



Preliminary Hydrogeological Assessment, Proposed Dolostone Quarry, Township of Flamborough

prepared for:
Lowndes Holdings Corp.

prepared by:
Gartner Lee Limited

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GLL 23-827

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5 Lowndes Holdings Corp.
1 Gartner Lee Limited



Gartner Lee Limited

August 17, 2004

Mr. David Lowndes
Lowndes Holdings Corp.
15-6400 Millcreek Drive
Mississauga, ON L5N 3E7

Dear Mr. Lowndes:

Re: GLL 23-827 – Preliminary Hydrogeological Assessment, Proposed Dolostone Quarry, Township of Flamborough

Please find enclosed our preliminary report on the aforementioned property.

This report reflects the completion of our preliminary hydrogeological assessment, which has concluded that the proposed quarry extraction is feasible. Results of the groundwater investigations to-date are included in this report, along with our preliminary assessment of the results. These will be updated as the field studies and groundwater modelling are completed later this summer. A final report will be prepared at that time.

Please call our offices should you have any questions.

Yours very truly,
GARTNER LEE LIMITED

Stephen C. Hollingshead, M.Sc.(Eng.), P.Eng.
Senior Geological Engineer
Principal

SCH/KDW:tmc
Attach.

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Letter of Transmittal

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1. Introduction

1.1 Background

The proposed quarry site is located on Part of Lot 1 and Lots 2 and 3, Concession 11, Geographic Township of Flamborough, now the City of Hamilton (Figure 1).

Lowndes Holdings Corp. is proposing to develop a below-water quarry license for the site and is applying for amendments to the Official Plans. The property covers an area of about 154 ha (380 acres). Gartner Lee was retained by Lowndes Holdings Corp. to provide a Hydrogeological Assessment of developing a below-water dolostone quarry on the site.

1.2 Objectives

This report contains preliminary information regarding aggregate resources, groundwater and surface water to address the requirements of:

- a) The Hamilton-Wentworth Official Plan, and
- b) Town of Flamborough Official Plan.

We understand that the site is already within an area designated “Gravel & Sand” in the Hamilton-Wentworth Official Plan and “Mineral Aggregate Resource Lands” in the Town of Flamborough Official Plan.

1.2.1 Official Plan Requirements

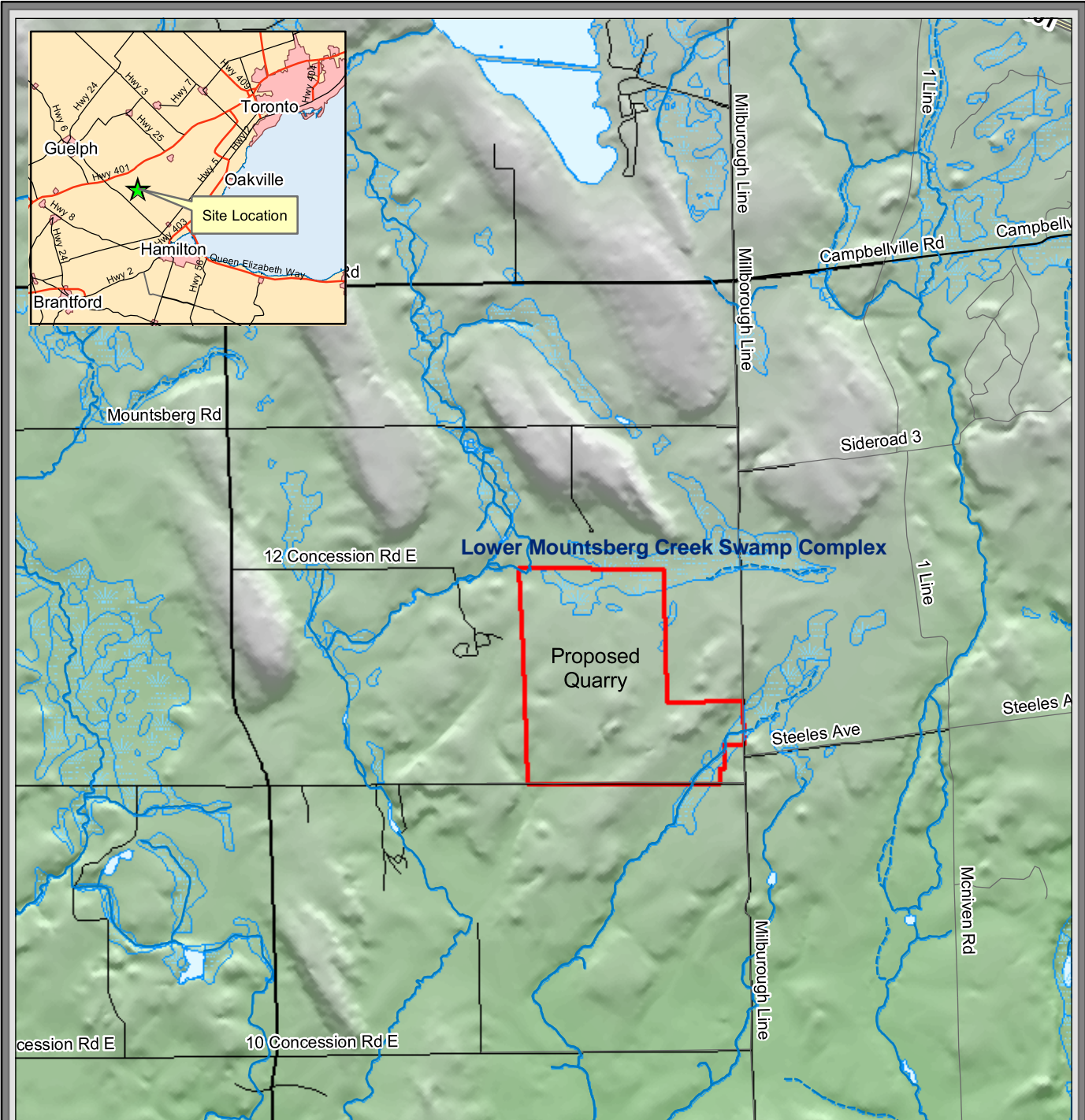
Section B.7.4 and B.7.5 of the *Town of Flamborough Official Plan* detail the following requirements:

B.7.4 (iii) Potential impacts on the environment, including measures required to minimize any adverse impacts.

B.7.5 (i) the location, dimensions, topography, size and description of the site proposed for a Mineral Resource Extraction Area;

(vi) surface water diversion, storage and drainage provisions;

(xii) hydrology, soil, wildlife or vegetation studies which may be required by Council due to specific site concerns.



Legend

- Proposal License Limit
- Provincially Significant Wetland
- Roads**
- Expressway
- Highway
- Secondary Highway
- Major Road
- Local Road
- River/Stream**
- Intermittent Stream
- Stream

Location Plan

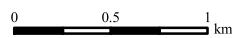
Figure 1

Proposed Dolostone Quarry

Project 23827, June 2004



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2. Site Setting

A review of available data for the site and the surrounding area was initially conducted in order to establish the site setting. This included a review of the current survey plans, Ministry of the Environment water well records, site plan concepts and existing mapping and reports on the site and the vicinity. The reference section at the end of this report lists materials that were used in the review.

2.1 Location, Land Uses and Topography

The property is bounded by residential development to the north¹, residential development and agricultural land (horse farm) to the west, forest to the east and Concession Road 11 to the south. Components of the Lower Mountsberg Swamp Complex are located in the northern portion of the site. The Lower Mountsberg Swamp Complex has been designated a Provincially Significant Wetland by the MNR. The remaining portion of the site consists of cultivated land separated by treed hedgerows.

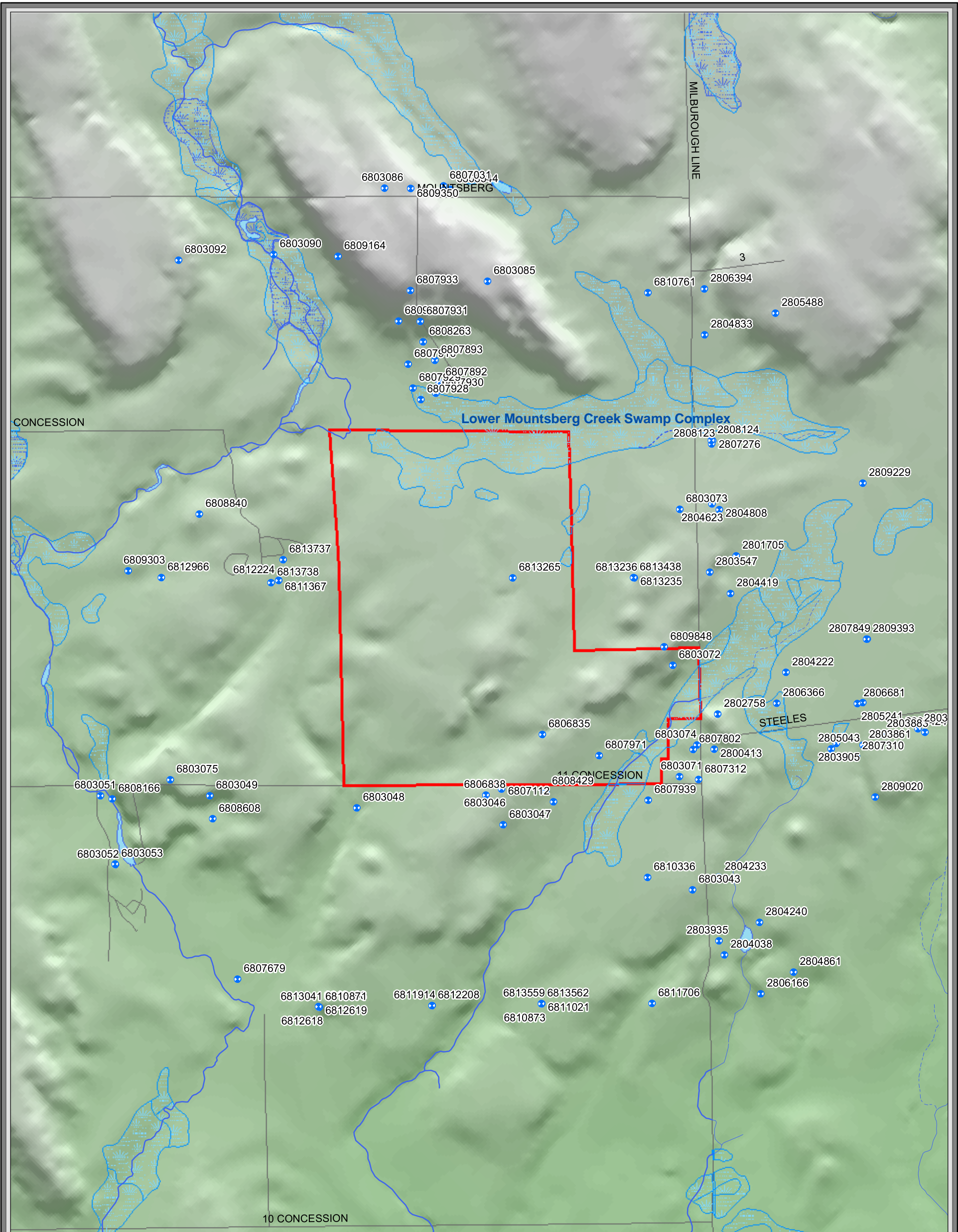
The subject property is fairly hummocky, with rolling hills encompassing the majority of the site, except within the wetland boundaries. A dugout pond is found near the southern property line, with a pond elevation of 280.7 mASL². The ground elevation on the southern part of the property, closest to Concession 11, is about 281.5 mASL and rises to about 294.2 mASL in the centre portion of the property, sloping downward to the north to an elevation of about 285 mASL in the wetland.

2.2 Site Investigations

Twelve (12) boreholes penetrated the Amabel formation and terminated at the contact of the underlying Cabot Head formation (see below for Geological description of the formations, and Appendix B for borehole logs). Groundwater monitors were installed in each borehole, but were not sealed therefore the monitor is acting as an open hole monitor or standpipe. At eight of these boreholes locations, an adjacent shallow borehole was established 3m below the water table and equipped with a groundwater monitor. Selected boreholes were also packer tested in order to determine permeable zones and hydraulic properties.

Four piezometer nests were established in the on-site wetland complexes, as shown on Figure 4. Each nest consists of a shallow and deep piezometer to determine hydraulic characteristics within the wetlands.

-
1. *For simplicity, “north” in this report generally refers to the top of the drawings and directions correspond to the road alignment, following local convention, rather than the actual compass directions (which are also shown in the drawings for reference).*
 2. *mASL refers to the elevation expressed in metres above mean sea level.*



Legend

- | | |
|-----------------------------|-------------------------|
| • Water Well Location | Water Features |
| ▭ Proposed License Boundary | ▭ Lake or River |
| Roads | ▭ Cartographic Wetland |
| — Local Road | River/Stream |
| — Major Road | --- Intermittent Stream |
| — Highway | — Stream |
| — Expressway | |

MOE Water Well Records

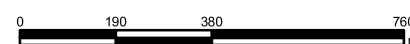
Figure 2

Proposed Dolostone Quarry

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Dolostone Quarry, Former Town of Flamborough, City of Hamilton**

Three staff gauges were established at each surface water-course leaving the site; Mountsburg Creek in the northwest, Flamboro Creek in the southeast, and an intermittent watercourse to the south.

2.3 Geology

The site is located in the Flamborough Plain physiographic region, described as a limestone plain with little overburden, scattered drumlins and numerous swamps (Chapman & Putnam, 1984). Overburden consists of either bouldary glacial till or sand and gravel.

Onsite overburden consists of bouldary silt till over most of the site, with organic deposits occurring in the northern portion of the site, shale and dolomite outcropping along the western boundary, and outwash gravel deposits in the southern portion (Karrow, 1986, 1987). The overburden, approximately 1 to 8 m thick, is underlain by limestone of the Amabel formation (ARIP, 1984). According to geological records, this formation is approximately 30 m thick (Telford, 1979). The ARIP depicts the site in the Selected Bedrock Resource Area 1, which encompasses the entire extent of the Amabel Formation covered by less than 25 feet (8 m) of drift.

The Middle Silurian Amabel Formation is divided into two members, the upper Amabel Member (approximately 14m in thickness) and the lower Amabel Member (approximately 19 m in thickness). The upper member of the Amabel is characterized as a grey to light grey to tan, thickly-bedded to massive, medium to coarse crystalline, fossiliferous (crinoidal), vuggy dolostone with a grainstone lithology. Visible, vuggy porosity is high. The transition to the lower member is gradational and marked by a decrease in bedding thickness and a finer crystal size.

The lower Amabel Member is described as a grey, medium bedded, fine to medium crystalline, vuggy dolostone. Fossil content is significantly lower than overlying member and shale stringers and stylolites are common, particularly near the bottom of the lower member. Visible porosity is significantly lower than the overlying member. The contact with the underlying Reynales formation is sharp.

The Lower Silurian Reynales Formation is approximately 2 m thick and described as a greenish to grey to white, thinly bedded, fine to very finely crystalline dolostone with calcareous shale. Fossils are rare and visible porosity (vugs) is low. The Reynales Formation marks a transition between the carbonates of the Amabel Formation and the underlying Cabot Head shales. The boreholes used in this study were drilled to the top of the Cabot Head Formation shale.

2.4 Hydrogeology and Water Well Records

Water wells within about 1 km of the quarry were plotted on an Ontario Base Map based on their UTM co-ordinates provided in the MOE well records. MOE well records are summarized in Appendix A.

There are 102 water well records within 1 km of the site boundaries (Figure 2). All but two of the wells are completed in the bedrock. All of the recorded wells are drilled wells. All but nine wells have fresh water, the remainder are unknown quality. Five wells are used for stock purposes, three for public supply and two are commercial, with the remaining used for domestic purposes. The MOE well records are summarized in Appendix A.

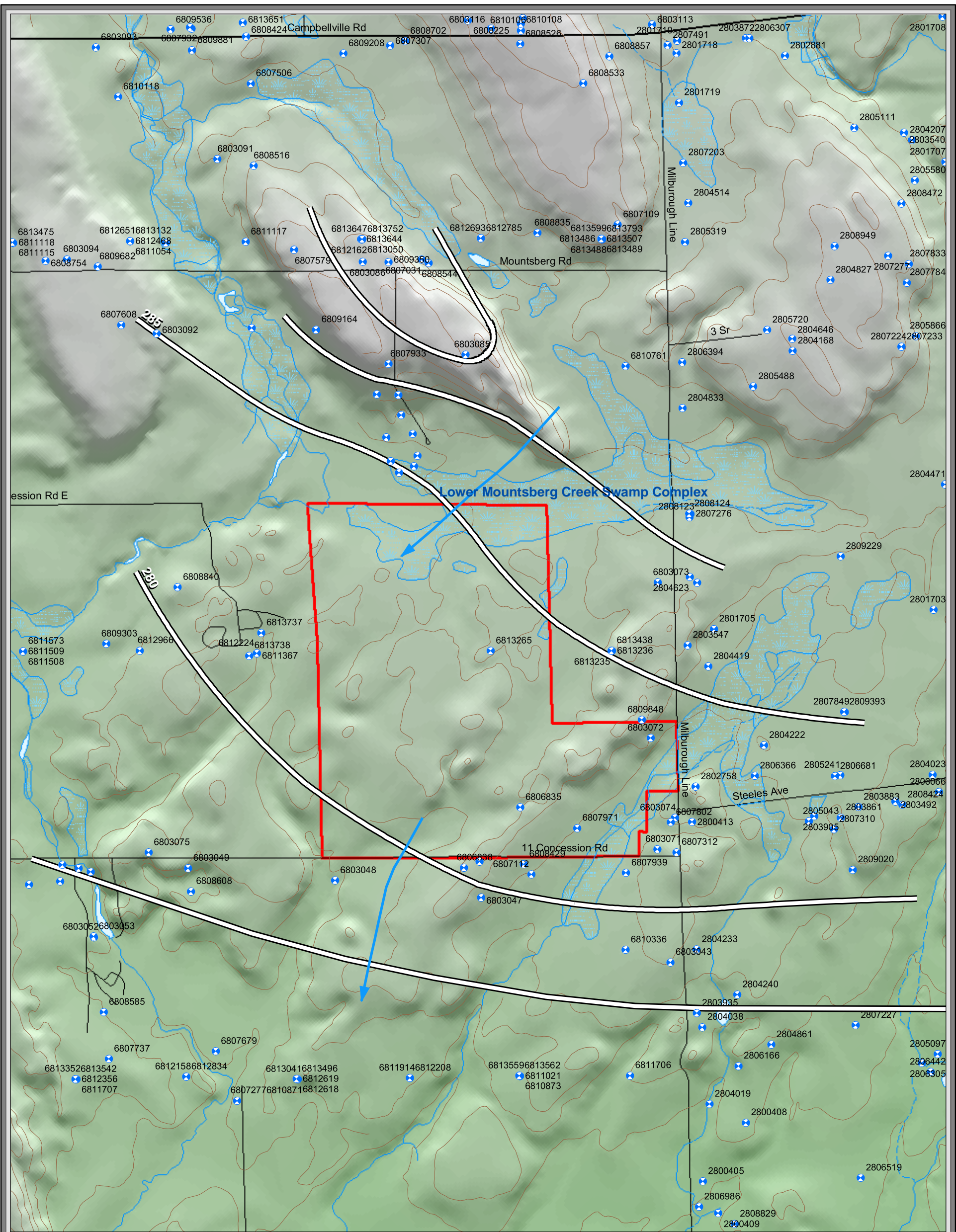
Based on the well records, the average elevation of the bedrock surface is 281.3 mASL, ranging from 279 to 284 mASL in the south and north, respectively. Therefore, the bedrock surface dips generally towards the south, with the average bedrock surface elevation being 5 m higher north of the site compared with to the south. Wells averaged 16.1 m in depth, ranging from 6.4 to 44.2 m. Wells are on average, deeper north of the site than south, 18.4 compared to 13.7.

The average static water level of the MOE well records was 282.9 mASL. Groundwater appears to move in a southerly direction, with wells north of the site (30 wells) having higher water levels on average than those found south of the site (41 wells); 289 mASL compared with 279 mASL. Figure 3 shows a general interpretation of groundwater level (potentiometric) contours based on the well records within about 1 km of the site, illustrating a north-south groundwater flow direction.

Groundwater monitoring wells were installed (see above) to establish the water level elevation of the water table and in selected aquifers. Groundwater levels are monitored monthly (see Appendix D for water level data).

2.5 Surface Water Drainage

The Lower Mountsberg Creek Swamp Complex is a low-lying swamp composed of organic material that appears to be connected to the bedrock water table. A portion of the swamp complex is located in the northern portion of the site, overlying bedrock. Organic soils overlying the bedrock (underlying the swamp) are in the order of 1 m to 2 m thick.



Legend

— Preliminary Potentiometric Contour Based on MOE Water Well Records

➔ Direction of Groundwater Flow

⊕ MOE Well Record

▭ Proposal License Limit

Roads

— Local Road

— Major Road

▭ Lake or River

▭ Provincially Significant Wetland

--- Intermittent Stream

— Stream

— contours

Potentiometric Contours

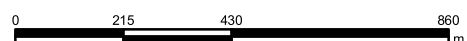
Figure 3

Proposed Dolostone Quarry

Project 23827, August 2004



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Flamboro Creek is located in the southeast sector of the site, draining towards the south. A tributary of Mountsberg Creek drains the swamp complex in the northern portion of the site and connects to Mountsberg Creek about 250 m northeast of the site. Both Flamboro Creek and Mountsberg Creek connect to Bronte Creek over 2 km to the south. Several intermittent, on-site watercourses drain to Mountsberg and Flamboro Creeks.

There is an unnamed drainage channel located adjacent to the dugout pond in the southern portion of the property, which discharges via a culvert under Concession Road 11, and drains to the south.

Streamflow measurements are conducted at these three locations monthly (see Appendix E).

3. Preliminary Hydrogeological Assessment

The preliminary Hydrogeological Assessment incorporates extensive site testing and analysis, including the following major components:

- a) Drilling and logging 12 boreholes; installation of groundwater monitors; installation of 4 piezometer nests and 3 staff gauges; and an analysis of MOE water well records for private wells within approximately 1 km of the quarry.
- b) A series of pumping tests to determine aquifer characteristics, the extent of the drawdown cone that may result from quarry dewatering, and the connectivity of streams and wetlands to the groundwater table.
- c) Seasonal baseline monitoring of groundwater levels and surface water flows.

The appendices to this report contain details of the data and analyses for the above work. The following sections summarize the relevant findings to-date.

3.1 Site Investigation Results

3.1.1 Groundwater Flow

Groundwater levels measured in shallow and deep monitors at the site are shown on Figures 4 and 5, along with the interpreted groundwater flow directions (water levels in the deep groundwater are approximate as they are based on open boreholes that are unsealed). Groundwater flow is to the south at both depths, with a more southwest direction of flow in the southern portion of the property. The

**Preliminary Hydrogeological Assessment Proposed
Dolostone Quarry, Former Town of Flamborough, City of Hamilton**

direction of groundwater movement is similar in the shallow and deep portions of the bedrock, illustrating that the Amabel formation essentially comprises of one hydrogeologic unit that is connected throughout. Note that the on-site flow directions mapped in Figures 4 and 5 from the detailed site investigations are also generally similar to those initially interpreted from the water well records surrounding the site (Figure 3).

3.1.2 Pumping Test

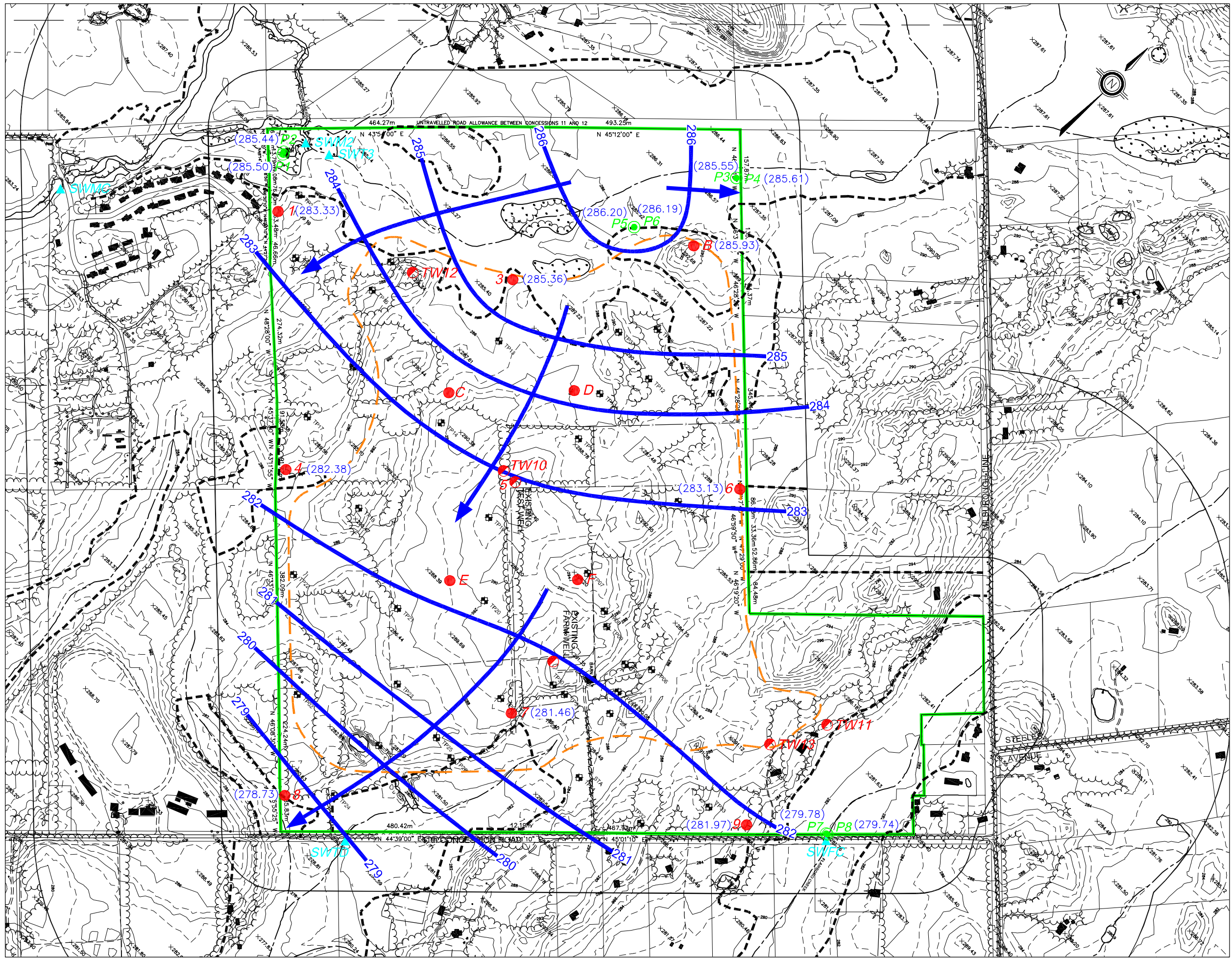
A 72-hour pump test was conducted at a pumping well, located approximately 2.5 m from BH-5, from April 20 to April 23, 2004. Prior the pump test, twenty-five groundwater pressure transducers were installed in the on-site groundwater monitors. An atmospheric pressure transducer was installed on-site to correct for atmospheric pressure changes. Manual groundwater levels were recorded throughout the test to monitor the groundwater system and to ensure accurate datalogger readings.

Prior the pump test, a four-staged step-test was conducted on the pumping well to determine the optimum pumping rate for the 72-hour pump test. A 1,309 m³/day (200 igpm) pumping rate was used for the pumping test. The groundwater pressure transducer installed in the pumping well was moved to BH-5 between the step-test and the 72-hour pump test, approximately 2.5 m away from the pumping well.

The data loggers were downloaded, on April 26, 2004, after they were removed from the monitor wells. Each data set was corrected for barometric pressure using the atmospheric pressure measured during the test with an on-site atmospheric pressure transducer. The corrected water levels were plotted versus time to create hydrographs for each monitoring well, enclosed in Appendix F. From these hydrographs the zone of influence for the pumping well was created and the aquifer properties were evaluated.

3.1.3 Zone of Influence

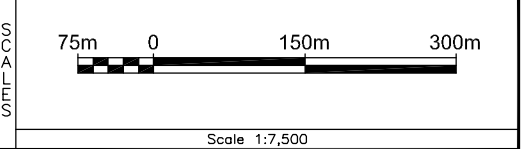
The drawdown created during the pumping test was calculated for each monitor from the hydrographs and plotted on Figure 6. Figure 6 shows that the zone of influence created by pumping at a rate of 1,309 m³/day (200 igpm) does not stress the entire groundwater system of the property. While the drawdown ranges from 12.18 m at BH-5 (near the pumping well and the centre of the site), there were no obvious responses at the property boundaries near monitors BH1, BH2B, BH8, BH9. The mini-piezometers (P1, P3, P5, and P8) installed within the wetland and near the Flamboro Creek and Mountsberg Creek did not respond to the initial pumping test.



- LEGEND**
- PROPERTY BOUNDARY
 - BOUNDARY OF AREA TO BE EXCAVATED
 - 15m → ← EXCAVATION SETBACK AND WIDTH
 - 310 - EXISTING 1m CONTOURS
 - 307.0 EXISTING SPOT ELEVATIONS
 - EXISTING TREE COVER
 - EXISTING CONIFER
 - EXISTING DECIDUOUS
 - EXISTING FENCE LINE
 - EXISTING SURFACE DRAINAGE
 - TP9 TEST PITS, 2003
 - W EXISTING WELL
 - TW12 PRODUCTION WELL
 - 1 MONITOR WELL LOCATION AND DESIGNATION
 - P8 PIEZOMETER LOCATION
 - ▲ SWFC SURFACE WATER STATION
 - (285.30) WATER LEVEL ELEVATIONS (JULY 2004)
 - 284 SHALLOW GROUND WATER CONTOURS
 - DIRECTION OF FLOW

NOTE:
 BASE DRAWING FROM LONG ENVIRONMENTAL CONSULTANTS INC.
 DRAWING 2 "EXISTING FEATURES" DATED MARCH 30, 2004.

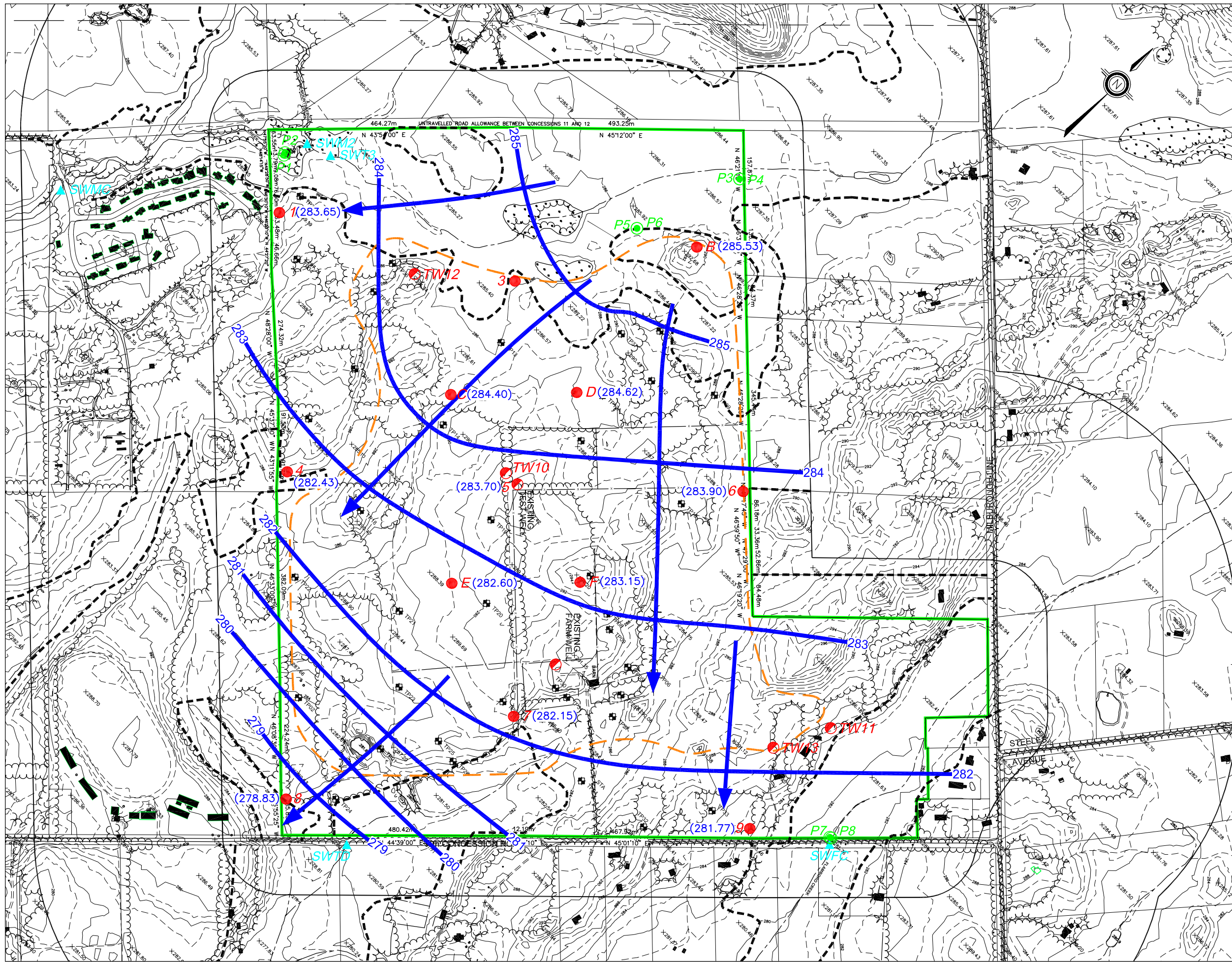
No.	Revision	Date	Initial



PROPOSED DOLOSTONE QUARRY

SHALLOW GROUND WATER CONTOURS

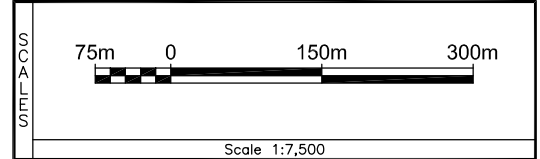
Designed By: KDW	Drawn By: JDM/JEP
Checked By: SCH	Approved By: -
Date Issued: AUGUST 2004	Project No.: 23-827



- LEGEND**
- PROPERTY BOUNDARY
 - BOUNDARY OF AREA TO BE EXCAVATED
 - 15m ↔ EXCAVATION SETBACK AND WIDTH
 - 310 - EXISTING 1m CONTOURS
 - . .307.0 EXISTING SPOT ELEVATIONS
 - EXISTING TREE COVER
 - EXISTING CONIFER
 - EXISTING DECIDUOUS
 - EXISTING FENCE LINE
 - EXISTING SURFACE DRAINAGE
 - TP9 TEST PITS, 2003
 - W EXISTING WELL
 - TW12 PRODUCTION WELL
 - 1 MONITOR WELL LOCATION AND DESIGNATION
 - P8 PIEZOMETER LOCATION
 - ▲ SWFC SURFACE WATER STATION
 - (285.30) WATER LEVEL ELEVATIONS (JULY 2004)
(APPROXIMATE, BASED ON OPEN BOREHOLES)
 - 284 DEEP GROUND WATER CONTOURS
 - DIRECTION OF FLOW

NOTE:
BASE DRAWING FROM LONG ENVIRONMENTAL CONSULTANTS INC.
DRAWING 2 "EXISTING FEATURES" DATED MARCH 30, 2004.

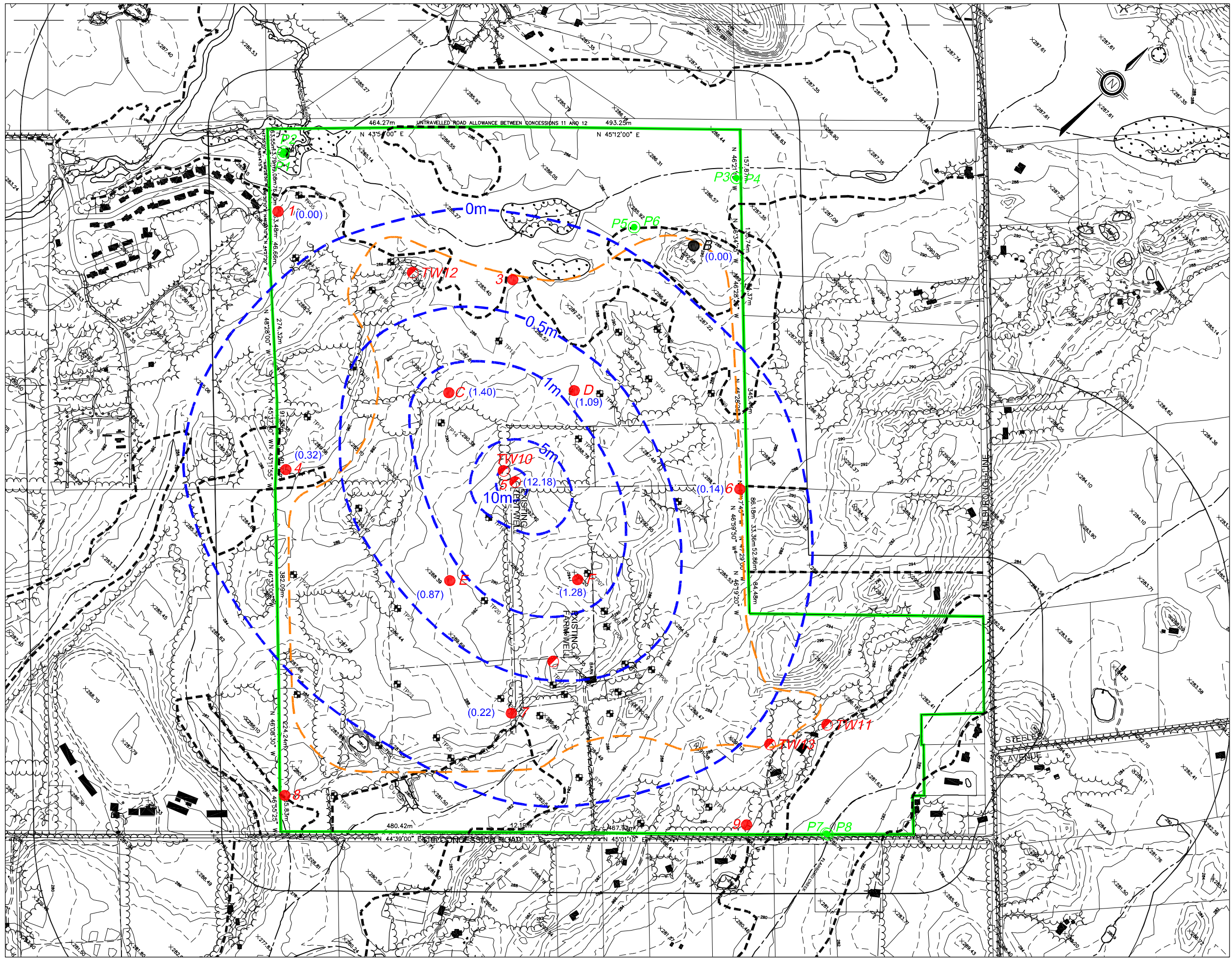
No.	Revision	Date	Initial



PROPOSED DOLOSTONE QUARRY

DEEP GROUND WATER CONTOURS

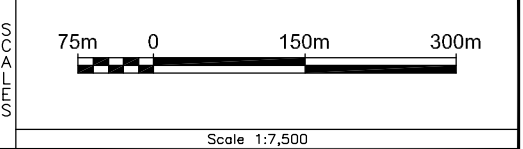
Designed By: KDW	Drawn By: JDM/JEP
Checked By: SCH	Approved By: —
Date Issued: AUGUST 2004	Project No.: 23-827



- LEGEND**
- PROPERTY BOUNDARY
 - BOUNDARY OF AREA TO BE EXCAVATED
 - 15m → ← EXCAVATION SETBACK AND WIDTH
 - 310 — EXISTING 1m CONTOURS
 - 307.0 — EXISTING SPOT ELEVATIONS
 - EXISTING TREE COVER
 - ☉ EXISTING CONIFER
 - ☁ EXISTING DECIDUOUS
 - EXISTING FENCE LINE
 - ← EXISTING SURFACE DRAINAGE
 - ▣ TP9 TEST PITS, 2003
 - ⊕ EXISTING WELL
 - TW12 PRODUCTION WELL
 - 1 MONITOR WELL LOCATION AND DESIGNATION
 - ⊙ P8 PIEZOMETER LOCATION
 - ▲ SWFC SURFACE WATER STATION
 - (1.40) MAXIMUM DRAWDOWN (m)
 - - 1m - - INTERPRETED DRAWDOWN CONTOURS

NOTE:
 BASE DRAWING FROM LONG ENVIRONMENTAL CONSULTANTS INC.
 DRAWING 2 "EXISTING FEATURES" DATED MARCH 30, 2004.

No.	Revision	Date	Initial



PROPOSED DOLOSTONE QUARRY

**72 HOUR PUMP TEST
 DEEP AQUIFER DRAWDOWN**

Designed By: CRM	Drawn By: JEP
Checked By: KDW	Approved By: —
Date Issued: APRIL 2004	Project No.: 23-827

**Preliminary Hydrogeological Assessment Proposed
Dolostone Quarry, Former Town of Flamborough, City of Hamilton**

3.1.4 Aquifer Properties

A number of analytical methods have been used and compared in interpreting the data from the aquifer tests and are described briefly below. It should be noted that for most of these solutions, a number of assumptions have been made in an effort to simplify the solution. Generally it is assumed that the aquifer is confined, is of infinite lateral extent, is homogeneous and uniform, and that the well is fully-penetrating, and has an infinitesimally small diameter.

The analyses methods all involve matching the drawdown data to the theoretical type curves. In an effort to simplify this process, WHI's *AquiferTest* was employed to assist in the management and interpretation of the data. The outputs, showing the curve matching for each of the data sets and each analytical method are shown in Appendix G and Table 1 displays the calculated transmissivities and hydraulic conductivities.

Table 1. Aquifer Properties from 72-Hour Pumping Test

Borehole	Maximum Drawdown (m)	Distance from Pumping Well (m)	Transmissivity (m²/s)	Hydraulic Conductivity (m/s)
BH4	0.32	465	4.31 x 10 ⁻³	1.01 x 10 ⁻⁴
BH5	12.18	2.5	6.87 x 10 ⁻³ 1.78 x 10 ⁻⁴ *	1.61 x 10 ⁻⁴ 4.16 x 10 ⁻⁶ *
BH6	0.14	460	9.71 x 10 ⁻³	2.27 x 10 ⁻⁴
BH7	0.22	465	4.54 x 10 ⁻³	1.06 x 10 ⁻⁴
BHC	1.40	225	3.27 x 10 ⁻³	7.66 x 10 ⁻⁵
BHF	1.28	235	1.76 x 10 ⁻² 1.00 x 10 ⁻³ *	4.13 x 10 ⁻⁴ 2.35 x 10 ⁻⁵ *
Averages			5.9 x 10⁻³	1.4 x 10⁻⁴

Note: * Using the Hantush-Jacob (Walton) method; all others according to the Cooper-Jacob method.

The Cooper-Jacob time-drawdown method was used to analyze all of the drawdown data. Two of the curves also were also analyzed using the Hantush-Jacob (Walton) method. These type curves fit well with these data. There is little difference between the methods at these two monitors. From the analyses the average transmissivity and hydraulic conductivity for the pump test data are 5.9 x 10⁻³ m²/s and 1.4 x 10⁻⁴ m/s, respectively.

According to the packer test results at the individual boreholes, bedrock conductivity varies throughout the Amabel formation from 9.14 x 10⁻⁹ to 1.36 x 10⁻⁵ m/s, averaging 6.56 x 10⁻⁶ m/s. However, there is a more conductive zone identified in each borehole, resulting in the highest conductivity values in this range. Furthermore, the pumping test results show a range in hydraulic conductivities ranging between

**Preliminary Hydrogeological Assessment Proposed
Dolostone Quarry, Former Town of Flamborough, City of Hamilton**

7.66×10^{-5} and 1.01×10^{-4} m/s, and averaging 1.4×10^{-4} m/s. This difference in ranges is a result of the packer test methodology, which prevents accurate testing in rock with conductivities about 10^{-5} m/s. Whereas the packer test results give an accurate profile in the permeability of the rock in each borehole, the pumping test results show more general hydraulic properties of the bedrock.

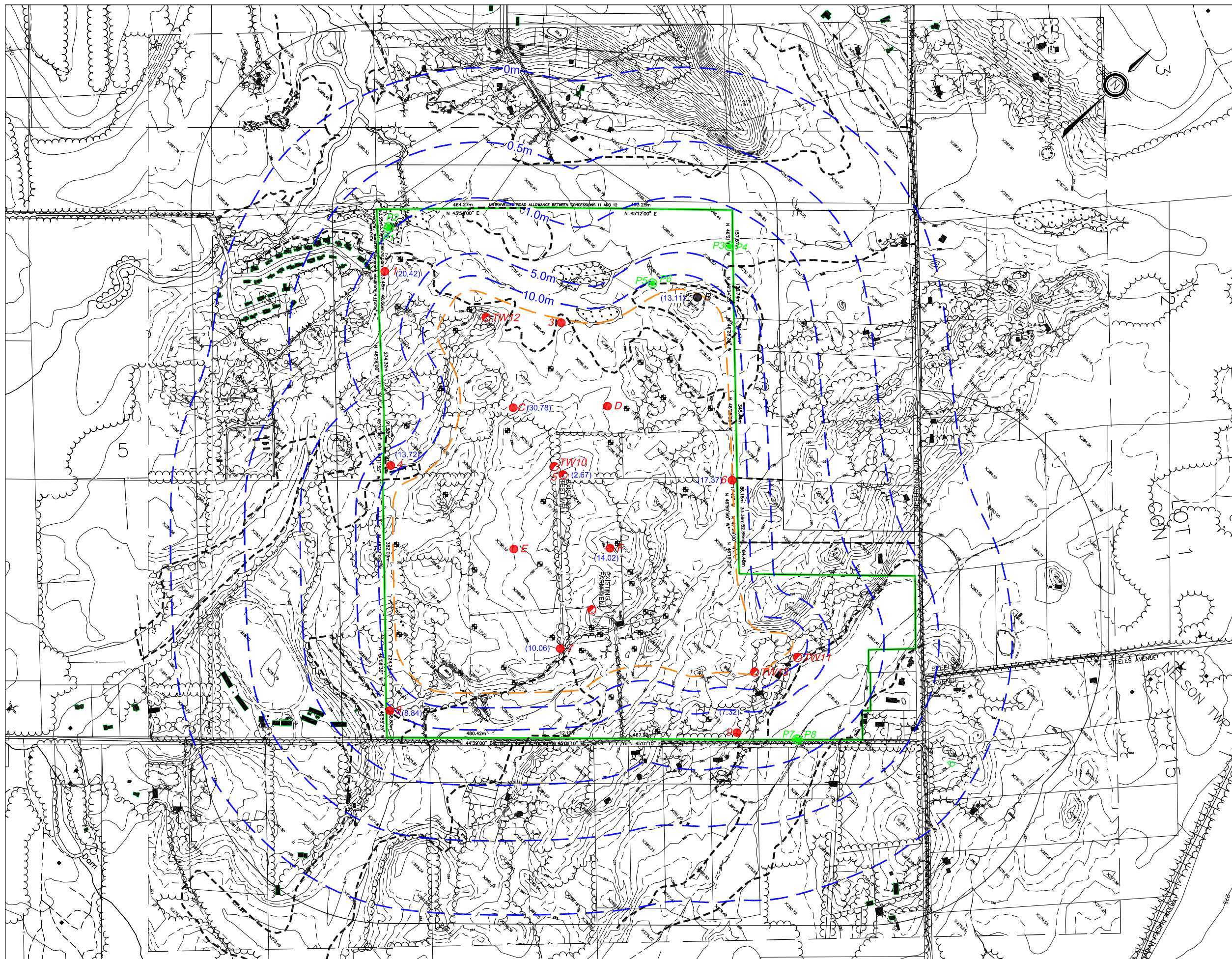
3.2 Predicted Water Well Impacts

The amount of drawdown recorded during the pumping test provides a preliminary indication of the extent and degree of impacts that may be experienced during quarry dewatering. In particular, the pumping test will be somewhat indicative of drawdown that may result from the first lift of the quarry extraction, since the water level in the pump well was lowered to about 25 m below ground surface, below the depth of the first lift. Furthermore, this is about the same depth as the most conductive zone in the aquifer, where most of the local water wells likely draw their primary water supply.

According to the results of the pumping test, water wells within 40 m of the excavation face could experience up to 10 m of drawdown, with 5 m of drawdown at a distance of about 100m, 1 m of drawdown at a distance of about 250 m, and negligible drawdown at a distance of about 600m. These distances have been mapped from the proposed limits of the quarry extraction in Figure 7. Subject to the results of the more detailed door-to-door water well inventory, a drawdown of 1 m or less can likely be sustained without any significant impact on the wells in this area, given their depth and the amount of well bore storage that appears to be available. Therefore, a distance of about 250 m from the quarry face appears to be the critical zone for water well impacts.

Comparison of Figure 7 with Figure 3, showing the locations of water wells in the MOE records, identifies six water wells that could potentially fall within the zone of primary impact from quarry dewatering of the first lift (excluding on-site wells owned by the proponent). All of these wells are south of the quarry on the south side of Concession Road 11. Review of the MOE records for these wells indicates that these wells are drilled between 9 and 17 m deep with low to moderate yields. All of these wells tap into an aquifer within the first lift of the quarry, and therefore could be effected by the quarry dewatering. At the very least, the depth of these wells will provide considerable well bore storage to help offset any drawdown impacts from excavation of the first lift.

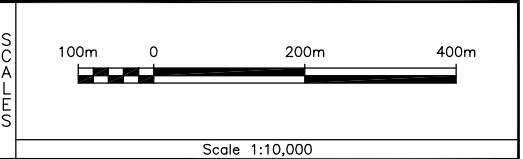
These wells to the south of the quarry along Concession Road 11, plus any others identified in this area during a private water well survey, merit further assessment during the groundwater modelling study because they are directly downgradient of the quarry. The quarry excavation and dewatering will essentially cut off some or most of the upgradient groundwater flow and recharge to these wells. For this reason, groundwater impacts are typically exacerbated on the downgradient side of a quarry, and the extent and degree of impact may actually be larger in this area than might be predicted by the pumping test.



- LEGEND**
- PROPERTY BOUNDARY
 - BOUNDARY OF AREA TO BE EXCAVATED
 - 15m ← EXCAVATION SETBACK AND WIDTH
 - 310 — EXISTING 1m CONTOURS
 - .307.0 — EXISTING SPOT ELEVATIONS
 - EXISTING TREE COVER
 - EXISTING CONIFER
 - EXISTING DECIDUOUS
 - EXISTING FENCE LINE
 - ← EXISTING SURFACE DRAINAGE
 - TP9 TEST PITS, 2003
 - ⊙ EXISTING WELL
 - TW12 PRODUCTION WELL
 - 1 MONITOR WELL LOCATION AND DESIGNATION
 - P8 PIEZOMETER LOCATION
 - ▲ SWFC SURFACE WATER STATION
 - (20.42) MAXIMUM DRAWDOWN (m)
 - - 1m - - INTERPRETED DRAWDOWN CONTOURS

NOTE:
 BASE DRAWING FROM LONG ENVIRONMENTAL CONSULTANTS INC.
 DRAWING 2 "EXISTING FEATURES" DATED MARCH 30, 2004.

No.	Revision	Date	Initial



PROPOSED DOLOSTONE QUARRY

APPROXIMATE DRAWDOWN FROM EXCAVATION OF FIRST LIFT

Designed By: CRM	Drawn By: JEP
Checked By: KDW	Approved By: —
Date Issued: JUNE 2004	Project No.: 23-827

3.2.1 Aquifer Properties

A number of analytical methods have been used and compared in interpreting the data from the aquifer tests and are described briefly below. It should be noted that for most of these solutions, a number of assumptions have been made in an effort to simplify the solution. Generally it is assumed that the aquifer is confined, is of infinite lateral extent, is homogeneous and uniform, and that the well is fully-penetrating, and has an infinitesimally small diameter.

Standard mitigation measures such as water well deepening, flow augmentation or artificial groundwater re-infiltration may be necessary if the drawdown is significant.

Again, it should be noted that the above drawdown assessment is approximate and preliminary. The extent of the drawdown impacts for all phases of the excavation will be refined and confirmed through the water well survey and groundwater modelling, and will be included in the final report.

3.3 Predicted Wetland Impacts

The groundwater table elevations measured in during the site investigations appear to match fairly closely with the standing water levels in the wetland in the northern portion of the site. This suggests they could be directly connected to the water table, with the wetlands being maintained by the groundwater table. If this proves to be the case, then there is a potential for reduced water levels in the wetland, since the preliminary drawdown predicted by the pumping test is significant (i.e., several metres) at this location (Figure 7).

However, there also remains the possibility that the wetland is bottomed in fine-grained soils and/or organic soils and is partially or wholly isolated from the water table. Additional field investigations will address this issue. Seasonal monitoring of groundwater and surface water levels, especially through the dry summer months, will indicate if the water level in the wetland follows groundwater level trends or acts independently.

Secondly, two additional pumping tests are planned to specifically assess the connectivity of the wetlands and streams to the groundwater table. The pumping test conducted between April 20-23 in the centre of the site yielded valuable hydrogeological data, but the effects did not extend to the perimeter of the site where the wetlands and streams are located. Future pumping will consist of two concurrent tests to be conducted adjacent to the wetland complex and streams, which would create a drawdown cone under the wetlands and streams, to determine their hydraulic connection to the bedrock aquifer.

**Preliminary Hydrogeological Assessment Proposed
Dolostone Quarry, Former Town of Flamborough, City of Hamilton**

The additional monitoring and testing, along with the groundwater modelling, will more accurately determine the degree of impact to the wetland water levels. The significance of these impacts will be then be characterized in the companion ecological assessment. Should there be significant ecological impacts, then there are mitigation measures that can be considered including the use of the dewatering discharge to maintain or enhance wetland levels. These will be developed and recommended, if and as required, during the completion of the hydrogeological impact assessment.

With regard to other vegetation assemblages around the proposed quarry excavation, the pumping test provides a preliminary estimate that the most significant water table drawdown will be confined within about 600 m of the limits of extraction (to be confirmed through additional modelling assessment, currently in progress). The companion ecological report identifies the extent of moisture-dependent (i.e., sensitive lowland) species within this zone, and the significance of any impacts that may result to these species from a decline in the water table.

3.4 Predicted Surface Water Impacts

Similar to the wetland assessment, discussed above, the water levels and groundwater table mapping to-date suggest a high potential for the streams to the north and southeast of the site to be fed by groundwater baseflow. However, the seasonal groundwater level data through the summer period, plus the two additional pumping tests detailed above, are necessary in order to determine the degree of connection that may exist, and thus the possible extent of the impact. The modelling will also address groundwater baseflow issues.

Groundwater and surface water samples will be taken during the upcoming pumping tests so that the compatibility of the dewatering discharge with the local receiving stream(s) can be confirmed, both in terms of chemistry and water temperature.

Information and observations to-date have not identified any significant surface water uses immediately downstream of the site such as water intakes, public parks or beaches, etc. A further field inventory is required for confirmation, along with a search of MOE permits to take water. If any of these uses are found, then they will be factored into the assessment of impacts on the streams.

The companion ecological assessment addresses the implications and significance of any baseflow reduction, and dewatering discharge, on aquatic species and habitat in the adjacent stream systems.

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A range of standard mitigation measures is available to offset stream flow or water quality impacts resulting from quarry dewatering, including: direct stream flow augmentation; artificial groundwater re-infiltration to enhance baseflow; splitting discharge between two or more discharge points; and holding ponds to balance peak flows, normalize discharge temperatures and/or settle particulates. These will be developed and recommended, if and as required, during the completion of the final hydrogeological impact assessment.

3.5 Conclusions

The following are *preliminary* hydrogeological conclusions based on field testing and analyses that have been completed to-date:

- a) There are six recorded water wells to the south of the proposed quarry that are most likely to be impacted by dewatering, because of their proximity to the quarry and the fact that they are directly downgradient of the quarry. A further assessment of these wells is required to determine if they are deep enough and/or have sufficient well bore storage to sustain drawdown. Mitigation measures such as augmentation from the quarry dewatering may be necessary if the water level decline is significant.
- b) Wells to the west, north and east of the proposed quarry are outside of the primary zone of influence predicted by the pumping test, and are wholly or partially upgradient of the quarry. They may not be significantly impacted by the quarry dewatering.
- c) Water levels in the wetland complex adjacent to the proposed quarry may be affected by the quarry dewatering if hydraulically connected to, and maintained by, the groundwater table. Mitigation measures such as augmentation from the quarry dewatering may be necessary if the water level decline is ecologically significant.

**Preliminary Hydrogeological Assessment Proposed
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- d) The streams crossing the northern and southeastern portions of the property may experience reduced groundwater baseflow if they are determined to be hydraulically connected to the groundwater table (to be determined through further testing that is underway). Standard mitigation measures such as flow augmentation or artificial groundwater re-infiltration may be necessary if the baseflow loss is ecologically significant, or if important downstream water uses are identified.
- e) Discharge of the quarry dewatering effluent may require the use of a holding pond to balance peak flows, reduce sediment loads and/or equilibrate water temperatures depending on ecological requirements.

Report Prepared By:



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Report Approved By:



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**Preliminary Hydrogeological Assessment Proposed
Dolostone Quarry, Former Town of Flamborough, City of Hamilton**

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Appendices

Appendix A

MOE Water Well Records

MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 2800413 Construction Date 301163 Primary Water Use Domestic
 Easting (NAD83) 582083 Northing (NAD83) 4809810 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 284.99
 Lot 015 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 3.05 Deepest Water Found 6.10
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 5.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min)
 Specific Capacity: 0.40 Recommended Pump Setting (gpm) : 20.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.13	Gravel		gravel, gravelly sand
2	2.13	6.40	Limestone		limestone

Well Number 2801705 Construction Date 200865 Primary Water Use Domestic
 Easting (NAD83) 581604 Northing (NAD83) 4810420 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 288.04
 Lot 002 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 12.70 Static Level 7.92 Deepest Water Found 17.07
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 7.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min)
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 50.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	14.02	Clay Boulders Gravel		diamicton: si to sa/si matrix
2	14.02	14.94	Limestone		limestone
3	14.94	17.07	Limestone	Grey	limestone

Well Number 2802758 Construction Date 210768 Primary Water Use Domestic
 Easting (NAD83) 581994 Northing (NAD83) 4809920 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 286.51
 Lot 001 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 7.92 Deepest Water Found 13.41
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min)
 Specific Capacity: 20.00 Recommended Pump Setting (gpm) : 38.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.13	Clay Stones		diamicton: si to sa/si matrix
2	2.13	10.97	Limestone	Brown	limestone
3	10.97	14.02	Shale	Red	shale



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 2803492 Construction Date 211270 Primary Water Use Domestic
 Easting (NAD83) 582604 Northing (NAD83) 4810440 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 281.94
 Lot 015 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 2.44 Deepest Water Found 11.89
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 12.00 Pump Time(h:m) : Depth (end of 60 min) 031
 Specific Capacity: 0.50 Recommended Pump Setting (gpm) : 31.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	4.88	Clay Boulders	Brown	diamicton: si to sa/si matrix
2	4.88	11.89	Dolomite	Blue	limestone

Well Number 2803547 Construction Date 250371 Primary Water Use Domestic
 Easting (NAD83) 581574 Northing (NAD83) 4810300 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 292.61
 Lot 002 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 8.23 Deepest Water Found 17.98
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 6.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 067
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 65.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	9.45	Clay Boulders	Brown	diamicton: si to sa/si matrix
2	9.45	20.42	Dolomite	Blue	limestone

Well Number 2803861 Construction Date 270772 Primary Water Use Domestic
 Easting (NAD83) 582494 Northing (NAD83) 4810240 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 283.46
 Lot 015 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 6.71 Deepest Water Found 9.14
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 3.00 Pump Time(h:m) 1 : 30 Depth (end of 60 min) 023
 Specific Capacity: 3.00 Recommended Pump Setting (gpm) : 29.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.74	Clay	Brown	clay, silty clay
2	2.74	9.14	Limestone		limestone



MOE Water Well Records Report

All depths and elevations are in metres

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Well Number 2803883 Construction Date 120572 Primary Water Use Domestic
 Easting (NAD83) 582514 Northing (NAD83) 4810320 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 283.46
 Lot 015 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 2.44 Deepest Water Found 9.14
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 12.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 012
 Specific Capacity: 3.00 Recommended Pump Setting (gpm) : 30.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.96	Sand Boulders	Brown	gravel, gravelly sand
2	3.96	10.67	Limestone	Grey	limestone

Well Number 2803905 Construction Date 230872 Primary Water Use Domestic
 Easting (NAD83) 582414 Northing (NAD83) 4810170 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 283.46
 Lot 015 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 1.83 Deepest Water Found 5.79
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min) 006
 Specific Capacity: 40.00 Recommended Pump Setting (gpm) : 20.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	4.27	Sand Stones	Brown	gravel, gravelly sand
2	4.27	7.62	Limestone	Brown	limestone

Well Number 2803935 Construction Date 241072 Primary Water Use Domestic
 Easting (NAD83) 582634 Northing (NAD83) 4809280 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 277.37
 Lot 014 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 2.44 Deepest Water Found 9.75
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 24.00 Pump Time(h:m) 1 : 30 Depth (end of 60 min) 008
 Specific Capacity: 3.40 Recommended Pump Setting (gpm) : 25.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.30	Topsoil	Black	fill (incl topsoil, waste)
2	0.30	2.74	Sand Boulders	Brown	gravel, gravelly sand
3	2.74	10.67	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

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Well Number 2804038 Construction Date 201072 Primary Water Use Domestic
 Easting (NAD83) 582689 Northing (NAD83) 4809260 UTM Zone 17
 Estimated Positional Accuracy margin of error : 300 m - 1 km Elevation 275.84
 Lot 014 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 1.52 Deepest Water Found 7.62
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 30.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 005
 Specific Capacity: 3.00 Recommended Pump Setting (gpm) : 24.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.66	Clay Boulders	Brown	diamicton: si to sa/si matrix
2	3.66	7.62	Limestone		limestone

Well Number 2804222 Construction Date 010573 Primary Water Use Domestic
 Easting (NAD83) 582072 Northing (NAD83) 4810230 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 286.51
 Lot 001 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 3.66 Deepest Water Found 15.85
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 25.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 017
 Specific Capacity: 5.00 Recommended Pump Setting (gpm) : 30.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.91	Silt	Brown	silt, sandy silt, clayey silt
2	0.91	16.76	Limestone	Grey	limestone

Well Number 2804233 Construction Date 120173 Primary Water Use Domestic
 Easting (NAD83) 582454 Northing (NAD83) 4809460 UTM Zone 17
 Estimated Positional Accuracy margin of error : 300 m - 1 km Elevation 281.94
 Lot 015 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 3.35 Deepest Water Found 10.97
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 15.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 011
 Specific Capacity: 1.70 Recommended Pump Setting (gpm) : 30.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.66	Clay Stones	Grey	diamicton: si to sa/si matrix
2	3.66	11.89	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 2804240 Construction Date 060873 Primary Water Use Domestic
 Easting (NAD83) 582697 Northing (NAD83) 4809450 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 277.37
 Lot 014 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 3.35 Deepest Water Found 9.45
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 6.00 Pump Time(h:m) 1 : 30 Depth (end of 60 min) 011
 Specific Capacity: 0.30 Recommended Pump Setting (gpm) : 33.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.30	Topsoil	Black	fill (incl topsoil, waste)
2	0.30	4.57	Sand Stones	Brown	gravel, gravelly sand
3	4.57	10.67	Limestone	Grey	limestone

Well Number 2804419 Construction Date 130474 Primary Water Use Domestic
 Easting (NAD83) 581692 Northing (NAD83) 4810300 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 288.34
 Lot 001 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 4.27 Deepest Water Found 14.63
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 25.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 016
 Specific Capacity: 12.50 Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.91	Silt	Brown	silt, sandy silt, clayey silt
2	0.91	5.18	Clay Gravel	Grey	diamicton: si to sa/si matrix
3	5.18	15.85	Limestone	Grey	limestone

Well Number 2804623 Construction Date 051174 Primary Water Use Domestic
 Easting (NAD83) 581389 Northing (NAD83) 4810500 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 292.30
 Lot 002 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 10.16 Static Level 6.40 Deepest Water Found 27.43
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 10.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 045
 Specific Capacity: 0.40 Recommended Pump Setting (gpm) : 60.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	8.23	Clay Sand	Brown	silt, sandy silt, clayey silt
2	8.23	21.34	Gravel	Brown	gravel, gravelly sand
3	21.34	24.08	Hardpan Gravel	Grey	diamicton: si/sa to sa, stone
4	24.08	27.43	Limestone	Brown	limestone



MOE Water Well Records Report

All depths and elevations are in metres

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Well Number 2804808 Construction Date 130875 Primary Water Use Domestic
 Easting (NAD83) 581426 Northing (NAD83) 4810510 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 292.61
 Lot 002 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 5.49 Deepest Water Found 10.97
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 023
 Specific Capacity: 4.00 Recommended Pump Setting (gpm) : 40.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.74	Clay Gravel	Brown	diamicton: si to sa/si matrix
2	2.74	12.80	Limestone	Grey	limestone

Well Number 2804833 Construction Date 050575 Primary Water Use Domestic
 Easting (NAD83) 580894 Northing (NAD83) 4810960 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 289.56
 Lot 003 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 2.44 Deepest Water Found 19.81
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 25.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 008
 Specific Capacity: 0.40 Recommended Pump Setting (gpm) : 25.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.30	Topsoil	Black	fill (incl topsoil, waste)
2	0.30	3.05	Limestone	Grey	limestone
3	3.05	21.34	Limestone	Grey	limestone

Well Number 2804861 Construction Date 170576 Primary Water Use Domestic
 Easting (NAD83) 582934 Northing (NAD83) 4809400 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 274.32
 Lot 014 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 2.44 Deepest Water Found 7.92
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 36.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min) 008
 Specific Capacity: 12.00 Recommended Pump Setting (gpm) : 25.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.91	Sand Gravel Loose	Brown	gravel, gravelly sand
2	0.91	9.14	Limestone Hard	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

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Well Number 2805043 Construction Date 120477 Primary Water Use Domestic
 Easting (NAD83) 582414 Northing (NAD83) 4810140 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 283.46
 Lot 015 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 0.61 Deepest Water Found 7.62
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 25.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min) 002
 Specific Capacity: 8.30 Recommended Pump Setting (gpm) : 25.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	1.22	Sand Stones Loose	Brown	gravel, gravelly sand
2	1.22	1.83	Limestone Loose Layered	Brown	limestone
3	1.83	9.14	Limestone Hard	Grey	limestone

Well Number 2805241 Construction Date 160578 Primary Water Use Domestic
 Easting (NAD83) 582374 Northing (NAD83) 4810360 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 286.51
 Lot 001 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 10.36 Deepest Water Found 25.60
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 17.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min) 034
 Specific Capacity: 34.00 Recommended Pump Setting (gpm) : 50.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	7.01	Previously Dug		fill (incl topsoil, waste)
2	7.01	22.56	Previously Drilled		fill (incl topsoil, waste)
3	22.56	26.82	Limestone	Grey	limestone

Well Number 2805488 Construction Date 070379 Primary Water Use Stock
 Easting (NAD83) 581034 Northing (NAD83) 4811220 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 304.80
 Lot 003 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 12.19 Deepest Water Found 19.81
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate Pump Time(h:m) : Depth (end of 60 min) 040
 Specific Capacity: 0.00 Recommended Pump Setting (gpm) : 65.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	12.19	Previously Dug		fill (incl topsoil, waste)
2	12.19	21.34	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 2806166 Construction Date 100584 Primary Water Use Domestic
 Easting (NAD83) 582902 Northing (NAD83) 4809250 UTM Zone 17
 Estimated Positional Accuracy margin of error : 10 - 30 m Elevation 273.00
 Lot 014 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 2.13 Deepest Water Found 9.75
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 36.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 007
 Specific Capacity: Recommended Pump Setting (gpm) : 32.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.30	Topsoil Loose	Black	fill (incl topsoil, waste)
2	0.30	5.18	Clay Gravel Loose	Brown	diamicton: si to sa/si matrix
3	5.18	6.71	Sand Gravel Loose	Brown	gravel, gravelly sand
4	6.71	10.67	Limestone Hard	Grey	limestone

Well Number 2806366 Construction Date 201185 Primary Water Use Domestic
 Easting (NAD83) 582132 Northing (NAD83) 4810120 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation
 Lot 001 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 1.22 Deepest Water Found 9.14
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 36.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 004
 Specific Capacity: Recommended Pump Setting (gpm) : 30.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.44	Clay Sandy Loose	Brown	silt, sandy silt, clayey silt
2	2.44	5.49	Limestone Layered	Grey	limestone
3	5.49	10.97	Limestone Hard	Grey	limestone

Well Number 2806394 Construction Date 300985 Primary Water Use Domestic
 Easting (NAD83) 580764 Northing (NAD83) 4811090 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation
 Lot 003 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 7.62 Deepest Water Found 14.94
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 7.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 025
 Specific Capacity: Recommended Pump Setting (gpm) : 39.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	1.22	Limestone Clay Fractured	Brown	limestone
2	1.22	15.85	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 2806681 Construction Date 130787 Primary Water Use Domestic
 Easting (NAD83) 582362 Northing (NAD83) 4810340 UTM Zone 17
 Estimated Positional Accuracy margin of error : 10 - 30 m Elevation 288.00
 Lot 001 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 4.88 Deepest Water Found 13.11
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 14.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min) 016
 Specific Capacity: Recommended Pump Setting (gpm) : 42.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.44	Sand Gravel Loose	Brown	gravel, gravelly sand
2	2.44	4.27	Rock Layered	Brown	rock
3	4.27	13.72	Limestone Hard	Grey	limestone

Well Number 2807276 Construction Date 250489 Primary Water Use Domestic
 Easting (NAD83) 581214 Northing (NAD83) 4810680 UTM Zone 17
 Estimated Positional Accuracy margin of error : 10 - 30 m Elevation 291.00
 Lot 002 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 0.91 Deepest Water Found 17.07
 Top of Screen Bottom of Screen Water Kind Unknown
 Pump Rate 24.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min) 003
 Specific Capacity: Recommended Pump Setting (gpm) : 52.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.44	Sand Gravel Loose	Brown	gravel, gravelly sand
2	2.44	17.68	Limestone Hard	Grey	limestone

Well Number 2807310 Construction Date 260689 Primary Water Use Domestic
 Easting (NAD83) 582508 Northing (NAD83) 4810190 UTM Zone 17
 Estimated Positional Accuracy margin of error : 10 - 30 m Elevation 284.00
 Lot 015 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 6.10 Deepest Water Found 12.19
 Top of Screen Bottom of Screen Water Kind Unknown
 Pump Rate 20.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min) 032
 Specific Capacity: Recommended Pump Setting (gpm) : 43.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	5.49	Boulders Gravel Sand	Brown	gravel, gravelly sand
2	5.49	14.02	Limestone Hard	Grey	limestone

MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 2807849 Construction Date 280891 Primary Water Use Domestic
 Easting (NAD83) 582209 Northing (NAD83) 4810550 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 001 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 6.71 Deepest Water Found 23.77
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 12.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: Recommended Pump Setting (gpm) : 65.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	1.22	Clay Stones	Brown	diamicton: si to sa/si matrix
2	1.22	9.14	Rock	Brown	rock
3	9.14	24.69	Rock	Grey	rock

Well Number 2808123 Construction Date 270892 Primary Water Use Domestic
 Easting (NAD83) 581220 Northing (NAD83) 4810670 UTM Zone 17
 Estimated Positional Accuracy margin of error : 10 - 30 m Elevation 291.00
 Lot 002 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level Deepest Water Found
 Top of Screen Bottom of Screen Water Kind
 Pump Rate Pump Time(h:m) : Depth (end of 60 min)
 Specific Capacity: Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.30	Topsoil		fill (incl topsoil, waste)
2	0.30	3.35	Sand Gravel Boulders	Brown	gravel, gravelly sand
3	3.35	5.18	Limestone	Brown	limestone
4	5.18	8.23	Limestone Layered	White	limestone

Well Number 2808124 Construction Date 290892 Primary Water Use Domestic
 Easting (NAD83) 581210 Northing (NAD83) 4810680 UTM Zone 17
 Estimated Positional Accuracy margin of error : 10 - 30 m Elevation 291.00
 Lot 002 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 2.44 Deepest Water Found 7.32
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 10.00 Pump Time(h:m) 12 : 0 Depth (end of 60 min) 015
 Specific Capacity: Recommended Pump Setting (gpm) : 20.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.30	Topsoil		fill (incl topsoil, waste)
2	0.30	3.05	Sand Gravel Boulders	Brown	gravel, gravelly sand
3	3.05	4.57	Limestone	Brown	limestone
4	4.57	7.32	Limestone	White	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 2808424 Construction Date 210396 Primary Water Use Domestic
 Easting (NAD83) 582634 Northing (NAD83) 4810450 UTM Zone 17
 Estimated Positional Accuracy margin of error : 10 - 30 m Elevation 284.00
 Lot 015 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 4.27 Deepest Water Found 11.28
 Top of Screen Bottom of Screen Water Kind Unknown
 Pump Rate 13.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 037
 Specific Capacity: Recommended Pump Setting (gpm) : 37.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	1.52	Sand Gravel Loose	Brown	gravel, gravelly sand
2	1.52	12.19	Limestone Layered	Grey	limestone

Well Number 2809020 Construction Date 150799 Primary Water Use Domestic
 Easting (NAD83) 582675 Northing (NAD83) 4810130 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 015 Concession 01 Milton Town (Nelson) Halton
 Well Diameter 15.24 Static Level 8.53 Deepest Water Found 16.76
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 15.00 Pump Time(h:m) : 30 Depth (end of 60 min)
 Specific Capacity: Recommended Pump Setting (gpm) : 55.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	1.52	Clay Sandy	Brown	silt, sandy silt, clayey silt
2	1.52	18.29	Limestone	Grey	limestone

Well Number 2809393 Construction Date 010601 Primary Water Use Domestic
 Easting (NAD83) 582207 Northing (NAD83) 4810550 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 001 Concession 01 Milton Town (Nassagaweya) Halton
 Well Diameter 15.24 Static Level 3.05 Deepest Water Found 18.90
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 1 : Depth (end of 60 min) 021
 Specific Capacity: Recommended Pump Setting (gpm) : 55.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.61	Topsoil	Black	fill (incl topsoil, waste)
2	0.61	1.52	Clay	Brown	clay, silty clay
3	1.52	2.74	Limestone Fractured Soft		limestone
4	2.74	18.90	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6803043 Construction Date 041167 Primary Water Use Domestic
 Easting (NAD83) 582416 Northing (NAD83) 4809350 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 284.68
 Lot 001 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 8.23 Deepest Water Found 16.76
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 30.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: 1.70 Recommended Pump Setting (gpm) : 50.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.61	Clay		clay, silty clay
2	0.61	17.68	Limestone		limestone

Well Number 6803046 Construction Date 260555 Primary Water Use Domestic
 Easting (NAD83) 581591 Northing (NAD83) 4809100 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation 292.00
 Lot 002 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 5.79 Deepest Water Found 13.72
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 15.00 Pump Time(h:m) 0 : 30 Depth (end of 60 min)
 Specific Capacity: 30.00 Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	4.57	Topsoil		fill (incl topsoil, waste)
2	4.57	17.07	Limestone	Grey	limestone

Well Number 6803047 Construction Date 200767 Primary Water Use Domestic
 Easting (NAD83) 581696 Northing (NAD83) 4809010 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 287.43
 Lot 002 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 8.23 Deepest Water Found 10.97
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 12.00 Pump Time(h:m) 3 : 0 Depth (end of 60 min)
 Specific Capacity: 2.00 Recommended Pump Setting (gpm) : 38.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.61	Topsoil		fill (incl topsoil, waste)
2	0.61	7.32	Medium Sand Boulders		gravel, gravelly sand
3	7.32	12.19	Limestone		limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6803048 Construction Date 170758 Primary Water Use Domestic
 Easting (NAD83) 581233 Northing (NAD83) 4808640 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation 280.11
 Lot 003 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 6.10 Deepest Water Found 14.33
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 4.00 Pump Time(h:m) 0 : 30 Depth (end of 60 min)
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.44	Clay		clay, silty clay
2	2.44	14.33	Limestone		limestone

Well Number 6803049 Construction Date 240355 Primary Water Use Domestic
 Easting (NAD83) 580781 Northing (NAD83) 4808270 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation 284.99
 Lot 005 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 0.91 Deepest Water Found 11.89
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 5.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	1.22	Topsoil Medium Sand		fill (incl topsoil, waste)
2	1.22	4.57	Clay	Brown	clay, silty clay
3	4.57	8.53	Fine Sand Boulders		gravel, gravelly sand
4	8.53	11.28	Gravel Clay		gravel, gravelly sand
5	11.28	11.58	Medium Sand		sand, silty sand
6	11.58	12.50	Limestone	Brown	limestone

Well Number 6803051 Construction Date 070655 Primary Water Use Domestic
 Easting (NAD83) 580470 Northing (NAD83) 4807960 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation 277.37
 Lot 006 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 3.05 Deepest Water Found 11.58
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 40.00 Pump Time(h:m) 3 : 0 Depth (end of 60 min)
 Specific Capacity: 80.00 Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.13	Medium Sand Gravel Boulders		gravel, gravelly sand
2	2.13	12.19	Limestone		limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6803052 Construction Date 010760 Primary Water Use Commercial
 Easting (NAD83) 580707 Northing (NAD83) 4807800 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation 277.37
 Lot 006 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 2.44 Deepest Water Found 8.23
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 10.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min)
 Specific Capacity: 3.30 Recommended Pump Setting (gpm) : 8.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.61	Topsoil Medium Sand		fill (incl topsoil, waste)
2	0.61	8.84	Limestone		limestone

Well Number 6803053 Construction Date 160762 Primary Water Use Domestic
 Easting (NAD83) 580704 Northing (NAD83) 4807810 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 277.37
 Lot 006 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 3.05 Deepest Water Found 8.23
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 10.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: 1.00 Recommended Pump Setting (gpm) : 30.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	7.92	Topsoil Clay Boulders		fill (incl topsoil, waste)
2	7.92	10.67	Limestone	White	limestone

Well Number 6803071 Construction Date 010754 Primary Water Use Domestic
 Easting (NAD83) 582062 Northing (NAD83) 4809640 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation 285.90
 Lot 001 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 4.57 Deepest Water Found 7.01
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 3.00 Pump Time(h:m) 3 : 0 Depth (end of 60 min)
 Specific Capacity: 0.30 Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.74	Boulders		gravel, gravelly sand
2	2.74	7.62	Limestone		limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6803072 Construction Date 140865 Primary Water Use Domestic
 Easting (NAD83) 581730 Northing (NAD83) 4809940 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 287.43
 Lot 001 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 5.79 Deepest Water Found 10.67
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 10.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: 0.50 Recommended Pump Setting (gpm) : 37.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	5.49	Clay Boulders Gravel		diamicton: si to sa/si matrix
2	5.49	11.89	Limestone	Grey	limestone

Well Number 6803073 Construction Date 290567 Primary Water Use Domestic
 Easting (NAD83) 581313 Northing (NAD83) 4810400 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 291.08
 Lot 001 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 0.61 Deepest Water Found 10.97
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: 1.40 Recommended Pump Setting (gpm) : 35.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.61	Silt		silt, sandy silt, clayey silt
2	0.61	3.66	Boulders Gravel		gravel, gravelly sand
3	3.66	10.97	Dolomite	Blue	limestone
4	10.97	11.58	Limestone	Red	limestone

Well Number 6803074 Construction Date 301267 Primary Water Use Domestic
 Easting (NAD83) 582023 Northing (NAD83) 4809780 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 284.99
 Lot 001 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 3.35 Deepest Water Found 11.28
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 7.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 37.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.44	Medium Sand Boulders		gravel, gravelly sand
2	2.44	11.89	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6803075 Construction Date 080564 Primary Water Use Domestic
 Easting (NAD83) 580624 Northing (NAD83) 4808200 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 286.51
 Lot 005 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 7.62 Deepest Water Found 15.24
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 10.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: 20.00 Recommended Pump Setting (gpm) : 30.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	15.85	Limestone		limestone

Well Number 6803085 Construction Date 070566 Primary Water Use Domestic
 Easting (NAD83) 580127 Northing (NAD83) 4810510 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 311.51
 Lot 002 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 7.62 Deepest Water Found 16.76
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 5.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: 0.10 Recommended Pump Setting (gpm) : 60.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	7.62	Topsoil Clay Gravel		fill (incl topsoil, waste)
2	7.62	20.73	Limestone		limestone

Well Number 6803086 Construction Date 141261 Primary Water Use Domestic
 Easting (NAD83) 579573 Northing (NAD83) 4810480 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 309.37
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 12.70 Static Level 13.72 Deepest Water Found 24.69
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 8.00 Pump Time(h:m) 3 : 0 Depth (end of 60 min)
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 85.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	10.97	Previously Dug		fill (incl topsoil, waste)
2	10.97	23.77	Clay Boulders		diamicton: si to sa/si matrix
3	23.77	27.13	Limestone		limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6803090 Construction Date 070654 Primary Water Use Domestic
 Easting (NAD83) 579444 Northing (NAD83) 4809980 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation 286.21
 Lot 004 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 2.13 Deepest Water Found 9.75
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 18.00 Pump Time(h:m) 0 : 15 Depth (end of 60 min)
 Specific Capacity: 36.00 Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.61	Topsoil		fill (incl topsoil, waste)
2	0.61	3.66	Clay Stones		diamicton: si to sa/si matrix
3	3.66	10.97	Limestone		limestone

Well Number 6803092 Construction Date 030959 Primary Water Use Stock
 Easting (NAD83) 579190 Northing (NAD83) 4809700 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 297.79
 Lot 005 Concession 12 East Flamborough Township Wentworth
 Well Diameter 17.78 Static Level 12.50 Deepest Water Found 27.43
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 6.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 70.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	11.58	Previously Dug		fill (incl topsoil, waste)
2	11.58	19.81	Clay Stones	Grey	diamicton: si to sa/si matrix
3	19.81	28.04	Limestone		limestone

Well Number 6806835 Construction Date 130168 Primary Water Use Stock
 Easting (NAD83) 581554 Northing (NAD83) 4809370 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 288.04
 Lot 002 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 2.44 Deepest Water Found 14.33
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 25.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: 1.10 Recommended Pump Setting (gpm) : 40.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.05	Medium Sand Gravel Stones	Brown	gravel, gravelly sand
2	3.05	15.24	Limestone	Brown	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6806838 Construction Date 190168 Primary Water Use Domestic
 Easting (NAD83) 581564 Northing (NAD83) 4809040 UTM Zone 17
 Estimated Positional Accuracy margin of error : 100 m - 300 m Elevation 289.56
 Lot 002 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 8.53 Deepest Water Found 14.63
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 11.00 Pump Time(h:m) 0 : 45 Depth (end of 60 min)
 Specific Capacity: 1.40 Recommended Pump Setting (gpm) : 44.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	7.01	Medium Sand Gravel Boulders	Brown	gravel, gravelly sand
2	7.01	15.24	Limestone	Brown	limestone

Well Number 6807031 Construction Date 150269 Primary Water Use Domestic
 Easting (NAD83) 579734 Northing (NAD83) 4810650 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 297.18
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level Deepest Water Found 28.04
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 10.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min)
 Specific Capacity: 0.00 Recommended Pump Setting (gpm) : 92.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	22.25	Clay Boulders Gravel	Grey	diamicton: si to sa/si matrix
2	22.25	23.16	Limestone		limestone
3	23.16	28.65	Limestone	Grey	limestone

Well Number 6807112 Construction Date 080369 Primary Water Use Domestic
 Easting (NAD83) 581774 Northing (NAD83) 4809210 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 284.99
 Lot 002 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 3.66 Deepest Water Found 12.50
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 4.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 39.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	5.49	Medium Sand Gravel Boulders	Brown	gravel, gravelly sand
2	5.49	13.11	Limestone	Brown	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6807312 Construction Date 160969 Primary Water Use Domestic
 Easting (NAD83) 582124 Northing (NAD83) 4809680 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 286.51
 Lot 001 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 4.57 Deepest Water Found 12.19
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 6.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 015
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 40.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.30	Topsoil	Brown	fill (incl topsoil, waste)
2	0.30	12.80	Limestone	Grey	limestone

Well Number 6807579 Construction Date 070970 Primary Water Use Domestic
 Easting (NAD83) 579344 Northing (NAD83) 4810320 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 309.37
 Lot 004 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 15.24 Deepest Water Found 22.86
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 3.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 050
 Specific Capacity: 0.10 Recommended Pump Setting (gpm) : 74.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	18.29	Clay Stones Boulders	Brown	diamicton: si to sa/si matrix
2	18.29	22.86	Gravel		gravel, gravelly sand

Well Number 6807679 Construction Date 060770 Primary Water Use Domestic
 Easting (NAD83) 581374 Northing (NAD83) 4807820 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 274.32
 Lot 005 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 2.13 Deepest Water Found 8.84
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 007
 Specific Capacity: 6.70 Recommended Pump Setting (gpm) : 22.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.61	Topsoil		fill (incl topsoil, waste)
2	0.61	3.05	Hardpan		diamicton: si to sa/si matrix
3	3.05	9.14	Limestone		limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6807802 Construction Date 270671 Primary Water Use Domestic
 Easting (NAD83) 582024 Northing (NAD83) 4809750 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 283.46
 Lot 001 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 3.35 Deepest Water Found 10.67
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 10.00 Pump Time(h:m) 1 : 30 Depth (end of 60 min) 012
 Specific Capacity: 10.00 Recommended Pump Setting (gpm) : 30.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.66	Silt Boulders	Brown	diamicton: si to sa/si matrix
2	3.66	11.58	Limestone	Grey	limestone

Well Number 6807892 Construction Date 040971 Primary Water Use Domestic
 Easting (NAD83) 580274 Northing (NAD83) 4810080 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 284.99
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 4.57 Deepest Water Found 11.58
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 4.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 015
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 38.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	1.52	Clay Stones	Brown	diamicton: si to sa/si matrix
2	1.52	12.19	Limestone	Grey	limestone

Well Number 6807893 Construction Date 080971 Primary Water Use Domestic
 Easting (NAD83) 580199 Northing (NAD83) 4810130 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 288.04
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 5.79 Deepest Water Found 14.63
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 4.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 019
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 48.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.05	Clay Stones	Brown	diamicton: si to sa/si matrix
2	3.05	7.62	Clay	Grey	clay, silty clay
3	7.62	15.24	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6807916 Construction Date 180671 Primary Water Use Domestic
 Easting (NAD83) 580134 Northing (NAD83) 4810050 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 286.51
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 1.52 Deepest Water Found 9.14
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 30.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 005
 Specific Capacity: 15.00 Recommended Pump Setting (gpm) : 25.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.66	Clay Stones	Brown	diamicton: si to sa/si matrix
2	3.66	10.67	Limestone	Grey	limestone

Well Number 6807928 Construction Date 260471 Primary Water Use Domestic
 Easting (NAD83) 580269 Northing (NAD83) 4809980 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 284.68
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 1.22 Deepest Water Found 9.75
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 25.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 004
 Specific Capacity: 25.00 Recommended Pump Setting (gpm) : 20.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	7.32	Clay Overburden	Brown	fill (incl topsoil, waste)
2	7.32	10.36	Limestone	Grey	limestone

Well Number 6807929 Construction Date 220471 Primary Water Use Domestic
 Easting (NAD83) 580214 Northing (NAD83) 4809990 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 284.99
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 1.22 Deepest Water Found 13.41
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 004
 Specific Capacity: 1.20 Recommended Pump Setting (gpm) : 20.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	4.57	Clay Overburden	Brown	fill (incl topsoil, waste)
2	4.57	8.23	Clay Stones Gravel	Brown	diamicton: si to sa/si matrix
3	8.23	14.02	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6807930 Construction Date 220471 Primary Water Use Domestic
 Easting (NAD83) 580294 Northing (NAD83) 4810040 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 284.99
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 0.91 Deepest Water Found 9.75
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 40.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 003
 Specific Capacity: 20.00 Recommended Pump Setting (gpm) : 20.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	5.18	Clay Boulders	Brown	diamicton: si to sa/si matrix
2	5.18	10.67	Limestone	Grey	limestone

Well Number 6807931 Construction Date 160471 Primary Water Use Domestic
 Easting (NAD83) 580049 Northing (NAD83) 4810200 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 295.66
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 7.62 Deepest Water Found 20.42
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 026
 Specific Capacity: 0.80 Recommended Pump Setting (gpm) : 60.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	10.67	Clay Stones	Grey	diamicton: si to sa/si matrix
2	10.67	21.34	Limestone	Grey	limestone

Well Number 6807933 Construction Date 130471 Primary Water Use Domestic
 Easting (NAD83) 579934 Northing (NAD83) 4810260 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 304.80
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 13.11 Deepest Water Found 28.96
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 15.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 044
 Specific Capacity: 0.40 Recommended Pump Setting (gpm) : 80.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	21.34	Clay Gravel Stones	Grey	diamicton: si to sa/si matrix
2	21.34	30.48	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6807939 Construction Date 260171 Primary Water Use Domestic
 Easting (NAD83) 582039 Northing (NAD83) 4809480 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 283.46
 Lot 001 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 3.05 Deepest Water Found 13.11
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 30.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 010
 Specific Capacity: 30.00 Recommended Pump Setting (gpm) : 20.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.30	Topsoil	Brown	fill (incl topsoil, waste)
2	0.30	14.02	Limestone	Grey	limestone

Well Number 6807971 Construction Date 240871 Primary Water Use Domestic
 Easting (NAD83) 581774 Northing (NAD83) 4809470 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 286.51
 Lot 001 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 5.49 Deepest Water Found 16.15
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 12.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 044
 Specific Capacity: 0.50 Recommended Pump Setting (gpm) : 50.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.74	Silt Boulders	Brown	diamicton: si to sa/si matrix
2	2.74	12.19	Limestone	Grey	limestone
3	12.19	16.15	Dolomite	Blue	limestone

Well Number 6808166 Construction Date 080672 Primary Water Use Domestic
 Easting (NAD83) 580514 Northing (NAD83) 4807980 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 281.94
 Lot 006 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 3.66 Deepest Water Found 9.14
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 1 : 30 Depth (end of 60 min) 021
 Specific Capacity: 2.20 Recommended Pump Setting (gpm) : 34.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.91	Silt	Brown	silt, sandy silt, clayey silt
2	0.91	10.97	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6808263 Construction Date 291072 Primary Water Use Domestic
 Easting (NAD83) 580114 Northing (NAD83) 4810150 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 289.56
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 4.57 Deepest Water Found 11.28
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 015
 Specific Capacity: 10.00 Recommended Pump Setting (gpm) : 30.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	5.49	Clay Stones	Brown	diamicton: si to sa/si matrix
2	5.49	12.19	Limestone	Grey	limestone

Well Number 6808429 Construction Date 100573 Primary Water Use Domestic
 Easting (NAD83) 581724 Northing (NAD83) 4809220 UTM Zone 17
 Estimated Positional Accuracy margin of error : 300 m - 1 km Elevation 285.90
 Lot 002 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 3.05 Deepest Water Found 7.92
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 15.00 Pump Time(h:m) 1 : 30 Depth (end of 60 min) 010
 Specific Capacity: 3.00 Recommended Pump Setting (gpm) : 27.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	6.71	Sand Boulders	Brown	gravel, gravelly sand
2	6.71	9.14	Limestone	White	limestone

Well Number 6808544 Construction Date 090873 Primary Water Use Domestic
 Easting (NAD83) 579764 Northing (NAD83) 4810660 UTM Zone 17
 Estimated Positional Accuracy margin of error : 300 m - 1 km Elevation 297.18
 Lot 002 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 1.83 Deepest Water Found 14.33
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 30.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 020
 Specific Capacity: 2.10 Recommended Pump Setting (gpm) : 40.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	4.88	Clay Gravel	Brown	diamicton: si to sa/si matrix
2	4.88	14.02	Clay Gravel	Grey	diamicton: si to sa/si matrix
3	14.02	14.63	Limestone Gravel	Brown	gravel, gravelly sand



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6808608 Construction Date 310873 Primary Water Use Domestic
 Easting (NAD83) 580854 Northing (NAD83) 4808210 UTM Zone 17
 Estimated Positional Accuracy margin of error : 300 m - 1 km Elevation 281.94
 Lot 005 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 6.71 Deepest Water Found 12.19
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 15.00 Pump Time(h:m) 1 : 30 Depth (end of 60 min) 022
 Specific Capacity: 1.50 Recommended Pump Setting (gpm) : 40.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.74	Sand Boulders	Brown	gravel, gravelly sand
2	2.74	13.41	Limestone	Grey	limestone

Well Number 6808840 Construction Date 150574 Primary Water Use Commercial
 Easting (NAD83) 579962 Northing (NAD83) 4809040 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 286.51
 Lot 005 Concession 11 East Flamborough Township Wentworth
 Well Diameter 20.32 Static Level 6.10 Deepest Water Found 10.67
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 30.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min) 020
 Specific Capacity: 2.70 Recommended Pump Setting (gpm) : 38.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	5.49	Sand Gravel Boulders	Brown	gravel, gravelly sand
2	5.49	12.80	Limestone	Grey	limestone

Well Number 6809164 Construction Date 150675 Primary Water Use Domestic
 Easting (NAD83) 579632 Northing (NAD83) 4810160 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 296.88
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 4.88 Deepest Water Found 32.31
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 18.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min) 103
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 112.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.96	Clay	Brown	clay, silty clay
2	3.96	13.72	Clay Boulders	Brown	diamicton: si to sa/si matrix
3	13.72	30.78	Clay Sand Gravel	Brown	diamicton: si to sa/si matrix
4	30.78	35.05	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6809251 Construction Date 171175 Primary Water Use Domestic
 Easting (NAD83) 579986 Northing (NAD83) 4810140 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 292.61
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 9.75 Deepest Water Found 20.42
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 2 : 0 Depth (end of 60 min) 032
 Specific Capacity: 0.80 Recommended Pump Setting (gpm) : 65.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	11.28	Clay Sandy Loose	Brown	silt, sandy silt, clayey silt
2	11.28	21.34	Limestone Hard	Grey	limestone

Well Number 6809303 Construction Date 070875 Primary Water Use Domestic
 Easting (NAD83) 579918 Northing (NAD83) 4808670 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 282.24
 Lot 005 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 3.05 Deepest Water Found 11.28
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 15.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 010
 Specific Capacity: 0.50 Recommended Pump Setting (gpm) : 25.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.61	Topsoil Stones	Black	fill (incl topsoil, waste)
2	0.61	12.19	Limestone	Grey	limestone

Well Number 6809350 Construction Date 220176 Primary Water Use Domestic
 Easting (NAD83) 579648 Northing (NAD83) 4810550 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 311.51
 Lot 003 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 14.94 Deepest Water Found 29.87
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 10.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 093
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 98.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	8.53	Clay	Brown	clay, silty clay
2	8.53	27.74	Clay Gravel Stones	Grey	diamicton: si to sa/si matrix
3	27.74	30.78	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6809848 Construction Date 210678 Primary Water Use Domestic
 Easting (NAD83) 581654 Northing (NAD83) 4809960 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 292.61
 Lot 001 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 6.10 Deepest Water Found 14.63
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 25.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 020
 Specific Capacity: 2.50 Recommended Pump Setting (gpm) : 48.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	7.32	Clay Boulders	Brown	diamicton: si to sa/si matrix
2	7.32	15.54	Limestone		limestone

Well Number 6810336 Construction Date 061281 Primary Water Use Domestic
 Easting (NAD83) 582254 Northing (NAD83) 4809260 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 283.46
 Lot 001 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 5.49 Deepest Water Found 14.63
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 018
 Specific Capacity: 0.60 Recommended Pump Setting (gpm) : 45.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	4.88	Clay Stones	Brown	diamicton: si to sa/si matrix
2	4.88	6.10	Limestone Fractured	Grey	limestone
3	6.10	15.85	Limestone	Grey	limestone

Well Number 6810761 Construction Date 180984 Primary Water Use Domestic
 Easting (NAD83) 580614 Northing (NAD83) 4810920 UTM Zone 17
 Estimated Positional Accuracy margin of error : 30 m - 100 m Elevation 292.61
 Lot 001 Concession 12 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 4.88 Deepest Water Found 9.14
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 5.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 016
 Specific Capacity: 0.20 Recommended Pump Setting (gpm) : 35.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.74	Clay	Grey	clay, silty clay
2	2.74	11.28	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6810871 Construction Date 010685 Primary Water Use Domestic
 Easting (NAD83) 581685 Northing (NAD83) 4807970 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 004 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 1.52 Deepest Water Found 21.95
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 11.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 065
 Specific Capacity: Recommended Pump Setting (gpm) : 72.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	1.83	Clay Sandy Loose	Brown	silt, sandy silt, clayey silt
2	1.83	6.71	Limestone Fine Sand Fine Gravel	Grey	gravel, gravelly sand
3	6.71	21.64	Limestone Hard	Grey	limestone
4	21.64	22.86	Limestone Clay Layered	Grey	limestone
5	22.86	23.16	Shale Hard	Red	shale

Well Number 6810873 Construction Date 130885 Primary Water Use Domestic
 Easting (NAD83) 582308 Northing (NAD83) 4808610 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 002 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 9.45 Deepest Water Found 18.29
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 25.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 031
 Specific Capacity: Recommended Pump Setting (gpm) : 55.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.05	Clay Sandy Loose	Brown	silt, sandy silt, clayey silt
2	3.05	5.49	Clay Sandy Gravel	Brown	diamicton: si to sa/si matrix
3	5.49	8.84	Clay Sandy Gravel	Brown	diamicton: si to sa/si matrix
4	8.84	9.45	Sand Gravel Loose	Brown	gravel, gravelly sand
5	9.45	18.29	Limestone Hard	Grey	limestone

Well Number 6811021 Construction Date 190686 Primary Water Use Domestic
 Easting (NAD83) 582308 Northing (NAD83) 4808610 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 002 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 2.74 Deepest Water Found 10.97
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 36.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 009
 Specific Capacity: Recommended Pump Setting (gpm) : 36.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	1.52	Sand Boulders Loose	Brown	gravel, gravelly sand
2	1.52	8.53	Sand Gravel Loose	Brown	gravel, gravelly sand
3	8.53	9.14	Limestone Layered	Grey	limestone
4	9.14	12.19	Limestone Hard	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6811367 Construction Date 270787 Primary Water Use Stock
 Easting (NAD83) 580373 Northing (NAD83) 4809070 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 004 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 10.06 Deepest Water Found 19.51
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 7.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 033
 Specific Capacity: Recommended Pump Setting (gpm) : 65.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	9.45	Clay	Brown	clay, silty clay
2	9.45	20.42	Limestone	Grey	limestone

Well Number 6811706 Construction Date 010689 Primary Water Use Domestic
 Easting (NAD83) 582620 Northing (NAD83) 4808920 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 001 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 5.18 Deepest Water Found 11.28
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 15.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 017
 Specific Capacity: Recommended Pump Setting (gpm) : 35.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.91	Clay Stones	Brown	diamicton: si to sa/si matrix
2	0.91	3.05	Limestone Fractured Soft	Brown	limestone
3	3.05	7.01	Limestone Soft	Brown	limestone
4	7.01	12.50	Limestone	Grey	limestone

Well Number 6811914 Construction Date 300790 Primary Water Use Stock
 Easting (NAD83) 582001 Northing (NAD83) 4808290 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 003 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 2.74 Deepest Water Found 17.37
 Top of Screen Bottom of Screen Water Kind Unknown
 Pump Rate 30.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 009
 Specific Capacity: Recommended Pump Setting (gpm) : 58.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.05	Sand Gravel Loose	Brown	gravel, gravelly sand
2	3.05	6.71	Sand Gravel Loose	Grey	gravel, gravelly sand
3	6.71	18.29	Limestone Hard	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6812208 **Construction Date** 290492 **Primary Water Use** Domestic
Easting (NAD83) 582001 **Northing (NAD83)** 4808290 **UTM Zone** 17
Estimated Positional Accuracy unknown utm **Elevation**
Lot 003 **Concession** 10 **East Flamborough Township** **Wentworth**
Well Diameter 15.24 **Static Level** 3.66 **Deepest Water Found** 15.24
Top of Screen **Bottom of Screen** **Water Kind** Unknown
Pump Rate 30.00 **Pump Time(h:m)** 1 : 0 **Depth (end of 60 min)** 012
Specific Capacity: **Recommended Pump Setting (gpm) :** 56.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
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Well Number 6812224 **Construction Date** 030692 **Primary Water Use** Public Supply
Easting (NAD83) 580373 **Northing (NAD83)** 4809070 **UTM Zone** 17
Estimated Positional Accuracy unknown utm **Elevation**
Lot 004 **Concession** 11 **East Flamborough Township** **Wentworth**
Well Diameter 15.24 **Static Level** 2.13 **Deepest Water Found** 14.94
Top of Screen **Bottom of Screen** **Water Kind** Unknown
Pump Rate 50.00 **Pump Time(h:m)** 24 : 0 **Depth (end of 60 min)** 010
Specific Capacity: **Recommended Pump Setting (gpm) :** 46.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.30	Topsoil Loose	Black	fill (incl topsoil, waste)
2	0.30	2.74	Sand Gravel Loose	Brown	gravel, gravelly sand
3	2.74	15.24	Limestone Hard	Grey	limestone

Well Number 6812618 **Construction Date** 110795 **Primary Water Use** Domestic
Easting (NAD83) 581685 **Northing (NAD83)** 4807970 **UTM Zone** 17
Estimated Positional Accuracy unknown utm **Elevation**
Lot 004 **Concession** 10 **East Flamborough Township** **Wentworth**
Well Diameter 15.24 **Static Level** 1.22 **Deepest Water Found** 15.54
Top of Screen **Bottom of Screen** **Water Kind** Unknown
Pump Rate 7.00 **Pump Time(h:m)** 0 : 30 **Depth (end of 60 min)**
Specific Capacity: **Recommended Pump Setting (gpm) :** 66.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.35	Sand Gravel Loose	Brown	gravel, gravelly sand
2	3.35	4.57	Limestone	Grey	gravel, gravelly sand
3	4.57	6.10	Gravel Sand Loose	Brown	gravel, gravelly sand
4	6.10	19.81	Limestone Hard	Grey	limestone
5	19.81	21.64	Limestone Shale Layered	Grey	interbedded limestone/shale
6	21.64	21.95	Shale Hard	Red	shale



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6812619 Construction Date 130795 Primary Water Use Domestic
 Easting (NAD83) 581685 Northing (NAD83) 4807970 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 004 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 1.22 Deepest Water Found 6.40
 Top of Screen Bottom of Screen Water Kind Unknown
 Pump Rate 15.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min) 018
 Specific Capacity: Recommended Pump Setting (gpm) : 23.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	5.18	Sand Gravel	Brown	gravel, gravelly sand
2	5.18	6.40	Gravel	Brown	gravel, gravelly sand
3	6.40	9.14	Limestone Hard	Grey	limestone

Well Number 6812966 Construction Date 230298 Primary Water Use Domestic
 Easting (NAD83) 580032 Northing (NAD83) 4808750 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 005 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 22.56 Deepest Water Found 42.06
 Top of Screen Bottom of Screen Water Kind Unknown
 Pump Rate 25.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: Recommended Pump Setting (gpm) : 140.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	7.01	Clay Sand	Brown	silt, sandy silt, clayey silt
2	7.01	21.03	Clay Sand	Grey	silt, sandy silt, clayey silt
3	21.03	44.20	Limestone Hard	Grey	limestone

Well Number 6813041 Construction Date 161098 Primary Water Use Domestic
 Easting (NAD83) 581685 Northing (NAD83) 4807970 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 004 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 1.52 Deepest Water Found 9.45
 Top of Screen Bottom of Screen Water Kind Unknown
 Pump Rate 20.00 Pump Time(h:m) 1 : 0 Depth (end of 60 min)
 Specific Capacity: Recommended Pump Setting (gpm) : 31.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.66	Sand	Brown	sand, silty sand
2	3.66	7.32	Sand Gravel	Brown	gravel, gravelly sand
3	7.32	10.67	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6813235 Construction Date 141099 Primary Water Use Domestic
 Easting (NAD83) 581375 Northing (NAD83) 4810070 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 001 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 5.49 Deepest Water Found 22.56
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 50.00 Pump Time(h:m) : 30 Depth (end of 60 min)
 Specific Capacity: Recommended Pump Setting (gpm) : 70.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.44	Clay Gravel	Brown	diamicton: si to sa/si matrix
2	2.44	24.38	Limestone	Grey	limestone

Well Number 6813236 Construction Date 141099 Primary Water Use Domestic
 Easting (NAD83) 581375 Northing (NAD83) 4810070 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 001 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 5.49 Deepest Water Found 22.86
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 50.00 Pump Time(h:m) : 30 Depth (end of 60 min)
 Specific Capacity: Recommended Pump Setting (gpm) : 70.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	0.91	Clay Boulders	Brown	diamicton: si to sa/si matrix
2	0.91	21.64	Limestone	Grey	limestone
3	21.64	23.47	Limestone Loose	Grey	limestone
4	23.47	24.38	Limestone	Grey	limestone

Well Number 6813265 Construction Date 080100 Primary Water Use Domestic
 Easting (NAD83) 581031 Northing (NAD83) 4809730 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 002 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 2.13 Deepest Water Found 16.76
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 30.00 Pump Time(h:m) 1 : Depth (end of 60 min) 030
 Specific Capacity: Recommended Pump Setting (gpm) : 45.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.44	Clay Boulders	Brown	diamicton: si to sa/si matrix
2	2.44	3.96	Gravel Boulders	Brown	gravel, gravelly sand
3	3.96	18.29	Limestone	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6813438 Construction Date 131100 Primary Water Use Domestic
 Easting (NAD83) 581373 Northing (NAD83) 4810070 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 001 Concession 11 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 7.32 Deepest Water Found 28.65
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 25.00 Pump Time(h:m) 1 : Depth (end of 60 min) 024
 Specific Capacity: Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	1.22	Clay Stones Loose	Brown	diamicton: si to sa/si matrix
2	1.22	30.48	Limestone Hard	Grey	limestone

Well Number 6813496 Construction Date 260601 Primary Water Use Irrigation
 Easting (NAD83) 581682 Northing (NAD83) 4807970 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 004 Concession 10 East Flamborough Township Wentworth
 Well Diameter Static Level 2.74 Deepest Water Found 17.37
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 40.00 Pump Time(h:m) 1 : Depth (end of 60 min) 009
 Specific Capacity: Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.05	Clay Sandy Stones	Brown	diamicton: si to sa/si matrix
2	3.05	7.32	Gravel Sand Loose	Brown	gravel, gravelly sand
3	7.32	9.14	Limestone Layered	Grey	limestone
4	9.14	18.29	Limestone Hard	Grey	limestone

Well Number 6813559 Construction Date 051101 Primary Water Use Domestic
 Easting (NAD83) 582306 Northing (NAD83) 4808610 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 002 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 7.92 Deepest Water Found 18.29
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 1 : Depth (end of 60 min)
 Specific Capacity: Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	4.57	Clay Sandy Gravel	Brown	diamicton: si to sa/si matrix
2	4.57	19.81	Limestone Hard	Grey	limestone



MOE Water Well Records Report

All depths and elevations are in metres

Project 23827

Well Number 6813562 Construction Date 051101 Primary Water Use Domestic
 Easting (NAD83) 582306 Northing (NAD83) 4808610 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 002 Concession 10 East Flamborough Township Wentworth
 Well Diameter 15.24 Static Level 6.71 Deepest Water Found 16.76
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 20.00 Pump Time(h:m) 1 : Depth (end of 60 min) 022
 Specific Capacity: Recommended Pump Setting (gpm) :

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	3.66	Clay Sandy Gravel	Brown	diamicton: si to sa/si matrix
2	3.66	18.29	Limestone Loose	Grey	limestone

Well Number 6813737 Construction Date 270902 Primary Water Use Public Supply
 Easting (NAD83) 580328 Northing (NAD83) 4809140 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 004 Concession 11 East Flamborough Township Wentworth
 Well Diameter 20.32 Static Level 12.50 Deepest Water Found 26.21
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 120.00 Pump Time(h:m) 2 : Depth (end of 60 min)
 Specific Capacity: Recommended Pump Setting (gpm) : 80.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	4.57	Boulders Fill	Brown	fill (incl topsoil, waste)
2	4.57	21.34	Limestone Sandstone Hard	Grey	limestone
3	21.34	22.56	Sandstone Hard	Brown	rock
4	22.56	25.91	Limestone Hard	Grey	limestone
5	25.91	28.35	Sandstone Limestone Hard	Brown	limestone

Well Number 6813738 Construction Date 221102 Primary Water Use Public Supply
 Easting (NAD83) 580358 Northing (NAD83) 4809040 UTM Zone 17
 Estimated Positional Accuracy unknown utm Elevation
 Lot 004 Concession 11 East Flamborough Township Wentworth
 Well Diameter 20.32 Static Level 10.67 Deepest Water Found 17.07
 Top of Screen Bottom of Screen Water Kind Fresh
 Pump Rate 80.00 Pump Time(h:m) 4 : Depth (end of 60 min)
 Specific Capacity: Recommended Pump Setting (gpm) : 54.00

Well Stratigraphy

Layer	Formation Top	Formation Bottom	Driller's Description	Colour	Standardized Description
1	0.00	2.44	Fill Boulders	Brown	fill (incl topsoil, waste)
2	2.44	11.28	Limestone Sandstone Hard	Grey	limestone
3	11.28	11.58	Sandstone Limestone Fine Sand	Brown	limestone
4	11.58	17.07	Limestone Hard	Grey	limestone
5	17.07	18.59	Sandstone Soft	Brown	rock



Appendix B

Borehole Logs

GRAPHICS, SYMBOLS AND ABBREVIATIONS ON LOGS

SAMPLE TYPES and TESTS

▬	SS	Split Spoon Sample	
⊗	SN	Non-Standard Split Spoon Sample	
I	ST	Shelby Tube Sample : (unconfined compression or unconsolidated undrained test)	◆
▬	DS	Denision Type Sample	
▬	PS	Piston Type Sample	
▬	CS	Continuous Sample	
▬	GS	Grab Sample	
▬	WS	Wash Sample	
▬	BQ	BQ Core Sample	
▬	HQ	HQ Core Sample	
▬	NQ	NQ Core Sample	
▬	DT	Dynamic Penetration Test	
▬	VT	Field Vane Test (undisturbed)	⊙
▬	VT	Field Vane Test (remoulded)	⊕

PENETRATION RESISTANCES

Standard Penetration Resistance(N Value)

The number of blows by a 63.6 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) Split Spoon Sampler for a distance of 300 mm (12 in.).

ABBREVIATIONS

- DTPL: Drier Than Plastic Limit
- APL: About Plastic Limit
- WTPL: Wetter Than Plastic Limit
- K: Hydraulic Conductivity (m/s)
- C_u : Undrained Shear Strength (kPa)
- % REC : Percentage of Sample Recovered
- % RQD : Indirect Measure of the Number of Fractures and Soundness of Rock Mass
- ▼ Approximate Water Table

GRAIN SIZE CLASSIFICATION %

trace, "eg. trace sand"	1 - 10
some, "eg. some sand"	10 - 20
adjective, "eg. sandy"	20 - 35
and, "eg. and sand"	35 - 50
noun, "eg. sand"	>50

Note: Classification Divisions Based on Modified M.I.T. Grain Size Scale

SOIL DESCRIPTIONS

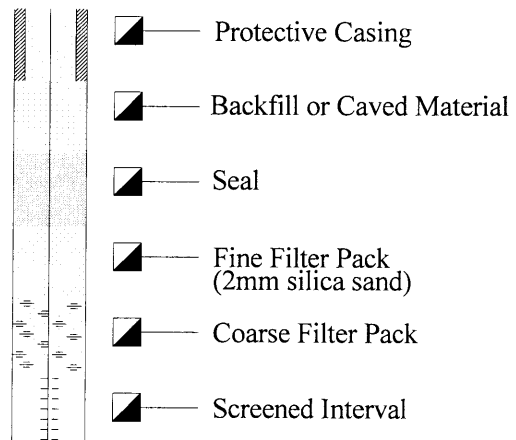
Cohesionless Soils

Relative Density	N Value
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

Cohesive Soils

Consistency	C_u (kPa)	N Value
Very soft	0 to 12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	over 200	over 30

MONITOR DETAILS





BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 1-I 1 of 2
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.		DATE: 26 February 2004 LOGGED BY JED GROUND ELEV 285.49 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE					RECOVERY (%)				RQD (%)				
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40
1		CLAY TILL Clay till overburden.		▽														
2.6																		
3		DOLOSTONE Light beige colour fossiliferous dolostone, coarse crystalline. Amabel.																
4					1	PQ				96		■						▲
5																		
6																		
7					2	PQ				88		■						▲
8																		
9																		
10					3	PQ				93		■						▲
11																		
12																		
13					4	PQ				101		>>■						▲
14																		
15																		
16		At about 16.04 m changes to a Blue-grey colour.			5	PQ				96		■						▲
17																		
18																		
19					6	PQ				102		>>■						▲

BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 1-I 2 of 2
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.	DATE: 26 February 2004 LOGGED BY JED GROUND ELEV 285.49 m ASL	

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE					RECOVERY (%)				RQD (%)					
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40	
21																			
22					7		PQ				86								
23																			
24																			
25					8		PQ				102	>>							
26																			
27																			
28					9		PQ				101	>>							
29																			
30																			
31					10		PQ				102	>>							
32																			
33																			
34					11		PQ				99								
35																			
35.5		SHALY DOLOSTONE																	
36		White-grey colour shaly dolostone, fine to very fine grain. Reynales formation.																	
37					12		PQ				50								
37.7																			
38.3		SHALE																	
38		Green weathered shale. Cabot Head. Borehole terminated at 38.25 m in shale. Water level measured on April 20, 2004 at 0.39 m below ground surface.																	

BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 1-II 1 of 1
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.	DATE: 26 February 2004 LOGGED BY JED GROUND ELEV 286.37 m ASL	

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE					RECOVERY (%)				RQD (%)						
					NUMBER	INTERVAL TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40			
1		CLAY TILL Clay till overburden.		▽																
2.6		DOLOSTONE Light beige colour fossiliferous dolostone, coarse crystalline. Amabel.																		
6.7		Borehole terminated at 6.71 m in dolostone. Geology inferred from borehole GLL 1-I. Water level measured on April 20, 2004 at 0.39 m below ground surface.																		

BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 3	1 of 2
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.		DATE: 26 March 2004 LOGGED BY: JED GROUND ELEV: 287.25 m ASL	

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE					RECOVERY (%)				RQD (%)						
					NUMBER	INTERVAL TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40			
1	CLAY TILL Clay till overburden.																			
2																				
3.1																				
3	DOLOSTONE Blue-grey colour fossiliferous dolostone, coarse crystalline. Amabel.																			
4																				
5																				
6																				
7																				
8																				
9			A 0.76 m thick cavity at about 8.53 m. Reddish-grey 0.23 m thick mud layer at about 9.09 m.																	
10																				
11			Cavity at about 10.36 m. Cavity at about 10.67 m.																	
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				

BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 4-I 1 of 2
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.	DATE: 24 February 2004 LOGGED BY JED GROUND ELEV 286.46 m ASL	

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE						RECOVERY (%)			RQD (%)						
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40		
1	CLAY TILL Clay till overburden.			▽																
2																				
3.0	DOLOSTONE Light beige colour fossiliferous dolostone, coarse crystalline. Amabel.				1	PQ				95										
4																				
5																				
6						2	PQ				95									
7																				
8																				
9					3	PQ				94										
10																				
11																				
12	Cavity				4	PQ				75										
13	Cavity																			
14																				
15					5	PQ				69										
16																				
17																				
18					6	PQ				100										
19																				



BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 4-II 1 of 1
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.		DATE: 24 February 2004 LOGGED BY JED GROUND ELEV 286.69 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE					RECOVERY (%)				RQD (%)						
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40		
1	[Hatched pattern]	CLAY TILL Clay till overburden.	[Solid black]	▽																
2																				
3.0		DOLOSTONE Light beige colour fossiliferous dolostone, coarse crystalline. Amabel.																		
4																				
5																				
6																				
7																				
7.6		Borehole terminated at 7.62 m in dolostone. Geology inferred from borehole GLL 4-I.																		
		Water level measured on April 20, 2004 at 1.09 m below ground surface.																		

BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 6-I 1 of 2
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.		DATE: 11 March 2004 LOGGED BY JED GROUND ELEV 288.00 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE					RECOVERY (%)				RQD (%)					
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40	
1		CLAY TILL Clay till overburden.																	
2.1				▽															
3		DOLOSTONE Light beige colour fossiliferous dolostone, coarse crystalline. Amabel.			1	PQ				104		>>	■						
4																			
5																			
6					2	PQ				104		>>	■						
7																			
8																			
9					3	PQ				91			■						
10																			
11																			
12					4	PQ				69			■						
13																			
14																			
15		At about 14.78 m changes to a Blue-grey colour.			5	PQ				78			■						
16																			
17																			
18					6	PQ				44			■						
19																			

BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 6-II 1 of 1
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.		DATE: 11 March 2004 LOGGED BY JED GROUND ELEV 287.56 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE					RECOVERY (%)			RQD (%)						
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40	
1		CLAY TILL Clay till overburden.																	
2.1		DOLOSTONE Light beige colour fossiliferous dolostone, coarse crystalline. Amabel.		▽															
3																			
4																			
5																			
6.1		Borehole terminated at 6.10 m in dolostone. Geology inferred from borehole GLL 6-1. Water level measured on April 20, 2004 at 2.36 m below ground surface.																	



BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 7-I 1 of 2
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.		DATE: 10 March 2004 LOGGED BY JED GROUND ELEV 285.77 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE						RECOVERY (%)				RQD (%)				
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40	
0.9		CLAY TILL Clay till overburden.																	
1		DOLOSTONE Light beige colour fossiliferous dolostone, coarse crystalline. Amabel.		▽															
2					1		PQ			92			■						▲
3																			
4																			
5					2		PQ			104			>>■						▲
6																			
7																			
8					3		PQ			103			>>■						▲
9																			
10																			
11					4		PQ			69			■						▲
12																			
13																			
14					5		PQ			102			>>■						▲
15																			
16																			
17					6		PQ			101			>>■						▲
18																			
19																			
		At about 17.07 m changes to a blue-grey colour.																	

BOREHOLE LOG

PROJECT: 23-827


BOREHOLE: GLL 7-I 2 of 2

Proposed Dolostone Quarry
 Flamborough, Ontario
FOR: Lowndes Holding Corp.

DATE: 10 March 2004
LOGGED BY JED
GROUND ELEV 285.77 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE					RECOVERY (%)				RQD (%)					
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40	
21					7		PQ			101		>>	■						▲
22																			
23																			
24																			
25																			
26																			
27																			
28																			
29																			
30																			
31																			
32																			
33																			
33.4																			
34		SHALY DOLOSTONE White-grey colour shaly dolostone, fine to very fine grain. Reynales formation.																	
35																			
35.4																			
36		SHALE Green weatherd shale with red argillaceous sandstone seams. Cabot Head.																	
37																			
38																			
38.4																			
		Borehole terminated at 38.40 m in shale.																	
		Water level measured on April 20, 2004 at 1.81 m below ground surface.																	









BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 7-II 1 of 1
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.		DATE: 10 March 2004 LOGGED BY JED GROUND ELEV 285.49 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE			RECOVERY (%)				RQD (%)								
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40		
0.9		CLAY TILL Clay till overburden.																		
1		DOLOSTONE Light beige colour fossiliferous dolostone, coarse crystalline. Amabel.																		
2																				
3																				
4																				
5																				
6.1		Borehole terminated at 6.10 m in dolostone. Geology inferred from borehole GLL 7-1. Water level measured on April 20, 2004 at 2.92 m below ground surface.																		


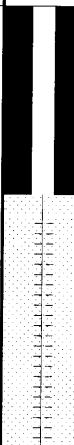

BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 8-I 1 of 2
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.		DATE: 10 March 2004 LOGGED BY JED GROUND ELEV 282.10 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE					RECOVERY (%)			RQD (%)					
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40
1		CLAY TILL Clay till overburden.																
3.1		DOLOSTONE Light beige colour fossiliferous dolostone, coarse crystalline. Amabel.			1	PQ				71								
4																		
5																		
6					2	PQ				91								
7																		
8																		
9																		
10					3	PQ				100								
11																		
12																		
13					4	PQ				73								
14																		
15																		
16					5	PQ				97								
17																		
18																		
19					6	PQ				91								

BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 8-II 1 of 1
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.		DATE: 10 March 2004 LOGGED BY: JED GROUND ELEV: 281.83 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE					RECOVERY (%)				RQD (%)					
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40	
1		CLAY TILL Clay till overburden.																	
2																			
3.1		DOLOSTONE Light beige colour fossiliferous dolostone, coarse crystalline. Amabel.																	
4																			
5																			
6																			
6.6		Borehole terminated at 6.55 m in dolostone. Geology inferred from borehole GLL 8-I. Water level measured on April 20, 2004 at 1.85 m below ground surface.																	

BOREHOLE LOG	PROJECT: 23-827	BOREHOLE: GLL 9-II 1 of 1
Proposed Dolostone Quarry Flamborough, Ontario FOR: Lowndes Holding Corp.		DATE: 12 March 2004 LOGGED BY: JED GROUND ELEV: 285.57 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	WATER LEVEL	SAMPLE					RECOVERY (%)				RQD (%)							
					NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	15	30	45	60	10	20	30	40			
1		CLAY TILL Clay till overburden.		▽																	
1.5																					
2		DOLOSTONE Light beige colour fossiliferous dolostone, coarse crystalline. Amabel.																			
3																					
4																					
5																					
6.1		Borehole terminated at 6.10 m in dolostone. Geology inferred from borehole GLL 9-I. Water level measured on April 20, 2004 at 1.45 m below ground surface.																			



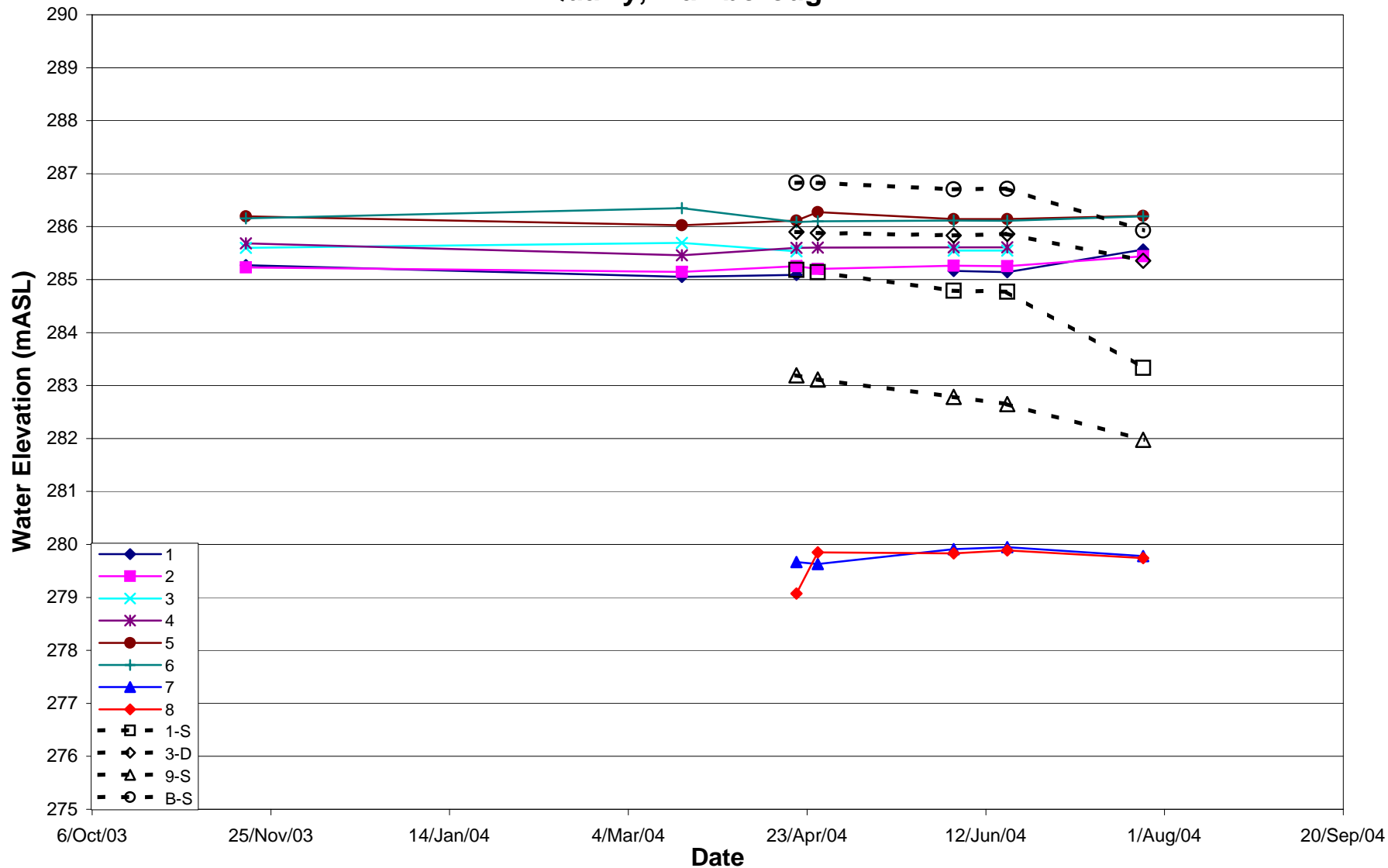
Appendix C

Piezometer Details and Water Levels

Appendix C: Mini-Piezometer Water Levels
Lowndes Holdings Corp.
Proposed Dolostone Quarry
Project Number: 23-827

				26/Apr/04		3/Jun/04		18/Jun/04		26/Jul/04	
Piezometer	Stick up (m)	Depth BGS (m)	Elevation (Approx.) (mASL)	Water Level BTC (m)	Water Elevation (mASL)	Water Level BTC (m)	Water Elevation (mASL)	Water Level BTC (m)	Water Elevation (mASL)	Water Level BTC (m)	Water Elevation (mASL)
1 Outside	0.67	0.75	285.1			0.675	285.165	0.650	285.14	1.075	285.565
2 Stream	1.42	0.91	285.521	1.1	285.201	1.160	285.261	1.150	285.251	1.34	285.441
3 Outside	0.74	0.83	285.605	1.12	285.221	1.180	285.281	1.170	285.271	1.34	285.441
4 Outside	1.085	1.085	285.642	0.7	285.565	0.685	285.55	0.684	285.549	n/a	
5 Outside	0.842	0.728	286.175	1.045	285.602	0.710	285.575	0.710	285.575	n/a	
6 Outside	0.88	1.3	286.158	1.08	285.637	1.050	285.607	1.070	285.627		
7 Stream	1.01	1.49	280.758	0.94	286.273	0.810	286.143	0.810	286.143	0.87	286.203
8 Stream	1.05	2.095	280.766	0.825	286.158	0.855	286.188	0.855	286.188		
				0.82	286.098	0.835	286.113	0.830	286.108	0.915	286.193
				0.855		0.865		0.865			
				1.13	279.628	0.845	279.913	0.810	279.948	0.98	279.778
				0.855	279.903	0.865	279.893	0.815	279.943	0.985	279.773
				0.91	279.848	0.925	279.833	0.870	279.888	1.015	279.743
				0.91	279.848	0.915	279.843	0.865	279.893	1.045	279.713
				26/Apr/04		3/Jun/04		18/Jun/04		26/Jul/04	
Staff Gauges											
TD SG						0.190		0.200		Dry	
FC SG				0.315		0.350		0.390			
M2 SG				0.37		0.305		0.320			

Appendix C: 2004 Water Levels in Mini-Piezometers, Proposed Dolostone Quarry, Flamborough



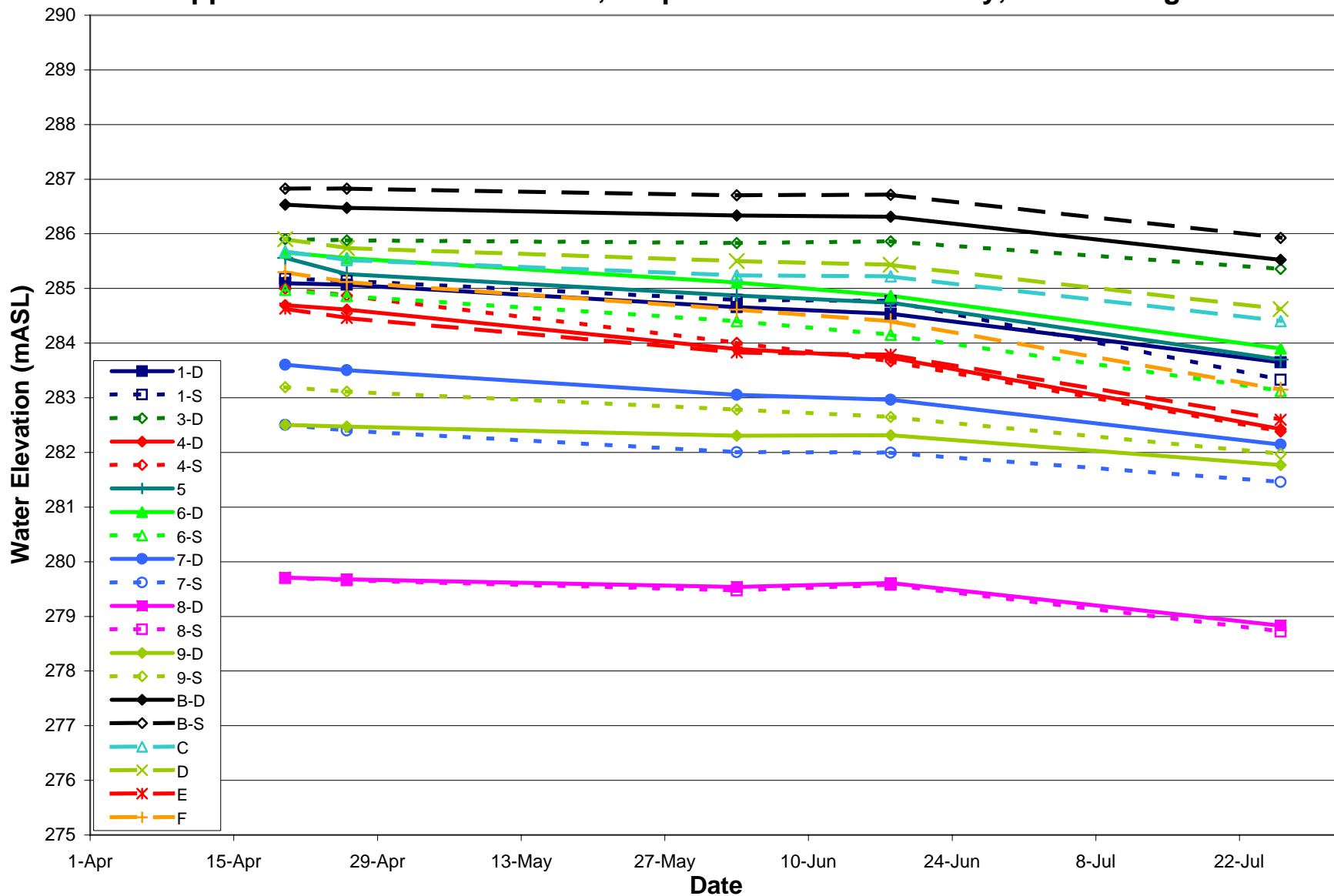
Appendix D

Water Level Data

Appendix D: Water Levels
Lowndes Holdings Corp.: Proposed Dolostone Quarry
Project Number: 23-827

Borehole	Stick up (m)	Depth BGS (m)	Ground Elevation (mASL)	20/Apr/04		26/Apr/04		3/Jun/04		18/Jun/04		26/Jul/04	
				Water Level BTC (m)	Water Elevation (mASL)	Water Level BTC (m)	Water Elevation (mASL)	Water Level BTC (m)	Water Elevation (mASL)	Water Level BTC (m)	Water Elevation (mASL)	Water Level BTC (m)	Water Elevation (mASL)
1-D	0.5	38.25	285.488	0.89	285.10	0.92	285.07	1.330	284.66	1.450	284.54	2.340	283.65
1-S	0.8	6.71	285.571	1.19	285.18	1.23	285.14	1.580	284.79	1.600	284.77	3.040	283.33
3-D	1.4	11.6	285.851	1.35	285.90	1.37	285.88	1.420	285.83	1.390	285.86	1.895	285.36
4-D	0.35	36.86	286.113	1.77	284.69	1.85	284.61	2.570	283.89	2.730	283.73	4.035	282.43
4-S	0.6	7.62	286.087	1.69	285.00	1.815	284.87	2.680	284.01	3.020	283.67	4.305	282.38
5	0.55		292.401	7.39	285.56	7.69	285.26	8.080	284.87	8.210	284.74	9.250	283.70
6-D	0.73	36.12	287.268	2.34	285.66	2.44	285.56	2.890	285.11	3.130	284.87	4.095	283.90
6-S	0.23	6.1	287.333	2.59	284.97	2.7	284.86	3.160	284.40	3.410	284.15	4.435	283.13
7-D	0.35	38.4	285.416	2.16	283.61	2.26	283.51	2.710	283.06	2.800	282.97	3.620	282.15
7-S	0.07	6.1	285.423	2.99	282.50	3.09	282.40	3.490	282.00	3.500	281.99	4.035	281.46
8-D	0.63	36.58	281.47	2.39	279.71	2.42	279.68	2.560	279.54	2.490	279.61	3.270	278.83
8-S	0.28	6.55	281.55	2.13	279.70	2.17	279.66	2.355	279.48	2.250	279.58	3.105	278.73
9-D	0.79	35.66	284.735	3.02	282.51	3.05	282.48	3.220	282.31	3.210	282.32	3.755	281.77
9-S	0.93	6.1	284.644	2.38	283.19	2.46	283.11	2.790	282.78	2.925	282.65	3.600	281.97
B-D	0.67	40.25	290.805	4.94	286.54	5	286.48	5.140	286.34	5.160	286.32	5.950	285.53
B-S	0.72		290.805	4.7	286.83	4.7	286.83	4.820	286.71	4.810	286.72	5.600	285.93
C	0.44	39.2	287.041	1.8	285.68	1.96	285.52	2.240	285.24	2.260	285.22	3.080	284.40
D	0.66	40.89	287.522	2.28	285.90	2.44	285.74	2.680	285.50	2.750	285.43	3.560	284.62
E	0.44	45.23	290.56	6.37	284.63	6.54	284.46	7.170	283.83	7.210	283.79	8.400	282.60
F	0.66	44.93	294.12	9.48	285.30	9.66	285.12	10.165	284.62	10.380	284.40	11.630	283.15

Appendix D: 2004 Water Levels, Proposed Dolostone Quarry, Flamborough



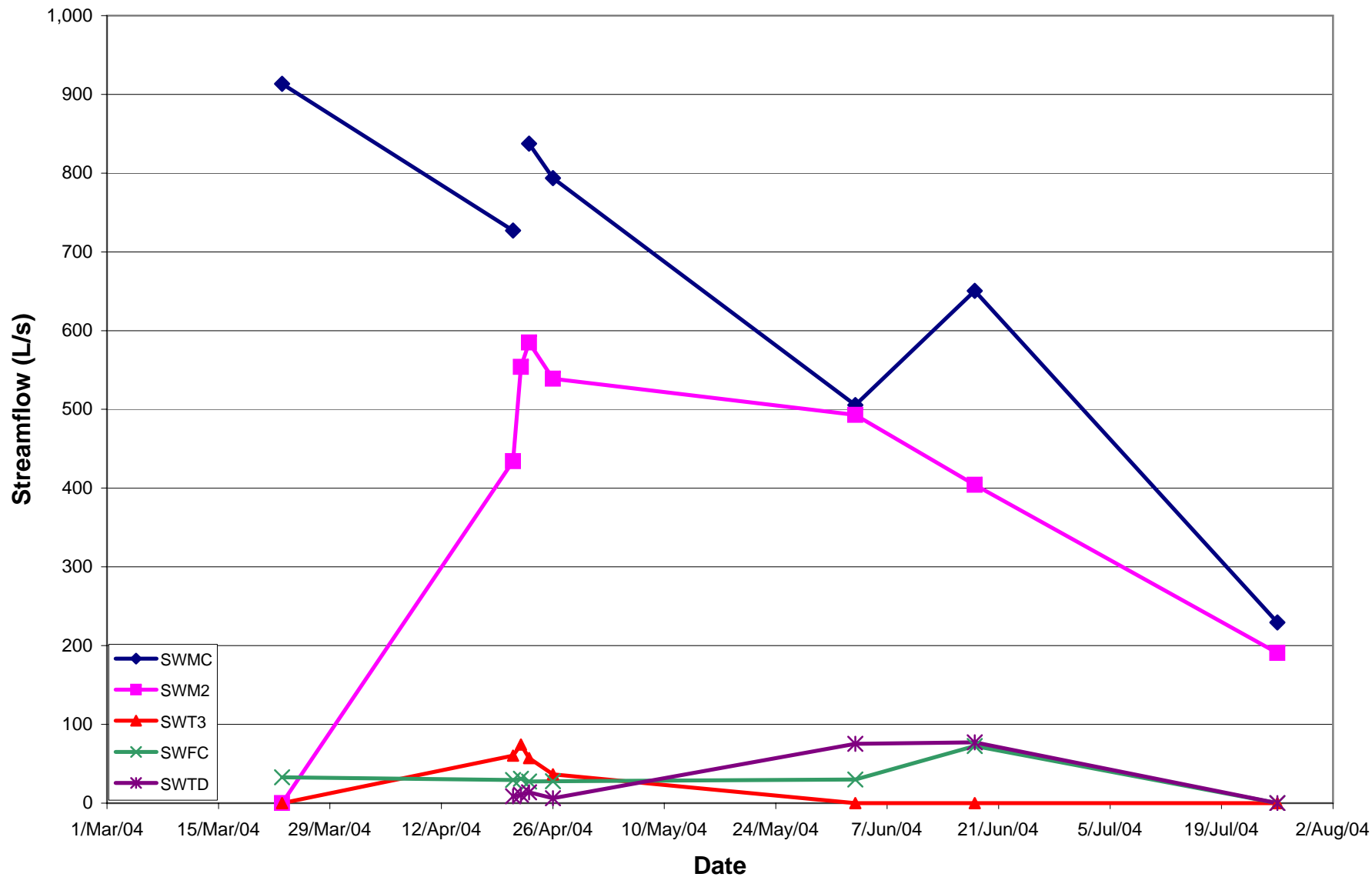
Appendix E

Stream Flow Data

Appendix E: Streamflow
Lowndes Holdings Corp.: Proposed Dolostone Quarry
Project Number: 23-827

Station	SWMC		SWM2		SWT3		SWFC		SWTD	
	Streamflow		Streamflow		Streamflow		Streamflow		Streamflow	
	L/s	m ³ /s	L/s	m ³ /s	L/s	m ³ /s	L/s	m ³ /s	L/s	m ³ /s
23-Mar-04	913.5	0.914	frozen	-	frozen	-	32.95	0.0330		-
21-Apr-04	727.25	0.727	434.06	0.434	60.25	0.060	29.25	0.029	8.7	0.009
22-Apr-04		-	553.95	0.554	74.42	0.074	31.03	0.031	10.7	0.011
23-Apr-04	837.57	0.838	584.78	0.585	57.21	0.057	27.50	0.027	13.7	0.014
26-Apr-04	793.68	0.794	538.99	0.539	36.68	0.037	27.97	0.028	6.3	0.006
3-Jun-04	505.39	0.505	493.08	0.493	no flow	-	29.92	0.030	75.25	0.075
18-Jun-04	650.63	0.651	404.21	0.404	no flow	-	72.55	0.073	77.19	0.077
26-Jul-04	229.51	0.230	190.81	0.191	no flow	-	no flow	-	no flow	-

Appendix E: Streamflow at Proposed Dolostone Quarry, Flamborough

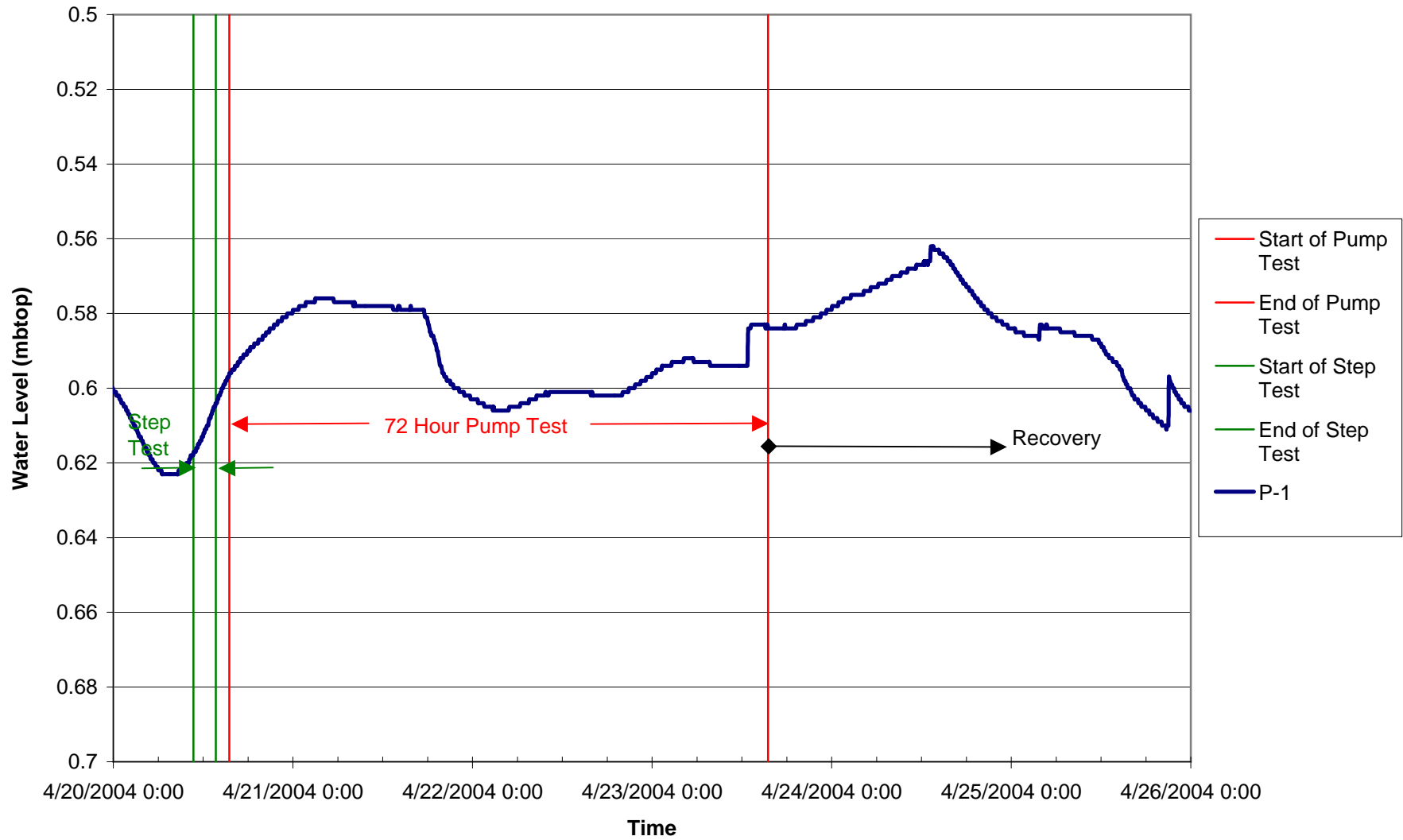


Appendix F

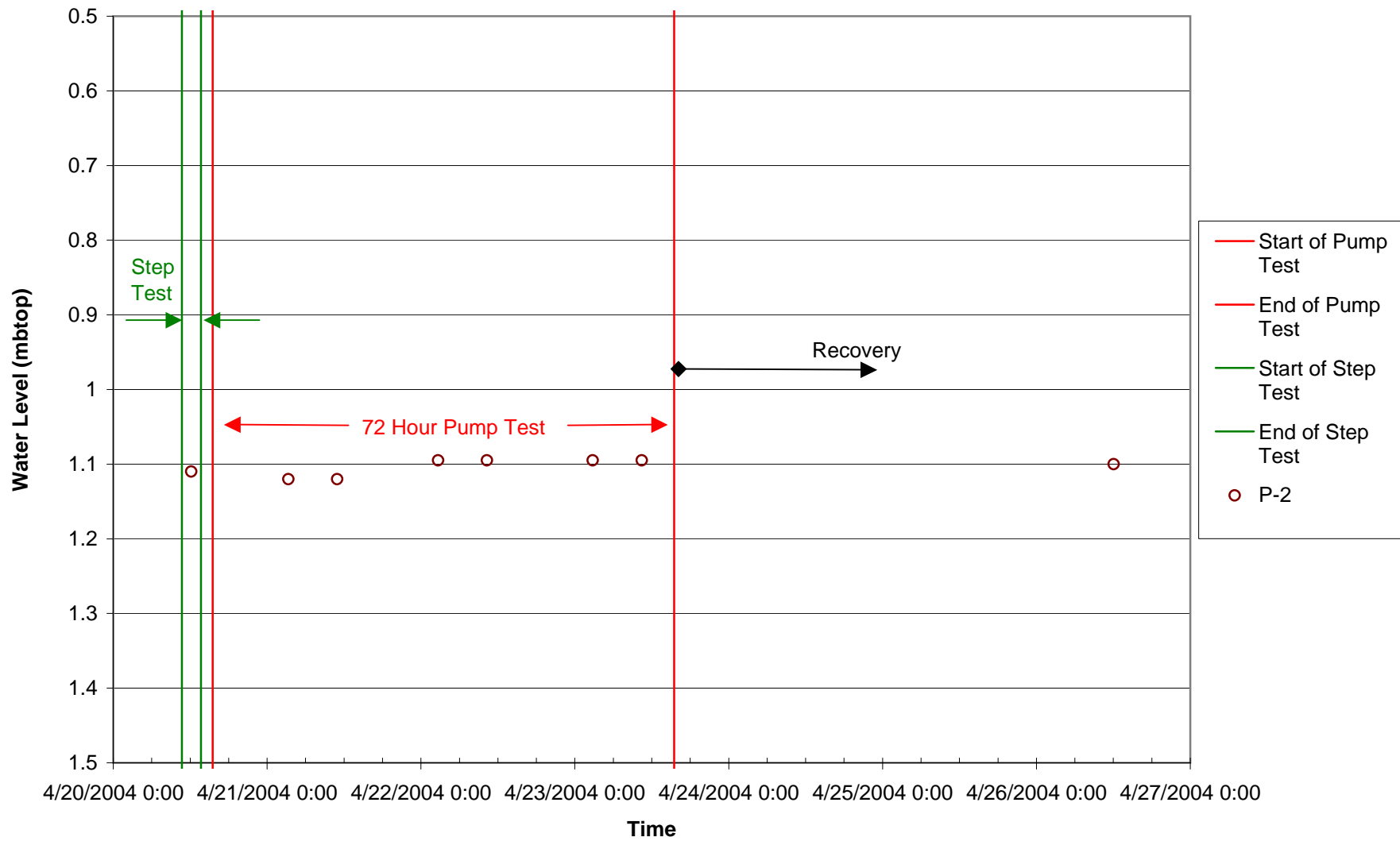
Pumping Test Results - Hydrographs



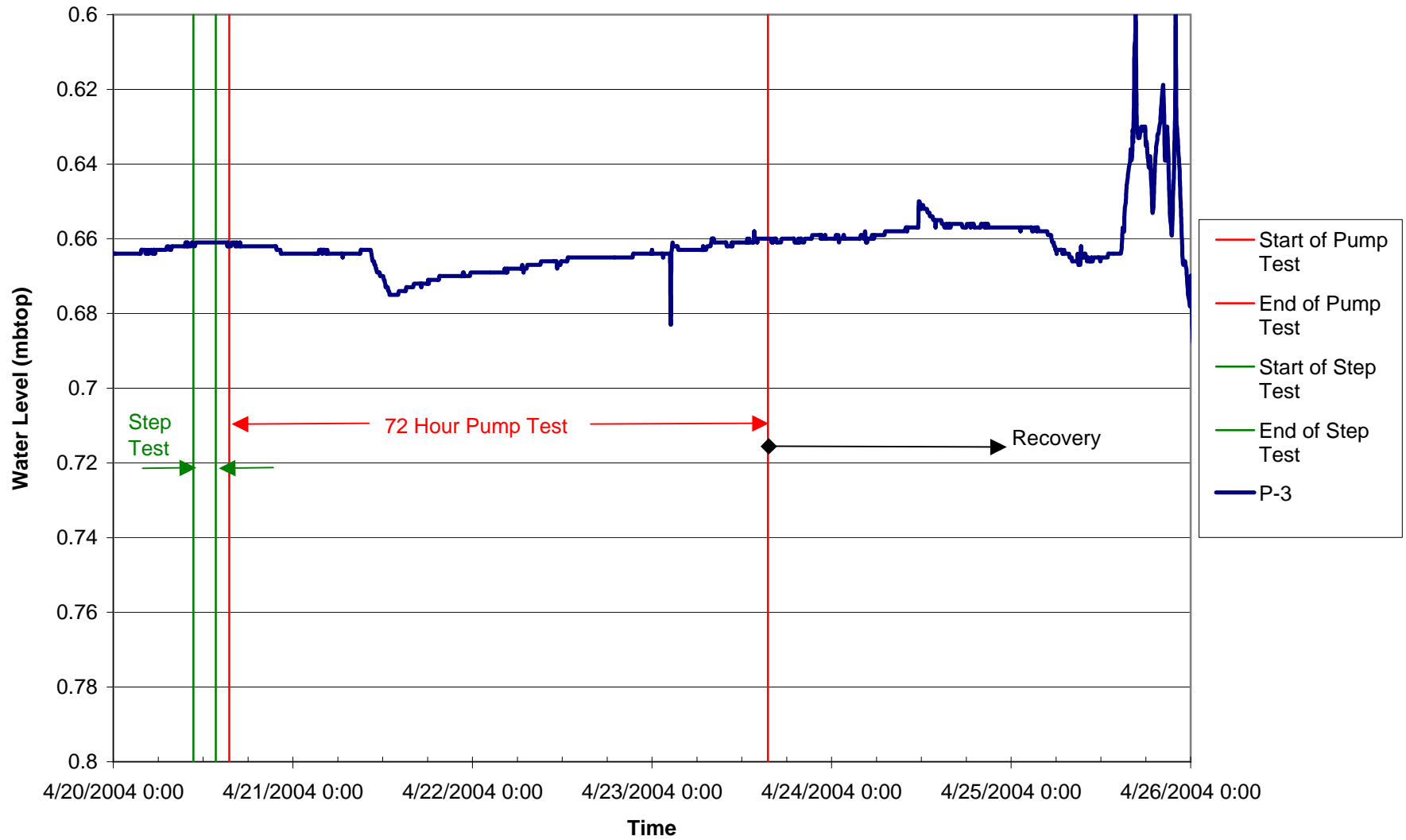
**Proposed Dolostone Quarry 72-Hour Pump Test
P- 1**



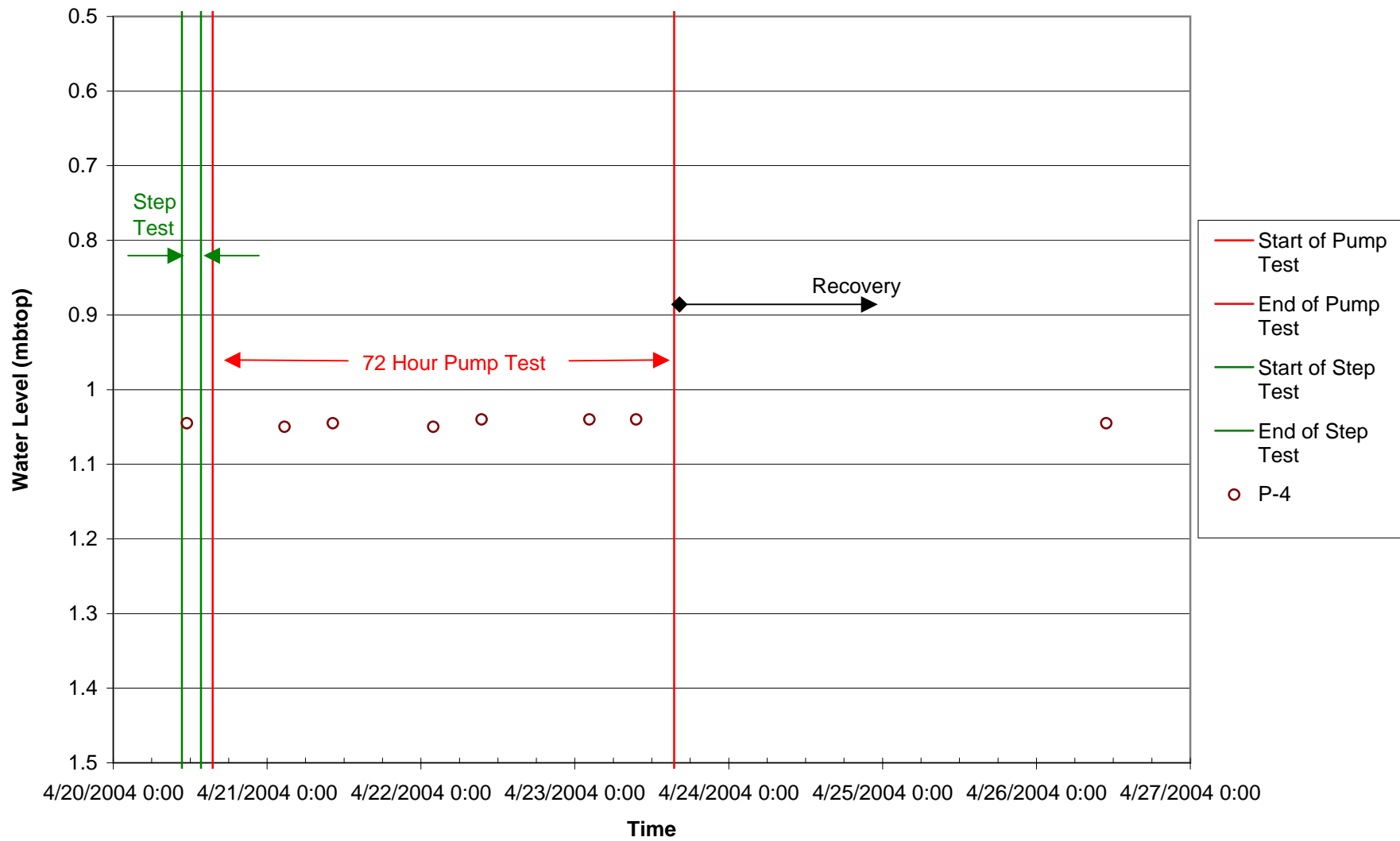
**Proposed Dolostone Quarry 72-Hour Pump Test
P-2**



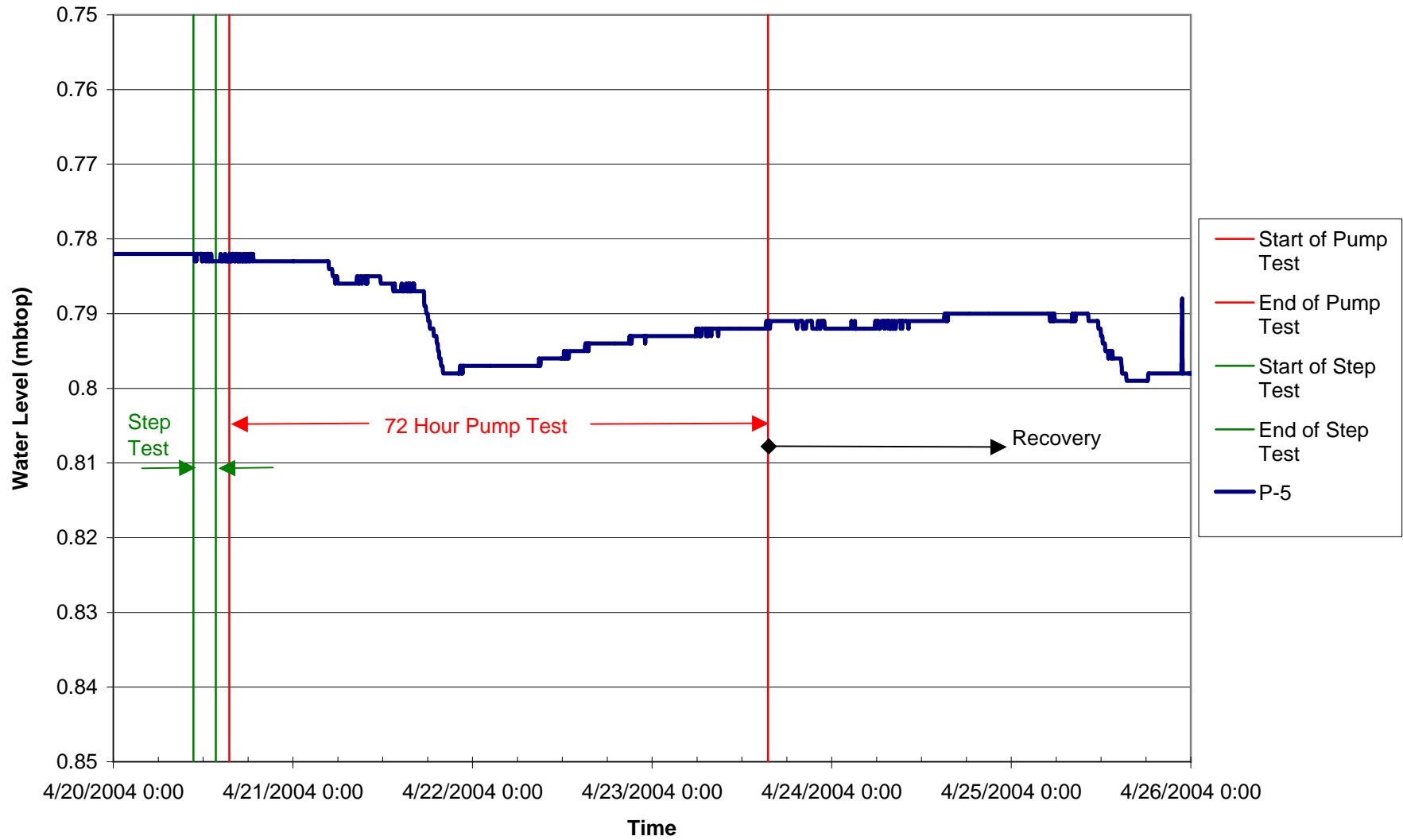
**Proposed Dolostone Quarry 72-Hour Pump Test
P- 3**



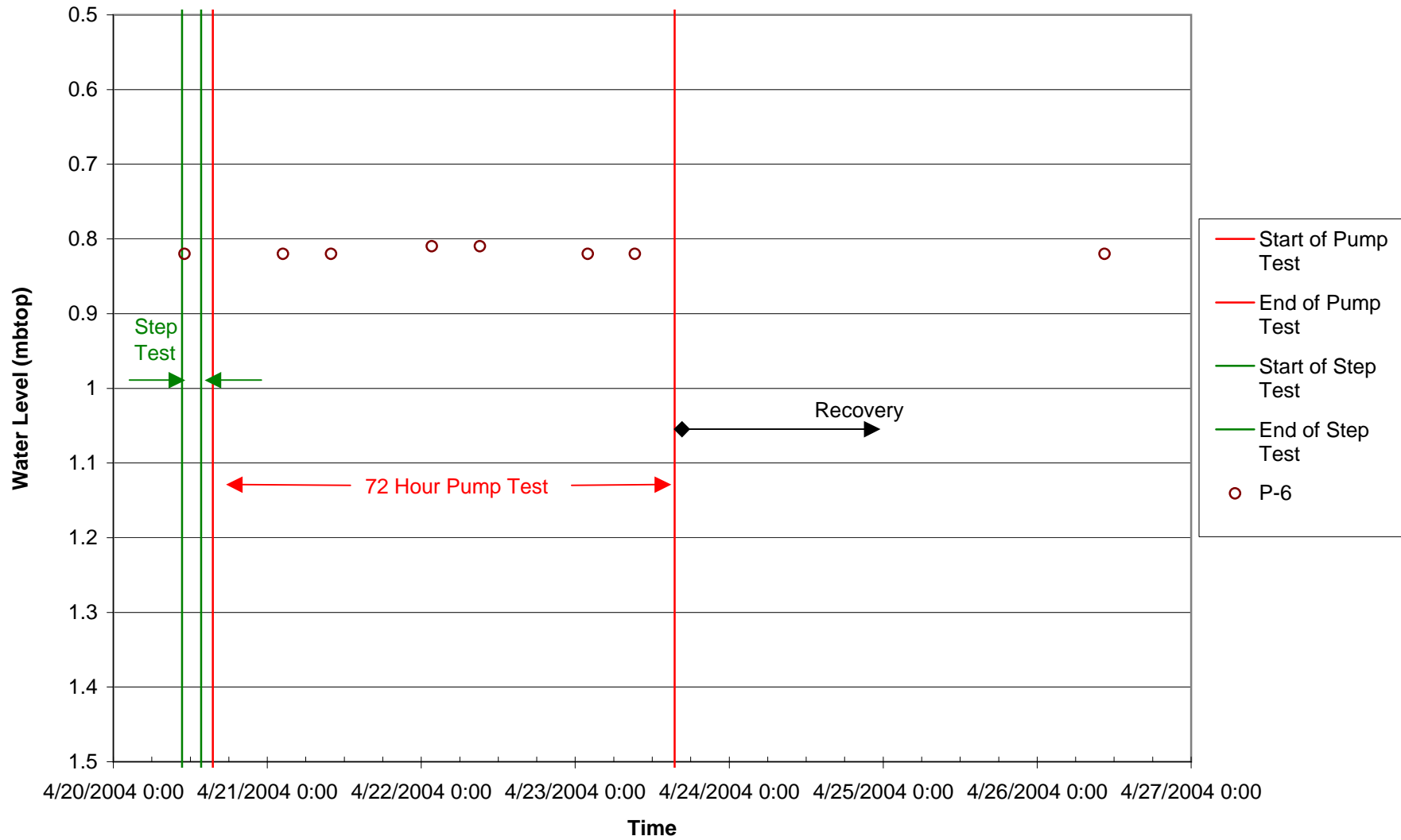
**Proposed Dolostone Quarry 72-Hour Pump Test
P - 4**



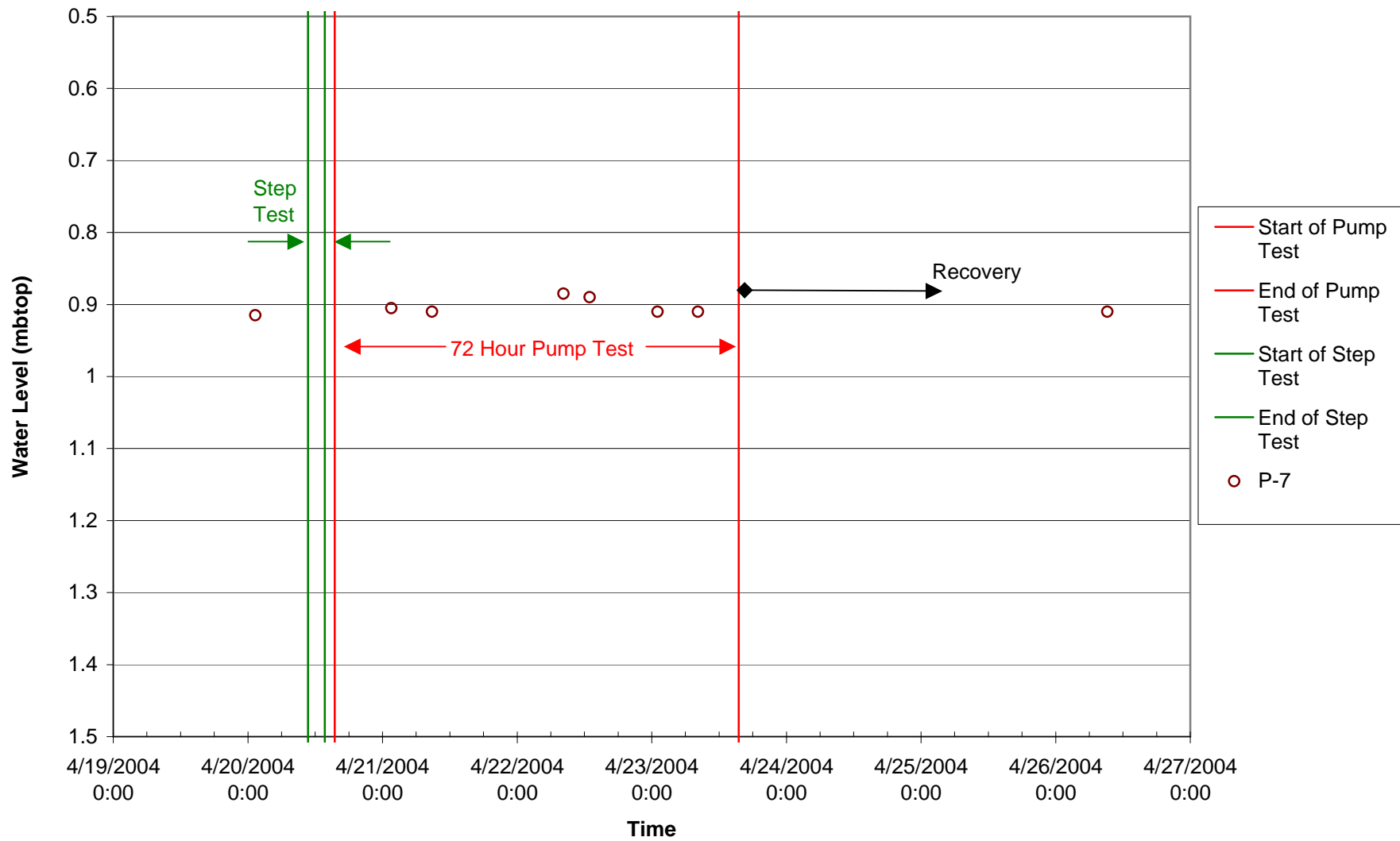
**Proposed Dolostone Quarry 72-Hour Pump Test
P- 5**



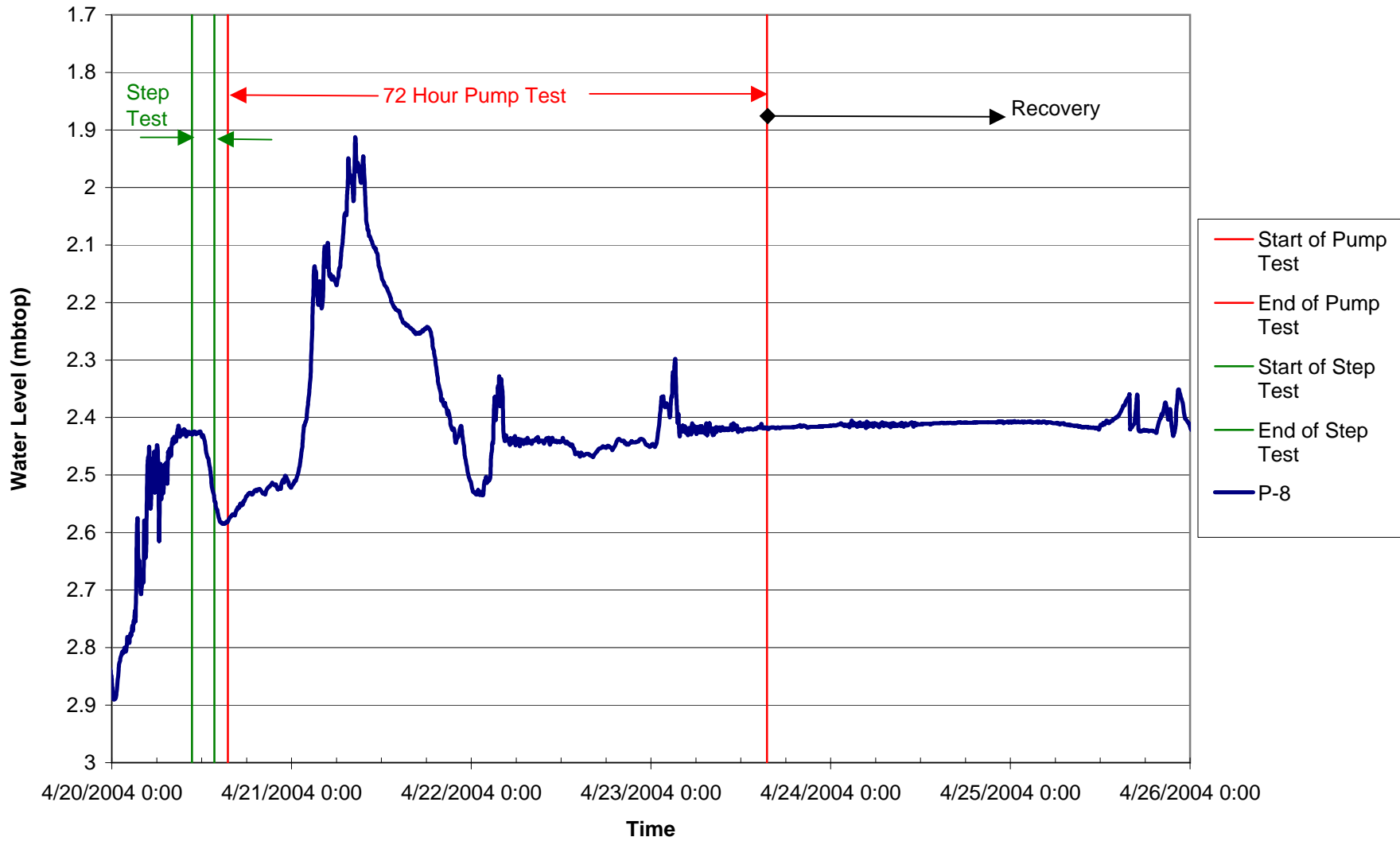
**Proposed Dolostone Quarry 72-Hour Pump Test
P - 6**



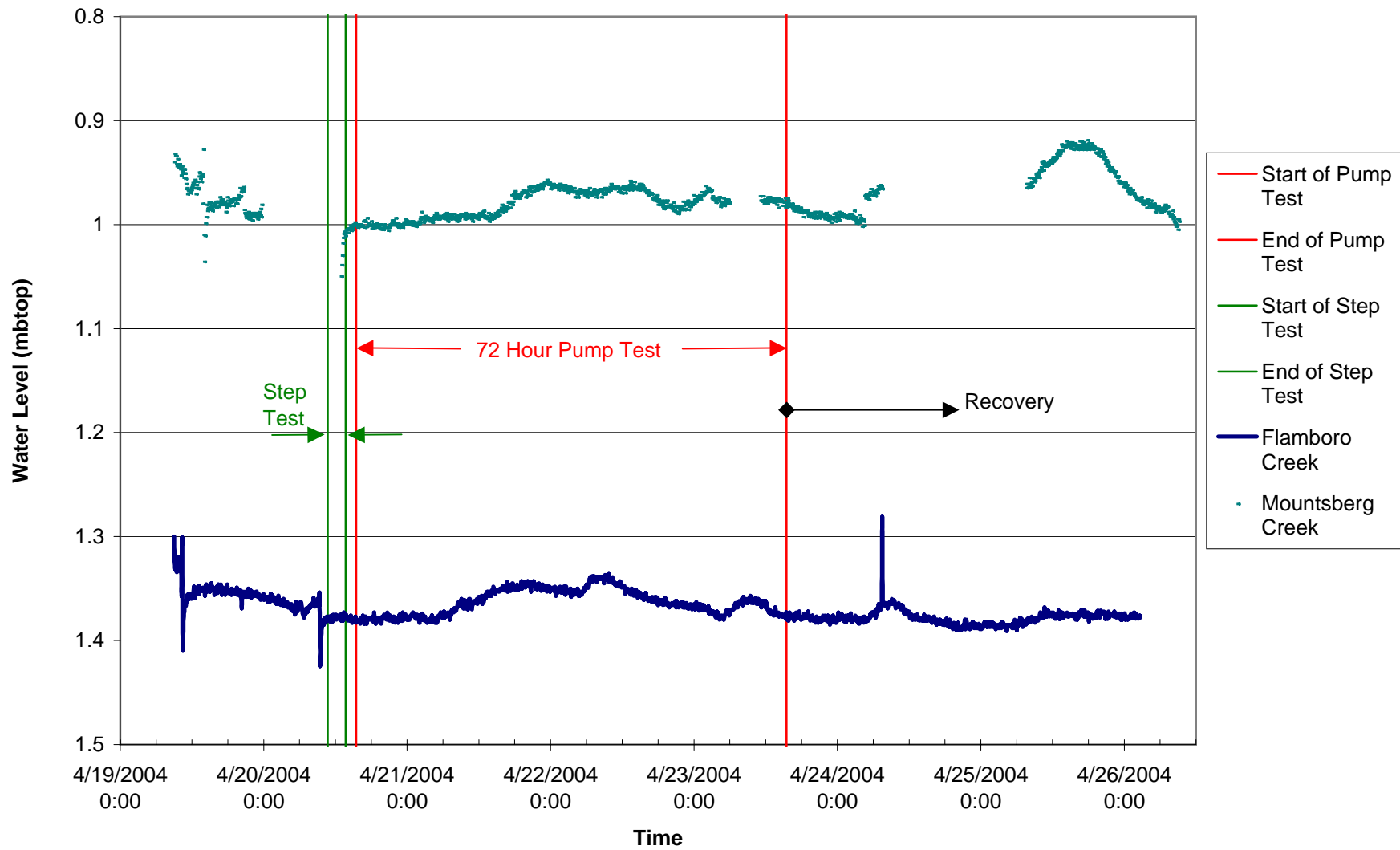
Proposed Dolostone Quarry 72-Hour Pump Test P - 7



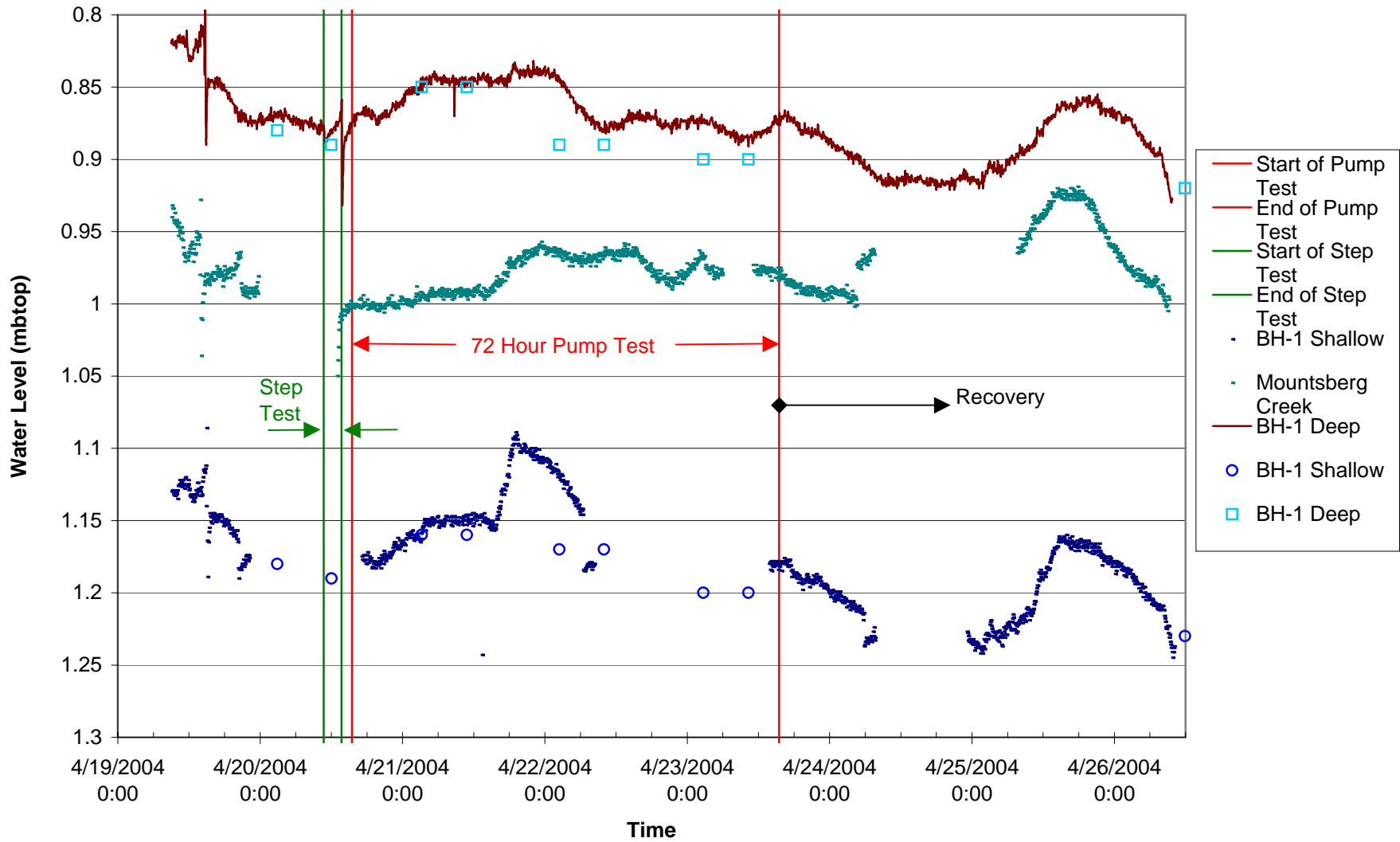
**Proposed Dolostone Quarry 72-Hour Pump Test
P- 8**



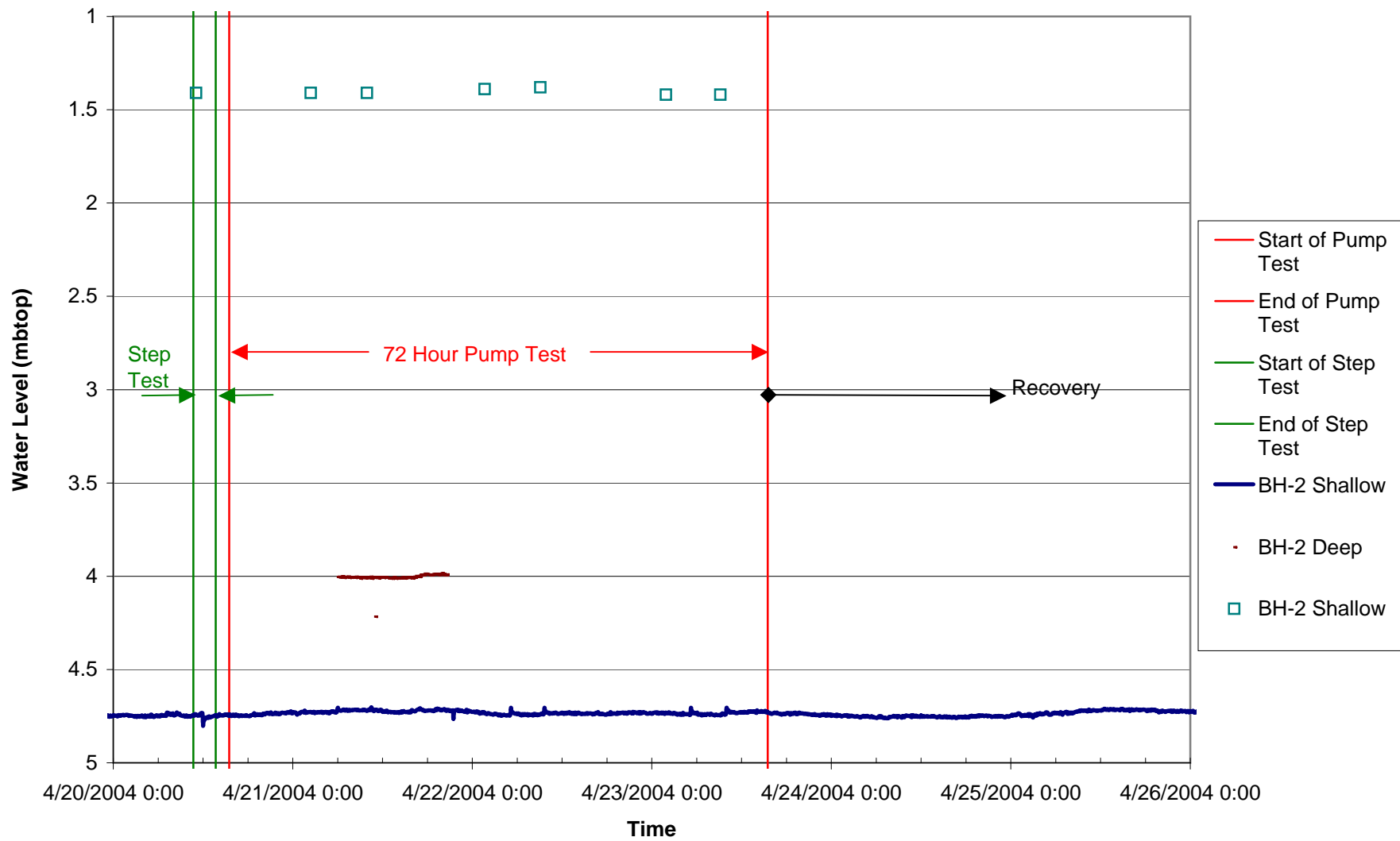
Proposed Dolostone Quarry 72-Hour Pump Test Flamboro & Mountsberg Creeks



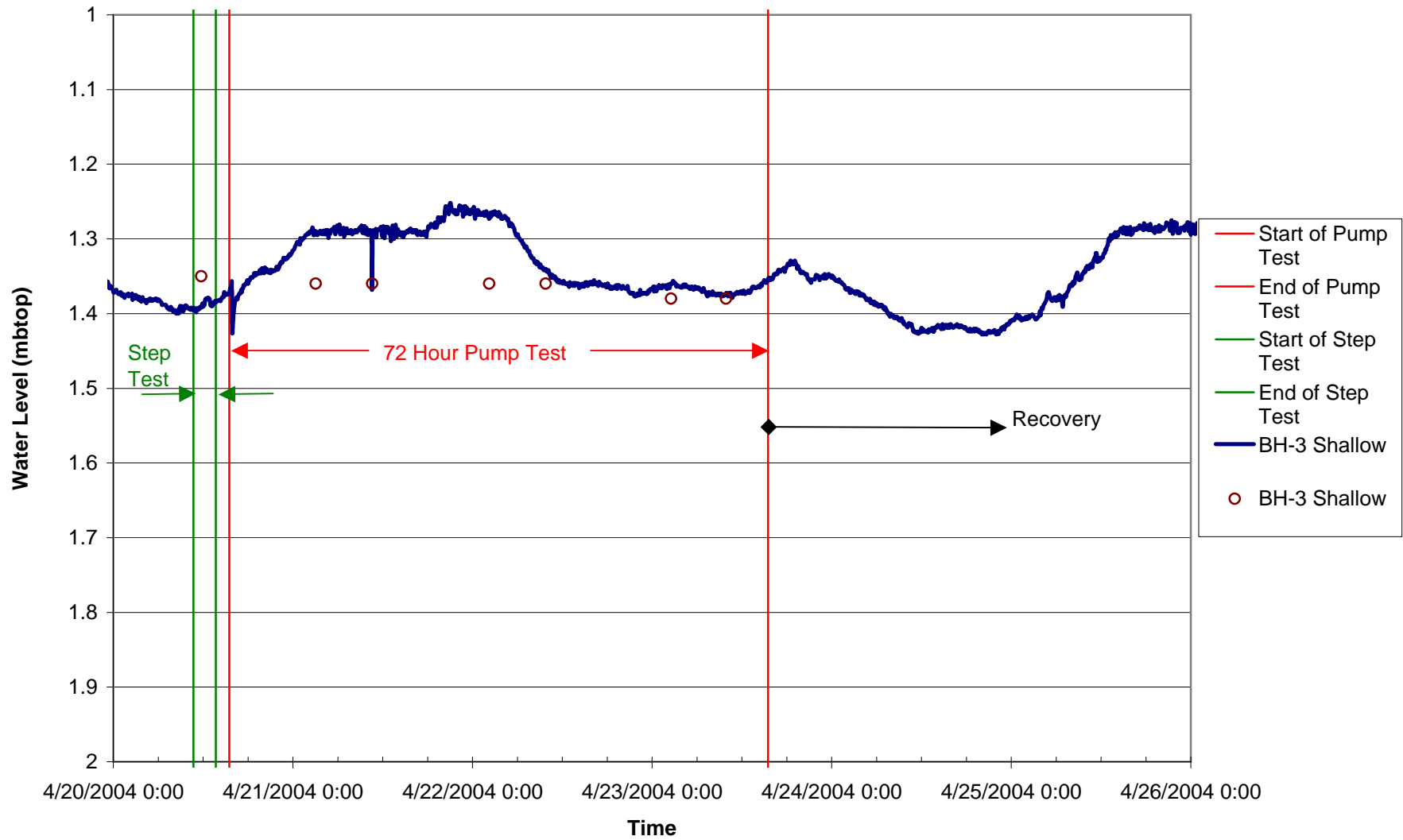
Proposed Dolostone Quarry 72-Hour Pump Test BH-1 Nest & Mountsberg Creek



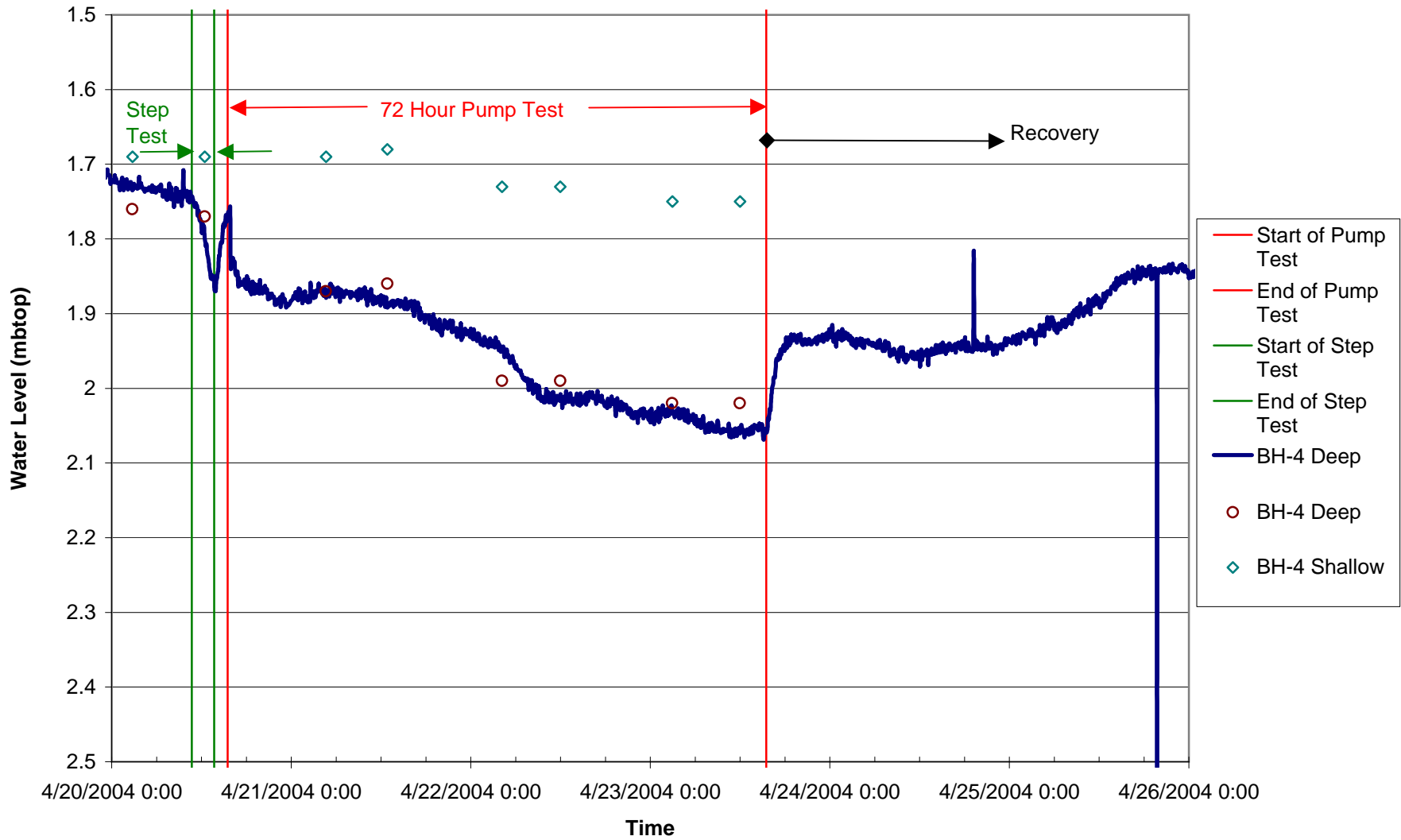
**Proposed Dolostone Quarry 72-Hour Pump Test
BH-2 Nest**



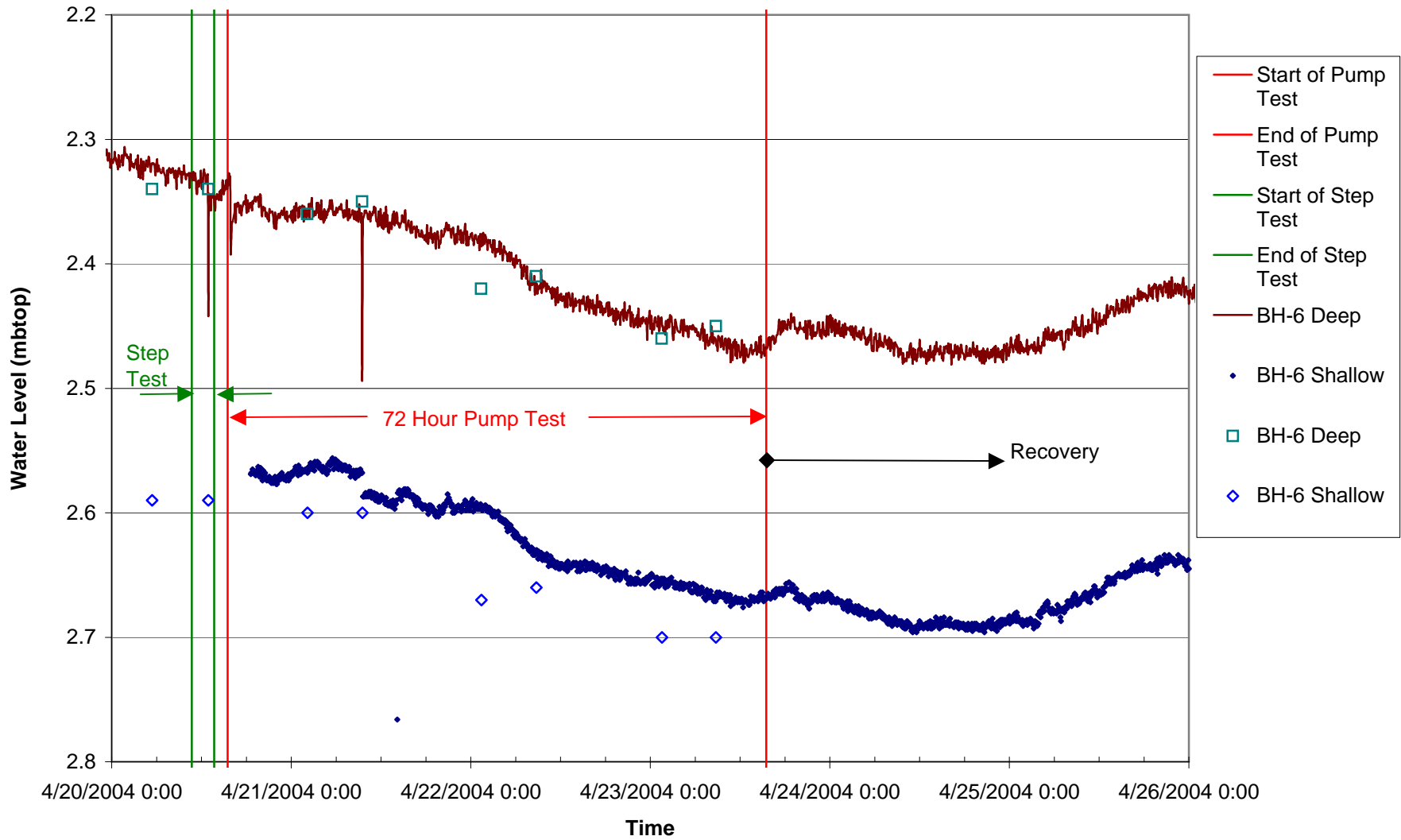
Proposed Dolostone Quarry 72-Hour Pump Test BH-3 Shallow



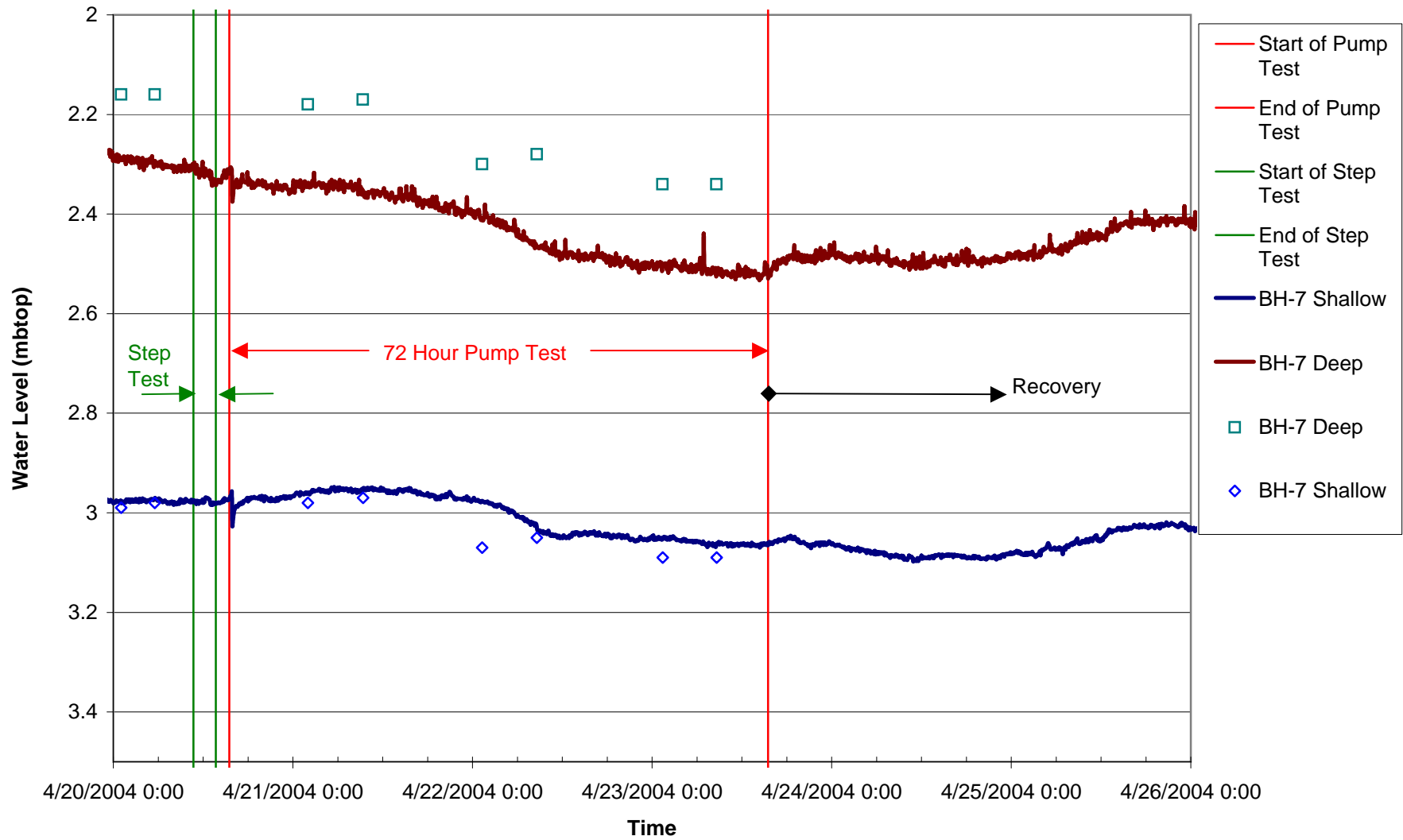
Proposed Dolostone Quarry 72-Hour Pump Test BH- 4 Nest



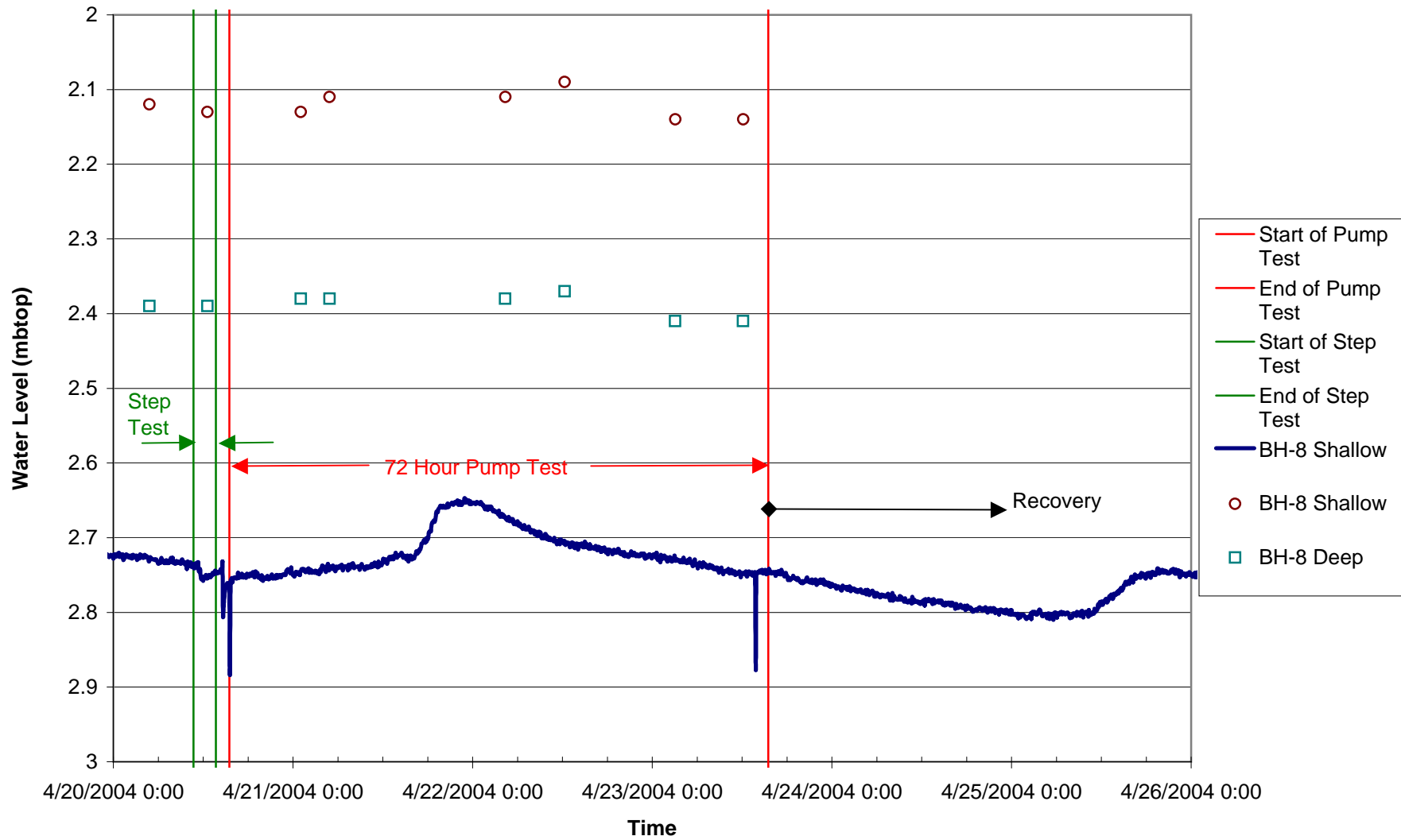
**Proposed Dolostone Quarry 72-Hour Pump Test
BH- 6 Nest**



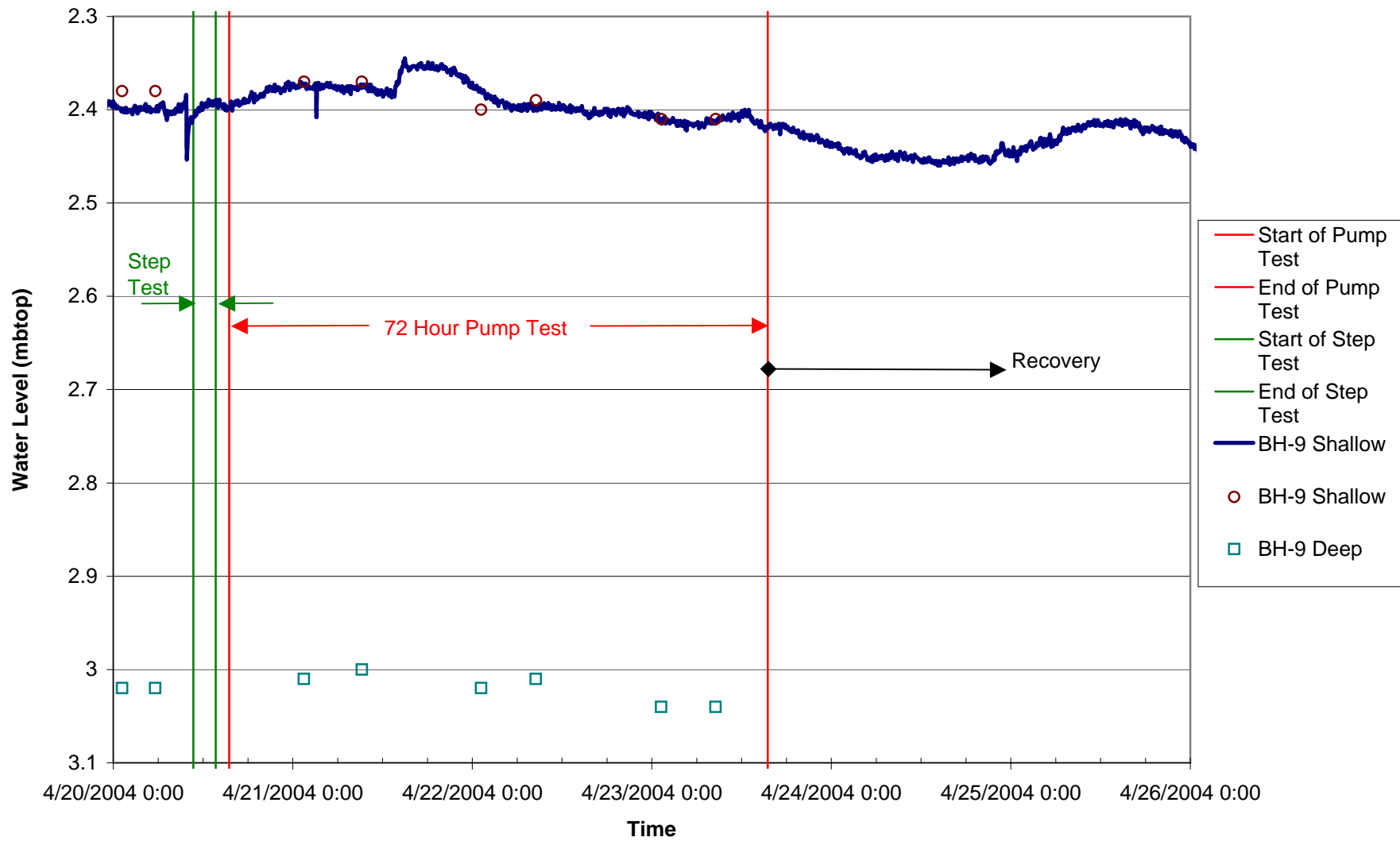
Proposed Dolostone Quarry 72-Hour Pump Test BH-7 Nest



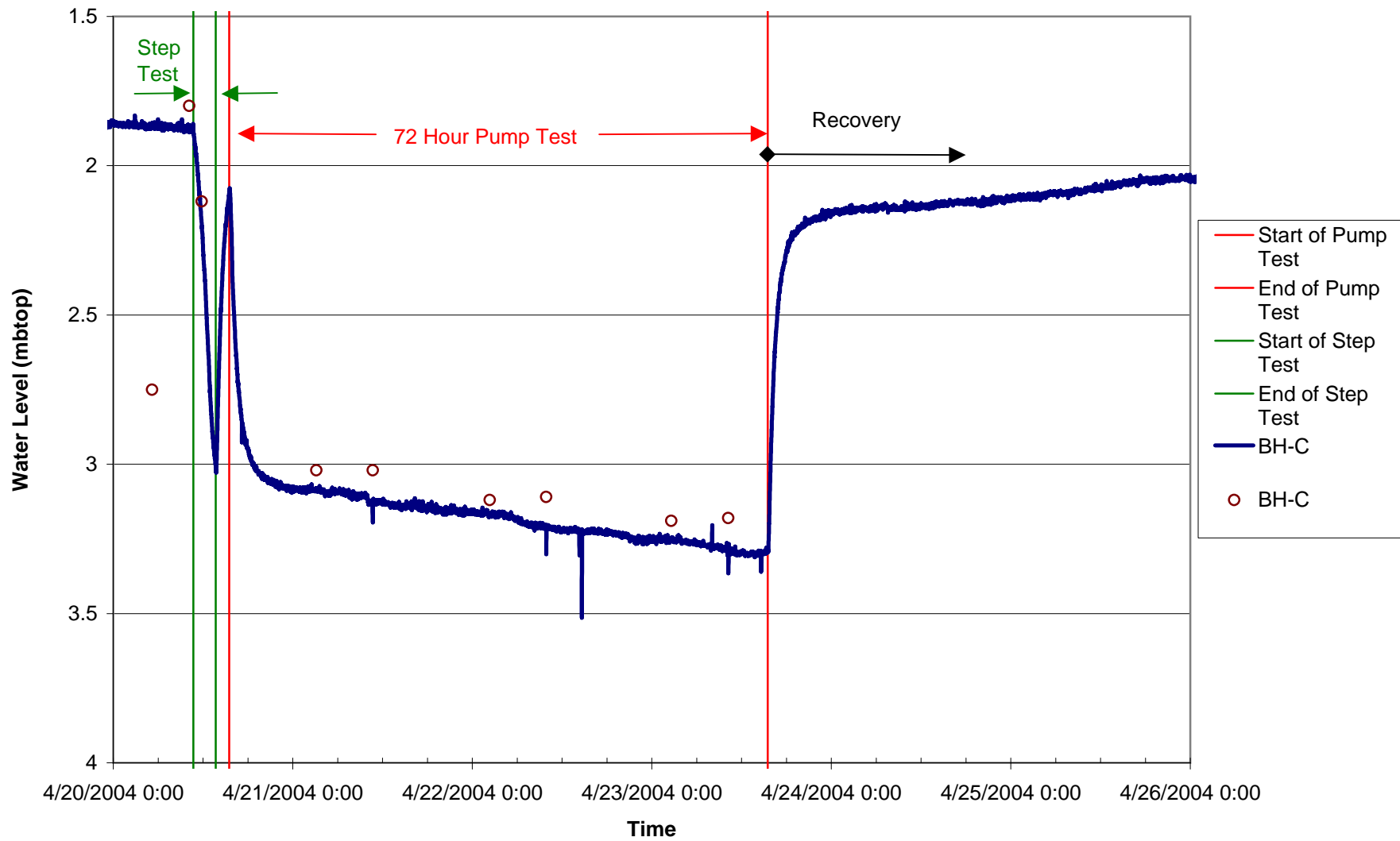
**Proposed Dolostone Quarry 72-Hour Pump Test
BH- 8 Nest**



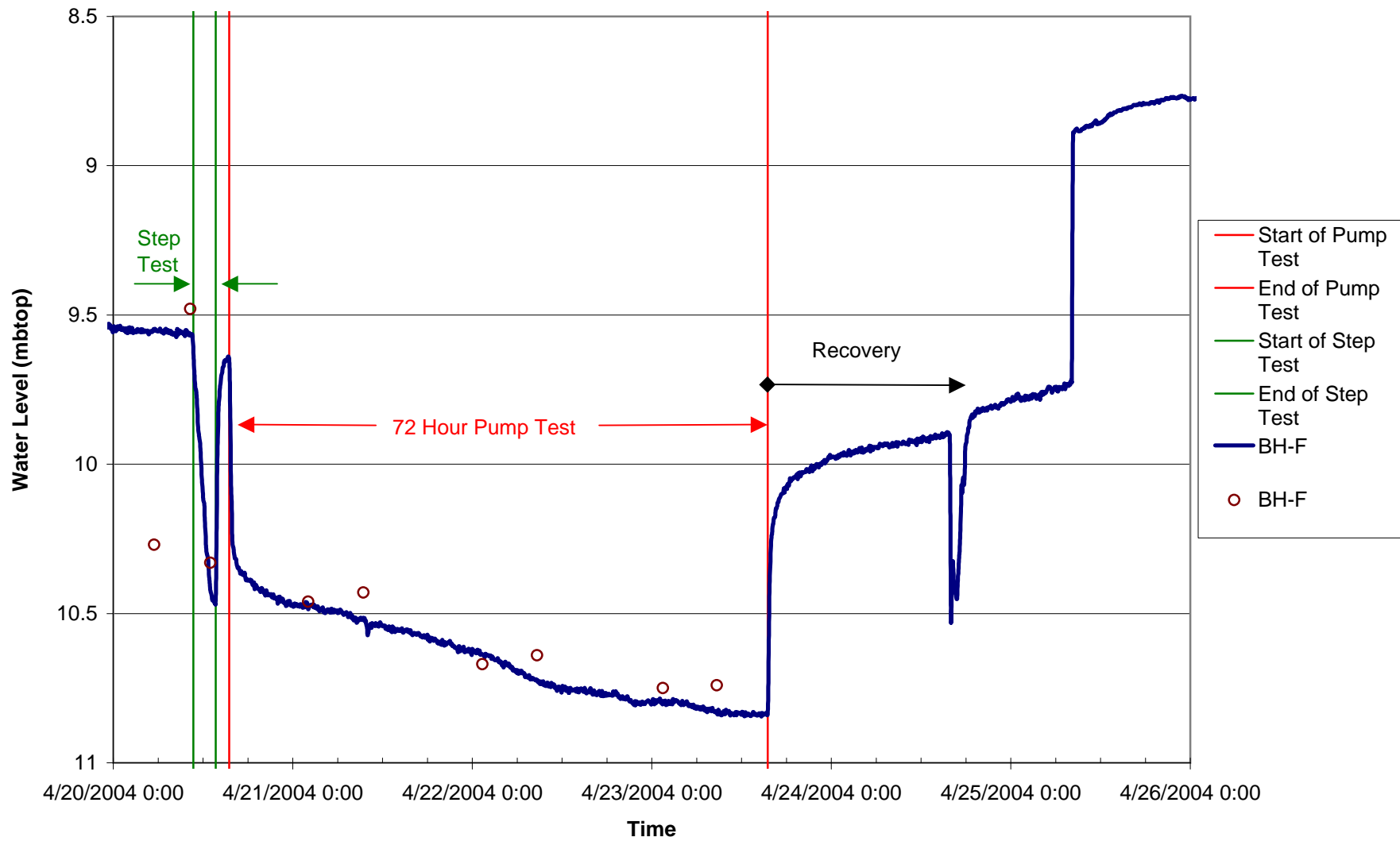
**Proposed Dolostone Quarry 72-Hour Pump Test
BH- 9 Nest**



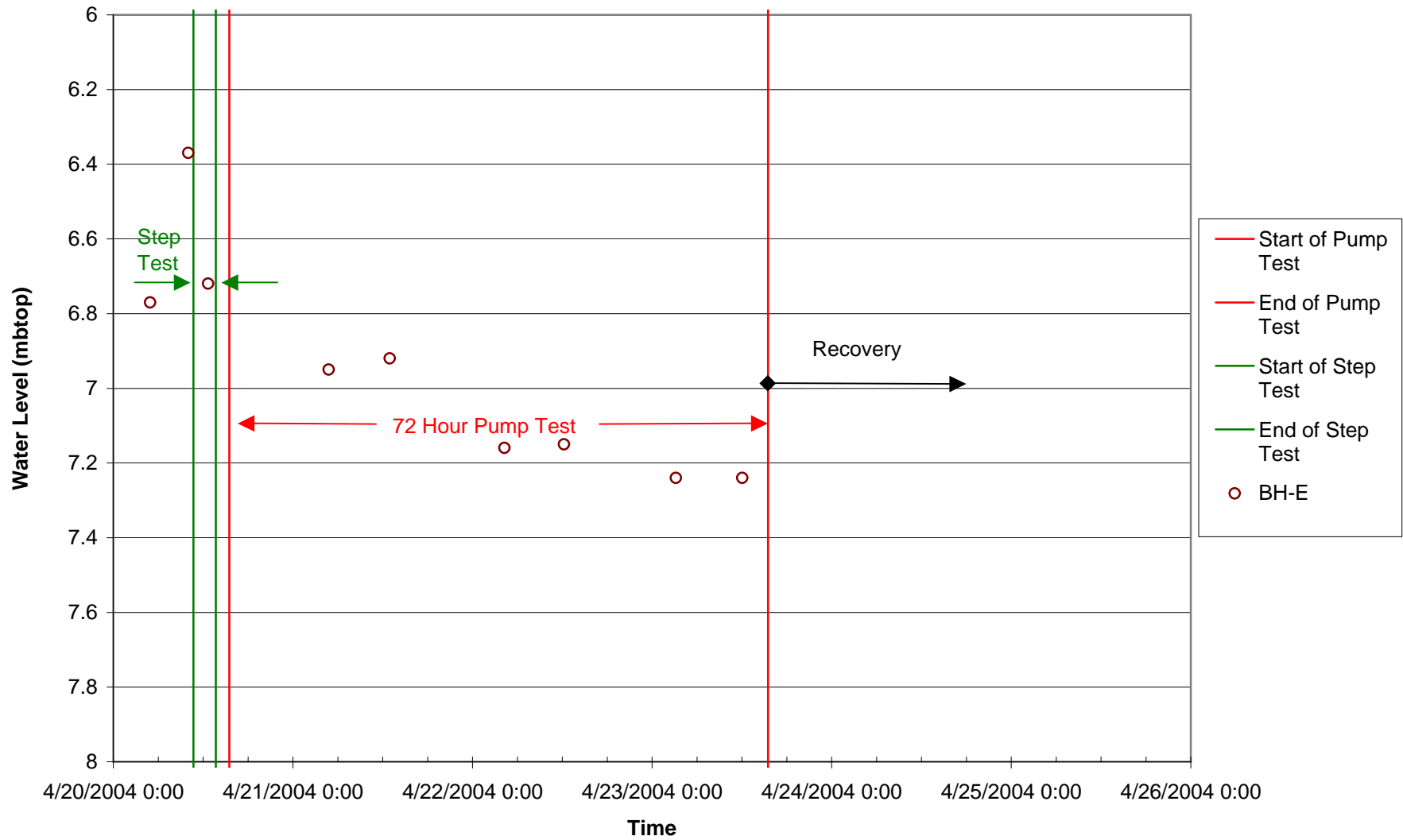
Proposed Dolostone Quarry 72-Hour Pump Test BH-C



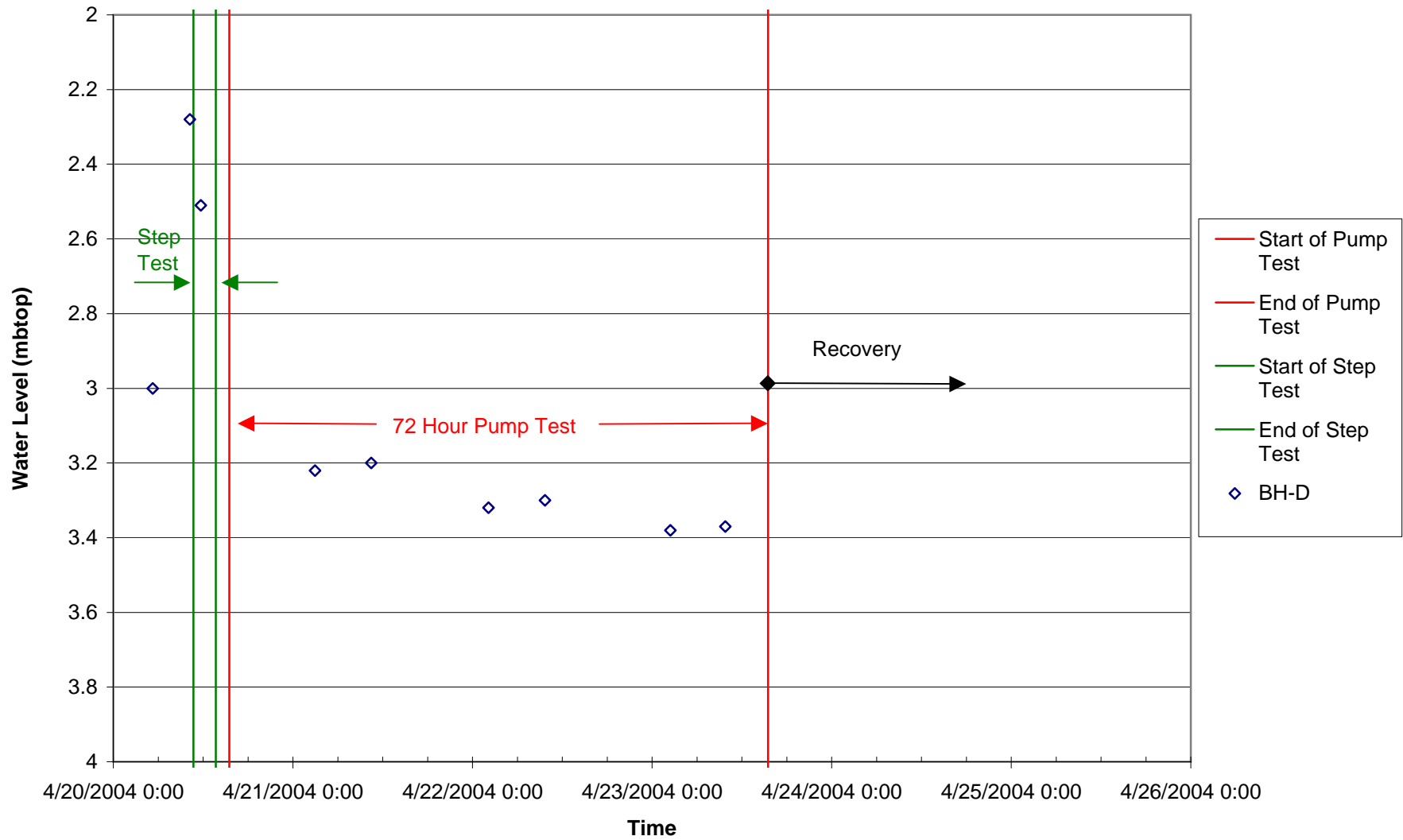
**Proposed Dolostone Quarry 72-Hour Pump Test
BH-F**



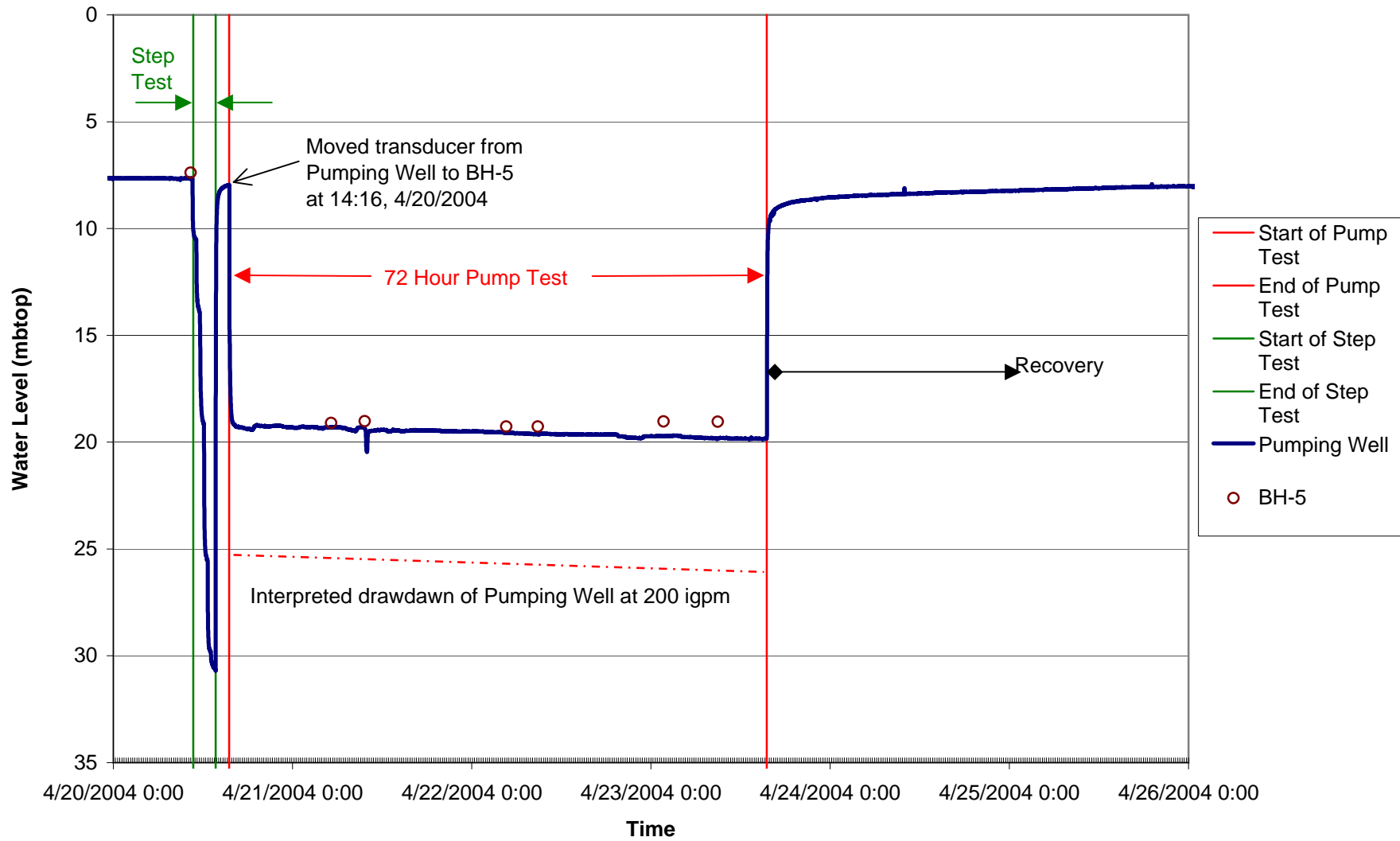
Proposed Dolostone Quarry 72-Hour Pump Test BH-E



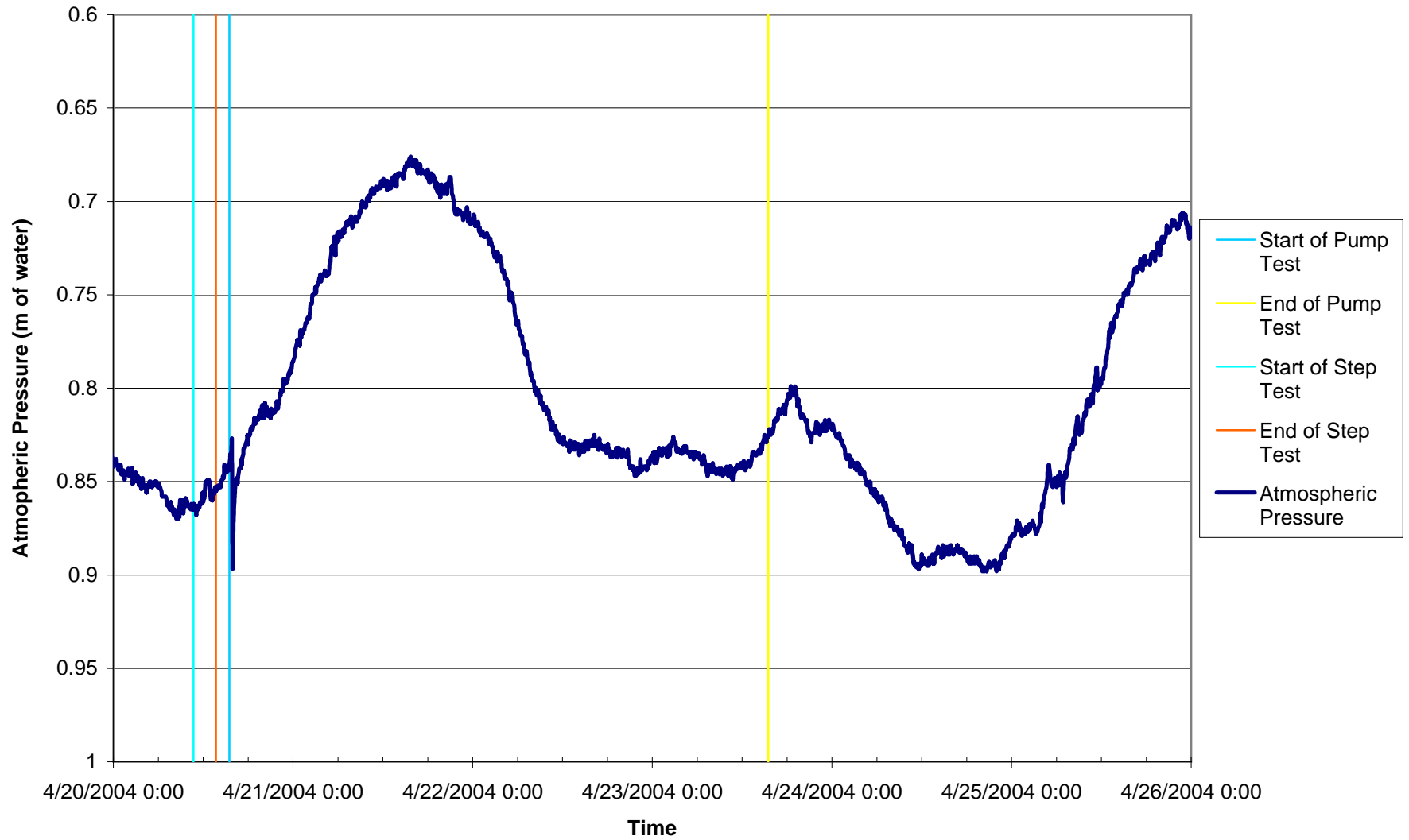
Proposed Dolostone Quarry 72-Hour Pump Test BH-D



Proposed Dolostone Quarry 72-Hour Pump Test Pumping Well & BH - 5



**Proposed Dolostone Quarry 72-Hour Pump Test
Atmospheric Pressure**



Appendix G

Pumping Test Results – Aquifer Properties

Appendix G: Hydraulic Properties from 72-hour Pump Test

Lowndes Holdings Corp.: Proposed Dolostone Quarry

Project: 23827

ID	Maximum Drawdown (m)	Distance to Pumping Well (m)	Transmissivity (m ² /s)	Hydraulic Conductivity (m/s)	Method
BH4	0.32	~465	4.31E-03	1.01E-04	Cooper-Jacob Time-Drawdown
BH5	12.18	~2.5	6.87E-03	1.61E-04	Cooper-Jacob Time-Drawdown
			1.78E-04	4.16E-06	Walton
BH6	0.14	~460	9.71E-03	2.27E-04	Cooper-Jacob Time-Drawdown
BH7	0.22	~465	4.54E-03	1.06E-04	Cooper-Jacob Time-Drawdown
BHC	1.40	~225	3.27E-03	7.66E-05	Cooper-Jacob Time-Drawdown
BHF	1.28	~235	1.76E-02	4.13E-04	Cooper-Jacob Time-Drawdown
			1.00E-03	2.35E-05	Walton
Average:			5.9E-03	1.4E-04	

Appendix H

Resumes

Stephen C. Hollingshead

B.A.Sc., M.Sc.(Eng.),P.Eng.
Senior Geological Engineer/Hydrogeologist
Principal

Profile

1984-Present Geological Engineer/Hydrogeologist, Gartner Lee Limited
1983-1985 M. Sc., (Eng.), Queen's University, Engineering Geology
1983 Principal Researcher, University of Toronto, Department of Geotechnical Engineering
1981 Soils Technician/Inspector, Peto MacCallum Limited
1980 Field Technician Ministry of Transportation and Communications Ontario
1979-1983 B.A.Sc. (Honours), University of Toronto, Geological (Geotechnical) Engineering

Experience

1984-Present Geological Engineer/Hydrogeologist, Gartner Lee Limited

Mr. Hollingshead joined Gartner Lee Limited in 1984 while completing his graduate degree in Engineering Geology at Queen's University. His training has provided him with technical skills in the areas of geology, terrain evaluation, geotechnical engineering, hydrogeology, and computer modelling. Since joining Gartner Lee he has applied these skills to a very diverse range of aggregate resources projects. His technical contribution to these projects has included aerial photograph interpretation, field testing supervision, quality and quantity analyses, groundwater monitoring, hydrogeological testing, and operational/rehabilitation design.

Mr. Hollingshead is one of Gartner Lee's most capable project managers, having been responsible for many of the firm's largest and most complex assignments and having personally carried out more than 100 aggregate projects. He manages site planning and approvals, aggregate resource evaluations and hydrogeological investigations for both commercial and municipal clients. Mr. Hollingshead has given expert testimony on behalf of his clients at several Ontario Municipal Board hearings, and he has also made presentations to both Councils and the general public.

A partial list of his clients include:

- Aggregate Producers' Association of Ontario
- Blue Circle Aggregates
- Canada Building Materials Company
- E.C. King Contracting
- Floyd Preston Limited
- Forwell Limited
- Greenwood Construction Co. Ltd.
- Harnden and King Construction
- Kitching & Son Ltd.
- Beamish Construction Co. Ltd.
- Ministry of Transportation for Ontario
- Region of Durham
- Region of Peel
- Seeley and Arnill Aggregates Inc.
- Steed & Evans Limited
- Taro Aggregates Ltd.
- TCG Materials Ltd.
- Town of Caledon
- Town of Georgina
- TRT Aggregates Limited
- Vicdom Sand & Gravel (Ontario) Limited
- Wimpey Minerals Canada

Selected highlights of his project experience in aggregate resources are outlined below.

Aggregate Resource Act Approvals

Mr. Hollingshead has successfully obtained approvals for his clients under the Aggregate Resources Act on a variety of projects. In a number of instances he has supplied specific technical studies such as resource assessment and hydrogeology in support of applications. In other instances he has led the development of the applications.

For example, he helped Greenwood Construction Co. Ltd. prepare a full application under the Act for a 500,000 tonne per year sand and gravel pit in East Garafraxa Township. Mr. Hollingshead worked closely with our client to ensure that the appropriate studies on the aggregate resources, air quality, noise, groundwater, and surface water were satisfactorily completed, the Site Plans were prepared, and he then prepared the application and summary reports. As a result, Greenwood Construction were successful in obtaining an Aggregate Resources Act licence to develop and operate the site.

Aggregate Resource Assessment

Mr. Hollingshead has undertaken several studies specifically aimed at determining the quantity and quality of the aggregate resources at potential new sites. Using his expertise in terrain analysis and geology, he usually initiates these projects with a careful review of existing maps and reports, supplemented by stereoscopic air photo interpretation. In this way, not only can the possible extent and nature of the resources be determined prior to on-site investigation, but any likely physical or environmental constraints can also be identified and factored into the analysis from the outset.

A number of projects have involved detailed programs of coring, sampling and testing bedrock resources for quantity and quality purposes. Quite a few projects consisted of sampling and testing sand and gravel resources from boreholes and test pits. In each case, the assessment of the testing results included comparison to aggregate quality standards (e.g., Ministry of Transportation OPSS) to determine if the material was of suitable quality, the type(s) of processing that may be required, and estimates of the quantities that were available.

Mr. Hollingshead has also been responsible for completing a series of annual resource inventories for a major Ontario aggregate producer. This involved a yearly analysis and/or updating for more than 30 aggregate properties. In each case, the analysis subdivided the resource quantities into the standard categories of “possible”, “probable” and “proven”, then further determined the “gross” and “net” quantities taking into account setbacks and other constraints.

Another notable project was the updating of the Ministry of Transportation’s Aggregate Source List (ASL) for the Northern Regional Office. This included a careful review, inspection, testing and field mapping of a large number of pits and quarries in advance of new construction projects in the Muskoka area.

Several of Mr. Hollingshead’s projects have involved or included an aggregate valuation component. In addition to identifying the quantity and quality of the material, an economic assessment of its value was also calculated based on market prices, projected future market prices, and the company/property’s marketplace position.

Hydrogeological Assessment, Design, Monitoring and Permitting

A substantial number of Mr. Hollingshead’s projects involve groundwater and surface water resources. He is a highly experienced hydrogeologist. Some of the related issues that he has dealt with on behalf of his aggregate clients have included:

- groundwater investigations;
- water well inventories;
- the design and implementation of groundwater and surface water monitoring programs;
- Permits to Take Water (PTTW) for wash plants or quarry dewatering;
- assessment of potential groundwater and surface water impacts in support of Aggregate Resource Act applications;
- the design of groundwater and surface water pumping and control systems;
- the design of mitigation measures to prevent groundwater and surface water impacts;
- investigation and resolution of groundwater interference claims; and
- investigation and remedial strategies for contamination.

Mr. Hollingshead led a hydrogeological assessment for the Kirkfield Quarry in Carden Township. Given the sensitive nature of the local aquifers, a very comprehensive field investigation program was conducted including drilling and monitoring, fracture pattern mapping, down-hole packer testing, borehole geophysical testing, and pump testing. Computer modelling techniques were used to evaluate the possible groundwater impacts, with specific emphasis on the related surface water impacts that might occur in the adjacent springs and streams. Eventually, the evaluation led to the design and construction of an artificial groundwater recharge trench, possibly the first of its kind in Ontario. It has been operated and monitored over a period of years since its approval. The system has performed exceptionally well in maintaining water levels in the unconfined aquifer downgradient of the quarry.

Another interesting project involved the investigation of public complaints regarding water well interference from blasting at E.C. King's Sydenham Quarry in Owen Sound. A unique testing program was designed and carried out whereby groundwater monitors placed in close proximity to blasting sites were instrumented with computerized data loggers and monitored before, during and after blasting events. The results proved that the water table was not affected by the blasting activities.

Mr. Hollingshead maintains routine groundwater and surface water monitoring programs at numerous pits and quarries in the province. In all cases, he works closely with his clients to ensure that the monitoring is focused and effective, and he has been successful in helping to train his clients to participate in their own monitoring programs.

Ecosystem Planning Assessments and Official Plan Policy

Mr. Hollingshead has a strong interest in the "ecosystem" approach to planning; in particular, the important role of geology and hydrogeology and their interrelationship with other environmental factors including surface water, aquatic and terrestrial biology, and socio-economic development. He applies these principals to many of his aggregate projects in order to ensure that important relationships are considered such as the linkages between groundwater recharge, cold water stream baseflow and fish habitat. Because Gartner Lee is an integrated environmental company, he often manages the full scope of the environmental studies necessary for pit and quarry approvals, and works closely between the groundwater, surface water and terrestrial/aquatic biologists to ensure that an ecosystem framework is followed.

Mr. Hollingshead has had a role in both the City of Vaughan and Town of Caledon Official Plan reviews in terms of aggregate policy. In particular, he worked as the environmental advisor to the Caledon Community Resources Study to make sure that proposed new aggregate resource polices respected the Town and Region of Peel's environmental goals, and were built around ecosystem planning principals. This project required a close liaison with the Credit Valley Conservation Authority, who were completing parallel subwatershed studies in the same area and were integrating aggregate extraction into their impact assessment scenarios.

Environmental Management Guidelines and Environmental Management Systems (EMS)

Mr. Hollingshead serves on the Aggregate Producers' Association of Ontario (APAO) Environment Committee. On behalf of the APAO, he recently prepared a completely revised *APAO Environmental Management Guide* to assist the industry in dealing with environmental matters. The revised Guide was structured around an Environmental Management System (EMS) format, which is an emerging reality in the aggregate business and a precursor to ISO 14000 registration. The Guide also contains comprehensive appendices of environmental regulations and best management practices for the aggregate industry, an emergency and spill response outline, and a property transaction checklist. Following the publication of the revised Guide, Mr. Hollingshead contributed to the organization and presentation of an environmental workshop for aggregate producers.

1983 Principal Researcher, University of Toronto, Department of Geotechnical Engineering

After completing his undergraduate studies, Mr. Hollingshead was employed by the University of Toronto on a research contract. The topic of research was the determination of the physical properties of deep-ocean, hydrothermally-deposited polymetallic sulphides as they related to expected mining processes.

1981 Soils Technician/Inspector, Peto MacCallum Limited

Mr. Hollingshead was responsible for soils inspection, particularly compaction, footing inspection, and foundation suitability, and also gained experience in laboratory soils testing. Many of the large construction projects he was involved with also required him to manage inspection programs.

1980 Field Technician, Ministry of Transportation and Communications, Ontario

Mr. Hollingshead worked as a technician involved in aggregate resource evaluation in southern Ontario. As a member of a field team, he gained experience in surveying, mapping, sampling, and field testing of aggregate deposits.

Memberships and Affiliations

- Professional Engineers of Ontario – Registered Professional Engineer
- Association of Professional Engineers and Geoscientists of Newfoundland – Registered Professional Engineer
- Aggregate Producers' Association of Ontario – Board of Directors
- Aggregate Producers' Association of Ontario – Environment Committee Chair (2000-2003)
- Canadian Geotechnical Society - Past Chair of Engineering Geology Division
- International Association of Engineering Geologists – Past Chair of Canadian National Group
- Canadian Geoscience Council – CGS Representative
- Canada's National History Society – Member

Notable Publications and Presentations

Kennedy, K.G., S.C. Hollingshead and R.E.J. Leech, 1986:

Determining head and pressure distribution in low transmissivity formations and soils. Groundwater Monitoring Review, vol. 6, no. 2.

Hollingshead, S.C. and T.B. Dupuis, 1992:

Paper waste utilization for pit and quarry rehabilitation. Presented at the Aggregate Producers Association of Ontario Annual Meeting. February 1992.

Hollingshead, S.C. and P.C. Neals, 1994:

Opportunity approach to site selection. Presented at the International Association for Impact Assessment Fourteenth Annual Meeting, June 14-18, 1994, Quebec City.

Aggregate Producers' Association of Ontario, 1998:

Environmental Management Guide for Ontario Pits and Quarries. Version 2.0; April 1998. Prepared by Gartner Lee Limited on behalf of the APAO Environment Committee.

Hollingshead, S.C., 1998:

Introduction to the APAO Environmental Management Guide and Update on Changes to Environmental Legislation. Presented at the APAO Environmental Management Seminar, November 24, 1998.

Hollingshead, S.C. and M. Miller, 1999:

New directions for Ontario aggregate producers. Aggregates and Roadbuilding; April 1999.

Hollingshead, S.C.:

Applying Day-to-Day Environmental Rules and Regulations: Having Your Water and Drinking it Too. Presented at the APAO Operations, Health and Safety Seminar. January 12-13, 2000.

Kevin D. Warner

B.E.S. (Honours), M.Sc.
Hydrogeologist

Profile

2002-Present	Hydrogeologist, Gartner Lee Limited
2000-2002	Project Manager/Hydrogeologist, Gibson Associates Limited
1999	Hydrological & Biogeochemical Technician, McMaster University
1997-1999	Teaching Assistant (Hydrology and Biogeochemistry), McMaster University
1997-1999	M.Sc., McMaster University, Hydrology & Biogeochemistry
1997	Research Assistant, McMaster University
1996	Agricultural Stream Impact Assessment Technician, Central Lake Ontario Conservation Authority
1993-1997	B.E.S. (Honours), University of Waterloo, Physical Geography

Experience

2002-Present Hydrogeologist, Gartner Lee Limited

Mr. Warner joined Gartner Lee Limited in early 2002 as a hydrogeologist and project manager. While specializing in licensing and monitoring projects for the aggregate industry as well as monitoring programs for existing landfills, he has also taken part in providing hydrogeological support for Permits To Take Water in various industrial and commercial developments.

Mr. Warner utilizes a holistic or ecosystem approach to his projects, maintaining a wide range of technical skills relating to hydrology and hydrogeology. He believes that to understand the hydrological and hydrogeological regimes in the environment, one must study all the interactions and relationships between these and their geological, biogeochemical and biological components.

2000-2002 Project Manager/Hydrogeologist, Gibson Associates Limited

Mr. Warner joined Gibson in early 2000 as a hydrogeologist and quickly became a project manager. He was involved on all aspects of any project from start-up to completion, including all field work, data analysis and report preparation.

Mr. Warner gained a very diverse range of experience while at Gibson, including providing hydrogeological support of privately serviced developments and site severances, private on-site septic system design, Permits To Take Water from surface and groundwater sources, groundwater contamination investigations, water resource investigations, water well interference and monitoring programs Environmental Impact Assessments, Records of Site Condition, and Environmental Site Assessments.

1997-1999 M.Sc., McMaster University, Hydrology & Biogeochemistry

Mr. Warner was the principal researcher on an investigation of the effect that the hydrological regime has on the trace gas exchange in natural, cutover and partly restored peatlands in Eastern Quebec. The prevailing hydrological conditions were found to have a dominate role in the rate of trace gas exchange in each of these sites, and on the success of restoration. Mr. Warner also calculated the net change that harvesting operations and restoration projects have on the carbon budget for these sites and its implications for the global carbon budget.

1997 Research Assistant, McMaster University

Mr. Warner assisted in the monitoring program of trace gas exchange in the fen complex in the Hudson Bay lowlands, near Churchill, Manitoba.

1996 Agricultural Stream Impact Assessment Technician, Central Lake Ontario Conservation Authority

Mr. Warner was a member of the Agricultural Stream Impact Assessment team, studying the effects of various agricultural practices on the Lynde Creek Watershed.

1993-1997 B.E.S. (Honours), University of Waterloo, Physical Geography

Mr. Warner majored in physical geography, specializing in hydrology, geomorphology (soils), remote sensing and air photo interpretation, and wetland science, while obtaining a diverse knowledge base in various geological and biological sciences.

Memberships and Affiliations

- Certified Environmental Inspector, Environmental Assessment Association

Notable Publications

Waddington, J.M. and K.D. Warner, 2002:
CO₂ exchange in a restored cutover peatland. *Ecoscience*, in press

Waddington, J.M., K.D. Warner, and G. Kennedy, 2002:
Cutover peatlands: Persistent source of atmospheric CO₂, *Global Biogeochemical Cycles*, in press