APPENDIX A

Site Data

APPENDIX A-1

Permits

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDED PERMIT TO TAKE WATER

Surface and Ground Water
NUMBER 7725-AACS54

Pursuant to Section 34.1 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:

Walker Aggregates Inc.
Post Office Box 100
Thorold, Ontario, L2V 3Y8
Canada

For the water taking from: Sump #1

Located at: Lot 24, Concession 12, Geographic Township of Nottawasaga
Clearview, County of Simcoe

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 and Climate Change.

(d) "District Office" means the Barrie District Office.

(e) "Permit" means this Permit to Take Water No. 7725-AACS54 including its Schedules, if any, issued in accordance with Section 34.1 of the OWRA.

(f) "Permit Holder" means Walker Aggregates 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 August 12, 2014 and signed by Kevin Kehl, 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 **December 31, 2026**. 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	Sump #1	Pond Dugout	Pits and Quarries	Dewatering	15,000	24	21,600,000	365	17 559860 4914550
						Total Taking:	21,600,000		

Notes:

- This Permit allows water taking for quarry de-watering purposes at the "existing" quarry located on Lot 24, concession 12, Clearview as well as Phase 1 of the "expansion" quarry located on Lot 25, concession 12, Clearview.

- Dewatering of the quarry is achieved by pumping from Sump # 1. Water management at the site also includes pumping for various **on-site** uses including: aggregate washing, dust suppression and watering of landscaped areas. Water is also pumped from the sump locations to the on-site reservoir for storage. Pumps at the new sump established within Phase 1 of the "expansion" area (Sump 3) are used to transfer water from Phase 1 of the expansion area to the sump locations within the "existing" quarry (Sump 1 and Sump 2). In addition, water collecting in various parts of the quarry may be directed to the sump locations by temporary pumps and/ or via gravity.

- The rate and amount restrictions reflected in Table 1 above apply only to the taking of water from Sump 1 **for off-site discharge** purposes. All other internal uses and transfers of water within the quarry are not considered water takings for purposes of this Permit and are not required to be metered as a condition of this Permit. The rate and amount of water taken and discharged off-site is monitored using a meter installed on the pipe that conveys the dewatering effluent to the off-site discharge location, within the adjacent wetland designated as Rob Roy Wetland 6 (RR6). The outflow from RR6 joins a small headwater tributary to the Beaver River.

3.3 Notwithstanding Table A, the taking of water from Sump 1 for purposes of discharge into the RR6 wetland shall be adjusted as necessary, in accordance with any recommendation resulting from the assessments required under Condition 4.4 of this Permit (below). The adjustment may include lowering of the maximum rate, amount and/ or duration of taking from those shown in Table A. Seasonally adjusted rates and amounts may also be applied, if necessary.

4. Monitoring

4.1 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 installed on the discharge pipe. 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 shall submit, on or before March 31st in every year, the daily water taking data collected and recorded for the previous year to the Ministry's Water Taking Reporting System.

4.2 The Permit Holder shall implement the the groundwater monitoring and well interference investigation & mitigation programs as described in Items 2 (i) and 2 (ii) of Schedule A of this Permit.

4.3 The Permit Holder shall monitor stream flows and water levels at appropriate locations, including locations SW1, SW2, SW02 and SW4 (a historical stream flow monitoring location on the tributary stream, located upstream of SW02) and drive point piezometers DP2 and DP4 within the wetland designated as RR6. The monitoring type and frequency shall be consistent with the descriptions provided in Table 3.4 of Item No. 4 of Schedule A of this Permit (i.e. the Adaptive Management Plan or AMP).

4.4 The Permit Holder shall engage relevantly qualified persons to periodically analyse the water taking and discharge, stream flow and groundwater monitoring data, along with any other relevant information/ data, to:

i) evaluate if conditions within the RR6 wetland receiving the discharge and within the Beaver River tributary stream have been altered beyond their historical ranges as a result of the taking and discharge. The assessment shall consider the historical range of flows in the stream as described in Table 3.5 of Item No. 4 of Schedule A of this Permit (the AMP). If values significantly different from those in the AMP are used to describe historical ranges, the rationale shall be provided. A record of the evaluation undertaken by the qualified person(s) shall be maintained; and

ii) determine the significance of any observed changes and make recommendations on necessary adjustments to lower the the rate, amount and/ or duration of the taking and discharge from those shown in Table A. Seasonally adjusted rates and amounts may also be recommended, if necessary.

4.5 The Permit Holder shall prepare an annual monitoring report which includes the following:

i) all monitoring data collected under this Permit. The data shall be presented in

appropriate format (graphical and tabular) along with the historical data. Maps prepared at appropriate scales that clearly identify the various monitoring locations, including historical ones, shall also be included;

ii) details of the periodic evaluations undertaken by qualified persons and the recommendations made as well as details on how the recommendations were implemented;

iii) any proposed changes to the monitoring program or the Permit, along with the justification for the modification;

iv) an evaluation of the quarry operation and analysis and interpretation of all monitoring data collected under this Permit to determine if the operation has resulted in any undesirable environmental impacts. The report shall contain conclusions with respect to any effects of quarry operation on groundwater resources; surface water resources and wells.

The report shall be prepared by qualified individual(s), and submitted to the Director and the District no later than May 31st of the each year.

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 Surface-Water Takings

The taking of water (including the taking of water into storage and the subsequent or simultaneous withdrawal from storage) shall be carried out in such a manner that streamflow is not stopped and is not reduced to a rate that will cause interference with downstream uses of water or with the natural functions of the stream.

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 and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, as amended, provides that the Notice requiring the 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:

3. The name of the appellant;
4. The address of the appellant;
5. The Permit to Take Water number;
6. The date of the Permit to Take Water;
7. The name of the Director;
8. 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
Email: ERTTribunalsecretary@ontario.ca

AND

The Director, Section 34.1, Ministry of the Environment and Climate Change
8th Floor
5775 Yonge St
Toronto ON M2M 4J1
Fax: (416) 325-6347

Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:

by Telephone at	by Fax at	by e-mail at
(416) 212-6349	(416) 326-5370	www.ert.gov.on.ca
Toll Free 1(866) 448-2248	Toll Free 1(844) 213-3474	

This Permit cancels and replaces Permit Number 1168-665NHB, issued on 2005/11/21.

Dated at Toronto this 22nd day of September, 2016.

Karoly Tajnay
Director, Section 34.1
Ontario Water Resources Act , R.S.O. 1990

Schedule A

This Schedule “A” forms part of Permit To Take Water 7725-AACS54, dated September 22, 2016.

1. Application for Permit To Take Water, signed signed by Kevin Kehl on August 8, 2014.

2. Report entitled "Permit To Take Water Amendment Application, Duntroon Quarry..." prepared by WSP and dated July 2014. Section of this report have been revised by the following documents:

    i. "Permit To Take Water Amendment Application, CLARIFICATION DOCUMENT, Duntroon Quarry..." prepared by WSP and dated April 2016;
    ii. "Permit To Take Water Amendment Application, CLARIFICATION DOCUMENT, Duntroon Quarry..." prepared by WSP and dated May 2016;

3. E-mail from Sara Watts of WSP to Ted Belayneh of MOECC dated June 16, 2016 and containing responses to questions regarding pumping rates and proposed PTTW conditions.

4. Report entitled: "Adaptive Management Plan (AMP), Duntroon Expansion Quarry...", Prepared for Walker Aggregates Inc., and dated December 6, 2013.

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 1521-A4VJ4X
Issue Date: October 17, 2016

Walker Aggregates Inc.
Post Office Box, No. 100
Thorold, Ontario
L2V 3Y8

Site Location: Duntroon Quarry
9881 County Road 91
Township of Clearview, County of Simcoe
L9Y 3Z7

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

proposed and existing sewage Works for collection, transmission, treatment and disposal of up to 130 L/s of water that accumulates within the confines of existing 47.1 hectares the Duntroon Quarry (a total land area of approximately 57.5 hectares located on Part Lot 24 and Expansion Property located on Lot 25, Concession XII in the Township of Clearview (former Township of Nottawasaga), County of Simcoe) aggregate extraction area from direct precipitation, surface runoff, snow melt and groundwater inflow, discharging to a wetland located at the west side of the property, and then to the twin culverts at Grey Road 31 and ultimately to Beaver River South Tributary, consisting of the following:

Proposed Works

- a future sump no. 3 equipped with a submersible pump, located on the quarry floor within the Phase 1 of the expansion property discharging via a gravity sewer line to sump no.1 and/or sump no.2 as described below.

Existing Works

- sump no. 2 equipped with a submersible pump, located at the western part of the aggregate extraction area (near the water storage reservoir) discharging via a gravity sewer line to sump no.1, or pumped directly to the adjacent water storage reservoir during extreme wet weather events;

- sump no. 1, approximately 17,050 m^3 in capacity and located south of the sump no. 2, equipped with a submersible pump and a 300 mm diameter forcemain laid on ground and traversing in a westerly direction, discharging to a wetland located and then to the twin culverts at Grey Road 31 which drains to Beaver River

South Tributary,

all other controls, electrical equipment, instrumentation, piping, valves and appurtenances essential for the proper operation of the aforementioned sewage Works.

all in accordance with the supporting documents listed in Schedule 'A'.

For the purpose of this environmental compliance approval, the following definitions apply:

"Approval" means this entire document and any schedules attached to it, and the application;

"District Manager" means the District Manager of the Barrie District Office of the Ministry;

"Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

"EPA" means the *Environmental Protection Act,* R.S.O. 1990, c.E.19, as amended;

"Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

"Owner" means Walker Aggregates Inc. and its successors and assignees;

"OWRA" means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;

"Works" means the sewage works described in the Owner's application and this Approval.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

(1) The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Except as otherwise provided by these conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, and the application for approval of the Works.

(3) Where there is a conflict between a provision of any document in the schedule referred to in this Approval and the conditions of this Approval, the Conditions in this Approval shall take precedence, and

where there is a conflict between the documents in the schedule, the document bearing the most recent date shall prevail.

(4) Where there is a conflict between the documents listed in the Schedule A, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

(5) The Conditions of this Approval are severable. If any Condition of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this Approval shall not be affected thereby.

(6) The issuance of, and compliance with the conditions of, this Approval does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement, including, but not limited to, the obligation to obtain approval from the local conservation authority/MNR or any other agency necessary to construct or operate the sewage Works; or

(b) limit in any way the authority of the Ministry to require certain steps be taken to require the Owner to furnish any further information related to compliance with this Approval.

2. CHANGE OF OWNER

(1) The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within 30 days of the change occurring:

(a) change of Owner;
(b) change of address of the Owner;
(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act* , R.S.O. 1990, c.B17 shall be included in the notification to the District Manager; or
(d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the District Manager.

(2) In the event of any change in ownership of the Works, the Owner shall notify in writing the succeeding owner of the existence of this Approval, and a copy of such notice shall be forwarded to the District Manager and the Director.

(3) The Owner shall ensure that all communications made pursuant to this condition will refer to this Approval's number.

3. OPERATION AND MAINTENANCE

(1) The Owner shall ensure that at all times, the Works and related equipment and appurtenances which are installed or used to achieve compliance with this Approval are properly operated and maintained. The Owner shall also ensure that all monitoring programs and maintenance schedules for the Works and related equipment are complied with.

(2) The Owner shall ensure that the maximum discharge rate from these Works does not exceed 250 L/s.

(3) Within three (3) months of the issuance date of this Approval, the Owner shall prepare an operations manual for the operation of the Works that includes, but is not necessarily limited to, the following information:

(a) operating procedures for routine operation of the Works; including reduction or termination of discharge during major rain events, if necessary;
(b) inspection programs, including frequency of inspection for the Works and the methods or tests employed to detect when maintenance is necessary, as well as downstream receiver inspections for the occurrence of erosion and flooding;
(c) repair and maintenance programs, including the frequency of repair and maintenance for the Works;
(e) contingency plans and procedures for dealing with potential spill, bypasses and any other abnormal situations and for notifying the District Manager; and
(f) complaint procedures for receiving and responding to public complaints.

(4) The Owner shall maintain the operations manual up to date through revisions undertaken from time to time and retain a copy at the location of the sewage Works. Upon request, the Owner shall make the manual available for inspection and copying by Ministry personnel.

4. EFFLUENT LIMITS

(1) The Owner shall design, construct, operate and maintain the Works such that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent discharge from the Works.

Table 1 Effluent Limits

Effluent Parameter	**Concentration Limit** (milligrams per litre unless otherwise indicated)
Column 1	Column 2
Oil & Grease	15
Total Suspended Solid (TSS)	25
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times	

(2) For the purposes of determining compliance with and enforcing subsection (1):

(a) For purposes of determining compliance with and enforcing subsection (1), non-compliance with respect to the parameters concentration limit as outlined in Column 1 is deemed to have occurred

when any single sample analyzed for Oil & Grease and Total Suspended Solids, (along with a follow-up confirmation sample collected within 7 days of the receipt of the original sample result that indicated that an exceedance had occurred), is greater than the corresponding maximum concentration set out in Column 2 of subsection (1).

(b) non-compliance with respect to pH is deemed to have occurred when any single measurement is outside of the indicated range.

5. EFFLUENT - VISUAL OBSERVATIONS

Notwithstanding any other condition in this Approval, the Owner shall ensure that the treated effluent from the Works is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film, sheen or foam on the receiving waters.

6. EFFLUENT QUALITY MONITORING AND RECORDING

The Owner shall, upon commencement of operation of the Works, carry out the following monitoring program:

(1) All samples and measurements taken for the purposes of this Approval are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) Samples shall be collected and analyzed at the following sampling locations, at the sampling frequencies and using the sample type specified for each parameter listed:

Table 2 - Effluent Monitoring	
Sampling Location	The outlet channel discharge point to the wetland
Sampling Frequency	once each month during periods of effluent discharge
Sampling Type	Grab
Sampling Parameters	Total Suspended Solids, Oil and Grease, Nitrite Nitrogen, Nitrate Nitrogen, Total Ammonia Nitrogen, pH (field), Temperature (field), Total Phosphorus, Conductivity (field), Chloride, Sulphate, Sodium, Potassium, Boron, Cadmium, Total Chromium, Cobalt, Copper, Iron, Lead, Nickel, Silicon, Silver, Zinc, Alkalinity, Total Dissolved Solids, Phenols (4AAP), Hardness and Turbidity

(4) The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)", as amended from time to time by more recently published editions;

(b) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions; and

(c) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition), as amended from time to time by more recently published editions.

(5) Conductivity, Temperature and pH shall be measured and recorded in the field at the time of sampling. The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives (PWQO)" dated July 1994, as amended, for ammonia (un-ionized).

(6) The Owner shall measure, record and calculate the discharge rate and volume of water pumped from the quarry sump on a daily basis during the discharging period and separately water not discharged from the Works but taken for other uses on a daily basis.

(7) The Owner shall undertake monthly inspections of the pumping sump and the outlet channel, and have excess settled material cleaned-out on a regular basis with results recorded in a log book to be made available for review by the Ministry upon request. The log shall include the name of the inspector, date of inspection and description of cleaning and maintenance measures undertaken for the sewage Works.

(8) The measurement frequencies and analytical parameters specified in subsections (2), in respect of any parameter are minimum requirements which may, after twelve (12) months of monitoring in accordance with this Condition, be modified by the District Manager in writing from time to time.

(9) The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this Approval.

7. REPORTING

(1) The Owner shall report to the District Manager or designate, of any exceedence of any parameter specified in Conditions 4 or 5 orally, as soon as reasonably possible, and in writing within seven (7) days of the exceedence, as defined in Condition 4(2).

(2) In addition to the obligations under Part X of the *Environmental Protection Act,* the Owner shall, within 10 working days of the occurrence of a reportable spill, bypass or loss of any product, by product, intermediate product, oils, solvents, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

(3) The Owner shall prepare and submit a performance report to the District Manager on an annual basis within ninety (90) days following the end of the period being reported upon. The reports shall contain, but shall not be limited to, the following information:

(a) a summary and interpretation of all monitoring data collected pursuant to Condition 6 and a comparison to the effluent limits outlined in Condition 4 and the Provincial Water Quality Objective and/or Ontario Drinking Water Objective for the monitored parameter, including an overview of the success and adequacy of the Works and recommendations of monitoring program changes. The report should provide an interpretation of the data as to the impact of the discharge of treated effluent form the quarry to the receiver with respect to water quality and quantity during periods of low/high flows and periods of discharge/no discharge;
(b) a tabulation of the total daily discharge rate and volume from the quarry sump and the total daily volume of water not discharged from the Works but taken for other uses;
(c) a description of any operating problems encountered and corrective actions taken;
(d) a summary of any effluent quality assurance or control measures undertaken in the reporting period;
(e) a summary of the calibration and maintenance carried out on all effluent monitoring equipment; and
(f) any other information the District Manager may require from time to time.

Schedule 'A' forms part of this Approval and contains a list of supporting documentation/information received, reviewed and relied upon in the issuance of this Approval.

SCHEDULE 'A'

1. Environmental Compliance Approval Application submitted by Was Foebel, Environmental Specialist Walker Aggregates Inc. dated June 3, 2013

2. Design Report entitled "Environmental Protection Act (R.S.O. 1990) Environmental Compliance Approval Application (Industrial Sewage Works) Duntroon Quarry, Part of Lot 24, Concession XII, Township of Clearview, County of Simcoe" dated May 2013 submitted under covering letter dated May 29, 2013 signed by Was Foebel, Environmental Specialist, Walker Aggregates Inc. and supporting information.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the Works are built and operated in the manner in which they were described for review and upon which Approval was granted. This condition is also included to emphasize the precedence of Conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition 2 is imposed to ensure that the Ministry records are kept accurate and current with respect to approved Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

3. Condition 3 is imposed to ensure that a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the Owner and made available to the Ministry. Such a manual is an integral part of the operation of the Works. Its compilation and use should assist the Owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the Owner's operation of the Work.

4. Conditions 4 and 5 are imposed to ensure that the effluent discharged from the Works meets the Ministry's effluent quality requirements thus minimizing environmental impact on the receiver.

5. Condition 6 is imposed to require the Owner to demonstrate on a continual basis that the quality of the effluent from the approved Works is consistent with the effluent limits specified in the Approval and that the approved Works do not cause any impairment to the receiving watercourse.

6. Condition 7 is imposed to provide a performance record for future references and to ensure that the Ministry is made aware of problems as they arise, so that the Ministry can work with the Owner in resolving the problems in a timely manner.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval 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.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;

6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment and
Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 17th day of October, 2016

Fariha Pannu.

Fariha Pannu, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

HV/
c: District Manager, MOECC Barrie
Jason Murchison, GENIVAR Inc.

APPENDIX A-2

Monitoring Network Details

Table A-1 Monitoring Well Details

Well ID	GPS Coordinates (NAD 83 Zone 17) Easting	Northing	Type	Well Pipe Diameter mm	Measuring Point Elevation mASL	Ground Elevation mASL	Screened Interval mASL or m	Geologic Formation Monitored	Monitoring Program
Old Quarry Monitoring Wells									
1. 98-8	559,631	4,914,368	O	102	517.25	516.50	Open Hole 35.1 m	Amabel/Fossil Hill	LTT
2. 98-9	559,354	4,914,817	O	102	526.35	525.90	Open Hole 48.5 m	Amabel/Fossil Hill	LTT
98-10			O	102	519.55	519.40	Open Hole 37.9 m	Amabel/Fossil Hill	Historical
98-11			O	102	522.58	522.20	Open Hole 41.2 m	Amabel/Fossil Hill	Historical
3. 98-12	560,373	4,915,090	O	102	527.22	526.70	Open Hole 42.4 m	Amabel/Fossil Hill	LTT
98-13			O	102	522.44	522.30	Open Hole 38.0 m	Amabel/Fossil Hill	Historical
OW99-1			O	102	519.38	519.10	Open Hole 29.5 m	Amabel	Historical
OW99-2			O	102	500.78	500.60	Open Hole 19.7 m	Amabel/Fossil Hill	Historical
4. PW99-1	559,630	4,914,385	O	152	513.98	513.90	Open Hole 32.9 m	Amabel/Fossil Hill	LTT
PW99-2			O	152	519.33	519.20	Open Hole 34.4 m	Amabel	Historical
PW99-3			O	152	501.13	500.90	Open Hole 21.4m	Amabel/Fossil Hill	Historical
MW2			O	102	524.86	523.20	Open Hole 20.8 m	Amabel	Historical
MW3 (R)			O	102	514.98	514.40	Open Hole 15.4 m	Amabel	Historical
MW4			O	102	522.45	521.90	Open Hole 39.9 m	Amabel/Fossil Hill	Historical
MW5			O	102	529.43	529.40	Open Hole 46.1 m	Amabel/Fossil Hill	Historical
5. MW6	559,545	4,914,893	O	102	534.87	533.60	Open Hole 36.4 m	Amabel	LTT
E2			O	203	520.97	521.00	Open Hole	Amabel	Historical
QUARRY HOUSE			O	102	529.38	528.72	Open Hole 14.6m	Amabel	Historical
SHOP WELL			O	102	523.50	522.49	Not Measured	Amabel	Historical
OFFICE WELL			O	152	532.52	532.40	Open Hole 24.7m	Amabel/Fossil Hill	Historical
OFFICE WELL (NEW)			O	152	532.04	531.35	Open Hole 37.2m	Amabel	Historical

Notes:
- PITM - Performance Indicator Trigger Monitoring
- LTTWM - Long Term Groundwater and Surface Water Monitoring
- Elevations provided in metres above sea level (mASL)
- Type 'O' indicates Open Hole
- Type 'S' indicates Standpipe
- Shading indicates well is decommissioned / no longer monitored.
- (R) indicates Replacement Monitoring Well
- N/A indicates information not available

Table A-1 Monitoring Well Details

Well ID	GPS Coordinates (NAD 83 Zone 17) Easting	Northing	Type	Well Pipe Diameter mm	Measuring Point Elevation mASL	Ground Elevation mASL	Screened Interval mASL or m	Geologic Formation Monitored	Monitoring Program
Extension Quarry Monitoring Wells									
BH02-1			O	102	523.30	522.64	Open Hole 39.5 m	Amabel/Fossil Hill	LTT
1. BH02-2	559,915	4,915,535	O	102	523.18	522.46	Open Hole 39.5 m	Amabel/Fossil Hill	LTT
BH02-3			O	102	530.58	529.64	Open Hole 9.5 m *	Amabel/Fossil Hill	LTT
BH02-4			O	102	530.70	530.02	Open Hole 50.1 m	Amabel/Fossil Hill	LTT
2. BH02-5	559,587	4,915,585	O	102	513.89	513.24	Open Hole 31.9 m	Amabel/Fossil Hill	LTT
3. BH02-5 (mid)			O	102	514.20	513.24	Open Hole 12.4 m	Amabel	LTT
4. BH02-5 (shallow)			O	102	514.17			Overburden	LTT
5. BH02-6	559,707	4,915,008	O	102	530.25	529.50	Open Hole 48.5 m	Amabel/Fossil Hill	LTT
6. BH03-7-I	559,356	4,915,510	O	102	511.01	510.27	502.9 - 501.1	Amabel	LTT
7. BH03-7-II			O	102	511.03	510.27	508.7 - 504.8	Overburden	LTT
8. BH03-7-III			O	102	511.72	510.56	Open Hole 30.7 m	Amabel/Fossil Hill	LTT
9. BH03-8	558,971	4,915,324	O	102	520.79	520.22	Open Hole 37.9 m	Amabel/Fossil Hill	LTT
10. BH03-9	559,106	4,914,893	O	102	518.93	518.45	Open Hole 39.5 m	Amabel/Fossil Hill	LTT
11. TW04-1	559,080	4,914,912	O	152	517.53	517.05	Open Hole 34.1 m	Amabel/Fossil Hill	LTT
12. TW04-2	559,084	4,914,928	O	152	518.11	517.46	Open Hole 34.1 m	Amabel/Fossil Hill	LTT
13. TW04-3	559,096	4,914,916	O	152	518.63	517.97	Open Hole 37.5 m	Amabel/Fossil Hill	LTT
14. BH08-1	560,485	4,915,410	O	102	512.32	511.51	Open Hole 27.4 m	Amabel/Fossil Hill	LTT
15. BH08-2	560,500	4,915,390	O	102	512.00	511.15	Open Hole 25.8 m	Amabel/Fossil Hill	LTT
16. BH08-3	560,462	4,915,414	O	102	513.41	512.57	Open Hole 28.8 m	Amabel/Fossil Hill	LTT
17. IW1	560,548	4,915,270	O	152	512.12	511.52	Open Hole 27.3 m	Amabel/Fossil Hill	LTT
18. IW1a	560,551	4,915,272	O	152	511.96	511.35	Open Hole 27.3 m	Amabel/Fossil Hill	N/A
19. IW2	560,519	4,915,490	O	152	509.22	508.66	Open Hole 24 m	Amabel/Fossil Hill	LTT
20. IW3	560,210	4,915,929	O	152	519.13	518.53	Open Hole 33.7 m	Amabel/Fossil Hill	LTT
21. IW4	560,026	4,916,230	O	152	511.02	510.36	Open Hole 25.4 m	Amabel/Fossil Hill	LTT
22. NW1	560,056	4,915,117	O	152	526.19	525.67	Open Hole 42.7 m	Amabel/Fossil Hill	LTT
NW2			O	152	531.99	531.35	Open Hole 54.7 m	Amabel/Fossil Hill	LTT

Notes:
- PITM - Performance Indicator Trigger Monitoring
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- Elevations provided in metres above sea level (mASL)
- Type 'O' indicates Open Hole
- Type 'S' indicates Standpipe
- (R) indicates Replacement Monitoring Well
- N/A indicates information not available
- Shading indicates well is decommissioned / no longer monitored.

Table A-1 Monitoring Well Details

Well ID	GPS Coordinates (NAD 83 Zone 17) Easting	Northing	Type	Well Pipe Diameter mm	Measuring Point Elevation mASL	Ground Elevation mASL	Screened Interval mASL or m	Geologic Formation Monitored	Monitoring Program
Extension Quarry Monitoring Wells (continued)									
NW3			O	152	515.13	514.44	Open Hole 29.6 m	Amabel/Fossil Hill	LTT
NW4			O	152	529.86	529.00	Open Hole 48.9 m	Amabel/Fossil Hill	LTT
NW5			O	152	521.68	520.95	Open Hole 39.7 m	Amabel/Fossil Hill	LTT
23. NW6	559,523	4,915,360	O	102	521.99	520.68	Open Hole 41.2 m	Amabel/Fossil Hill	LTT
24. NW7	559,474	4,915,175	O	152	523.92	523.18	Open Hole 42.1 m	Amabel/Fossil Hill	LTT
25. NW8	559,254	4,915,016	O	152	531.87	531.07	Open Hole 43 m	Amabel/Fossil Hill	LTT
26. NW9	559,032	4,914,979	O	152	521.45	520.86	Open Hole 41.7 m	Amabel/Fossil Hill	LTT
27. NW10-DP	558,939	4,915,604	S	152	511.18	509.69	509.6 - 509.1	Overburden	LTT
28. NW10-Shallow			O	152	510.31	509.69	Open Hole 3.8 m	Amabel	LTT
29. NW10-Deep			O	152	510.45	509.69	Open Hole 29.5 m	Amabel/Fossil Hill	LTT
HA1								Overburden	N/A
HA2								Overburden	N/A
HA3								Overburden	N/A
Drivepoints									
1. DP1	559,561	4,914,433	S	51	513.05	511.80	511.3 - 510.8	Overburden	LTT
2. DP2	559,302	4,914,600	S	51	512.94	512.10	511.3 - 510.8	Overburden	PITM
3. DP3	560,307	4,914,281	S	51	514.65	513.60	511.9 - 511.4	Overburden	LTT
4. DP4	559,084	4,914,245	S	51	512.11	511.40	510.4 - 509.9	Overburden	PITM
5. DP5	559,094	4,915,562	S	51	510.49	509.66	509.6 - 508.7	Overburden	PITM
6. DP6	559,788	4,915,730	S	51	512.20	511.45	511.0 - 510.1	Overburden	PITM
7. DP7	559,282	4,915,583	S	51	509.91	509.18	507.4 - 506.9	Overburden	PITM
8. DP8	559,105	4,914,573	S	51	511.88	511.12	510.9 - 510.5	Overburden	PITM
9. DP9	560,274	4,915,622	S	51	508.88	507.74	507.2 - 506.6	Overburden	PITM
DP10			S	51				Overburden	PITM
DP11			S	51				Overburden	PITM
10. BRIDSON DP	560,371	4,915,534	S	38	511.30	510.40	509.6 - 508.8	Overburden	PITM

Notes:
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- Elevations provided in metres above sea level (mASL)
- Type 'O' indicates Open Hole
- Type 'S' indicates Standpipe
- Type 'DW' indicates Domestic Well
- (R) indicates Replacement Monitoring Well
- N/A indicates information not available
- ND indicates Not Determined
- Shading indicates well is decommissioned / no longer monitored.

Table A-1 Monitoring Well Details

Well ID	GPS Coordinates (NAD 83 Zone 17) Easting	Northing	Type	Well Pipe Diameter mm	Measuring Point Elevation mASL	Ground Elevation mASL	Screened Interval mASL or m	Geologic Formation Monitored	Monitoring Program
Domestic Wells									
1. RW1	560,654	4,915,472	DW	Drilled 152	508.75	508.57	Depth: 16.1 m	Amabel	LTT
2. RW2	560,955	4,915,330	DW	Drilled 152	505.20	504.50	Depth: 29.0 m	Amabel	LTT
3. RW3	559,271	4,916,187	DW	Drilled 152	519.00	518.70	Depth: 16.5 m	Amabel	LTT
RW4			DW	Drilled 152	510.50	509.80	Depth: 55.5 m	Amabel/Fossil Hill/	LTT
4. RW5	561,414	4,915,373	DW	Drilled 152	478.60	478.00	Depth: 35.0 m	Manitoulin/Shale	LTT
RW6			DW	Dug 800	451.00	451.00	Depth: 8.2 m	Overburden	LTT
5. RW7	561,701	4,914,943	DW	Drilled 152	453.00	452.30	Depth: 10.1 m	Overburden/Shale	LTT
6. RW8	560,669	4,917,079	DW	Dug 750	431.00	431.00	Depth: 3.5 m	Overburden	LTT
RW9			DW	Drilled 152	524.00	524.00	Depth: 27.4 m	Amabel	LTT
RW10			DW	Dug 750	494.50	Not surveyed	N/A	N/A	Historical
RW11			DW	Drilled 152	453.10	453.00	Depth: 48.8 m	Overburden/Shale	Historical
RW11 DUG			DW	Dug 750	453.00	453.00	Depth: 6.0 m	Overburden	Historical
7. RW12	561,826	4,915,816	DW	Dug	425.80	Not surveyed	Depth 3.7 m	Overburden	Historical
8. RW13			DW	Dug	425.80	Not surveyed	Depth 3.7 m	Overburden	Historical
RW15			DW	Drilled 152	529.74	529.19	Depth: 24.4 m	Amabel	Historical
9. RW16	560,474	4,915,397	DW	Drilled 152	513.32	512.48	Depth: 16.2 m	Amabel	LTT
10. RW17	558,976	4,915,443	DW	Drilled 127	514.70	Not surveyed	Depth: 8.5 m	N/A	LTT
RW18			DW	Dug 1000	513.80	513.00	Depth: 2.7 m	Overburden/Amabel	LTT
RW19			DW	Drilled 152	523.80	Not Surveyed	Depth: 36.3 m	Amabel	LTT

Notes:
- PITM - Performance Indicator Trigger Monitoring
- LTTWM - Long Term Groundwater and Surface Water Monitoring
- Elevations provided in metres above sea level (mASL)
- Type 'O' indicates Open Hole
- Type 'S' indicates Standpipe
- Type 'DW' indicates Domestic Well
- (R) indicates Replacement Monitoring Well
- N/A indicates information not available
- ND indicates Not Determined
- Shading indicates well is decommissioned / no longer monitored.

Table A-1 Monitoring Well Details

Well ID	GPS Coordinates (NAD 83 Zone 17) Easting	Northing	Type	Well Pipe Diameter mm	Measuring Point Elevation mASL	Ground Elevation mASL	Screened Interval mASL or m	Geologic Formation Monitored	Monitoring Program
Carmarthen Lake Farms Monitoring Wells									
CLF1			DW	152	521.05	520.76	Open Hole 36.6 m	Amabel/Fossil Hill	LTT
CLF2			DW	152	519.23	519.57	Open Hole 49.4 m	Amabel/Fossil Hill	LTT
1. CLF3	559,156	4,913,134	DW	152	517.62	517.11	Open Hole ND	Amabel	LTT
2. CLF4	559,380	4,913,266	DW	152	509.96	509.48	Open Hole 15.2 m	Amabel	LTT
3. CLF5	559,526	4,913,347	DW	152	509.16	508.80	Open Hole ND	Amabel	LTT
Offsite Monitoring Wells									
1. 101-B	557,929	4,914,109	O	152	502.98	502.51	Open Hole 6.1 m	Amabel	LTT
2. 102-C	558,319	4,914,489	O	102	511.39	510.53	Open Hole 7.0 m	Amabel	LTT
3. 103-D	558,523	4,914,172	O	152	513.40	513.18	Open Hole 7.9 m	Amabel	LTT
4. 104-A	558,215	4,914,020	O	152	517.67	516.89	Open Hole 9.6 m	Amabel	LTT
5. OW1-4	558,477	4,914,250	O	102	514.40	513.21	Open Hole 28.6 m	Amabel/Fossil Hill	LTT
OW1-6			O	102	514.96	513.92	Open Hole 30.0 m	Amabel/Fossil Hill	N/A
OW3-1			O	102	508.75	508.01	Open Hole 29.3 m	Amabel/Fossil Hill	LTT
6. OW5-2	557,888	4,914,245	O	102	504.21	502.84	Open Hole 27.9 m	Amabel/Fossil Hill	LTT
7. OW6-3	558,317	4,914,465	O	102	511.12	510.63	Open Hole 5.3 m	Amabel	LTT

Notes:
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- Elevations provided in metres above sea level (mASL)
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- Type 'S' indicates Standpipe
- Type 'DW' indicates Domestic Well
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Table A-1 Monitoring Well Details

Well ID	GPS Coordinates (NAD 83 Zone 17) Easting	Northing	Type	Well Pipe Diameter mm	Measuring Point Elevation mASL	Ground Elevation mASL	Screened Interval mASL or m	Geologic Formation Monitored	Monitoring Program
St. Mary's Cement Osprey Quarry Monitoring Wells									
1. OW1-I					513.29	512.22	507.7 - 506.2	Amabel	
2. OW1-II					513.29	512.22	503.1 - 501.6	Amabel	
3. OW1-III					513.21	512.18	487.0 - 485.5	Amabel	
4. OW1-IV					513.21	512.18	482.8 - 481.3	Fossil Hill	
5. OW2-I					523.42	522.24	512.2 - 510.7	Amabel	
6. OW2-II					523.42	522.24	503.1 - 501.6	Amabel	
7. OW2-III					523.18	522.14	500.3 - 498.8	Amabel	
8. OW2-IV					523.18	522.14	480.2 - 478.7	Fossil Hill/Cabot Head	
9. OW3-I					516.34	515.57	511.1 - 509.6	Amabel	
10. OW3-II					516.34	515.57	500.2 - 498.7	Amabel	
11. OW3-III					516.58	515.53	494.7 - 493.2	Amabel	
12. OW3-IV					516.58	515.53	486.5 - 485.0	Amabel	
13. OW4-I					519.76	518.87	513.4 - 511.9	Amabel	
14. OW4-II					519.76	518.87	510.8 - 509.3	Amabel	
15. OW4-III					519.72	518.85	498.3 - 496.8	Amabel	
16. OW4-IV					519.72	518.85	492.9 - 491.4	Amabel	
17. OW5-I					510.75	510.01	503.5 - 502.0	Amabel	
18. OW5-II					510.75	510.01	499.3 - 497.8	Amabel	
19. OW5-III					510.85	510.06	493.8 - 492.3	Amabel	
20. OW5-IV					510.85	510.06	481.8 - 480.3	Fossil Hill/Cabot Head	
21. OW6-I					528.51	526.28	514.6 - 513.1	Amabel	
22. OW6-II					528.51	526.28	503.1 - 501.6	Amabel	
23. OW6-III					528.08	526.21	482.4 - 480.9	Amabel	
24. OW6-IV					528.08	526.21	477.3 - 475.8	Fossil Hill/Cabot Head	

Notes:
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- Type 'O' indicates Open Hole
- Type 'S' indicates Standpipe
- Type 'DW' indicates Domestic Well
- (R) indicates Replacement Monitoring Well
- N/A indicates information not available
- ND indicates Not Determined
- Shading indicates well is decommissioned / no longer monitored.

Table A-2 Surface Water Station Details

Designation	GPS Coordinates (NAD 83 Zone 17)		Ground Elevation	Description	Culvert Dimensions	Monitoring Program	Measurement Type
	Easting	Northing	mASL				
1. SW1	559,117	4,914,254	513	Twin culverts located at southwest corner of quarry wetland at Grey County Road 31 (Townline Road)	South culvert dia. 0.62m, North culvert dia. 0.60m	PITM	V, M
2. SW2	559,070	4,914,769	515	Single culvert located at northwest corner of quarry wetland	Oblong shaped culvert	PITM	V,M
SWB-1			513	Single culvert located at southwest corner of quarry; outlet into quarry wetland	Oblong shaped culvert	Historical	-
QFSW1			500	Quarry floor influx from west face	Stream Channel Flow	Historical	-
3. QFSW2	559,825	4,914,595	499	Quarry floor surface water flow in channel prior to main sump pond	Stream Channel Flow	LTTWM	V
4. SW0-2	558,329	4,914,495	510	Stream Channel west of SW1 on Osprey Quarry Property	Stream Channel Flow	PITM	V,M
5. SW3	558,890	4,915,581	510	Single culvert located across Grey Rd 31 at north edge of proposed quarry property	Oblong shaped culvert	PITM	V,M,E
SW3A			511	Single culvert located under Grey Rd 31, just south of intersection with 26/27 Sideroad	Oblong shaped culvert	Historical	V,B,E
6. SW4	558,893	4,913,962	515	Single culvert located on Osprey 10th Line, east of Kenwell farm buildings	Culvert Diameter: 0.57 m	PTTW	E,V
SW5			499	Single concrete culvert located on Osprey 10th Line	4.91 m wide square concrete culvert	Historical	V
SW6			500	Single concrete culvert located on Osprey 10th Line	4.78 m wide square concrete culvert	Historical	V
7. SW6A	555,263	4,912,697	495	Double culvert on Osprey Sideroad 30, south of Osprey 10th Line	Stream Channel Flow	PITM	V
SW7			512	Millar pond outlet	Stream Channel Flow	LTTWM	V,E
8. SW8	560,355	4,915,502	510	Bridson pond outlet	Bucket Capture of Flow out of partial culvert	LTTWM	V,E
9. SW9	560,454	4,915,647	508	Channel flow beneath walking path into sinkhole on Bridson property	Stream Channel Flow	PITM	V,M,E
10. SW10	561,200	4,915,641	477	Seep uphill of B. Franks' well tile catchment	Stream Channel Flow	PITM	V,M,E

Notes:
- PITM - Performance Indicator Trigger Monitoring
- LTTWM - Long Term Groundwater and Surface Water Monitoring
- PTTW - Permit to Take Water Monitoring
- Elevations provided in metres above sea level (mASL)
- Ground Elevation data approximated from Ontario Base Map elevation contours
- * indicates historical surface water station that is not included in the PITM
- V indicates Valeport Electronic Flow Velocity Meter measurement
- M indicates manual velocity measurement
- - indicates SW location not currently monitored for discharge volumes
- E indicates visual estimate velocity measurement
- B indicates bucket collection velocity measurement
- Shading indicates surface water station is no longer monitored

Table A-2 Surface Water Station Details

Designation	GPS Coordinates (NAD 83 Zone 17)		Ground Elevation	Description	Culvert Dimensions	Monitoring Program	Measurement Type
	Easting	Northing	mASL				
11. SW11	561,151	4,916,011	445	Culmination of B. Franks' seeps into a stream; taken near toe of scarp where stream passes beneath path	Stream Channel Flow	PITM	V,M,E
12. SW11A	561,128	4,916,011	446	B. Franks' seep, located near toe of scarp in rock talus	Stream Channel Flow	PITM	V,M,E
13. SW11B	561,098	4,916,018	446	B. Franks' seep, located near toe of scarp in rock talus	Stream Channel Flow	PITM	V,M,E
14. SW11C	561,079	4,916,034	446	B. Franks' seep, located near toe of scarp in rock talus	Stream Channel Flow	PITM	V,M,E
15. SW11D	561,052	4,916,043	446	B. Franks' seep, located near toe of scarp in rock talus	Stream Channel Flow	PITM	V,M,E
16. SW11E	561,238	4,915,997	435	Stream from B. Franks' seeps into pond; downstream from SW11 and just upstream of pond	Stream Channel Flow	PITM	V,E,B
SW12			435	Single culvert into B. Franks' pond from south	Bucket capture of flow out of culvert	Historical	V,E,B
SW12A			450	Single culvert near B. Franks' barn	Stream Channel Flow	Historical	V,E
17. SW13	561,288	4,916,042	427	B. Franks' pond outlet	Bucket capture of flow out of culvert	LTTWM	V,E,B
18. SW14	561,526	4,916,249	410	Channel flow east of Conc. 10, from culvert crossing Conc. 10 south of H. Franks' driveway	Stream Channel Flow	PITM	V
19. SW15	561,495	4,916,432	420	Channel flow east of Conc. 10, from culvert crossing Conc. 10 north of H. Franks' driveway	Stream Channel Flow	PITM	V
20. SW16	561,198	4,916,724	415	Single culvert under 26/27 Sideroad east of F. Sestito's property	Stream Channel Flow	PITM	E
21. SW17	560,607	4,916,532	431	Sestito pond outlet channel on south side of 26/27 Sideroad, measured just west Sestito property driveway	Stream Channel Flow	PITM	V,M,E
22. SW17A	560,603	4,916,543	430	Stream channel on north side of 26/27 Sideroad, measured across from Sestito property driveway	Stream Channel Flow	PITM	V
SW17B			431	Stream channel on south side of 26/27 Sideroad, measured west of Sistito property driveway, upstream of where 17/17B join.	Stream Channel Flow	Historical	V
23. SW18	561,401	4,917,002	390	Single culvert on Concession 10, north of 26/27 Sideroad	Stream Channel Flow	PITM	V
24. SW19	564,257	4,915,492	335	Single large diameter culvert for Batteaux Creek on County Rd. 124	Stream Channel Flow	LTTWM	V
25. SW20	560,066	4,916,392	495	Concrete crib north of 26/27 sideroad adjacent to Pretty River Provincial Park/Bruce Trail	Stream Channel Flow	LTTWM	V,E

Notes:
- PITM - Performance Indicator Trigger Monitoring
- LTTWM - Long Term Groundwater and Surface Water Monitoring
- Elevations provided in metres above sea level (mASL)
- Ground Elevation data approximated from Ontario Base Map elevation contours
- * indicates historical surface water station that is not included in the PITM
- Shading indicates surface water station is no longer monitored
- V indicates Valeport Electronic Flow Velocity Meter measurement
- M indicates manual velocity measurement
- - indicates SW location not currently monitored for discharge volumes
- E indicates visual estimate velocity measurement
- B indicates bucket collection velocity measurement

Table A-2 Surface Water Station Details

Designation	GPS Coordinates (NAD 83 Zone 17)		Ground Elevation	Description	Culvert Dimensions	Monitoring Program	Measurement Type
	Easting	Northing	mASL				
26. SW21	560,308	4,916,284	430	H. Franks' pond outlet	Bucket capture of flow out of culvert	LTTWM	V,E,B
27. SW21A	561,246	4,916,261	433	H. Franks' pond inlet	Stream Channel Flow	LTTWM	V,E,B
28. SW21B	561,039	4,916,193	449	Cistern overflow channel uphill of H. Franks' pond, feeds pond inlet	Stream Channel Flow	LTTWM	V,M,E
29. SW21C	560,708	4,916,241	470	H. Franks' water supply system cistern inlet/overflow culvert	Stream channel Flow	PITM	V,E
SW21D			450	Single culvert under H. Franks field access trail at base of scarp	Bucket capture of flow out of culvert	Historical	V,B,E
30. SW22	560,686	4,914,713	492	Single culvert under ski trail west of Sampson fields	Bucket capture of flow out of culvert	LTTWM	V,B
31. SW22A	560,952	4,915,039	485	Seep feeding small stream in northwest corner of Sampson fields	Stream Channel Flow	LTTWM	B,E
SW22B			477	Swamp/seep area on north side of access trail from Sampson fields to ski trails	Stream Channel Flow	Historical	-
32. SW22C	560,977	4,914,876	477	Culvert on south side of access trail from Sampson fields to ski trails. Culvert is infilled with sediment and channel is relatively flat. Treated as stream flow.	Stream Channel Flow just downstream of culvert	LTTWM	V
SW23			410	Single culvert crossing 26/27 Sideroad west of Concession 10	Bucket capture of flow out of culvert	Historical	-
SW24			445	F. Sestito's pond inlet from H. Franks' property	Stream Channel Flow	Historical	V,M,E
33. SW24A	560,566	4,916,379	460	F. Sestito's water supply: barrel overflow and pipe discharges (below Manitoulin formation outcrop)	Bucket capture of flow out of pipes, Valeport measurement of stream channel	PITM	V,B,E
SW24B			445	Seep channel just up from F. Sestito's garden	Bucket capture of flow out of pipes, Valeport measurement of stream channel	Historical	V,B,E
SW24C			442	Stream just east of where SW24A and SW24B combine and upstream of outlet into Sistito pond.	Stream Channel Flow	Historical	V
SW25			507	Single culvert outlet into swamp southwest of Edward Lake; fed by Edward Lake and open grate in the ditch north of SW25	Culvert Diameter: 0.62 m	Historical	-
SW25A			508	Channel outlet from Edward Lake into a culvert which crosses beneath Grey Road 31. Only monitored when input from open grate/ditch is observed when monitoring SW25.	Stream Channel Flow	Historical	-

Notes:
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- LTTWM - Long Term Groundwater and Surface Water Monitoring
- Elevations provided in metres above sea level (mASL)
- Ground Elevation data approximated from Ontario Base Map elevation contours
- * indicates historical surface water station that is not included in the PITM
- Shading indicates surface water station is no longer monitored
- V indicates Valeport Electronic Flow Velocity Meter measurement
- M indicates manual velocity measurement
- - indicates SW location not currently monitored for discharge volumes
- E indicates visual estimate velocity measurement
- B indicates bucket collection velocity measurement

Table A-2 Surface Water Station Details

Designation	GPS Coordinates (NAD 83 Zone 17) Easting	Northing	Ground Elevation mASL	Description	Culvert Dimensions	Monitoring Program	Measurement Type
SW26			507	Channel flow upstream of sinkhole on ski trails near unopened road allowance for 21/22 Sideroad	Stream Channel Flow	Historical	-
SW26A			512	Two culverts upstream of SW26 sinkhole	East Culvert Diameter: 0.38 m West Culvert: Oblong Shaped	Historical	-
SW27			462	Culmination of SW27A and SW27B	Stream Channel Flow	Historical	-
SW27A			492	Groundwater seep, located east of SW28, east of Bruce Trail	Stream Channel Flow	Historical	-
SW27B			497	Groundwater seep, located north-west of SW27A, east of Bruce Trail	Stream Channel Flow	Historical	-
34. SW77	560,150	4,916,292	494	Groundwater seep, located south-east of SW20, west of Bruce Trail	Stream Channel Flow	PITM	V
SW3B (RR3 KARST)			510	RR3 Wetland Karst Sink Point Channel, west of Grey County Road 31, downstream of SW3 and SW3C.	Stream Channel Flow	PITM	V
SW3C (RR3 OUT)			510	RR3 Wetland outflow from pond that is downstream of SW3. West of Grey County Road 31.	Stream Channel Flow	LTTWM	V
35. PR Control	558,059	4,918,224	360	Pretty River Control Station on 30/31 Sideroad. Flow measured on south side of road, upstream of culvert.	Stream Channel Flow	PITM	V
36. BC Control	563,251	4,914,197	405	Batteaux Creek Control Station on 21/22 Sideroad. Flow measured on north side of road, downstream of culvert.	Stream Channel Flow	PITM	V
37. BH03-7 SG1	559,349	4,915,519	510.5	Pretty River Control Station on 30/31 Sideroad. Flow measured on south side of road, upstream of culvert.	Stream Channel Flow	PITM	V
38. BH03-7 SG2	559,323	4,915,530		Batteaux Creek Control Station on 21/22 Sideroad. Flow measured on north side of road, downstream of culvert.	Stream Channel Flow	PITM	V

Notes:
- PITM - Performance Indicator Trigger Monitoring
- LTTWM - Long Term Groundwater and Surface Water Monitoring
- Elevations provided in metres above sea level (mASL)
- Ground Elevation data approximated from Ontario Base Map elevation contours
- * indicates historical surface water station that is not included in the PITM
- Shading indicates surface water station is no longer monitored
- V indicates Valeport Electronic Flow Velocity Meter measurement
- M indicates manual velocity measurement
- - indicates SW location not currently monitored for discharge volumes
- E indicates visual estimate velocity measurement
- B indicates bucket collection velocity measurement

APPENDIX A-3

Borehole Logs

BOREHOLE LOG EXPLANATION FORM

This explanatory section provides the background to assist in the use of the borehole logs. Each of the headings used on the borehole log, is briefly explained.

DEPTH

This column gives the depth of interpreted geologic contacts in metres below ground surface.

STRATIGRAPHIC DESCRIPTION

This column gives a description of the soil based on a tactile examination of the samples and/or laboratory test results. Each stratum is described according to the following classification and terminology.

Soil Classification *		Terminology	Proportion
Clay	<0.002 mm		
Silt	0.002 to 0.06 mm	"trace" (eg. trace sand)	<10%
Sand	0.06 to 2 mm	"some" (eg. some sand)	10% - 20%
Gravel	2 to 60 mm	adjective (eg. sandy)	20% - 35%
Cobbles	60 to 200 mm	"and" (eg. and sand)	35% - 50%
Boulders	>200 mm	noun (eg. sand)	>50%

* Extension of MIT Classification system unless otherwise noted.

The use of the geologic term "till" implies that both disseminated coarser grained (sand, gravel, cobbles or boulders) particles and finer grained (silt and clay) particles may occur within the described matrix.

The compactness of cohesionless soils and the consistency of cohesive soils are defined by the following:

COHESIONLESS SOIL		COHESIVE SOIL	
Compactness	Standard Penetration Resistance "N", Blows / 0.3 m	Consistency	Standard Penetration Resistance "N", Blows / 0.3 m
Very Loose	0 to 4	Very Soft	0 to 2
Loose	4 to 10	Soft	2 to 4
Compact	10 to 30	Firm	4 to 8
Dense	30 to 50	Stiff	8 to 15
Very Dense	Over 50	Very Stiff	15 to 30
		Hard	Over 30

The moisture conditions of cohesionless and cohesive soils are defined as follows.

COHESIONLESS SOILS	COHESIVE SOILS		
Dry	DTPL	-	Drier Than Plastic Limit
Moist	APL	-	About Plastic Limit
Wet	WTPL	-	Wetter Than Plastic Limit
Saturated	MWTPL	-	Much Wetter Than Plastic Limit

STRATIGRAPHY

Symbols may be used to pictorially identify the interpreted stratigraphy of the soil and rock strata.

MONITOR DETAILS

This column shows the position and designation of standpipe and/or piezometer ground water monitors installed in the borehole. Also the water level may be shown for the date indicated.


Standpipe and Designation


Piezometer and Designation


Gas Monitor and Designation


Borehole Seal (Peltonite, Bentonite or Hole Plug)


Cement Seal


Granular Pack


Granular Backfill


Native Soil Backfill/Cave

Where monitors are placed in separate boreholes, these are shown individually in the "Monitor Details" column. Otherwise, monitors are in the same borehole. For further data regarding seals, screens, etc., the reader is referred to the summary of monitor details table.

SAMPLE

These columns describe the sample type and number, the "N" value, the water content, the percentage recovery, and Rock Quality Designation (RQD), of each sample obtained from the borehole where applicable. The information is recorded at the approximate depth at which the sample was obtained. The legend for sample type is explained below.

SS =	Split Spoon	GS =	Grab Sample
ST =	Thin Walled Shelby Tube	CS =	Channel Sample
AS =	Auger Flight Sample	WS =	Wash Sample
CC =	Continuous Core	RC =	Rock Core

$$\%\ \text{Recovery} = \frac{\text{Length of Core Recovered Per Run}}{\text{Total Length of Run}} \times 100$$

Where rock drilling was carried out, the term RQD (Rock Quality Designation) is used. The RQD is an indirect measure of the number of fractures and soundness of the rock mass. It is obtained from the rock cores by summing the length of core recovered, counting only those pieces of sound core that are 100 mm or more in length. The RQD value is expressed as a percentage and is the ratio of the summed core lengths to the total length of core run. The classification based on the RQD value is given below.

RQD Classification	RQD (%)
Very poor quality	< 25
Poor quality	25 - 50
Fair quality	50 - 75
Good quality	75 - 90
Excellent quality	90 - 100

TEST DATA

The central section of the log provides graphs which are used to plot selected field and laboratory test results at the depth at which they were carried out. The plotting scales are shown at the head of the column.

Dynamic Penetration Resistance - The number of blows required to advance a 51 mm diameter, 60° steel cone fitted to the end of 45 mm OD drill rods, 0.3 m into the subsoil. The cone is driven with a 63.5 kg hammer over a fall of 750 mm.

Standard Penetration Resistance - Standard Penetration Test (SPT) "N" Value - The number of blows required to advance a 51 mm diameter standard split-spoon sampler 300 mm into the subsoil, driven by means of a 63.5 kg hammer falling freely a distance of 750 mm. In cases where the split spoon does not penetrate 300 mm, the number of blows over the distance of actual penetration in millimetres is shown as $\frac{x Blows}{mm}$

Water Content - The ratio of the mass of water to the mass of oven-dry solids in the soil expressed as a percentage.

W_P - Plastic Limit of a fine-grained soil expressed as a percentage as determined from the Atterberg Limit Test.

W_L - Liquid Limit of a fine-grained soil expressed as a percentage as determined from the Atterberg Limit Test.

REMARKS

The last column describes pertinent drilling details, field observations and/or provides an indication of other field or laboratory tests that were performed.

BOREHOLE NO. 98-8

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY
PROJECT NO.: 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: DECEMBER 14,15 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE
GEOLOGIST: KJF

GROUND ELEVATION: ESTIMATED 516 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec	REMARKS
0	OVERBURDEN: MEDIUM TO DARK BROWN CLAYEY SILT TILL, BECOMING SANDY BELOW 3.1 m.	OVERBURDEN	102 mm ID CASING	AS					ORIGINAL GROUND SURFACE ELEVATION HAS CHANGED DUE TO QUARRY OPERATIONS. LOCATED IN SOUTHWEST CORNER OF EXISTING QUARRY.
2	– CUTTING RETURNS WET BELOW 1.8 m								108 mm ID HOLLOW STEM AUGERS USED IN OVERBURDEN.
4									CASING STICKUP 165 mm.
6									102 mm CASING SET TO 8.4 m.
7.6									
8	DOLOSTONE: LIGHT BROWNISH GREY TO VERY LIGHT GREY COLOUR, CHALKY APPEARANCE, MEDIUM GRAINED, FOSSIL REMNANTS. (AMABEL FORMATION, UNIT 2)	AMABEL FORMATION UNIT 2	OPEN HQ BOREHOLE	RC	100	69	N/A		
				RC	100	16	0.29	$1.7X10^{-5}$	
10	– 230 mm VERTICAL FRACTURE AT 9.1 m. – VUGS 1–2% UNIFORMLY DISTRIBUTED								
				RC	100	88	0.28		
12	– HORIZONTAL TO SUBHORIZONTAL BEDDING			RC	100	83	0.28	$7.8X10^{-7}$	
14				RC	100	100	0.29		
				RC	100	97	0.31		
16								$1.5X10^{-7}$	
				RC	100	100	0.31		
18				RC	100	97	0.27	$1.3X10^{-6}$	NOTE: AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION
20				RC	100	97	0.32		

BOREHOLE NO. 98-8

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY
PROJECT NO.: 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: DECEMBER 14,15 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE
GEOLOGIST: KJF

GROUND ELEVATION: ESTIMATED 516 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec (E^{-11} to E^{-4})	REMARKS
20	DOLOSTONE: (CONT) 150 mm REEFAL FACIES BED AT 19.9 m	AMABEL FORMATION UNIT 2	OPEN HQ BOREHOLE					1.3×10^{-6}	ORIGINAL GROUND SURFACE ELEVATION HAS CHANGED DUE TO QUARRY OPERATIONS. LOCATED IN SOUTHWEST CORNER OF EXISTING QUARRY.
22				RC	100	95	0.28		
24				RC	100	100	0.26	3.0×10^{-6}	
26				RC RC	100 100	87 100	0.28 N/A	8.0×10^{-7}	
28	– GRADATIONAL LOWER CONTACT OVER ±1 m. – FIRST STYLOLITE AT 28.3 m.			RC	100	82	0.26		
	29.1			RC RC	100 100	63 89	N/A N/A	2.6×10^{-7}	
30	DOLOSTONE: CREAMY GREY TO GREY BROWN COLOURED, FINE TO MEDIUM GRAINED, STYLOLITES AND SHALE 1 mm TO 10 mm THICK INCREASING FREQUENCY WITH DEPTH.	FOSSIL HILL FORMATION							
32				RC	100	68	0.15	6.9×10^{-8}	
34	34.0			RC RC	100 100	83 11	0.13 0.13		
	SHALE: GREENISH GREY, CALCAREOUS. (CABOT HEAD FORMATION)	CH							
	35.1								
36	BOREHOLE TERMINATED AT 35.1 m IN SHALE.								
38									
40									NOTE: AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION

BOREHOLE NO. 98-9

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY **PROJECT NO.:** 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. **DATE:** DECEMBER 15,16 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE **GEOLOGIST:** KJF

GROUND ELEVATION: 525.9 mASL **REVIEWER:** AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec (E^{-11} – E^{-4})	REMARKS
0									LOCATED IN NORTHWEST CORNER OF EXISTING QUARRY.
0.6	OVERBURDEN: MEDIUM BROWN CLAYEY SILT TILL.		102 mm ID CASING	RC	47	0	N/A		102 mm CASING SET AT 1.7 m.
	DOLOSTONE: LIGHT BROWNISH GREY TO VERY LIGHT GREY, MEDIUM TO COARSE GRAINED WITH A CRAGGY APPEARANCE, IRREGULAR BEDDING. (AMABEL FORMATION, UNIT 1)	AMABEL FORMATION UNIT 1		RC	95	65	0.26		
2	– FOSSILS THROUGHOUT								
				RC	100	55	0.23		
	– IRREGULARLY SHAPED VUGS 2–3%								
4	– OCCASIONAL FLANK FACIES UNITS INTERBEDDED UP TO 300 mm THICK.			RC	100	66	0.24		
	– BROWN CLAYEY SILT INFILLING WITH RUSTY STAINING ON FRACTURES AND VUGS								
6				RC	100	88	0.23		
				RC	100	88	0.24		
8								$6.7X10^{-6}$	
				RC	100	100	0.25		
10									
			OPEN HQ BOREHOLE	RC	100	93	0.28	$7.8X10^{-6}$	
12									
				RC	100	73	0.27		
				RC	100	88	0.28		
14								$2.2X10^{-6}$	
				RC	100	89	0.37		
16									
				RC	100	79	0.23		
18								$1.0X10^{-6}$	
				RC	100	85	0.27		NOTE: AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION
				RC	100	92	0.27	$3.2X10^{-7}$	
20									

BOREHOLE NO. 98-9

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY
PROJECT NO.: 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: DECEMBER 15,16 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE
GEOLOGIST: KJF

GROUND ELEVATION: 525.9 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec (E^{-11} – E^{-4})	REMARKS
20									
	20.1 DOLOSTONE: (CONT)								LOCATED IN NORTHWEST CORNER OF EXISTING QUARRY.
	DOLOSTONE: LIGHT GREY, MEDIUM GRAINED WITH A DULL CHALKY APPEARANCE, SLIGHT RUSTY STAINING THROUGHOUT, UNIFORM DISTRIBUTION OF VUGS, 1–2%, HORIZONTAL TO SUBHORIZONTAL BEDDING. (AMABEL FORMATION, UNIT 2)	AMABEL FORMATION UNIT 2	OPEN HQ BOREHOLE	RC	100	95	0.22	$3.2X10^{-7}$	
22									
	– BECOMING DARKER GREY WITH DEPTH			RC	100	95	0.25		
24								$8.5X10^{-8}$	
				RC	100	89	0.20		
	– 0.2 m REEFAL FACIES AT 25.9 m AND 34.7 m.			RC	100	100	0.28		
26									
				RC	100	90	0.34	$8.5X10^{-7}$	
28									
				RC	100	92	0.29		
30									
				RC	100	85	0.26	$6.3X10^{-7}$	
32									
				RC	100	90	0.29		
				RC	100	95	0.28	$3.4X10^{-7}$	
34									
				RC	100	93	0.31		
36									
				RC	100	92	0.26	$1.4X10^{-6}$	
38									
				RC	100	100	0.23		
				RC	100	95	N/A	$1.7X10^{-7}$	NOTE: AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION
40									

BOREHOLE NO. 98-9

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY
PROJECT NO.: 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: DECEMBER 15,16 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE
GEOLOGIST: KJF

GROUND ELEVATION: 525.9 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec	REMARKS
40	DOLOSTONE: (CONT) – GRADATIONAL LOWER CONTACT OVER ±1 m INTERVAL	UNIT 2		RC	100	85	0.22	$1.7X10^{-7}$	LOCATED IN NORTHWEST CORNER OF EXISTING QUARRY. FIRST STYLOLITE AT 40.6 m.
41.8 / 42	DOLOSTONE: MEDIUM GREY TO BUFF GREY WITH A CREAMY APPEARANCE, FINE GRAINED. – STYLOLITES AND OCCASIONAL THIN SHALE INTERBEDS UP TO 2 mm THICK	FOSSIL HILL FORMATION	OPEN HQ BOREHOLE	RC	100	73	0.17	$3.1X10^{-8}$	
44				RC	100	75	0.17		
46				RC	43	41	0.19	$4.1X10^{-8}$	
48	– 105 mm SHALE BED AT 47.5 m.			RC	N/A	N/A	0.01		
48.0 / 48.5	SHALE: GREENISH GREY, CALCAREOUS. (CABOT HEAD FORMATION) BOREHOLE TERMINATED AT 48.5 m IN SHALE.	CH							
50									
52									
54									
56									
58									
60									

NOTE:
AMABEL FORMATION:
UNIT 1: REEFAL FACIES
UNIT 2: FLANK FACIES
FH: FOSSIL HILL FORMATION
CH: CABOT HEAD FORMATION

BOREHOLE NO. 98-10

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY
PROJECT NO.: 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: JANUARY 18,19 1999

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE
GEOLOGIST: KJF

GROUND ELEVATION: 519.4 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE	SAMPLE	SAMPLE % RECOVERY	SAMPLE RQD (%)	DRILL PENETRATION m/min	WATER CONTENT % 10 20 30 (Wp — WL)	REMARKS
0											LOCATED IN CENTRAL PART OF EXISTING QUARRY ON QUARRY FLOOR.
	OVERBURDEN: MEDIUM BROWN FILL AND SILTY CLAY TILL.	OVERBURDEN	102 mm ID CASING	AS							102 mm ID CASING SET TO 3.1 m.
2											
2.3				RC			100	0	N/A		CASING STICKUP 230 mm.
	DOLOSTONE: INTERBEDDED REEFAL AND FLANK FACIES, LIGHT GREY TO BUFF GREY WITH A FAINT RUSTY TINGE, CHALKY APPEARANCE, MEDIUM TO COARSE GRAINED, IRREGULARLY SHAPED VUGS 1–4%, FOSSILS AND FOSSIL REMNANTS. (AMABEL FORMATION, UNIT 2/1)	AMABEL FORMATION UNIT 2/1		RC			100	58	N/A		BROKEN BEDROCK AT SURFACE 1.8 m TO 2.3 m.
4				RC			100	100	0.17		
6				RC			100	97	0.29		
8				RC			100	68	0.30		
10				RC			100	92	0.26		
11.0				RC			100	90	0.37		
	DOLOSTONE: LIGHT TO MEDIUM GREY, WITH A RUSTY TINGE TO 27.7 m, MEDIUM GRAINED, HORIZONTAL TO SUBHORIZONTAL BEDDING. (AMABEL FORMATION, UNIT 2)	AMABEL FORMATION UNIT 2	OPEN HQ BOREHOLE	RC			100	82	0.28		
12											
	– VUGS 1–2%, UNIFORMLY DISTRIBUTED			RC			100	82	0.27		
14	– OCCASIONAL REEFAL FACIES BEDS UP TO 0.1 m THICK FROM 11.0 m TO 16.1 m.										
	– FOSSIL REMNANTS			RC			100	95	0.25		
16											
				RC			100	88	0.34		
18											
				RC			100	100	0.32		NOTE: AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION
20				RC			100	81	0.31		

BOREHOLE NO. 98-10

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: JANUARY 18,19, 1999
BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE
GEOLOGIST: KJF
GROUND ELEVATION: 519.4 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	DRILL PENETRATION m/min	WATER CONTENT % (10 20 30; W_P W_L)	REMARKS
20	DOLOSTONE: (CONT)	AMABEL FORMATION UNIT 2	OPEN HQ BOREHOLE						LOCATED IN CENTRAL PART OF EXISTING QUARRY ON QUARRY FLOOR.
22				RC	100	100	0.29		
				RC	100	95	0.29		
24				RC	100	92	0.37		
26				RC	100	98	0.27		
				RC	100	92	N/A		
28				RC	100	94	0.22		
30	– FIRST STYLOLITE AT 30.6 m.			RC	100	100	0.26		
32	GRADATIONAL LOWER CONTACT OVER ±1 m.			RC	100	93	N/A		
31.9	DOLOSTONE: LIGHT TO MEDIUM GREY TO CREAMY BUFF GREY, BECOMING DARKER WITH DEPTH, FINE GRAINED.	FOSSIL HILL FORMATION							
	– OCCASIONAL STYLOLITES AND THIN SHALE BEDS UP TO 2 mm – ARGILLACEOUS BELOW 37.5 m			RC	100	87	0.14		
34									
36				RC	100	88	0.17		
				RC	98	55	0.26		
37.8	– 110 mm SHALE BED AT 37.3 m.								
38									
37.9	SHALE: GREENISH GREY, CALCAREOUS. (CABOT HEAD FORMATION)	CH							NOTE: AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION
	BOREHOLE TERMINATED AT 37.9 m IN SHALE.								
40									

BOREHOLE NO. 98-11

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY
PROJECT NO.: 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: DECEMBER 22,23 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE
GEOLOGIST: KJF

GROUND ELEVATION: 522.2 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE	SAMPLE	SAMPLE % RECOVERY	SAMPLE RQD (%)	DRILL PENETRATION m/min	WATER CONTENT % (10 20 30; W_P – W_L)	REMARKS
0											
	OVERBURDEN: GRAVEL FILL, LIGHT GREY, DRY TO MOIST. (FOUNDATION FOR PLANT)	OVERBURDEN	102 mm ID CASING	AS							LOCATED IN CENTRAL PART OF EXISTING QUARRY ON QUARRY FLOOR. 102 mm ID CASING SET TO 5.6 m.
2											
4											
4.9				RC			73	0	N/A		
6	DOLOSTONE: LIGHT GREY BROWN TO BUFF GREY WITH A MOTTLED APPEARANCE, MEDIUM TO COARSE GRAINED. (AMABEL FORMATION, UNIT 1) – IRREGULAR SHAPED VUGS INCREASING TO 5–6% BELOW 17.4 m.	AMABEL FORMATION UNIT 1	OPEN HQ BOREHOLE	RC			100	76	0.22		BROKEN BEDROCK SURFACE.
8	– BROWN CLAYEY SILT INFILLING WITH RUSTY STAINING ON FRACTURES AND VUGS.			RC			100	48	0.25		
10	– FOSSILS THROUGHOUT			RC			100	82	0.22		
12				RC			100	92	0.22		
14				RC			100	82	0.21		
16				RC			100	46	0.27		
18				RC			100	53	0.25		
20				RC			100	58	0.26		
				RC			100	83	0.25		NOTE: AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION
				RC			100	65	0.26		

BOREHOLE NO. 98-11

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY **PROJECT NO.:** 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. **DATE:** DECEMBER 22,23 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE **GEOLOGIST:** KJF

GROUND ELEVATION: 522.2 mASL **REVIEWER:** AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	DRILL PENETRATION m/min	WATER CONTENT % (10 20 30; W_P – W_L)	REMARKS
20	DOLOSTONE: (CONT)	AMABEL UNIT 1	OPEN HQ BOREHOLE								LOCATED IN CENTRAL PART OF EXISTING QUARRY ON QUARRY FLOOR.
				RC			100	55	N/A		
22											
	22.9			RC			100	68	N/A		
24	DOLOSTONE: LIGHT BUFF GREY TO A MEDIUM GREY WITH A CHALKY APPEARANCE, MEDIUM TO FINE GRAINED, HORIZONTAL TO SUBHORIZONTAL BEDDING. (AMABEL FORMATION, UNIT 2)	AMABEL FORMATION UNIT 2		RC			100	48	0.23		
	– FAINT RUSTY STAINING THROUGHOUT										
26				RC			100	84	0.26		
				RC			98	95	0.27		
28	–VUGS 1–2% WITH A UNIFORM DISTRIBUTION										
				RC			100	93	0.23		
30											
	– FOSSIL REMNANTS THROUGHOUT			RC			98	94	0.26		
32	– GRADATIONAL LOWER CONTACT OVER ±1 m			RC			98	95	0.25		
	– FIRST STYLOLITE AT 32.7 m.										
	33.4			RC			100	55	0.22		
34	DOLOSTONE: LIGHT GREY TO MEDIUM CREAMY GREY TO BROWN, FINE TO MEDIUM GRAINED.	FOSSIL HILL FORMATION									
				RC			100	100	0.20		
36	– OCCASIONAL STYLOLITES AND SHALE INTERBEDS UP TO 2 mm THICK										
				RC			100	87	0.19		
38											
				RC			100	98	0.29		
	– PYRITE CRYSTALS AT 39.0 m.										
40				RC			100	N/A	0.20		

NOTE:
AMABEL FORMATION:
UNIT 1: REEFAL FACIES
UNIT 2: FLANK FACIES
FH: FOSSIL HILL FORMATION
CH: CABOT HEAD FORMATION

BOREHOLE NO. 98-11

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY **PROJECT NO.:** 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. **DATE:** DECEMBER 22,23 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE **GEOLOGIST:** KJF

GROUND ELEVATION: 522.2 mASL **REVIEWER:** AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE	SAMPLE	SAMPLE % RECOVERY	SAMPLE RQD (%)	DRILL PENETRATION m/min	WATER CONTENT % 10 20 30 (W_P – W_L)	REMARKS
40											
40.6	DOLOSTONE: (CONT) – 80 mm SHALE BED AT 40.1 m.	FH	OPEN HQ BOREHOLE								LOCATED IN CENTRAL PART OF EXISTING QUARRY ON QUARRY FLOOR.
41.2	SHALE: GREY GREENISH, CALCAREOUS. (CABOT HEAD FORMATION)	CH									
42	BOREHOLE TERMINATED AT 41.2 m IN SHALE.										
44											
46											
48											
50											
52											
54											
56											
58											
60											NOTE: AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION

BOREHOLE NO. 98-12

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY
PROJECT NO.: 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: DECEMBER 21, 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE
GEOLOGIST: KJF

GROUND ELEVATION: 526.7 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE	SAMPLE	SAMPLE % RECOVERY	SAMPLE RQD (%)	DRILL PENETRATION m/min	WATER CONTENT % 10 20 30 W_P W_L	REMARKS
0											
	OVERBURDEN: CLAYEY SILT, MEDIUM BROWN.	OVERBURDEN	102 mm ID CASING	AS							LOCATED IN NORTHEAST CORNER OF EXISTING QUARRY. 102 mm ID CASING SET TO 5.6 m. BOREHOLE SET INTO BERM
2											
4	4.0			RC			77	0	N/A		
	DOLOSTONE: LIGHT GREYISH BROWN TO MOTTLED GREYISH BUFF BROWN APPEARANCE. MEDIUM TO COARSE GRAINED, CRAGGY APPEARANCE, FOSSILS THROUGHOUT. (AMABEL FORMATION, UNIT 1)	AMABEL FORMATION UNIT 1	OPEN HQ BOREHOLE	RC			100	46	N/A		
6	– IRREGULARLY SHAPED VUGS 2–3%			RC			100	82	0.29		
	– SOME CLAYEY SILT INFILLING AND RUSTY STAINS ON FRACTURES			RC			100	83	0.16		
8											
				RC			100	93	0.16		
10											
				RC			100	80	0.30		
12											
				RC			100	88	0.30		
				RC			100	97	0.31		
14											
				RC			100	95	0.26		
16											
	16.7			RC			100	100	0.31		
	DOLOSTONE: LIGHT TO MEDIUM BROWN GREY WITH FAINT RUSTY STAINING THROUGHOUT, MEDIUM GRAINED, CHALKY APPEARANCE. (AMABEL FORMATION, UNIT 2)	AMABEL FORMATION UNIT 2									
18				RC			100	100	0.26		
				RC			100	97	N/A		
20											

NOTE:
AMABEL FORMATION:
UNIT 1: REEFAL FACIES
UNIT 2: FLANK FACIES
FH: FOSSIL HILL FORMATION
CH: CABOT HEAD FORMATION

BOREHOLE NO. 98-12

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: DECEMBER 21, 1998
BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE
GEOLOGIST: KJF
GROUND ELEVATION: 526.7 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE	SAMPLE	SAMPLE % RECOVERY	SAMPLE RQD (%)	DRILL PENETRATION m/min	WATER CONTENT % 10 20 30 W_P W_L	REMARKS
20	DOLOSTONE: (CONT)	AMABEL FORMATION UNIT 2	OPEN HQ BOREHOLE								LOCATED IN NORTHEAST CORNER OF EXISTING QUARRY.
				RC			100	96	0.37		
22	– VUGS 1–2% WITH A UNIFORM DISTRIBUTION – FOSSIL REMNANTS			RC			100	90	0.34		
24	– HORIZONTAL TO SUBHORIZONTAL BEDDING			RC			100	52	0.29		
				RC			100	52	0.37		
26											
				RC			100	80	0.29		
28											
				RC			100	95	0.32		
30											
				RC			100	87	0.29		
	– FIRST STYLOLITE AT 30.9 m.										
32				RC			100	97	0.28		
	– BECOMING FINER GRAINED AND LESS VUGGY BELOW 32.5 m.			RC			100	92	0.25		
34											
				RC			100	90	0.28		
	– GRADATIONAL LOWER CONTACT OVER ±2 m INTERVAL										
36	36.0										
	DOLOSTONE: MEDIUM GREY TO LIGHT CREAMY GREY, MEDIUM TO FINE GRAINED, OCCASIONAL THIN SHALE LAMINAE OR STYLOLITE UP TO 2 mm THICK.	FOSSIL HILL FORMATION		RC			100	97	0.17		
38	– INCREASING SHALE CONTENT BELOW 37.5 m.										
				RC			100	89	N/A		
	– MINOR PYRITE MINERALIZATION AT 39.5 m AND 40.8 m.										NOTE: AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION
				RC			100	97	N/A		
40											

BOREHOLE NO. 98-12

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY
PROJECT NO.: 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: DECEMBER 21, 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE
GEOLOGIST: KJF

GROUND ELEVATION: 526.7 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE	SAMPLE	SAMPLE % RECOVERY	SAMPLE RQD (%)	DRILL PENETRATION m/min	WATER CONTENT % 10 20 30 W_P W_L	REMARKS
40											
	DOLOSTONE: (CONT)										LOCATED IN NORTHEAST CORNER OF EXISTING QUARRY.
	– 50 mm SHALE BED AT 41.6 m.	FH	OPEN HQ BH	RC			97	97	N/A		
42	– PYRITE CRYSTALS AT 41.8 m IN 20 mm VUG.										
42.1	SHALE: GREENISH GREY, CALCAREOUS. (CABOT HEAD FORMATION)	CH		RC			100	0	0.17		
42.4	BOREHOLE TERMINATED AT 42.4 m IN SHALE.										
44											
46											
48											
50											
52											
54											
56											
58											
60											NOTE: AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION

BOREHOLE NO. 98-13

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY **PROJECT NO.:** 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. **DATE:** DECEMBER 17,18,19 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE **GEOLOGIST:** KJF

GROUND ELEVATION: 522.3 mASL **REVIEWER:** AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	DRILL PENETRATION m/min	WATER CONTENT % (10 20 30) W_P W_L	REMARKS
0	OVERBURDEN: MEDIUM BROWN SILTY CLAY TILL, OCCASIONAL BOULDERS.	OVERBURDEN	102 mm ID CASING	AS					LOCATED ON EAST SIDE OF EXISTING QUARRY. 102 mm ID CASING SET TO 9.7 m.
8.6	BOULDERS ENCOUNTERED 0.5 m ABOVE BEDROCK.								
8.6	DOLOSTONE: LIGHT GREY TO VERY LIGHT GREY, MEDIUM TO COARSE GRAINED. (AMABEL FORMATION, UNIT 1)	AMABEL FORMATION UNIT 1	OPEN HQ BOREHOLE	RC	66	41	N/A		
10	– IRREGULAR BEDDING WITH AN OVERALL CRAGGY AND WEATHERED APPEARANCE – FOSSILS AND FOSSIL REMNANTS			RC	96	50	0.22		
12				RC	80	100	N/A		
12	– RUST STAINED FRACTURES WITH CLAYEY SILT INFILLING			RC	100	88	0.20		
14	– IRREGULARLY SHAPED VUGS 3–5% WITH LOCAL ZONES TO 10% – 250 mm VOID AT 14.3 m.			RC	83	61	N/A		
16				RC	100	92	N/A		
16	– SOME FLANK FACIES INTERBEDDED, 0.6 m BED AT 13.7 m AND 1.2 m BED AT 17.1 m, LIGHT GREY WITH A CHALKY APPEARANCE			RC	100	35	0.16		
18				RC	100	78	0.20		NOTE: AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION
20				RC	100	100	0.29		

BOREHOLE NO. 98-13

PROJECT NAME: ROCK QUALITY INVESTIGATION - DUNTROON QUARRY **PROJECT NO.:** 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. **DATE:** DECEMBER 17,18,19 1998

BOREHOLE TYPE: HQ SIZED (64 mm) ROCK CORE **GEOLOGIST:** KJF

GROUND ELEVATION: 522.3 mASL **REVIEWER:** AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	DRILL PENETRATION mm/sec	WATER CONTENT % (10 20 30) W_P W_L	REMARKS
20	DOLOSTONE: (CONT)	UNIT 1	OPEN HQ BOREHOLE								LOCATED ON EAST SIDE OF EXISTING QUARRY.
				RC			93	43	0.18		
22	22.1										
	DOLOSTONE: LIGHT TO MEDIUM GREY, MEDIUM GRAINED, CHALKY APPEARANCE, FAINT RUSTY TINGE. (AMABEL FORMATION, UNIT 2)	AMABEL FORMATION UNIT 2		RC			100	78	0.23		
	– VUGS 2–3% WITH A UNIFORM DISTRIBUTION										
24	– HORIZONTAL TO SUBHORIZONTAL BEDDING			RC			100	45	0.27		
	– 0.7 m SILT INFILLED VERTICAL FRACTURE AT 25.6 m.			RC			100	68	0.30		
26											
				RC			100	62	0.19		
	– OCCASIONAL REEFAL FACIES INTERBEDS ±1 m BED AT 28.0 m										
28											TWO 100 mm ZONES OF BROKEN RECOVERY AT 28.7 m AND 30.2 m.
				RC			100	53	0.30		
30											
				RC			100	75	0.26		
	– FIRST STYLOLITE AT 31.0 m.										
32	– GRADATIONAL LOWER CONTACT OVER ±2 m INTERVAL			RC			100	85	0.28		
	32.8										
	DOLOSTONE: LIGHT TO MEDIUM BUFF GREY TO CREAM COLOURED, FINE GRAINED.	FOSSIL HILL FORMATION		RC			100	76	0.28		
34	– STYLOLYTES AND OCCASIONAL THIN SHALE INTERBEDS UP TO 2 mm INCREASING WITH DEPTH.										
				RC			100	98	0.23		
36											
				RC			100	65	N/A		
	– 35 mm SHALE BED AT 37.6 m. – PYRITE CRYSTALS AT 37.7 m.										
38	37.9										
	38.0 SHALE: GREENISH GREY, CALCAREOUS. (CABOT HEAD FORMATION)	CH									NOTE:
	BOREHOLE TERMINATED AT 38.0 m IN SHALE.										AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FORMATION CH: CABOT HEAD FORMATION
40											

BOREHOLE NO. OW99-1

PROJECT NAME: DUNTROON QUARRY | **PROJECT NO.:** 930521.08

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. | **DATE:** MAY, 1999

BOREHOLE TYPE: 150 mm AIRTRACK HOLE | **GEOLOGIST:**

GROUND ELEVATION: 519.0 mASL | **CONTRACTOR:** GEORGIAN AGGREGATES

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0	DOLOSTONE BEDROCK										100 mm ø PVC PROTECTIVE CASING
5											
10											100 mm ø OPEN HOLE
15											
20											
25											
29.5 / 30	HOLE TERMINATED AT 29.5 m BELOW GRADE										
35											
40											
45											
50											

BOREHOLE NO. OW99-2

PROJECT NAME: DUNTROON QUARRY
PROJECT NO.: 930521.08

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: MAY, 1999

BOREHOLE TYPE: 100 mm AIRTRACK HOLE
GEOLOGIST:

GROUND ELEVATION: 500.6 mASL
CONTRACTOR: GEORGIAN AGGREGATES

DEPTH (m)		STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0		DOLOSTONE BEDROCK										100 mm ø PROTECTIVE CASING
5												
10												100 mm ø OPEN HOLE
15												
20	19.7											
		HOLE TERMINATED AT 19.7 m BELOW GRADE										
25												
30												
35												
40												
45												
50												

BOREHOLE NO. PW99-1

PROJECT NAME: DUNTROON QUARRY | **PROJECT NO.:** 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. | **DATE:** JULY 09, 1999

BOREHOLE TYPE: 150 mm ROTARY WATER WELL | **GEOLOGIST:**

GROUND ELEVATION: 513.9 mASL | **CONTRACTOR:** HIGHLAND WATERWELLS

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0	WELL DRILLERS LOG										
	BROWN SANDY CLAY WITH GRAVEL										150 mm ø STEEL CASING
4.3											BENSEAL PLUG
5	LIGHT BROWN BROKEN LIMESTONE (OVERBURDEN)										150 mm ø OPEN HOLE WELL
9.4											
10	LIGHT BROWN LIMESTONE, HARD										
15											
20											
25											
29.0											
30	GREY LIMESTONE										
31.4											
	BROWN LIMESTONE										
32.9											
	WELL TERMINATED AT 32.9 m BELOW GRADE										
35											
40											
45											
50											

BOREHOLE NO. PW99-2

PROJECT NAME: DUNTROON QUARRY | **PROJECT NO.:** 930521.08

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. | **DATE:** MAY, 1999

BOREHOLE TYPE: 150 mm AIRTRACK HOLE | **GEOLOGIST:**

GROUND ELEVATION: 519.2 mASL | **CONTRACTOR:** GEORGIAN AGGREGATES

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 (W_P – W_L)	REMARKS
0	DOLOSTONE BEDROCK										150 mm ø PROTECTIVE CASING
5											150 mm ø OPEN HOLE
10											
15											
20											
25											
30											
34.4											
35	HOLE TERMINATED AT 34.4 m BELOW GRADE										
40											
45											
50											

BOREHOLE NO. PW99-3

PROJECT NAME: DUNTROON QUARRY | **PROJECT NO.:** 930521.08

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. | **DATE:** MAY, 1999

BOREHOLE TYPE: 150 mm AIRTRACK HOLE | **GEOLOGIST:**

GROUND ELEVATION: 500.9 mASL | **CONTRACTOR:** GEORGIAN AGGREGATES

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0	DOLOSTONE BEDROCK										150 mm ø PROTECTIVE CASING
5											150 mm ø OPEN HOLE
10											
15											
20											
20.8											
21.4	SHALE BEDROCK										SHALE INTERPOLATED FROM BH98-1
25	HOLE TERMINATED AT 21.4 m BELOW GRADE IN SHALE										
30											
35											
40											
45											
50											

BOREHOLE NO. BH02-1

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 4, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 522.6 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec	REMARKS
0								E⁻¹¹ E⁻⁴	
2	SILT: BROWN SILT, SOME SAND, TRACE GRAVEL, TRACE CLAY, MOIST.	OVERBURDEN	H.Q. CASING						LOCATED IN S.E. CORNER OF EXPANSION PROPERTY
3.6									
4	DOLOSTONE: WHITE TO CREAMY, UNIFORM MEDIUM GRAINED WITH SACCHAROIDAL TEXTURE. WEAKLY BEDDED. 2%–5% VUGS UP TO 16 mm IN SIZE. – 5.5 m TO 5.7 m LIGHT GREY TO CREAMY, CHAOTIC BEDDED MEDIUM TO COARSE GRAINED DOLOSTONE WITH CHRINOIDAL FOSSIL FRAGMENTS UP TO 4 cm.	AMABEL FORMATION UNIT 2	5.2 m	RC	98	98	0.15		
6				RC	98	73	0.15		
8			OPEN H.Q. BOREHOLE	RC	100	100	0.13		
8.2									
10	DOLOSTONE: LIGHT GREY, WITH WHITE "SPECKLED" APPEARANCE, MEDIUM TO COARSE TEXTURE. WEAKLY BEDDED CRINOIDAL FOSSIL FRAGMENTS UP TO 3 cm. – 9.0 m TO 9.9 m IRREGULAR VERTICAL FRACTURE WITH SLIGHT RUST STAINING	AMABEL FORMATION UNIT 1		RC	98	76	0.18		
				RC	98	90	0.22	4.3E–6	
12	–BELOW 10.7 m LIGHT GREY TO CREAMY WHITE, CHAOTIC BEDDING, FOSSILIFEROUS, 2%–3% VUGS UP TO 3 cm WITH CRYSTALLINE CALCITE INFILL.			RC	100	100	0.27	2.5E–6	
12.6									
14	DOLOSTONE: MOTTLED LIGHT/ MEDIUM GREY, UNIFORM MEDIUM GRAINED WITH SACCHAROIDAL TEXTURE. WEAKLY DEVELOPED BEDDING. 3%–5% VUGS UP TO 9 mm WITH BROWN SEDIMENT INFILL. BECOMING FINE GRAINED WITH DEPTH. FRACTURES HAVE BROWN SEDIMENT ON FACES.	AMABEL FORMATION UNIT 2		RC	98	100	0.24	5.1E–08	
				RC	100	100	0.23	7.0E–08	
16				RC	100	100	0.19	2.4E–07	
18	–BELOW 17.4 m UNIFORM FINE TO MEDIUM GRAINED, AND OCCASIONAL POORLY DEVELOPED BROWN STYLOLITE.			RC	100	100	0.23	5.8E–08	
				RC	100	97	0.17	7.6E–08	
20									

NOTE
AMABEL FORMATION:
UNIT 1: REEFAL FACIES
UNIT 2: FLANK FACIES
FH: FOSSIL HILL FM
CH: CABOT HEAD FM

BOREHOLE NO. BH02-1

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 4, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 522.6 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec	REMARKS
20	DOLOSTONE CONTINUED	AMABEL FORMATION UNIT 2	OPEN H.Q. BOREHOLE	RC	100	100	0.25	1.1E-07	LOCATED IN S.E. CORNER OF EXPANSION PROPERTY
22	−21.9 m GREY, UNIFORM MEDIUM GRAINED WITH SACCHAROIDAL TEXTURE AND "SPECKLED" APPEARANCE. UP TO 5% CRINOIDAL FOSSIL FRAGMENTS, WEAKLY BEDDED.			RC	97	95	0.25	4.0E-7	
24	− 24.0 TO 24.8 m VERTICAL FRACTURES WITH WEAK RUSTY ORANGE STAINING, PARTIALLY RESEALED WITH CARBONATE. FRACTURES OCCUR DOMINANTLY PARALLEL TO BEDDING.			RC	100	78	0.30	5.8E-7	
26				RC	100	100	0.27	7.9E-7	
28				RC	98	100	0.25	6.9E-08	
30	− 30.4 m TO 31.1 m MOTTLED MEDIUM GREY TO BROWN FINE GRAINED DOLOSTONE			RC	100	100	0.13	8.1E-08	
32				RC	97	100	0.19	1.3E-07	
33.4				RC	98	100	0.22		
34	DOLOSTONE: MOTTLED BLUE−GREY/ GREY FINE GRAINED WITH SACCHAROIDAL TEXTURE. INCREASING STYLOLITES, BECOMING GREY IN COLOUR WITH DEPTH. OCCASIONAL PARTING OF PALE GREEN TO GREY SHALE UP TO 2 mm THICK. OCCASIONAL PINCH−AND−SWELL TYPE BEDS AND NODULES OF WHITE TO LIGHT GREY CHERT. BECOMING PINKISH−BROWN BELOW 35.7 m WITH UP TO 2% PATCHY MASSIVE PYRITE.	FOSSIL HILL FM		RC	100	100	0.19		
36	FRACTURES OCCUR DOMINANTLY AT STYLOLITES/ PARTINGS.			RC	100	100	0.15	2.9E-09	
37.4				RC	100	100	0.12		
38	SHALE: GREENISH−GREY SHALE, VARIABLE SOFT TO HARD, FISSILE.	CH		RC	100	100	0.12	9.0E-09	NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
39.5	BOREHOLE TERMINATED AT 39.5 m IN SHALE.			RC	100	100	0.15	4.8E-08	CIRCULATION MAINTAINED FOR ENTIRE BOREHOLE.
40									

BOREHOLE NO. BH02-2

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 10, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 522.5 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec (E⁻¹¹ – E⁻⁴)	REMARKS
0	SILT: BROWN SILT, SOME SAND, TRACE GRAVEL, TRACE CLAY, MOIST.	OVERBURDEN	H.Q. CASING						LOCATED IN NE QUADRANT OF PROPERTY
6.2	DOLOSTONE: MOTTLED LIGHT GREY/ LIGHT BROWN, MEDIUM GRAINED UNIFORM TEXTURE, WEAKLY BEDDED.	UNIT 2	7.0 m	RC	92	96	0.78		
7.0	DOLOSTONE: PATCHY LIGHT GREY/ LIGHT BROWN, MEDIUM GRAINED WITH "SPECKLED" APPEARANCE. CRINOIDAL FOSSIL FRAGMENTS UP TO 5%, WEAKLY DEVELOPED BEDDING. FRACTURES MAINLY PARALLEL TO BEDDING.	AMABEL FORMATION UNIT 1	OPEN H.Q. BOREHOLE	RC	93	100	0.28		
				RC	98	100	0.20		
				RC	100	100	0.27	1.1E−7	
				RC	100	98	0.28	3.1E−7	
				RC	100	100	0.23		
14.7	DOLOSTONE: MOTTLED LIGHT GREY/ MEDIUM GREY, MEDIUM GRAINED WITH SACCHAROIDAL TEXTURE. NUMEROUS CRINOIDAL FOSSIL FRAGMENTS WITH WEAKLY DEVELOPED BEDDING.	UNIT 2		RC	100	97	0.22	1.1E−6	
16.6	DOLOSTONE: MOTTLED LIGHT GREY/ MEDIUM GREY, MEDIUM TO COARSE GRAINED WITH CHAOTIC APPEARANCE AND FOSSIL FRAGMENTS. OVERALL "ROUGH" APPEARANCE, BRITTLE. OCCASIONAL BROWN STYLOLITE.	AMABEL UNIT 1		RC	98	92	0.24	4.7E−7	
				RC	100	100	0.26	2.7E−7	
				RC	100	100	0.25	1.2E−7	

NOTE
AMABEL FORMATION:
UNIT 1: REEFAL FACIES
UNIT 2: FLANK FACIES
FH: FOSSIL HILL FM
CH: CABOT HEAD FM

BOREHOLE NO. BH02-2

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 10, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 522.5 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec (E⁻¹¹ – E⁻⁴)	REMARKS
20	DOLOSTONE CONTINUED	UNIT 1	OPEN H.Q. BOREHOLE					1.2E-7	LOCATED IN NE QUADRANT OF PROPERTY
21.2	DOLOSTONE: PATCHY LIGHT GREY/ LIGHT BROWN MEDIUM TO FINE GRAINED, WITH SACCHAROIDAL TEXTURE. MODERATE TO WEAKLY DEVELOPED BEDDING WITH 1–2 mm CRINOIDAL FOSSIL FRAGMENTS PRODUCING LOCAL "SPECKLED" TEXTURE. OCCASIONAL BROWN MODERATE TO WELL DEVELOPED STYLOLITE, INCREASING WITH DEPTH.	AMABEL FORMATION UNIT 2		RC	98	100	0.24	4.7E-7	
22									
				RC	100	95	0.30		
24								5.0E-7	
				RC	100	100	0.24		
26				RC	100	100	0.31	2.4E-7	
				RC	98	100	0.29	5.8E-7	
28									
				RC	98	100	0.26		
30								2.7E-7	
				RC	100	100	0.21		
32				RC	100	100	0.20	3.7E-7	
32.6	DOLOSTONE: MOTTLED BLUE–GREY TO GREY FINE TO MEDIUM GRAINED WITH SACCHAROIDAL TEXTURE. OCCASIONAL STYLOLITE, BECOMING GREY IN COLOUR. OCCASIONAL 10 mm–SCALE PINCH–AND–SWELL TYPE BEDS/ NODULES OF LIGHT GREY CHERT. – AT 34.9 m BECOMING PINKISH–BROWN, FINE GRAINED WITH OCCASIONAL FAINT PARTINGS/ LAMINAE OF SHALE UP TO 3 mm THICK WITH UP TO 5 mm AGGLOMERATIONS OF PATCHY MASSIVE PYRITE. FRACTURES OCCUR MAINLY ALONG STYLOLITES/ LAMINAE. – 37.6 m TO 37.9 m SHALE INTERBED	FOSSIL HILL FORMATION		RC	100	100	0.18	1.8E-07	
34									
				RC	100	100	0.14	5.9E-09	
36									
								1.2E-07	
38									CIRCULATION MAINTAINED FOR ENTIRE BOREHOLE.
38.4	SHALE: GREENISH–GREY, SOFT TO HARD, FISSILE.	CH							NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
39.5	BOREHOLE TERMINATED AT 39.5 m IN SHALE.								
40									

BOREHOLE NO. BH02-3

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 12, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 529.7 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE	SAMPLE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	WATER CONTENT % 10 20 30 (W_P – W_L)	REMARKS
0											
	SILT: BROWN SILT, SOME SAND, TRACE GRAVEL, TRACE CLAY, MOIST.	OVERBURDEN	H.Q. CASING								LOCATED NEAR CENTRE OF PROPERTY.
2											
3.1											
	DOLOSTONE: LIGHT GREY MEDIUM TO COARSE GRAINED DOLOSTONE, CHAOTIC APPEARANCE WITH UP TO 10% WHITE FOSSIL FRAGMENTS, "HONEYCOMB" TEXTURE (CORAL) UP TO 30 mm. 2%–3% VUGS UP TO 13 mm.	AMABEL FORMATION UNIT 1		RC			88	96	0.24		
4			4.6 m								
			OPEN H.Q. BOREHOLE (64 mm)	RC			98	86	0.30		
6	– 5.8 m TO 6.7 m IRREGULAR VERTICAL FRACTURE WITH MODERATE ORANGE RUSTY STAINING ON FACES.										
				RC			100	93	0.33		
8				RC			100	88	0.35		
				RC			56	76	0.41		
10											
				RC			0	N/A	0.53		
12											
12.0											
	BOREHOLE TERMINATED AT 12.0 m IN DOLOSTONE.		DRY								NO CORE RECOVERY IN LAST RUN. LOST CIRCULATION AT 9.5 m BELOW GROUND SURFACE.
14											
16											
18											
											NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
20											

BOREHOLE NO. BH02-4

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 13, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 530.0 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec	REMARKS
0									
	SILT: BROWN SILT, SOME SAND, TRACE GRAVEL, TRACE CLAY, MOIST.	OVER-BURDEN	H.Q. CASING						LOCATED NEAR CENTRE OF PROPERTY
1.3			3.0 m						
	DOLOSTONE: LIGHT GREY, MEDIUM TO COARSE GRAINED DOLOSTONE, CHAOTIC BEDDING WITH LOCALLY UP TO 7% WHITE FOSSIL FRAGMENTS (POSSIBLY CORAL) WITH "HONEYCOMB" TEXTURE, UP TO 30 mm. 3%–5% VUGS UP TO 30 mm.	AMABEL FORMATION UNIT 1		RC	100	67	0.22		
2									
	FRACTURES DOMINANTLY SUBHORIZONTAL, IRREGULAR.			RC	100	100	0.25		
4									
				RC	100	100	0.31		
6									
				RC	100	90	0.26		
8				RC	98	100	0.30		
			OPEN H.Q. BOREHOLE						
				RC	97	100	0.31		
10									
				RC	94	98	0.30		AT 11.0 m TEMPORARY LOSS OF CIRCULATION. (RECOVERED)
12									
				RC	94	100	0.30	2.5E–06	
13.1									
	DOLOSTONE: MOTTLED LIGHT GREY/ LIGHT BROWN, WITH OCCASIONAL CREAM COLOURED BANDS, UNIFORM, MEDIUM GRAINED. OCCASIONAL CRINOIDAL FOSSIL FRAGMENTS, WEAKLY BEDDED. 1%–2% VUGS UP TO 20 mm WITH CRYSTALLINE CALCITE INFILLING.	AMABEL FORMATION UNIT 2		RC	100	100	0.31	5.3E–07	
14									
				RC	100	100	0.28		
16								4.5E–07	
				RC	100	100	0.30		
18								2.2E–06	
				RC	100	35	0.30		NOTE
	– 19.0 m TO 20.0 m IRREGULAR VERTICAL FRACTURE WITH MODERATE TO STRONG RUST STAINING.								AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
				RC	100	100	0.30	4.8E–07	
20									

BOREHOLE NO. BH02-4

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 13, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 530.0 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec	REMARKS
20	DOLOSTONE CONTINUED	AMABEL FORMATION UNIT 2	OPEN H.Q. BOREHOLE					4.8E−07	LOCATED NEAR CENTRE OF PROPERTY
	FRACTURES BECOMING DOMINANTLY PARALLEL TO SUB−HORIZONTAL BEDDING.			RC	100	62	0.35	8.5E−06	
22	– 22.4 m TO 22.6 m GREY FINE GRAINED DOLOSTONE WITH WEAKLY DEVELOPED, CREAMY "STRIPED" APPEARANCE, BRITTLE.			RC	98	100	0.30		
	– AT 23.2 m BECOMING UNIFORM WITH SACCHAROIDAL TEXTURE.			RC	100	100	0.30	1.2E−05	
24									
				RC	100	97	0.31	1.3E−06	
26									
				RC	98	100	0.30	9.0E−08	
28	– 27.5 m TO 27.6 m DIAGONAL FRACTURE WITH WEAK RUSTY STAINING.			RC	100	100	0.30		
								1.5E−06	
30				RC	100	100	0.21		
	– 30.1 m TO 31.0 m GREY FINE GRAINED DOLOSTONE WITH POORLY DEVELOPED, DISCONTINUOUS CREAMY "STRIPES". BRITTLE, CRUMBLY. LOCALLY UP TO 10% PATCHY VUGS WITH CALCITE CRYSTALS UP TO 2 mm.			RC	100	95	0.23	7.4E−06	
32									
				RC	98	100	0.23	1.2E−05	
	– 33.1 m TO 35.3 m MOTTLED BROWN/ LIGHT BROWN FINE GRAINED DOLOSTONE WITH OCCASIONAL WISPY PARTING OF DULL GREEN SHALE. OCCASIONAL POORLY DEVELOPED BROWN STYLOLITE. INCREASING FREQUENCY WITH DEPTH.			RC	100	100	0.26		
34								9.3E−06	
36				RC	98	100	0.29		
				RC	100	100	0.30	8.1E−07	
	– 35.3 TO 37.0 m GREY, UNIFORM, MEDIUM GRAINED DOLOSTONE WITH "SPECKLED" APPEARANCE. OCCASIONAL CRINOID FOSSIL FRAGMENTS, WEAKLY BEDDED.								NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
38				RC	100	100	0.24	9.9E−07	
40									

BOREHOLE NO. BH02-4

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 13, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 530.0 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec (E⁻¹¹ – E⁻⁴)	REMARKS
40	DOLOSTONE CONTINUED	AMABEL UNIT 2	OPEN H.Q. BOREHOLE	RC	100	100	0.31		LOCATED NEAR CENTRE OF PROPERTY
	FRACTURES OCCUR DOMINANTLY AT PARTINGS/LAMINAE.			RC	100	85	0.24	7.6E−08	
42									
	– 43.2 m TO 44.0 m MOTTLED BROWN/ GREY–BROWN FINE GRAINED DOLOSTONE. OCCASIONAL GREY SHALE PARTINGS UP TO 2 mm THICK.			RC	98	100	0.21	5.4E−08	
44	44.0								
	DOLOSTONE: MOTTLED BLUE–GREY/GREY FINE GRAINED DOLOSTONE, OCCASIONAL GREY SHALE PARTINGS UP TO 3 mm THICK INCREASING WITH DEPTH. OCCASIONAL PINCH–AND–SWELL TYPE BEDS UP TO 3 cm THICK, OCCASIONAL NODULES OF LIGHT GREY CHERT TO 30 mm.	FOSSIL HILL FM		RC	100	100	0.18	6.1E−09	
46	– AT 46.3 m BECOMING PINKISH–BROWN DOLOSTONE WITH 1%–2% PATCHY PYRITE.			RC	100	100	0.20	8.0E−09	
				RC	100	100	0.11	2.8E−08	
48									
	48.8								
	SHALE: GREENISH–GREY, SOFT TO HARD, FISSILE.	CH							
50	50.1								
	BOREHOLE TERMINATED AT 50.1 m IN SHALE.								
52									
									CIRCULATION MAINTAINED FOR ENTIRE BOREHOLE.
54									
56									
58									NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
60									

LOG OF BOREHOLE BH02-5 (deep)

WSP

project |	Duntroon Quarry			**project no.** |	111-53312-00
client |	Walker Aggregates Inc.	**rig type** |	CME 75, track-mounted	**date started** |	2014/10/09
location |	Duntroon, Ontario	**method** |	Rock coring	**supervisor** |	BTC
position |	E: 559585 N: 4915584 (17T, Geodetic)	**coring** |	HQ core, OD=96mm, ID=64mm	**reviewer** |	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Water Content (%) & Plasticity	PID Readings	Well Details	Lab Data and Comments
0	513.3	**GROUND SURFACE** **OVERBURDEN**					513	Dynamic Cone: 10 20 30 40 Unconfined / Pocket Penetrometer / Field Vane / Lab Vane: 40 80 120 160	PL MC LL: 10 20 30			GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
1							512					
2							511					
3							510					
4							509					
5							508					
6							507					
7							506					
8							505					
9	504.3 9.0	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; fossiliferous, strong core with a rough cut texture, thickly bedded, scratched by a knife; slightly weathered with muddy reddish brown staining on fracture surfaces, ~5%, vugs typically 1 mm to 3 mm, poor to fair RQD. (Flank facies)		R1		TCR = **100**% RQD = **63**%	504					
10				R2		TCR = **96**% RQD = **80**%	503					
11	502.6						502					10 cm void at 10.7 m depth.
12	500.9 12.4			R3		TCR = **92**% RQD = **34**%	501					

END OF BOREHOLE

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in bedrock at 9.24 m depth.

LOG OF BOREHOLE BH02-5 (mid)

WSP

project |	Duntroon Quarry			**project no. |**	111-53312-00
client |	Walker Aggregates Inc.	**rig type |**	CME 75, track-mounted	**date started |**	2014/10/09
location |	Duntroon, Ontario	**method |**	Rock coring	**supervisor |**	BTC
position |	E: 559585 N: 4915584 (17T, Geodetic)	**coring |**	HQ core, OD=96mm, ID=64mm	**reviewer |**	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Water Content (%) & Plasticity	PID Readings	Well Details	Lab Data and Comments
0	513.3	**GROUND SURFACE**					513	Dynamic Cone 10 20 30 40; Unconfined / Pocket Penetrometer / Field Vane / Lab Vane 40 80 120 160	PL MC LL 10 20 30			GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		OVERBURDEN										
1							512					
2							511					
3							510					
4							509					
5							508					
6							507					
7							506					
8							505					
9	504.3 / 9.0	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; fossiliferous, strong core with a rough cut texture, thickly bedded, scratched by a knife; slightly weathered with muddy reddish brown staining on fracture surfaces, ~5%, vugs typically 1 mm to 3 mm, poor to fair RQD. (Flank facies)		R1		TCR = **100%** RQD = **63%**	504					
10				R2		TCR = **96%** RQD = **80%**	503					
11	502.6			R3		TCR = **92%** RQD = **34%**	502					10 cm void at 10.7 m depth.
12	500.9 / 12.4						501					

END OF BOREHOLE

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in bedrock at 9.24 m depth.

BOREHOLE NO. BH02-5

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 18, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 513.2 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec	REMARKS
0	SILT: BROWN SILT, SOME SAND, TRACE GRAVEL, TRACE CLAY, MOIST.	OVERBURDEN	H.Q. CASING						LOCATED IN NORTH–CENTRAL PART OF PROPERTY
9.3	DOLOSTONE: LIGHT GREY, MEDIUM TO COARSE GRAINED DOLOSTONE, CHAOTIC BEDDING, OCCASIONAL WHITE FOSSIL FRAGMENTS WITH "HONEYCOMB" TEXTURE UP TO 30 mm. 2%–5% VUGS UP TO 20 mm.	AMABEL UNIT 1		RC	100	93	0.23		
	11.6 TO 12.2 m SUBHORIZONTAL FRACTURES, IRREGULAR WITH WEAK ORANGE RUSTY STAINING.			RC	100	44	0.27		LOST CIRCULATION AT 11.2 m AND 12.8 m, ADVANCED CASING TO 13.4 m. CIRCULATION RECOVERED
			13.4 m	RC	100	100	0.27		
13.9	DOLOSTONE: PATCHY LIGHT GREY/LIGHT BROWN, UNIFORM, MEDIUM GRAINED DOLOSTONE WITH SACCHAROIDAL TEXTURE. OCCASIONAL CRINOIDAL FOSSIL FRAGMENT, WEAKLY BEDDED. 1%–2% VUGS UP TO 2 cm. OCCASIONAL BROWN STYLOLITE, INCREASING FREQUENCY WITH DEPTH.	AMABEL UNIT 2	OPEN H.Q. BOREHOLE	RC	100	92	0.29	2.9E–06	
								2.9E–06	
				RC	100	100	0.29	3.6E–07	
				RC	98	100	0.28	2.8E–07	NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
	– 19.5 m TO 20.7 m WHITE "SPECKLED" APPEARANCE WITH INCREASING CRINOIDAL FOSSIL FRAGMENTS, WEAKLY BEDDED.			RC	100	97	0.28	4.5E–07	

BOREHOLE NO. BH02-5

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 18, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 513.2 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec (E-11 to E-4)	REMARKS
20									
	DOLOSTONE CONTINUED	AMABEL UNIT 2	OPEN H.Q. BOREHOLE	RC	100	100	0.31	3.7E-07	LOCATED IN NORTH-CENTRAL PART OF PROPERTY
22				RC	100	100	0.38	1.3E-06	
				RC	100	100	0.32		
24	24.0								
	DOLOSTONE: MOTTLED BLUE-GREY/ GREY FINE GRAINED DOLOSTONE. STYLOLITES BECOMING GREY IN COLOUR. OCCASIONAL WISPY PARTING OF GREY SHALE UP TO 2 mm THICK, INCREASING FREQUENCY WITH DEPTH.	FOSSIL HILL FORMATION						5.1E-08	
26	- AT 24.9 m DISCOLORED BROWN HALO AT FRACTURE.			RC	100	100	0.31		
				RC	100	95	0.28	4.1E-08	
	FRACTURES OCCUR DOMINANTLY AT SHALE PARTINGS WITH GREY SEDIMENT ON FACES.								
28				RC	100	73	0.24	6.8E-08	
				RC	100	88	0.26		
30	- AT 29.6 m BECOMING PINKISH-BROWN WITH 2%-3% PATCHY MASSIVE PYRITE. LOCALLY UP TO 15% WHITE FOSSIL FRAGMENTS AT UPPER CONTACT.							3.8E-06	
	30.9								
	- 30.4 m TO 30.5 m GREEN SHALE INTERBED.	CH		RC	100	76	0.16		
32	31.9								
	SHALE: GREENISH-GREY, SOFT TO HARD, FISSILE.								
	BOREHOLE TERMINATED AT 31.9 m IN SHALE.								
34									
36									
38									NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
40									

BOREHOLE NO. BH02-6

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 20, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 529.5 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec	REMARKS
0									
2.0	SILT: BROWN SILT, SOME SAND, TRACE GRAVEL, TRACE CLAY, MOIST.	OVERBURDEN	H.Q. CASING						LOCATED SOUTH CENTRAL PROTION OF PROPERTY
	DOLOSTONE: GREY, MEDIUM TO COARSE GRAINED WITH WHITE FOSSIL FRAGMENTS, "HONEYCOMB" TEXTURE AND CHAOTIC BEDDING. 2%–3% VUGS WITH WHITE CHALKY APPEARANCE.	AMABEL FORMATION UNIT 1		RC	100	88	0.29		
4				RC	98	98	0.30		
	– 3.3 m TO 4.2 m CREAMY WHITE, UNIFORM, MEDIUM GRAINED DOLOSTONE WITH OCCASIONAL CRINOIDAL FOSSIL FRAGMENTS, WEAKLY BEDDED.								
6	WEAK BROWN SEDIMENT STAIN ON FRACTURE FACES.			RC	98	80	0.30		
				RC	100	100	0.38		
8									LOST CIRCULATION AT 7.0 m. ADVANCE CASING TO 8.2 m.
			8.2 m	RC	98	49	0.25		
8.8	– 8.7 m TO 9.1 m VERTICAL UNDULATING FRACTURE WITH WEAK RUSTY STAINING AND BROWN SEDIMENT ON FACES.								
10	DOLOSTONE: MOTTLED GREY/ LIGHT GREY, UNIFORM, MEDIUM GRAINED WITH UP TO 10% WHITE CRINOIDAL FOSSIL FRAGMENTS, WEAKLY BEDDED. "SPECKLED" APPEARANCE. 3%–5% VUGS UP TO 9 mm.	UNIT 2		RC	100	82	0.29		
				RC	98	100	0.26		
12			OPEN H.Q. BOREHOLE						
13.1				RC	100	83	0.33		
	DOLOSTONE: GREY, FINE GRAINED DOLOSTONE. HARD, BRITTLE WITH PATCHY VUGS UP TO 11 mm WITH FINE GRAINED CALCITE ± DOLOMITE INFILL.	AMABEL FORMATION UNIT 1							
14	– 13.6 m TO 17.9 m BECOMING MOTTLED LIGHT BROWN/ LIGHT GREY.			RC	100	100	0.31	1.0E–06	
				RC	98	56	0.31		
16								1.7E–06	
				RC	100	100	0.34		
18								1.3E–06	
				RC	100	100	0.34		NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
20				RC	100	100	0.35	1.0E–06	

BOREHOLE NO. BH02-6

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 20, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 529.5 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec (E⁻¹¹ – E⁻⁴)	REMARKS
20									
	DOLOSTONE CONTINUED	UNIT 1						1.0E−06	LOCATED SOUTH CENTRAL PROTION OF PROPERTY
20.7									
	DOLOSTONE: MOTTLED LIGHT BROWN/ LIGHT GREY DOLOSTONE, UNIFORM, FINE GRAINED WITH SACCHAROIDAL TEXTURE. OCCASIONAL CRINOIDAL FOSSIL FRAGMENTS, WEAKLY BEDDED. <2% VUGS UP TO 20 mm. OCCASIONAL POORLY DEVELOPED BROWN STYLOLITE, INCREASING FREQUENCY WITH DEPTH.	AMABEL FORMATION UNIT 2	OPEN H.Q. BOREHOLE	RC	100	84	0.27	7.3E−07	
22									
	– 23.4 m TO 23.7 m IRREGULAR VERTICAL, FRACTURE WITH BROWN RUSTY STAINING ON FACES.			RC	100	76	0.37	1.5E−06	
24									
				RC	100	100	0.35	2.0E−06	
26				RC	100	100	0.28		
	FRACTURES DOMINANTLY PARALLEL TO SUB−HORIZONTAL BEDDING.			RC	100	100	0.24	5.8E−07	
28									
				RC	100	100	0.28	4.1E−07	
30									
				RC	100	100	0.31	1.3E−06	
32				RC	100	73	0.32		
	– 32.1 m TO 32.7 m MOTTLED LIGHT GREY/ GREY FINE GRAINED, HARD, BRITTLE.			RC	100	100	0.37	2.7E−06	
34									
				RC	100	100	0.30	2.0E−06	
36									
				RC	100	100	0.29	1.2E−06	
38				RC	100	100	0.31		
				RC	100	100	0.29	7.8E−07	NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
40									

BOREHOLE NO. BH02-6

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: DECEMBER 20, 2002
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 529.5 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec	REMARKS
40	DOLOSTONE CONTINUED	UNIT 2	OPEN H.Q. BOREHOLE	RC	100	100	0.26	6.4E−07	LOCATED SOUTH CENTRAL PROTION OF PROPERTY
41.8				RC	100	100	0.22		
42	DOLOSTONE: MOTTLED BLUE−GREY/ GREY, FINE GRAINED DOLOSTONE. OCCASIONAL WISPY GREY SHALE PARTINGS INCREASING WITH DEPTH, UP TO 3 mm THICK. OCCASIONAL PINCH−AND−SWELL TYPE BEDS, NODULES OF LIGHT GREY CHERT UP TO 30 mm THICK. FRACTURES OCCUR DOMINANTLY AT STYLOLITE/ PARTINGS WITH GREY SHALE. − 43.7 m TO 44.2 m LIGHT BROWN DISCOLORATION, WITH WEAKLY DEVELOPED HALO.	FOSSIL HILL FORMATION						2.7E−09	
44				RC	100	100	0.17		
46				RC	100	100	0.17	1.7E−08	
				RC	100	100	0.16	9.0E−09	
47.3									
48	SHALE: GREENISH−GREY, SOFT TO HARD, FISSILE.	CH							
48.5	BOREHOLE TERMINATED AT 48.5 m IN SHALE.								
50									
52									
54									
56									
58									
60									

NOTE
AMABEL FORMATION:
UNIT 1: REEFAL FACIES
UNIT 2: FLANK FACIES
FH: FOSSIL HILL FM
CH: CABOT HEAD FM

LOG OF BOREHOLE BH03-7 (deep)

WSP

project |	Duntroon Quarry			**project no.** |	111-53312-00
client |	Walker Aggregates Inc.	**rig type** |	CME 75, track-mounted	**date started** |	2014/10/03
location |	Duntroon, Ontario	**method** |	Rock coring	**supervisor** |	BTC
position |	E: 559353 N: 4915510 (17T, Geodetic)	**coring** |	HQ core, OD=96mm, ID=64mm	**reviewer** |	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	SAMPLE Number	SAMPLE Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Water Content (%) & Plasticity	PID Readings	Well Details	Lab Data and Comments
0	510.6	**GROUND SURFACE**					510	Dynamic Cone 10 20 30 40; Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160	PL MC LL 10 20 30		▼	GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		OVERBURDEN										
1							509					
2							508					
3							507					
4							506					
5							505					
6	504.0						504					
7	6.6	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; thickly bedded; fossiliferous (fossil debris); strong core with a rough cut texture, scratched with a knife; slightly weathered appearance with minor rusy staining on fracture surfaces; vugs up to 5%, typically 1 mm to 2 mm. Poor to very poor RQD to 10.1 m depth, then good RQD. (Flank facies)			R1	TCR = **100**% RQD = **11**%	503					
8	502.6				R2	TCR = **100**% RQD = **16**%	502					
9	501.2	Reefal facies with an open vuggy appearance from 6.4 m to 10.1 m depth, broken core recovered as fragments and numerous vertical fractures. Reddish brown muddy infilling to 13.1 m depth.										
10					R3	TCR = **95**% RQD = **52**%	501					
11	499.6	Core becoming darker bluish grey with a decrease in vugs below 16.2 m and finer textured.					500					
12					R4	TCR = **100**% RQD = **78**%	499					
	498.1	Thin stylolytes (<1 mm) below 22.9 m depth, 2 to 3 per 0.3 m.										
13		White chert bed 25 mm thick at 24.6 m depth and 50 mm nodule at 25.3 m depth.			R5	TCR = **100**% RQD = **63**%	498					
		Gradational lower contact at 25.6 m depth at change in colour and texture.										
14	496.6				R6	TCR = **100**% RQD = **78**%	497					
15	495.1						496					
16					R7	TCR = **100**% RQD = **98**%	495					
	493.6						494					

(continued next page)

LOG OF BOREHOLE BH03-7 (deep)

project | Duntroon Quarry
project no. | 111-53312-00
client | Walker Aggregates Inc.
rig type | CME 75, track-mounted
date started | 2014/10/03
location | Duntroon, Ontario
method | Rock coring
supervisor | BTC
position | E: 559353 N: 4915510 (17T, Geodetic)
coring | HQ core, OD=96mm, ID=64mm
reviewer | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
17							493
18	492.0				R8	TCR = 98% RQD = 86%	492
19					R9	TCR = 98% RQD = 98%	491
20	490.5				R10	TCR = 98% RQD = 98%	490
21							
22	489.0				R11	TCR = 100% RQD = 100%	489
23	487.4				R12	TCR = 100% RQD = 95%	488
24	486.0				R13	TCR = 100% RQD = 88%	487
25	485.0						486
	25.6	**DOLOSTONE (Fossil Hill Formation)** Light pinkish brown to greyish brown; fine grained, stylolytes 10 to 12 per 0.3 m, 1 mm thick. Sharp lower contact on change in texture.			R14	TCR = 50% RQD = 97%	485
26	484.5						484
27	482.9						483
28	482.2				R15	TCR = * RQD = *	482
	28.4	**SHALE (Cabot Head Formation)** Greenish grey calcareous shale; completely weathered, plastic texture. Some reddish coloured beds up to 0.3 m thick, very poor RQD.					
29	481.4				R16	TCR = * RQD = *	481
30	479.9						480
	30.7	**END OF BOREHOLE** Borehole was open upon completion. Open hole well installed in borehole. Casing cemented in bedrock at 10.51 m depth.					

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160
Water Content (%) & Plasticity — PL MC LL: 10 20 30
PID Readings
Well Details
Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Dark coloured fine grained dolostone bed from 28.6 m to 28.9 m depth.

* Core barrel not catching core.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Oct 8, 2014	0.7	509.9

BOREHOLE NO. BH03-7

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: APRIL 10, 2003
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 510.3 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS I	MONITOR DETAILS II	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	WATER CONTENT % 10 20 30 (W_P – W_L)	REMARKS
0												
	CLAYEY SILT: LIGHT BROWN, MOTTLED BROWN, TRACE SAND, TRACE GRAVEL. OCCASIONAL LAMINAE OF FINE TO MEDIUM SAND.				SS	3		50				LOCATED NEAR WETLAND NORTHWEST QUADRANT OF PROPERTY
					SS	6		42				
1.4												
2	SILTY SAND: LIGHT BROWN, TRACE GRAVEL, TRACE CLAY. WET, COMPACT. OCCASIONAL LAMINAE OF FINE TO MEDIUM SAND.	OVERBURDEN			SS	10		54				
					SS	23		58				
4					SS	19		75				
					SS	27		71				
5.5					SS	11		75				
6	SANDY SILT TILL: GREY SANDY SILT, TRACE CLAY. VERY STIFF TO HARD.				SS	35		54				
6.6												
	DOLOSTONE: LIGHT BROWN TO LIGHT GREY, MEDIUM GRAINED WITH SACCHAROIDAL TEXTURE, WEAKLY BEDDED, 3–5% VUGS UP TO 20 mm, BROKEN.	UNIT 2			SS	24		79				
7.5					RC	–		100	90	0.21		
8	DOLOSTONE: PATCHY GREY TO LIGHT GREY, FINE GRAINED DOLOSTONE, UNIFORM TEXTURE, BROKEN TO BLOCKY. – AT 8.0 m FRACTURE WITH 5 mm THICK RED–BROWN SEDIMENT INFILL.	UNIT 1			RC	–		81	77	0.15		
9.2												
10	BOREHOLE TERMINATED AT 9.2 m IN DOLOSTONE.											
12												
14												
16												
18												NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
20												

BOREHOLE NO. BH03-8

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: APRIL 11, 2003
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 520.2 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec (E-11 to E-4)	REMARKS
0	SILT TILL: DARK BROWN, SILT SOME SAND, SOME GRAVEL, TRACE CLAY, OCCASIONAL COBBLE/BOULDER, VERY STIFF, DTPL.	OVERBURDEN	H.Q. CASING	SS	41				LOCATED ON WEST SIDE OF PROPERTY
2				SS					
4				SS					
6				SS					
6.2	DOLOSTONE: PATCHY GREY/LIGHT GREY, MEDIUM TO COARSE GRAINED DOLOSTONE, CHAOTIC TEXTURE, 3–5% VUGS UP TO 40 mm.	AMABEL FM. UNIT 1	7.3 m	RC	84	75	0.29		
8				RC	95	51	0.14	1.7E–06	
10				RC	98	81	0.16	2.0E–07	
	– BELOW 10.5 m BECOMING FINE GRAINED, 1–2% VUGS UP TO 20 mm.			RC	82	87	0.18		
11.8	DOLOSTONE: MOTTLED LIGHT BROWN/LIGHT GREY, UNIFORM MEDIUM GRAINED DOLOSTONE WITH SACCHAROIDAL TEXTURE, MODERATE TO WELL DEVELOPED BEDDING.	AMABEL FM. UNIT 2	OPEN H.Q. BOREHOLE	RC	100	100	0.29	2.5E–07	
12									
14				RC	100	83	0.25	3.4E–07	
16				RC	98	92	0.30	9.0E–07	
16.3	DOLOSTONE: PATCHY GREY/LIGHT GREY, FINE GRAINED DOLOSTONE, CHAOTIC TEXTURE, 1–2% VUGS UP TO 50 mm.	AMABEL FM. UNIT 1		RC	100	100	0.15	1.9E–07	
18				RC	100	93	0.21		NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
20				RC	100	100	0.18	2.2E–06	

BOREHOLE NO. BH03-8

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: APRIL 11, 2003
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 520.2 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec (E^{-11} – E^{-4})	REMARKS
20									
	DOLOSTONE: CONTINUED.	AMABEL FM. UNIT 1	OPEN H.Q. BOREHOLE	RC	98	100	0.25	3.9E−07	LOCATED ON WEST SIDE OF PROPERTY
22				RC	97	100	0.22		
				RC	100	97	0.26	1.3E−06	
24									
				RC	100	97	0.29	9.1E−07	
26	25.8								
	DOLOSTONE: LIGHT GREY, UNIFORM, MEDIUM GRAINED DOLOSTONE WITH "SPECKLED" APPEARANCE, WEAKLY BEDDED, 3–5% WHITE CRINOIDAL FOSSIL FRAGMENTS, BROKEN TO MASSIVE, RARE BROWN STYOLITES, OCCASIONAL GREY SHALE LAMINAE/PARTING UP TO 2 mm.			RC	100	100	0.31	4.0E−07	
28				RC	100	89	0.31		
	– BELOW 31.4 m INCREASING BROWN STYLOLITES.	AMABEL FM. UNIT 2						3.1E−07	
				RC	100	95	–		
30									
				RC	98	88	0.29	1.7E−06	
32				RC	100	100	0.22		
								1.5E−06	
	33.2								
	DOLOSTONE: BLUE–GREY, FINE GRAINED WITH SACCHAROIDAL TEXTURE, INCREASING STYLOLITES, BECOMING GREY IN COLOUR.			RC	93	100	0.22		
34								3.6E−07	
	– AT 34.1 m BECOMING PINKISH–BROWN WITH OCCASIONAL cm SCALE PINCH–AND –SWELL TYPE BEDS AND NODULES OF GREY CHERT, OCCASIONAL PYRITE	FOSSIL HILL FM		RC	93	100	–		
36	– AT 34.7 m FRACTURE WITH LIGHT BROWN HALO ± 30 mm.							6.2E−10	
	37.4								
	37.9 SHALE: GREENISH–GREY, SOFT TO HARD, FISSILE.	CH							CIRCULATION MAINTAINED FOR ENTIRE HOLE.
38	BOREHOLE TERMINATED AT 37.9 m IN SHALE.								NOTE AMABEL FORMATION: UNIT 1: REEFAL FACIES UNIT 2: FLANK FACIES FH: FOSSIL HILL FM CH: CABOT HEAD FM
40									

BOREHOLE NO. BH03-9

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: APRIL 14, 2003
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 518.5 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / min	HYDRAULIC CONDUCTIVITY m / sec	REMARKS
0									
	SILT TILL: DARK BROWN, SILT, SOME SAND, SOME GRAVEL, TRACE CLAY, OCCASIONAL BOULDER/COBBLE.	OVER-BURDEN	H.Q. CASING	SS	90				LOCATED IN SOUTHEAST PART OF PROPERTY.
1.6									
	DOLOSTONE: PATCHY LIGHT BROWN/LIGHT GREY, MEDIUM TO COARSE GRAINED DOLOSTONE WITH CHAOTIC TEXTURE, FREQUENT FOSSIL FRAGMENTS UP TO 60 mm, 3–5% VUGS UP TO 30 mm WITH OCCASIONAL CALCITE INFILL.	AMABEL FORMATION UNIT 1		RC	85	76	0.24		TEMPORARILY LOST CIRCULATION AT 1.8 m mBGS. LOST CIRCULATION AT 7.9 mBGS.
2									
				RC	45	19	0.16		
4			4.0 m						
				RC	100	76	0.14		
6									
				RC	100	100	0.12		
								9.9E−07	
8				RC	95	96	0.18		
				RC	100	100	0.17		
								4.1E−05	
10									
				RC	100	95	0.15		
								9.2E−07	
12									
				RC	100	88	0.18		
			OPEN H.Q. BOREHOLE						
14				RC	93	85	0.21	2.3E−06	
				RC	100	100	0.22		
								8.6E−06	
16									
				RC	100	100	0.21		
								8.9E−07	
18									
				RC	98	92	0.19		NOTE
									AMABEL FORMATION:
									UNIT 1: REEFAL FACIES
									UNIT 2: FLANK FACIES
				RC	95	100	0.19	4.3E−06	FH: FOSSIL HILL FM
20									CH: CABOT HEAD FM

BOREHOLE NO. BH03-9

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50
CLIENT: GEORGIAN AGGREGATES LIMITED
DATE: APRIL 14, 2003
BOREHOLE TYPE: H.Q. (64 mm) ROCK CORE
SUPERVISOR: PFR
GROUND ELEVATION: 518.5 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE % RECOVERY	SAMPLE RQD (%)	RATE OF DRILL PENETRATION m / mIn	HYDRAULIC CONDUCTIVITY m / sec (E-11 to E-4)	REMARKS
20									
	DOLOSTONE: CONTINUED. – 21.0 TO 21.3 m VERTICAL FRACTURE WITH MODERATE ORANGE STAINING.	UNIT 1	OPEN H.Q. BOREHOLE	RC	100	100	0.21	4.3E–07	LOCATED IN SOUTHEAST PART OF PROPERTY.
22									
	22.3								
	DOLOSTONE: LIGHT GREY, MEDIUM GRAINED DOLOSTONE, UNIFORM WITH "SPECKLED" TEXTURE. WEAKLY BEDDED, 3–5% CRINOIDAL FOSSIL FRAGMENTS (CRINOIDS), RARE BROWN STYLOLITES. – BREAKS DOMINANTLY PARALLEL TO BEDDING, MODERATE ORANGE STAINING, 23.8 m AND 26.5 m.	AMABEL FORMATION UNIT 2		RC	100	95	0.19	5.3E–06	
24				RC	100	95	0.18	5.2E–06	
				RC	100	100	0.19	1.7E–06	
26									
				RC	100	88	0.18	7.3E–07	
28									
				RC	100	100	0.20	1.5E–05	
30									
				RC	100	97	0.20	1.3E–06	
32									
	33.0			RC	100	95	0.16	5.2E–07	
	DOLOSTONE: BLUE–GREY, FINE TO MEDIUM GRAINED DOLOSTONE WITH SACCHAROIDAL TEXTURE, INCREASING STYLOLITES, BECOMING GREY. – AT 33.7 m FRACTURE WITH LIGHT BROWN HALO ±100 mm. – AT 34.6 m PINKISH–BROWN, FINE GRAINED DOLOSTONE WITH SACCHAROIDAL TEXTURE, OCCASIONAL SHALE LAMINAE UP TO 3 mm THICK, OCCASIONAL PINCH–AND–SWELL TYPE BED OR NODULE OF GREY CHERT, OCCASIONAL PYRITE. – AT 33.7 m FRACTURE WITH LIGHT BROWN HALO ±100 mm.	FOSSIL HILL FORMATION		RC	100	100	0.16	7.9E–09	
34									
				RC	95	100	0.13	4.9E–09	
36									
38									
	38.9								
	SHALE: GREENISH–GREY, SOFT TO HARD, FISSILE.	CH							
40	39.5 BOREHOLE TERMINATED AT 39.5 m IN SHALE								

NOTE
AMABEL FORMATION:
UNIT 1: REEFAL FACIES
UNIT 2: FLANK FACIES
FH: FOSSIL HILL FM
CH: CABOT HEAD FM

BOREHOLE NO. BH08-1

PROJECT NAME: DUNTROON EXPANSION - BRIDSON MONITORS
PROJECT NO.: 04-930521.52

CLIENT: WALKER INDUSTRIES HOLDINGS
DATE COMPLETED: Dec 02, 2008

BOREHOLE TYPE: HQ CORE
SUPERVISOR: SLW

GROUND ELEVATION: 511.5 mASL
REVIEWER: AGH

UTM CO-ORDINATES
UTM Zone: 17 NAD: 27
Easting: 560471
Northing: 4915197

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0.0	SILT: BROWN SILT, SOME SAND, TRACE GRAVEL, TRACE CLAY, MOIST. 50 mm SEAM OF COARSE GRAVEL AT 1.8 m.			SS1	29		54				
				SS2	18		46				
				SS3	63		54		63		
2.1	DOLOSTONE: LIGHT GREY TO WHITE DOLOSTONE BANDED IN DARK GREY, MEDIUM HARD, FRACTURED TO VERY BROKEN, WEATHERED. - VUGGY - FOSSILIFEROUS			RC4			75	0			AUGER REFUSAL AT 2.1 m. ASSUMED BEDROCK. CASING SEATED TO 2.6 m. OPEN HOLE INSTALLATION.
				RC5			100	54			
4.3	DOLOSTONE: GREY DOLOSTONE, BECOMING YELLOW TINGED WITH DEPTH, MEDIUM HARD, FRACTURED TO MASSIVE, SOME WEATHERING AND SEDIMENT INFILLING IN FRACTURES. - VUGGY - FOSSILIFEROUS			RC6			100	92			
				RC7			100	97			
7.4	DOLOSTONE: LIGHT GREY TO WHITE DOLOSTONE WITH DARK GREY MOTTLING, MEDIUM HARD, FRACTURED TO MASSIVE, SLIGHT WEATHERING. - NUMEROUS SMALL VUGS - FEW FOSSILS			RC8			100	79			
				RC9			97	95			
				RC10			98	99			
				RC11			100	95			
13.7	DOLOSTONE: GREY DOLOSTONE WITH INCREASING DARK GREY BANDING AND MOTTLING WITH DEPTH. BRONZE COLOURED, INCLUSIONS BEGINNING AT 18 m. MEDIUM HARD, FRACTURED TO MASSIVE, SOME STAINING AND WEATHERING IN FRACTURES. - VUGGY			RC12			100	88			
				RC13			100	82			
				RC14			100	90			
				RC15			100	92			
20.0											

GENIVAR GEOLOGIC B/W (M) WITH UTM 4-93052152 BRIDSON MONITORS.GPJ JAGGER HIMS BASIC.GDT 3/10/10

BOREHOLE NO. BH08-1

PROJECT NAME: DUNTROON EXPANSION - BRIDSON MONITORS
PROJECT NO.: 04-930521.52

CLIENT: WALKER INDUSTRIES HOLDINGS
DATE COMPLETED: Dec 02, 2008

BOREHOLE TYPE: HQ CORE
SUPERVISOR: SLW

GROUND ELEVATION: 511.5 mASL
REVIEWER: AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	UTM CO-ORDINATES / REMARKS
20.0											UTM Zone: 17 NAD: 27 Easting: 560471 Northing: 4915197
20.4	DOLOSTONE: CONTINUED.										
	DOLOSTONE: BLUE-GREEN MOTTLED DOLOSTONE, WHITE INCLUSIONS, MEDIUM HARD, TEXTURE IS SMOOTH, FRACTURED TO MASSIVE. (FOSSIL HILL FORMATION) - VUGS (MINOR)			RC16			100	93			
21.0											
22.0				RC17			100	92			
23.0											
				RC18			100	89			
24.0											
24.8											
24.9	SHALE: BLUE-GREEN GREY SHALE, VARIABLE SOFT TO HARD.			RC19			100	70			
25.0											
25.8	DOLOSTONE: BLUE-GREEN MOTTLED DOLOSTONE, MEDIUM HARD, FRACTURED TO MASSIVE.										
26.0											
	SHALE: BLUE-GREEN GREY SHALE, VARIABLE SOFT TO HARD. (CABOT HEAD FORMATION)			RC20			100	20			
27.0											
27.4	BOREHOLE TERMINATED AT 27.4 m IN SHALE.										BOREHOLE TERMINATED AT 27.4 m IN BLUE-GREEN SHALE. WATER LEVEL 2.49 mBGL MEASURED ON DEC. 5, 2008. FINAL STICK-UP 1.83 m ABOVE GROUND LEVEL.
28.0											
29.0											
30.0											
31.0											
32.0											
33.0											
34.0											
35.0											
36.0											
37.0											
38.0											
39.0											
40.0											

GENIVAR GEOLOGIC B/W (M) WITH UTM 4-93052152 BRIDSON MONITORS.GPJ JAGGER HIMS BASIC.GDT 3/10/10

BOREHOLE NO. BH08-2

PROJECT NAME: DUNTROON EXPANSION - BRIDSON MONITORS
PROJECT NO.: 04-930521.52

CLIENT: WALKER INDUSTRIES HOLDINGS
DATE COMPLETED: Dec 03, 2008

BOREHOLE TYPE: HQ CORE
SUPERVISOR: SLW

GROUND ELEVATION: 511.2 mASL
REVIEWER: AGH

UTM CO-ORDINATES
UTM Zone: 17 NAD: 27
Easting: 560484
Northing: 4915175

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0.0	SILT: DARK BROWN TO BROWN SILT, SOME SAND, TRACE GRAVEL, TRACE CLAY, MOIST, DENSE. ORGANIC MATTER AT GROUND SURFACE.			SS1	33		38		43		
1.0				SS2	43		21				
				SS3	50		100				
1.8											
2.0	DOLOSTONE: CREAMY WHITE DOLOSTONE, MOTTLED WITH LIGHT AND DARK GREY, MEDIUM HARD, BROKEN BECOMING MASSIVE WITH DEPTH, WEATHERED FRACTURES. - FOSSILIFEROUS - VUGGY - SOME CALCITE INFILL WITHIN LARGER VUGS			RC4			100	0			AUGER REFUSAL AT 1.8 m. ASSUMED BEDROCK.
				RC5			100	0			CASING SEATED TO 2.7 m. OPEN HOLE INSTALLATION.
3.0											
				RC6			100	52			
4.0											
5.0				RC7			100	60			
6.0											
				RC8			100	84			
7.0											
7.5											
8.0	DOLOSTONE: LIGHT GREY DOLOSTONE BANDED AND MOTTLED WITH DARK GREY, SOME RUST COLOURED MOTTLING, MEDIUM HARD, FRACTURED TO MASSIVE. FRACTURES SHOWING RUST STAINING WITH DEPTH. - NUMEROUS SMALL VUGS - FEW FOSSILS			RC9			100	89			
9.0											
				RC10			100	79			
10.0											
10.5											
11.0	DOLOSTONE: LIGHT GREY DOLOSTONE MOTTLED WITH DARK GREY, BROWN SPOTS, MEDIUM HARD, SMOOTH TEXTURE, MASSIVE. - VUGS (MINOR)			RC11			100	100			
12.0											
12.3											
13.0	DOLOSTONE: LIGHT GREY DOLOSTONE, VERY DARK GREY MOTTLING AND BANDING, MEDIUM HARD, MASSIVE. - VUGGY			RC12			100	98			
14.0											
				RC13			100	92			
15.0											
16.0				RC14			100	97			
16.6											
17.0	DOLOSTONE: LIGHT GREY TO MEDIUM GREY DOLOSTONE, DARK GREY MOTTLING, RUST COLOURED THIN BANDING, MEDIUM HARD, MASSIVE TO FRACTURED. - VUGGY			RC15			100	98			
18.0											
19.0				RC16			100	98			
19.7											
20.0	DOLOSTONE:										

GENIVAR GEOLOGIC B/W (M) WITH UTM 4-93052152 BRIDSON MONITORS.GPJ JAGGER HIMS BASIC.GDT 3/10/10

BOREHOLE NO. BH08-2

PROJECT NAME: DUNTROON EXPANSION - BRIDSON MONITORS
PROJECT NO.: 04-930521.52

CLIENT: WALKER INDUSTRIES HOLDINGS
DATE COMPLETED: Dec 03, 2008

BOREHOLE TYPE: HQ CORE
SUPERVISOR: SLW

GROUND ELEVATION: 511.2 mASL
REVIEWER: AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	UTM CO-ORDINATES / REMARKS
20.0											UTM Zone: 17 NAD: 27 Easting: 560484 Northing: 4915175
21.0	DOLOSTONE: CONTINUED. BLUE GREEN MOTTLED GREY DOLOSTONE, DARKER BLUE-GREEN THIN BANDING, BROWN SPOTS AND MOTTLING, WHITE INCLUSIONS, SMOOTH TEXTURE, MEDIUM HARD, MASSIVE TO FRACTURED. (FOSSIL HILL FORMATION) - VUGS (MINOR)			RC17			100	83			
22.0				RC18			100	80			
23.0											
24.0				RC19			100	78			
25.0											
25.0	SHALE: BLUE GREEN SHALE, SOFT, VERY BROKEN. (CABOT HEAD FORMATION)			RC20			100	40			
25.8	BOREHOLE TERMINATED AT 25.8 m IN SHALE.										BOREHOLE TERMINATED AT 25.8 m IN BLUE-GREEN SHALE. WATER LEVEL 2.26 mBGL MEASURED ON DEC. 5, 2008. FINAL STICK-UP 1.82 m ABOVE GROUND LEVEL.
26.0											
27.0											
28.0											
29.0											
30.0											
31.0											
32.0											
33.0											
34.0											
35.0											
36.0											
37.0											
38.0											
39.0											
40.0											

GENIVAR GEOLOGIC B/W (M) WITH UTM 4-93052152 BRIDSON MONITORS.GPJ JAGGER HIMS BASIC.GDT 3/10/10

BOREHOLE NO. BH08-3

PROJECT NAME: DUNTROON EXPANSION - BRIDSON MONITORS
PROJECT NO.: 04-930521.52

CLIENT: WALKER INDUSTRIES HOLDINGS
DATE COMPLETED: Dec 04, 2008

BOREHOLE TYPE: HQ CORE
SUPERVISOR: SLW

GROUND ELEVATION: 512.6 mASL
REVIEWER: AGH

UTM CO-ORDINATES
UTM Zone: 17 NAD: 27
Easting: 560447
Northing: 4915198

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0.0	SILT: DARK BROWN TO BROWN SILT, SOME SAND, TRACE GRAVEL, TRACE CLAY, MOIST, DENSE. ORGANIC MATTER AT GROUND SURFACE.			SS1	18		42				
1.0				SS2	27		50				
2.0				SS3	44		58		44		
3.0				SS4	27		58				
3.0	DOLOSTONE: CREAMY WHITE DOLOSTONE, MOTTLED WITH LIGHT AND DARK BLUE-GREY, MEDIUM HARD, BROKEN BECOMING MASSIVE WITH DEPTH, WEATHERING OF FRACTURES DECREASING WITH DEPTH. - VUGGY - FOSSILIFEROUS - SOME CALCITE INFILL WITHIN LARGER VUGS			RC5			100	84			AUGER REFUSAL AT 3.0 m. ASSUMED BEDROCK. CASING SEATED TO 3.2 m. OPEN HOLE INSTALLATION.
4.0											
5.0				RC6			100	78			
6.0											
7.0				RC7			100	83			
8.0											
9.0				RC8			95	91			
9.0	DOLOSTONE: LIGHT GREY DOLOSTONE BANDED AND MOTTLED WITH DARK GREY, MEDIUM HARD, FRACTURED TO MASSIVE. FRACTURES SHOWING STAINING AND SILTY INFILLING WITH DEPTH. - NUMEROUS SMALL VUGS - FEW FOSSILS			RC9			98	84			
10.0											
11.0				RC10			100	86			
12.0											
12.5	DOLOSTONE: LIGHT GREY DOLOSTONE MOTTLED WITH DARK GREY, BROWN SPOTS, MEDIUM HARD, SMOOTH TEXTURE, MASSIVE. - FEW VUGS			RC11			100	95			
13.0											
14.0				RC12			100	93			
14.0	DOLOSTONE: LIGHT TO MEDIUM GREY DOLOSTONE WITH DEPTH, DARK GREY BANDING, MEDIUM HARD, MASSIVE.										
15.0											
15.1	DOLOSTONE: MEDIUM GREY DOLOSTONE BECOMING LIGHT GREY WITH DEPTH. DARK GREY MOTTLING, RUST COLOURED THIN BANDING, MEDIUM HARD, MASSIVE. - NUMEROUS SMALL VUGS			RC13			100	98			
16.0											
17.0				RC14			100	92			
18.0											
19.0				RC15			100	93			
19.7	DOLOSTONE:										
20.0											

GENIVAR GEOLOGIC B/W (M) WITH UTM 4-93052152 BRIDSON MONITORS.GPJ JAGGER HIMS BASIC.GDT 3/10/10

BOREHOLE NO. BH08-3

PROJECT NAME: DUNTROON EXPANSION - BRIDSON MONITORS
PROJECT NO.: 04-930521.52

CLIENT: WALKER INDUSTRIES HOLDINGS
DATE COMPLETED: Dec 04, 2008

BOREHOLE TYPE: HQ CORE
SUPERVISOR: SLW

GROUND ELEVATION: 512.6 mASL
REVIEWER: AGH

UTM CO-ORDINATES
UTM Zone: 17 NAD: 27
Easting: 560447
Northing: 4915198

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
20.0											
	DOLOSTONE: CONTINUED. LIGHT GREY DOLOSTONE WITH INCREASING LIGHT/DARK BANDING WITH DEPTH, RUST COLOURED THIN BANDING, MEDIUM HARD, MASSIVE. - NUMEROUS SMALL VUGS			RC16			100	91			
21.0											
22.0				RC17			100	93			
22.1	DOLOSTONE: BLUE GREEN MOTTLED GREY DOLOSTONE, DARKER BLUE-GREEN THIN BANDING, INCREASING WHITE BANDING WITH DEPTH. WHITE INCLUSIONS AND BROWN SPOTTING WITH DEPTH. SMOOTH TEXTURE, MEDIUM HARD, MASSIVE TO FRACTURED. (FOSSIL HILL FORMATION) - VUGS (MINOR)										
23.0				RC18			100	88			
24.0											
25.0				RC19			100	90			
26.0											
27.0				RC20			100	84			
27.5	SHALE: BLUE GREEN SHALE, SOFT, VERY BROKEN. (CABOT HEAD FORMATION)										
28.0				RC21			100	11			
28.8	BOREHOLE TERMINATED AT 28.8 m IN SHALE.										BOREHOLE TERMINATED AT 28.8 m IN BLUE-GREEN SHALE. WATER LEVEL 3.53 mBGL MEASURED ON DEC. 5, 2008. FINAL STICK-UP 1.55 m ABOVE GROUND LEVEL.
29.0											
30.0											
31.0											
32.0											
33.0											
34.0											
35.0											
36.0											
37.0											
38.0											
39.0											
40.0											

GENIVAR GEOLOGIC B/W (M) WITH UTM 4-93052152 BRIDSON MONITORS.GPJ JAGGER HIMS BASIC.GDT 3/10/10

LOG OF BOREHOLE NW1

WSP

project | Duntroon Quarry		**project no.** | 111-53312-00
client | Walker Aggregates Inc.	**rig type** |	**date started** | 2014/08/26
location | Duntroon, Ontario	**method** | Rock coring	**supervisor** | KMT
position | E: 560059 N: 4915125 (17T, Geodetic)	**coring** | PQ core, OD=123mm, ID=85mm	**reviewer** | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
0	525.7	**GROUND SURFACE**					525
		OVERBURDEN					
1	524.5						524
	1.2	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; strong core with a rough texture, scratched by a knife, slightly weathered with rusty orange staining on fracture surfaces; thickly bedded, good to excellent RQD, vugs <5%, 2 to 4 mm. (Flank facies)			R1	TCR = **73**% RQD = **47**%	523
2							522
3							521
4	521.4	Reefal facies texture with more open cavities and increased fossil content from 1.2 m to 5.1 m, 11.0 m to 12.8 m and from 17.0 m to 18.2 m depth.			R2	TCR = **64**% RQD = **31**%	520
5							519
6	519.3	Core becoming darker bluish grey in colour below 17.1 m. Mottled grey and white appearance from 25.9 m to 37.0 m depth.			R3	TCR = **99**% RQD = **85**%	518
7							517
8							516
9	516.3	Gradational lower contact at change in texture at 37.0 m depth.			R4	TCR = **100**% RQD = **99**%	515
10							514
11							513
12	513.2				R5	TCR = **98**% RQD = **96**%	512
13							511
14							510
15	510.2				R6	TCR = **77**% RQD = **74**%	509
16							508
17							507
18	507.1				R7	TCR = **98**% RQD = **94**%	506
19							505
20							504
21	504.1				R8	TCR = **100**% RQD = **70**%	503
22							502
23	501.0						

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Vertical fracture from 22.0 m to 22.6 m depth.

(continued next page)

LOG OF BOREHOLE NW1

WSP

project |	Duntroon Quarry			**project no.** |	111-53312-00
client |	Walker Aggregates Inc.	**rig type** |		**date started** |	2014/08/26
location |	Duntroon, Ontario	**method** |	Rock coring	**supervisor** |	KMT
position |	E: 560059 N: 4915125 (17T, Geodetic)	**coring** |	PQ core, OD=123mm, ID=85mm	**reviewer** |	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
24	501.0				R8		501
25					R9	TCR = **100**% RQD = **100**%	500
26							499
27	498.0				R10	TCR = **94**% RQD = **89**%	498
28							497
29							496
30	494.9				R11	TCR = **100**% RQD = **93**%	495
31							494
32							493
33	491.9				R12	TCR = **1**% RQD = **1**%	492
34	491.0				R13	TCR = **1**% RQD = **1**%	491
35							490
36	488.8						489
37	488.7 / 37.0	**DOLOSTONE (Fossil Hill Formation)** Bluish grey fine grained stycolytic typically 3 to 5 per 0.3 m. Cherty lenses, 25 mm thick, 2 per 0.3 m from 37.8 m to 39.0 m depth. Sharp lower contact at change in texture.			R14	TCR = **100**% RQD = **96**%	488
38							487
39	485.8						486
40	484.6 / 41.2	**SHALE (Cabot Head Formation)** Greenish grey shale, calcareous, weathered, plastic texture. 0.6 m thick dolostone bed at 41.3 m.			R15	TCR = **100**% RQD = **100**%	485
41							484
42	483.0 / 42.7	**END OF BOREHOLE** Borehole was open upon completion. Open hole well installed in borehole. Casing cemented in bedrock at 2.24 m depth.					483

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Red mud filled vertical fracture, with enhanced weathering from 33.6 m to 36.8 m depth.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 17, 2014	13.2	512.5

LOG OF BOREHOLE NW2

WSP

project |	Duntroon Quarry			**project no. |**	111-53312-00
client |	Walker Aggregates Inc.	**rig type |**		**date started |**	2014/08/12
location |	Duntroon, Ontario	**method |**	Rock coring	**supervisor |**	TKC
position |	E: 560108 N: 4915311 (17T, Geodetic)	**coring |**	PQ core, OD=123mm, ID=85mm	**reviewer |**	KJF

Depth Scale (m)	Elev Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
0	531.4	**GROUND SURFACE**					531
		OVERBURDEN					
3	527.7						528
4	3.7	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; strong core with a rough cut texture, scratched by a knife; slightly weathered with rusty orange staining on fractures, vuggy typically 5%, thickly bedded, overall good to excellent RQD. (Flank facies)			R1	TCR = **99%** RQD = **90%**	527
6	524.8	Reefal facies texture with vugs and cavities up to 10 cm and increased fossil content from 12.2 m to 13.4 m and 36.7 m to 37.4 m.			R2	TCR = **100%** RQD = **95%**	525
8	522.4	Core becoming darker bluish grey below 24.2 m. Mottled grey and white to light pinkish brown below 42.1 m.			R3	TCR = **100%** RQD = **100%**	523
10	519.7	Gradational lower contact on change in texture.			R4	TCR = **98%** RQD = **79%**	521
12	516.9				R5	TCR = **99%** RQD = **72%**	519
14	513.7				R6	TCR = **95%** RQD = **71%**	517
16	510.3				R7	TCR = **95%** RQD = **90%**	515
18	507.1				R8	TCR = **97%** RQD = **87%**	513
20	503.8				R9	TCR = **100%** RQD = **97%**	511
22	500.7						509
24							507
26							505
28							503
29							502

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Water Content (%) & Plasticity
PL MC LL
10 20 30

PID Readings

Well Details

Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Some reddish mud infilling on vertical fracture from 18.1 m to 18.3 m.

(continued next page)

LOG OF BOREHOLE NW2

project | Duntroon Quarry | **project no. |** 111-53312-00

client | Walker Aggregates Inc. | **rig type |** | **date started |** 2014/08/12

location | Duntroon, Ontario | **method |** Rock coring | **supervisor |** TKC

position | E: 560108 N: 4915311 (17T, Geodetic) | **coring |** PQ core, OD=123mm, ID=85mm | **reviewer |** KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
30	500.7				R9		501
31							500
32					R10	TCR = 98% RQD = 74%	499
33	497.5						498
34							497
35					R11	TCR = 89% RQD = 76%	496
36							495
37	494.0						494
38					R12	TCR = 96% RQD = 93%	493
39							492
40	490.8						491
41					R13	TCR = 89% RQD = 85%	490
42							489
43	487.6						488
44					R14	TCR = 100% RQD = 70%	487
45							486
46	484.8 / 484.8 / 46.6	**DOLOSTONE (Fossil Hill Formation)** Dark pinkish brown fine grained, stylolytes typically 3 to 5 per 0.3 m, typically 3 mm thick, stylolytes increasing with depth. 10 cm coral fossil at lower contact. Sharp lower contact at first shale bed.			R15	TCR = 100% RQD = 90%	485
47							484
48							483
49	481.5						482
50					R16	TCR = 100% RQD = 89%	481
51	479.9						480
52	51.5	**SHALE (Cabot Head Formation)** Greenish grey calcareous, weathered, plastic texture. 10 cm thick at contact overlying 0.33 m thick dolostone bed. Reddish fossiliferous sandstone beds 25 mm to 100 mm thick comprise 20% of recovered core.					479
53	478.4				R17	TCR = 100% RQD = 82%	478
54	476.7						477
	54.7	**END OF BOREHOLE** Borehole was open upon completion. Open hole well installed in borehole. Casing cemented in bedrock at 3.66 m depth.					

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Broken core recovery from 32.3 m to 33.1 m.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 2, 2014	25.9	505.5

LOG OF BOREHOLE NW3

WSP

project |	Duntroon Quarry			**project no.** |	111-53312-00
client |	Walker Aggregates Inc.	**rig type** |		**date started** |	2014/09/12
location |	Duntroon, Ontario	**method** |	Rock coring	**supervisor** |	TKC/SLW
position |	E: 560217 N: 4915465 (17T, Geodetic)	**coring** |	PQ core, OD=123mm, ID=85mm	**reviewer** |	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Water Content (%) & Plasticity	PID Readings	Well Details	Lab Data and Comments
0	514.4	**GROUND SURFACE**					514					
		OVERBURDEN										
1							513					
2							512					
3							511				▼	
4	510.4						510					
	4.0	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; fossiliferous, strong core with a rough cut texture, scratched by a knife; porous to vuggy with vugs representing 10% to 20% of recovered core. Reddish muddy infilling to 11.4 m. Minor weathering with rusty stained fracture surfaces, thickly bedded, overall fair to good RQD.			R1	TCR = **97**% RQD = **46**%						
5							509					
6		Reefal facies appearance from 4.0 m to 13.6 m and from 14.9 m to 15.0 m with a more open vuggy texture and significant fossil debris, lower RQD values.										
7	507.8				R2	TCR = **99**% RQD = **76**%	508					
		Core darker in colour below 12.2 m. Core becoming mottled grey/white below 23.8 m with a wispy stylolytic texture.										
8							507					
		Gradational lower contact on change in texture.										
9	505.6						506					
10					R3	TCR = **97**% RQD = **55**%	505					Vertical fractures from 10.1 m to 11.5 m, 16.0 m to 16.3 m and 18.3 m to 18.8 m depth.
11							504					
12	502.4						503					
13					R4	TCR = **98**% RQD = **86**%	502					
14							501					
15	499.2						500					
	496.1				R5	TCR = **88**% RQD = **69**%	499					

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LOG OF BOREHOLE NW3

project | Duntroon Quarry
project no. | 111-53312-00
client | Walker Aggregates Inc.
rig type |
date started | 2014/09/12
location | Duntroon, Ontario
method | Rock coring
supervisor | TKC/SLW
position | E: 560217 N: 4915465 (17T, Geodetic)
coring | PQ core, OD=123mm, ID=85mm
reviewer | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
16							498
17					R5	TCR = **88%** RQD = **69%**	497
18	496.1						496
19					R6	TCR = **98%** RQD = **78%**	495
20							494
21	493.2						493
22					R7	TCR = **98%** RQD = **86%**	492
23							491
24	489.9						490
	489.6						
25	24.8	**DOLOSTONE (Fossil Hill Formation)** Light greyish brown to pinkish brown, fine grained with stylolytic to shaley partings 2 to 5 mm thick, typically 5 per 0.3 m. Sharp lower contact on first shale bed.					489
26					R8	TCR = **92%** RQD = **80%**	488
27	486.7						487
28	486.1						486
	28.4	**SHALE (Cabot Head Formation)** Greenish grey calcareous shale, weathered, plastic texture, thin reddish coloured fossiliferous sandstone beds from 28.7 m to 29.4 m depth.			R9	TCR = **100%** RQD = **57%**	
29	484.8						485
	29.6	**END OF BOREHOLE**					

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160
Water Content (%) & Plasticity — PL MC LL: 10 20 30
PID Readings
Well Details
Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in at least 1 m of competent bedrock.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 17, 2014	3.4	511.0

LOG OF BOREHOLE NW4

WSP

project | Duntroon Quarry		**project no.** | 111-53312-00
client | Walker Aggregates Inc.	**rig type** |	**date started** | 2014/08/28
location | Duntroon, Ontario	**method** | Rock coring	**supervisor** | KMT
position | E: 559674 N: 4915228 (17T, Geodetic)	**coring** | PQ core, OD=123mm, ID=85mm	**reviewer** | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
0	529.0	**GROUND SURFACE**					529
		OVERBURDEN					
1							528
2	526.3						527
3	2.7	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; fossiliferous, slightly brittle rock core with a rough cut texture, scratched by a knife; porous texture with interconnected vugs up to 50 mm. Reefal facies appearance (fossil debris) with a poorer RQD from contact to 28.5 m. Flank facies appearance below 28.5 m with less vugs and higher RQD. Minor weathering with mud infilling to 13.1 m, thickly bedded, fair to good RQD. (Flank facies)					526
4							525
5				R1		TCR = **97%** RQD = **89%**	524
6							523
7	522.1	Core becoming darker bluish grey in colour below 14.9 m. Mottled grey/white appearance below 34.1 m, shaley to wispy stylolytes (typically 5 per 0.3 m) below 41.5 m.		R2		TCR = **98%** RQD = **90%**	522
8							521
9	520.1	Gradational lower contact on change in texture at 43.2 m.		R3		TCR = **100%** RQD = **87%**	520
10							519
11							518
12	517.1			R4		TCR = **100%** RQD = **92%**	517
13							516
14							515
15	514.0			R5		TCR = **98%** RQD = **98%**	514
16							513
17							512
18	510.8			R6		TCR = **99%** RQD = **87%**	511
19							510
20							509
21	507.7			R7		TCR = **100%** RQD = **94%**	508
22							507
23							506
24	504.5			R8		TCR = **98%** RQD = **95%**	505
25							504
26							503
27	501.4			R9		TCR = **100%** RQD = **100%**	502
28							501
29							500
	498.4						

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued next page)

LOG OF BOREHOLE NW4

WSP

project | Duntroon Quarry		**project no.** | 111-53312-00
client | Walker Aggregates Inc.	**rig type** |	**date started** | 2014/08/28
location | Duntroon, Ontario	**method** | Rock coring	**supervisor** | KMT
position | E: 559674 N: 4915228 (17T, Geodetic)	**coring** | PQ core, OD=123mm, ID=85mm	**reviewer** | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
30	498.4				R9		499
31							498
32					R10	TCR = **99**% RQD = **96**%	497
33	495.2						496
34							495
35					R11	TCR = **98**% RQD = **98**%	494
36	492.3						493
37							492
38					R12	TCR = **98**% RQD = **98**%	491
39	489.1						490
40							489
41					R13	TCR = **100**% RQD = **84**%	488
42	486.1						487
43	485.8						486
44	43.2	**DOLOSTONE (Fossil Hill Formation)** Light pinkish grey to greenish grey, fine grained, stylolytic to shaley minor pyrite mineralization.			R14	TCR = **100**% RQD = **94**%	485
45		Sharp lower contact on first appearance of shale.					484
46	483.2						483
47	481.9				R15	TCR = **100**% RQD = **49**%	482
48	47.1	**SHALE (Cabot Head Formation)** Greenish grey calcareous shale, weathered, plastic texture, thin reddish coloured fossiliferous sandstone beds below 48.6 m.					481
	480.1						
	48.9	**END OF BOREHOLE**					

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane — 40 80 120 160

Water Content (%) & Plasticity: PL MC LL — 10 20 30

PID Readings

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Vertical fracture from 45.8 m to 47.1 m depth.

Dolostone bed from 47.1 m to 47.5 m depth.

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in bedrock at 3.66 m depth.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 5, 2014	10.6	518.4

library: genivar - library.glb report: gen log v1 file: bh logs.gpj

LOG OF BOREHOLE NW5

WSP

project | Duntroon Quarry		**project no.** | 111-53312-00
client | Walker Aggregates Inc.	**rig type** |	**date started** | 2014/08/27
location | Duntroon, Ontario	**method** | Rock coring	**supervisor** | KMT
position | E: 559641 N: 4915406 (17T, Geodetic)	**coring** | PQ core, OD=123mm, ID=85mm	**reviewer** | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
0	521.0	**GROUND SURFACE**					520
		OVERBURDEN					
1							519
2							
3							518
4							
5							517
6							
7							516
8							
9							515
10	510.6						
	10.4	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; strong core with a rough texture, scratched by a knife; slightly weathered with light rusty orange staining on fractures and some reddish mud staining to 27.1 m, thickly bedded, good to excellent RQD. Vugs <5%, typically 2 to 4 mm. (Flank facies)			R1	TCR = **99**% RQD = **94**%	514
11							
12							513
13	507.6	Reefal texture with more open cavities and increased fossil content from 15.0 m to 18.0 m and 18.8 m to 19.6 m.					
					R2	TCR = **100**% RQD = **94**%	512
14		Core becoming darker grey below 17.7 m.					
15	505.5	Mottled apeparance below 25.9 m with increasing vugs (15%). Less vuggy below 30.8 m.					511
					R3	TCR = **100**% RQD = **97**%	
16		Gradational lower contact on change in texture at 34.1 m.					510
17							
18	502.4						509
19					R4	TCR = **100**% RQD = **75**%	
20							508
21	499.4						
	496.8				R5		507

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Vertical fracture with red mud infilling from 20.7 m to 23.3 m and 24.0 m 24.6 m.

(continued next page)

LOG OF BOREHOLE NW5

project |	Duntroon Quarry			**project no.** |	111-53312-00
client |	Walker Aggregates Inc.	**rig type** |		**date started** |	2014/08/27
location |	Duntroon, Ontario	**method** |	Rock coring	**supervisor** |	KMT
position |	E: 559641 N: 4915406 (17T, Geodetic)	**coring** |	PQ core, OD=123mm, ID=85mm	**reviewer** |	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
22							498
23					R5	TCR = **100**% RQD = **29**%	497
24	496.8						496
25					R6	TCR = **100**% RQD = **86**%	495
26							494
27	493.7						493
28					R7	TCR = **99**% RQD = **94**%	492
29							491
30	490.6						490
31					R8	TCR = **98**% RQD = **89**%	489
32							488
33	487.5						487
34	486.9 / 34.1	**DOLOSTONE (Fossil Hill Formation)** Bluish grey, fine grained, stylolytes typically 1 to 2 per metre. Rare shale partings up to 1 cm thick. Sharp lower contact at first shale bed.			R9	TCR = **98**% RQD = **91**%	486
35							485
36	484.3						484
37	483.5 / 37.5	**SHALE (Cabot Head Formation)** Greenish grey calcareous, weathered plastic shale, thin reddish coloured fossiliferous sandstone bed below 39.2 m depth.			R10	TCR = **99**% RQD = **88**%	483
38							482
39	481.3 / 39.7						

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

END OF BOREHOLE

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in bedrock at 10.36 m depth.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 8, 2014	5.4	515.5

LOG OF BOREHOLE NW6

WSP

project |	Duntroon Quarry			**project no.** |	111-53312-00
client |	Walker Aggregates Inc.	**rig type** |	CME 75, track-mounted	**date started** |	2014/09/29
location |	Duntroon, Ontario	**method** |	Rock coring	**supervisor** |	BTC
position |	E: 559515 N: 4915354 (17T, Geodetic)	**coring** |	HQ core, OD=96mm, ID=64mm	**reviewer** |	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
0	520.7	**GROUND SURFACE**					520
		OVERBURDEN					
1							519
2							
	517.9						518
3	2.8	**DOLOSTONE (Amabel Formation)** Creamy white with a chalky dull appearance; uniform; fine to medium grained; strong core with a rough texture, scratched by a knife; slightly weathered with red mud infilling to 12.5 m then light rusty orange staining on fractures, thickly bedded, overall good to excellent RQD, vugs <5% with cavities up to 20 mm, vugs are poorly interconnected. (Flank facies)		R1		TCR = **81**% RQD = **44**%	517
4	516.4			R2		TCR = **100**% RQD = **100**%	
				R3		TCR = **95**% RQD = **73**%	516
5							
6	514.5	Minor reefal texture 20.7 m to 21.6 m with a more open, fossiliferous appearance.		R4		TCR = **100**% RQD = **82**%	515
7	513.1	Core becoming darker blue grey with a mottled appearance below 12.2 m. Less vuggy below 23.3 m. Core has mottled grey/white appearance below 23.3 m.		R5		TCR = **98**% RQD = **80**%	514
8							
9	511.5	Gradational lower contact at change in texture at 35.1 m.		R6		TCR = **100**% RQD = **85**%	513
10	510.0			R7		TCR = **100**% RQD = **72**%	512
11							
12	508.5			R8		TCR = **100**% RQD = **50**%	511
13	507.0			R9		TCR = **100**% RQD = **87**%	510
14							
15	505.4			R10		TCR = **100**% RQD = **100**%	509
16	503.9			R11		TCR = **100**% RQD = **0**%	508
17							
18	502.5			R12		TCR = **100**% RQD = **0**%	507
19	500.9			R13		TCR = **100**% RQD = **83**%	506
20							
21	499.4						505
	497.8			R14		TCR = **100**% RQD =	504
							503
							502
							501
							500
							499

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued next page)

LOG OF BOREHOLE NW6

WSP

project | Duntroon Quarry
project no. | 111-53312-00
client | Walker Aggregates Inc.
rig type | CME 75, track-mounted
date started | 2014/09/29
location | Duntroon, Ontario
method | Rock coring
supervisor | BTC
position | E: 559515 N: 4915354 (17T, Geodetic)
coring | HQ core, OD=96mm, ID=64mm
reviewer | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery
22						92%
	497.8				R14	TCR = 100% RQD = 92%
23					R15	TCR = 100% RQD = 96%
24	496.5					
					R16	TCR = 98% RQD = 98%
25	494.9					
26					R17	TCR = 100% RQD = 88%
27	493.4					
					R18	TCR = 100% RQD = 94%
28	491.9					
29					R19	TCR = 100% RQD = 96%
30	490.1					
					R20	TCR = 100% RQD = 93%
31						
32	488.6				R21	TCR = 100% RQD = 0%
33	487.1					
					R22	TCR = 100% RQD = 95%
34						
35	485.6 / 35.1	**DOLOSTONE (Fossil Hill Formation)** Bluish grey, fine grained, stylolytic typically 4 to 5 per 0.3 m up to 3 mm thick, chert as 1 cm thick veins 35.6 m to 36.1 m depth. Sharp lower contact at first shale bed appearance.			R23	TCR = 100% RQD = 72%
36	484.0					
37					R24	TCR = 100% RQD = 83%
38	482.5					
	482.0 / 38.7	**SHALE (Cabot Head Formation)** Greenish grey calcareous shale, weathered, plastic texture, thin reddish coloured fossiliferous sandstone beds from 40.2 m to 40.8 m depth.			R25	TCR = 35% RQD = 27%
39	481.0					
40					R26	TCR = 93% RQD = 0%
41	479.6 / 41.2					

END OF BOREHOLE

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in bedrock at 4.88 m depth.

Elevation Scale (mASL): 498, 497, 496, 495, 494, 493, 492, 491, 490, 489, 488, 487, 486, 485, 484, 483, 482, 481, 480

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160
Water Content (%) & Plasticity — PL, MC, LL: 10 20 30
PID Readings
Well Details
Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Oct 1, 2014	5.5	515.2

LOG OF BOREHOLE NW7

WSP

project | Duntroon Quarry		**project no.** | 111-53312-00
client | Walker Aggregates Inc.	**rig type** |	**date started** | 2014/09/04
location | Duntroon, Ontario	**method** | Rock coring	**supervisor** | KMT
position | E: 559466 N: 4915175 (17T, Geodetic)	**coring** | PQ core, OD=123mm, ID=85mm	**reviewer** | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
0	523.2	**GROUND SURFACE**					523
		OVERBURDEN					
1							522
2							521
3							520
4							519
5							518
6	516.5						517
7	6.7	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; strong core with a rough cut texture, scratched by a knife; slightly weathered with rusty orange staining on fracture surfaces, thickly bedded, good to excellent RQD, vugs typically 5%, 2 to 5 mm. (Flank facies)			R1	TCR = **76**% RQD = **43**%	516
8							515
9	513.9	Reefal facies texture with open porous structure slumped biohorns and abundant fossils from 12.5 m to 18.7 m depth.			R2	TCR = **100**% RQD = **100**%	514
10							513
11		Core becoming darker bluish grey below 12.5 m. Mottled blue/grey and white below 27.1 m.					512
12	510.9	Gradational lower contact on change in texture.			R3	TCR = **100**% RQD = **91**%	511
13							510
14							509
15	507.9				R4	TCR = **100**% RQD = **96**%	508
16							507
17							506
18	504.8				R5	TCR = **88**% RQD = **74**%	505
19							504
20							503
21	502.1				R6	TCR = **98**% RQD = **94**%	502
	499.0						

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued next page)

LOG OF BOREHOLE NW7

WSP

project | Duntroon Quarry		**project no.** | 111-53312-00
client | Walker Aggregates Inc.	**rig type** |	**date started** | 2014/09/04
location | Duntroon, Ontario	**method** | Rock coring	**supervisor** | KMT
position | E: 559466 N: 4915175 (17T, Geodetic)	**coring** | PQ core, OD=123mm, ID=85mm	**reviewer** | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
22							501
23					R6	TCR = **98%** RQD = **94%**	500
24	499.0						499
25					R7	TCR = **90%** RQD = **52%**	498
26							497
27	495.6						496
28					R8	TCR = **100%** RQD = **95%**	495
29							494
30	492.4						493
31					R9	TCR = **100%** RQD = **88%**	492
32							491
33	489.5						490
34					R10	TCR = **100%** RQD = **91%**	489
35							488
36	486.5						487
37	485.4				R11	TCR = **98%** RQD = **85%**	486
38	37.8	**DOLOSTONE (Fossil Hill Formation)** Bluish grey fine grained dolostone, stylolytes 2 to 3 per 0.3 m, 2 mm thick. Chert as 50 mm nodules from 38.3 m to 38.6 m. Sharp lower contact at first shale bed.					485
39							484
40	483.4						483
41	481.7				R12	TCR = **98%** RQD = **80%**	482
42	41.5 / 481.1 / 42.1	**SHALE (Cabot Head Formation)** Greenish grey calcareous shale, weathered, plastic texture, rare thin redish fossiliferous sandstone beds up to 20 mm thick.					

END OF BOREHOLE

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in bedrock at 6.71 m depth.

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Water Content (%) & Plasticity
PL MC LL
10 20 30

PID Readings

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Vertical fracture from 26.0 m to 27.2 m with minor orange staining.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 19, 2014	5.6	517.6

LOG OF BOREHOLE NW8

WSP

project | Duntroon Quarry		**project no.** | 111-53312-00
client | Walker Aggregates Inc.	**rig type** |	**date started** | 2014/09/15
location | Duntroon, Ontario	**method** | Rock coring	**supervisor** | BTC
position | E: 559244 N: 4915009 (17T, Geodetic)	**coring** | PQ core, OD=123mm, ID=85mm	**reviewer** | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	SAMPLE: Number	SAMPLE: Type	SAMPLE: SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Water Content (%) & Plasticity	PID Readings	Well Details	Lab Data and Comments
0	531.1	**GROUND SURFACE**					531	Dynamic Cone: 10 20 30 40				GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
1		**OVERBURDEN**					530	Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160	PL MC LL; 10 20 30			
2							529					
3							528				▼	
4	527.0 / 4.1						527					
5		**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; fossiliferous, strong core with a rough cut texture, scratched by a knife; slightly weathered with minor rusty orange staining and pitting, and vugs ~5% with vugs up to 1 cm, but locally greater 15% to 20% from 27.9 m to 33.2 m, 3 mm to 5 mm, thickly bedded, good to excellent RQD, except 37.0 m to 38.7 m where recovered core pieces are smaller. (Flank facies)			R1	TCR = **95%** RQD = **60%**	526					
6							525					
7	524.0						524					
8					R2	TCR = **100%** RQD = **100%**	523					
9	521.7	Reefal facies texture with higher porosity and more fossiliferous from 7.6 m to 9.4 m, 11.3 m to 11.4 m, 13.9 m to 14.3 m and 18.3 m to 20.6 m.					522					
10		Core becoming darker bluish grey below 13.4 m. Becoming less vuggy and mottled grey-white below 27.7 m.			R3	TCR = **98%** RQD = **88%**	521					
11							520					
12	518.6	Gradational lower contact on change in texture at 37.8 m.					519					
13							518					
14					R4	TCR = **100%** RQD = **90%**	517					
15	515.6						516					
16							515					
17					R5	TCR = **94%** RQD = **92%**	514					
18	512.5						513					
19							512					
20					R6	TCR = **100%** RQD = **84%**	511					
21	509.5						510					
22							509					
23					R7	TCR = **95%** RQD = **87%**	508					
	506.4											

(continued next page)

LOG OF BOREHOLE NW8

WSP

project | Duntroon Quarry		**project no.** | 111-53312-00
client | Walker Aggregates Inc.	**rig type** |	**date started** | 2014/09/15
location | Duntroon, Ontario	**method** | Rock coring	**supervisor** | BTC
position | E: 559244 N: 4915009 (17T, Geodetic)	**coring** | PQ core, OD=123mm, ID=85mm	**reviewer** | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
24	506.4				R7		507
25							506
26					R8	TCR = **100**% RQD = **97**%	505
27	503.4						504
28					R9	TCR = **100**% RQD = **98**%	503
29							502
30	500.3						501
31					R10	TCR = **100**% RQD = **100**%	500
32							499
33	497.3						498
34					R11	TCR = **95**% RQD = **90**%	497
35							496
36	494.2						495
37	493.3				R12	TCR = **100**% RQD = **62**%	494
38	37.8	**DOLOSTONE (Fossil Hill Formation)** Pinkish grey to greenish grey, fine grained, stylolytes 3 to 5 per 0.3 m, up to 3 mm thick, glauconite "blebs" associated wtih stylolytes below 41.0 m.					493
39							492
40	491.2	Sharp lower contact at first shale bed.					491
41	489.6				R13	TCR = **81**% RQD = **42**%	490
42	41.5	**SHALE (Cabot Head Formation)** Greenish grey calcareous shale, weathered, plastic texture, thin typically 5 to 10 cm reddish coloured fossiliferous sandstone beds below 41.9 m.					489
	488.1						
	43.0	**END OF BOREHOLE**					

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Water Content (%) & Plasticity
PL MC LL
10 20 30

PID Readings

Well Details

Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in bedrock at 3.96 m depth.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 25, 2014	3.5	527.6

library: genivar - library.glb report: gen log v1 file: bh logs.gpj

LOG OF BOREHOLE NW9

WSP

project | Duntroon Quarry		**project no.** | 111-53312-00
client | Walker Aggregates Inc.	**rig type** |	**date started** | 2014/09/11
location | Duntroon, Ontario	**method** | Rock coring	**supervisor** | KMT
position | E: 559031 N: 4914966 (17T, Geodetic)	**coring** | PQ core, OD=123mm, ID=85mm	**reviewer** | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
0	520.9	**GROUND SURFACE**					520
		OVERBURDEN					
1							519
2							518
3							517
4							516
5							515
6							514
7							513
8	513.0 / 7.9	**DOLOSTONE (Amabel Formation)** Creamy white with a chalky dull appearance; uniform; fine to medium grained; fossiliferous, strong core with a rough cut texture (drilling method artifact), scratched by a knife; slightly weathered, vugs (5%) typically 2 mm to 5 mm but up to 32 mm, vugs are interconnected, overall good to excellent RQD. (Flank facies)			R1	TCR = **98**% RQD = **80**%	512
9							511
10							510
11	509.9	Reefal facies texture, with higher porosity, lower RQD and more fossiliferous 9.1 m to 9.4 m, 11.6 m, to 14.3 m, 15.8 m to 20.4 m and 23.5 m to 23.8 m.			R2	TCR = **91**% RQD = **68**%	509
12							508
13							507
14	506.7	Core becoming darker bluish grey in colour below 14.9 m and less vuggy below 23.8 m. Becoming mottled gery/white below 32.3 m.			R3	TCR = **100**% RQD = **98**%	506
15	505.7	Gradational lower contact at 26.6 m at change in colour and texture.			R4	TCR = **100**% RQD = **99**%	505
16							504
17							503
18	502.9				R5	TCR = **99**% RQD = **83**%	502
19							501
20							500
21	499.8				R6	TCR = **100**% RQD = **78**%	499
22							498
23	496.9						497

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued next page)

LOG OF BOREHOLE NW9

project |	Duntroon Quarry			**project no.** |	111-53312-00
client |	Walker Aggregates Inc.	**rig type** |		**date started** |	2014/09/11
location |	Duntroon, Ontario	**method** |	Rock coring	**supervisor** |	KMT
position |	E: 559031 N: 4914966 (17T, Geodetic)	**coring** |	PQ core, OD=123mm, ID=85mm	**reviewer** |	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
24							496
25					R7	TCR = **100**% RQD = **97**%	495
26							494
27	493.8						493
28					R8	TCR = **101**% RQD = **94**%	492
29							491
30	490.7						490
31					R9	TCR = **100**% RQD = **98**%	489
32	488.3						488
33							487
34					R10	TCR = **99**% RQD = **98**%	486
35	485.4						485
36	484.3						484
37	36.6	**DOLOSTONE (Fossil Hill Formation)** Light bluish grey, fine grained, stylolytic to shaley partings 1 to 5 per 0.3 m up to 3 mm thick.			R11	TCR = **101**% RQD = **92**%	483
38	482.3	Sharp lower contact at first shale bed.					482
39							481
40	480.4				R12	TCR = **99**% RQD = **90**%	480
41	40.5	**SHALE (Cabot Head Formation)** Greenish grey calcareous shale, weathered, plastic texture, thin reddish coloured fossiliferous sandstone beds from 41.2 m to 41.7 m depth.					
	479.2						
	41.7						

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

END OF BOREHOLE

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in bedrock at 8.28 m depth.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 23, 2014	4.5	516.3

library: genivar - library.glb **report:** gen log v1 **file:** bh logs.gpj

LOG OF BOREHOLE NW10

WSP

project |	Duntroon Quarry			**project no.** |	111-53312-00
client |	Walker Aggregates Inc.	**rig type** |		**date started** |	0214/09/09
location |	Duntroon, Ontario	**method** |	Rock coring	**supervisor** |	KMT
position |	E: 558938 N: 4915593 (17T, Geodetic)	**coring** |	PQ core, OD=123mm, ID=85mm	**reviewer** |	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
0	509.7	**GROUND SURFACE**					509
		OVERBURDEN					
1							508
	507.7						
2	2.0	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; fossiliferous, strong core with a rough cut texture, scratched by a knife; vugs 2% to 3% typically 1 mm to 4 mm, slightly weathered (noticably less weathered than adjacent boreholes), thickly bedded, overall good to excellent RQD. (Flank facies)			R1	TCR = **90**% RQD = **53**%	507
3		Reefal texture with large vugs and fossiliferous from 4.3 m to 8.8 m.					506
4							
5	504.6	Core becoming darker grey in colour below 14.6 m, becoming mottled grey-white below 20.4 m.					505
					R2	TCR = **100**% RQD = **94**%	504
6		Gradational lower contact at change in texture at 25.6 m.					
7							503
8	501.4						502
					R3	TCR = **96**% RQD = **74**%	
9	500.4						501
10							500
					R4	TCR = **100**% RQD = **89**%	
11							499
12	497.2						498
					R5	TCR = **100**% RQD = **97**%	497
13							
14							496
	494.2						495
15	491.2				R6	TCR = **100**% RQD =	494

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued next page)

LOG OF BOREHOLE NW10

project | Duntroon Quarry
project no. | 111-53312-00
client | Walker Aggregates Inc.
rig type |
date started | 0214/09/09
location | Duntroon, Ontario
method | Rock coring
supervisor | KMT
position | E: 558938 N: 4915593 (17T, Geodetic)
coring | PQ core, OD=123mm, ID=85mm
reviewer | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
16		*(continued)*				97%	
17					R6	TCR = **100**% RQD = **97**%	493
18	491.2						492
19					R7	TCR = **98**% RQD = **97**%	491
20							490
21	488.3						489
22					R8	TCR = **100**% RQD = **95**%	488
23							487
24	485.2						486
25	484.1						485
26	25.6	**DOLOSTONE (Fossil Hill Formation)** Bluish grey, fine grained, stylolytic 3 to 5 per 0.3 m up to 3 mm thick, dark shaley partings 5 mm thick at 25 mm to 50 mm intervals below 28.0 m.			R9	TCR = **100**% RQD = **100**%	484
27	482.4	Sharp lower contact at first appearance of a shale bed.					483
28					R10	TCR = **100**% RQD = **54**%	482
29	480.3						481
	480.2 29.5	**SHALE (Cabot Head Formation)** Greenish grey calcareous shale, weathered, plastic texture.					

END OF BOREHOLE

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in bedrock at 2.59 m depth.

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160
Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings | Well Details | Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Glauconite as 1 cm blebs at 26.7 m depth.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 24, 2014	0.7	509.0

library: genivar - library.glb **report:** gen log v1 **file:** bh logs.gpj

BOREHOLE NO. NW10 Shallow

PROJECT NAME: DUNTROON EXPANSION
PROJECT NO.: 111-53312-00 52.1
CLIENT: WALKER AGGREGATES INC.
DATE COMPLETED: Sep 18, 2014
BOREHOLE TYPE: 123 mm OD PQ CORE
SUPERVISOR: BTC
GROUND ELEVATION: 509.7 mASL
REVIEWER: SLW

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	UTM CO-ORDINATES / REMARKS
0.0	509.7	OVERBURDEN										
2.0	507.7	DOLOSTONE (AMABEL FORMATION): CREAMY WHITE WITH A DULL APPEARANCE; UNIFORM; FINE TO MEDIUM GRAINED; FOSSILIFEROUS; STRONG CORE WITH A ROUGH CUT TEXTURE.										
3.8	505.9	MONITOR TERMINATED AT 3.82 m IN DOLOSTONE.										

UTM CO-ORDINATES
UTM Zone: 17 NAD: 83
Easting: 558940
Northing: 4915376

REMARKS

BOREHOLE NO. NW10-DP

PROJECT NAME: DUNTROON EXPANSION
PROJECT NO.: 111-53312-00 52.1
CLIENT: WALKER AGGREGATES INC.
DATE COMPLETED: Sep 18, 2014
BOREHOLE TYPE: 1 1/4" HAND AUGER
SUPERVISOR: BTC
GROUND ELEVATION: 509.7 mASL
REVIEWER: SLW

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	UTM CO-ORDINATES / REMARKS
0.0	509.7	TOP SOIL										
0.2	509.5	BROWN SILT AND SAND, TRACE GRAVEL. MOIST.										
0.8	508.9	DRIVEPOINT TERMINATED AT 0.8 m.										

UTM CO-ORDINATES
UTM Zone: 17 NAD: 83
Easting: 558940
Northing: 4915376

REMARKS

LOG OF BOREHOLE IW1

WSP

project |	Duntroon Quarry			**project no.** |	111-53312-00
client |	Walker Aggregates Inc.	**rig type** |		**date started** |	2014/08/05
location |	Duntroon, Ontario	**method** |	Rock coring	**supervisor** |	BTC/TKC
position |	E: 560551 N: 4915269 (17T, Geodetic)	**coring** |	PQ core, OD=123mm, ID=85mm	**reviewer** |	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) & Undrained Shear Strength (kPa)	Water Content (%) & Plasticity	PID Readings	Well Details	Lab Data and Comments
0	511.5	**GROUND SURFACE**					511					
		OVERBURDEN										
1							510					
2							509					
3							508					
4	507.1											
	4.4	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; strong core with a rough cut texture, scratched by a knife; slightly weathered with rusty orange staining on fracture surfaces, thickly bedded, good RQD, vugs typically 5%, 2 to 6 mm. (Flank facies)			R1	TCR = **100**% RQD = **32**%	507					
5		Reefal facies texture with open cavities and increased and mounded fossil content from 4.6 m to 6.1 m and 10.1 m to 11.9 m.					506					
6							505					
7	504.2	Core becoming darker bluish grey below 7.6 m. Mottled pinkish grey appearance below 17.1 m.										Broken core recovery from 7.0 m to 7.5 m depth.
		Gradational lower contact on change in texture.			R2	TCR = **99**% RQD = **64**%	504					
8							503					
9	502.4										▼	
					R3	TCR = **98**% RQD = **78**%	502					
10							501					
11							500					
12	499.4											Broken core recovery from 11.8 m to 13.3 m depth with minor red mud infilling.
					R4	TCR = **98**% RQD = **80**%	499					
13							498					
14							497					
	496.3											

(continued next page)

LOG OF BOREHOLE IW1

project | Duntroon Quarry
project no. | 111-53312-00
client | Walker Aggregates Inc.
rig type |
date started | 2014/08/05
location | Duntroon, Ontario
method | Rock coring
supervisor | BTC/TKC
position | E: 560551 N: 4915269 (17T, Geodetic)
coring | PQ core, OD=123mm, ID=85mm
reviewer | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
15					R4		
16							496
17					R5	TCR = 100% RQD = 72%	495
18	493.3						494
19							493
20					R6	TCR = 100% RQD = 80%	492
	491.1						
	20.4	**DOLOSTONE (Fossil Hill Formation)** Bluish grey fine grained dolostone, stylolytes 2 to 3 per 0.3 m, 2 to 3 mm thick, 12 mm chert nodule at 23.9 m.					491
21	490.2	Sharp lower contact at first appearance of shale.					
22							490
23					R7	TCR = 100% RQD = 73%	489
24	487.2						488
	24.3	**SHALE (Cabot Head Formation)** Greenish grey calcareous shale, weathered, plastic texture. 0.3 m dolostone bed at 24.4 m.					487
25							
26					R8	TCR = 100% RQD = 9%	486
27	484.2						485
	27.3	**END OF BOREHOLE**					

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160
Water Content (%) & Plasticity — PL MC LL: 10 20 30
PID Readings
Well Details
Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in 3 m of competent bedrock.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Aug 6, 2014	8.8	502.8

library: genivar - library.glb report: gen log v1 file: bh logs.gpj

LOG OF BOREHOLE IW1a

WSP

project |	Duntroon Quarry			**project no.** |	111-53312-00
client |	Walker Aggregates Inc.	**rig type** |		**date started** |	2014/08/06
location |	Duntroon, Ontario	**method** |	Rock coring	**supervisor** |	BTC/TKC
position |	E: 560554 N: 4915269 (17T, Geodetic)	**coring** |	PQ core, OD=123mm, ID=85mm	**reviewer** |	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	SAMPLE: Number	SAMPLE: Type	SAMPLE: SPT N-Value / Core Recovery
0	511.4	**GROUND SURFACE**				
		OVERBURDEN				
4	507.0 / 4.4	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; strong core with a rough cut texture, scratched by a knife; slightly weathered with rusty orange staining on fracture surfaces, thickly bedded, good RQD, vugs typically 5%, 2 to 6 mm. (Flank facies) Reefal facies texture with open cavities and increased and mounded fossil content from 4.6 m to 6.1 m and 10.1 m to 11.9 m. Core becoming darker bluish grey below 7.6 m. Mottled pinkish grey appearance below 17.1 m. Gradational lower contact on change in texture.				

Elevation Scale (mASL): 511, 510, 509, 508, 507, 506, 505, 504, 503, 502, 501, 500, 499, 498, 497

Penetration Test Values (Blows / 0.3m) × Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160

Water Content (%) & Plasticity: PL MC LL 10 20 30

PID Readings

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued next page)

LOG OF BOREHOLE IW1a

project |	Duntroon Quarry	**project no.** |	111-53312-00
client |	Walker Aggregates Inc.	**rig type** |	
location |	Duntroon, Ontario	**method** |	Rock coring
position |	E: 560554 N: 4915269 (17T, Geodetic)	**coring** |	PQ core, OD=123mm, ID=85mm
date started |	2014/08/06		
supervisor |	BTC/TKC		
reviewer |	KJF		

SUBSURFACE PROFILE | SAMPLE

Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY (continued) | Graphic Plot | Number | Type | SPT N-Value / Core Recovery | Elevation Scale (mASL) | Penetration Test Values (Blows / 0.3m) × Dynamic Cone 10 20 30 40 | Undrained Shear Strength (kPa) ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane 40 80 120 160 | Water Content (%) & Plasticity PL MC LL 10 20 30 | PID Readings | Well Details | Lab Data and Comments / GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

491.0 / 20.4 — **DOLOSTONE (Fossil Hill Formation)**
Bluish grey fine grained dolostone, stylolytes 2 to 3 per 0.3 m, 2 to 3 mm thick, 12 mm chert nodule at 23.9 m.

Sharp lower contact at first appearance of shale.

487.1 / 24.3 — **SHALE (Cabot Head Formation)**
Greenish grey calcareous shale, weathered, plastic texture. 0.3 m dolostone bed at 24.4 m.

484.1 / 27.3

END OF BOREHOLE

Borehole was open upon completion.

No samples collected. Stratigraphy inferred from adjacent borehole IW1.

Open hole well installed in borehole. Casing cemented in 3 m of competent bedrock.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 15, 2014	8.8	502.6

LOG OF BOREHOLE IW2

WSP

project | Duntroon Quarry		**project no.** | 111-53312-00
client | Walker Aggregates Inc.	**rig type** |	**date started** | 2014/08/11
location | Duntroon, Ontario	**method** | Rock coring	**supervisor** | SLW/TKC
position | E: 560521 N: 4915489 (17T, Geodetic)	**coring** | PQ core, OD=123mm, ID=85mm	**reviewer** | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
0	508.7	**GROUND SURFACE**					508
		OVERBURDEN					
1							507
2							506
3							505
4	504.0						504
5	4.7	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform; fine to medium grained; strong core with a rough texture, scratched by a knife, slightly weathered with minor light rusty orange staining on fracture surfaces; thickly bedded, good to excellent RQD, vugs <5%, typically 2 to 4 mm. (Flank facies)			R1	TCR = **100**% RQD = **84**%	503
6		Rare thin reefal facies beds 50 mm thick with open, fossiliferous appearance.					502
7		Core becoming darker bluish grey in colour below 7.3 m. Becoming mottled grey white below 15.5 m.					501
8	500.8	Gradational lower contact at change in texture.			R2	TCR = **100**% RQD = **100**%	500
9							499
10	498.9				R3	TCR = **100**% RQD = **98**%	498
11							497
12							496
13	495.9				R4	TCR = **97**% RQD = **78**%	495
14							494
	492.7						

Penetration Test Values (Blows / 0.3m) — × Dynamic Cone — 10 20 30 40

Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane — 40 80 120 160

Water Content (%) & Plasticity — PL MC LL — 10 20 30

PID Readings

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

(continued next page)

LOG OF BOREHOLE IW2

project | Duntroon Quarry
project no. | 111-53312-00
client | Walker Aggregates Inc.
rig type |
date started | 2014/08/11
location | Duntroon, Ontario
method | Rock coring
supervisor | SLW/TKC
position | E: 560521 N: 4915489 (17T, Geodetic)
coring | PQ core, OD=123mm, ID=85mm
reviewer | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
15					R4	TCR = **97%** RQD = **78%**	
	492.7						493
16							
							492
17					R5	TCR = **97%** RQD = **87%**	
							491
18							
	489.8						490
19							
	488.9						489
	19.8	**DOLOSTONE (Fossil Hill Formation)** Bluish grey fine grained stycolytic typically 6 per 0.3 m. Sharp lower contact on first appearance of shale.			R6	TCR = **97%** RQD = **56%**	
20							488
21							
	486.6						487
22	486.3						
	22.4	**SHALE (Cabot Head Formation)** Greenish grey calcareous, weathered, plastic shale bed 25 mm thick. Dolostone bed from 22.4 m to 23.2 m depth. Three 25 m reddish coloured fossiliferous sandstone beds below 23.5 m depth.			R7	TCR = **97%** RQD = **61%**	486
23							
	484.7						485
24	24.0						

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160
Water Content (%) & Plasticity — PL MC LL: 10 20 30
PID Readings
Well Details
Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Broken core recovery from 20.4 m to 20.4 m depth.

Vertical fracture from 21.5 m to 21.7 m depth.

END OF BOREHOLE

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in bedrock at 4.27 m depth.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 16, 2014	1.7	507.0

library: genivar - library.glb **report:** gen log v1 **file:** bh logs.gpj

LOG OF BOREHOLE IW3

WSP

project | Duntroon Quarry		**project no.** | 111-53312-00
client | Walker Aggregates Inc.	**rig type** |	**date started** | 2014/09/05
location | Duntroon, Ontario	**method** | Rock coring	**supervisor** | KMT
position | E: 560214 N: 4915919 (17T, Geodetic)	**coring** | PQ core, OD=123mm, ID=85mm	**reviewer** | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Water Content (%) & Plasticity	PID Readings	Well Details	Lab Data and Comments / GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
0	518.5	**GROUND SURFACE**					518	Dynamic Cone: 10 20 30 40				
		OVERBURDEN						Undrained Shear Strength (kPa): ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane; 40 80 120 160	PL MC LL; 10 20 30			
1							517					
2							516					
3							515					
	514.7											
4	3.8	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform fine to medium grained; fossiliferous; strong core with rough texture; scratched with a knife; thickly bedded; slightly weathered with minor rusty staining on fracture surfaces; vugs throughout (~5%), 2 to 4 mm; fair to good RQD. (Flank facies)			R1	TCR = **99**% RQD = **65**%	514					
5							513					
6							512					
	511.9	Reefal facies with an open vuggy appearance up to 30% vugs, and a chalky texture, minor reddish muddy infilling with poor RQD from 3.8 m to 8.5 m and from 15.6 m to 16.8 m depth.			R2	TCR = **100**% RQD = **55**%						
7		Core becoming darker greyish brown in colour below 24.4 m, finer grained texture with wispy stylolytic contacts and a decrease in vugs (~1%).					511					
8							510					
	509.6	Gradational lower contact at change in colour and texture.										
9							509					
10					R3	TCR = **99**% RQD = **89**%	508					
11							507					
	506.5											
12							506					
13												
14					R4	TCR = **99**% RQD = **82**%	505					
	503.4						504					
15												
16							503				▼	
					R5	TCR = **100**% RQD = **85**%	502					
17												
	500.3						501					

(continued next page)

LOG OF BOREHOLE IW3

project | Duntroon Quarry
project no. | 111-53312-00
client | Walker Aggregates Inc.
rig type |
date started | 2014/09/05
location | Duntroon, Ontario
method | Rock coring
supervisor | KMT
position | E: 560214 N: 4915919 (17T, Geodetic)
coring | PQ core, OD=123mm, ID=85mm
reviewer | KJF

Depth Scale (m)	Elev Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
18					R5		500
19							499
20					R6	TCR = **100**% RQD = **67**%	498
21	497.3						497
22					R7	TCR = **100**% RQD = **87**%	496
23							495
24	494.3						494
25					R8	TCR = **99**% RQD = **96**%	493
26	492.1						492
	26.4	**DOLOSTONE (Fossil Hill Formation)** Light greyish brown to pinkish brown; fine grained with wispy to wavy stylolytes (2 to 5 per 0.3 m), up to 2 mm thick, minor pyrite mineralization.					
27	491.2						491
28					R9	TCR = **100**% RQD = **72**%	490
29							489
30	488.1						488
31							487
32					R10	TCR = **56**% RQD = **44**%	486
33	484.8						485
	33.7						

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa) — ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane: 40 80 120 160
Water Content (%) & Plasticity — PL MC LL: 10 20 30
PID Readings
Well Details
Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Lower 1.8 m of core lost to drilling. Cabot Head Shale not recovered, but confirmed by return water fragments.

END OF BOREHOLE

Borehole was open upon completion.

Open hole well installed in borehole. Casing cemented in bedrock at 6.86 m depth.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 29, 2014	15.7	502.9

LOG OF BOREHOLE IW4

WSP

project |	Duntroon Quarry	**project no. |**	111-53312-00
client |	Walker Aggregates Inc.	**rig type |**		**date started |**	2014/09/08
location |	Duntroon, Ontario	**method |**	Rock coring	**supervisor |**	KMT
position |	E: 560023 N: 4916216 (17T, Geodetic)	**coring |**	PQ core, OD=123mm, ID=85mm	**reviewer |**	KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery
0	510.4	**GROUND SURFACE**				
		OVERBURDEN				
	500.5					
10	9.9	**DOLOSTONE (Amabel Formation)** Creamy white with a dull appearance; uniform fine to medium grained; fossiliferous; strong core with rough texture; scratched with a knife; thickly bedded; slightly weathered with minor rusty staining on fracture surfaces; vugs throughout (~5%) up to 1 cm but typically 2 mm to 4 mm. Overall fair to good RQD. (Flank facies)			R1	TCR = * RQD = *
11	499.0	Slight reefal facies appearance (11.0 m - 13.9 m depth) with poor recovery, vuggy, reddish mud staining and poor RQD.			R2	TCR = * RQD = *
12		Core becoming darker bluish in colour below 18.1 m depth with shaley stylolytes (2 mm to 3 mm) and wispy stylolytic contacts typically 1 per 0.3 m.				
13	496.5	Gradational lower contact at 20.7 m depth at change in colour and texture.			R3	TCR = **77**% RQD = **33**%
14	495.3					

Elevation Scale (mASL): 510, 509, 508, 507, 506, 505, 504, 503, 502, 501, 500, 499, 498, 497, 496

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160

Water Content (%) & Plasticity — PL MC LL: 10 20 30

PID Readings

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

* Core barrel not catching core.

(continued next page)

LOG OF BOREHOLE IW4

project | Duntroon Quarry
project no. | 111-53312-00
client | Walker Aggregates Inc.
rig type |
date started | 2014/09/08
location | Duntroon, Ontario
method | Rock coring
supervisor | KMT
position | E: 560023 N: 4916216 (17T, Geodetic)
coring | PQ core, OD=123mm, ID=85mm
reviewer | KJF

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY (continued)	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Water Content (%) & Plasticity	PID Readings	Well Details	Lab Data and Comments
15							495					
16							494					Vertical fracture 16.3 m to 16.9 m.
17					R4	TCR = 100% RQD = 66%	493				▼	
18	492.3						492					
19					R5	TCR = 100% RQD = 93%	491					
20	489.7						490					Pyrite mineralization for 5 cm at 20.4 m.
21	489.4 20.7	**DOLOSTONE (Fossil Hill Formation)** Light greyish brown to pinkish brown; fine grained with wispy blue stylolytes typically 3 mm to 5 mm thick; minor pyrite mineralization; occasional chert as white crystals 2 mm to 3 mm. 30 mm reddish calcareous sandstone bed at 21.9 m depth. Sharp lower contact on change in texture.			R6	TCR = 90% RQD = 76%	489					
22							488					
23							487					
24	486.2						486					
25	485.7 24.7	**SHALE (Cabot Head Formation)** Greenish grey calcareous shale; soft, muddy appearance.			R7	TCR = 97% RQD = 77%	485					
	485.0 25.4	**END OF BOREHOLE** Borehole was open upon completion. Open hole well installed in borehole. Casing cemented in bedrock at 6.86 m depth.										

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40
Undrained Shear Strength (kPa): ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane 40 80 120 160
Water Content (%) & Plasticity: PL MC LL 10 20 30
Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Sep 30, 2014	17.4	493.0

BOREHOLE NO. DP99-1

PROJECT NAME: DUNTROON QUARRY | **PROJECT NO.:** 930521.08

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. | **DATE:** JUNE 29, 1999

BOREHOLE TYPE: 60 mm ID HAND AUGER | **GEOLOGIST:** WDN

GROUND ELEVATION: 511.8 mASL | **REVIEWER:** AGH

DEPTH (m)		STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0												
		ORGANICS BLACK SILTY, FIBROUS ORGANICS, SATURATED										
	0.4											
0.5		SILT, SOME CLAY BROWN, MOTTLED WITH ORANGE, RED, AND GREEN SILT, SOME CLAY, STONY, WET										
1.0	1.0											0.45 m SLOT 10 SCREEN 0.50 m SAND PACK
		AUGER REFUSAL AT 1.0 m ON ASSUMED BEDROCK										
1.5												
2.0												
2.5												
3.0												
3.5												
4.0												
4.5												
5.0												

BOREHOLE NO. DP99-2

PROJECT NAME: DUNTROON QUARRY | **PROJECT NO.:** 930521.08

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. | **DATE:** JUNE 29, 1999

BOREHOLE TYPE: 60 mm ID HAND AUGER | **GEOLOGIST:** WDN

GROUND ELEVATION: 512.1 mASL | **REVIEWER:** AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0	ORGANICS DARK BROWN TO BLACK SILTY FIBROUS ORGANICS, BECOMES PEATY WITH DEPTH, SATURATED										
0.5											
1.0											0.45 m SLOT 10 SCREEN 0.50 m SAND PACK
1.3	CALCAREOUS AUGER CUTTINGS										
1.5	AUGER REFUSAL AT 1.0 m ON ASSUMED BEDROCK										
2.0											
2.5											
3.0											
3.5											
4.0											
4.5											
5.0											

BOREHOLE NO. DP99-3

PROJECT NAME: DUNTROON QUARRY | **PROJECT NO.:** 930521.08

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. | **DATE:** JULY 21, 1999

BOREHOLE TYPE: 60 mm ID HAND AUGER | **GEOLOGIST:** AGH

GROUND ELEVATION: 513.6 mASL | **REVIEWER:**

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0	ORGANICS DARK BROWN TO BLACK SILTY FIBROUS ORGANICS, SOME ORGANIC SILT, ROOTLETS AND WOOD VEGETATION, SOFT, MOIST TO WET, BECOMING SATURATED AT ABOUT 1.5 m										
0.5											
1.0											0.45 m SLOT 10 SCREEN 0.50 m SAND PACK
1.5											
2.0											
2.14 / 2.20	GREY SILTY SAND, SATURATED										
	HOLE TERMINATED AT 2.20 m IN GREY SILTY SAND										
2.5											
3.0											
3.5											
4.0											
4.5											
5.0											

BOREHOLE NO. DP99-4

PROJECT NAME: DUNTROON QUARRY | **PROJECT NO.:** 930521.08

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. | **DATE:** JUNE 30, 1999

BOREHOLE TYPE: 60 mm ID HAND AUGER | **GEOLOGIST:** WDN

GROUND ELEVATION: 511.4 mASL | **REVIEWER:** AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0	ORGANICS BLACK FIBROUS ORGANICS, PEAT, SATURATED										
0.5											
1.0											0.45 m SLOT 10 SCREEN 0.50 m SAND PACK
1.35	SILT, SOME FINE SAND: GREENISH GREY SILT, SOME FINE SAND, RANDOM PEBBLES, SATURATED										
1.5	1.50 AUGER REFUSAL AT 1.5 m ON ASSUMED BEDROCK										
2.0											
2.5											
3.0											
3.5											
4.0											
4.5											
5.0											

BOREHOLE NO. DP5

PROJECT NAME: PROPOSED DUNTROON QUARRY EXPANSION
PROJECT NO.: 04 930521.52

CLIENT: WALKER AGGREGATES INC.
DATE COMPLETED: Jul 03, 2007

BOREHOLE TYPE: HAND AUGER
SUPERVISOR: SLW

GROUND ELEVATION: 509.5 NOT DETERMINED
REVIEWER: MJL

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	UTM CO-ORDINATES / REMARKS
0.0											UTM Zone: 17 NAD: 83 Easting: 559086 Northing: 4915559
0.0 – 0.2	ORGANIC SILT: DARK BROWN ORGANIC SILT, TRACE CLAY, ORGANICS, WET TO SATURATED.			AS1			100				ROB ROY PSW WETLAND COMPLEX UNIT 2
0.2 – 0.4	CLAYEY SILT: LIGHT BROWN CLAYEY SILT, TRACE SAND, WTPL.			AS2			100				
0.4 – 1.0	SAND: LIGHT BROWN FINE SAND, TRACE TO SOME SILT TO FINE TO MEDIUM SAND, TRACE TO SOME SILT WITH DEPTH, SATURATED.			AS3 AS4 AS5			100 100 100				
1.0	HAND AUGER HOLE TERMINATED AT 1.0 m DUE TO REFUSAL.										
2.0											
3.0											
4.0											
5.0											

JHL GEOLOGIC B/W (METRIC) WITH UTM 4-93052152 DRIVE POINTS.GPJ JAGGER HIMS BASIC.GDT 9/7/07

BOREHOLE NO. DP6

PROJECT NAME: PROPOSED DUNTROON QUARRY EXPANSION
PROJECT NO.: 04 930521.52
CLIENT: WALKER AGGREGATES INC.
DATE COMPLETED: Jul 03, 2007
BOREHOLE TYPE: HAND AUGER
SUPERVISOR: SLW
GROUND ELEVATION: 511.3 NOT DETERMINED
REVIEWER: MJL

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P W_L)	UTM CO-ORDINATES / REMARKS
0.0											UTM Zone: 17 NAD: 27 Easting: 559774 Northing: 4915513
0.1	ORGANIC SILT: DARK BROWN ORGANIC SILT, ORGANICS, MOIST.			AS1			100				EXPANSION LANDS ESCARPMENT ANSI A WETLAND
	SILT: LIGHT BROWN SILT, SOME TO TRACE FINE SAND, TRACE CLAY, DTPL TO APL AT 0.6 m.			AS2			100				
				AS3			100				
				AS4			100				
				AS5			100				
				AS6			100				
				AS7			100				
1.0											
				AS8			100				
1.4	HAND AUGER HOLE TERMINATED AT 1.4 m DUE TO REFUSAL.										
2.0											
3.0											
4.0											
5.0											

JHL GEOLOGIC B/W (METRIC) WITH UTM 4-93052152 DRIVE POINTS.GPJ JAGGER HIMS BASIC.GDT 9/7/07

BOREHOLE NO. DP7

PROJECT NAME: DUNTROON EXPANSION
PROJECT NO.: 111-53312-00 52.1
CLIENT: WALKER AGGREGATES INC.
DATE COMPLETED: Jul 10, 2014
BOREHOLE TYPE: 1 1/4" HAND AUGER
SUPERVISOR: TKC
GROUND ELEVATION: 509.2 mASL
REVIEWER: SLW

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	UTM CO-ORDINATES / REMARKS
0.0	509.2	TOPSOIL										UTM Zone: 17 NAD: 83 Easting: 559345 Northing: 4915351
0.2	509.0	FINE SAND, SOME SILT										
0.8	508.4	SILTY TILL, TRACE SAND										
2.5	506.7	DRIVEPOINT TERMINATED AT 2.5 m.										

BOREHOLE NO. DP8

PROJECT NAME: DUNTROON EXPANSION
PROJECT NO.: 111-53312-00 52.1
CLIENT: WALKER AGGREGATES INC.
DATE COMPLETED: Jul 10, 2014
BOREHOLE TYPE: 1 1/4" HAND AUGER
SUPERVISOR: BTC
GROUND ELEVATION: 511.1 mASL
REVIEWER: SLW

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	UTM CO-ORDINATES / REMARKS
0.0	511.1	TOPSOIL										UTM Zone: 17 NAD: 83 Easting: 559094 Northing: 4914360
0.5	510.6	DARK BROWN SOIL										
0.9	510.2	DRIVEPOINT TERMINATED AT 0.9 m.										

BOREHOLE NO. DP9

PROJECT NAME: DUNTROON EXPANSION
PROJECT NO.: 111-53312-00 52.1
CLIENT: WALKER AGGREGATES INC.
DATE COMPLETED: Sep 10, 2014
BOREHOLE TYPE: 1 1/4" HAND AUGER
SUPERVISOR: KMT
GROUND ELEVATION: 507.7 mASL
REVIEWER: KJF

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0.0	507.7	BROWN SATURATED TOPSOIL										
0.1	507.6	BROWN AND GREYISH CLAYEY SILT, SATURATED. RUST STAINING.										WATER PONDED AT 0.12 m ABOVE GROUND.
0.5	507.2	BROWN CLAYEY SILT TO SILTY CLAY. TRACE GRAVEL.										
1.3	506.4	DRIVEPOINT TERMINATED AT 1.33 m.										

UTM CO-ORDINATES
UTM Zone: 17 NAD: 83
Easting: 560273
Northing: 4915407

BOREHOLE NO. DP-5 (BRIDSON PROPERTY)

PROJECT NAME: DUNTROON QUARRY EXPANSION **PROJECT NO.:** 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. **DATE:** SEPTEMBER 26, 2003

BOREHOLE TYPE: HAND AUGER **SUPERVISOR:** AGH

GROUND ELEVATION: ESTIMATED 510 mASL **REVIEWER:**

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0	SILT: DARK BROWN ORGANIC SILT, TOPSOIL, ROOTLETS, APL TO WTPL.			AS							LOCATED ON BRIDSON PROPERTY
0.2				AS							
0.26	SILT: LIGHT BROWN/MOTTLED GREYISH BROWN SILT, TRACE TO SOME SAND, TRACE CLAY, TRACE GRAVEL, MOIST.			AS							
0.4											
0.6				AS							
0.67	SILTY FINE SAND: LIGHT BROWN /MOTTLED GREYSIH BROWN SILTY FINE SAND TO FINE SANDY SILT, TRACE CLAY, MOIST			AS							
0.8				AS							
1.0				AS							
1.06	SILT: LIGHT BROWN TO GREYISH BROWN SILT, SOME SAND, TRACE CLAY, APL TO WTPL.			AS							
1.2				AS							
1.4				AS							
1.6				AS							
1.72	HAND AUGER HOLE TERMINATED AT 1.72 m IN SILT.			AS							
1.8											
2.0											

BOREHOLE NO. HA1

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: SEPTEMBER 11, 2003

BOREHOLE TYPE: HAND AUGER
SUPERVISOR: MJL

GROUND ELEVATION: ESTIMATED 510 mASL
REVIEWER: AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0	SILT: DARK BROWN ORGANIC SILT, TOPSOIL, ROOTLETS, DTPL TO APL.			AS							LOCATED ON BRIDSON PROPERTY
0.2											
0.23	SILT: LIGHT BROWN MOTTLED SILT, SOME SAND, TRACE CLAY BECOMING SANDY SILT WITH DEPTH, MOIST.			AS							
0.4				AS							
0.6				AS							
0.76				AS							
0.8	HAND AUGER HOLE TERMINATED AT 0.76 m IN SILT.										
1.0											
1.2											
1.4											
1.6											
1.8											
2.0											

BOREHOLE NO. HA2

PROJECT NAME: DUNTROON QUARRY EXPANSION | **PROJECT NO.:** 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC. | **DATE:** SEPTEMBER 26, 2003

BOREHOLE TYPE: HAND AUGER | **SUPERVISOR:** AGH

GROUND ELEVATION: ESTIMATED 511 mASL | **REVIEWER:**

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0									10 20 30	10 20 30	
	SILT: DARK BROWN TO BROWN ORGANIC SILT (PEATY), MOIST BECOMING APL.			AS							LOCATED IN WETLAND, NORTHWEST CORNER OF EXPANSION LANDS
0.15				AS							
0.2	SILT: BROWN/MOTTLED BROWN–GREY ORGANIC SILT, TRACE CLAY BECOMING SILT, TRACE TO SOME CLAY, APL TO WTPL. –GRADES TO FINE SANDY SILT, TRACE TO SOME CLAY			AS							
0.4				AS							
0.50											
	SILTY SAND: BROWN SILTY SAND, TRACE CLAY, WET TO SATURATED. THIN LAYER OF CLAYEY SILT AT BASE.										
0.6				AS							
0.8				AS							
0.90	REFUSAL ON BOULDER OR BEDROCK			AS							
	HAND AUGER HOLE TERMINATED AT 0.90 m DUE TO AUGER REFUSAL ON BOULDER OR BEDROCK.										
1.0											
1.2											
1.4											
1.6											
1.8											
2.0											

BOREHOLE NO. HA3

PROJECT NAME: DUNTROON QUARRY EXPANSION
PROJECT NO.: 930521.50

CLIENT: GEORGIAN AGGREGATES AND CONSTRUCTION INC.
DATE: SEPTEMBER 26, 2003

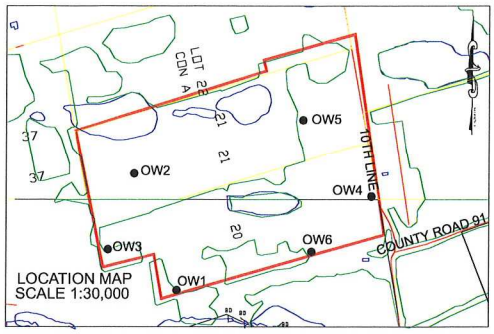
BOREHOLE TYPE: HAND AUGER
SUPERVISOR: AGH

GROUND ELEVATION: ESTIMATED 511 mASL
REVIEWER:

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0											
	SILT: DARK BROWN ORGANIC SILT (PEATY), BECOMING BROWN–GREY ORGANIC SILT (LESS PEATY), MOIST.			AS							LOCATED IN WETLAND, NORTHWEST CORNER OF EXPANSION LANDS
	0.15			AS							
0.2	SILT: BROWN GREY SILT, SOME CLAY, TRACE SAND, APL TO WTPL.			AS							
	0.35			AS							
0.4	SILTY SAND: MOTTLED BROWN TO BROWN SILTY SAND, TRACE TO SOME CLAY, TRACE GRAVEL AT BASE, APL TO WTPL, WET TO SATURATED.										
				AS							
0.6				AS							
0.8				AS							GRAIN SIZE SAMPLE MIT CLASSIFICATION GRAVEL 11 % SAND 61 % SILT 23 % CLAY 5 % FINE SAND 31 % MED. SAND 18.5 % COARSE SAND 11.5 %
				AS							
1.0											
				AS							
1.2	1.20 SILT LAYERS AT DEPTH.										
	HAND AUGER HOLE TERMINATED AT 1.20 m IN BROWN SILTY SAND.										
1.4											
1.6											
1.8											
2.0											

OW1 NEST

Drill Date: August 2004
Drilling Method: Continuous Core
Driller: Lantech Drilling
Geologist: TLW
Ground Surface Elevation: 512.2 masl



Depth (m)	Strat.	Geology Formation	Geology Member	Stratigraphic Description
				Overburden
4		Amabel Formation		**Dolostone** Light grey to beige, fine crystalline, occasional fossils (brachiopods), low porosity, vuggy (vugs lined with fine calcite crystals)
8				Massive dolostone between 8 and 12.2 m, mottled, fossiliferous (crinoids, bivalves, brachiopods)
12				Less dense dolostone between 12.2 and 20.7 m Below 12.2 m - iron staining in vugs
16				
20				Between 18 and 19 m - blue / white mottling
24				Massive dolostone Blue / white mottling from 20.7 m to bottom of hole Vug frequency decreasing with depth Stylolites between 22 and 29 m
28			Lions Head	**Dolostone** Massive, light to dark grey, occasional tan beds, aphanitic, low fossil content
32		Fossil Hill		**Dolostone,** mottled blue-grey, low fossil content occasional shale interbeds

Transmissivity Profile (m^2/s): 10^{-6}, 10^{-5}, 10^{-4}

Monitoring Well: I, II, III, IV

Bottom of Borehole = 31.93 m

NOTES:
Borehole OW1-04 was logged by John Emery Geotechnical Engineering Limited
For a detailed description of the geological units refer to Section 5.0 of the report
Information on well construction details refer to Appendix A: Methodology
Information on stratigraphic contacts refer to Appendix D: Borehole Geophysics
Information on transmissivity profiles refer to Appendix F: Packer Testing Data

Water levels measured on:
- April 13,2005
- November 15,2005

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

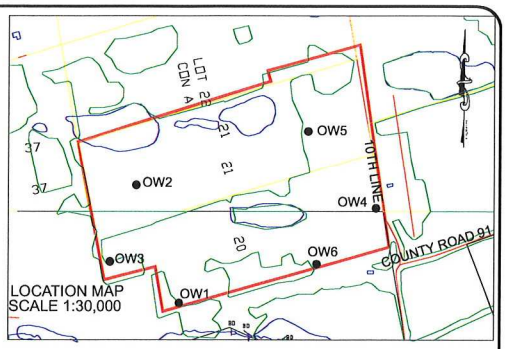
Observation Well Nest 1

Date Issued:	December 2005
Geologist:	TLW
Project No.	04-015
File Name:	OW1-page 1.cdr

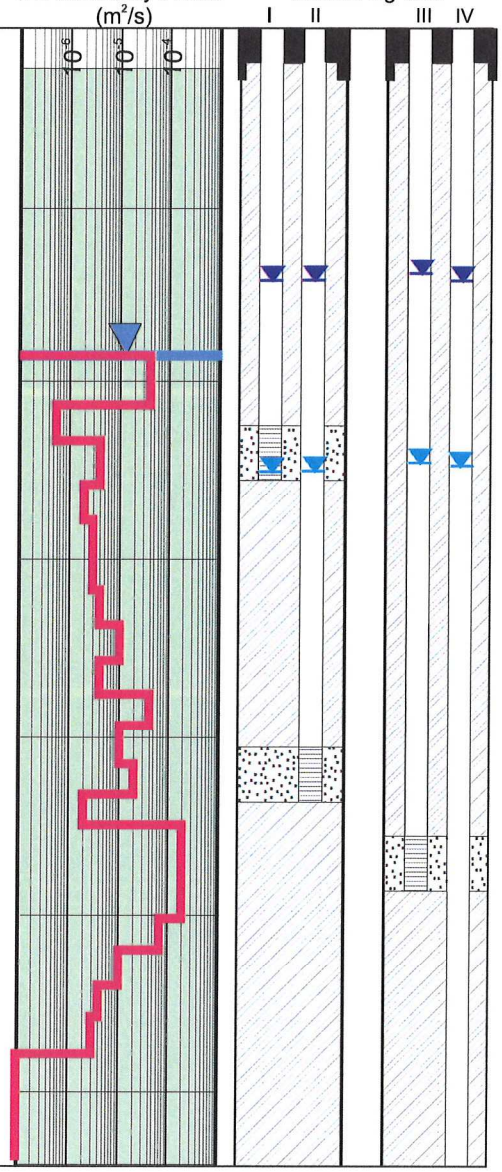
Highland Quarry
Hydrogeological Assessment

OW2 NEST

Drill Date: August 2004
Drilling Method: Continuous Core
Driller: Lantech Drilling
Geologist: TLW
Ground Surface Elevation: 522.2 masl



Depth (m)	Strat.	Geology Formation	Geology Member	Stratigraphic Description
0				**Overburden** Brown, silty sand, occasional gravel
4		Amabel Formation		**Dolostone** Light grey to beige, slightly mottled, fine crystalline fossiliferous (brachiopods), medium bedded, vuggy fractures between 1.6 and 3.7 m are weathered
8				At 8.5 m - highly fractured for 0.4 m, weathered (iron staining)
12				
16				
20				
24				Light grey to bluish grey, iron staining in vugs Weathered fractures between 24 and 27 m
28				**Dolostone** Light grey, massive, fine crystalline with aphanitic sections
32				



NOTES:
Borehole OW2-04 was logged by John Emery Geotechnical Engineering Limited
For a detailed description of the geological units refer to Section 5.0 of the report
Information on well construction details refer to Appendix A: Methodology
Information on stratigraphic contacts refer to Appendix D: Borehole Geophysics
Information on transmissivity profiles refer to Appendix F: Packer Testing Data

Water levels measured on:
- April 13,2005
- November 15,2005

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

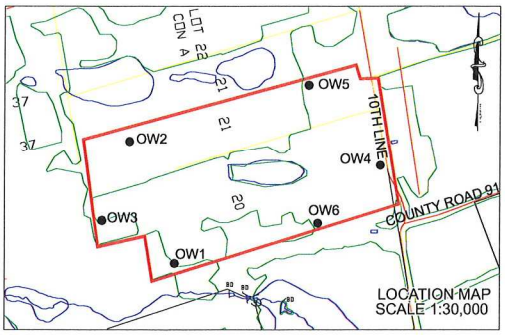
Observation Well Nest 2

Date Issued:	December 2005
Geologist:	TLW
Project No.	04-015
File Name:	OW2-page 1.cdr

Highland Quarry
Hydrogeological Assessment

OW2 NEST

Drill Date: August 2004
Drilling Method: Continuous Core
Driller: Lantech Drilling
Geologist: TLW
Ground Surface Elevation: 522.2 masl



Depth (m)	Strat.	Geology Formation	Geology Member	Stratigraphic Description
		Amabel Formation		(Continued from previous page)
36			Lions Head	**Dolostone** Light grey, stylolites, occasional pyrite, filled fracture and tan beds
40		Fossil Hill		**Dolostone** Mottled blue-grey, low fossil content, occasional shale interbed
44		Cabot Head		**Shale** Dark green, thin bedded, massive to brittle
				Bottom of Borehole = 44.46 mbgl
48				
52				
56				
60				
64				

Transmissivity Profile (m^2/s): 10^{-6} 10^{-5} 10^{-4}

Monitoring Well: III IV

NOTES:
Borehole OW2-04 was logged by John Emery Geotechnical Engineering Limited
For a detailed description of the geological units refer to Section 5.0 of the report
Information on well construction details refer to Appendix A: Methodology
Information on stratigraphic contacts refer to Appendix D: Borehole Geophysics
Information on transmissivity profiles refer to Appendix F: Packer Testing Data

Water levels measured on:
- April 13,2005
- November 15,2005

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

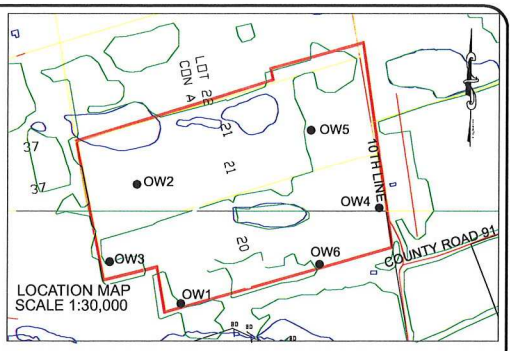
Observation Well Nest 2

Date Issued:	December 2005
Geologist:	TLW
Project No.	04-015
File Name:	OW2-page 2.cdr

Highland Quarry
Hydrogeological Assessment

OW3 NEST

Drill Date: August 2004
Drilling Method: Continuous Core
Driller: Lantech Drilling
Geologist: TLW
Ground Surface Elevation: 515.5 masl



Depth (m)	Strat.	Geology Formation	Geology Member	Stratigraphic Description
0		Amabel Formation		**Overburden**
				Dolostone Light grey to beige, fine crystalline, occasional fossils (brachiopods), massive bedded, vugs with iron staining to 7.3 m
4				
				Between 7.3 and 20.1 m mottled light grey to grey
8				Weathered fracture at 9 m (iron staining)
12				
				Stylolites between 15 and 16 m
16				Between 17 and 18 m - large weather fracture with crystallization
20				
				Vuggy between 23.5 and 26.3 m
24				
28				
			Lions Head	**Dolostone** Massive, light to dark grey, occasional tan bed
32				

Transmissivity Profile (m^2/s): 10^{-6}, 10^{-5}, 10^{-4}

Monitoring Well: I, II, III, IV

Bottom of Borehole = 31.57 m

NOTES:
For a detailed description of the geological units refer to Section 5.0 of the report
Information on well construction details refer to Appendix A: Methodology
Information on stratigraphic contacts refer to Appendix D: Borehole Geophysics
Information on transmissivity profiles refer to Appendix F: Packer Testing Data

Water levels measured on:
- April 13,2005
- November 15,2005

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

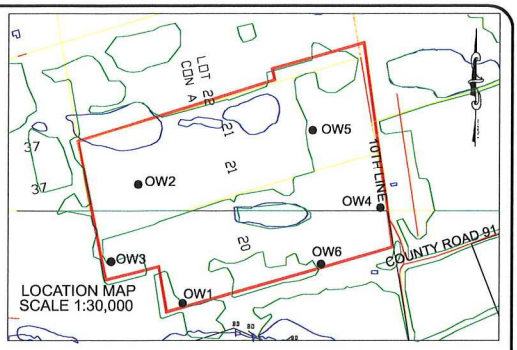
Observation Well Nest 3

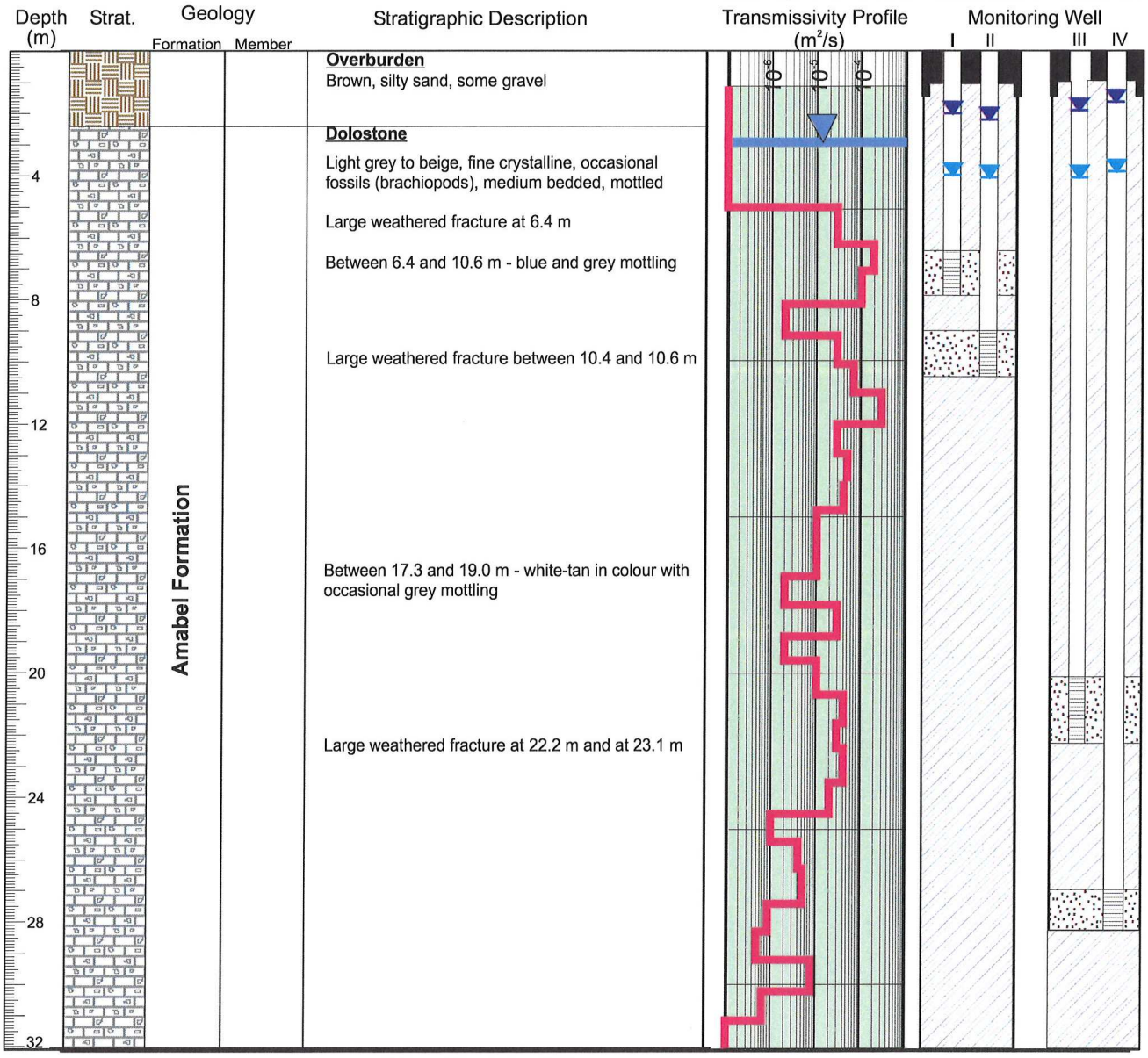
Date Issued:	December 2005
Geologist:	TLW
Project No.	04-015
File Name:	OW3-page 1.cdr

Highland Quarry
Hydrogeological Assessment

OW4 NEST

Drill Date: August 2004
Drilling Method: Continuous Core
Driller: Lantech Drilling
Geologist: TLW
Ground Surface Elevation: 518.8 masl





Bottom of Borehole = 32.9 m

NOTES:
Borehole OW4-04 was logged by John Emery Geotechnical Engineering Limited
For a detailed description of the geological units refer to Section 5.0 of the report
Information on well construction details refer to Appendix A: Methodology
Information on stratigraphic contacts refer to Appendix D: Borehole Geophysics
Information on transmissivity profiles refer to Appendix F: Packer Testing Data

Water levels measured on:
- April 13,2005
- November 15,2005

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

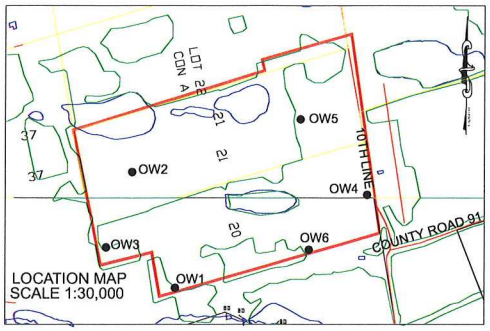
Observation Well Nest 4

Date Issued:	December 2005
Geologist:	TLW
Project No.	04-015
File Name:	OW4-page 1.cdr

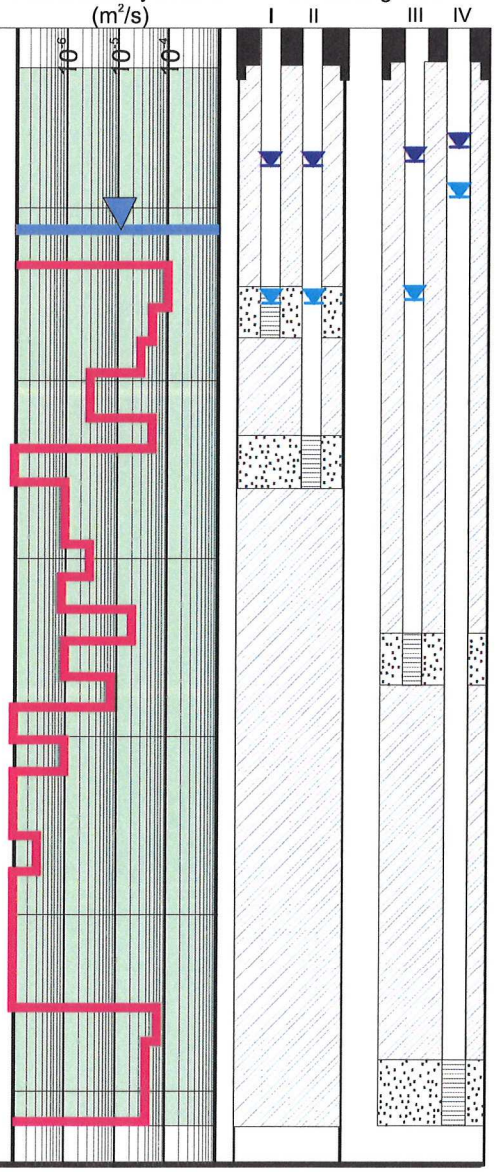
Highland Quarry
Hydrogeological Assessment

OW5 NEST

Drill Date: August 2004
Drilling Method: Continuous Core
Driller: Lantech Drilling
Geologist: TLW
Ground Surface Elevation: 510.8 masl



Depth (m)	Strat.	Geology Formation	Geology Member	Stratigraphic Description
0				**Overburden** Brown, silty sand, some gravel
4		Amabel Formation		**Dolostone** Light grey to beige, fine crystalline, occasional fossils (brachiopods), medium bedded, mottled, vuggy, alternating dense to less dense
8				Weathered fracture at 7.6 m
12				Whitish to light grey, massive Weathered fracture at 12.1 m
16				Between 14.5 and 20.5 iron staining in vugs and fractures
20				Light to medium grey, massive
24				
28			Lions Head	**Dolostone** Distinct change in lithology - blue/white mottling massive
		Fossil Hill		**Dolostone**, greenish grey, low fossil content, occasional shale seam
		Cabot Head		**Shale** Dark green, thin bedded, massive to brittle
32				Bottom of Borehole = 31.0 m



NOTES:
For a detailed description of the geological units refer to Section 5.0 of the report
Information on well construction details refer to Appendix A: Methodology
Information on stratigraphic contacts refer to Appendix D: Borehole Geophysics
Information on transmissivity profiles refer to Appendix F: Packer Testing Data

Water levels measured on:
- April 13,2005
- November 15,2005

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

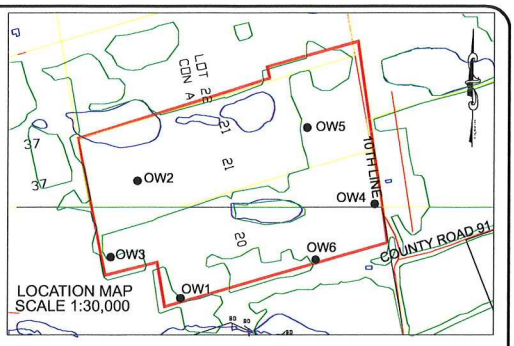
Observation Well Nest 5

Date Issued:	December 2005
Geologist:	TLW
Project No.	04-015
File Name:	OW5-page 1.cdr

Highland Quarry
Hydrogeological Assessment

OW6 NEST

Drill Date: August 2004
Drilling Method: Continuous Core
Driller: Lantech Drilling
Geologist: TLW
Ground Surface Elevation: 526.2 masl



Depth (m)	Strat.	Geology Formation	Geology Member	Stratigraphic Description
0				**Overburden** Brown, silty sand, occasional gravel
4		Amabel Formation		**Dolostone** Light grey to beige, slightly mottled, fine crystalline fossiliferous (brachiopods), medium bedded, vuggy, dense fractures between 1.6 and 3.7 m are weathered
8				
12				Weathered fractures at 11.5, 12.8, 13.4, 14.2 m (fracture at 14.2 is on a 45 degree angle)
16				Light grey, less dense, vuggy, weathered fracture at 18.2 m
20				Highly fractured and weathered between 23.5 and 27.0 m (drill rods dropped between 24.5 - 25.5 m)
24				
28				Whitish-grey, dense
32				

Transmissivity Profile (m^2/s): 10^{-6}, 10^{-5}, 10^{-4}

Monitoring Well: I, II, III, IV

NOTES:
For a detailed description of the geological units refer to Section 5.0 of the report
Information on well construction details refer to Appendix A: Methodology
Information on stratigraphic contacts refer to Appendix D: Borehole Geophysics
Information on transmissivity profiles refer to Appendix F: Packer Testing Data
Water levels measured on:
April 13,2005
November 15,2005
*Represents zone of packer communication t
no analysis possible

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

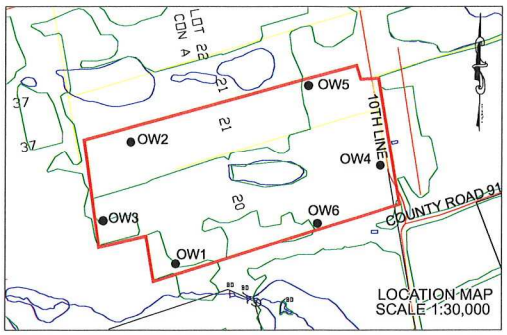
Observation Well Nest 6

Date Issued:	December 2005
Geologist:	TLW
Project No.	04-015
File Name:	OW6-page 1.cdr

Highland Quarry
Hydrogeological Assessment

OW6 NEST

Drill Date: August 2004
Drilling Method: Continuous Core
Driller: Lantech Drilling
Geologist: TLW
Ground Surface Elevation: 526.2 masl



Depth (m)	Strat.	Geology Formation	Geology Member	Stratigraphic Description
36		Amabel Formation		(Continued from previous page)
40				
44				
48			Lions Head	**Dolostone** Light grey, mottled, occasional tan bed, low fossil content
52		Fossil Hill		**Dolostone** Greenish grey, shale seams, thin bedded, low fossil content
		Cabot Head		**Shale** Dark green, thin bedded, massive to fissile
				Bottom of Borehole = 51.19 mbgl
56				
60				
64				

Transmissivity Profile (m^2/s): 10^{-6}, 10^{-5}, 10^{-4} *

Monitoring Well: III IV

NOTES:
For a detailed description of the geological units refer to Section 5.0 of the report
Information on well construction details refer to Appendix A: Methodology
Information on stratigraphic contacts refer to Appendix D: Borehole Geophysics
Information on transmissivity profiles refer to Appendix F: Packer Testing Data
Water levels measured on:
- April 13,2005
- November 15,2005

*Represents zone of packer communication t no analysis possible

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Observation Well Nest 6

Date Issued:	December 2005
Geologist:	TLW
Project No.	04-015
File Name:	OW6-page 2.cdr

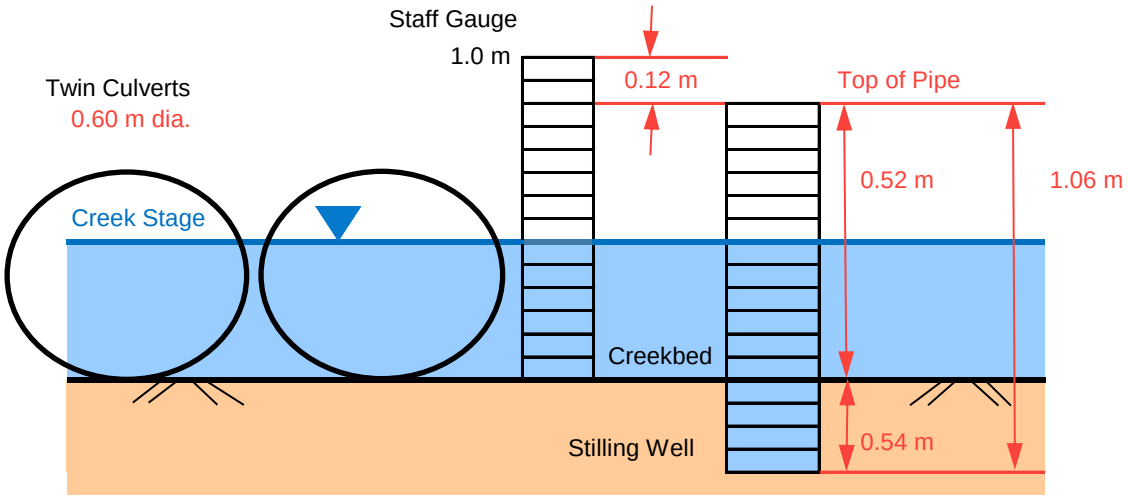
Highland Quarry
Hydrogeological Assessment

APPENDIX A-4

Surface Water Station Instrumentation Details

Station SW1

Project Name:	Duntroon Quarry	**Date:**	July 30, 2015
Client:	Walker Aggregates Inc.	**Supervisor:**	JHL
Project Number:	111-53312-05	**Scale:**	NTS



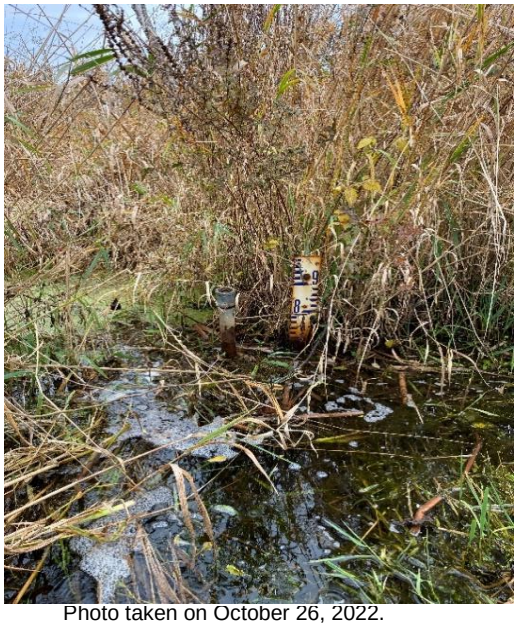
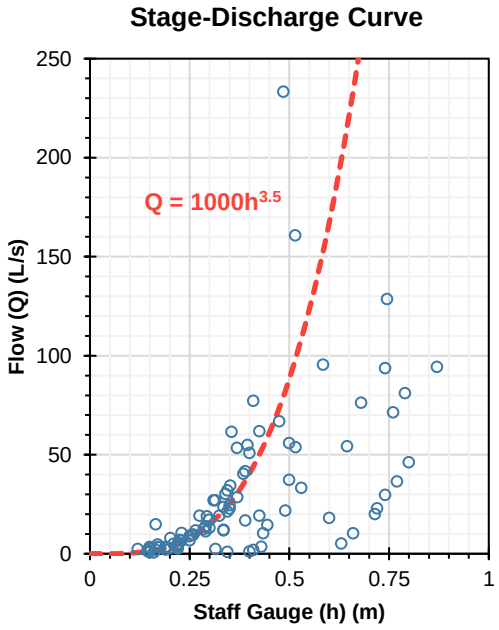


Photo taken on October 26, 2022.



Notes:

Twin culverts outflow from RR6 west of Main Quarry west of Grey County Road 31.

GPS Coordinates 559,117 E 4,914,254 N (NAD 83 Zone 17).

Approximate ground elevation is 513 masl (estimated from Ontario Base Mapping).

Station SW2

Project Name:	Duntroon Quarry	**Date:**	July 30, 2015
Client:	Walker Aggregates Inc.	**Supervisor:**	JHL
Project Number:	111-53312-05	**Scale:**	NTS

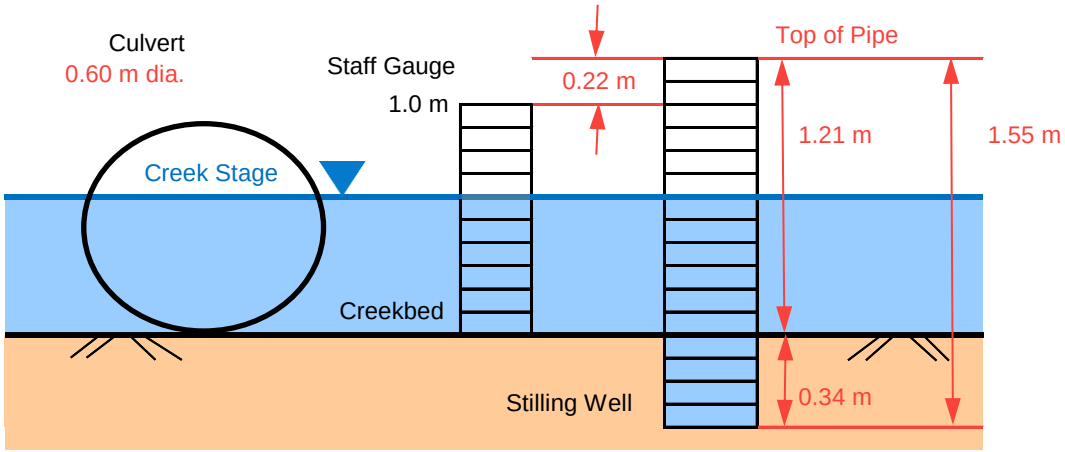
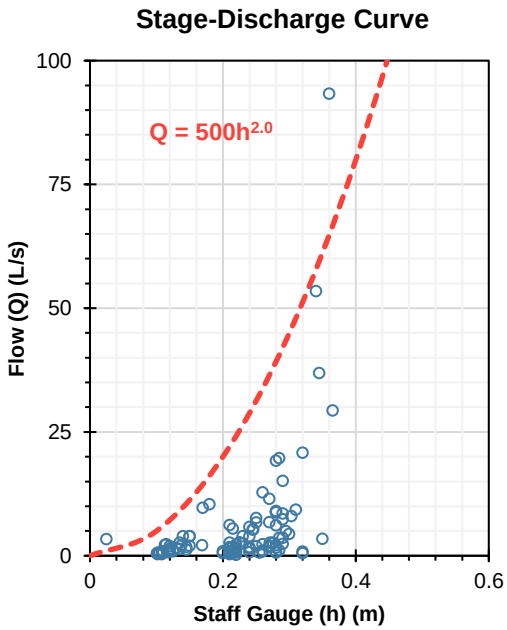


Photo taken on October 26, 2022.



Notes:

Upstream flow to RR6 west of Main Quarry south of Grey County Road 91.

GPS Coordinates 559,070 E 4,914,769 N (NAD 83 Zone 17).

Approximate ground elevation is 515 masl (estimated from Ontario Base Mapping).

Station SW0-2

Project Name:	Duntroon Quarry	**Date:**	July 12, 2023
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

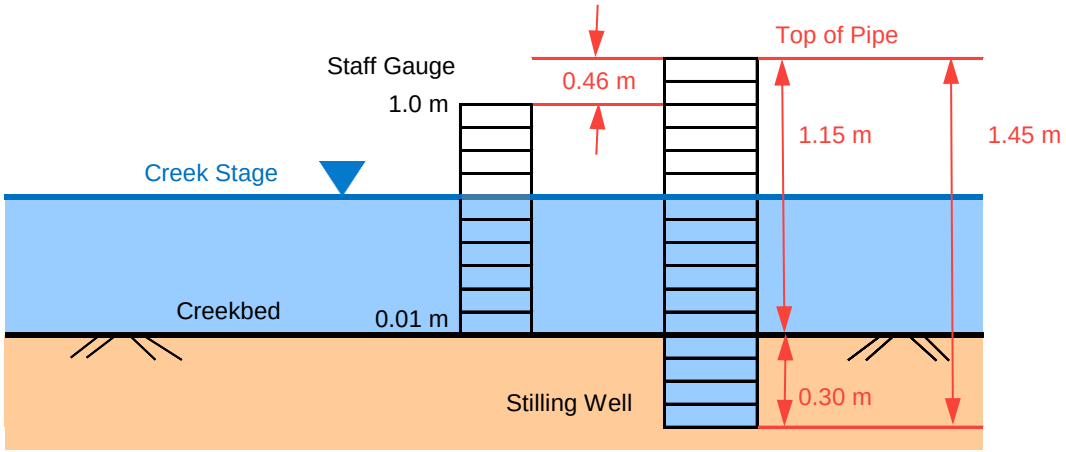
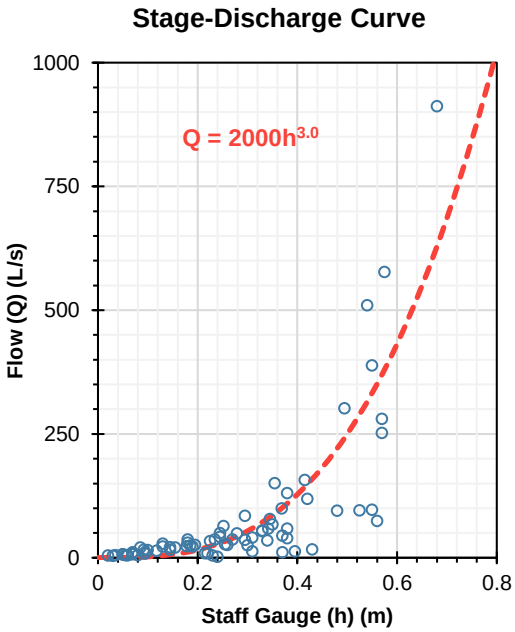


Photo taken on July 12, 2023.



Notes:

Outflow from RR6 west of Main Quarry west of Grey County Rd 31

GPS Coordinates 558,329 E 4,914,495 N (NAD 83 Zone 17).

Approximate ground elevation is 510 masl (estimated from Ontario Base Mapping).

Station SW3

Project Name:	Duntroon Quarry	**Date:**	July 31, 2015
Client:	Walker Aggregates Inc.	**Supervisor:**	JHL
Project Number:	111-53312-05	**Scale:**	NTS

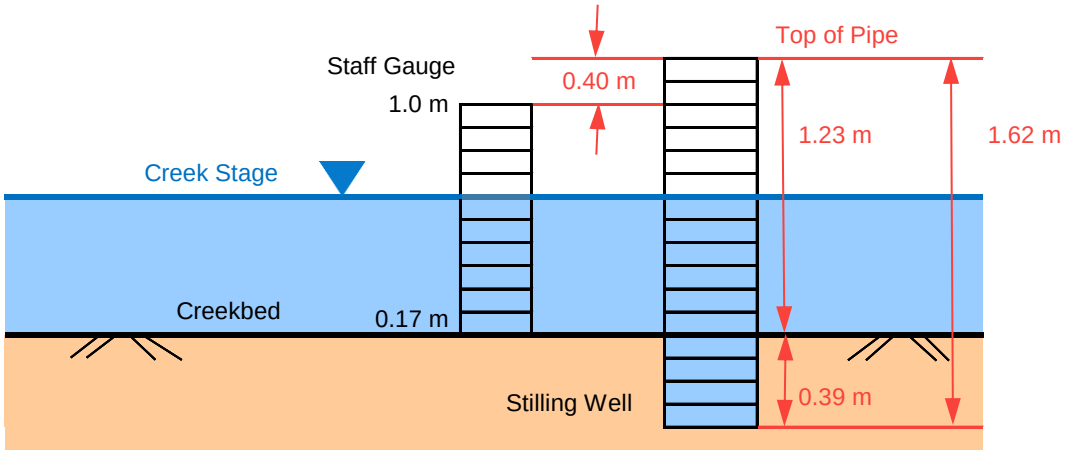
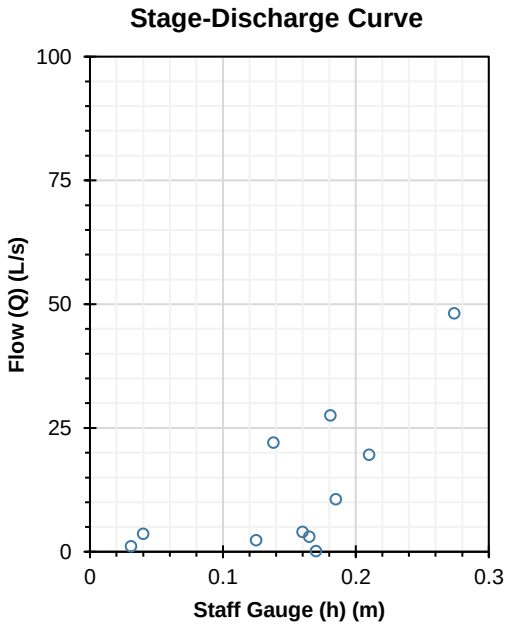


Photo taken on September 29, 2022.



Notes:

Outflow from RR2 northwest of Extension Quarry west of Grey County Rd 31

GPS Coordinates 558,890 E 4,915,581 N (NAD 83 Zone 17).

Approximate ground elevation is 510 masl (estimated from Ontario Base Mapping).

Station SW4

Project Name:	Duntroon Quarry	**Date:**	November 21, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

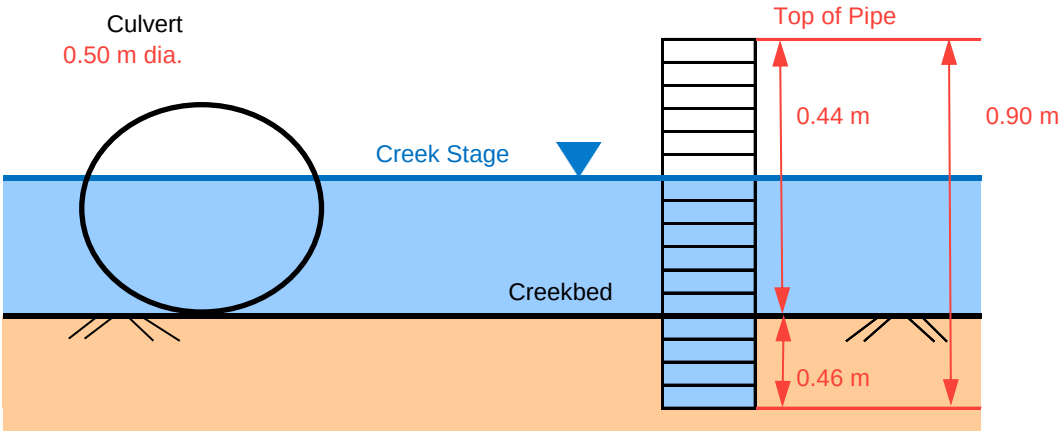
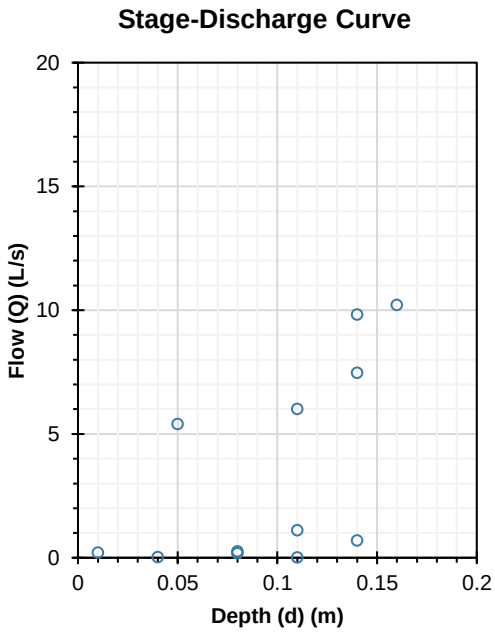


Photo taken on November 21, 2022.



Notes:

RR6 inlet at southwest along north of 10th Conc.

GPS Coordinates 558,893 E 4,913,962 N (NAD 83 Zone 17).

Approximate ground elevation is 515 masl (estimated from Ontario Base Mapping).

Station SW6A

Project Name:	Duntroon Quarry	**Date:**	July 16, 2015
Client:	Walker Aggregates Inc.	**Supervisor:**	JHL
Project Number:	111-53312-05	**Scale:**	NTS

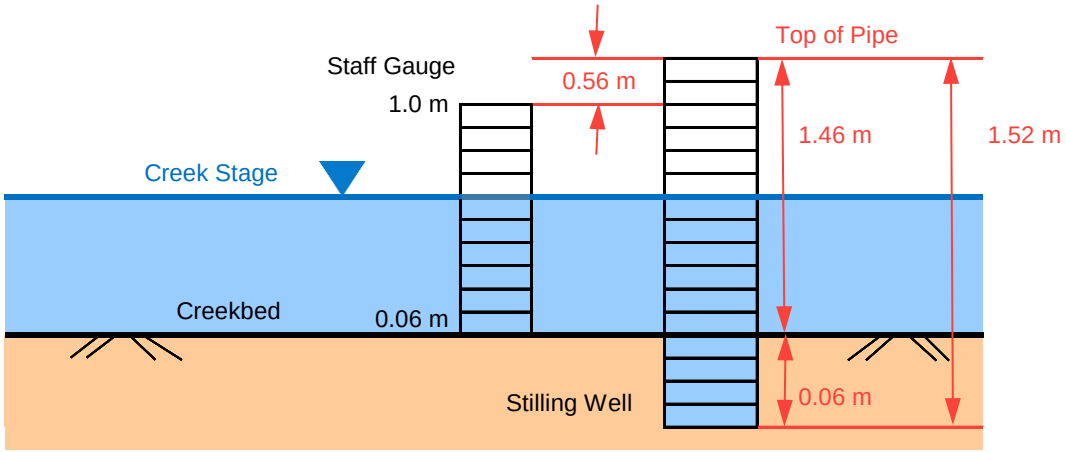
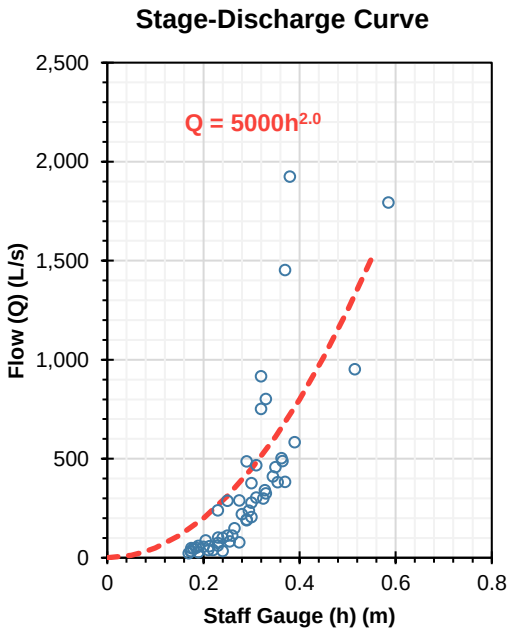


Photo taken on September 27, 2022.



Notes:

Beaver River southwest of Main Quarry west of Osprey Sideroad 30.

GPS Coordinates 555,263 E 4,912,697 N (NAD 83 Zone 17).

Approximate ground elevation is 495 masl (estimated from Ontario Base Mapping).

Station SW8

Project Name:	Duntroon Quarry	**Date:**	November 23, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

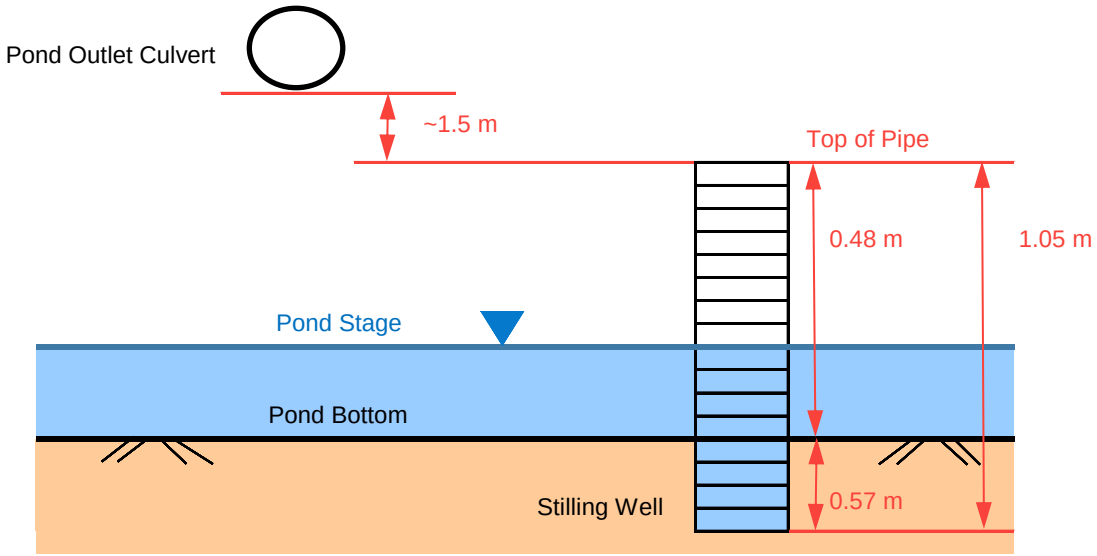


Photo taken on November 23, 2022.

Notes:

Bridson Pond outlet culvert.

GPS Coordinates 560,355 E 4,915,502 N (NAD 83 Zone 17).

Approximate ground elevation is 510 masl (estimated from Ontario Base Mapping).

Station SW9

Project Name:	Duntroon Quarry	**Date:**	July 31, 2015
Client:	Walker Aggregates Inc.	**Supervisor:**	JHL
Project Number:	111-53312-05	**Scale:**	NTS

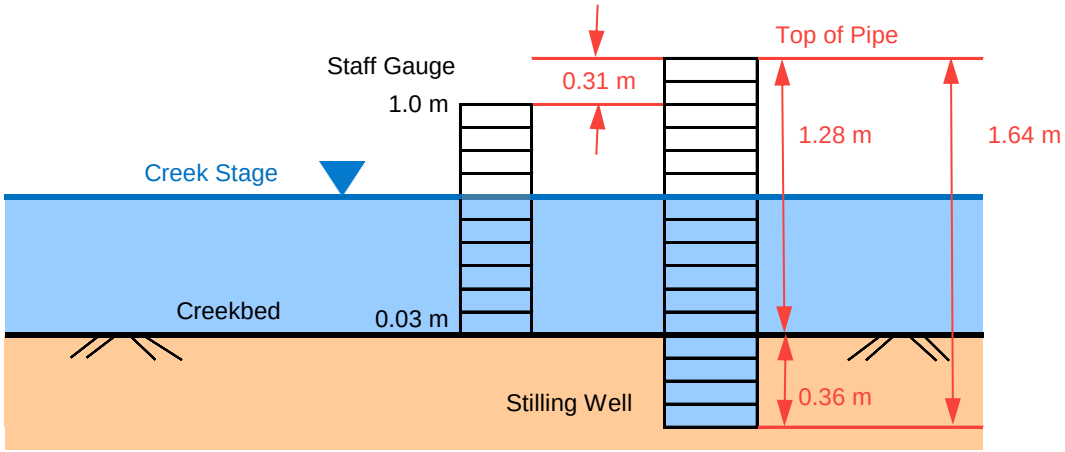
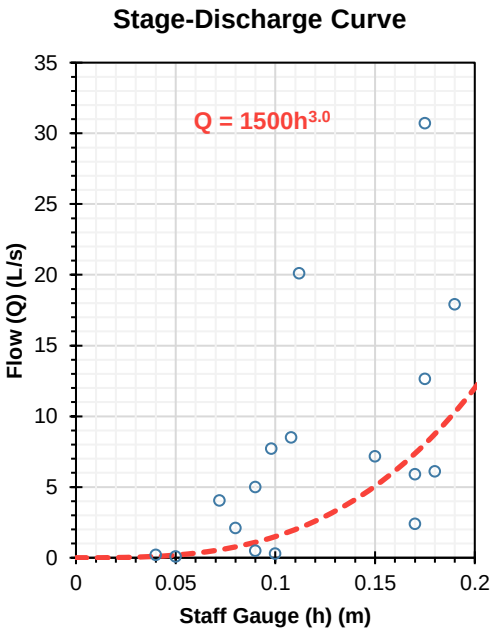


Photo taken on October 28, 2022.



Notes:

Outflow from ANSI Wetland B east of Extension Quarry to sinkhole area.

GPS Coordinates 560,454 E 4,915,647 N (NAD 83 Zone 17).

Approximate ground elevation is 508 masl (estimated from Ontario Base Mapping).

Station SW10

Project Name:	Duntroon Quarry	**Date:**	October 27, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC / SRF / BC
Project Number:	111-53312-05	**Scale:**	NTS

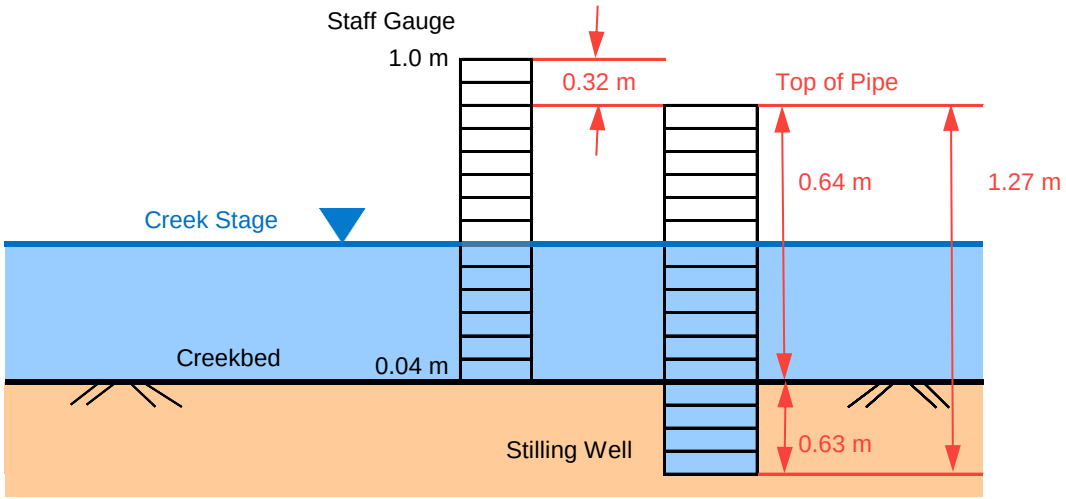
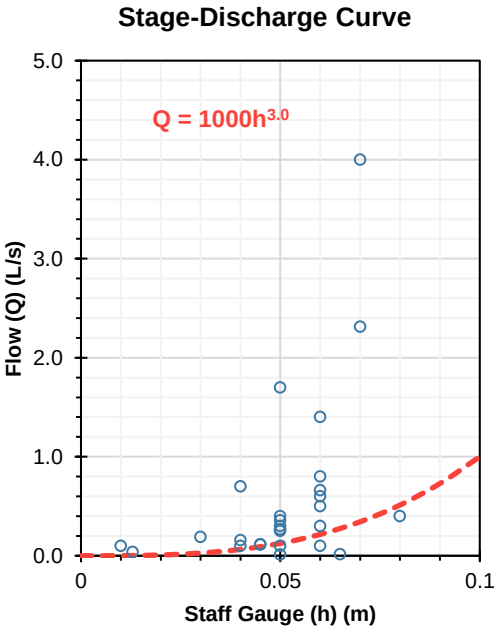


Photo taken on October 27, 2022.



Notes:

Escarpment seep east of Extension Quarry, upgradient of farm well tile collection system.

GPS Coordinates 561,200 E 4,915,641 N (NAD 83 Zone 17).

Approximate ground elevation is 477 masl (estimated from Ontario Base Mapping).

Station SW11

Project Name:	Duntroon Quarry	**Date:**	November 22, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

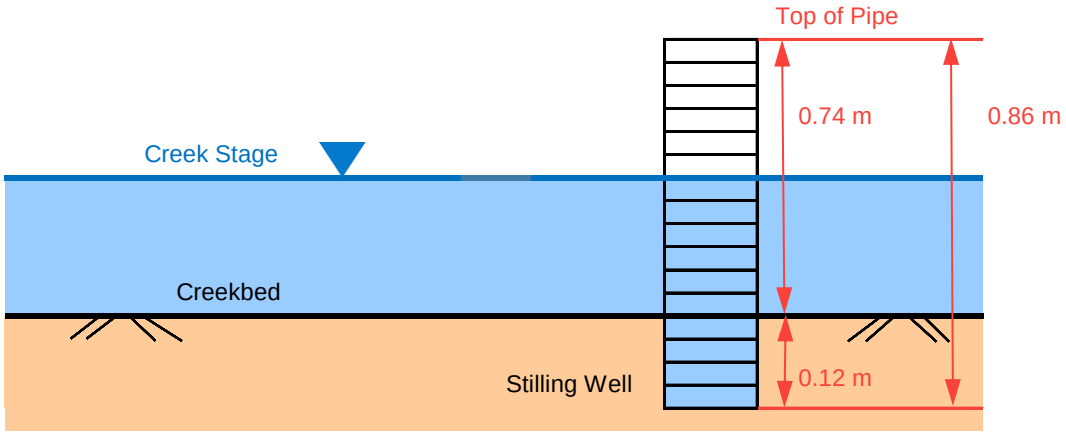
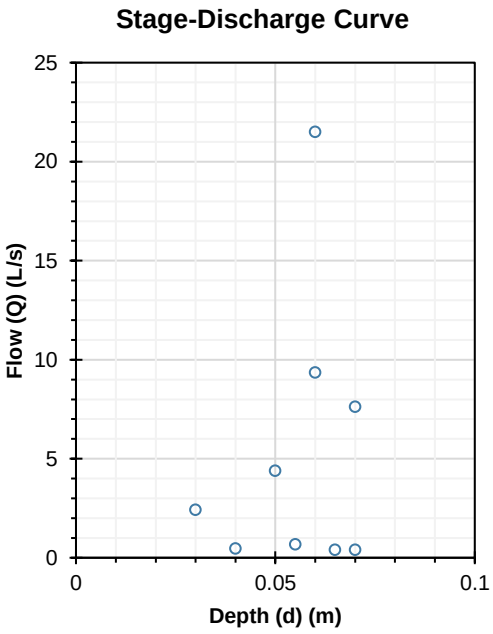


Photo taken on November 22, 2022.



Notes:

Culmination of escarpment seeps SW11A-D on Franks property east of Extension Quarry.

GPS Coordinates 561,151 E 4,916,011 N (NAD 83 Zone 17).

Approximate ground elevation is 445 masl (estimated from Ontario Base Mapping).

Station SW11A

Project Name:	Duntroon Quarry	**Date:**	November 22, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

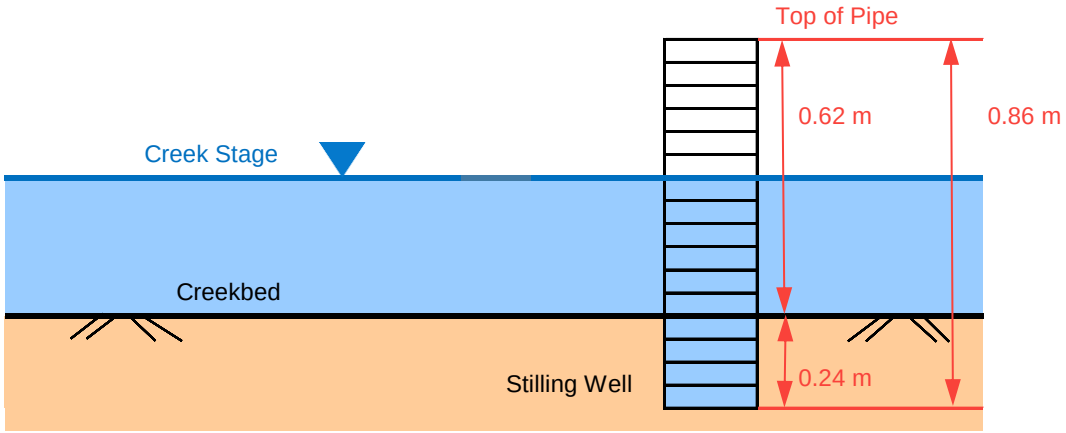
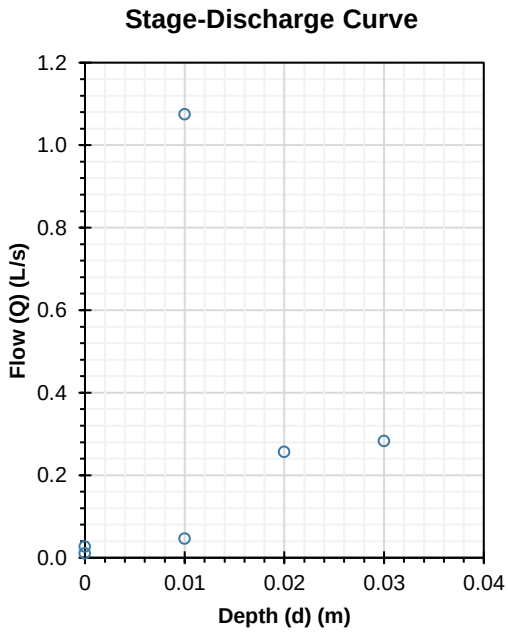


Photo taken on November 22, 2022.



Notes:

Escarpment seep on Franks property east of Extension Quarry.

GPS Coordinates 561,128 E 4,916,011 N (NAD 83 Zone 17).

Approximate ground elevation is 446 masl (estimated from Ontario Base Mapping).

Station SW11B

Project Name:	Duntroon Quarry	**Date:**	November 22, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

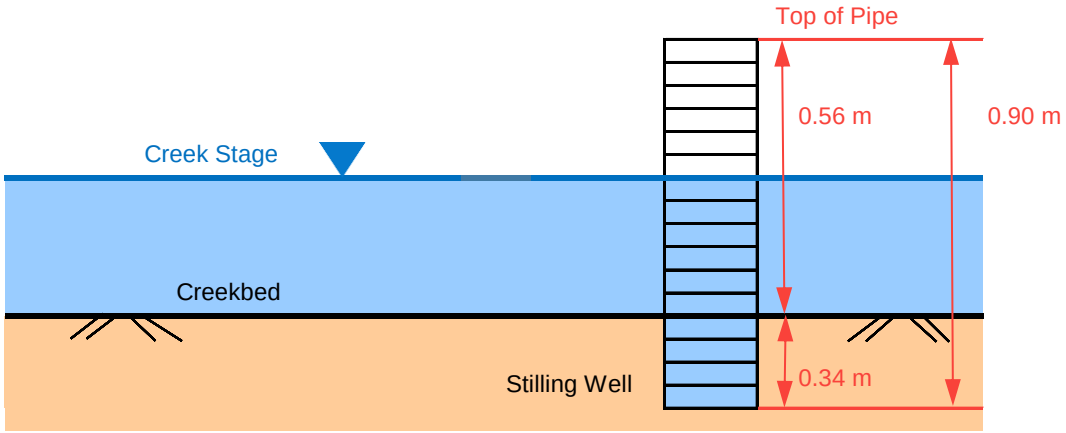
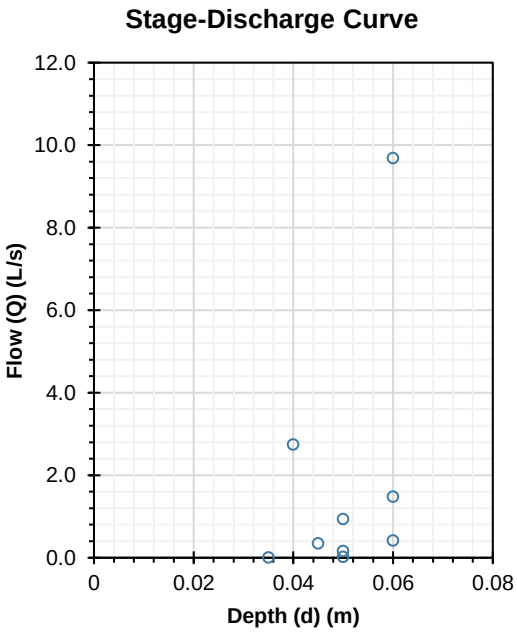


Photo taken on November 22, 2022.



Notes:

Escarpment seep on Franks property east of Extension Quarry.

GPS Coordinates 561,098 E 4,916,018 N (NAD 83 Zone 17).

Approximate ground elevation is 446 masl (estimated from Ontario Base Mapping).

Station SW11C

Project Name:	Duntroon Quarry	**Date:**	November 22, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

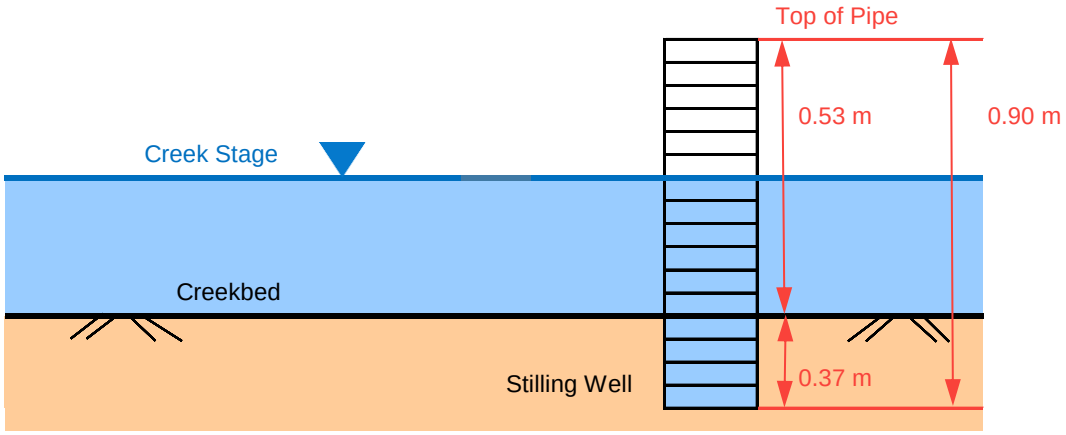
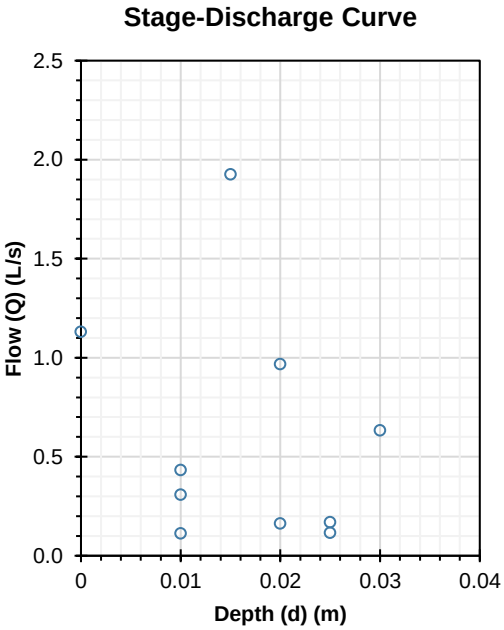


Photo taken on November 22, 2022.



Notes:

Escarpment seep on Franks property east of Extension Quarry.

GPS Coordinates 561,079 E 4,916,034 N (NAD 83 Zone 17).

Approximate ground elevation is 446 masl (estimated from Ontario Base Mapping).

Station SW11D

Project Name:	Duntroon Quarry	**Date:**	November 22, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

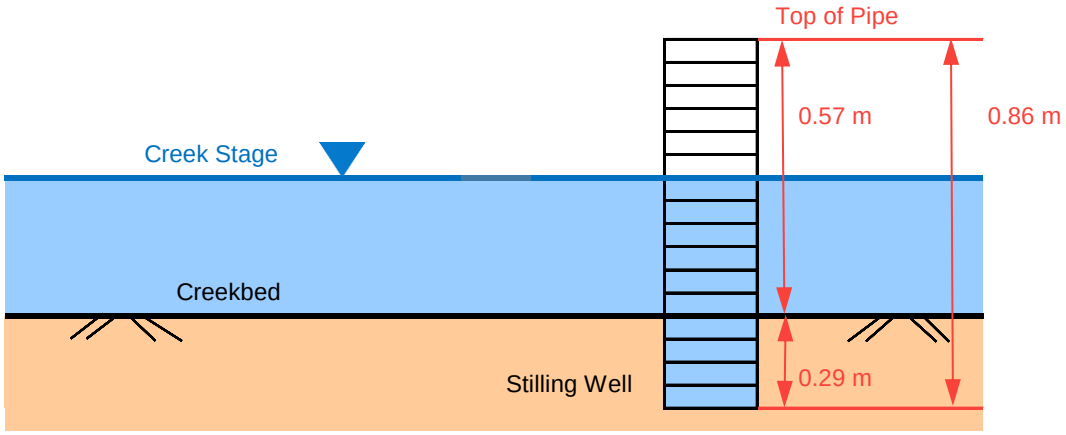
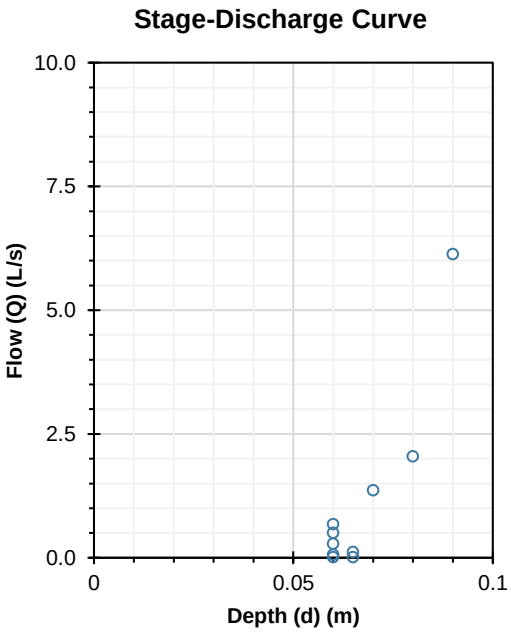


Photo taken on November 22, 2022.



Notes:

Escarpment seep on Franks property east of Extension Quarry.

GPS Coordinates 561,052 E 4,916,043 N (NAD 83 Zone 17).

Approximate ground elevation is 446 masl (estimated from Ontario Base Mapping).

Station SW11E

Project Name:	Duntroon Quarry	**Date:**	October 27, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC / SRF / BC
Project Number:	111-53312-05	**Scale:**	NTS

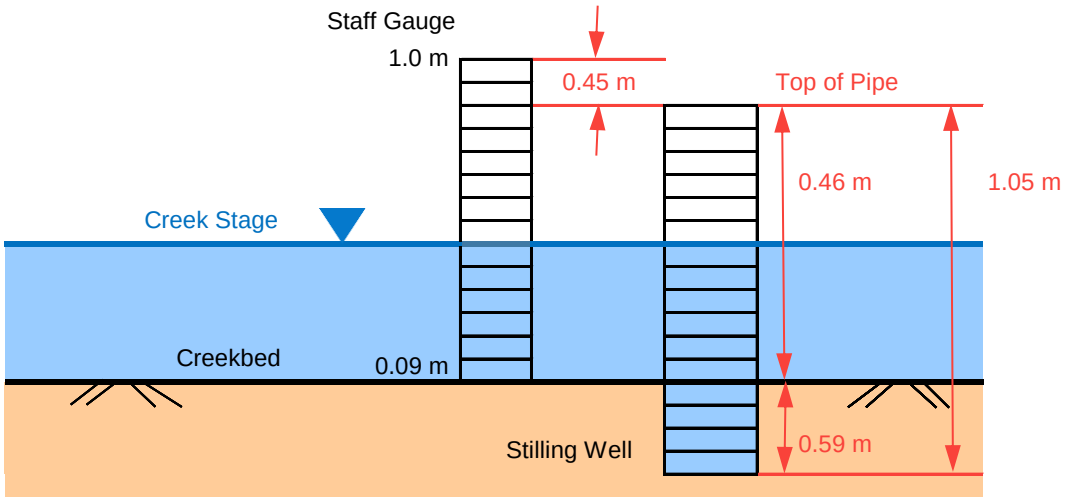
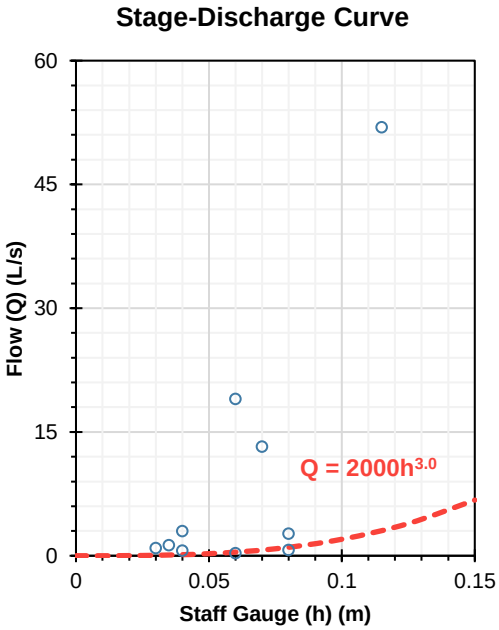


Photo taken on October 27, 2022.



Notes:

Escarpment seep northeast of Extension Quarry, upstream of in-line pond.

GPS Coordinates 561,238 E 4,915,997 N (NAD 83 Zone 17).

Approximate ground elevation is 435 masl (estimated from Ontario Base Mapping).

Station SW13

Project Name:	Duntroon Quarry	**Date:**	November 22, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

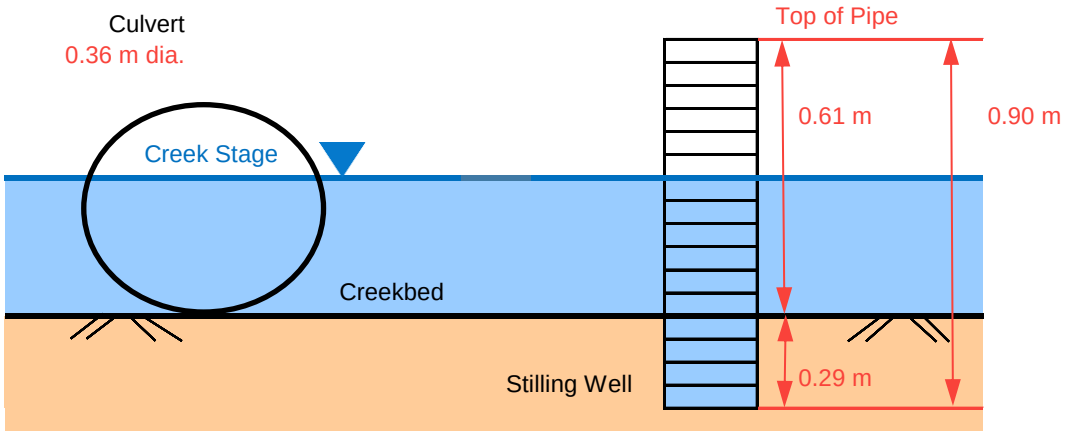
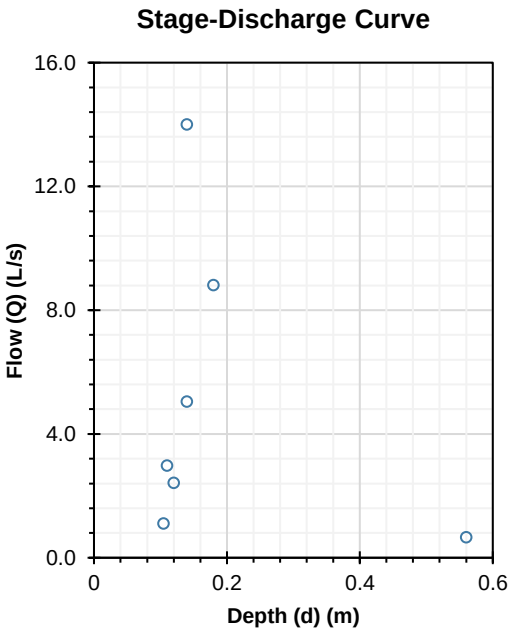


Photo taken on November 22, 2022.



Notes:

Franks Pond outlet culvert east of Extension Quarry.

GPS Coordinates 561,288 E 4,916,042 N (NAD 83 Zone 17).

Approximate ground elevation is 427 masl (estimated from Ontario Base Mapping).

Station SW14

Project Name:	Duntroon Quarry	**Date:**	October 27, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC / SRF / BC
Project Number:	111-53312-05	**Scale:**	NTS

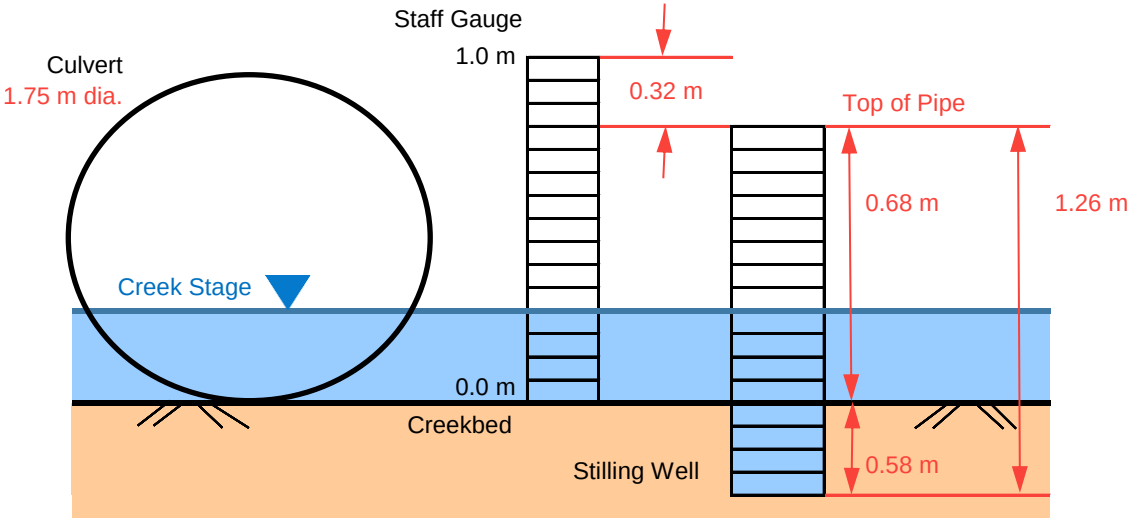
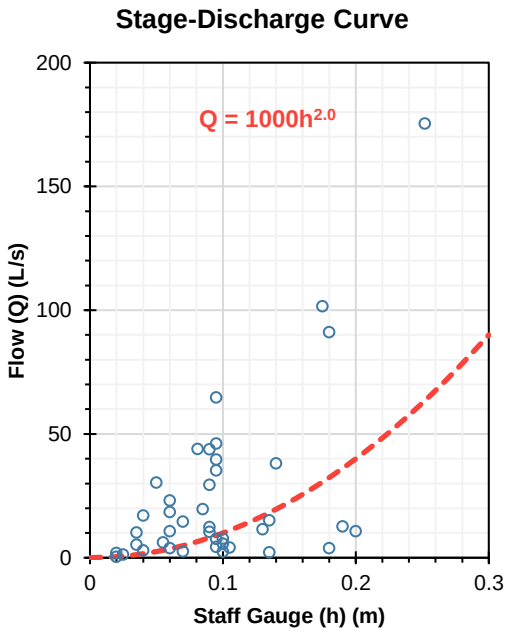


Photo taken on October 27, 2022.



Notes:

Batteaux Creek northeast of Extension Quarry east of Conc 10.

GPS Coordinates 561,526 E 4,916,249 N (NAD 83 Zone 17).

Approximate ground elevation is 410 masl (estimated from Ontario Base Mapping).

Station SW15

Project Name:	Duntroon Quarry	**Date:**	May 16, 2023
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

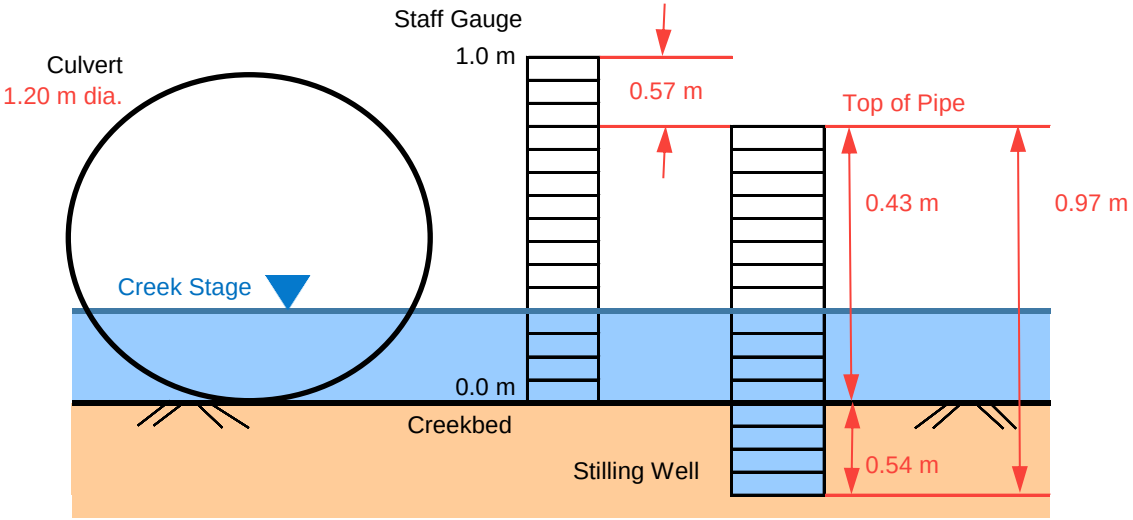
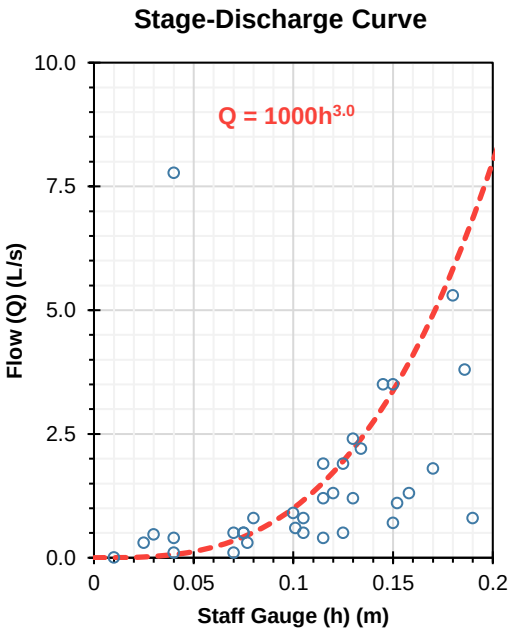


Photo taken on May 16, 2023.



Notes:

Batteaux Creek northeast of Extension Quarry east of Conc 10.

GPS Coordinates 561,495 E 4,916,432 N (NAD 83 Zone 17).

Approximate ground elevation is 420 masl (estimated from Ontario Base Mapping).

Station SW16

Project Name:	Duntroon Quarry	**Date:**	November 23, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

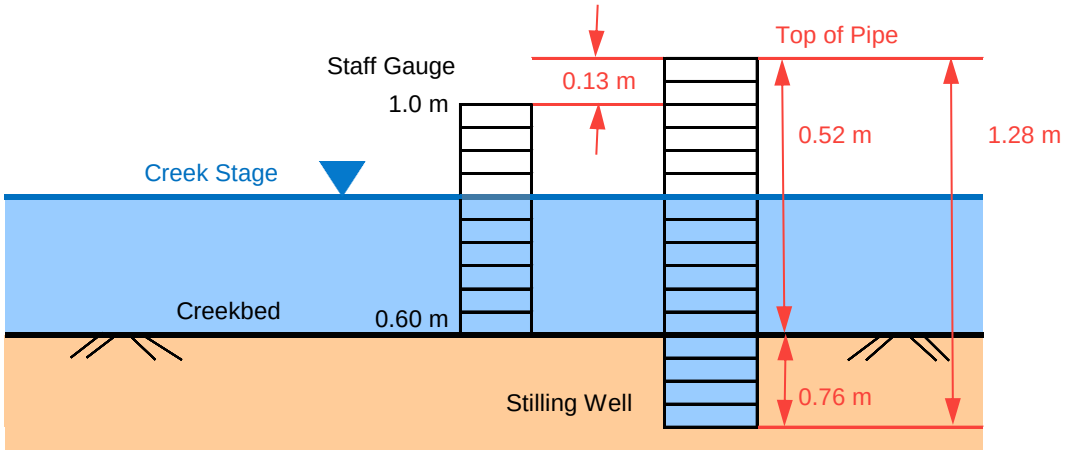
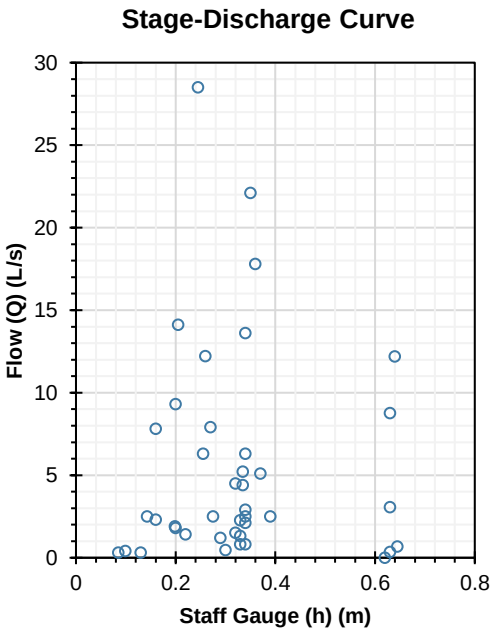


Photo taken on October 27, 2022.



Notes:

Pretty River tributary northeast of Extension Quarry at 26/27 Sideroad.

GPS Coordinates 561,198 E 4,916,724 N (NAD 83 Zone 17).

Approximate ground elevation is 415 masl (estimated from Ontario Base Mapping).

Station SW17

Project Name:	Duntroon Quarry	**Date:**	July 31, 2015
Client:	Walker Aggregates Inc.	**Supervisor:**	JHL
Project Number:	111-53312-05	**Scale:**	NTS

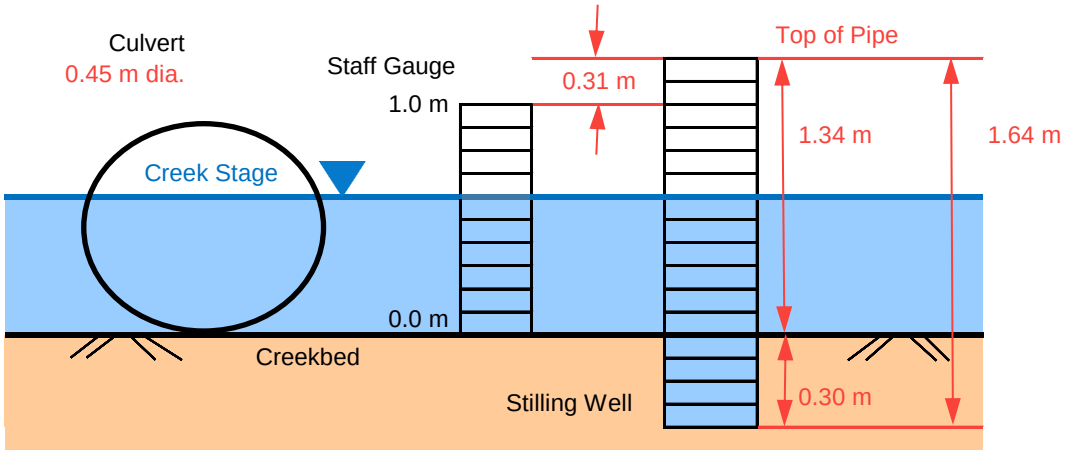
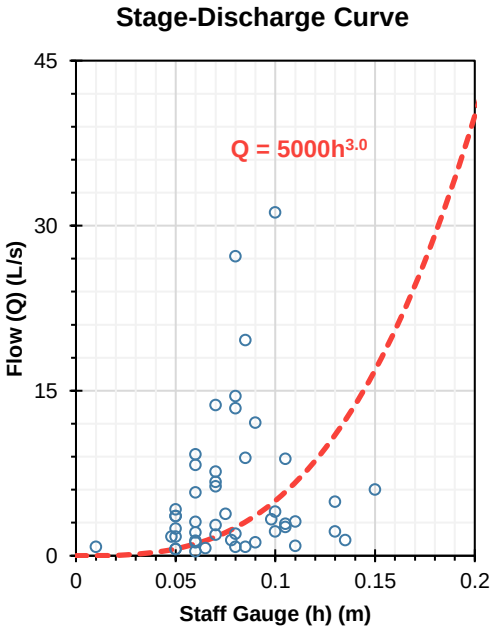


Photo taken on September 29, 2022.



Notes:

Pretty River in-line pond outlet northeast of Extension Quarry south of 26/27 Sideroad.

GPS Coordinates 560,607 E 4,916,532 N (NAD 83 Zone 17).

Approximate ground elevation is 431 masl (estimated from Ontario Base Mapping).

Station SW17A

Project Name:	Duntroon Quarry	**Date:**	November 23, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

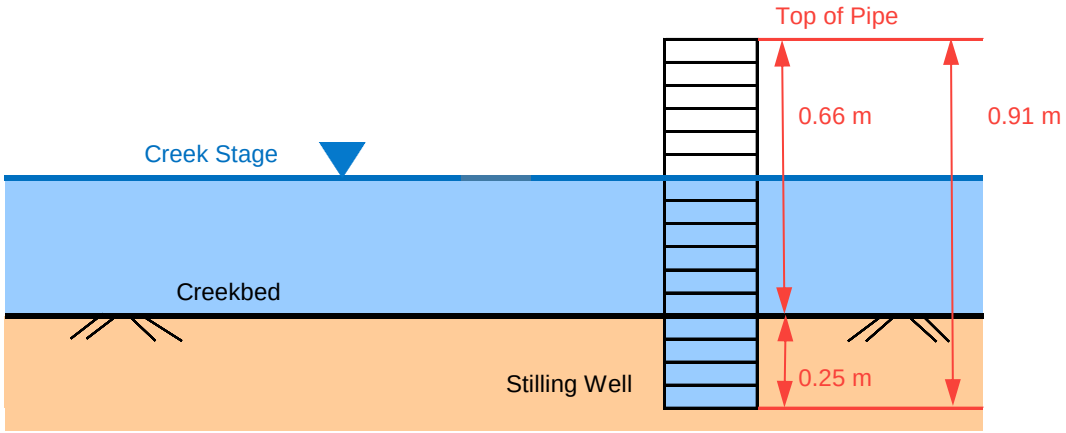
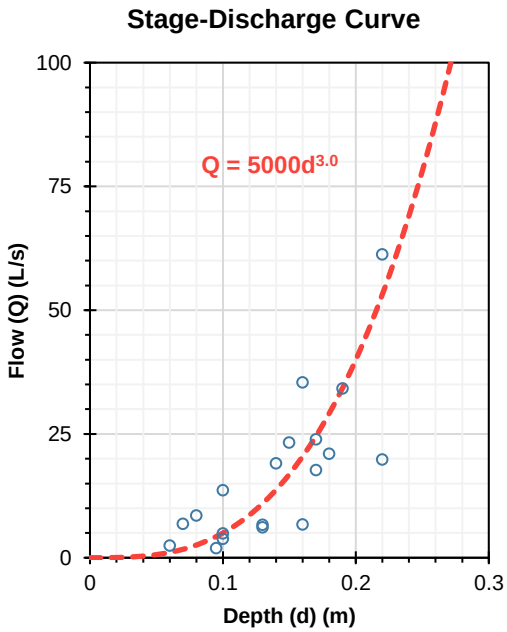


Photo taken on November 23, 2022.



Notes:

Pretty River tributary northeast of Extension Quarry north of 26/27 Sideroad.

GPS Coordinates 560,603 E 4,916,543 N (NAD 83 Zone 17).

Approximate ground elevation is 430 masl (estimated from Ontario Base Mapping).

Station SW18

Project Name:	Duntroon Quarry	**Date:**	November 22, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

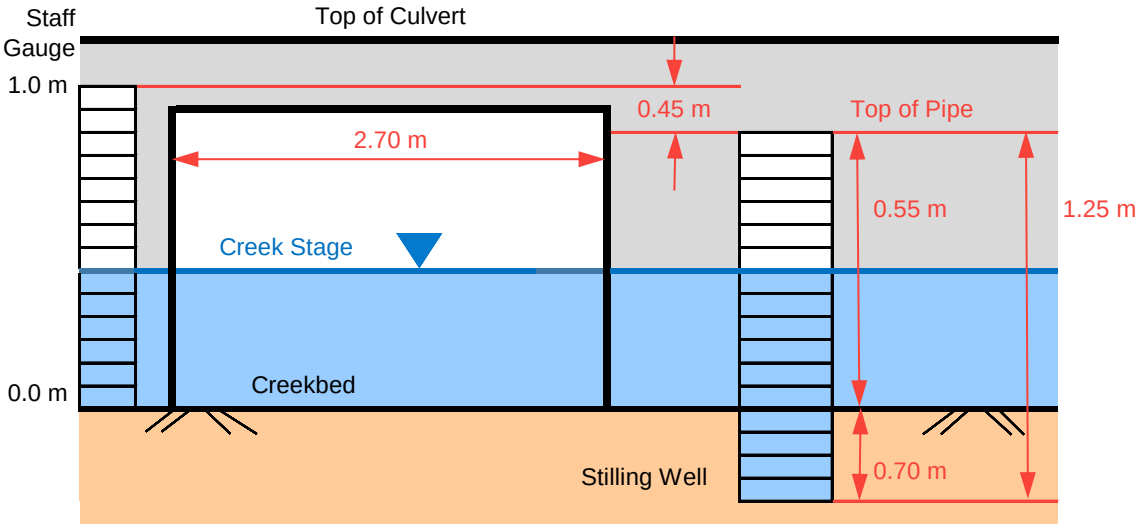
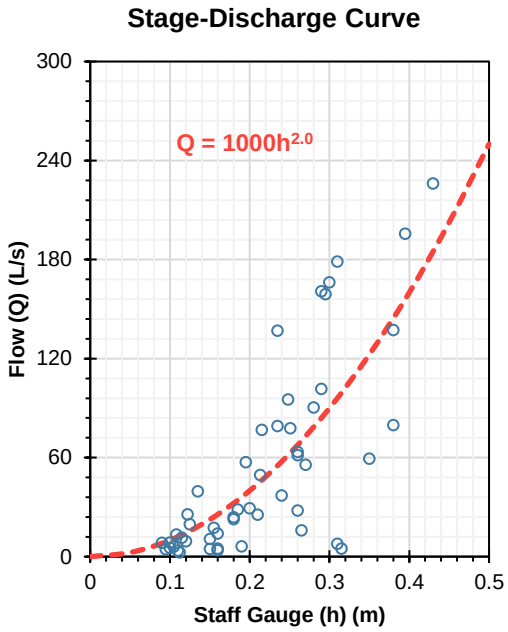


Photo taken on November 22, 2022.



Notes:

Pretty River tributary northeast of Extension Quarry west of Conc 10.

GPS Coordinates 561,401 E 4,917,002 N (NAD 83 Zone 17).

Approximate ground elevation is 390 masl (estimated from Ontario Base Mapping).

Station SW19

Project Name:	Duntroon Quarry	**Date:**	July 12, 2023
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

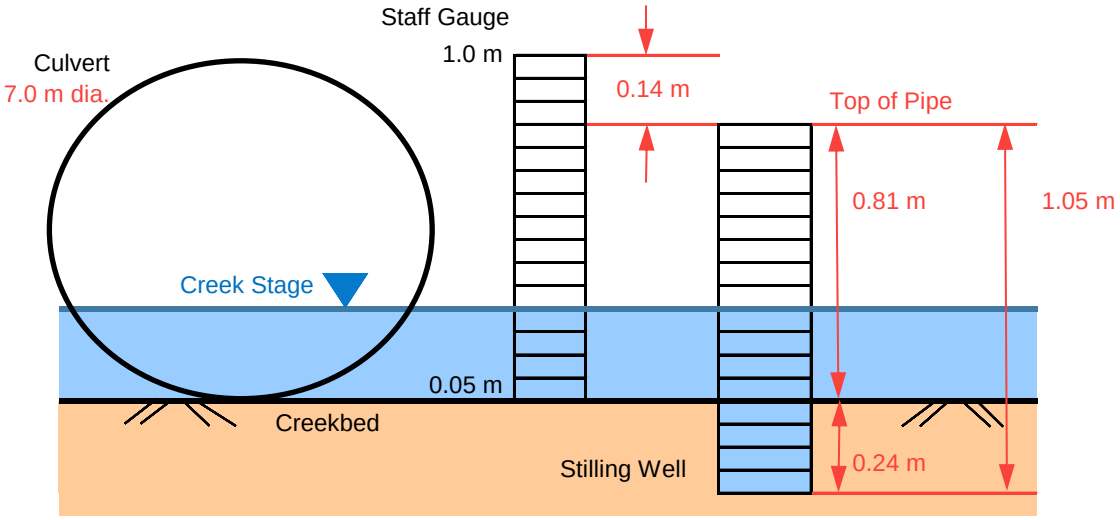
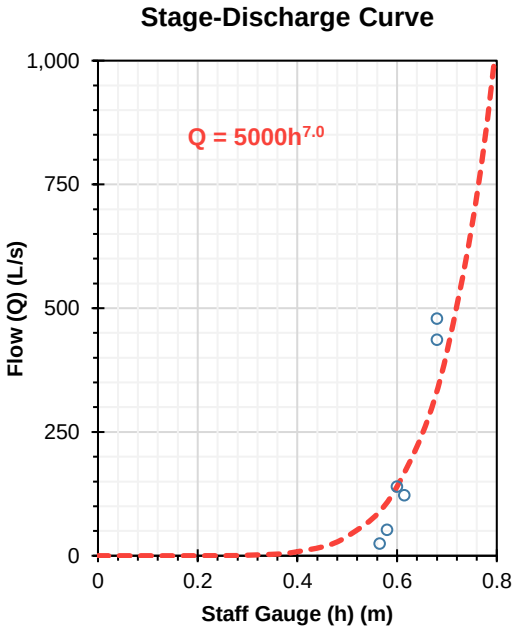


Photo taken on July 12, 2023.



Notes:

Batteaux Creek east of Extension Quarry at County Road 124.

GPS Coordinates 564,257 E 4,915,492 N (NAD 83 Zone 17).

Approximate ground elevation is 335 masl (estimated from Ontario Base Mapping).

Station SW20

Project Name:	Duntroon Quarry	**Date:**	May 16, 2023
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

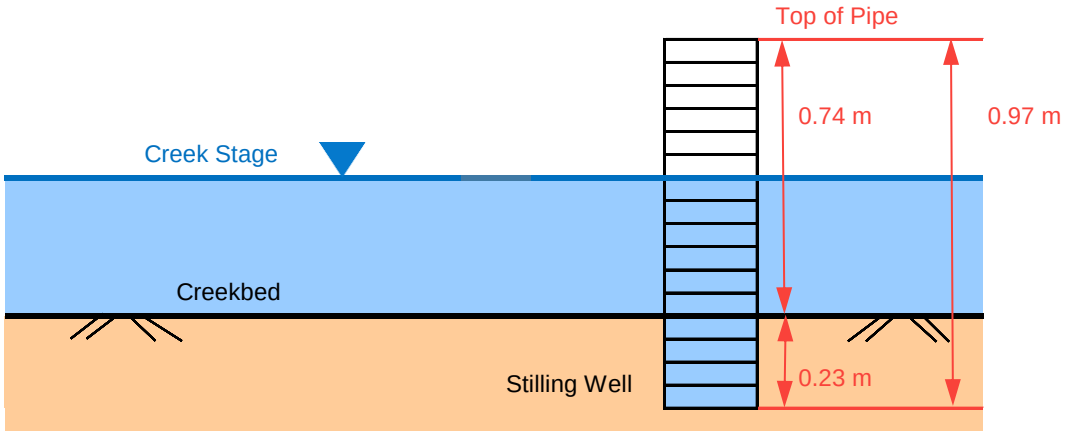
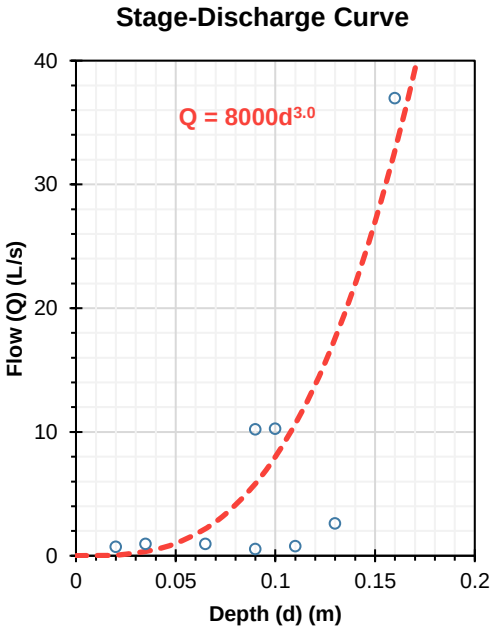


Photo taken on May 16, 2023.



Notes:

Escarpment seep to Pretty River northeast of Extension Quarry.

GPS Coordinates 560,066 E 4,916,392 N (NAD 83 Zone 17).

Approximate ground elevation is 495 masl (estimated from Ontario Base Mapping).

Station SW21

Project Name:	Duntroon Quarry	**Date:**	November 22, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

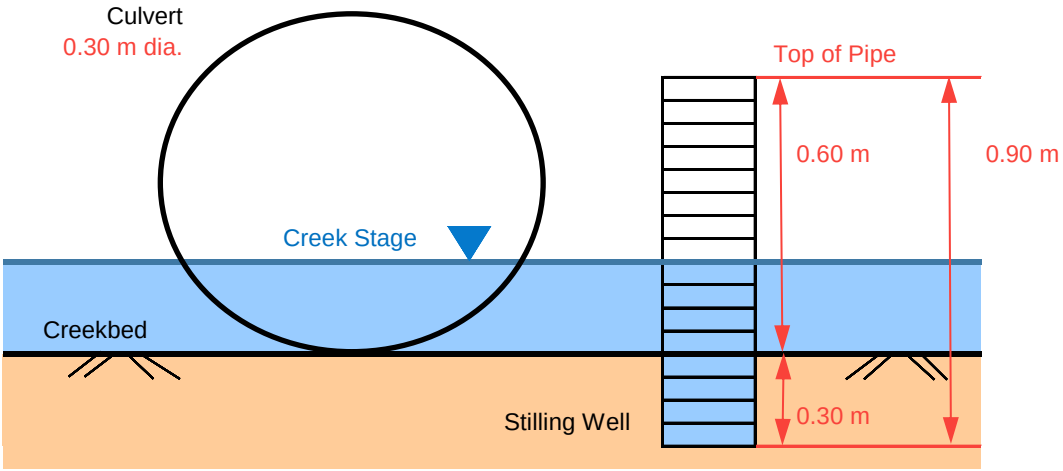
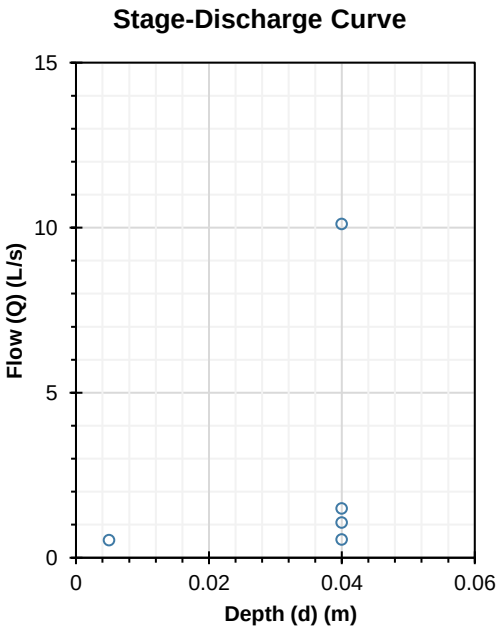


Photo taken on November 22, 2022.



Notes:

In-line pond discharge below escarpment east of Extension Quarry.

GPS Coordinates 560,308 E 4,916,284 N (NAD 83 Zone 17).

Approximate ground elevation is 430 masl (estimated from Ontario Base Mapping).

Station SW21A

Project Name:	Duntroon Quarry	**Date:**	November 22, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

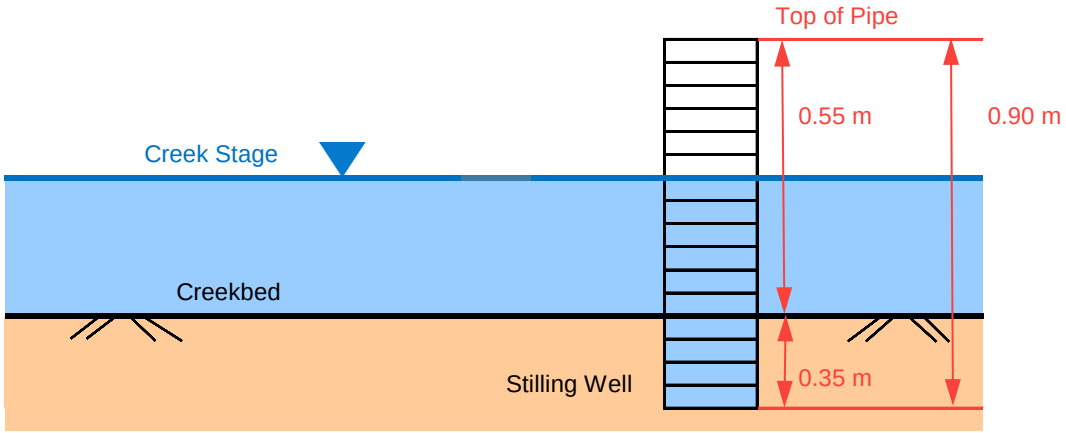


Photo taken on November 22, 2022.

Notes:

In-line pond inlet below escarpment east of Extension Quarry.

GPS Coordinates 561,246 E 4,916,261 N (NAD 83 Zone 17).

Approximate ground elevation is 433 masl (estimated from Ontario Base Mapping).

Station SW21B

Project Name:	Duntroon Quarry	**Date:**	November 22, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

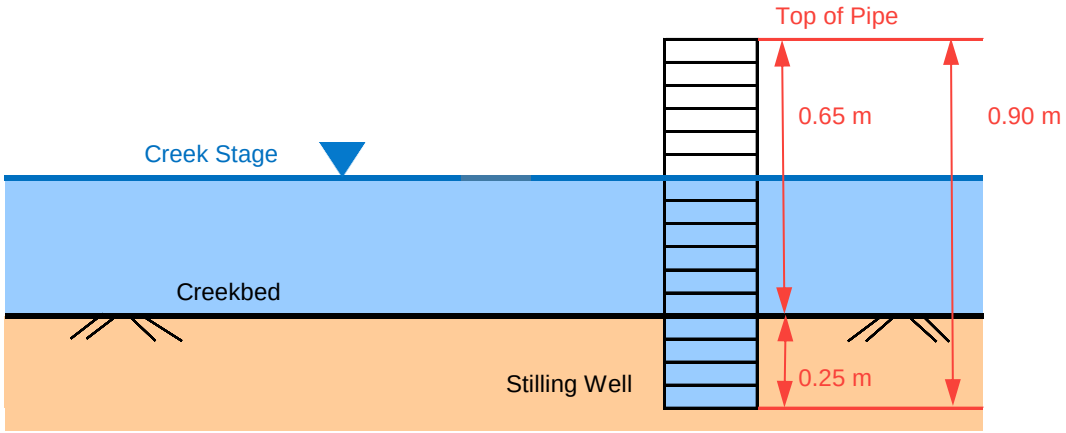


Photo taken on September 29, 2022.

Notes:

Residential cistern overflow outlet below escarpment east of Extension Quarry.

GPS Coordinates 561,039 E 4,916,193 N (NAD 83 Zone 17).

Approximate ground elevation is 449 masl (estimated from Ontario Base Mapping).

Station SW21C

Project Name:	Duntroon Quarry	**Date:**	October 27, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC / SRF / BC
Project Number:	111-53312-05	**Scale:**	NTS

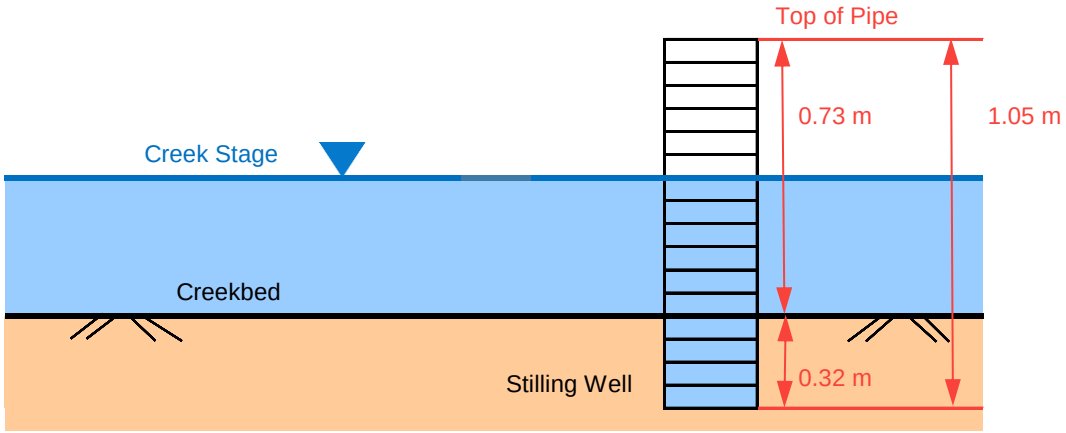
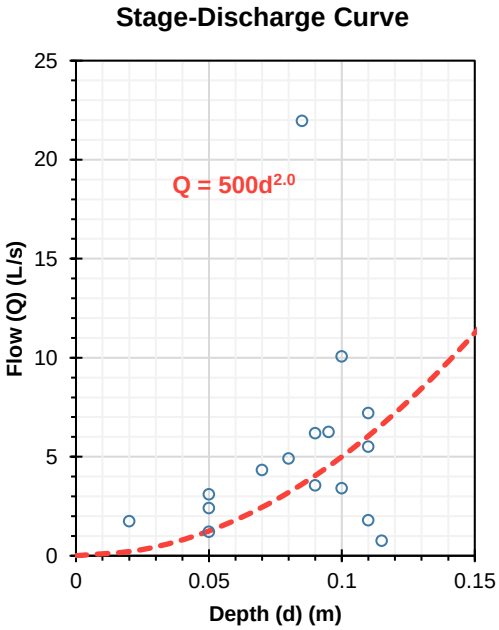


Photo taken on October 27, 2022.



Notes:

Escarpment seep northeast of Extension Quarry, upgradient of cistern inlet pipe.

GPS Coordinates 560,708 E 4,916,241 N (NAD 83 Zone 17).

Approximate ground elevation is 470 masl (estimated from Ontario Base Mapping).

Station SW22

Project Name:	Duntroon Quarry	**Date:**	November 23, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

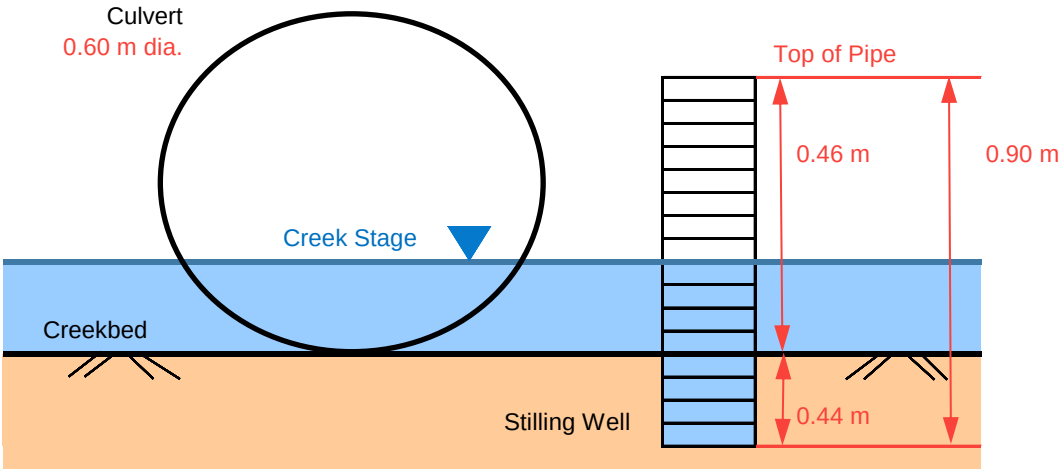
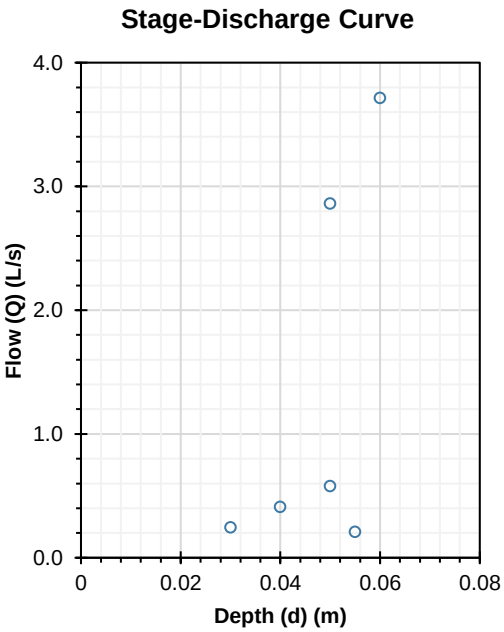


Photo taken on November 23, 2022.



Notes:

Escarpment seep culvert beneath ski trail east of Main Quarry.

GPS Coordinates 560,686 E 4,914,713 N (NAD 83 Zone 17).

Approximate ground elevation is 492 masl (estimated from Ontario Base Mapping).

Station SW22A

Project Name:	Duntroon Quarry	**Date:**	November 23, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

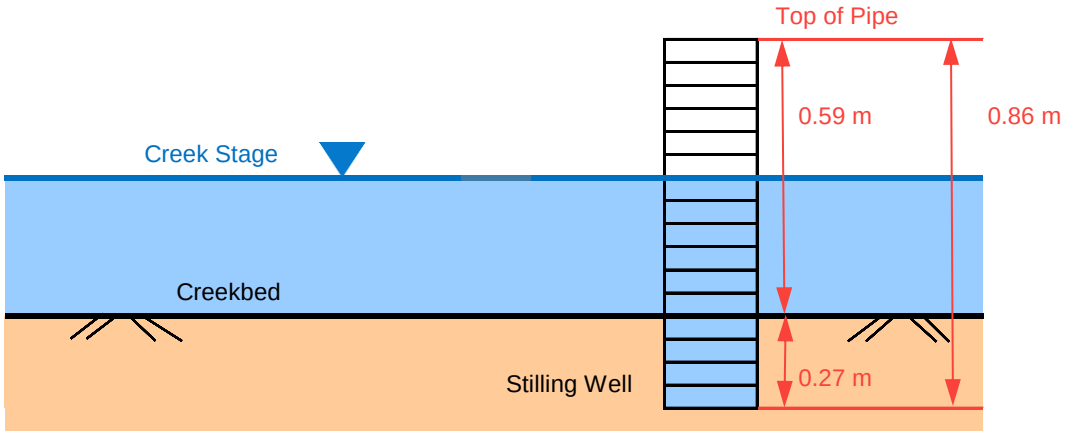
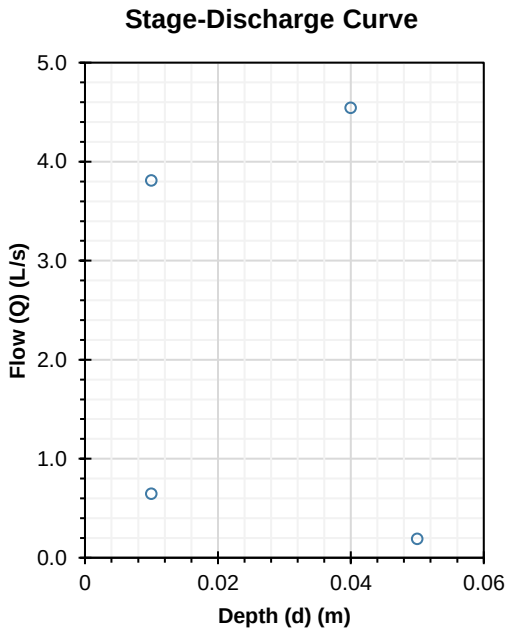


Photo taken on November 23, 2022.



Notes:

Escarpment seep east of Main Quarry.

GPS Coordinates 560,952 E 4,915,039 N (NAD 83 Zone 17).

Approximate ground elevation is 485 masl (estimated from Ontario Base Mapping).

Station SW22C

Project Name:	Duntroon Quarry	**Date:**	November 23, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

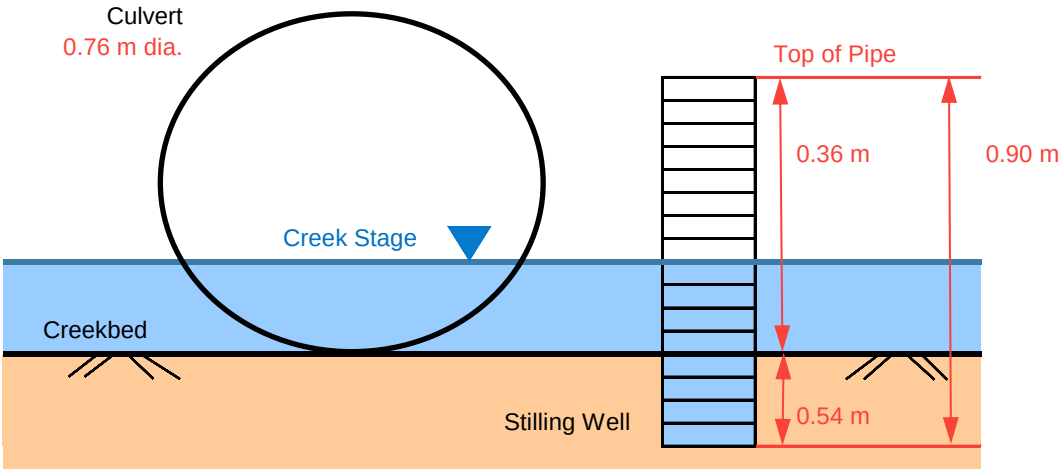
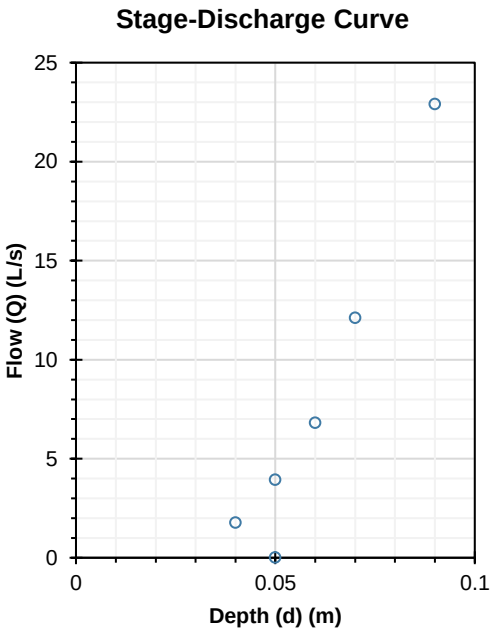


Photo taken on November 23, 2022.



Notes:

Escarpment seep flow channel culvert east of Main Quarry.

GPS Coordinates 560,977 E 4,914,876 N (NAD 83 Zone 17).

Approximate ground elevation is 477 masl (estimated from Ontario Base Mapping).

Station SW24A

Project Name:	Duntroon Quarry	**Date:**	November 23, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

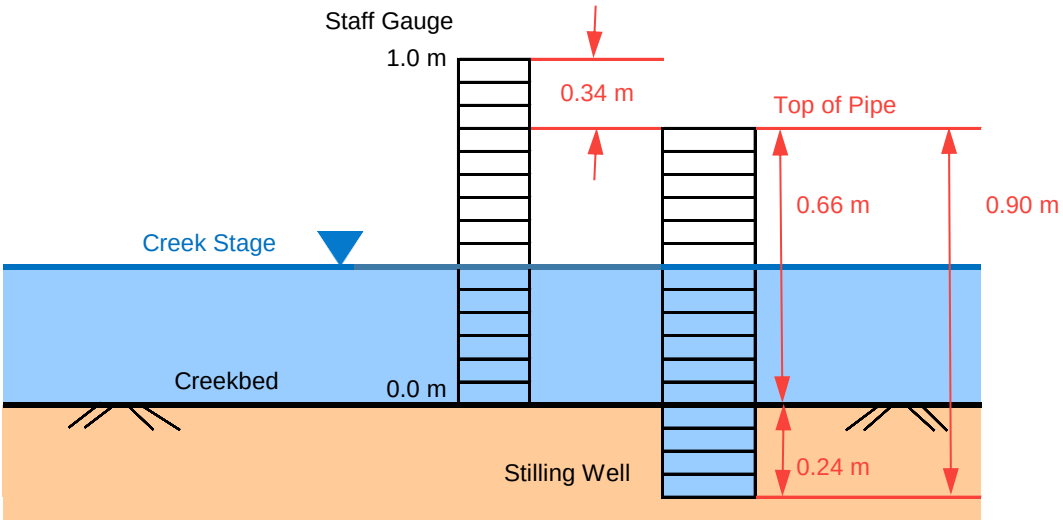
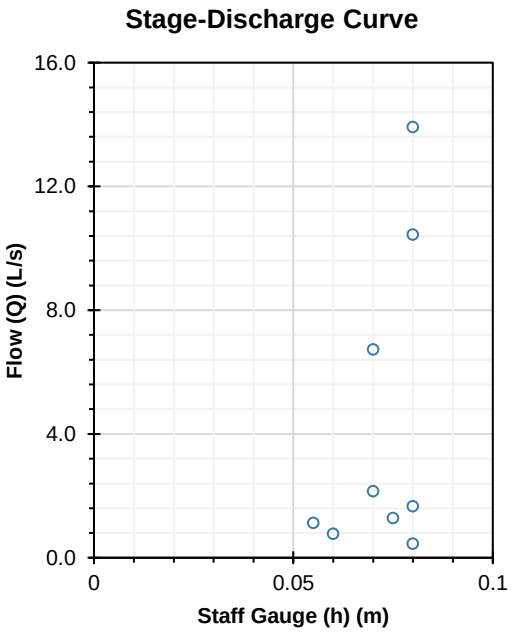


Photo taken on November 23, 2022.



Notes:

Escarpment seep channel at water supply collection system northeast of Extension Quarry.

GPS Coordinates 560,566 E 4,916,379 N (NAD 83 Zone 17).

Approximate ground elevation is 460 masl (estimated from Ontario Base Mapping).

Station SW77

Project Name:	Duntroon Quarry	**Date:**	November 21, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

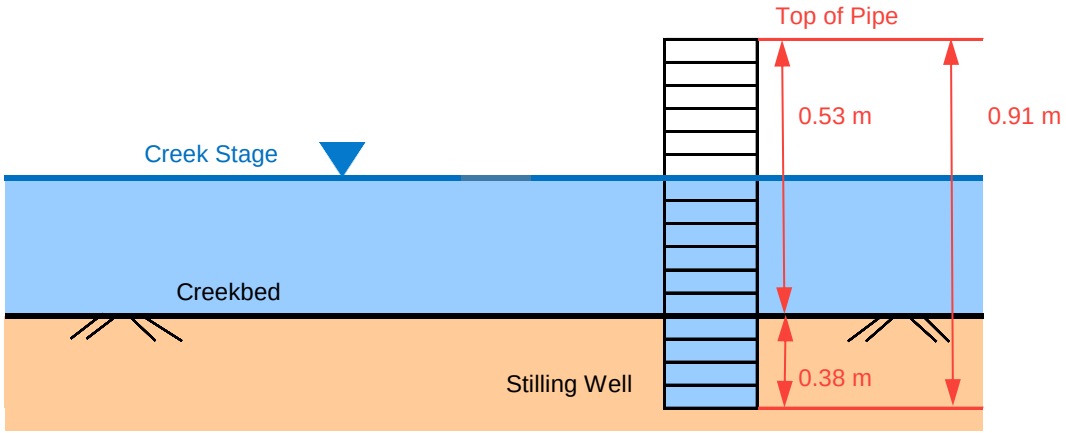
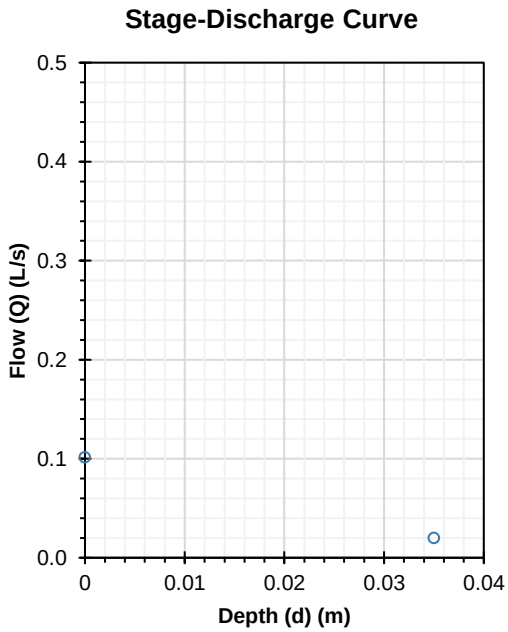


Photo taken on November 21, 2022.



Notes:

Escarpment seep northeast of Extension Quarry.

GPS Coordinates 560,150 E 4,916,292 N (NAD 83 Zone 17).

Approximate ground elevation is 494 masl (estimated from Ontario Base Mapping).

Station PR Control

Project Name:	Duntroon Quarry	**Date:**	October 28, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC / SRF / BC
Project Number:	111-53312-05	**Scale:**	NTS

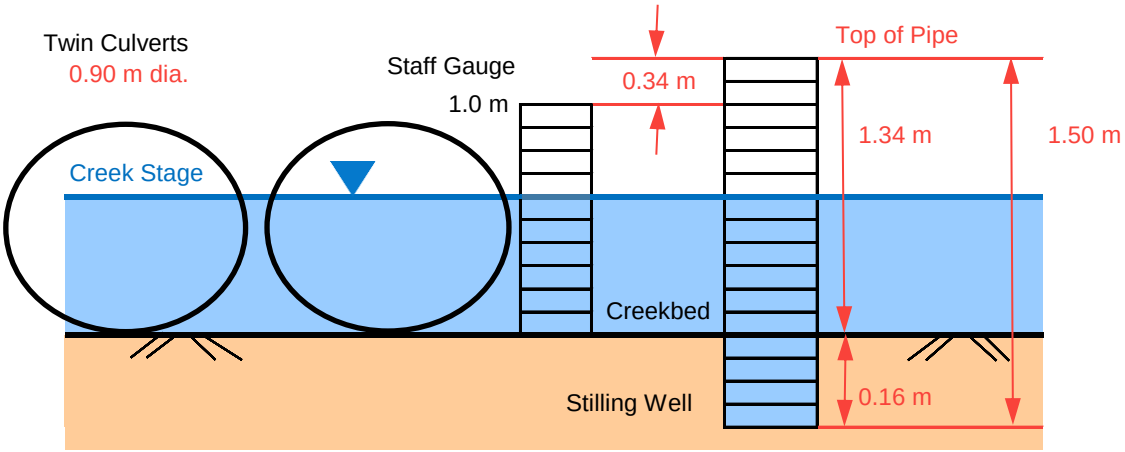
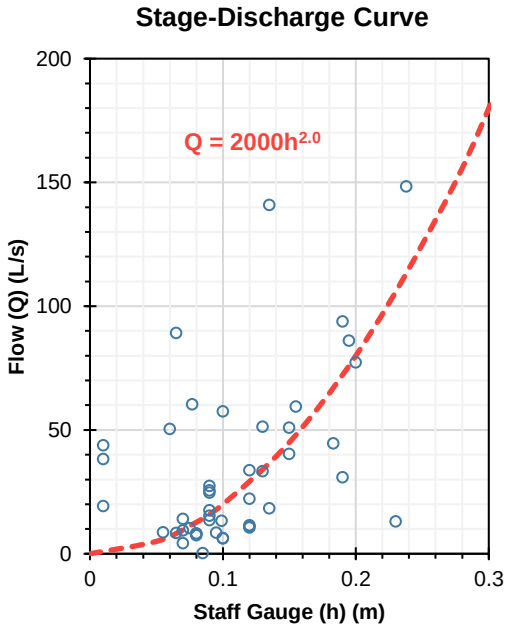


Photo taken on October 28, 2022.



Notes:

Pretty River Control Station identified with NVCA north of Quarry on 30/31 Sideroad.

GPS Coordinates 558,059 E 4,918,224 N (NAD 83 Zone 17).

Approximate ground elevation is 360 masl (estimated from Ontario Base Mapping).

Station BC Control

Project Name:	Duntroon Quarry	**Date:**	November 22, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

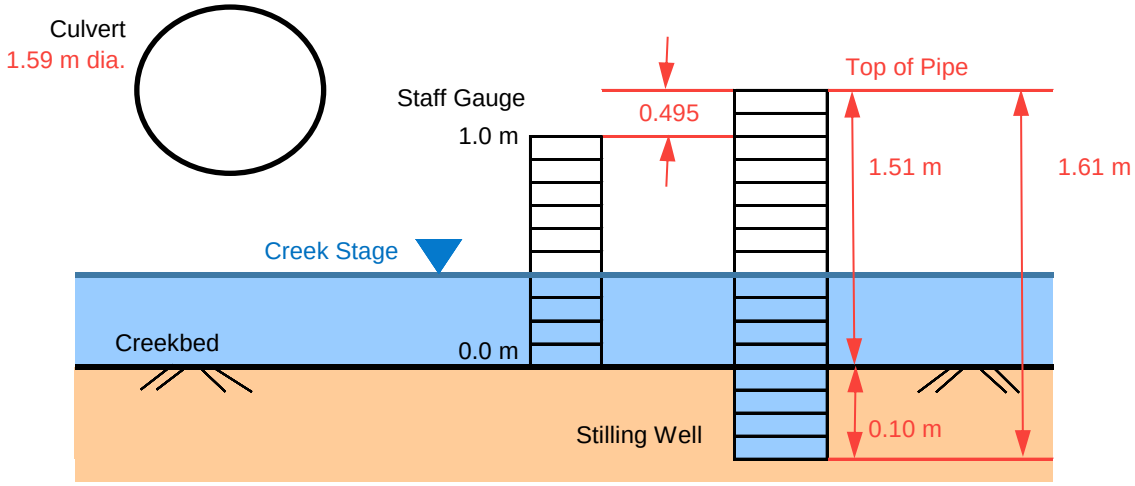
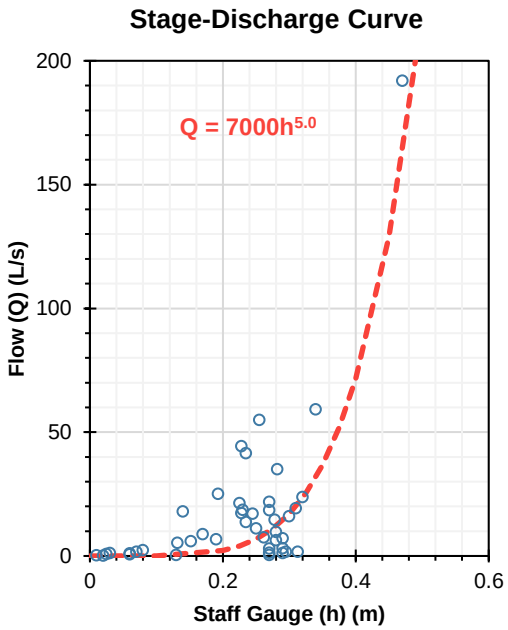


Photo taken on November 22, 2022.



Notes:

Batteaux Creek Control Station identified with NVCA southeast of Quarry on 21/22 Sideroad

GPS Coordinates 563,251 E 4,914,197 N (NAD 83 Zone 17).

Approximate ground elevation is 405 masl (estimated from Ontario Base Mapping).

BH03-7 SG1

Project Name:	Duntroon Quarry	**Date:**	November 23, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

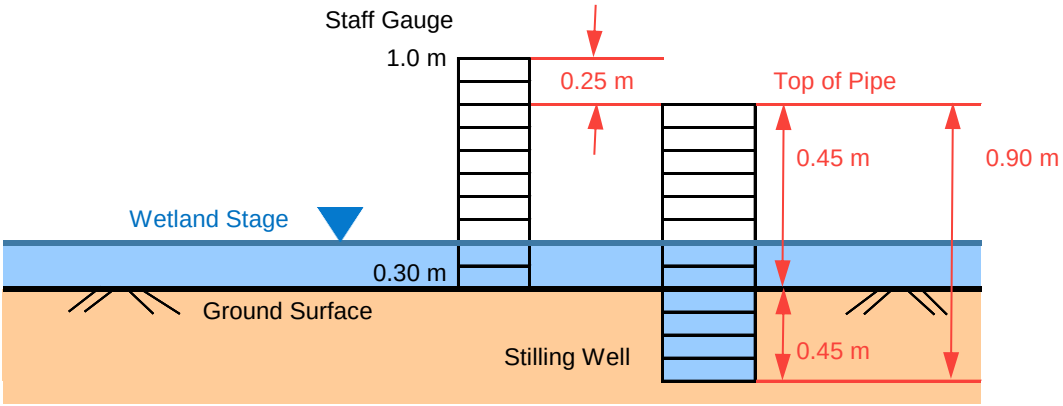


Photo taken on November 23, 2022.

Notes:

RR2 north of BH03-7 well nest

GPS Coordinates 559,349 E 4,915,519 N (NAD 83 Zone 17).

Approximate ground elevation is 510.5 masl (estimated from April 2022 LIDAR survey).

BH03-7 SG2

Project Name:	Duntroon Quarry	**Date:**	November 23, 2022
Client:	Walker Aggregates Inc.	**Supervisor:**	BC
Project Number:	111-53312-05	**Scale:**	NTS

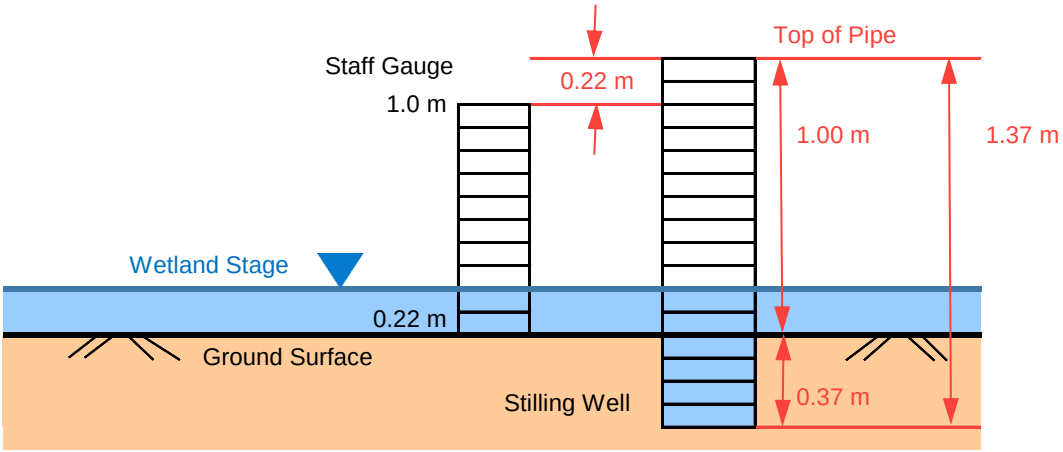


Photo taken on November 23, 2022.

Notes:

RR2 northwest of BH03-7 well nest

GPS Coordinates 559,323 E 4,915,530 N (NAD 83 Zone 17).

Approximate ground elevation is 510.5 masl (estimated from April 2022 LIDAR survey).