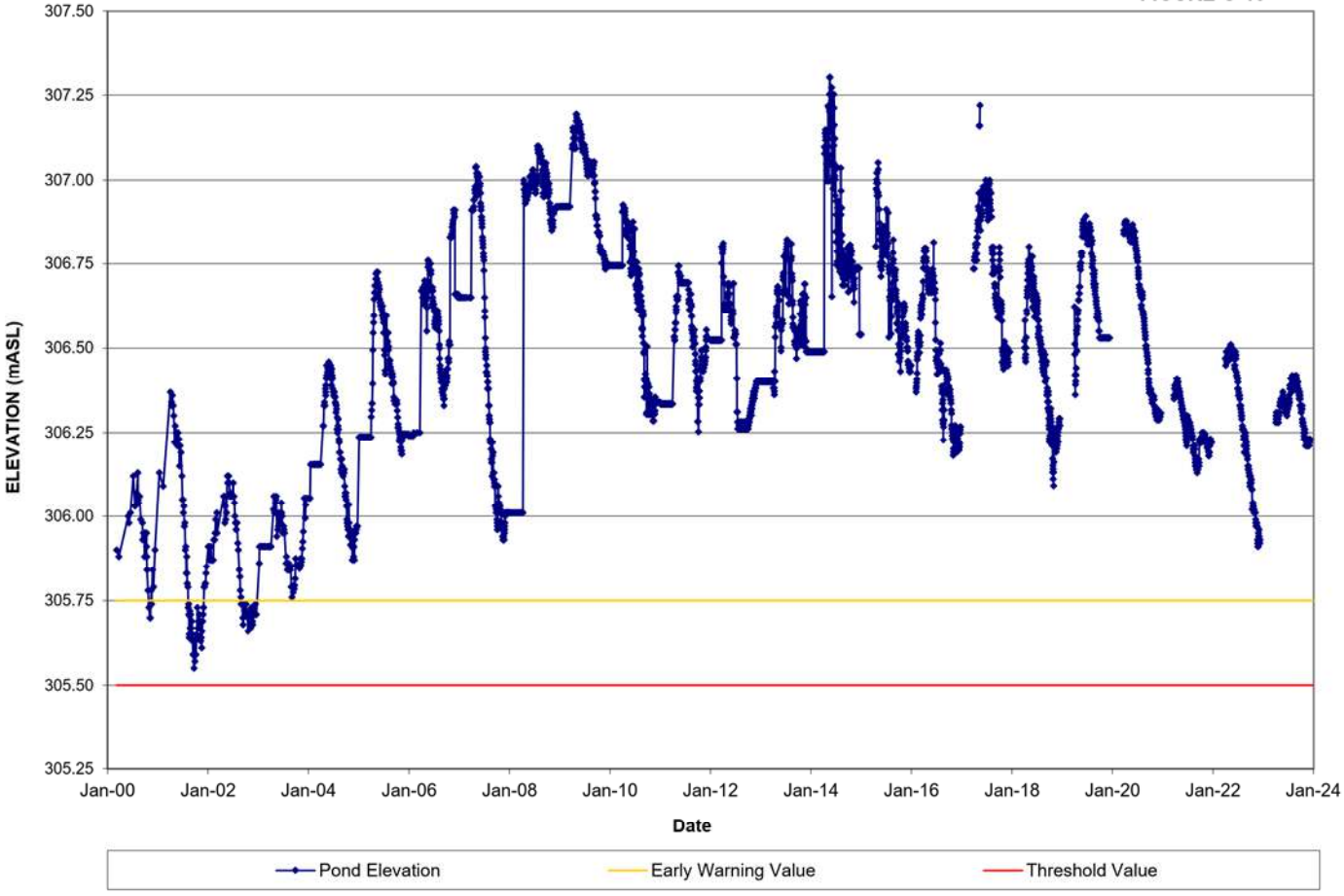
DP5C/CR Thresholds

FIGURE G-12



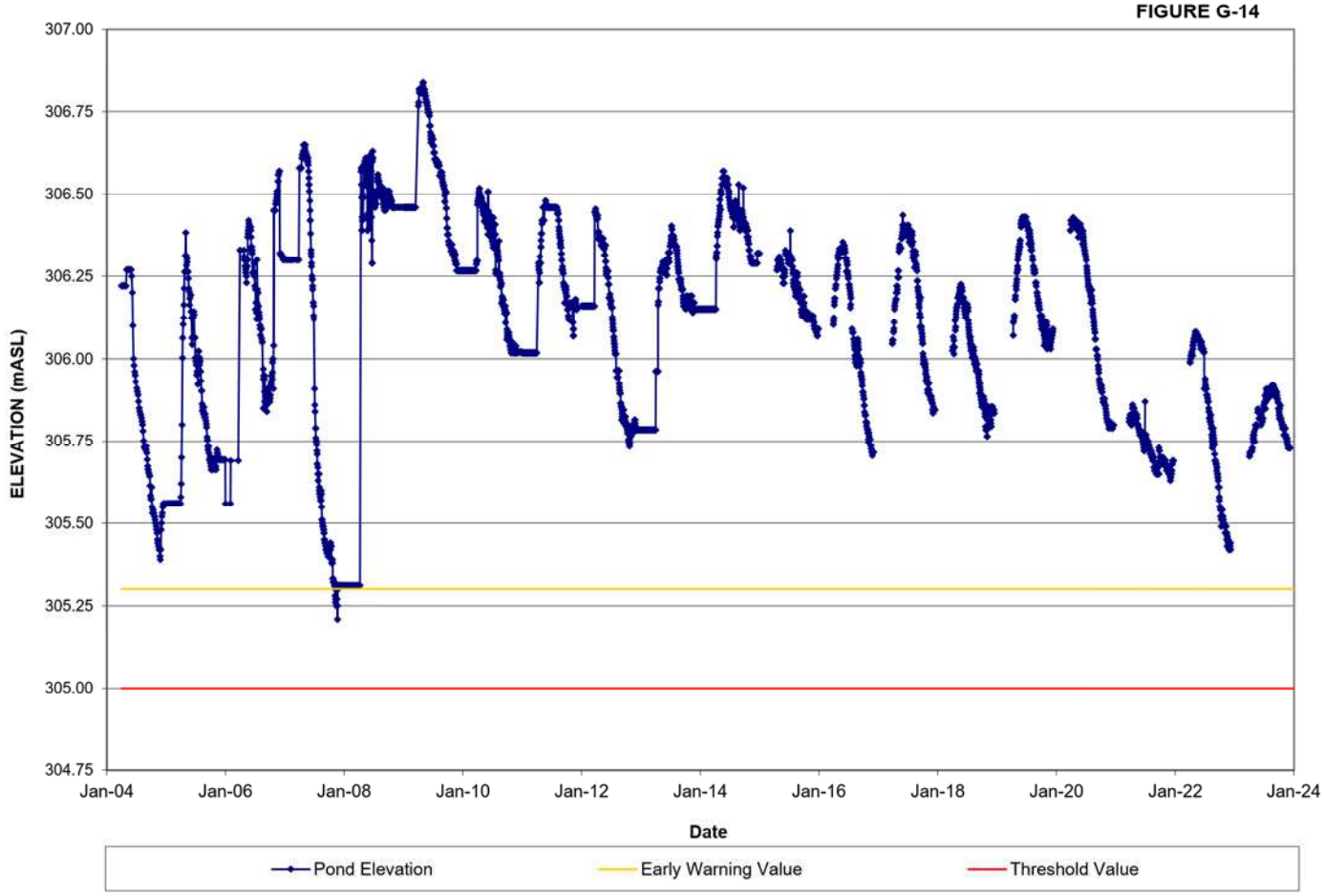
Phase 1 Pond Elevation

FIGURE G-13



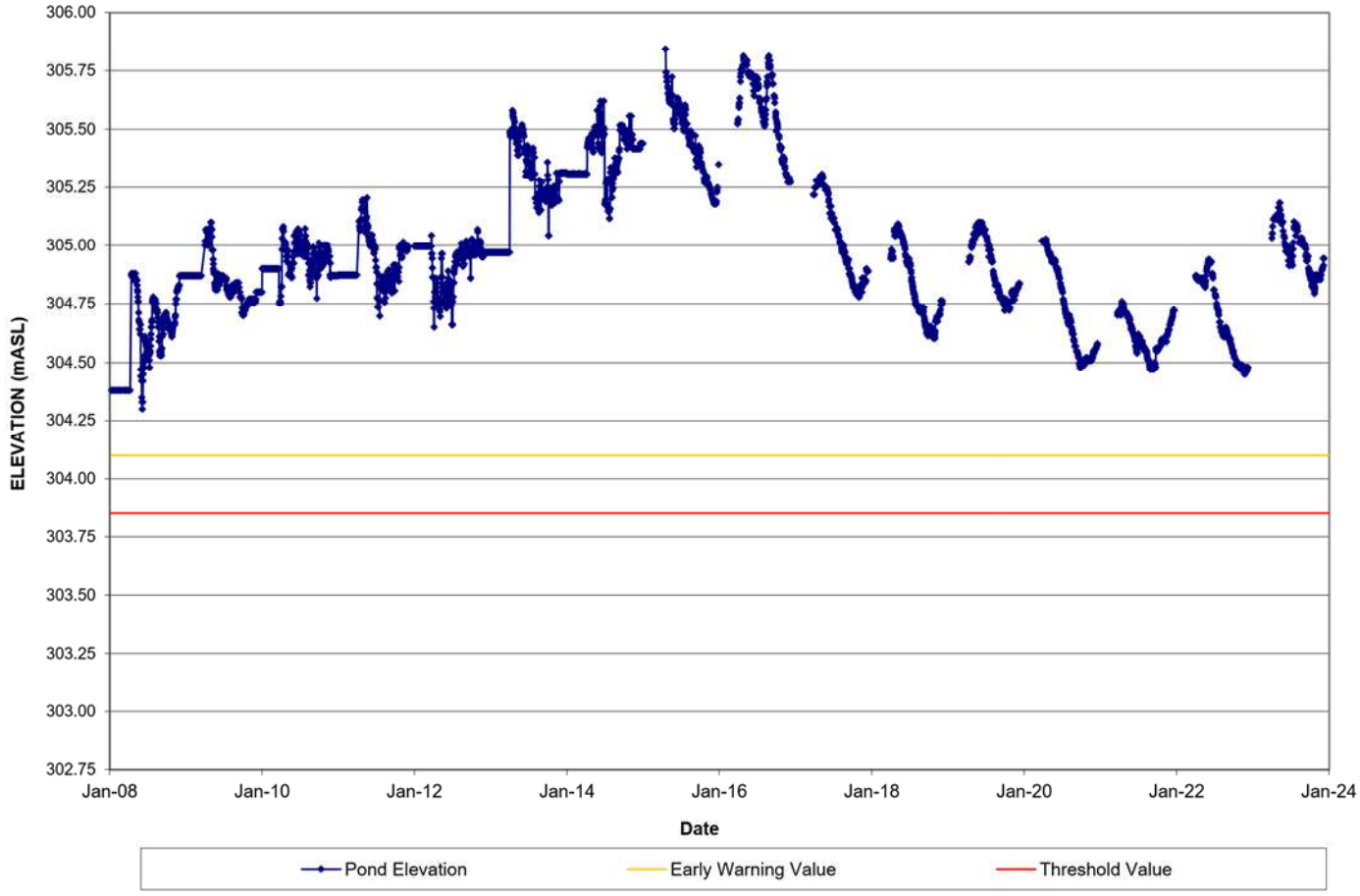
Phase 2 Pond Elevation

FIGURE G-14



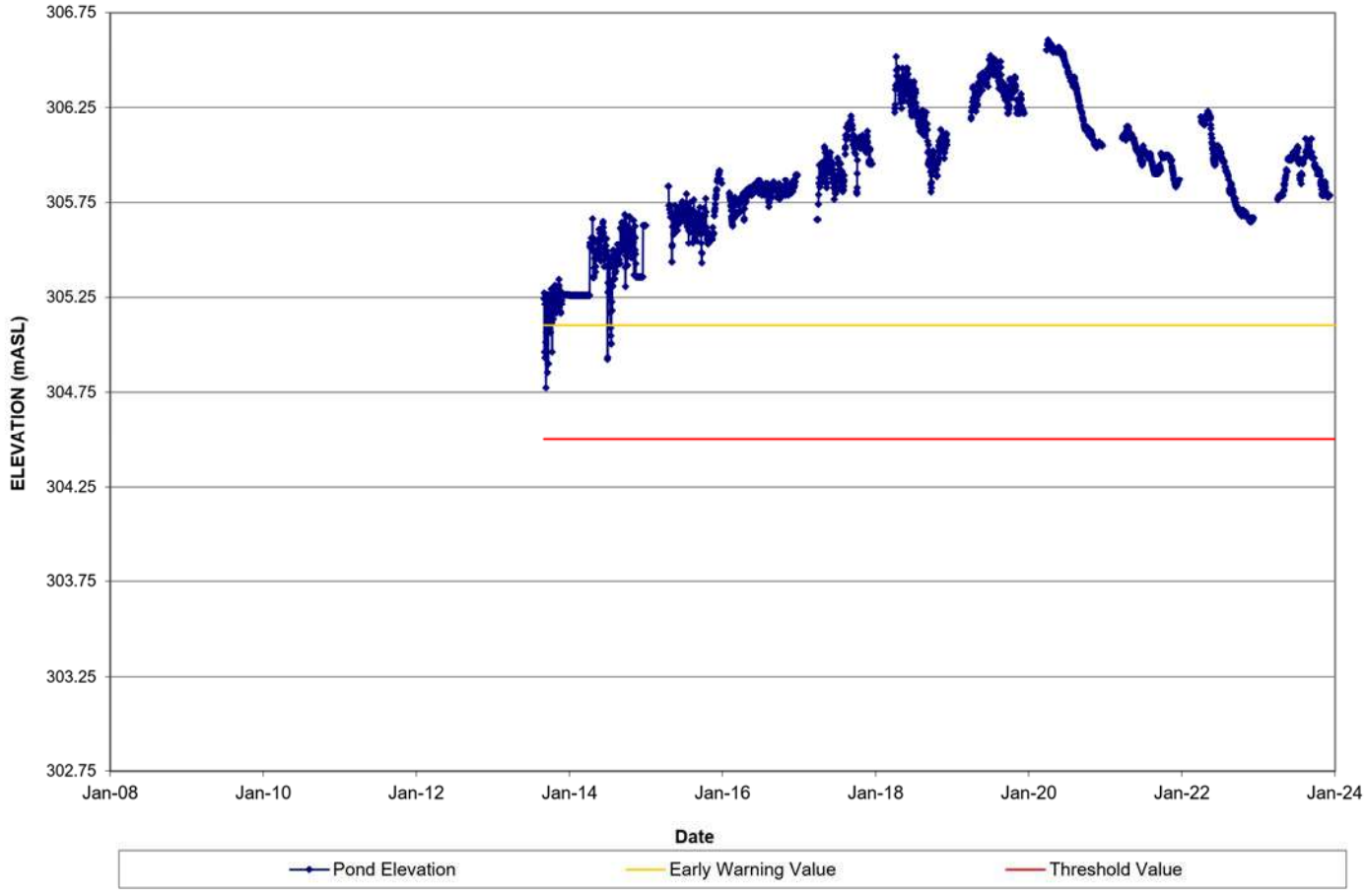
Phase 3 Pond Elevation

FIGURE G-15



Phase 4 Pond Elevation

FIGURE G-16



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REPORT

TECHNICAL APPENDIX C 2023 ANNUAL FISHERIES REPORT OF THE MILL CREEK COORDINATED MONITORING REPORT

Submitted to:

DUFFERIN AGGREGATES, A CRH COMPANY

Submitted by:

WSP Canada Inc.

582 Lancaster St. West, Kitchener Ontario N2K1M3 Canada

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CA0019938.6257

March 27, 2024

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TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 Project Background

Dufferin Aggregates, a CRH Company (Dufferin) initially retained WSP Canada Inc. (WSP) in 2020 to undertake the fisheries monitoring for the Mill Creek operation as required by the Ontario Ministry of Natural Resources and Forestry (MNRF) **Aggregate Licence Number 5738**. WSP had already been completing a number of separate requirements for the permit licence including surface water and hydrogeology. Prior to 2020, the fisheries assessment portion of the licence was completed by LRG Environmental (LRG). As of the 2021 field season, WSP was solely responsible for the monitoring of the fisheries assessment portion under Licence Number 5738.

Detailed environmental monitoring is a condition of the aggregate licence, in particular condition #23, which states:

> *"Pit operation shall not result in a net loss of the productive capacity of fish habitat in Mill Creek or its tributaries."*

The purpose of this Technical Appendix is to integrate the 2023 spawning results with data from previous years. A detailed environmental monitoring plan for the Mill Creek operation was originally developed in 1993 (Planning Initiatives, 1993) and received final approval by the MNRF and the Department of Fisheries and Oceans (DFO) in October 1993. The monitoring program includes the preparation of a technical appendix for each discipline:

- Technical Appendix A – Surface Water Hydrology
- Technical Appendix B – Hydrogeology
- Technical Appendix C – Fisheries

After evaluation of the ecological monitoring results, changes to the program were proposed and accepted by MNRF in 2012 and implemented in 2013. One of the changes was to reduce the trout population electrofishing survey to once every two years instead of annually. As a result, there was no population electrofishing survey completed in 2014, 2016, 2018, 2021, and 2023.

In January 2019 a fuel spill occurred on Highway 401 and a significant quantity of *Jet Fuel A* entered Mill Creek within the Hanlon Reach. MNRF agreed to postpone the electrofishing survey from 2019 to 2020 due to concerns regarding worker safety and possible disturbance of residual fuel in the sediments. More details regarding the jet fuel spill can be found in the 2019 Report (Coordinated Monitoring Report 2019). The creek was given a year to recover from the works associated with the jet fuel spill, with population surveys commencing in 2020, and then ever other year after (2022, planned for 2024). The sampling program for 2023, as outlined in this report, included only the Brown Trout spawning surveys conducted in the fall.

A *Coordinated Monitoring Report* that summarizes and integrates information from each of the monitoring programs is submitted to MNRF by March 31 each year. Limited gravel extraction at the site began in 1994. Extraction below the water table commenced in the spring of 1995 in the south end of Phase 1. Therefore, the fisheries data collected up to and including 1994 represent the pre-operational baseline conditions. Further details on the operation are provided in the Coordinated Report.

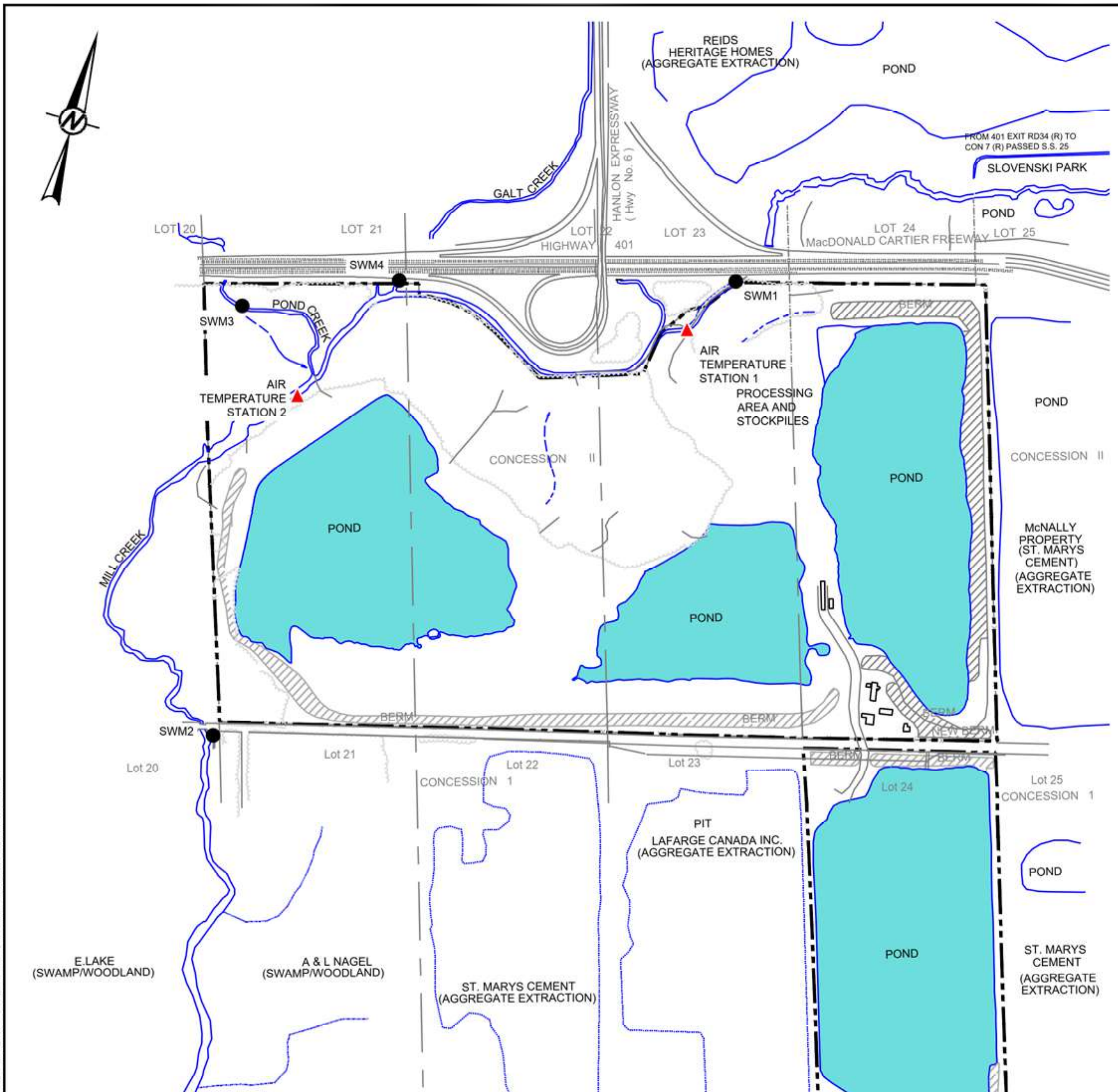
1.2 Study Area

Mill Creek is a permanently flowing watercourse, which originates on the Galt moraine about 3.2 km northeast of the Village of Aberfoyle. The creek drains about 5,972 square ha of largely rural land before it enters the Grand River near Shades Mill in the City of Cambridge.

Some earlier reports refer to Mill Creek as Galt Creek. However, in the current nomenclature, Galt Creek is one of two small tributaries that enter Mill Creek from the north. Pond Creek is the other coldwater tributary that enters Mill Creek about 260 m downstream of Galt Creek (Figure 1).

For this report, the Study Area is divided into two reaches that are referred to as the Hanlon By-pass station (Highway 401 downstream to Galt Creek – 610 m) and the University of Guelph station (Galt Creek downstream to the western property boundary – 660 m). The former name is attributed to the section that was diverted around the Highway 401/Hanlon Expressway interchange during construction in 1974.

There is a third reach known as The Bond Tract, which is located approximately 6 km downstream of the University of Guelph station. The original purpose of the Bond Tract was to provide reference data for the Study Area, however redd surveys (spawning) are not conducted at the Bond Tract Station due to absence of suitable spawning habitat.



LEGEND

- HYDRO/TELEPHONE LINE
- POST AND WIRE FENCE
- BUILDING
- AIR TEMPERATURE MONITORING LOCATION
- GATE
- WOODLANDS/FOREST (MIXED)
- SURFACE WATER MONITORING (SWM) STATION
- POND
- NATURAL DRAINAGE
- CREEK
- BOUNDARY OF LICENSED PROPERTY

0 250 500
1:12,500 METRES

CLIENT
DUFFERIN AGGREGATES

CONSULTANT
wsp

YYYY-MM-DD	2024-02-21
DESIGNED	-
PREPARED	SV
REVIEWED	RW
APPROVED	RW

PROJECT
2023 FISHERIES REPORT
MILL CREEK AGGREGATES PIT
TOWNSHIP OF PUSLINCH

TITLE
SURFACE WATER MONITORING LOCATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019938.6257	0003	A	1

1.3 Background Fisheries Information

1.3.1 Trout in Mill Creek

A historical perspective of the background fisheries information was summarized in the 1995 Coordinated Monitoring Report (ESP *et al.* 1995). Mill Creek was a native Brook trout (*Salvelinus fontinalis*) stream that gradually deteriorated as a result of watershed development including agriculture, land clearing, and the construction of the Highway 401 and the Hanlon Expressway. Brown trout (*Salmo trutta)* were first stocked in the watershed in the 1940's and stocking continued in the 1950's and 1960's. Replacement of native Brook trout by Brown trout is common in North America in locations where temperatures become too warm for Brook trout (Nyman 1970; Jonsson *et al.* 2001). Other factors that may account for Brown trout's ability to out-compete Brook trout include greater aggressiveness in foraging and use of spawning sites, faster growth rate, survival to a larger size, and greater resistance to predators (Fausch and White 1981; Waters 1983). In addition, Brown trout stocking programs provided an additional advantage for Brown trout over Brook trout. There is also evidence of redd superimposition by the later spawning and larger Brown trout over Brook trout spawning locations (Witzel and MacCrimmon 1983; Sorensen *et al.* 1995). In Mill Creek, Brown trout is now the dominant salmonid species in the main channel, with Brook trout found primarily in the small coldwater tributaries. Other studies have confirmed that the salmonid population in Mill Creek above Highway 401 is almost exclusively Brown trout (Dance Environmental Inc. 2000).

1.3.2 Trout Habitat

Within the Study Area speckled alder (*Alnus incana*), dogwood (*Cornus sp.*), white cedar (*Thuja occidentalis*), willow (*Salix sp.)* and white birch *(Betula papyrifera*) provide riparian stream cover. The forest canopy is sparse in the eastern section of the Mill Creek property, through which the channelized section (lower section of the Hanlon By-pass) of the creek flows. However, the University of Guelph section and Pond Creek are shaded by dense forest canopy.

A habitat assessment conducted by MNRF in the early 1980's indicated that Mill Creek was suffering from high temperatures and nutrient enrichment originated upstream of Highway 401 and high sand and silt bed load in the downstream end of the Hanlon By-pass station. Rehabilitation projects within the Study Area conducted by the Grand River Conservation Authority (GRCA), the MNRF, and local fishing enthusiasts during the mid-1980's resulted in increased Brown trout biomass and spawning activity. The number of redds per kilometre of stream doubled between 1983 and 1987 and fish biomass increased almost six-fold between 1984 and 1994. The key Habitat Suitability Index (HSI) variables for Brown trout (Raleigh *et al.* 1983) were calculated for both sections of the stream. Historically, the HSI scores in the University reach for adult and young trout were 0.6 and 0.42, respectively. The HSI scores in the Hanlon reach were 0.3 and 0.2, respectively, indicating poorer quality salmonid habitat in the Hanlon reach compared with the University section.

Beavers have inhabited the study area since at least 2014. The felling of trees and building of dams has interfered with water flow and fish movement. Five large beavers were trapped and removed in the fall of 2018. Beaver dam removal was recommended to agencies for summer 2019; however, this was postponed due to the jet fuel spill in 2019 and the COVID-19 pandemic lasting from 2020 to 2022. Since WSP have taken over the monitoring of the Brown trout in Mill Creek, fluctuations in beaver activity continue to be observed, with dams built and then blown out by flows each year.

Since 2001, the Friends of Mill Creek (FOMC), the MNRF, and GRCA have conducted a summer stream temperature survey generally between Highway 401 and Brock Road. The FOMC is a unique partnership

between the local industry, private residents, and various levels of government including Puslinch Township, GRCA, MNRF, and Wellington County with Dufferin Aggregates as a supporter. One of the primary objectives of the FOMC is to protect and restore fish habitat in Mill Creek. From 2003 to 2018, habitat restoration projects were carried out by the Mill Creek Rangers with funding from the FOMC. No work has been undertaken in the Study Area since the 2019 jet fuel spill, and works were postponed between 2020 and 2022 due to COVID-19 safety measures in place.

2.0 METHODS

Monitoring conducted and reported in this fisheries report includes:

- Mill Creek water chemistry;
- Mill Creek surface water temperature; and
- Brown trout spawning (redd) survey results for the University and Hanlon reaches.

2.1 Water Quality

Water quality results for the period from 1993-2022 are found in **Sub-Appendix A** of this report. Historical surface water quality data (pre-1993) are available in ESP *et. al*. (1995) Technical Appendix C. Groundwater chemistry is analyzed as part of the groundwater monitoring program (Technical Appendix B).

For this report, water samples were collected by WSP on November 24, 2023, at the four surface water sampling stations (SWM1, SWM2, SWM3, and SWM4). A blind duplicate sample was collected at SWM1 and submitted to the laboratory as SWM5. Station locations are shown on Figure 1. Water samples were submitted to Bureau Veritas in Mississauga and analyzed for the following parameters:

- pH, conductivity, hardness
- total alkalinity
- nitrate, nitrite, ammonia
- total phosphorus, orthophosphate
- total organic carbon
- total suspended solids
- chloride
- fecal coliform bacteria, Total coliforms and *Escherichia coliforms* (E. coli)
- biochemical oxygen demand, chemical oxygen demand

In addition to the field duplicate, the laboratory conducts its own internal QA/QC program which includes routine duplicate analysis, spiked matrix samples, spiked blanks, and method blank samples.

2.2 Surface Water Temperature

Water temperature is recorded hourly at all four monitoring stations as part of the surface water monitoring program (Technical Appendix B). Water temperatures are discussed in this report as it relates to available trout habitat. Prior to 1997, water temperatures were measured manually, not necessarily daily, and usually only once per day. Prior to 1993, water temperatures were measured by the GRCA and Faunaquatics.

2.3 Redd Survey

Trout redds have been counted in the study area for 41 years beginning in 1983. Although the staff have changed over the years, the redd surveys have continued to be conducted by experienced fisheries biologists who are familiar with the Study Area as well as the specific habitat requirements for Brown trout spawning.

The redds were recorded on WSP owned spawning survey field sheets and compared to historical data. A trout redd is an obvious nest or disturbance in the substrate. WSP takes the assessment a step further, providing more detail in regard to the spawning evidence. A *confirmed redd* is a disturbance in the substrate and a fish visually observed in the general vicinity; a *probable redd* has substrate disturbance but no fish visually observed; and a *scrape* is a less defined or small clearing of disturbed substrate with no fish visually observed. Brown trout redds are typically elongated scars in the streambed, characterized by a scour or hole in the substrate followed by a mound of gravel at the downstream end. Multiple redds have several scars and mounds created by more than one spawning pair. Brook trout redds are smaller, rounder, and less obvious than Brown trout redds.

3.0 RESULTS

3.1 Water Quality

The water quality monitoring program provides a snapshot of existing water quality conditions. Data for 2023 is provided in Table 2. The entirety of the data from 1993 to 2022 for water chemistry is provided in **Sub-Appendix A** of this report. Overall, the results indicate that water quality is similar within the Study Area, but the data does suggest possible influences from road salt and agricultural practices.

In 2023, the fecal coliform count ranged from 10 to 40 CFU/100 mL with no results exceeding the Provincial Water Quality Objective (PWQO) of 100 CFU/100 mL. These numbers have decreased from those reported in 2022 which results in a range of 10-120 CFU/mL. In 2022, SWM1 was recorded at 120 CFU/mL, exceeding the PWQO limits. However, this value has significantly decreased as of the 2023 results and the SWM1 station is now showing at 20 CFU/mL. The other sampling locations have shown steady low concentration values in 2022 and 2023.

For nitrate, there is no PWQO for the protection of freshwater biota, as it is relatively non-toxic to fish. There is a federal (Environment Canada) water quality guideline for nitrate of 12 mg/L and the Ontario Drinking Water Standard for nitrate is 10 mg/L. The concentrations of most of the water quality parameters are similar between the upstream (SWM1) and downstream (SWM2) limits of the Mill Creek property and follow concentration trends from previous years. The presence of nitrate in the two tributaries can be attributed to agricultural runoff in the watershed. In 2023, the highest nitrate level was observed at SWM3 (Pond Creek) with a value of 4.21 mg/L, which was similar to but lower than recent years (4.35 mg/L and 5.02 mg/L in 2021 and 2022, respectively) and is well below federal and provincial guidelines. In 2022 SWM4 noted an elevated level of nitrate at 4.72 mg/L, however 2023 levels have decreased to values similar to years 2021 and prior at 2.58 mg/L.

Like previous years, nitrite was not detected in 2023 (<0.010 mg/L).

Phosphorus levels in Mill Creek have varied historically from less than the analytical detection limits to exceeding the PWQO in different years. Total phosphorus was below detection limits (0.020 mg/L) at all sampling stations in 2023, remaining below PWQO limits (0.030 mg/L for streams).

The Canadian water quality guidelines for chloride for the protection of freshwater life are 640 mg/L (short term exposure of < 96 hrs) and 120 mg/L for long term or indefinite exposure (CCME, 2012). Chloride and conductivity were higher in Galt Creek (SWM4) relative to the other three stations (Table 2) which is consistent with previous years. The recent results show chloride concentrations in Mill Creek ranged from 33 mg/L at SWM3 to 88 mg/L at SWM4. Therefore, salt concentrations measured in Mill Creek are well below levels expected to impact fisheries.

The basic water chemistry of Mill Creek appears relatively unchanged over the past 30+ years, however, chloride and conductivity levels in Mill Creek appear to have gradually increased during the past 22 years (Figure 2). Prior to 1999, chloride levels in Mill Creek were consistently below 40 mg/L but are now routinely above 50 mg/L, with some recent values above 80 mg/L. Sampling has been conducted in November and December in recent years. It is likely that road salt has already been applied by this time and these changes are likely due to the influence of road salts applied within the watershed and entering the water system. Therefore, stream chloride and conductivity values could be influenced by seasonal conditions and time of sampling.

Conductivity values in Mill Creek are relatively high (typically greater than 650 mS/cm) for a surface stream indicating the high proportion of groundwater in the system. The higher conductivity in Galt Creek (SWM4) further emphasizes the strong groundwater influence on this small tributary.

Table 1: Mill Creek Water Quality November 24, 2023.

	SWM1 Hwy 401	SMW2 (Boundary)	SWM3 Pond Creek	SMW4 Galt Creek	PWQO[1]	RDL[2]
All units are mg/L, unless otherwise indicated.						
pH (units)	8.34	8.33	8.35	8.30	**6.5-8.5**	**N/A**
Conductivity (mS/cm)	0.74	0.80	0.69	0.88	-	**0.001**
Hardness (mg/L as $CaCO_3$)	330	350	350	350	-	**1.0**
Alkalinity (Total mg/L as Ca CO_3)	270	270	280	270	-	**1.0**
Chloride	53	70	33	88	-	**1.0**
Nitrate (mg/L)	0.43	1.02	4.21	2.58	**See[3]**	**0.10**
Nitrite (mg/L)	<0.010/ND	<0.010/ND	<0.010/ND	<0.010/ND	**<0.1[4]**	**0.010**
Total Ammonia-N	<0.050	<0.050	<0.050	<0.050	**1.20**	**0.050**
Orthophosphate	<0.010/ND	<0.010/ND	<0.010/ND	<0.010/ND	-	**0.010**
Total Phosphorus	<0.020/ND	<0.020/ND	<0.020/ND	<0.020/ND	**0.030**	**0.020**
Total Organic Carbon	5.9	5.3	2.7	5.5	-	**0.40**
Total BOD	<2/ND	<2/ND	<2/ND	<2/ND	-	**2**
Total Chemical Oxygen Demand	17	18	11	16	-	**4.0**
Total Suspended Solids	<10/ND	<10/ND	<10/ND	<10/ND	-	**10**
Fecal Coliforms (CFU/100mL)	20	40	10	20	**100**	**10**
Total Coliforms (CFU/100mL)	610	480	610	310	-	**10**
Escherichia coli	<10	30	<10	10	-	**10**

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] RDL = Reportable Detection Limit
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
N/A = Not Applicable ND = Not Detected

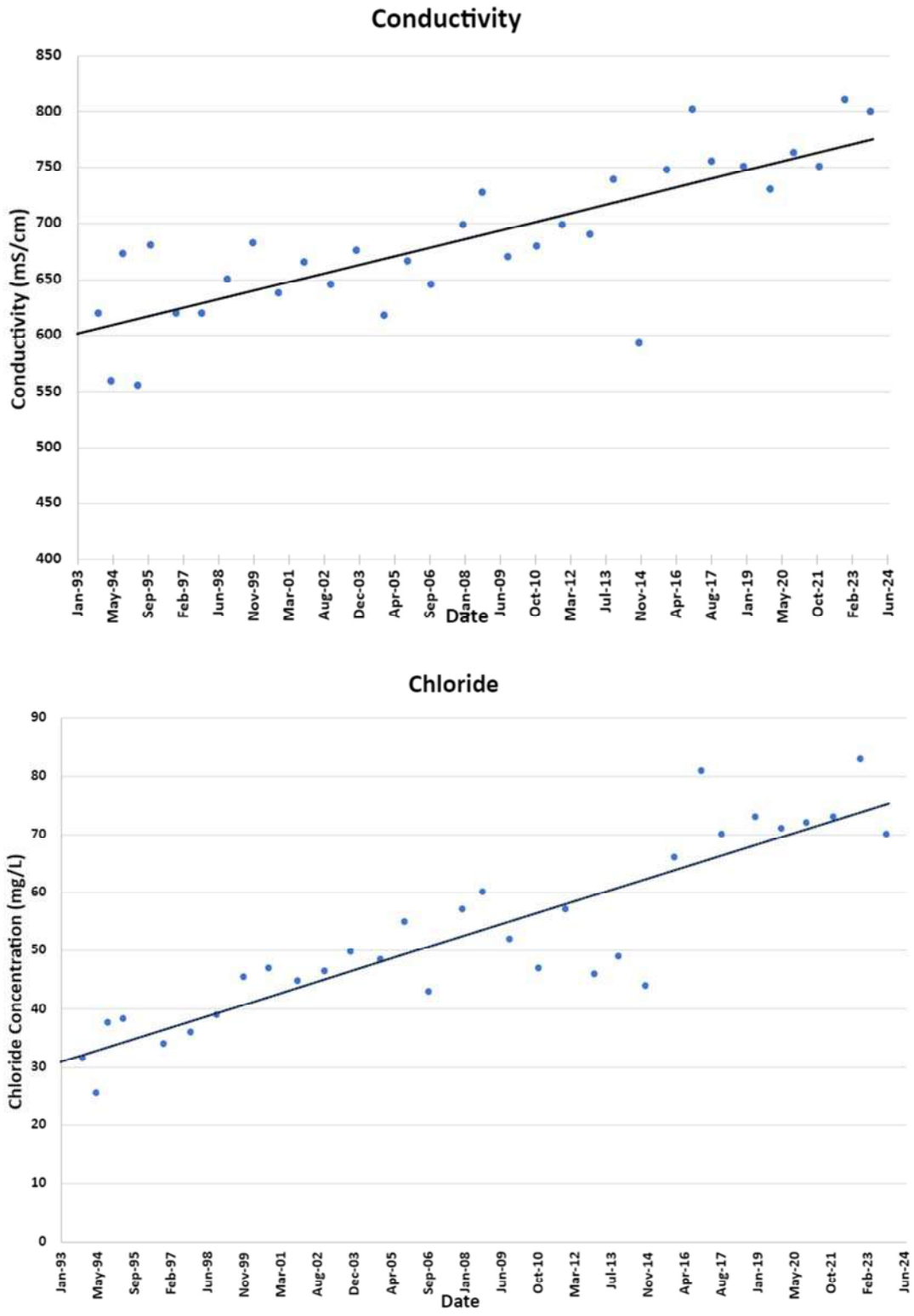


Figure 2: Historical Conductivity and Chloride Values in Mill Creek at SWM2 (1993-2023)

3.2 Surface Water Temperature

Water temperatures in the main channel of Mill Creek (SWM1 and SWM2) for the summer of 2023 are shown in Figure 3 along with critical trout temperatures. The maximum recommended tolerable temperature for Brown trout is considered to be 26.8°C (Raleigh et al, 1986).

The maximum summer water temperature in Mill Creek in 2023 was 23.98°C at SWM1 on July 5 at 16:00 hours (Figure 3). The highest water temperature ever recorded in the Study Area was 27.9°C in 2002. The maximum surface water temperature in 2023 occurred the day after a two day long maximum air temperature which peaked at 29°C on July 4, and 31°C on July 5, 2021. Water temperatures relative to air temperatures are discussed in further detail in Technical Appendix A. The main branch of Mill Creek within the study area did not exceed the upper tolerable temperature for Brown trout (26.8°C) in 2023. However, the maximum temperature which Brook trout can tolerate is 24°C (Raleigh 1982) and this was very close to being matched but not exceeded on July 5, 2023 (Figure 3).

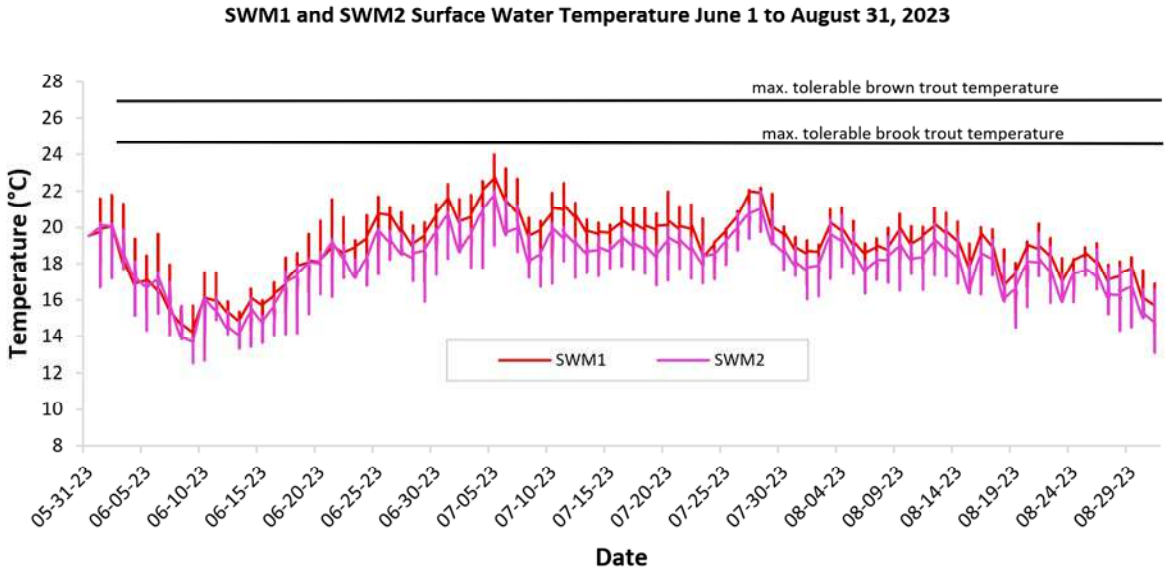


Figure 3: Thermographs from SWM1 and SWM2, for June 1 to August 31, 2023

Stream water temperatures have traditionally been cooler at the downstream SWM2 station compared with SWM1 and this trend continued in 2023. When the maximum water temperature occurred at SWM1 (23.98°C: July 5, 16:00), the temperature at SWM2 was 1.94°C lower (Figure 4). The maximum summer temperature at SWM2 in 2023 was 22.04°C, on July 5, at 20:00. The greatest temperature difference between SWM1 and SWM2 during the summer of 2023 occurred on June 21st at 15:00 when SWM2 was 3.34°C cooler than SWM1.

Surface water temperatures are cooler at SWM2 than SWM1 due to groundwater input, inflow of the two coldwater tributaries, and good shade from riparian vegetation within the University of Guelph reach down to Concession Road 2. The maximum summer temperatures in the two small tributaries were only 16.36°C (SWM3) and 16.95 °C (SWM4). Thus, through the conveyance from the coldwater tributaries, this reach of Mill Creek continues to protect and enhance the coldwater attributes of the stream and provides good habitat for Brown trout.

The continuous temperature recorders also illustrate the effect of diurnal solar warming on Mill Creek as the water temperatures gradually rise during the day and cool off at night (Figure 4 and 5). At SWM1 the temperature

fluctuation was 2.5°C between July 5th and July 6th, following the maximum temperature (Table 2). At SWM2 the temperature fluctuation was 2.1°C. At SWM3 and SWM4, the temperature fluctuation was 3.3°C and 0.9°C, respectively (Figure 5), again supporting the conclusion that the temperatures at SWM3 and SWM4 are controlled by groundwater inputs.

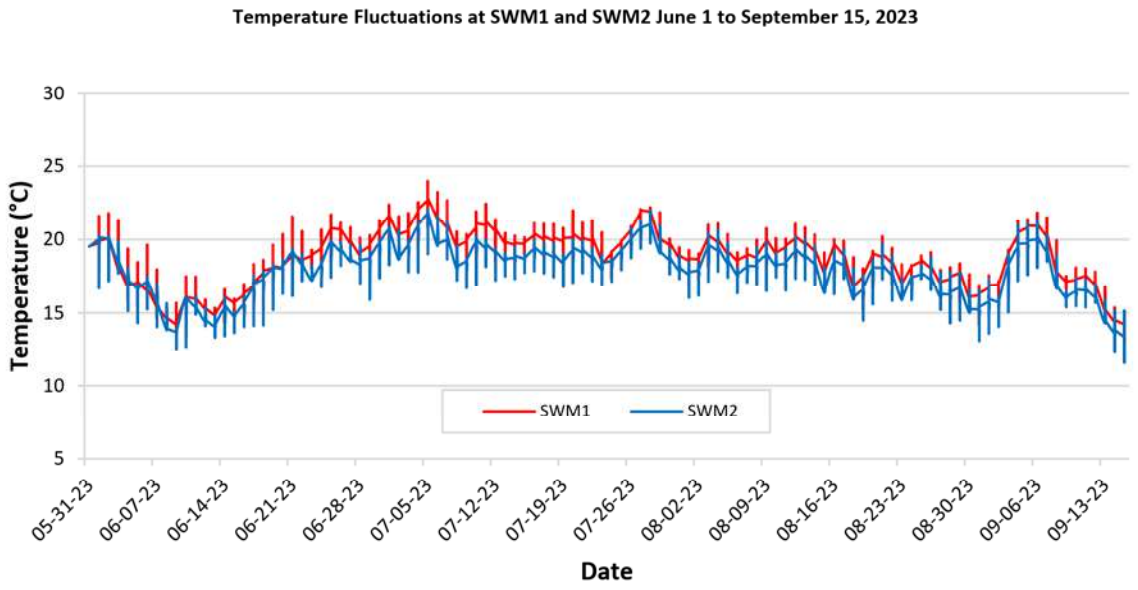


Figure 4: Diurnal Temperature Fluctuations from June 1 to September 15, 2023 at SWM1 and SWM2

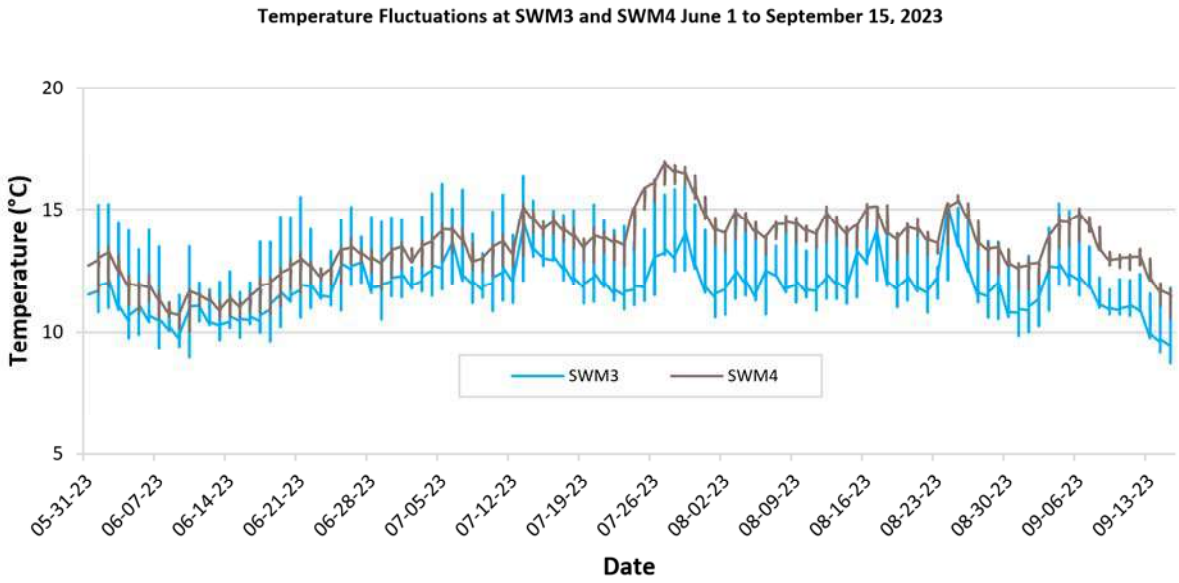


Figure 5: Diurnal Temperature Fluctuations from June 1 to September 15, 2023 at SWM3 and SWM4

Table 2: Diurnal Temperature Difference Following Maximum Recorded Temperature at Each Surface Water Monitoring Station in 2023

Station	Summer Maximum			Post-Maximum Low			Fluctuation[a] (°C)
	Temp. (°C)	Date	Time	Temp. (°C)	Date	Time	
SWM1	23.986	July 5	16:00	21.459	July 6	8:00	2.527
SWM2	22.04	July 5	20:00	19.917	July 6	10:00	2.123
SWM3	16.362	July 13	14:00	13.088	July 14	7:00	3.274
SWM4	16.951	July 27	22:00	16.056	July 28	11:00	0.895

[a] Difference between summer maximum and minimum temperature the following day

The maximum surface water temperatures recorded at all four monitoring locations within Mill Creek since 1983 are illustrated in Figures 6 and 7, respectively. Surface water data were collected manually prior to 1997 and true maximum temperatures may not be represented by the dataset, since data were not recorded on a continual basis (sampling events were selected according to weather conditions). In addition, temperatures were typically recorded manually between noon and 15:00, but maximum temperatures can now be observed after 16:00. Therefore, while water temperatures appear higher since 1998, maximum temperatures prior to 1997 may actually have been greater than those presented in Figures 6 and 7.

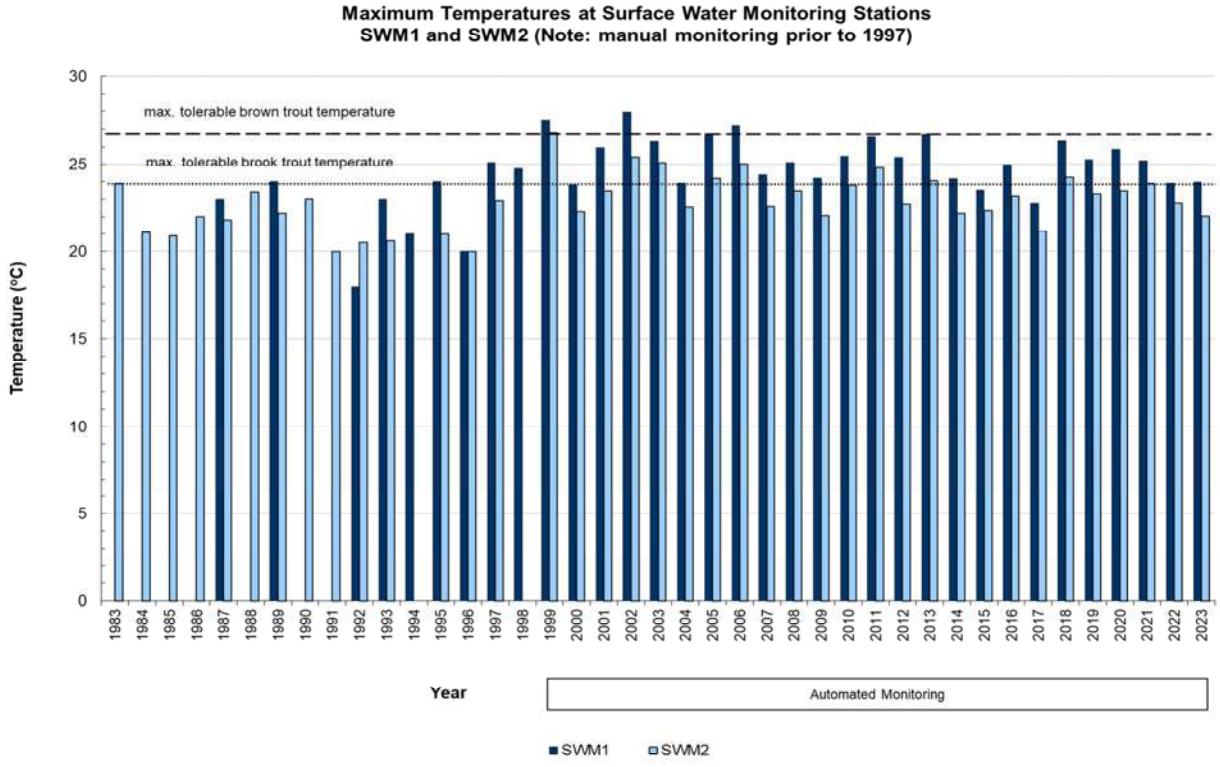


Figure 6: Historical Maximum Mid-Summer Water Temperatures in Mill Creek (1983 to 2023) at SWM1 and SWM2

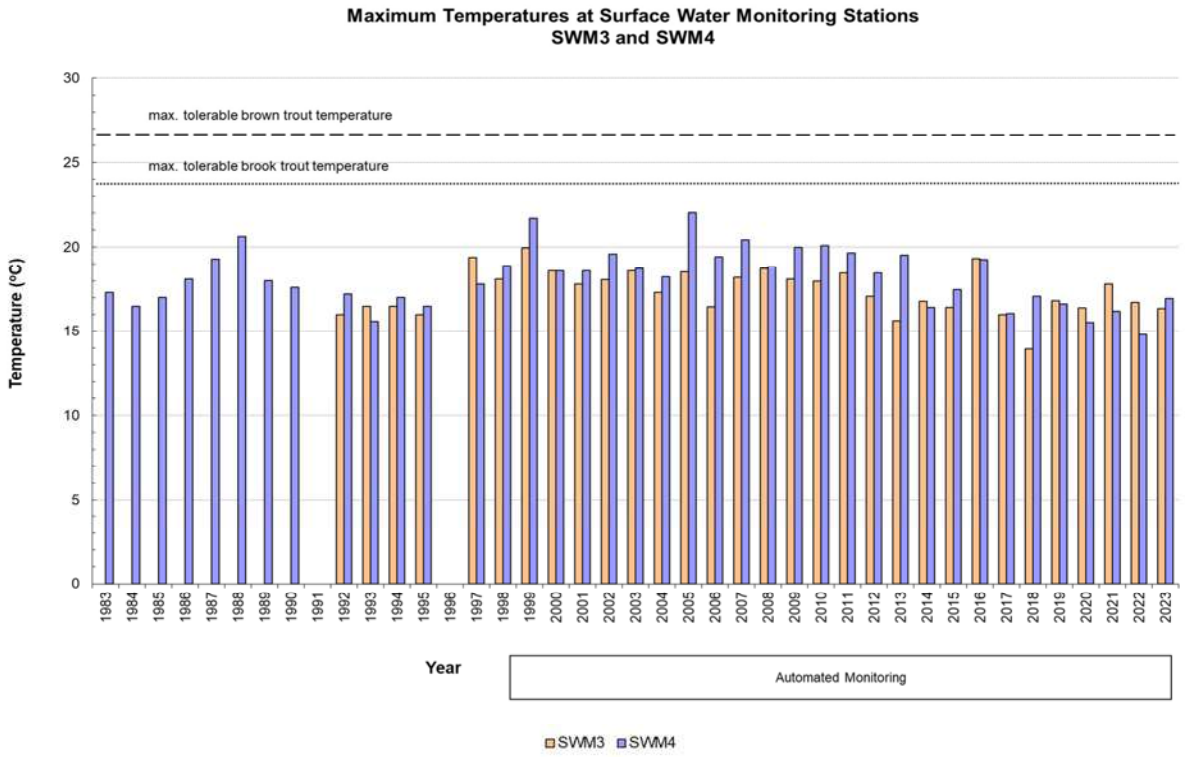


Figure 7: Historical Maximum Mid-Summer Water Temperatures in Mill Creek (1983 to 2023) for SWM3 and SWM4

3.3 Redd Surveys

The 2023 redd spawning survey indicated a total of 26 probable redds within the Mill Creek project limits. Historically the University section has higher redd counts, with the Hanlon section having lower counts. The 2023 redd surveys followed this trend with 16 redds noted in the University stretch, and 10 in the Hanlon stretch. The 2023 reported numbers follows the 2022 downward trend of overall redds in both sections, with 2022 reporting 11 redds in the University section and 15 redds in the Hanlon section.

The number of redds within the Mill Creek Project limits has been generally trending downwards for the past 10 years, although 2023 did see a slightly higher number of redds (16) compared to 2022 (11), as noted in Figure 8 and Figure 9. The lack of scrapes noted in the 2023 survey may also indicate the declining options for desirable spawning conditions, but may also be a result of the other factors impacting access to the spawning habitat (i.e., beaver damming downstream of the study limits). The lowered redd count in the past two years has similar results to the results from 1983 to 1987 prior to any rehabilitation efforts, suggesting that the spawning activity in the reach is cyclic, and the results from 2023 are following historic trends. The highest number of redds recorded to date in this reach was 194 in 2010, and the lowest value on record was 9 total redds measured in 1984. Although redd counts are low, they are not below historic records and the water quality and temperate readings do not point directly to any concerns for the trout population beyond historic fluctuations in results.

In the Hanlon section, the redd count was 10 in 2023, compared to 15 in 2022, 39 in 2021, and 30 in 2020 (Figure 9). The declining redd counts are similar to those observed from 1987 to 1995, prior to major rehabilitation works. The numbers recorded in the past two years may be an indication of a general decline in spawning habitat

available in the Hanlon section, but may also be a result of the other factors impacting access to the spawning habitat (i.e., beaver damming downstream of the study limits). The lower number of scrapes noted in the 2023 survey may also indicate the declining options for desirable spawning conditions. The highest number of redds recorded to date in this reach was 107 in 2016 which was also the first time that the number of redds in the Hanlon reach exceeded the number of redds in the University reach. Although generally trending downward, the spawning results appear to be following historic trends similar to the University reach. The lowest redd count recorded for the project was 1, documented in 1988, and our recent 2023 results are still well above this historic low.

As previously discussed, a scrape is a less defined or small clearing of disturbed substrate with no fish visually observed. They could be indicators or redds being created but were then abandoned either due to fish being startled off, or the fish uncovered less then desirable spawning conditions in the substrate. 2020 was the first year in which scrapes had been recorded in the University and Hanlon sections, therefore it is unclear whether this is comparable to previous years; however, as more scrape data is recorded, trends may become evident. The number of scrapes in the University section was 6 in 2022 compared to 23 in 2021 and 18 in 2020. The number of scrapes in the Hanlon section in 2022 was 2, with 35 and 43 in 2021 and 2020, respectively. Due to an absence of scrapes none were recorded during the 2023 redd surveys. The lack of scrape presence may be due to a decrease in activity, as well as the survey being completed after the main trout migration causing the scrapes to be less identifiable. There are a number of variables that may be impacting the spawning conditions in the two reaches, but overall the results do appear to be following historic trends, and the water chemistry and temperatures of the two reaches have not returned any results that would suggest the spawning activity is being impacted by the Mill Creek Pit operation.

Redd survey dates and results are summarized in **Sub-Appendix B**. Redd surveys are not conducted at the Bond Tract Station due to absence of suitable spawning habitat.

In 2018 the low numbers of Brown trout redds observed were largely attributed to the presence of beaver dams in the study reaches of Mill Creek. Although no beaver dams were observed in the reaches assessed in 2023, the area has a lot of beaver activity and there might have been dams built beyond the study limits impacting flows. Beaver damming and sedimentation as a result of the dam release was observed in 2022 during the spawning season. Since WSP's spawning surveys are only a once a year event, there may have been seasonal events like sedimentation from another dam release that also could have impacted spawning in 2023. WSP did report evidence of beaver presence in the reaches during the 2023 spawning surveys, however, full dams impacting fish migration were not observed.

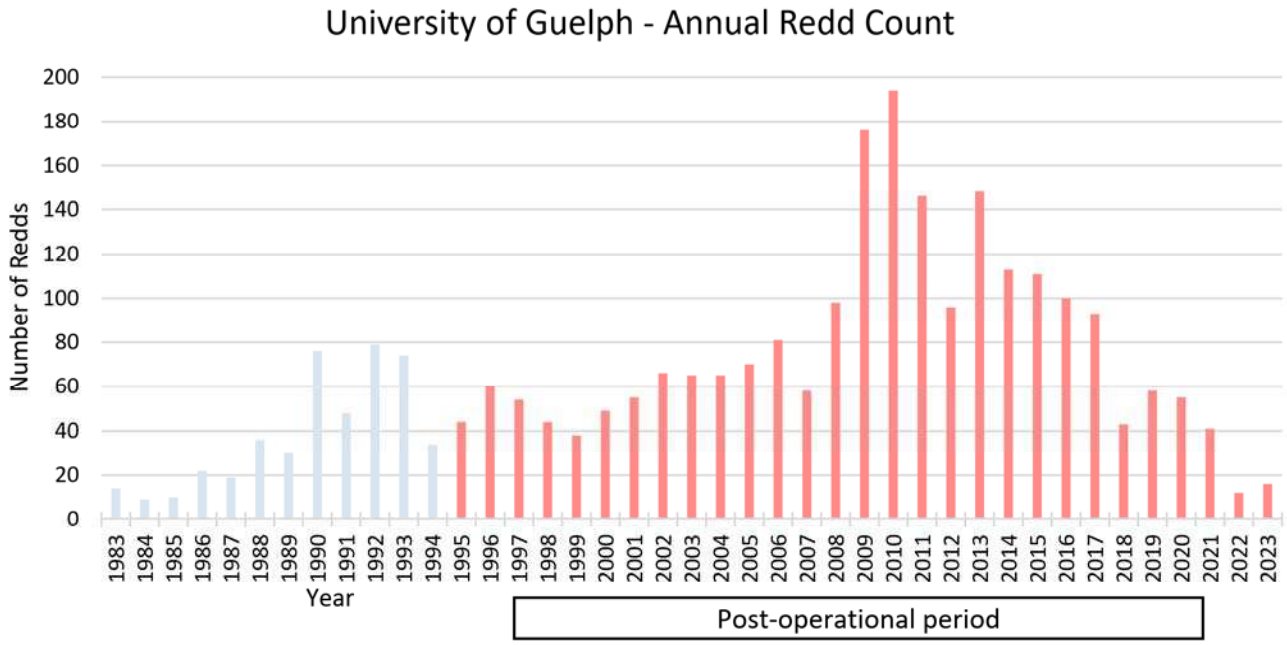


Figure 8: Annual Brown Trout Redd Counts in the University of Guelph Station

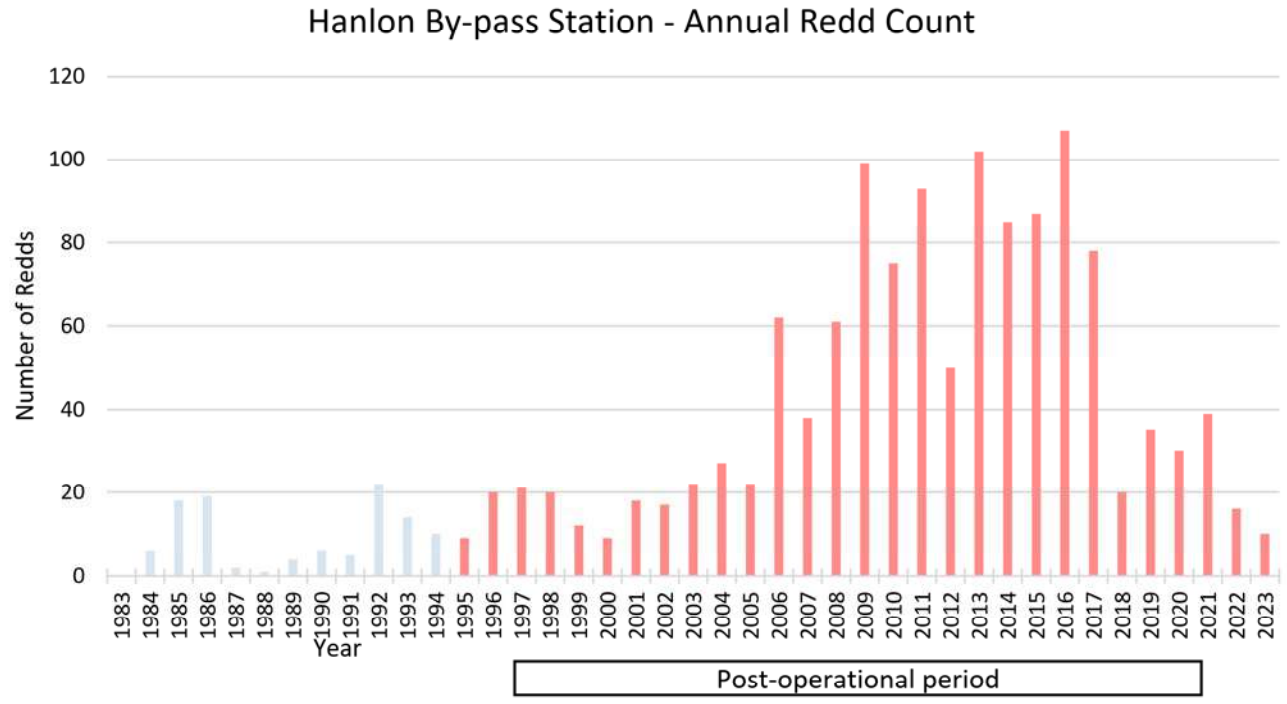


Figure 9: Annual Brown Trout Redd Counts in the Hanlon By-pass Station

Beaver activity in Mill Creek is not new. A beaver dam was removed from the upper end of the University of Guelph Reach in July 2015. Beaver activity and dam development was observed again in 2017, 2018, 2020, and 2022. These structures caused decreased flow rates and flooding in the lower Hanlon reach, which already suffers from low flow rates and build-up of silt. Spawning generally does not occur in this area due to the sediment deposition and it has long been the recommendation of the monitoring team that rehabilitation work should be undertaken here.

In addition to the dams, the beavers have caused increased deadfall in the creek in the form of large trees as well as large expanses of shrubs and branches which have narrowed the width of the creek significantly near the upper end of the Hanlon reach.

4.0 SUMMARY AND RECOMMENDATIONS

4.1 Summary

This was the 29th year of monitoring the trout population since below water table extraction commenced. Significant natural fluctuations in population and spawning activity occurred for the period from 1983 to 1994 prior to below-water table aggregate extraction.

Water chemistry has not changed notably in Mill Creek or its tributaries, although chloride and conductivity levels appear to be trending upwards in recent years. Chloride and conductivity may be a reflection of road salt entering the environment.

The maximum summer water temperatures in Mill Creek in 2023 were similar to recent years. The maximum tolerable temperature for Brown trout was not exceeded at any of the stations in 2023. However, the maximum tolerable temperature for Brook trout was almost met but not exceeded at SWM1. Water temperature in Mill Creek continues to remain low as it passes through the study area as a result of groundwater input, contributions from two coldwater tributaries, and increases in good riparian shading (forested stands).

This was the 41st consecutive year of trout redd surveys. Spawning activity as indicated by the observed number of redds has been trending downwards for the past 10 years. Typically, the University reach has higher spawning activity due to better habitat conditions, though in recent years the spawning data were comparable and showed a general cyclic pattern to the results that is consistent with historical observations. While the redd counts are more similar to numbers prior to the aggerate extraction below the water table, the 2022 Mark-Recapture fisheries monitoring program demonstrated that the Brown trout population within Mill Creek has remained healthy with good recruitment that also suggests that spawning remains successful even if redd counts are down.

The results from 2023 surface water, water chemistry, and spawning surveys provide continued evidence that aggregate extraction below the water table (beginning in 1995) has had no measurable impact on the level of Brown trout spawning activity. Therefore, Dufferin Aggregates continues to be in compliance with Licence Condition #23, which states there must be no “net loss of the productive capacity of fish habitat in Mill Creek or its tributaries.”

4.2 Biological Thresholds

Warning threshold values to be considered over the course of the monitoring program for the aggregate licence were originally proposed in the initial 1993 Coordinated Report on Monitoring Program. Actions designed for these warning thresholds were then implemented for Mill Creek to identify actions to address the threshold

warnings, which included mitigation and/or habitat enhancement ideas. For the fisheries and biological parameters, the “action thresholds” to be considered were:

1) Consistent reduction in fisheries production as indicated by spawning activity, salmonid biomass estimates or other biological indicators;

2) Consistent reduction in fisheries habitat as indicated by physical habitat attributes (e.g. stream cross sections); and

3) Measured changes in water quality for fish.

To date, there has not been a measurable reduction in fisheries (trout) production in any of the study reaches. On the contrary, the average number of trout is higher, for the post-extraction period. To date, there has not been a significant reduction in fish habitat, and there has been no measurable change in water quality in Mill Creek.

Numerical threshold levels would be difficult to establish for this component of the program. Historic fluctuations in fish populations and redd counts (41 years of data) have occurred in the past and are attributed to several factors unrelated to gravel extraction.

4.3 Recommendations

The trout population and the redd survey form the core of the fisheries monitoring program for the pit licence. In the 41 years that the trout populations have been monitored, the results have indicated a cyclic pattern to the growth and productivity of the trout population, with declines typically associated with increased beaver activity or other external sources (i.e. jet fuel spill) influencing the population for a short period of time, before the population rebounds. There are no indications in the water chemistry or water temperature monitoring results that would suggest that the below water aggregate extraction has had a negative impact on the trout productivity in Mill Creek. Since the water chemistry and temperature are the two main factors that would directly impact trout health and habitat suitability in the creek, provided that these measures do not change, WSP does not anticipate any significant negative impact on trout productivity in Mill Creek.

WSP’s 2023 spawning results align with historic trends in Mill Creek, with the spawning results currently at the dip in cycle. WSP recommends that annual spawning surveys continue to ensure that the spawning activity continues to follow historic trends and the rebounds in the next few years. However, the water chemistry and temperature monitoring does not suggest that the habitat suitability has changed significantly that would point to future concerns for the trout population or the steady decline of the trend. As there are no red flags in the monitoring data direct attributed to the aggregate extraction, WSP is of the opinion that increasing the time between sampling periods for the mark/recapture surveys would only provide positive support for the trout population by not stressing the population out during a low period in their reproductive cycle. Instead of completing mark/recapture surveys in 2024, they can be moved to 2026. By allowing the population to grow un-impacted for a couple of years, the young of year from 2022 will have a chance to grow to reproductive age and establish spawning patterns in the Mill Creek reaches assessed.

As the spawning, water temperature and quality surveys will continue annually, their results can be used as a trigger to initial more frequent mark/recapture surveys. By increasing the time between mark/recapture programs, there will be less human related stress on the population (from sampling), and less of a need to defend a difference in the numbers that are not directly linked to the aggregate extraction below the water table. There is now over 25 years of historic data to compare any results received through a delayed mark/recapture program.

While it is agreed that the Bond Tract reach is a poor reference area when compared to the Hanlon By-pass and University reaches due to the different fish habitat elements it provides (or lacks as is the case for preferred adult habitat), WSP recommends continuing to monitor its trout population concurrently with the other two reaches to help highlight any general trends in the Mill Creek watershed related to the Brown trout population.

To help facilitate the redd surveys in 2024, it is recommended that some of the more cumbersome large fallen trees and woody debris in the study reaches be removed, if feasible, to minimize impacts on flow and debris jamming seasonally that could impact migration to the area for spawning. Any reoccurring beaver activity and dam building should also be addressed prior to the initiation of the population sampling and fall spawning run.

As of this report, the habitat mapping is historic (over 6 years old) and WSP has noted a number of changes in the reaches not captured on the habitat maps reviewed each year. Updated habitat mapping could be essential in helping to determine any cause of the decline in redd counts in the past few years, and if the general habitat suitability for spawning has changed.

5.0 REFERENCES

CCME, 2012. Canadian Council for the Ministers of the Environment. Canadian Water Quality Guidelines for the Protection of Aquatic Life. http://ceqg-rcqe.ccme.ca/en/index.html.

Dance Environmental Inc., 2001. 2000 Fisheries Monitoring Report – Mill Creek Drainage Basin. Reid Heritage Homes Ltd., Puslinch Township.

ESP, M.M. Dillon, Jagger Hims Ltd. and Eagles Planning Ltd., 1995. Coordinated Report on Monitoring Programs for Mill Creek. Prepared for Mill Creek Aggregates (Dufferin Aggregates/Forwells). Ecological Services for Planning Ltd., M.M. Dillon, Jagger Hims Ltd., Eagles Planning Ltd.

Jonsson, B., N. Jonsson, E. Bradtkorb and P.J. Ingebrightson. 2001. Life history traits of brown trout vary with size of small streams. Functional Ecology 15(3): 310-317.

Nyman, O.L. 1970. Ecological interaction of brown trout (*Salmo trutta*) L., and brook trout (*Salvelinus fontinalis*) (Mitchill), in a stream. Canadian Field-Naturalist 84:343-350.

Planning Initiatives, 1993. Co-ordinated Report on Monitoring Programs for Mill Creek Aggregates. November, 1993.

Raleigh, R.F. 1982. Habitat Suitability Index Models: Brook Trout, U.S. Dept. Int., Fish and Wildlife Service. FWS/OBS-82/10.24. 42 pp.

Raleigh, R.F., L.D. Zuckerman and P.C. Nelson. 1986. Habitat Suitability Index Model and Instream Flow Suitability Curves: Brown Trout. Biological Report 82(10.124) of the U.S. Department of the Interior, Fish and Wildlife Service (National Ecology Center).

Witzel, L.D. and H.R. Maccrimmon. 1983. Redd-Site Selection by Brook Trout and Brown Trout in Southwestern Ontario Streams. Trans American Fisheries Society. Vol 112(6):760-771.

Waters, T.F. 1983. Replacement of brook trout by brown trout over 15 years in a Minnesota stream: production and abundance. Transactions of the American Fisheries Society 112:137-146.

Signature Page

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APPENDIX A

WATER QUALITY DATA (1993-2022)

Appendix Table A-1. Mill Creek Water Quality Monitoring; Nov. 25, 1993 (ESP).						
	SWM1 Hwy 401	SWM4 Galt Ck	SWM3 Pond Ck	SWM2 (boundary)	PWQO1	LOQ2
All units are mg/L unless indicated otherwise.						
Temperature (°C)	0	1.5	3	1.5	-	
pH (units)	7.4	7.3	7.3	7.3	6.5-8.5	0.01
Conductivity (umhos/cm)	590	700	600	620	-	1
Hardness (mg/L as CaCo3)	320	320	310	300	-	1
Alkalinity (bicarbonate)	250	240	250	250	-	
Alkalinity (carbonate)	5	5	5	5	-	
Alkalinity (Total)	250	240	250	250	-	1
Chloride	20.7	56.7	15.8	31.5	-	0.05
Nitrate	0.45	1.55	3.62	0.68	see[3]	0.03
Nitrite	0.15	0.15	0.15	0.15	0.06[4]	0.03
Ammonia[5]	0.042 (0.0005)	0.042 (0.0005)	0.042 (0.0005)	0.07 (0.0008)	1.2 (0.02)	0.02
Orthophosphate	0.022	0.022	0.022	0.022	-	0.05
Total Phosphorus	0.022	0.022	0.022	0.022	0.03	0.01
Total Organic Carbon	4.25	3.18	2.48	3.78	-	0.05
BOD5	1.7	2	2	1.7	-	1
Chemical Oxygen Demand	31	14	2.7	57	-	5
Total Suspended Solids	2.3	1.6	4.3	2.0		1
Fecal Coliforms (CFU/100ml)	2	4	3	4		
Total Coliforms (CFU/100ml)	18	23	17	19		

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] at pH 7.5 and 20°C

Appendix Table A-2. Mill Creek Water Quality Monitoring; May 11, 1994 (ESP).						
	SWM1 Hwy 401	SWM4 Galt Ck	SWM3 Pond Ck	SWM2 (boundary)	PWQO1	LOQ2
All units are mg/L unless indicated otherwise.						
Temperature (°C)						
pH (units)	7.9	8.06	8.05	8.1	6.5-8.5	0.01
Conductivity (umhos/cm)	522	641	557	559	-	1
Hardness (mg/L as CaCo3)	280	294	299	287	-	1
Alkalinity (bicarbonate)	230	235	244	233	-	
Alkalinity (carbonate)	1.7	2.5	2.6	2.8	-	
Alkalinity (Total)	234	237	247	236	-	1
Chloride	16.7	49.9	16.6	25.5	-	0.05
Nitrate	0.30	0.77	3.05	0.46	see[3]	0.03
Nitrite	nd	nd	nd	nd	0.06[4]	0.03
Ammonia[5]	0.03 (0.001)	nd (0.000)	nd (0.000)	0.04 (0.002)	1.2 (0.02)	0.02
Orthophosphate	nd	nd	nd	nd	-	0.05
Total Phosphorus	0.06	0.04	0.04	nd	0.03	0.01
Total Organic Carbon	3.44	3.13	1.47	3.23	-	0.05
BOD5	nd	nd	nd	nd	-	1
Chemical Oxygen Demand	15	13	7	14	-	5
Total Suspended Solids	2	1	1	1		1
Fecal Coliforms (CFU/100ml)	<1	3	<1	3		
Total Coliforms (CFU/100ml)	<2	6	<2	10		

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20EC

Appendix Table A-3. Mill Creek Water Quality Monitoring; Oct. 17, 1994 (ESP).						
	SWM1 Hwy 401	SWM4 Galt Ck	SWM3 Pond Ck	DP2	PWQO1	LOQ2
All units are mg/L unless indicated otherwise.						
Temperature (°C)						
pH (units)	8.6	8.4	8.3	8.5	6.5-8.5	0.01
Conductivity (umhos/cm)	592	765	630	673	-	1
Hardness (mg/L as CaCo3)	293	335	329	313	-	1
Alkalinity (bicarbonate)	229	254	252	238	-	
Alkalinity (carbonate)	3	3	2	2	-	
Alkalinity (Total)	232	257	254	240	-	1
Chloride	21.2	61.1	14.3	37.6	-	0.05
Nitrate					see[3]	0.03
Nitrite					0.06[4]	0.03
Ammonia[5]	nd	nd	0.05	nd	1.2 (0.02)	0.01
Orthophosphate	<0.01	<0.01	<0.01	0.06	-	0.05
Total Phosphorus	0.03	0.07	0.03	0.03	0.03	0.02
Total Organic Carbon	2.1	0.3	nd	1.5	-	0.3
BOD5	nd	nd	nd	nd	-	2
Chemical Oxygen Demand	14	36	nd	12	-	10
Total Suspended Solids	2	2	2	2		1
Fecal Coliforms (CFU/100ml)	15	12	14	10		
Total Coliforms (CFU/100ml)	42	38	40	66		

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20EC
nd not detected

Appendix Table A-4. Mill Creek Water Quality Monitoring; May 17, 1995 (Jagger Hims Ltd).

	SWM1 Hwy 401	SWM4 Galt Ck	SWM3 Pond Ck	DP2	PWQO1	LOQ2
All units are mg/L unless indicated otherwise.						
Temperature (°C)						
pH (units)	8.11	8.06	8.19	8.12	6.5-8.5	0.01
Conductivity (umhos/cm)	514	635	572	556	-	1
Hardness (mg/L as CaCo3)	291	309	249	298	-	1
Alkalinity (bicarbonate)	206	228	149	216	-	0.1
Alkalinity (carbonate)	2.5	2.5	2.2	2.7	-	0.1
Alkalinity (Total)	208	231	151	219	-	1
Chloride	27.2	84.5	86.8	38.4	-	0.05
Nitrate	0.34	0.95	2.87	0.63	see[3]	0.03
Nitrite	nd	nd	nd	nd	0.06[4]	0.03
Ammonia[5]	0.21	0.07	0.01	0.3	1.2 (0.02)	0.01
Orthophosphate	nd	nd	nd	nd	-	0.05
Total Phosphorus	nd	nd	nd	nd	0.03	0.06
Total Organic Carbon	4.9	4.9	nd	3.9	-	0.5
BOD5	2	2	6	2	-	2
Chemical Oxygen Demand	17	15	nd	15	-	10
Total Suspended Solids	nd	nd	nd	nd		5
Fecal Coliforms (CFU/100ml)	89	61	nd	70		1
Total Coliforms (CFU/100ml)	260	160	4	240		2

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20EC
nd not detected

Appendix Table A-5. Mill Creek Water Quality Monitoring; Nov. 16, 1995 (ESP).						
	SWM1 Hwy 401	SWM4 Galt Ck	SWM3 Pond Ck	DP2	PWQO1	LOQ2
All units are mg/L unless indicated otherwise.						
Temperature (°C)						
pH (units)	7.5	7.7	7.7	7.7	6.5-8.5	0.01
Conductivity (umhos/cm)	567	806	604	681	-	1
Hardness (mg/L as CaCo3)	250	263	277	254	-	1
Alkalinity (bicarbonate)	185	191	228	191	-	10
Alkalinity (carbonate)	0	0	0	0	-	
Alkalinity (Total)	185	191	228	191	-	10
Chloride	23.8	103	209	62.4	-	0.11
Nitrate	0.29	0.66	3.15	0.46	see[3]	0.05
Nitrite					0.06[4]	0.04
Ammonia[5]	nd	nd	nd	nd	1.2 (0.02)	0.057
Orthophosphate	nd	nd	nd	nd	-	0.022
Total Phosphorus	nd	nd	nd	nd	0.03	0.022
Total Organic Carbon	13.2	12.7	4.84	12.5	-	1
BOD5	nd	nd	nd	nd	-	2
Chemical Oxygen Demand	33	33	17	31	-	5
Total Suspended Solids	3.2	2.8	nd	2.0		1.4
Fecal Coliforms (CFU/100ml)	20	60	4	28		0
Total Coliforms (CFU/100ml)	300	600	180	200		0

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20EC
nd not detected

AppendixTableA-6. Mill Creek Water Quality Monitoring; Nov. 19, 1996 (ESP)						
	SWM1 Hwy 401	SWM4 Galt Ck	SWM3 Pond Ck	SWM2 (boundary)	PWQO1	LOQ2
All units are mg/L unless indicated otherwise.						
Temperature (°C)						
pH (units)	8.2	8.0	8.0	8.1	6.5-8.5	0.01
Conductivity (umhos/cm)	570	670	600	620	-	0.8
Hardness (mg/L as CaCo3)	310	310	310	310	-	10
Alkalinity (bicarbonate)	260	250	260	260	-	10
Alkalinity (carbonate)	nd	nd	nd	nd	-	10
Alkalinity (Total)	260	250	260	260	-	10
Chloride	22	57	16	34	-	0.2
Nitrate	0.65	1.2	3.7	0.90	see[3]	0.05
Nitrite	nd	nd	nd	nd	0.06[4]	0.1
Ammonia[5]	nd	nd	nd	nd	1.2 (0.02)	0.10
Orthophosphate	nd	nd	nd	nd	-	0.3
Total Phosphorus	0.03	0.08	0.08	0.12	0.03	0.02
Total Organic Carbon	20	12	12	10	-	1
BOD5	nd	nd	nd	nd	-	2
Chemical Oxygen Demand	nd	nd	nd	nd	-	5
Total Suspended Solids	2	nd	nd	1.6		1
Fecal Coliforms (CFU/100ml)	10	0	20	10		0
Total Coliforms (CFU/100ml)	470	270	420	400		0

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- no guideline)
[2] LOQ = Limit of Quantification
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20□C
nd not detected

Appendix Table A-7.	Mill Creek Water Quality Monitoring; Nov. 6, 1997 (ESP).					
	SWM1 Hwy 401	SWM4 Galt Ck	SWM3 Pond Ck	SWM2 (boundary)	PWQO1	LOQ2
All units are mg/L unless indicated otherwise.						
Temperature (°C)	7	6.5	6	6		
pH (units)	7.8	7.8	7.7	7.7	6.5-8.5	0.01
Conductivity (umhos/cm)	580	720	610	620	-	0.8
Hardness (mg/L as CaCo3)	340	350	340	320	-	10
Alkalinity (bicarbonate)	220	240	260	230	-	10
Alkalinity (carbonate)	nd	nd	nd	nd	-	10
Alkalinity (Total)	220	240	260	230	-	10
Chloride	25	61	18	36	-	0.2
Nitrate	0.64	1.1	3.8	0.86	see[3]	0.05
Nitrite	nd	nd	nd	nd	0.06[4]	0.1
Ammonia[5]	nd	nd	nd	nd	1.2 (0.02)	0.10
Orthophosphate	nd	nd	nd	nd	-	0.02
Total Phosphorus	nd	nd	nd	nd	0.03	0.02
Total Organic Carbon	9.2	6.6	4.0	9.2	-	0.5
BOD5	nd	nd	nd	nd	-	2
Chemical Oxygen Demand	10	9	nd	19	-	5
Total Suspended Solids	4	2	2	2		1
Fecal Coliforms (CFU/100ml)	40	50	5	30		0
Total Coliforms (CFU/100ml)	80	160	150	100		0

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20EC
nd not detected

Appendix Table A-8. Mill Creek Water Quality Monitoring; Nov. 6, 1998.						
	SWM1 Hwy 401	SWM4 Galt Ck	SWM3 Pond Ck	SWM2 (boundary)	PWQO1	LOQ2
All unitsare mg/L unless indicated otherwise.						
Temperature (°C)	6	4	5	6		
pH (units)	8.3	8.2	7.9	8.2	6.5-8.5	0.01
Conductivity (umhos/cm)	580	630	690	650	-	0.8
Hardness (mg/L as CaCo3)	310	360	370	320	-	10
Alkalinity (bicarbonate)	260	280	270	260	-	10
Alkalinity (carbonate)	nd	nd	nd	Nd	-	10
Alkalinity (Total)	260	280	270	260	-	10
Chloride	23	16	31	39	-	0.2
Nitrate	0.47	5	0.21	1.2	see[3]	0.05
Nitrite	nd	nd	nd	nd	0.06[4]	0.1
Ammonia[5]	nd	nd	nd	nd	1.2 (0.02)	0.10
Orthophosphate	nd	nd	nd	nd	-	0.02
Total Phosphorus	0.07	0.05	0.06	0.06	0.03	0.02
Total Organic Carbon	2.5	0.8	0.69	2.9	-	0.5
BOD5	nd	nd	nd	2	-	2
Chemical Oxygen Demand	nd	nd	nd	7	-	5
Total Suspended Solids	22	6	nd	4		1
Fecal Coliforms (CFU/100ml)	170	nd	<10	70		0
Total Coliforms (CFU/100ml)	>2000	640	1600	2500		0

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
nd not detected

Appendix Table A-9. Mill Creek Water Quality Monitoring; Nov. 11, 1999.						
	SWM1 Hwy 401	SWM4 Galt Ck	SWM3 Pond Ck	SWM2 (boundary)	PWQO1	LOQ2
All units are mg/L unless indicated otherwise.						
Temperature (°C)						
pH (units)	8.10	8.10	7.74	8.12	6.5-8.5	0.01
Conductivity (umhos/cm)	635	634	922	683	-	0.8
Hardness (mg/L as CaCo3)	312	353	395	349	-	10
Alkalinity (bicarbonate)					-	10
Alkalinity (carbonate)					-	10
Alkalinity (Total)	237	284	239	243	-	10
Chloride	32.7	18.8	63.5	45.4	-	0.2
Nitrate	0.5	3.2	0.2	0.7	see[3]	0.05
Nitrite	<0.1	<0.1	<0.1	<0.1	0.06[4]	0.1
Ammonia[5]	<0.05	<0.05	<0.05	<0.05	1.2 (0.02)	0.10
Orthophosphate	0.012	0.009	0.014	0.011	-	0.02
Total Phosphorus	<0.02	<0.02	<0.02	<0.02	0.03	0.02
Total Organic Carbon	4.7	1.9	6.7	4.3	-	0.5
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	18.0	<4	19.0	12.0	-	5
Total Suspended Solids	<1	1	5	<1		1
Fecal Coliforms (CFU/100ml)	60	<10	<10	50		0
Total Coliforms (CFU/100ml)	1200	900	300	2200		0

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
nd not detected

Appendix Table A-10. Mill Creek Water Quality Monitoring; Oct. 31, 2000.

	SWM1 Hwy 401	SWM4 Galt Ck	SWM3 Pond Ck	SWM2 (boundary)	PWQO1	LOQ2
All units are mg/L unless indicated otherwise.						
Temperature (°C)						
pH (units)	8.35	8.3	8.31	8.29	6.5-8.5	0.01
Conductivity (umhos/cm)					-	0.8
Hardness (mg/L as CaCo3)	316	359	343	334	-	10
Alkalinity (Total)	252	262	276	253	-	10
Chloride	22	82	16	47	-	0.2
Nitrate	0.4	1.48	4.38	0.84	see[3]	0.05
Nitrite	<0.06	<0.06	<0.06	<0.06	0.06[4]	0.1
Ammonia[5]	0.2	<0.1	<0.1	0.4	1.2 (0.02)	0.10
Orthophosphate	0.012	0.009	0.014	0.011	-	0.02
Total Phosphorus	0.04	<0.03	<0.03	<0.03	0.03	0.02
Total Organic Carbon	4.3	2.5	1.9	3.9	-	0.5
BOD5	2	2	2	2	-	2
Chemical Oxygen Demand	<8	<8	<8	8	-	5
Total Suspended Solids	<3	4	<3	<3		1
Fecal Coliforms (CFU/100ml)	18	8	24	15		0
Total Coliforms (CFU/100ml)	34	31	45	29		0

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
nd not detected

Appendix Table A-11. Mill Creek Water Quality Monitoring; Nov. 14, 2001.

	SWM 1 Hwy. 401	SWM 4 Galt Crk.	SWM 3 Pond Crk.	SWM 2 (boundary)	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.28	8.06	8.16	8.20	6.5 – 8.5	0.01
Conducivity (μmhos/cm)	611	810	644	665	-	0.2
Hardness (mg/L as CaCo3)	335	384	356	343	-	10
Alkalinity (Total)	235	253	266	241	-	1
Chloride	27.0	80.6	21.4	44.8	-	0.15
Nitrate	0.5	1.5	4.2	0.9	See[3]	0.1
Nitrite	ND	ND	ND	ND	0.06[4]	0.1
Ammonia[5]	ND	ND	ND	ND	1.2 (0.02)	0.05
Orthophosphate	ND	ND	ND	ND	-	0.005
Total Phosphorus	0.12	0.05	0.19	0.04	0.03	0.02
Total Organic Carbon	6.2	2.9	2.1	5.1	-	0.2
BOD5	ND	ND	ND	ND	-	2
Chemical Oxygen Demand	17.4	12.1	10	18.0	-	5
Total Suspended Solids	ND	ND	3	ND		1
Fecal Coliforms (CFU/100ml)	<10	200	<10	200	100	0
Total Coliforms (CFU/100ml)	240	200	180	500		0

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected

Appendix Table A-12. Mill Creek Water Quality Monitoring; Nov. 14, 2002.

	SWM 1 Hwy. 401	SWM 4 Galt Ck.	SWM 3 Pond Ck.	DP2	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.15	8.12	8.03	8.12	6.5 – 8.5	0.01
Conducivity (μmhos/cm)	571	804	609	645	-	0.2
Hardness (mg/L as CaCo3)	328	374	355	344	-	N/A
Alkalinity (Total)	250	280	277	259	-	1
Chloride	24.8	95.8	21.5	46.4	-	0.15
Nitrate	0.6	1.6	3.5	1.0	See[3]	0.1
Nitrite	ND	ND	ND	ND	0.06[4]	0.1
Ammonia[5]	ND	ND	ND	ND	1.2 (0.02)[5]	0.05
Orthophosphate	0.005	0.006	0.010	0.005	-	0.005
Total Phosphorus	0.10	ND	ND	ND	0.03	0.02
Total Organic Carbon	7.5	6.0	6.0	7.5	-	0.1
BOD5	4	7	ND	ND	-	1[6]
Chemical Oxygen Demand	13.0	17.0	13.7	15.0	-	4
Total Suspended Solids	ND	ND	ND	ND	-	1
Fecal Coliforms (CFU/100ml)	>200	16	27	>200	100	N/A
Total Coliforms (CFU/100ml)	>200	27	32	>200	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
[6] LOQ is 3 for samples DP2 and SWM3
ND = not detected
N/A = not applicable

Appendix Table A-13. Mill Creek Water Quality Monitoring; Nov. 14, 2003.

	SWM 1 Hwy. 401	SWM 4 Galt Ck.	SWM 3 Pond Ck.	DP2	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.19	8.10	8.13	8.15	6.5 – 8.5	0.01
Conducivity (μmhos/cm)	631	767	620	676	-	0.2
Hardness (mg/L as CaCo3)	313	323	340	320	-	N/A
Alkalinity (Total)	243	249	265	244	-	1
Chloride	33.9	81.6	21.9	49.8	-	0.15
Nitrate	0.7	1.4	3.7	1.0	See[3]	0.1
Nitrite	ND	ND	ND	ND	0.06[4]	0.1
Ammonia[5]	0.06	ND	ND	0.06	1.2 (0.02)[5]	0.05
Orthophosphate	0.006	0.009	0.005	0.006	-	0.005
Total Phosphorus	ND	ND	ND	ND	0.03	0.02
Total Organic Carbon	6.0	5.2	1.7	5.4	-	0.1
BOD5	ND	ND	ND	ND	-	1[6]
Chemical Oxygen Demand	21.0	15.0	11.0	15.0	-	4
Total Suspended Solids	1	ND	ND	ND	-	1
Fecal Coliforms (CFU/100ml)	>200	41	4	>200	100	N/A
Total Coliforms (CFU/100ml)	>200	>200	>200	>200	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
[6] LOQ is 3 for samples DP2 and SWM3
ND = not detected
N/A = not applicable

Appendix Table A-14. Mill Creek Water Quality Monitoring; Dec. 2, 2004.

	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.22	8.19	8.24	8.23	6.5 – 8.5	0.01
Conductivity (µmhos/cm)	568	700	577	618	-	0.2
Hardness (mg/L as $CaCO_3$)	313	324	326	319	-	n/a
Alkalinity (Total)	227	232	254	228	-	1
Chloride	33.2	78.8	29.3	48.5	-	0.15
Nitrate	0.8	1.1	2.6	0.8	See[3]	0.1
Nitrite	ND	ND	ND	ND	0.06[4]	0.1
Ammonia	n/a	n/a	n/a	n/a	1.2 (0.02)[5]	0.05
Orthophosphate	ND	0.005	ND	ND	-	0.005
Total Phosphorus	ND	ND	ND	ND	0.03	0.02
Total Organic Carbon	7.8	9.6	5.6	8.3	-	0.1
BOD5	2	ND	2	2	-	1[6]
Chemical Oxygen Demand	25	22	18	26	-	4
Total Suspended Solids	1	1	ND	5	-	1
Fecal Coliforms (CFU/100ml)	>200	10	4	>200	100	n/a
Total Coliforms (CFU/100ml)	>200	>200	>200	>200	-	n/a

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
[6] LOQ is 2 for sample SWM4
ND = not detected
n/a = not applicable

Appendix Table A-15. Mill Creek Water Quality Monitoring; Nov. 8, 2005.						
	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.34	8.33	8.30	8.33	6.5 – 8.5	0.01
Conductivity (μmhos/cm)	587	772	592	666	-	2
Hardness (mg/L as $CaCO_3$)	300	330	320	310	-	n/a
Alkalinity (Total)	269	289	296	272	-	1
Chloride	35	86	23	55	-	1
Nitrate	0.3	2.2	3.5	0.8	See[3]	0.1
Nitrite	ND	ND	ND	ND	0.06[4]	0.01
Ammonia	0.05	ND	ND	0.08	1.2 (0.02)[5]	0.05
Orthophosphate	0.010	0.010	0.011	0.010	-	0.005
Total Phosphorus	ND	ND	0.02	ND	0.03	0.02
Total Organic Carbon	4.5	3.7	2.7	4.5	-	0.1
BOD5	ND	ND	ND	ND	-	2
Chemical Oxygen Demand	10	9	23	6	-	4
Total Suspended Solids	ND	2	2	5	-	1
Fecal Coliforms (CFU/100ml)	30	10	<10	20	100	10
Total Coliforms (CFU/100ml)	100	100	200	500	-	10

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected
n/a = not applicable

Appendix Table A-16. Mill Creek Water Quality Monitoring; Oct 13, 2006.

	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.3	8.0	8.2	8.1	6.5 – 8.5	0.01
Conductivity (μmhos/cm)	612	726	592	645	-	2
Hardness (mg/L as $CaCO_3$)	280	300	270	290	-	1
Alkalinity (Total)	236	242	241	233	-	1
Chloride	34	66	28	43	-	1
Nitrate	0.2	1.1	2.4	0.4	See[3]	0.1
Nitrite	ND	ND	0.01	ND	0.06[4]	0.01
Ammonia	0.06	ND	ND	0.05	1.2 (0.02)[5]	0.05
Orthophosphate	ND	ND	ND	ND	-	0.01
Total Phosphorus	ND	ND	ND	ND	0.03	0.002
Total Organic Carbon	10.6	10.6	6.3	10.8	-	0.1
BOD5	ND	ND	ND	ND	-	2
Chemical Oxygen Demand	24	34	19	29	-	4
Total Suspended Solids	3	1	1	1	-	1
Fecal Coliforms (CFU/100ml)	160	360	1000	100	100	10
Total Coliforms (CFU/100ml)	300	360	2100	600	-	10

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected
n/a = not applicable

Appendix Table A-17 Mill Creek Water Quality Monitoring; January 24, 2008 (reported for the 2007 monitoring year).

	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.07	8.10	8.09	8.05	6.5 – 8.5	0.001
Conductivity (μmhos/cm)	645	798	624	699	-	0.4
Hardness (mg/L as $CaCO_3$)	360	360	350	350	-	10
Alkalinity (Total)	240	260	270	240	-	10
Chloride	43	84	26	57	-	2
Nitrate	0.9	3.9	4.6	1.6	See[3]	0.1
Nitrite	<0.1	<0.1	<0.1	<0.1	0.1[4]	0.1
Ammonia	0.14	<0.05	<0.05	0.09	1.2 (0.02)[5]	0.05
Orthophosphate	<0.003	0.003	<0.003	0.003	-	0.003
Total Phosphorus	0.010	<0.006	0.013	0.016	0.03	0.006
Total Organic Carbon	3	<1	<1	2	-	1
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	<10	70	40	<10	-	10
Total Suspended Solids	1	1	3	6	-	1
Fecal Coliforms (CFU/100ml)	3	4	27	4	100	0
Total Coliforms (CFU/100ml)	280	150	190	130	-	10

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected
n/a = not applicable

Appendix Table A-18 Mill Creek Water Quality Monitoring; October, 2008.

	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.1	8.2	8.1	8.2	6.5 – 8.5	0.001
Conductivity (µmhos/cm)	671	812	634	727	-	2
Hardness (mg/L as $CaCO_3$)	300	350	310	330	-	1
Alkalinity (Total)	262	276	271	261	-	1
Chloride	46	81	25	60	-	1
Nitrate	0.4	3.2	4.1	1.1	See[3]	0.1
Nitrite	<0.01	<0.01	<0.01	<0.01	<0.1[4]	0.01
Ammonia	<0.05	<0.05	<0.05	<0.05	1.2 (0.02)[5]	0.05
Orthophosphate	<0.01	<0.01	<0.01	<0.01	-	0.01
Total Phosphorus	0.013	0.010	0.013	0.030	0.03	0.002
Total Organic Carbon	5.6	3.1	2.1	4.2	-	0.1
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	11	<4	<4	16	-	4
Total Suspended Solids	1	1	2	1	-	1
Fecal Coliforms (CFU/100ml)	20	<10	10	30	100	10
Total Coliforms (CFU/100ml)	150	480	130	70	-	10

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected
n/a = not applicable

Appendix Table A-19 Mill Creek Water Quality Monitoring; October, 2009.						
	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.2	8.2	8.2	8.1	6.5 – 8.5	0.001
Conductivity (µmhos/cm)	614	788	631	670	-	2
Hardness (mg/L as $CaCO_3$)	280	320	300	280	-	1
Alkalinity (Total)	246	273	264	259	-	1
Chloride	41	75	27	52	-	1
Nitrate	0.4	3.7	5.0	1.1	See[3]	0.1
Nitrite	<0.01	<0.01	0.02	<0.01	<0.1[4]	0.01
Ammonia	<0.05	<0.05	<0.05	<0.05	1.2 (0.02)[5]	0.05
Orthophosphate	<0.01	0.01	<0.01	<0.01	-	0.01
Total Phosphorus	0.014	0.018	0.014	0.014	0.03	0.002
Total Organic Carbon	9.0	5.9	2.5	8.1	-	0.1
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	13	7	4	10	-	4
Total Suspended Solids	<10	<10	<10	<10	-	1
Fecal Coliforms (CFU/100ml)	80	120	190	150	100	10
Total Coliforms (CFU/100ml)	330	390	370	250	-	10

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected
n/a = not applicable

Appendix Table A-20 Mill Creek Water Quality Monitoring; November, 2010.						
	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.28	8.22	8.28	8.26	6.5 – 8.5	
Conductivity (µmhos/cm)	631	773	650	680	-	1
Hardness (mg/L as $CaCO_3$)	270	290	290	270	-	1
Alkalinity (Total)	242	254	264	244	-	1
Chloride	37	76	29	47	-	1
Nitrate	0.4	2.7	4.4	0.9	See[3]	0.1
Nitrite	<0.01	<0.01	<0.01	<0.01	<0.1[4]	0.01
Ammonia	<0.05	<0.05	<0.05	<0.05	1.2 (0.02)[5]	0.05
Orthophosphate	<0.01	<0.01	<0.01	<0.01	-	0.01
Total Phosphorus	<0.02	<0.02	<0.02	<0.02	0.03	0.02
Total Organic Carbon	5.9	6.2	3.4	5.8	-	0.2
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	18	17	11	19	-	4
Total Suspended Solids	<10	<10	<10	<10	-	10
Fecal Coliforms (CFU/100ml)	37	8	250	62	100	N/A
Total Coliforms (CFU/100ml)	>2000	130	300	210	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected
n/a = not applicable

Appendix Table A-21 Mill Creek Water Quality Monitoring; November, 2011.						
	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.26	8.19	8.23	8.23	6.5 – 8.5	
Conductivity (µmhos/cm)	657	796	648	699	-	1
Hardness (mg/L as $CaCO_3$)	300	320	320	310	-	1
Alkalinity (Total)	234	231	255	233	-	1
Chloride	43	81	29	57	-	1
Nitrate	0.4	2.8	4.3	1.0	See[3]	0.1
Nitrite	<0.01	<0.01	<0.01	<0.01	<0.1[4]	0.01
Ammonia	<0.05	<0.05	<0.05	<0.05	1.2 (0.02)[5]	0.05
Orthophosphate	<0.01	<0.01	<0.01	<0.01	-	0.01
Total Phosphorus	0.03	0.03	0.02	0.03	0.03	0.02
Total Organic Carbon	5.8	5.5	3.5	6.0	-	0.2
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	18	15	<4	<4	-	4
Total Suspended Solids	<10	<10	<10	<10	-	10
Fecal Coliforms (CFU/100ml)	25	20	85	22	100	N/A
Total Coliforms (CFU/100ml)	160	200	160	140	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected
n/a = not applicable

Appendix Table A-22 Mill Creek Water Quality Monitoring; December, 2012.

	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.18	8.11	8.17	8.11	6.5 – 8.5	
Conductivity (µmhos/cm)	640	780	670	690	-	1
Hardness (mg/L as $CaCO_3$)	320	330	350	320	-	1
Alkalinity (Total)	240	240	270	240	-	1
Chloride	39	73	28	46	-	1
Nitrate	0.43	2.8	4.6	1.1	See[3]	0.1
Nitrite	<0.01	<0.01	<0.01	<0.01	<0.1[4]	0.01
Ammonia	0.073	<0.05	<0.05	<0.05	1.2 (0.02)[5]	0.05
Orthophosphate	<0.01	<0.01	<0.01	<0.01	-	0.01
Total Phosphorus	0.021	0.005	0.007	0.010	0.03	0.002
Total Organic Carbon	5.7	5.7	2.4	5.7	-	0.2
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	13	12	9.6	13	-	4
Total Suspended Solids	<10	<10	<10	<10	-	10
Fecal Coliforms (CFU/100ml)	34	18	4	45	100	N/A
Total Coliforms (CFU/100ml)	200	>2000	130	200	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected
n/a = not applicable

Appendix Table A-23 Mill Creek Water Quality Monitoring; November, 2013.						
	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQ01	L0Q2
All units are mg/L, unless otherwise indicated.						
pH (units)	8.27	8.26	8.26	8.16	6.5 – 8.5	
Conductivity (µmhos/cm)	679	790	652	739	-	1
Hardness (mg/L as $CaCO_3$)	310	320	310	310	-	1
Alkalinity (Total)	270	270	270	270	-	1
Chloride	40	72	26	49	-	1
Nitrate	0.44	3.0	4.2	0.69	See[3]	0.1
Nitrite	<0.01	<0.01	<0.01	<0.01	<0.1[4]	0.01
Ammonia	0.062	<0.05	<0.05	<0.05	1.2 (0.02)[5]	0.05
Orthophosphate	<0.01	<0.01	<0.01	<0.01	-	0.01
Total Phosphorus	0.002	<0.002	0.006	<0.002	0.03	0.002
Total Organic Carbon	4.9	4.8	2.5	4.7	-	0.2
BOD5	<2	<2	<2	2	-	2
Chemical Oxygen Demand	16	16	4.5	14	-	4
Total Suspended Solids	<10	<10	<10	<10	-	10
Fecal Coliforms (CFU/100ml)	34	52	16	13	100	N/A
Total Coliforms (CFU/100ml)	>2000	>2000	>2000	>2000	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected
n/a = not applicable

Appendix Table A-24 Mill Creek Water Quality Monitoring; November 26, 2014.						
	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQO[1]	LOQ[2]
All units are mg/L, unless otherwise indicated.						
pH (units)	8.09	8.11	8.18	8.11	6.5 – 8.5	
Conductivity (µmhos/cm)	569	692	633	593	-	1
Hardness (mg/L as $CaCO_3$)	260	280	310	270	-	1
Alkalinity (Total)	220	240	260	230	-	1
Chloride	37	66	31	44	-	1
Nitrate	0.31	1.8	3.4	0.59	See[3]	0.1
Nitrite	<0.01	<0.01	<0.01	<0.01	<0.1[4]	0.01
Ammonia	0.079	0.059	0.059	0.081	1.2 (0.02)[5]	0.05
Orthophosphate	<0.01	<0.01	<0.01	<0.01	-	0.01
Total Phosphorus	0.015	0.015	0.008	0.026	0.03	0.004
Total Organic Carbon	9.2	8.0	4.1	9.1	-	0.2
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	21	18	7.1	22	-	4
Total Suspended Solids	<10	<10	<10	<10	-	10
Fecal Coliforms (CFU/100ml)	180	110	4	190	100	N/A
Total Coliforms (CFU/100ml)	>2000	>2000	>2000	>2000	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected
n/a = not applicable

Appendix Table A-25 Mill Creek Water Quality Monitoring; December 14, 2015.						
	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQO[1]	LOQ[2]
All units are mg/L, unless otherwise indicated.						
pH (units)	8.26	8.22	8.22	8.26	6.5 – 8.5	N/A
Conductivity (µmhos/cm)	688	833	668	747	-	1
Hardness (mg/L as $CaCO_3$)	310	330	330	320	-	1
Alkalinity (Total)	250	260	270	260	-	1
Chloride	46	88	28	66	-	1
Nitrate	0.42	3.69	4.50	1.37	See[3]	0.1
Nitrite	<0.01	<0.01	<0.01	<0.01	<0.1[4]	0.01
Ammonia	<0.050	<0.050	<0.050	<0.050	1.2 (0.02)[5]	0.05
Orthophosphate	<0.01	<0.01	<0.01	0.012	-	0.01
Total Phosphorus	<0.020	<0.020	<0.020	<0.020	0.03	0.020
Total Organic Carbon	3.6	3.2	2.0	3.5	-	0.2
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	11	9.3	<4.0	14	-	4
Total Suspended Solids	<10	<10	<10	<10	-	10
Fecal Coliforms (CFU/100ml)	32	2	2	120	100	N/A
Total Coliforms (CFU/100ml)	>2000	49	92	120	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Reportable Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
ND = not detected
n/a = not applicable

Appendix Table A-26 Mill Creek Water Quality Monitoring; December 14, 2016.						
	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQO[1]	LOQ[2]
All units are mg/L, unless otherwise indicated.						
pH (units)	8.31	8.27	8.20	8.28	6.5 – 8.5	N/A
Conductivity (µmhos/cm)	744	883	674	802	-	1
Hardness (mg/L as $CaCO_3$)	320	330	320	310	-	1
Alkalinity (Total)	270	270	280	270	-	1
Chloride	62	100	29	81	-	1
Nitrate	0.46	3.89	4.25	1.57	See[3]	0.1
Nitrite	<0.01	<0.01	<0.01	<0.01	<0.1[4]	0.01
Ammonia	<0.050	<0.050	<0.050	<0.050	1.2 (0.02)[5]	0.05
Orthophosphate	<0.01	<0.01	<0.01	<0.01	-	0.01
Total Phosphorus	<0.020	<0.020	<0.020	<0.020	0.03	0.020
Total Organic Carbon	4.4	2.9	2.9	3.9	-	0.2
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	4.2	<4.0	12	<4.0	-	4
Total Suspended Solids	<10	<10	<10	<10	-	10
Fecal Coliforms (CFU/100ml)	11	4	0	17	100	N/A
Total Coliforms (CFU/100ml)	140	68	190	100	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Reportable Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
n/a = not applicable

Appendix Table A-27 Mill Creek Water Quality Monitoring; September 21, 2017.

	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQO[1]	LOQ[2]
All units are mg/L, unless otherwise indicated.						
pH (units)	8.29	8.30	8.25	8.31	6.5 – 8.5	N/A
Conductivity (µmhos/cm)	684	857	661	755	-	1
Hardness (mg/L as $CaCO_3$)	330	390	380	350	-	1
Alkalinity (Total)	260	280	280	260	-	1
Chloride	47	86	23	70	-	1
Nitrate	0.26	4.72	4.84	1.55	See[3]	0.1
Nitrite	<0.01	<0.01	0.017	<0.01	<0.1[4]	0.01
Ammonia	<0.050	<0.050	<0.050	<0.050	1.2 (0.02)[5]	0.05
Orthophosphate	<0.01	<0.01	<0.01	<0.01	-	0.01
Total Phosphorus	<0.020	<0.020	<0.020	<0.020	0.03	0.020
Total Organic Carbon	3.2	2.0	1.6	2.8	-	0.2
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	10	<4.0	4.6	9.0	-	4
Total Suspended Solids	<10	<10	<10	<10	-	10
Fecal Coliforms (CFU/100ml)	20	40	70	30	100	N/A
Total Coliforms (CFU/100ml)	No Analysis	No Analysis	No Analysis	No Analysis	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Reportable Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
n/a = not applicable

Table A-28. Mill Creek Water Quality December 7, 2018.

	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQO[1]	LOQ[2]
All units are mg/L, unless otherwise indicated.						
pH (units)	8.30	8.27	8.30	8.30	6.5 – 8.5	N/A
Conductivity (µmhos/cm)	700	860	660	750	-	1
Hardness (mg/L as $CaCO_3$)	320	350	350	330	-	1
Alkalinity (Total)	260	270	270	260	-	1
Chloride	59	97	31	73	-	1
Nitrate	0.45	3.50	4.33	1.15	See[3]	0.1
Nitrite	No analysis	No analysis	No analysis	No analysis	<0.1[4]	0.01
Ammonia	0.080	<0.050	<0.050	0.076	1.2 (0.02)[5]	0.05
Orthophosphate	<0.01	<0.01	<0.01	<0.01	-	0.01
Total Phosphorus	<0.020	0.035	<0.020	<0.020	0.03	0.020
Total Organic Carbon	6.4	5.0	2.5	6.0	-	0.2
BOD5	<2	<2	<2	<2	-	2
Chemical Oxygen Demand	15	11	11	13	-	4
Total Suspended Solids	<10	<10	<10	11	-	10
Fecal Coliforms (CFU/100ml)	10	20	<10	<10	100	N/A
Total Coliforms (CFU/100ml)	40	50	120	40	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Reportable Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] value in brackets is calculated un-ionized ammonia at pH 8.0 and 20°C
n/a = not applicable

Table A-29. Mill Creek Water Quality December 13, 2019						
	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQO[1]	LOQ[2]
All units are mg/L, unless otherwise indicated.						
pH (units)	8.55	8.57	8.58	8.56	6.5 – 8.5	N/A
Conductivity (µmhos/cm)	680	840	650	730	-	1
Hardness (mg/L as $CaCO_3$)	330	360	350	330	-	1
Alkalinity (Total)	260	270	280	260	-	1
Chloride	61	96	31	71	-	1
Nitrate	0.41	3.6	4.49	1.07	See[3]	0.1
Nitrite	ND	ND	ND	ND	<0.14[4]	0.01
Ammonia	0.057	ND	0.051	0.062	1.2	0.05
Orthophosphate	ND	ND	ND	ND	-	0.01
Total Phosphorus	ND	ND	ND	ND	0.03	0.020
Total Organic Carbon	6.0	3.9	2.3	5.5	-	0.2
BOD5	ND	ND	ND	ND	-	2
Chemical Oxygen Demand	12	12	ND	12	-	4
Total Suspended Solids	ND	ND	ND	ND	-	10
Fecal Coliforms (CFU/100ml)	29	47	9	56	100	N/A
Total Coliforms (CFU/100ml)	63	71	120	58	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Reportable Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
n/a = not applicable

Table A-30. Mill Creek Water Quality November 19, 2020

	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQO[1]	LOQ[2]
All units are mg/L, unless otherwise indicated.						
pH (units)	8.21	8.22	8.21	8.18	6.5-8.5	N/A
Conductivity (µmhos/cm)	0.695	0.763	0.679	0.884	-	0.001
Hardness (mg/L as $CaCO_3$)	320	330	330	350	-	1.0
Alkalinity (Total)	260	260	280	280	-	1.0
Chloride	57	72	32	100	-	1.0
Nitrate	0.34	1.20	4.68	3.90	See3	0.10
Nitrite	ND	ND	ND	ND	<0.14	0.010
Ammonia	0.34	1.20	ND	ND	1.20	0.050
Orthophosphate	ND	ND	ND	ND	-	0.010
Total Phosphorus	0.023	ND	ND	ND	0.030	0.020
Total Organic Carbon	4.6	4.2	2.1	3.1	-	0.40
BOD5	ND	ND	ND	ND	-	2
Chemical Oxygen Demand	11	9.9	5.0	9.6	-	4.0
Total Suspended Solids	ND	ND	ND	ND	-	10
Fecal Coliforms (CFU/100ml)	20	20	30	10	100	N/A
Total Coliforms (CFU/100ml)	220	120	280	180	-	N/A

[1] PWQO = Provincial Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] LOQ = Limit of Quantitation (Reportable Detection Limit)
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
n/a = not applicable

Table A-31. Mill Creek Water Quality November 19, 2021

	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQO[1]	L0Q[2]
All units are mg/L, unless otherwise indicated.						
pH (units)	8.33	8.24	8.22	8.18	6.5-8.5	N/A
Conductivity (mS/cm)	0.68	0.84	0.69	0.75	-	0.001
Hardness (mg/L as $CaCO_3$)	310	320	330	310	-	1.0
Alkalinity (Total mg/L as Ca CO_3)	270	270	280	260	-	1.0
Chloride	59	92	34	73	-	1.0
Nitrate (mg/L)	0.39	2.69	4.35	1.02	See[3]	0.10
Nitrite (mg/L)	<0.010/ND	<0.010/ND	<0.010/ND	<0.010/ND	<0.1[4]	0.010
Total Ammonia-N	0.39	2.69	4.35	1.02	1.20	0.050
Orthophosphate	0.021	<0.010/ND	<0.010/ND	<0.010/ND	-	0.010
Total Phosphorus	0.025	<0.020/ND	<0.020/ND	0.026	0.030	0.020
Total Organic Carbon	6.6	6.5	2.5	6.2	-	0.40
Total BOD	<2/ND	<2/ND	<2/ND	<2/ND	-	2
Total Chemical Oxygen Demand	16	15	4.7	13	-	4.0
Total Suspended Solids	<10/ND	<10/ND	<10/ND	<10/ND	-	10
Fecal Coliforms (CFU/100mL) [5]	97	16	1	53	100	10
Total Coliforms (CFU/100mL) [5]	160	230	1	260	-	10
Escherichia coli [5]	55	12	1	47	-	10

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] RDL = Reportable Detection Limit
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
[5] Sample collected on December 3, 2021.

N/A = Not Applicable ND = Not Detected

Appendix Table A-32. Mill Creek Water Quality November 18, 2022						
	SWM1 Hwy. 401	SWM4 Galt Ck.	SWM3 Pond Ck.	SWM2 (boundary)	PWQO[1]	L0Q[2]
All units are mg/L, unless otherwise indicated.						
pH (units)	8.35	8.28	8.27	8.41	6.5-8.5	N/A
Conductivity (mS/cm)	0.72	0.95	0.70	0.81	-	0.001
Hardness (mg/L as $CaCO_3$)	320	360	340	320	-	1.0
Alkalinity (Total mg/L as Ca CO_3)	270	280	290	270	-	1.0
Chloride	58	110	31	83	-	1.0
Nitrate (mg/L)	0.41	4.72	5.02	1.63	See[3]	0.10
Nitrite (mg/L)	<0.010/ND	<0.010/ND	<0.010/ND	<0.010/ND	<0.1[4]	0.010
Total Ammonia-N	<0.050	<0.050	<0.050	<0.050	1.20	0.050
Orthophosphate	<0.010/ND	<0.010/ND	<0.010/ND	<0.010/ND	-	0.010
Total Phosphorus	<0.020/ND	<0.020/ND	<0.020/ND	<0.020/ND	0.030	0.020
Total Organic Carbon	3.0	1.7	1.6	2.6	-	0.40
Total BOD	<2/ND	<2/ND	<2/ND	<2/ND	-	2
Total Chemical Oxygen Demand	8.0	<4.0	<4.0	6.0	-	4.0
Total Suspended Solids	<10/ND	<10/ND	<10/ND	<10/ND	-	10
Fecal Coliforms (CFU/100mL)	120	30	<10	30	100	10
Total Coliforms (CFU/100mL)	-*	-*	-*	-*	-	10
Escherichia coli	120	30	<10	30	-	10

[1] PWQO = Provincial Water Quality Guideline for the Protection of Aquatic Life (- denotes no guideline)
[2] RDL = Reportable Detection Limit
[3] concentrations that stimulate prolific weed growth should be avoided
[4] federal guideline (CCREM)
* total coliform data was not completed due to lab error

N/A = Not Applicable ND = Not Detected

Appendix Table A33. Historical Conductivity and Alkalinity Values in Mill Creek

Source	Date	Conductivity (µmhos/cm)	Alkalinity (mg/L)	Location
MNR	1971	--	215	SWM2
	1976	550	226	SWM2
Faun Aquatics (FA)	Aug-1980	560	--	SWM2
	Sep-1980	590	--	SWM2
	Jul-1982	620	--	SWM2
FA/ MOE	1975 – 1988	425 – 652	134 – 270	All stations.
ESP/ESG/CWA	Nov-1993	620	250	DP2
	May-1994	559	233	DP2
	Oct-1994	673	238	DP2
	May-1995	556	219	DP2
	Nov-1995	681	191	DP2
	Nov-1996	620	260	SWM2
	Nov-1997	620	230	SWM2
	Nov-1998	650	260	SWM2
	Nov-1999	683	243	SWM2
	Nov-2000	638	253	DP2
	Nov-2001	665	241	DP2
	Nov-2002	645	259	DP2
	Dec-2003	676	244	SWM2
	Dec-2004	618	228	SWM2
	Nov-2005	666	272	SWM2
GLL	Oct-2006	645	233	SWM2
	Jan-2008	699	240	SWM2
AECOM Canada/ LRG Environmental	Oct- 2008	727	261	SWM2
	Aug-2009	670	259	SWM2
LRG Environmental	Nov-2010	680	244	SWM2
	Nov-2011	699	233	SWM2
	Dec-2012	690	240	SWM2
	Nov-2013	739	270	SWM2
	Nov-2014	593	230	SWM2
	Dec 2015	747	260	SWM2
	Dec 2016	802	270	SWM2
	Sept 2017	755	260	SWM2
	Dec. 2018	750	260	SWM2
	Dec. 2019	730	260	SWM2
WSP	Nov. 2020	763	260	SWM2
	Nov. 2021	750	260	SWM2
	Nov. 2022	810	270	SWM2

APPENDIX B

REDD SURVEY DATES AND RESULTS

Appendix Table C-1. Summary of Mill Creek redd survey dates

	Stream Reach			
	Hanlon By-pass	University of Guelph	Marker	Surveyed By:*
1995	23-Oct	23-Oct	-	MZ
	10-Nov	10-Nov		
	11-Dec	11-Dec		
1996	29-Oct	29-Oct	orange flag	MZ, NH
	18-Nov	18-Nov		
	06-Dec	06-Dec		
1997	06-Nov	06-Nov	blue flag	RB, NH
	20-Nov	20-Nov		
	08-Dec	08-Dec		
1998	06-Nov	06-Nov	orange flag	RB, NH
	07-Dec	07-Dec		
	18-Dec	18-Dec		
1999	11-Nov	11-Nov	blue flag	RB, NH
	04-Dec	07-Dec		
	18-Dec	18-Dec		
2000	11-Nov	11-Nov	-	MJ
	02-Dec	02-Dec		
2001	14-Nov	14-Nov	-	NH
	05-Dec	05-Dec		
2002	14-Nov	14-Nov	orange flag	NH, MJ
	27-Nov	27-Nov		
2003	11-Nov	11-Nov	orange flag	MJ, KH
	02-Dec	02-Dec		
2004	09-Nov	09-Nov	orange flag	MJ, KH, RP
	10-Dec	10-Dec		
2005	23-Nov	23-Nov	orange flag	MJ
2006	28-Nov	28-Nov	blue flag	MJ, LW
	11-Dec	11-Dec		
2007	01-Dec	01-Dec	orange flag	MJ
	17-Dec	17-Dec		
2008	25-Nov, 18-Dec	25-Nov, 18-Dec	-	VS, SB
2009	26-Nov	26-Nov	orange flag	MJ, LW
2010	24-Nov	24-Nov	orange flag	MJ, LW
2011	25-Nov	25-Nov	-	LW, KC
2012	7-Dec	7-Dec	-	KM, NB
2013	27-Nov	27-Nov	-	LW, KM
2014	26-Nov	26-Nov	-	LW, KM
2015	8-Dec	8-Dec	-	LW, ME
2016	29-Nov	29-Nov	-	LW, ME
2017	23-Nov	23-Nov	-	LW, NB
2018	8-Dec	8-Dec	-	LW
2019	13-Dec	13-Dec	-	LW, LK
2020	19-Nov	19-Nov	-	LK, KL
2021	19-Nov	19-Nov	-	KL, RS
2022	17-Nov	18-Nov	-	RS, CH
2023	24-Nov	24-Nov	-	CH, ND

* NH – Nancy Harttrup	LW – Lisa Wren	KC/KM – Kelly Clayton/Mason
MZ – Mike Zimmer	VS – Valerie Stevenson	NB – Nathan Burnett
RB – Rick Baldwin	SB – Sarah Burgess	KH – Kara Hearne
MJ – Mike Johns	RP – Rob Price	ME – Mitch Ellah
LK – Leslie Keith	KL – Kim LeBrun	RS – Rachel Stephens
.CH – Courtney Huber	ND – Nathan DeCarlo	

Appendix Table C-2. Redd Count Summary; 1983 to 2023		
Year	University of Guelph	Hanlon By-pass
1983	14	0
1984	9	6
1985	10	18
1986	22	19
1987	19	2
1988	36	1
1989	30	4
1990	76	6
1991	48	5
1992	79	22
1993	74	14
1994	34	10
1995	44	9
1996	60	20
1997	54	21
1998	44	20
1999	38	12
2000	49*	9
2001	55	18
2002	66	17
2003	65	22
2004	65	27
2005	70	22
2006	81	62
2007	58	38
2008	98	61
2009	176	99
2010	194	75
2011	146	93
2012	96	50
2013	148	102
2014	113	85
2015	111	87
2016	100	107
2017	93	78
2018	43	20
2019	58	35
2020	55	30
2021	41	39
2022	11	15
2023	16	10
* redd count in 2000 was incorrectly reported as 46 in this table in the 2001 Monitoring Report.		

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