JUNIPER RIDGE LANDFILL EXPANSION APPLICATION
VOLUME II
SITE ASSESSMENT REPORT

Submitted by:

STATE OF MAINE BUREAU OF GENERAL SERVICES,
as Owner
and
NEWSME LANDFILL OPERATIONS, LLC,
as Operator

July 2015

SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE



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EXECUTIVE SUMMARY

The hydrogeologic and subsurface investigations conducted for the Juniper Ridge Landfill (JRL or Landfill) proposed expansion project (Expansion) included soil borings, test pits, geophysical surveys, groundwater observation wells and piezometers, pumping tests, groundwater velocity testing, physical testing of soils and bedrock, collection of groundwater levels, and groundwater age-dating. These data have been combined with previous explorations of the area to develop a complete hydrogeological description and understanding of the Expansion site. This information was used to identify relevant site characteristics, develop engineering recommendations for the Expansion design and construction, identify site sensitive receptors, and assess groundwater flow travel time.

These investigations demonstrate that the Expansion site is well suited for landfill development and meets the Maine Department of Environmental Protection (MEDEP) Landfill Siting Criteria as provided in the Solid Waste Rules (2015). The investigations showed that the Expansion area, similar to the existing landfill, is underlain by a dense glacial till deposit that varies in thickness, which is itself underlain by competent bedrock. The investigations included detailed studies on the deeper portions of the bedrock, focusing on the groundwater transport within the bedrock and the flow characteristics of the bedrock.

The shallow groundwater table lies within a few feet of the natural existing ground surface. Groundwater levels will tend to drop once the Expansion has been constructed due to the loss of precipitation recharge once the landfill liner is in place. Groundwater currently recharges through the till soils and enters the bedrock moving vertically downward beneath the higher portions of the site and laterally along the flanks of the drumlin hill feature that forms the site. Groundwater then moves upward beneath the surrounding nearby streams. Groundwater travel times are expected to increase when the site is covered with the landfill liner system because of the reduced infiltration rates and flattening of the natural groundwater gradients. The information collected during the various investigations has allowed mapping of the directions of groundwater flow and approximation of the rates of movement within the subsurface.

The bedrock at the JRL Site has received a significant amount of attention to develop a better understanding of the bedrock fracture patterns and its hydraulic characteristics. Groundwater within the bedrock flows primarily through fractures. A multi-disciplinary approach, including geophysical mapping techniques, fracture mapping, and groundwater pump testing, was utilized to characterize the groundwater flow behavior within the bedrock. The information collected on the bedrock allows a confident evaluation of the groundwater flow directions and travel rates within the bedrock near the Expansion site so that the groundwater can be monitored throughout the life of the landfill.

The design of the Expansion, which includes a double-liner system, and an imported soil layer beneath the liner system, allows for improvement allowance offset credits as well as travel time credits of at least five years. Sensitive receptors around the site include streams, surface waters, off-site groundwater in soil and bedrock, and an isolated sand and gravel deposit located to the southeast of the landfill.[1] In accordance with the MEDEP landfill design requirements, the proposed design of the Expansion, as well as the natural setting of the Site, provides greater than six years of travel time to the identified site sensitive receptors in the unlikely event of a liner leak. The identified site sensitive receptors were corroborated using a regional groundwater flow simulation. The existing off-site water supply wells are protected from groundwater flow emanating from the Expansion area by both regional topography, and groundwater flow regimes from the Expansion area, which also was further demonstrated by the regional groundwater flow simulation. The groundwater simulations also demonstrated that the sand and gravel aquifer mapped along Route 16, east of the landfill, is hydraulically isolated from the landfill. The natural topography and geology, as well as more than one mile of separation from the Expansion site, protects the aquifer from being adversely impacted by breaches of the leachate containment systems.

[1] Section 400.1.Aaa defines “sensitive receptor” as “public and private water supply aquifers and wellhead protection zones; public and private drinking water supplies; significant groundwater aquifers and primary sand and gravel recharge areas; sand and gravel deposits; and Class AA, A, and B surface water bodies and great ponds.” The bedrock groundwater beneath the Expansion area will not be used as a drinking water supply, and does not fall into any of the other categories that would qualify it as a sensitive receptor.

The principal monitoring of the Expansion's performance will be through continuous monitoring of the liquid levels in the leak detection system that underlies the primary liner system of the Expansion. The monitoring of the surrounding groundwater and surface waters will supplement the leak detection monitoring system. The information collected during the site investigation programs, as well as the travel time analysis, has allowed for the proper siting of groundwater and surface monitoring points around the Expansion. The detailed bedrock examination and testing showed that the bedrock fractures are frequent and interconnected. Thus, groundwater monitoring of the bedrock is feasible with wells spaced around the Expansion perimeter.

SITE ASSESSMENT REPORT
JUNIPER RIDGE LANDFILL EXPANSION APPLICATION
OLD TOWN, MAINE

1.0 INTRODUCTION

Chapter 401 of the Maine Solid Waste Management Rules (the "Rules") identifies licensing and application requirements for siting, design, and operation of landfills and expanded landfills in Maine. This Site Assessment Report compiles the results of the site-specific investigations completed at the JRL in support of the application for the Expansion of the existing landfill Facility. Section 2 of Chapter 401 of the Rules defines the hydrogeologic information that must be gathered to identify site characteristics for determining suitability for landfill siting. This report provides information that addresses the following items required by the Rules:

- Review of available regional hydrogeologic literature pertinent to the Landfill and surrounding area;
- Descriptions of the site-specific field investigations completed for the Expansion between 2004 and 2014;
- Interpretation of the hydrogeologic setting of the JRL, including groundwater travel time analyses from the proposed Expansion landfill cells to identified site sensitive receptors;
- Characterization of the existing groundwater and surface water quality;
- Recommendations for environmental monitoring around the Expansion; and,
- Recommendations for the Expansion design based on the site conditions.

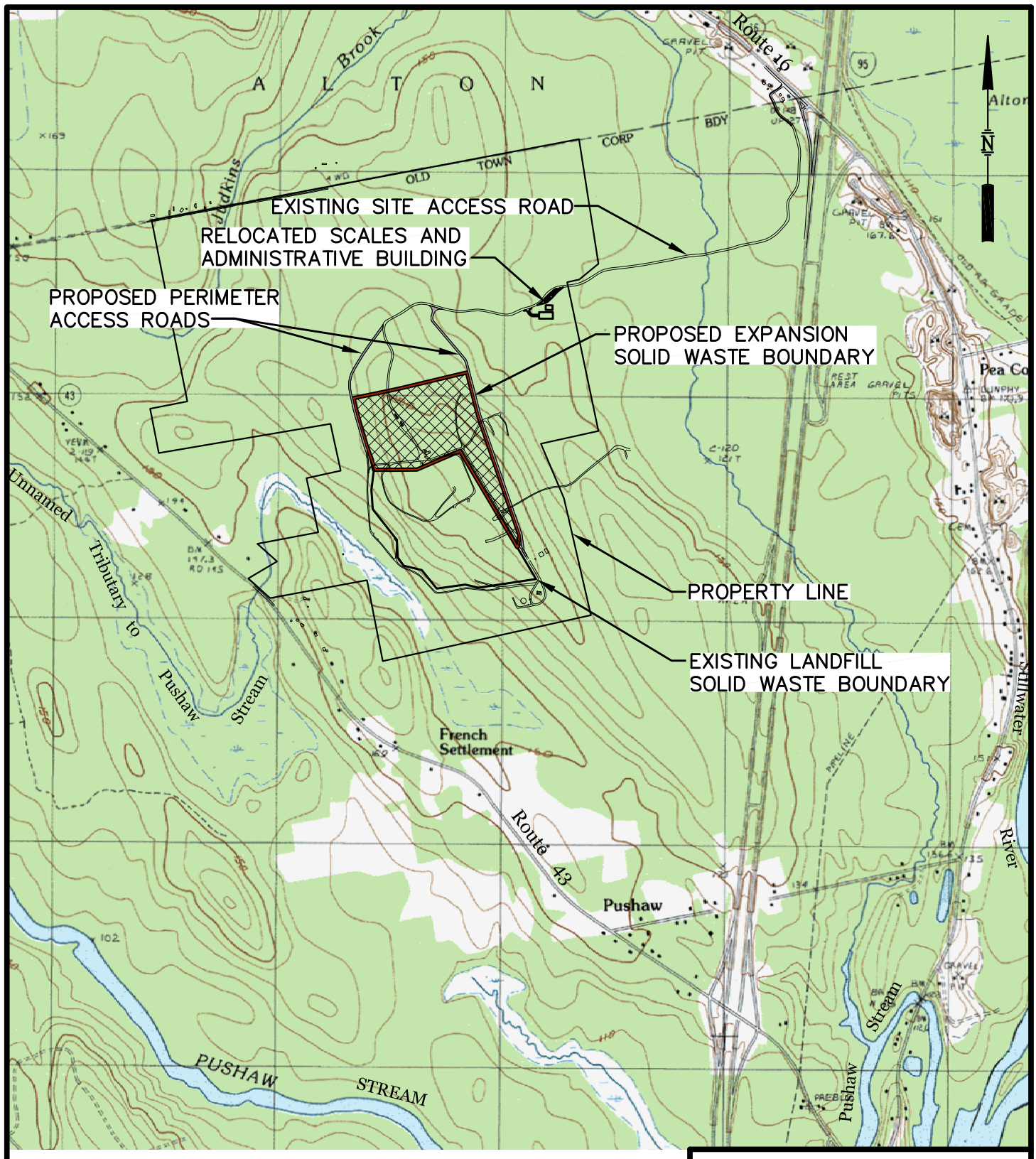
Much of the information collected for the hydrogeologic characterization was also utilized for the geotechnical analyses of the Expansion.

2.0 SITE SETTING

This section presents background information about the surrounding land use, site layout, regional hydrogeologic setting, and groundwater use in proximity to the Expansion area. The information comes from published sources as well as previous investigations conducted for the existing Facility. For the purposes of this Site Assessment Report, the term "Expansion" refers to the proposed landfill expansion footprint or structure. The term "Site" refers to the Expansion, the existing landfill, and the entire JRL property owned by the Bureau of General Services (BGS).

2.1 Surrounding Land Use

The existing JRL Facility is located in a locally-designated landfill zone that is surrounded by a rural residential and farming "R-3A" zone as defined by the current City of Old Town Zoning Ordinance (June 1, 2009). The Facility is located on the west side of Interstate I-95 in Old Town approximately 1.4 miles southwest of Exit 199, as shown on the site location map in Figure 2-1. The Expansion area is located north of and adjacent to the existing Landfill within an approximate 780-acre parcel of land owned by the BGS, as depicted in Figure 2-1. Access to the site is by means of a paved, two-mile-long, private road that joins Maine Route 16 in Alton, Maine. Similar to the original landfill area, the Expansion footprint is located on a wooded parcel of land with hardwoods predominating in the upper topographic elevations, and softwoods predominating in the lower elevations. Pursuant to the current zoning map for the City of Old Town, the Expansion is not located within the resource protection or shoreland zones, as shown in Figure 2-2. The nearest residences to the proposed Expansion along Maine Route 43, Maine Route 16, and Stagecoach Road are about 2,100 feet, 6,400 feet, and 3,000 feet distant, respectively. With the exception of the existing landfill to the south, the Expansion is surrounded by mature woodlands.



BASE MAP ADAPTED FROM 7.5 MIN
USGS TOPOGRAPHIC QUADRANGLE:
OLD TOWN, MAINE–1988

1000 0 2000 4000 FEET

DWG: SITELOC LMN: SITELOC CTB: SITELOC REV: 6/9/2015

FIGURE 2–1
SITE LOCATION MAP
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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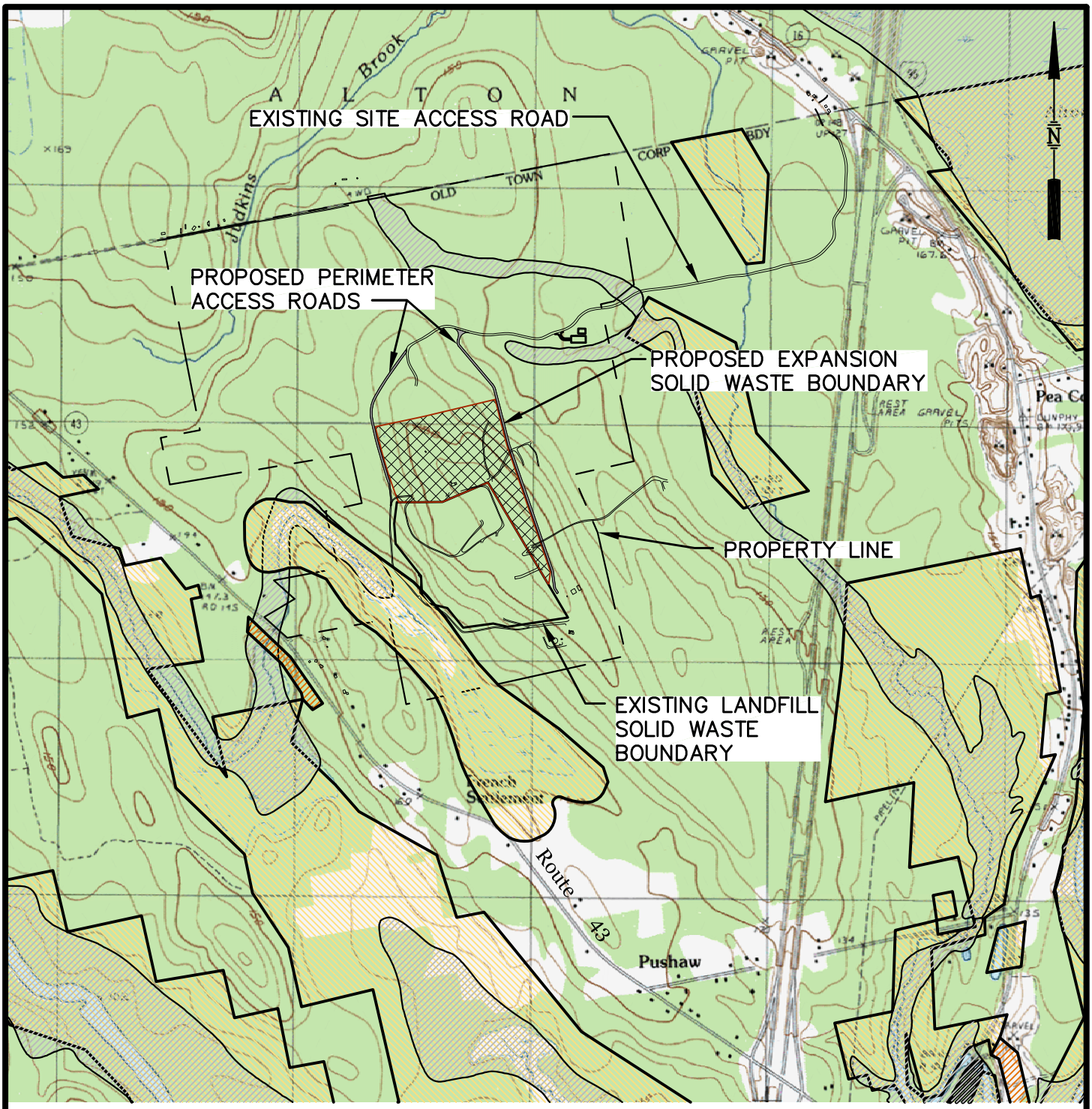

BASE MAP ADAPTED FROM 7.5 MIN USGS TOPOGRAPHIC QUADRANGLE OLD TOWN, MAINE–1988

MAPPING SOURCES

100–YEAR FLOOD BOUNDARY TAKEN FROM FLOOD INSURANCE RATE MAP DATED APRIL 17, 1978.

SHORELAND AND RESOURCE PROTECTION ZONES FROM ZONING MAP, CITY OF OLD TOWN, MAINE, DATED MARCH 2010.

LEGEND

- 100–YR FLOODPLAIN
- RESOURCE PROTECTION ZONE
- SHORELAND ZONING

1000 0 2000 4000 FEET

DWG: SITELOC LMN: FEMA CTB: SITELOC REV: 5/28/2015

FIGURE 2–2
SHORELAND, RESOURCE PROTECTION AND 100–YEAR FLOODPLAIN ZONES
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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2.2 Existing Landfill

The existing JRL is designed as a secure landfill, which includes a base liner consisting of an 80-mil high-density polyethylene (HDPE) liner, geosynthetic clay liner (GCL), and two feet of compacted clay or till. The landfill was originally permitted and operated by James River Paper Company, Inc. The State of Maine purchased the landfill from the Fort James Operating Company, the successor of Fort James in 2004. The existing permitted landfill will cover about 68 acres when completely developed. Since construction began in 1996 nine landfill cells have been constructed. A leachate storage pond, located to the southwest of the existing landfill, was historically used to store leachate but has been replaced with a glass-lined, aboveground, leachate storage tank. Environmental monitoring of the existing Facility has shown that the landfill liner contains the leachate generated by JRL, the leachate is collected in the landfill's leachate collection system, and subsequently the leachate is transported to the Expera wastewater treatment facility for treatment.

The existing landfill is surrounded on all sides by mature woodlands. Dwellings along regional roads are supplied with potable water from drilled or dug wells that are hydrogeologically isolated from the existing landfill and the proposed Expansion by topographic features, wetlands, and streams (see Figure 2-1). Existing topographic elevations for the Expansion footprint range from about 215 feet above 1927 National Geodetic Vertical Datum (NGVD) to a low of 170 feet above NGVD, similar to those of the existing landfill (USGS, 1988).

2.3 Regional Climate

Climatological records indicate that the Old Town area experiences a mean annual precipitation of about 40.3 inches per year and a mean annual temperature of almost 44 degrees Fahrenheit (ºF) (NOAA, 2014). Monthly precipitation totals are nearly uniform throughout the year, except for February, which averages about 30 percent less than the average monthly precipitation of about 3.4 inches. July is typically the warmest month of the year when the temperature reaches an average of over 68ºF, and January the coldest having an average temperature of about 18ºF. Mean annual snowfall in the Old Town area totals approximately 73 inches per year, with the month of January receiving the most snow.

About half of the mean annual precipitation is returned to the atmosphere through evapotranspiration, mostly between May and September in a Maine woodland setting. The remainder of the precipitation infiltrates into the groundwater system or drains overland as surface flow. Groundwater recharge is limited when the ground is frozen, a condition that exists generally from the months of December through April in this region of Maine. Modeling studies have suggested that groundwater recharge on northern Maine glacial till sites may range between 3 and 6 inches per year (Gerber and Hebson, 1996).

An approximate natural annual water balance for the Old Town area is:

Annual precipitation	40 inches per year
Evapotranspiration from natural wooded areas	19 to 21 inches per year
Groundwater recharge into till soils	3 to 6 inches per year
Stormwater runoff from natural areas	13 to 18 inches per year

2.4 Surface Water Features

The approximately 780-acre parcel owned by the BGS is divided into four watersheds: one draining to the east; one to the northwest; one to the northeast; and another draining to the southwest. The northwest and the northeast watersheds both contribute to different tributaries of Judkins Brook (Class B), which eventually joins Birch Stream (Class A) northeast of the site. The southwest watershed contributes to an unnamed tributary that empties into Pushaw Stream (Class B). The east watershed empties into another unnamed and un-mapped tributary, which eventually drains to Judkins Brook. Both Birch Stream and Pushaw Stream empty into the Stillwater River (Class B), which flows to the Penobscot River (Class B). Judkins Brook is located approximately 2,300 feet northwest of the Expansion at its nearest point. The nearest USGS-mapped tributary to Judkins Brook to the northeast is about 3,500 feet from the Expansion footprint. The nearest USGS-mapped tributary to Pushaw Stream on the west side of the Expansion is about 950 feet from the Expansion boundary. The nearest USGS-mapped tributary to Pushaw Stream to the east is approximately 3,000 feet from the Expansion footprint. There are no Class AA or SA surface waters within 1,000 feet of the Expansion footprint and no classified surface waters within 100 feet. The Site watersheds are illustrated in Figure 2-3.

According to the Federal Emergency Management Agency (FEMA) 1978 floodplain maps the Expansion is not located within the 100-year floodplain (see Figure 2-2).

2.5 Mapped Wetlands

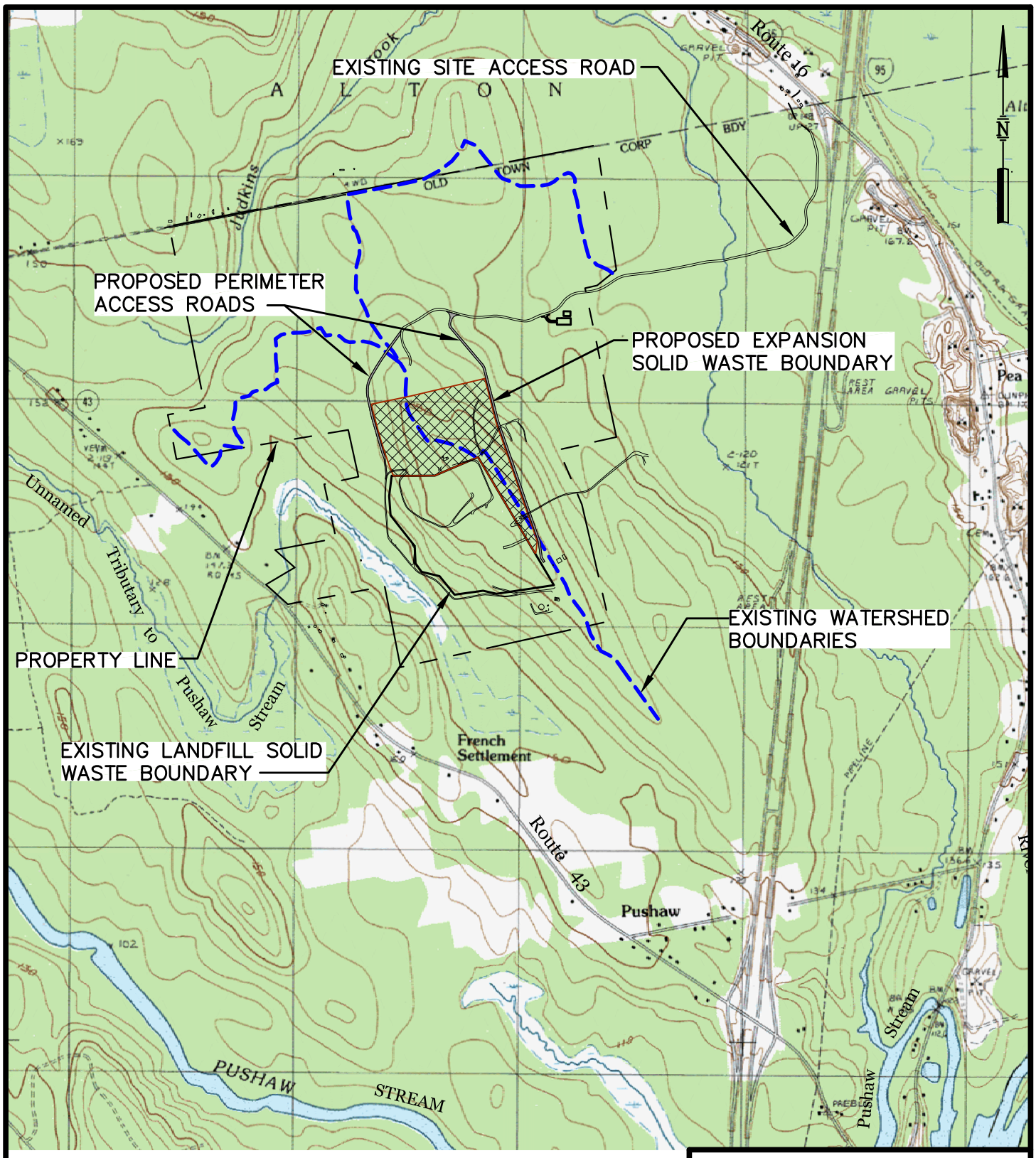
The U.S. Department of the Interior (1995) National Wetlands Inventory Map (Old Town, Maine) and the Freshwater Wetlands Map compiled by the Maine Geological Survey (MGS) provide a preliminary determination of the proximity of mapped wetlands to the Expansion (Mullen and Tolman, 1983). Based on these sources, the closest mapped wetland to the Expansion lies approximately 700 feet west of the Expansion footprint, as shown in Figure 2-4. Detailed wetland mapping, presented in Section 3.2.14 herein, provides site-specific information on wetland boundaries.

2.6 Regional Geologic Setting

Behavior of groundwater movement beneath and surrounding the landfill Facility is a function of geology and topography. The native soils of the region reflect their glacial origin, while the topography closely resembles the shape of the underlying bedrock surface, which has been altered by erosion processes associated with past glacial advances and retreats.

2.6.1 Surficial Soils. The surficial soils mapping published by the MGS indicates glacial till deposits predominate the higher topographic elevations of the Site (Borns and Thompson, 1981). Marine silt and clay deposits are often found in stream valleys and lowlands.

The marine soils were deposited atop the glacial till formation, after retreat of the glacial ice. The approximate distribution of these soil types is shown on the surficial geology map in Figure 2-5. The MGS surficial geologic map also suggests that some of the elongated hills, such as the one on which the JRL Facility is positioned, were formed as glacial drumlins, with their long axes oriented in a northwest-southeast direction (Borns and Thompson, 1981). The Expansion footprint is positioned in an area underlain by glacial till.



BASE MAP ADAPTED FROM 7.5 MIN USGS TOPOGRAPHIC QUADRANGLE OLD TOWN, MAINE–1988

1000 0 2000 4000 FEET

DWG: SITELOC LMN: WATERSHED CTB: SITELOC REV: 5/26/15

FIGURE 2–3
SITE WATERSHEDS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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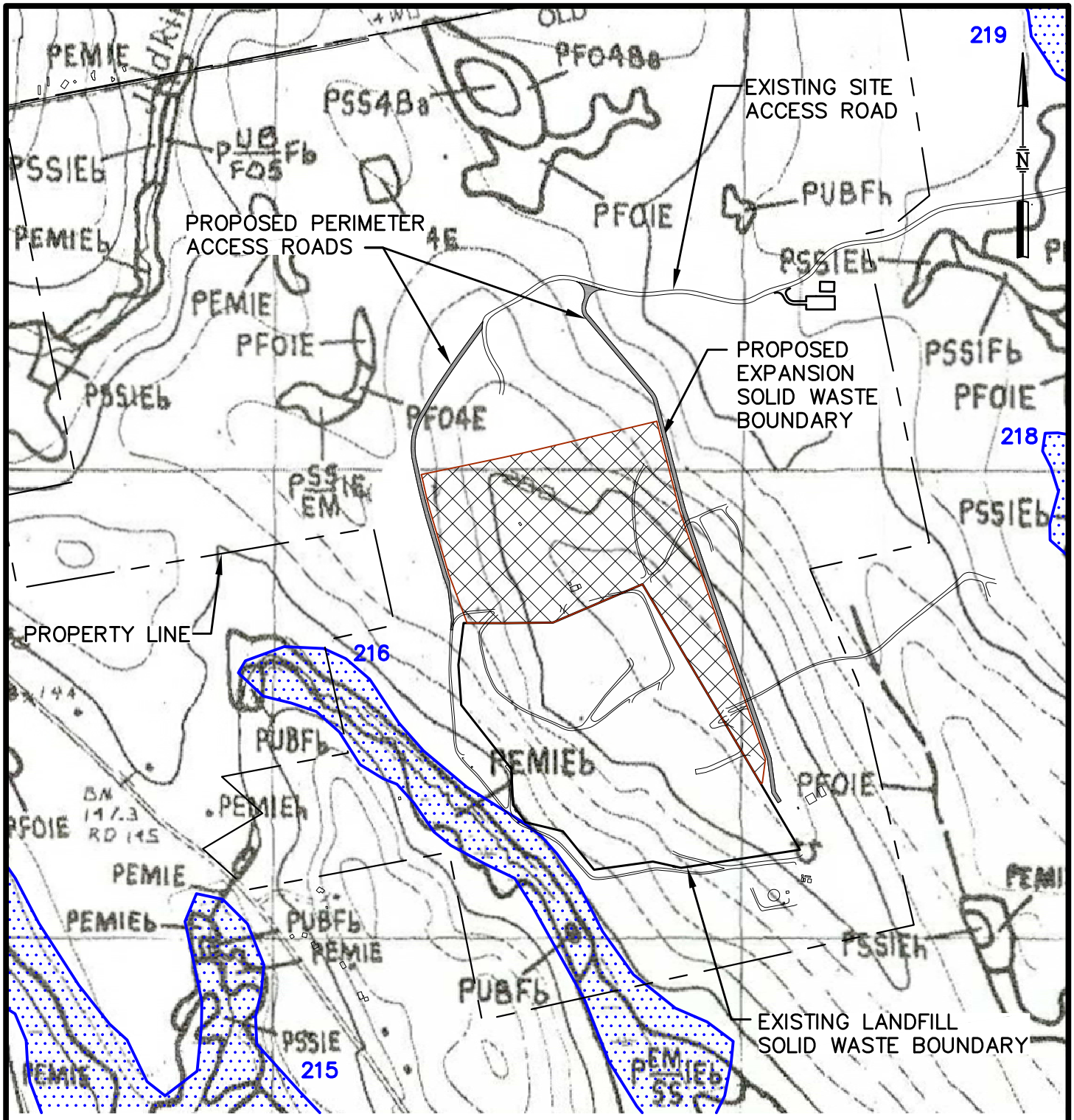

MAPPING SOURCES

REFERENCE DRAWING: MAINE GEOLOGICAL SURVEY FRESHWATER WETLANDS–MAP 41 BY MULLEN AND TOLMAN, 1983

U.S. FISH AND WILDLIFE SERVICE, NATIONAL WETLANDS INVENTORY MAP, OLD TOWN, MAINE, 2015.

LEGEND

216 — MGS WETLAND BOUNDARY WITH WETLAND NUMBER

PEMIE — NWI WETLAND BOUNDARY WITH CLASSIFICATION

500 0 1000 2000 FEET

DWG: SITELOC LMN: MGS-WETLANDS CTB: SITELOC REV: 5/28/15

FIGURE 2–4
FRESHWATER WETLANDS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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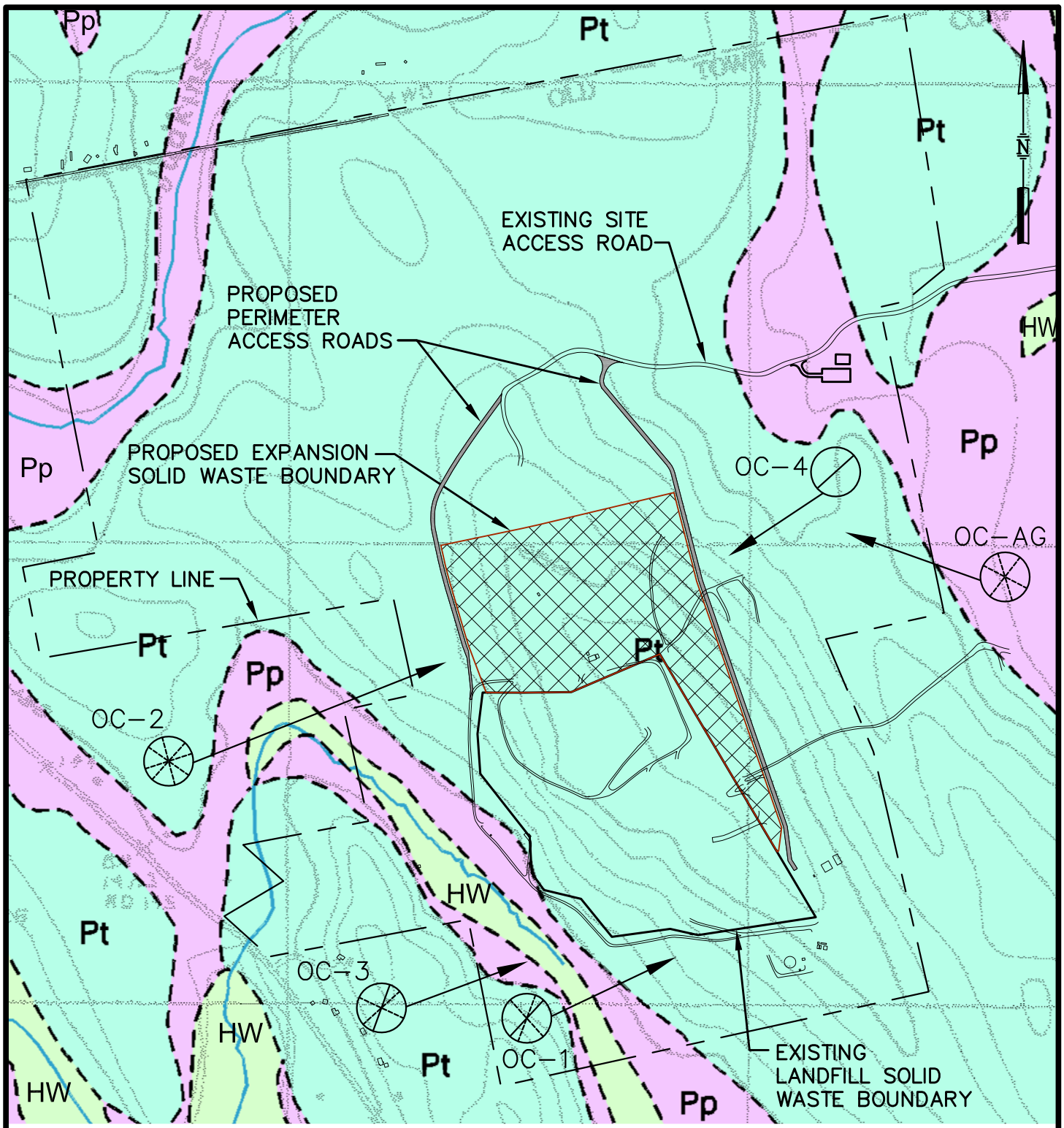

MAPPING SOURCE

MAINE GEOLOGICAL SURVEY OPEN FILE NO. 12-15 BY KELLEY AND KELLEY, 2012.

LEGEND

Pt	TILL
Pp	PRESUMPSCOT FORMATION
HW	WETLAND DEPOSITS

BEDDING (———) AND FRACTURE (– – – – –) ORIENTATIONS MEASURED AT OUTCROPS (LOCATION APPROXIMATE)

500 0 1000 2000 FEET

FIGURE 2-5
SURFICIAL GEOLOGY
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

DWG: SITELOC LMN: SurficialGeology CTB: SITELOC REV: 5/28/2015

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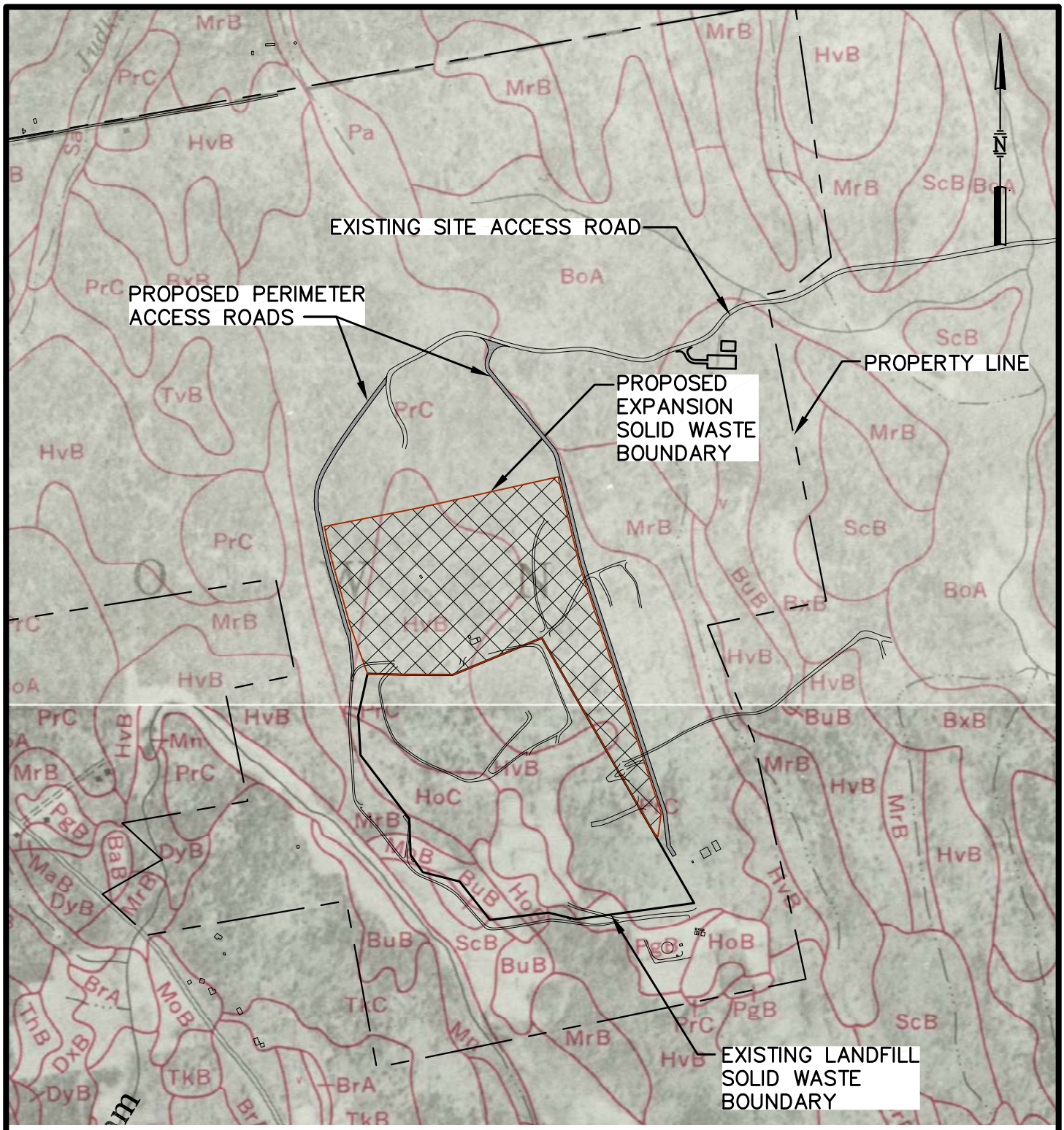
Figure 2-6 presents a medium intensity soils map based on the USDA Soil Conservation Service (SCS) Soil Survey of Penobscot County (SCS, 2014). Plaisted and Howland soils are the predominant SCS soil types mapped within the Expansion footprint. These two surficial soil profiles are derived from glacial till. The SCS mapping for the Expansion is in general agreement with the MGS mapping.

In numerous soil borings drilled for permitting of the existing JRL, a dense basal till was found beneath the Facility property and in the Expansion area (SME, 1991). The glacial till typically ranges from 10 to 50 feet thick beneath the existing landfill and provides a natural containment layer for the landfill due to its fine-grained nature. At a few locations outside of the existing landfill boundary, bedrock outcrops are exposed at the ground surface. There were several isolated zones of washed till or sandy lenses in the till found in the previous site investigations. However, these discontinuous washed or sandy lenses are often found within finer grained glacial tills. They are also common to drumlins in Maine, particularly on their lee (down-ice) sides (Flint, 1957). Previous borings also indicated marine silt or clay deposits in the stream valley west of the JRL.

2.6.2 Bedrock. Bedrock geologic maps prepared by the MGS were reviewed for mapped bedrock type(s) and bedrock fault location(s) in the vicinity of the proposed Expansion. Similar to the existing JRL, the bedrock beneath the Expansion is mapped as interbedded metamorphosed quartzite, siltstone, graywacke, and phyllite of the Vassalboro Formation according to the latest MGS mapping (Griffin, 1976a; Osberg, et al., 1985). No bedrock faults have been mapped within the Site. The nearest mapped bedrock fault is located approximately six miles southeast of the Site, striking northeast-southwest (Griffin, 1976b).

Four bedrock outcrops consisting of interbedded metaquartzite, metagraywacke and/or phyllite were observed by SME around the perimeter of the existing JRL during design of the existing landfill (SME, 1991). Three of the four outcrops (OC-1, OC-2, and OC-3) exhibited visible fractures where a Brunton compass could be used to measure fracture plane orientations.



MAPPING SOURCE
NATURAL RESOURCES CONSERVATION SERVICE, WEB SOIL SURVEY OF PENOBSCOT COUNTY, MAINE, 2014.

LEGEND

BoA	BIDDEFORD MUCKY PEAT
BuB	BUXTON SILT LOAM
HoC	HOWLAND GRAVELLY LOAM
HvB	HOWLAND VERY STONY LOAM
MoB	MONARDA SILT LOAM
MrB	MONARDA–BURNHAM COMPLEX
PgB	PLAISTED GRAVELLY LOAM
PrC	PLAISTED VERY STONY LOAM
ScB	SCANTIC SILT LOAM

500 0 1000 2000 FEET

DWG: SOILS LMN: SOILS CTB: SITELOC REV: 4/9/2015

FIGURE 2–6
MEDIUM INTENSITY SOIL TYPES
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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Although fractures were visible on OC-4, they were not accessible to measurement (see Figure 2-5).

The fracture mapping of these four outcrops indicated one set or grouping of fractures was striking northwest/southeast (N14W to N74W) relative to True North, and another set was oriented in a northeast/southwest (N25E to N67E) direction. The fractures of both sets are typically steeply dipping (i.e., greater than 60 degrees below horizontal). Bedrock had measurable relic bedding oriented nearly vertical with a strike of N32E to N39E. The fracture lengths in some cases extended beyond the outcrop exposure (e.g., greater than twenty feet). The approximate fracture spacing observed in both sets was in the order of inches or a few feet apart. No evidence of bedrock faulting was observed in any of the outcrops. Some mineral foliation was observed in the phyllite. Where present, the foliation planes were generally striking northeast/southwest. Fracture and bedding data from the 1990-1991 Site investigations are summarized in Table 2-1. (See Figure 2-5 for outcrop locations.)

TABLE 2-1

BEDROCK OUTCROP MAPPING SUMMARY

Location	Feature	Approximate Average Strike (Degrees relative to True North)	Approximate Average Dip (Degrees)
OC-1	Fracture	N51W	Near Vertical
OC-1	Relic Bedding	N43E	85NW
OC-1	Fracture	N23W	70SW
OC-1	Fracture	N23W	70SW
OC-1	Fracture	N32E	60NW
OC-1	Fracture	N32E	65NW
OC-1	Fracture	N35E	Near Vertical
OC-1	Fracture	N39E	Near Vertical
OC-1	Fracture	N60E	Near Vertical
OC-1	Fracture	N27E	Near Vertical
OC-2	Fracture	N58W	Near Vertical
OC-2	Fracture	N52W	Near Vertical
OC-2	Relic Bedding	N39E	Near Vertical
OC-2	Relic Bedding	N32E	Near Vertical
OC-2	Fracture	N75E	60NW
OC-2	Fracture	N75E	Near Vertical
OC-2	Fracture	N67E	76NW
OC-2	Fracture	N67E	72NW
OC-3	Fracture	N65W	80SW
OC-3	Fracture	N60W	85SW
OC-3	Fracture	N64W	80NE
OC-3	Fracture	N55E	80SE
OC-3	Fracture	N74W	80NE
OC-3	Fracture	Due North	80W
OC-3	Fracture	N25E	60NW
OC-3	Fracture	N67E	72SE
OC-3	Relic Bedding	N20E	80NW
OC-4	Relic Bedding	N48E	82NW

Photolineaments represent linear or curvilinear tonal, topographic, seepage, vegetative, and/or drainage patterns visually observed on aerial photographs that may represent bedrock geologic structures such as formation contacts or fracture zones. High-altitude aerial photos for the Site area were reviewed by MGS (Caswell, Eichler and Hill, 1986). Low-altitude, black and white aerial photographs were examined by SME in 1991. There are no photolineaments mapped by MGS within the Expansion. Only one northwest/southeast oriented photolineament identified by SME in 1991 was found to enter the existing landfill area. No topographic expressions of this photolineament could be visually observed during SME's Site reconnaissance, but it aligns with the northwest/southeast fracture set observed in bedrock outcrops.

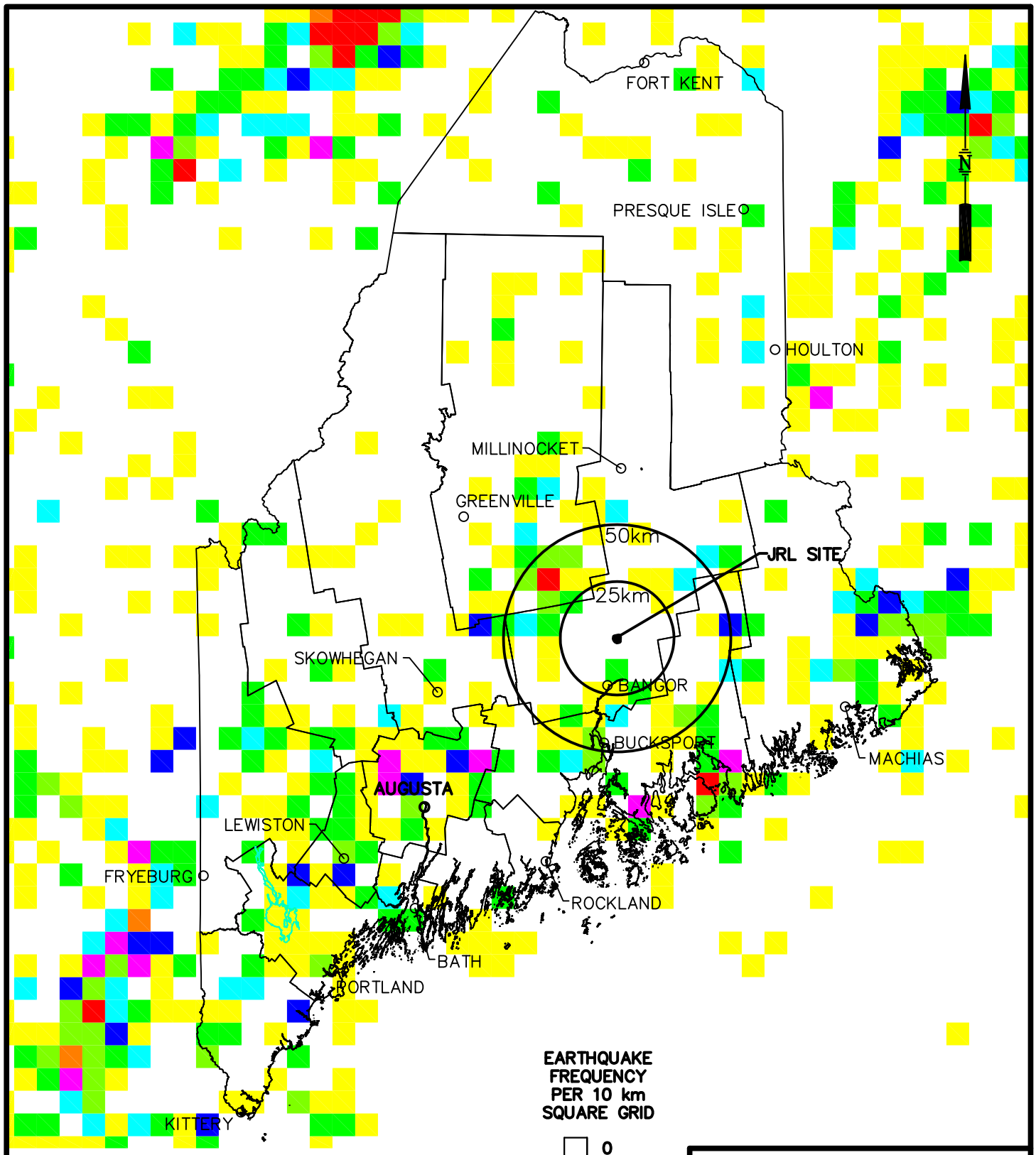
2.7 Seismicity

One-hundred and thirteen documented earthquakes have occurred within a 50-kilometer radius of the Site with magnitudes ranging from 0.6 to 4.5 on the Richter scale (Weston Observatory, 2015). The largest magnitude earthquake within this 50-kilometer radius occurred in 1928 with a magnitude of 4.5 on the Richter scale and was located approximately 25 kilometers from the Site. Figure 2-7 illustrates the distribution and magnitude of earthquakes in Maine for the period 1900 to 2014. The USGS seismic hazard maps (USGS 2014) indicate that earthquake-related ground accelerations in the Old Town, Maine area having a 10 percent probability of being exceeded at least once in 50 and 250 years are approximately 0.074*g* and 0.18*g*, respectively.

2.8 Groundwater Hydrology

A relatively shallow water table exists beneath much of the Facility property based on water level measurements collected during monitoring associated with the existing JRL operations (SME, 1991; SME, 2014; SCS, 1985). This is due to the relatively low hydraulic conductivities of the natural soils and bedrock. Consequentially, the direction of groundwater flow is largely controlled by topography. Therefore, groundwater would be expected to generally flow from the higher Expansion topographic elevations towards the west and east depending on its location within the drumlin.

Precipitation and snowmelt recharge the groundwater table beneath areas of higher topographic elevations (e.g., hilltops, top of drumlin, ridges). Overall, groundwater primarily moves horizontally from these recharge areas to the groundwater discharge areas located along streams and low-lying topography. Downward groundwater seepage gradients measured at the higher Site elevations confirm groundwater recharge in these areas (SME, 1991). Upward groundwater seepage gradients beneath the west flanks of the drumlin and unnamed tributary to Pushaw Stream confirm groundwater discharge at the lower Site elevations (SME, 1991).



NOTES

1. FIGURE COMPILED FROM WESTON OBSERVATORY DATA.
2. FIGURE REPRESENTS DISTRIBUTION OF EARTHQUAKES BY FREQUENCY ACROSS MAINE 1900 TO 2014.

30 0 60 120 KILOMETERS

DWG: QUAKES2014 LMN: QUAKE CTB: SME–STD REV: 4/10/2015

FIGURE 2–7
EARTHQUAKE EPICENTERS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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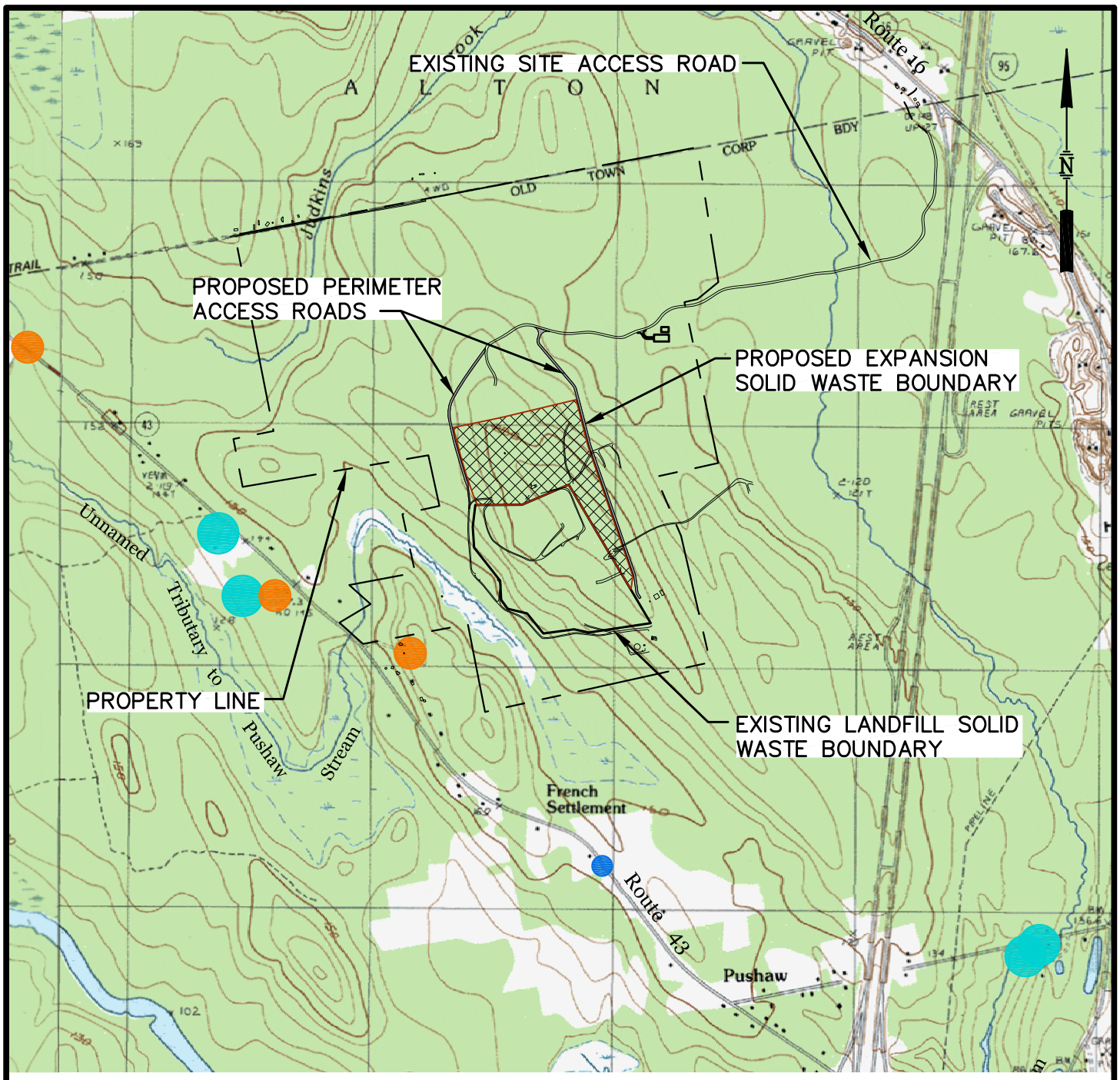
Soil and bedrock hydraulic conductivities were measured in previous investigations of the existing JRL Site. Horizontal hydraulic conductivities of the brown and gray glacial tills ranged from $1.8x10^{-5}$ centimeters per second (cm/sec) to $2.4x10^{-6}$ cm/sec (SME, 1991). Slightly higher hydraulic conductivities were measured in the discontinuous washed till and sandy zones within the basal till (geometric mean of $5.3x10^{-4}$ cm/sec). Hydraulic conductivities of the bedrock ranged from $9.2x10^{-8}$ to $3.2x10^{-3}$ cm/sec. Groundwater seepage velocity in the basal till was measured by J.D. Tewhey Associates, Inc. of South Portland, Maine at the existing JRL at 39 feet per year (Woodard & Curran, 2003).

2.9 Local Groundwater Resources

Residences along Maine Route 43, Maine Route 16, and Stagecoach Road rely on drilled or dug wells for their water supplies. Wells along these roads are, respectively, about 2,100 feet, 6,400 feet, and 3,000 feet or more from the proposed Expansion. The nearest groundwater supply well identified in the MGS database of wells (MGS, 2014) is approximately 2,200 feet south of the Expansion boundary. The locations of these MGS catalogued wells relative to the Site are shown in Figure 2-8.

The nearest MGS-mapped significant sand and gravel aquifer is approximately one mile east of the Expansion which runs along the western shore of the Stillwater River as shown in Figure 2-9 (Tolman and Lanctot, 2008). These mapped sand and gravel deposits were deposited during glacial retreat after the till was deposited along the bedrock surface (Borns and Thompson, 1981). There are no stratified sand and gravel deposits mapped by MGS within the JRL Site (Borns and Thompson, 1981; Foster and Smith, 2001). Therefore, the Expansion does not overlie or fall within 300 feet of a significant sand and gravel aquifer.



BASE MAP ADAPTED FROM 7.5 MIN USGS TOPOGRAPHIC QUADRANGLE OLD TOWN, MAINE–1988

MAPPING SOURCE

MAINE GEOLOGICAL SURVEY WATER WELL DATABASE, DATED AUGUST 28, 2014.

LEGEND

- REPORTED WELL YIELD LESS THAN 5 GALLONS PER MINUTE
- REPORTED WELL YIELD BETWEEN 5 AND 10 GALLONS PER MINUTE
- REPORTED WELL YIELD GREATER THAN 10 AND LESS THAN 20 GALLONS PER MINUTE

1000 0 2000 4000 FEET

FIGURE 2–8
BEDROCK WELL YIELDS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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DWG: SITELOC LMN: BR–WellYields CTB: SITELOC REV: 5/28/2015

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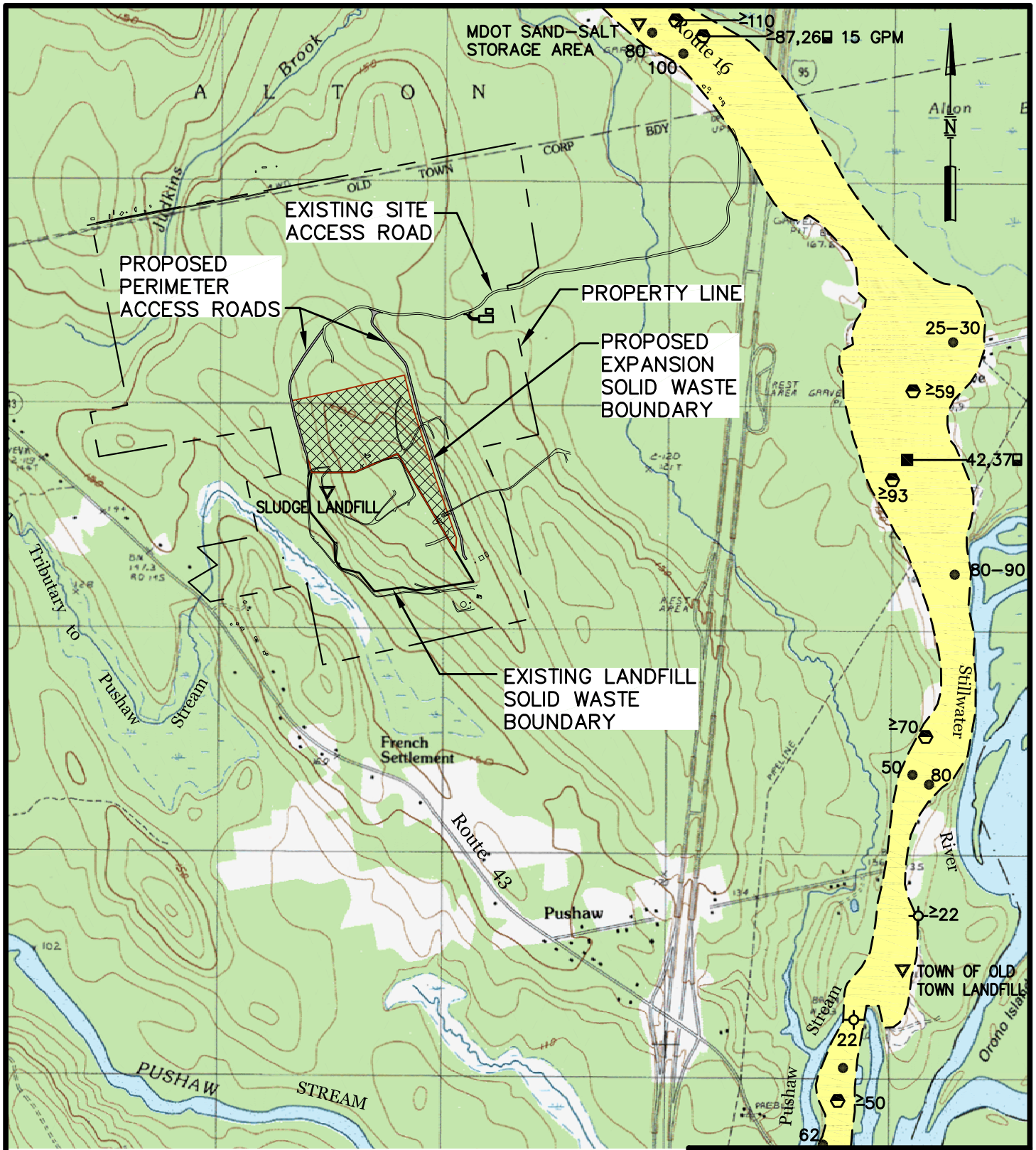

BASE MAP ADAPTED FROM 7.5 MIN USGS TOPOGRAPHIC QUADRANGLE OLD TOWN, MAINE-1988

MAPPING SOURCE

MAINE GEOLOGICAL SURVEY OPEN FILE NO. 08-87 BY TOLMAN AND LANCTOT, 2008.

LEGEND

MAPPED SIGNIFICANT SAND AND GRAVEL AQUIFER

1000 0 2000 4000 FEET

DWG: SG-Aquifer LMN: SG-AQUIF CTB: SITELOC REV: 5/28/2015

FIGURE 2-9
SIGNIFICANT SAND AND GRAVEL AQUIFERS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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3.0 SITE INVESTIGATIONS

The site-specific investigations conducted to gather information for characterizing the geologic and hydrogeologic conditions of the Expansion are summarized in this section. These extensive investigations were carried out to evaluate the Expansion area relative to MEDEP landfill siting criteria and to develop the data needed to engineer the design of the Expansion. The data were used to complete site-specific calculations (e.g., travel time, foundation stability, and landfill settlement), as required by the MEDEP Rules. Other hydrogeologic investigations focused on acquiring further understanding of the groundwater flow pathways through the bedrock. The following site assessment activities have been conducted at the Expansion area:

- Wetlands delineation within 2,000 feet of the Expansion footprint;
- Subsurface investigations that included the excavation of test pits and drilling of soil and deep bedrock borings to sample and evaluate soil and bedrock lithologies;
- Bedrock coring for lithologic mapping, measurement of fracture frequency, and to estimate bedrock porosity;
- Surficial geophysical surveys using electrical earth resistivity and Very Low Frequency-Electromagnetic (VLF-EM) methodologies to evaluate possible bedrock fracture zones and structural features;
- Borehole geophysical logging to identify structural features in bedrock and fracture orientation;
- Installation of multi-level piezometer clusters and monitoring wells to measure seasonal groundwater fluctuation and determine groundwater flow rates and directions during the wet and dry seasons;
- In situ hydraulic conductivity testing of the till and bedrock formations in monitoring wells and piezometers;
- Soil property testing, including water content, density, porosity, specific gravity, Atterberg limits, hydraulic conductivity, and grain size distribution;
- Laboratory hydraulic conductivity testing of undisturbed tube samples to measure the vertical hydraulic conductivity of the till;

- Natural gradient groundwater tracer tests to measure groundwater velocities in the till and bedrock;
- Age-dating of groundwater to provide corroborative information on groundwater velocities;
- Bedrock groundwater pumping tests to evaluate fracture interconnectivity; and,
- Water quality testing of the natural background groundwater.

In addition, data from previous investigations performed for the permitting and design of the existing JRL in 1991 are referenced in this report. Much of the site-specific information for the Expansion was summarized in the 2006 Preliminary Information Report (PIR) (SME, 2006). Since the PIR was submitted to MEDEP, SME conducted additional investigations of the basal till underlying the Expansion area to assess its vertical hydraulic conductivity, a tracer test to measure the horizontal groundwater velocity in the shallow bedrock flow system, and deeper hydrogeologic characterization of the bedrock, and test pitting to further refine the bedrock surface beneath the Expansion. Information presented in the PIR has been updated to reflect the additional data collected since the PIR.

3.1 Previous Investigations at Existing Landfill

During the period between March 1990 and January 1991, SME conducted a series of subsurface exploration programs to evaluate the soil and groundwater conditions as part of the permitting and design of the existing JRL. These investigations included: (1) drilling of approximately 38 borings (which included installation of either monitoring wells or piezometers), (2) excavating 50 test pits, (3) running approximately 11,800 lineal feet of seismic refraction transects, (4) photolineament mapping, (5) bedrock outcrop mapping, (6) in situ hydraulic conductivity testing, (7) wet- and dry-season groundwater level measurements, and (8) water quality sampling and analysis. The approximate locations of these explorations are shown in Figure 3-1. The 1990 and 1991 investigations were used to interpret the geology and

LINE 5

TOTAL LINE 5
LENGTH 3281 FEET

LINE 4

TOTAL LINE 10
LENGTH 2297 FEET

LINE 10

LINE 11

TOTAL LINE 11
LENGTH 1312 FEET

TOTAL LINE 4
LENGTH 5250 FEET

PROPOSED EXPANSION
SOLID WASTE BOUNDARY

LINE 6

LINE 7

LINE 8

LINE 9

LINE 3

LINE 2

LINE 1

A

A'

B

B'

C

C'

(ACTIVE)

EXISTING LANDFILL
SOLID WASTE BOUNDARY

CONSTRUCTED
LANDFILL CELLS

PROPERTY LINE

250 0 500 FEET

NOTES

1. EXISTING GROUND CONTOURS FROM DECEMBER 31, 2014 AERIAL SURVEY PERFORMED BY AERIAL SURVEY AND PHOTO, INC. OF NORRIDGEWOCK, MAINE.

2. PROPERTY LINE LOCATIONS ARE A RESULT OF FIELD SURVEY PERFORMED BY HERRICK AND SALSBURY, INC. LAND SURVEYORS, ELLSWORTH, MAINE FOR TRYTON TREE FARM PROJECT, PATTEN CORPORATION–DOWNEAST, OLD TOWN, MAINE, FEBRUARY 23, 1988, REVISED APRIL 7, 1988.

3. LOCATIONS OF EXPLORATIONS ARE APPROXIMATE.

4. DRAWING SHOULD NOT BE USED FOR DESIGN, QUANTITY TAKE–OFFS, GRADES, SURVEY ETC.

LEGEND

- TP–04–01 — TEST PIT LOCATION
- P–220B — PIEZOMETER LOCATION
- MW–06–02 — MONITORING WELL LOCATION
- OW–06–05 — OBSERVATION WELL LOCATION
- PW–08–01 — AIR ROTARY BORING
- EARTH RESISTIVITY AND VLF–EM SURVEY LINES
- A A' — INTERPRETED GEOLOGIC PROFILE LOCATION

DWG: FIGURES LMN: SITE–INVESTIGATION CTB: OVERBURDEN REV: 4/17/15

FIGURE 3–1
SITE INVESTIGATION MAP
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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hydrogeology of the Site and to prepare Volume III of the Landfill's August 1991 MEDEP permit application, titled "*Site Investigation and Hydrogeologic Evaluation*." Relevant information from those earlier investigations has been used when evaluating the geologic and hydrogeologic characteristics of the Expansion.

3.2 Subsurface Characterization - Proposed Landfill Expansion Area

3.2.1 Test Pits. In June 2004, thirty-four test pits (TP-04-01 through TP-04-34) were excavated under the direction of an SME Maine-Certified Geologist for the purpose of characterizing near-surface soils (i.e., less than 20 feet from existing ground surface), and providing a preliminary confirmation of the geology north of the existing landfill, including within the Expansion footprint. The locations of the June 2004 test pits are also shown on Figure 3-1.

The walls of each test pit were visually examined for signs of fractures and/or fault displacement in the soils and representative soil samples were collected for laboratory testing from the various geologic units encountered during excavation of the test pits. There were no signs of faulting or slip-planes in the till. Moisture content and grain size analyses were performed in the laboratory on selected soil samples from the test pits.

In 2014, ten test pits (TP-14-1 through TP-14-10) were performed in and around the Expansion area to examine for potential shallow bedrock. One area examined, located to the north of the current operations building, indicated what appeared previously to be a bedrock outcrop, was in fact a boulder and bedrock was deeper than seven feet below the ground surface. The other area examined, just east of the Expansion confirmed the presence of shallow bedrock in an area previously identified.

Test pit logs from the 2004 and 2014 programs are presented in Appendix A. Laboratory test results are summarized on the respective logs, and details of the laboratory testing are further discussed in Section 3.3. Logs of twenty-five test pits from a 1990 investigation are also contained in Appendix A, and their locations are shown on Figure 3-1. Appendix A includes test pits that were excavated within the Expansion area, as well as relevant test pits from outside, but adjacent, to the Expansion.

3.2.2 Borings, Piezometers and Monitoring Wells. The geology and hydrogeology of the Expansion area have been evaluated on separate occasions as part of Site investigations conducted between 2004 and 2014. The nature of the drilling programs for these investigations is summarized as follows:

- A total of twenty-eight piezometers and monitoring wells were installed at fifteen locations (designated P-04-05 through P-04-14, MW-304A, MW-401A, MW-401B, MW-402A, and MW-402B) between July and October 2004 for a preliminary lithology and hydrogeologic characterization of the Site.

- Six borings drilled between December 2004 and January 2005 were completed with wells screened in the shallow till, and designated MW-04-111 and MW-05-01 through MW-05-05. A natural-gradient tracer test in till was conducted starting in February 2005 utilizing this group of wells to measure the groundwater velocity in the till.

- A monitoring well (MW-06-01) and three piezometers (P-06-03, P-06-04A and P-06-04B) were installed in till to provide hydrogeologic information about conditions east of the Expansion area.

- In March and April 2006, seven borings were drilled and seven monitoring/ observation wells were installed in the shallow bedrock just north of the Expansion, designated MW-06-02 and OW-06-05 through OW-06-10. The bedrock encountered in MW-06-02 was logged using a suite of common downhole geophysical tests. This group of wells was utilized for a groundwater pump test in July 2006 and a natural-gradient bedrock groundwater tracer test conducted in June 2008. These tests were used to examine bedrock fracture interconnectivity and estimate the groundwater velocity in the bedrock.

- Borings were drilled at ten locations (B-08-01 through B-08-10) during June and July 2008, and piezometers installed in six of these borings (P-08-03A and B;

P-08-04; P-08-06; P-08-07; P-08-09A, B and C; and P-08-10A, B and C) located within and adjacent to the Expansion area. Undisturbed thin-walled tube samples of till were collected from these boreholes to measure their vertical hydraulic conductivity.

- In December 2008 and January 2009, four bedrock boreholes (designated PW-08-01 through PW-08-04) were drilled. The locations of these boreholes were chosen based on supplemental resistivity and VLF-EM geophysical surveys completed between November 2008 and January 2009. Downhole geophysical logging was completed within each borehole. These borings extended to a depth of at least 200 feet into bedrock to examine the deeper bedrock structure, consistency, and hydraulic characteristics.

- Three wells, MW-207, MW-302, and MW-303, which were located in areas of the existing landfill development were replaced with MW11-207R, MW-302R, and MW12-303R.

Collectively, these drilling programs provide data to supplement the geologic information from the test pitting, allow for the collection of soil and bedrock samples for laboratory analysis and visual examination, and have been used to identify where to install piezometers or monitoring wells to characterize the hydrogeologic conditions at the Site. Their approximate locations are included in Figure 3-1. Collectively these explorations provided data on both the Expansion and the surrounding area since understanding groundwater migration away from the Expansion, and future monitoring, requires defining the entire area studied. All drilling was performed by Maine Test Borings, Inc. (MTB) of Brewer, Maine with the exception of the deep bedrock drilling program, which was completed by Goodwin Well Drilling, Inc. (Goodwin) of Turner, Maine. Each boring and piezometer installation was monitored and logged under the direction of an SME Maine-Certified Geologist. Interpretive boring logs prepared by SME, MTB, and Goodwin are included in Appendix B. Table 3-1 presents a summary of the monitoring well and piezometer installation details for the various drilling programs associated with the Expansion. Logs of borings adjacent to the Expansion area that were drilled (1990 and 1992) for the

existing JRL are also included in Table 3-1 and Appendix B, and their locations are shown on Figure 3-1.

TABLE 3-1

WELL/PIEZOMETER INSTALLATION DETAILS

Area	Instrument Designation	Installation Date	Screened Geologic Unit	Depth of Boring ft bgs	Ground Elevation ft-NGVD	Slotted Screen Interval						
						Depth ft bgs			Elevation ft - NGVD			Length ft
Inside Proposed Expansion	P-04-05A	07/20/04	Basal Till	48.5	201.0	47.0	-	48.0	154.0	-	153.0	1
	P-04-05B					14.0	-	15.0	187.0	-	186.0	1
	P-04-06A	07/21/04	Bedrock	44.4	208.3	42.9	-	43.9	165.4	-	164.4	1
	P-04-06B		Basal Till			9.0	-	10.0	199.3	-	198.3	1
	P-08-06	07/07/08	Basal Till	14	182.2	11.2	-	13.2	171.0	-	169.0	2
	P-08-07	07/08/08	Basal Till	15.6	211.7	10.0	-	12.0	201.7	-	199.7	2
	PW-08-02	01/05/09	Bedrock	235	204.0	38.0	-	235.0	166.0	-	-31.0	197
	MW-207	05/02/90	Bedrock	31.7	214.7	25.0	-	30.0	189.7	-	184.7	5
	MW11-207R	05/12/11	Bedrock	41.8	212.5	41.8		36.8	177.2	-	172.2	5
	MW-212	06/12/90	Basal Till	36.3	217.4	12.0	-	17.0	205.3	-	200.4	5
	P-212	01/12/90	Bedrock	36.3	217.4	31.3	-	36.3	186.1	-	181.1	5
	P-225	09/17/90	Basal Till	15.1	212.8	7.7	-	12.7	205.1	-	200.1	5
	MW-302	03/10/92	Bedrock	30.4	202.1	19.8	-	29.8	182.3	-	172.3	10
	MW-302R	10/01/07	Bedrock	29.9	204.5	19.5	-	29.5	185.0	-	175.0	10
	MW-304A	07/15/04	Bedrock	40	214.7	29.5	-	39.5	185.2	-	175.2	10
East of Proposed Expansion	P-04-13A	09/29/04	Bedrock	128.3	144.4	125.5	-	127.5	18.9	-	16.9	2
	P-04-13B		Bedrock			64.0	-	66.0	80.4	-	78.4	2
	P-04-13C		Marine Clay	10	144.8	8.0	-	9.0	136.8	-	135.8	1
	MW-06-01	03/01/06	Cobble Zone	22	163.3	10.0	-	20	153	-	143	10
	P-06-03	02/28/06	Basal Till	17	198.9	10	-	15	189	-	184	5
	P-06-04A	02/28/06	Basal Till/ Bedrock	30.2	186.2	28	-	30	158	-	156	2
	P-06-04B		Basal Till			10	-	15	176	-	171	5
	P-08-09A	07/09/08	Sandy Zone	42.6	198.2	35.3	-	37.3	162.9	-	160.9	2
	P-08-09B		Washed Till			15.2	-	20.2	183.0	-	178.0	5
	P-08-09C		Basal Till			6.8	-	9.8	191.4	-	188.4	3
	P-08-10A	07/11/08	Sandy Zone	95	202.2	87.0	-	89.0	115.2	-	113.2	2
	P-08-10B					56.0	-	58.0	146.2	-	144.2	2
	P-08-10C		Basal Till			11.4	-	17.9	190.8	-	184.3	6.5
	MW-213	06/15/90	Basal Till	42	180.3	14.6	-	19.6	165.7	-	160.7	5
	P-213	06/15/90	Boulder Zone	42	180.3	33.3	-	38.3	197.0	-	142.0	5

TABLE 3-1 (cont'd)

Area	Instrument Designation	Installation Date	Screened Geologic Unit	Depth of Boring ft bgs	Ground Elevation ft-NGVD	Slotted Screen Interval						
						Depth ft bgs			Elevation ft - NGVD			Length ft
North of Proposed Landfill	P-04-08A	08/02/04	Basal Till	41.4	188.8	38.5	-	39.5	150.3	-	149.3	1
	P-04-08B					15.5	-	16.5	173.3	-	172.3	1
	P-04-09A	08/05/04	Bedrock	45	167.0	38.0	-	39.0	129.0	-	128.0	1
	P-04-09B		Basal Till			14.0	-	15.0	153.0	-	152.0	1
	P-04-10A	08/05/04	Bedrock	35	166	33.1	-	34.1	132.9	-	131.9	1
	P-04-10B		Basal Till			8.2	-	9.2	157.8	-	156.8	1
	P-04-11A	09/09/04	Basal Till	50.5	184.0	48.5	-	49.5	135.5	-	134.5	1
	P-04-11B		Basal Till			9.0	-	10.0	175.0	-	174.0	1
	P-04-12A	09/21/04	Bedrock	122	166.3	59.0	-	64.0	107.3	-	102.3	5
	P-04-12B	09/21/04	Bedrock	122	166.3	37.0	-	39.0	129.3	-	127.3	2
	P-04-12C	09/21/04	Marine Clay	6	166.3	4.3	-	5.3	162.0	-	161.0	1
	P-04-14A	10/07/08	Bedrock	103.8	150.2	57.0	-	59.0	93.2	-	91.2	2
	P-04-14B	10/07/08	Bedrock	103.8	150.2	14.5	-	16.5	135.7	-	133.7	2
	MW-04-111	12/30/04	Basal Till	15.5	192.1	10.0	-	15.0	182.1		177.1	5
	MW-05-01	01/03/05	Basal Till	15.5	191.8	10.0	-	15.0	181.8	-	176.8	5
	MW-05-02	01/03/05	Basal Till	15.5	191.8	10.0	-	15.0	181.8	-	176.8	5
	MW-05-03	01/04/05	Basal Till	15.5	192.2	10.0	-	15.0	182.2	-	177.2	5
	MW-05-04	01/05/05	Basal Till	15.5	192.2	10.0	-	15.0	182.2	-	177.2	5
	MW-05-05	01/05/05	Basal Till	15.5	191.9	10.0	-	15.0	181.9	-	176.9	5
	MW-06-02	04/03/06	Bedrock	41.5	188.8	25.0	-	35.0	163.8	-	153.8	10
	OW-06-05	03/27/06	Bedrock	36.8	187.6	26.5	-	36.5	161.1	-	151.1	10
	OW-06-06	03/28/06	Bedrock	38.1	187.3	28.0	-	38.0	159.3	-	149.3	10
	OW-06-07	03/29/06	Bedrock	38.5	186.6	28.0	-	38.0	158.6	-	148.6	10
	OW-06-08	03/30/06	Bedrock	34	187.1	24.0	-	34.0	163.1	-	153.1	10
	OW-06-09	03/31/06	Bedrock	39.4	187.2	29.0	-	39.0	158.2	-	148.2	10
	OW-06-10	04/03/06	Bedrock	43.6	188.4	32.0	-	42.0	156.4	-	146.4	10
	P-08-03A	07/02/08	Basal and Washed Till	16.3	168.9	13.5	-	15.5	155.4	-	153.4	2
	P-08-03B		Basal Till			3.3	-	5.3	165.6	-	163.6	2
	P-08-04A	07/03/08	Basal Till	8	192.7	5.2	-	7.2	187.5	-	185.5	2
	PW-08-01	12/30/08	Bedrock	260	173.1	64.0	-	260.0	109.1	-	-86.9	196
	PW-08-03	01/06/09	Bedrock	235	169.4	38.0	-	235.0	131.4	-	-65.6	197
	PW-08-04	01/09/09	Bedrock	215	172.5	18.0	-	215.0	134.5	-	-42.5	197

TABLE 3-1 (cont'd)

Area	Instrument Designation	Installation Date	Screened Geologic Unit	Depth of Boring ft bgs	Ground Elevation ft-NGVD	Slotted Screen Interval						
						Depth ft bgs			Elevation ft - NGVD			Length ft
West of Proposed Expansion	P-04-07A	07/28/04	Bedrock	107.5	174.1	73.0	-	83.0	101.1	-	91.1	10
	P-04-07B					24.5	-	25.5	149.6	-	148.6	1
	P-04-07C	07/28/04	Washed Till	5.5	174.0	4.3	-	5.3	169.7	-	168.7	1
	MW-223A	09/10/90	Bedrock	33	173.5	28	-	33	145.5	-	140.5	5
	MW-223B	9/11/1990	Basal Till	17.6	173.5	12.6	-	17.6	160.9	-	155.9	5
South of Expansion	P-201A	7/11/1990	Bedrock	70.1	148.2	67.7	-	69.7	80.5	-	78.5	5
	P-201D		Basal Till			35	-	40	113.2	-	108.2	10
	MW-204	5/15/1990	Basal Till	42	158.5	13.8	-	18.8	144.7	-	139.7	5
	P-204A		Basal Till			29	-	34	129.5	-	124.5	5
	P-205B	12/7/1990	Basal Till	14	204.7	5	-	10	199.7	-	194.7	5
	P-206A	5/8/1990	Bedrock	90.5	201.5	85.5	-	90.5	116	-	111	5
	P-206B		Washed Till			49.7	-	54.7	151.8	-	146.8	5
	P-206C	5/10/1990	Basal Till	22	201.2	6	-	11	195.2	-	190.2	5
	MW-206A		Basal Till			15	-	20	186.2	-	181.2	5
	P-211A	6/7/1990	Bedrock	22.6	180.6	5	-	10	175.6	-	170.6	5
	P-211B		Basal Till			16.6	-	21.6	164	-	159	5
	P-214A	6/21/1990	Bedrock	62.2	189.2	57.2	-	62.2	132	-	127	5
	P-214B		Basal Till			38.1	-	43.1	151.1	-	146.1	5
	P-214C		Basal Till			11	-	16	178.2	-	173.2	5
	P-215A	6/25/1990	Bedrock	33	211.7	28	-	33	183.7	-	178.7	5
	P-215B		Basal Till			7	-	12	204.7	-	199.7	5
	P-216B	7/2/1990	Basal Till	20.4	157.3	5	-	10	152.3	-	147.3	5
	MW-216B		Basal Till			14	-	19	143.3	-	138.3	5
	P-222A	09/06/90	Bedrock	30.4	212.4	23.7	-	28.7	188.7	-	183.7	5
	P-222B	09/06/90	Basal Till	30.4	212.4	5.2	-	10.2	207.2	-	202.2	5
	P-226A	09/13/90	Basal Till	25.3	215.0	20.3	-	25.3	194.7	-	189.7	5
	P-226B	12/07/90	Basal Till	12	215.5	5	-	10	210.5	-	205.5	5
	MW-227	9/17/1990	Basal Till	22	161	15	-	20	146	-	141	5
	P-228	12/7/1990	Basal Till	12	215	5	-	10	210	-	205	5
	P-230	12/7/1990	Basal Till	12	214.7	5	-	10	209.7	-	204.7	5
	MW-301	7/2/1996	Bedrock	183	163	162.5	-	183.5	0.5	-	-19.5	20
	MW-303	7/9/1990	Washed Till	46.5	213	37.4	-	47.4	175.6	-	165.6	10
	MW-303R	9/11/2012	Washed Till	41.5	206.1	30.5	-	40.5	175.6		165.6	10
	MW-401A	07/12/04	Bedrock	109.4	153.8	98.8	-	108.8	55.0	-	45.0	10
	MW-401B	07/13/04	Basal Till	20.5	154.6	10.0	-	20.0	144.6	-	134.6	10
	MW-402A	6/29/2004	Bedrock	106	149.5	95.5	-	105.5	54		44	10
	MW-402B	6/29/2004	Basal Till	22.5	149.8	12	-	22	137.8		127.8	10
	P-502A	2/27/1992	Washed Till	50.8	208.4	38	-	43	170.4		165.4	5

TABLE 3-1 (cont'd)

Area	Instrument Designation	Installation Date	Screened Geologic Unit	Depth of Boring ft bgs	Ground Elevation ft-NGVD	Slotted Screen Interval						
						Depth ft bgs			Elevation ft - NGVD			Length ft
South of Expansion (cont'd)	P-502B		Basal Till			6.3	-	11.3	202.1		197.1	5
	P-504A	03/06/92	Washed Till	54.2	212.0	43	-	48	169.0	-	164.0	5
	P-504B	03/06/92	Basal Till	54.2	212.0	23.3	-	25.3	188.7	-	186.7	2
	P-504C	03/06/92	Basal Till	54.2	212.0	7	-	10	205.0	-	202.0	3

Notes:
PW-08-01, PW-08-02, PW-08-03, and PW-08-04 are open boreholes.
bgs - below ground surface existing at time of boring.

MTB borings in soils were drilled using the drive and wash-rotary technique in a cased (HW) borehole. Split-spoon samples (American Society for Testing and Materials (ASTM) Method D 1586) were collected at up to 5-foot sampling intervals for logging the soils and determining lithologic unit thicknesses. Representative soil samples were selected for laboratory testing, including water content, grain size analyses, and specific gravity. The split-spoon blow counts allowed interpretation of the relative density and consistency of the encountered soils. Most MTB borings were advanced to split spoon or casing refusal, which was typically confirmed by drilling with a roller cone or through rock coring. Bedrock cores were obtained from some MTB borings using an N-size (2-inch nominal inside diameter) or H-size (2.5-inch nominal inside diameter) core barrel in general accordance with ASTM D 2113. The cores were logged for fracture spacing, lithology, core recovery, and Rock Quality Designation (RQD). Detailed core lithologic logs were prepared by a geologist from Northeast Geophysical Services (NGS) of Bangor, Maine. Bedrock core logs prepared with the assistance of NGS are contained in Appendix C.

Borings were drilled by MTB at eight locations (B-08-01 through B-08-08) between June 30 and July 11, 2008, including five within the footprint of the Expansion, to collect undisturbed samples of the till. Samples of till were collected with 3-inch diameter thin-walled tubes following ASTM Method D 1587. The tubes were sealed with wax shortly after the sample was collected to maintain its natural moisture content. B-08-09 and B-08-10 were located in the eastern portion of the landfill Facility and were installed to provide information related to the wetland alternatives analysis for the Expansion footprint. The undisturbed tube samples were used to measure the vertical hydraulic conductivity, water content, and density of the till.

The 6-inch diameter, deep bedrock borings were drilled by Goodwin using the air-rotary technique. No split-spoon soil samples or bedrock core were collected from these borings. Drill cuttings (soil and bedrock chips) ejected from the borehole during the drilling process were periodically collected for visual examination and logging by an SME Maine-Certified Geologist. A six-inch diameter black iron pipe isolation casing was set into the top of bedrock to stabilize the soil portion of the borehole before drilling of the underlying bedrock occurred. The air-rotary holes were drilled to investigate the deeper portions of the bedrock and, therefore, as a rule, were drilled to penetrate at least 200 feet of the bedrock. The boreholes were logged by NGS using downhole geophysical instruments, as discussed in Section 3.2.5. This logging, in addition to the driller's boring logs, allowed for identification of fractures and fracture zones within the bedrock.

The air-rotary borings were drilled after careful review of the results of the earth resistivity geophysical profiling, which are discussed in Section 3.2.12. The electrical resistivity survey identified lower resistivity areas within the bedrock, which are often suggestive of bedrock fracture zones or denser fracture networks. The air-rotary boreholes were drilled at three selected low-resistance bedrock areas (PW-08-01, PW-08-02, and PW-08-04), as well as one-high resistance area (PW-08-03). Low-resistivity zones were intentionally drilled within the Expansion footprint and surrounding area to provide adequate coverage from a groundwater transport viewpoint. The area of higher resistivity was selected as a means to develop confidence that the surface resistivity geophysical method is useful for identifying bedrock zones with limited or less dense fracturing at this Site. The presence of fractures intersecting the air-rotary boreholes and their relative density was confirmed by downhole geophysical logging, which also corroborated the lower fracture density at PW-08-03. However, the existence of lower resistivity or denser fracturing did not necessarily demonstrate that the fractures were hydraulically interconnected. Bedrock fractures can be dead-ended or have limited areal extent and not be hydraulically connected into other fractures. Therefore, pump testing was conducted in the four air-rotary boreholes to evaluate the hydraulic continuity and interconnectivity between fractures.

During the Expansion investigations from 2004 to 2009, 47 piezometers, 18 monitoring wells, and 6 observation wells were available to monitor groundwater levels within and around the Expansion footprint. The wells and piezometers allowed for monitoring groundwater levels and performing slug tests and pump tests. At locations where more than one piezometer was installed in a borehole or two monitoring wells were located adjacent to one another, a letter suffix was added to the well or piezometer identification to indicate the relative depth of its screened interval. In those cases, "A" indicates the deepest screened interval, "B" indicates a screened interval less deep than "A," and "C" indicates a screened interval less deep than "B." These instruments were positioned at vertical locations selected to measure groundwater piezometric conditions of specific geologic units or fractures and to measure vertical groundwater seepage gradients.

Monitoring well and piezometer installations followed ASTM Method D 5092 guidelines. The installations consisted of 3/4-inch or 1-inch diameter (piezometers) and 2-inch diameter (monitoring or observation wells), Schedule 40 PVC pipe with a 0.01-inch slotted screen section placed at the bottom of the instrument. The annual space surrounding the slotted screens was backfilled with clean, uniformly-graded filter sand. A bentonite seal (pellets or grout) was used to isolate the slotted screen from the overlying and underlying (if applicable) annular space in the borehole, and to prevent surface water from hydraulically short-circuiting the screen. The slotted screen and sand pack lengths varied depending on the borehole's specific geologic condition, as summarized in Table 3-1. At locations where multiple-level wells or piezometers (i.e., well or piezometer clusters) were installed, the wells and piezometers were installed in either the same or multiple boreholes, depending on accessibility of the borehole annulus for sealing with bentonite. All instruments were protected with a steel casing enclosed by a 4-inch diameter steel pipe with a locking top to prevent unauthorized access. Each well or piezometer was developed by purging with water and pumping subsequent to installation.

The ground surface elevation at each boring was surveyed to the nearest 0.1 foot relative to the NGVD, 1988. Piezometer and well casing top elevations were measured to the nearest 0.01 foot. Horizontal locations for wells and borings were surveyed to an accuracy of about one foot. The coordinate and elevation surveys were performed by SME with GPS instrumentation.

3.2.3 Groundwater Level Measurements. Periodic groundwater level measurements have been obtained throughout the development history of this landfill Site using the numerous wells and piezometers. Since about 2004, water levels have been measured in the proposed landfill Expansion area. During 2007, monthly water levels were measured to characterize groundwater level variation throughout an entire annual cycle. The 2007 data was used to develop wet and dry season groundwater maps to evaluate possible changes in hydraulic gradients and groundwater flow directions. In 2014, water level measurements were made, confirming that the annual cycle measured monthly in 2007 was still valid for current site conditions

Water levels were measured from the top of the PVC risers, converted to an elevation, and reported to the nearest 0.01 foot. The water level readings were collected using electronic or mechanical water level meters. The water level measurements in the instruments were used to determine the depth to the groundwater table and calculate horizontal and vertical groundwater seepage gradients. The seepage gradients, along with the hydraulic conductivity results, were used to estimate the directions and rates of groundwater flow. A summary of water level measurements is tabulated in Appendix D.

3.2.4 In Situ Hydraulic Conductivity Testing. Slug tests were performed in the monitoring wells and piezometers to estimate the in situ hydraulic conductivity of the till and the bedrock beneath the Expansion. A slug of water was either removed from (rising-head test) or added to (falling-head test) the instrument and the rate that the groundwater recovered to its static condition recorded at periodic intervals. Automated measurements of water level displacement were obtained with an electronic pressure transducer and the information was stored on electronic data recorders. Slug test data were evaluated with the AQTESOLV for Windows®, Version 3.5 computer program (Duffield, 2003). Hydraulic conductivities were calculated from the slug test data using the method of Bouwer and Rice (1976). Results of the in situ slug testing are summarized in Table 3-2 and on the respective boring logs in Appendix B. Plots of the slug test results are documented in Appendix E.

TABLE 3-2

IN SITU HYDRAULIC CONDUCTIVITY TEST RESULTS

Instrument Designation	Screened Geologic Unit	Sand Pack Interval (ft-bgs)	Slug Tests Hydraulic Conductivity (cm/sec)	In or Out of Expansion Footprint
P-04-05A	Basal Till	47 - 48	7.2E-06	In
P-04-05B	Basal Till	14 - 15	6.8E-07	In
P-04-06A	Bedrock	42.9 - 43.9	4.9E-05	In
P-04-06B	Basal Till	9 - 10	1.9E-06	In
P-08-06	Basal Till	11.2 - 13.2	1.6E-06	In
P-08-07	Basal Till	10 - 12	1.4E-06	In
MW-207	Bedrock	25 - 30	1.7E-05	In
P-212	Bedrock	31.3 - 36.3	7.8E-06	In
P-225	Basal Till	7.7 - 12.7	2.6E-05	In
MW-304A	Bedrock	29.5 - 39.5	4.8E-03	In
P-04-08A	Basal Till	38.5 - 39.5	3.2E-07	Out
P-04-08B	Basal Till	15.5 - 16.5	1.9E-06	Out
P-04-09A	Bedrock	38 - 39	9.7E-07	Out
P-04-09B	Basal Till	14 - 15	3.5E-05	Out
P-04-10A	Bedrock	33.1 - 34.1	1.4E-03	Out
P-04-10B	Basal Till	8.2 - 9.2	5.1E-05	Out
P-04-11A	Basal Till	48.5 - 49.5	3.2E-05	Out
P-04-11B	Basal Till	9 - 10	1.9E-05	Out
P-04-12A	Bedrock	59 - 64	4.1E-05	Out
P-04-12B	Bedrock	37 - 39	2.7E-04	Out
P-04-12C	Marine Clay	4.3 - 5.3	7.7E-06	Out
P-04-14A	Bedrock	57 - 59	6.6E-03	Out
P-04-14B	Bedrock	14.5 - 16.5	1.3E-03	Out
MW-04-111	Basal Till	10 - 15	7.9E-05	Out
MW-05-01	Basal Till	10 - 15	8.9E-05	Out
MW-05-02	Basal Till	10 - 15	1.9E-05	Out
MW-05-03	Basal Till	10 - 15	4.2E-05	Out
MW-05-04	Basal Till	10 - 15	1.5E-04	Out
MW-05-05	Basal Till	10 - 15	1.7E-05	Out
MW-06-02	Bedrock	25 - 35	4.3E-05	Out
OW-06-05	Bedrock	26.5 - 36.5	2.6E-06	Out
OW-06-06	Bedrock	28 - 38	8.4E-07	Out
OW-06-07	Bedrock	28 - 38	1.5E-06	Out
OW-06-08	Bedrock	24 - 34	3.3E-05	Out
OW-06-09	Bedrock	29 - 39	1.6E-05	Out
OW-06-10	Bedrock	32 - 42	6.7E-06	Out

TABLE 3-2 (cont'd)

Instrument Designation	Screened Geologic Unit	Sand Pack Interval (ft-bgs)	Slug Tests Hydraulic Conductivity (cm/sec)	In or Out of Expansion Footprint
P-08-03B	Basal Till	3.3 - 5.3	1.1E-06	Out
P-08-04A	Basal Till	5.2 - 7.2	5.4E-06	Out
P-04-13A	Bedrock	125.5 - 127.5	1.3E-07	Out
P-04-13B	Bedrock	64 - 66	1.3E-06	Out
P-04-13C	Marine Clay	8 - 9	1.6E-07	Out
MW-06-01	Cobble Zone	10 - 20	3.1E-03	Out
MW-213	Basal Till	14.6 - 19.6	2.4E-05	Out
P-213	Boulder Zone	33.3 - 38.3	9.5E-03	Out
P-04-07A	Bedrock	73 - 83	8.5E-06	Out
P-04-07B	Bedrock	24.5 - 25.5	3.2E-03	Out
P-04-07C	Basal Till/Bedrock	4.3 - 5.3	2.0E-05	Out
MW-223A	Bedrock	28 - 33	2.7E-04	Out
MW-223B	Basal Till	12.6 - 17.6	4.2E-05	Out
MW-227	Basal Till	15 - 20	1.6E-07	Out
MW-301[1]	Bedrock	146.9 - 182.7	7.0E-07	Out
MW-301[1]	Bedrock	146.9 - 182.7	6.8E-07	Out
MW-301[1]	Bedrock	151.7 - 182.7	6.0E-07	Out
MW-301[1]	Bedrock	161.5 - 182.7	1.2E-06	Out
P-201A	Bedrock	67.7 - 69.7	4.6E-04	Out
P-201D	Basal Till	35 - 40	1.1E-05	Out
P-202A	Bedrock	27.9 - 37.9	5.3E-04	Out
MW-204	Basal Till	13.8 - 18.8	1.0E-05	Out
P-204A	Basal Till	29 - 34	8.8E-06	Out
P-206A	Bedrock	85.5 - 90.5	9.5E-06	Out
P-206B	Washed Till	49.7 - 54.7	2.5E-03	Out
P-206C	Basal Till	6 - 11	1.1E-05	Out
MW-206A	Basal Till	15 - 20	3.4E-07	Out
P-210	Bedrock	20 - 25	2.3E-04	Out
P-211A	Bedrock	5 - 10	4.2E-04	Out
P-211B	Basal Till	16.6 - 21.6	3.5E-05	Out
P-214A	Bedrock	57.2 - 62.2	1.5E-04	Out
P-214B	Basal Till	38.1 - 43.1	1.7E-05	Out
P-214C	Basal Till	11 - 16	1.9E-06	Out
P-215A	Bedrock	28 - 33	3.2E-03	Out
P-215B	Basal Till	7 - 12	4.6E-06	Out
P-216B	Basal Till	5 - 10	3.4E-04	Out
MW-216B	Basal Till	14 - 19	4.9E-05	Out
P-220B	Basal Till	15 - 20	2.3E-05	Out
P-222A	Bedrock	23.7 - 28.7	3.2E-04	Out
P-222B	Basal Till	5.2 - 10.2	1.2E-06	Out
P-226A	Basal Till	20.3 - 25.3	7.8E-06	Out
P-502A	Washed Till	38 - 43	4.6E-03	Out
P-502B	Basal Till	6.3 - 11.3	3.5E-05	Out
P-504A	Washed Till	43 - 48	7.4E-03	Out
Geometric Mean Horizontal Hydraulic Conductivity	**Basal Till**		**9.4E-06**	
	Washed Till		**1.9E-03**	
	Bedrock		**3.5E-05**	

Note:
MW-301 tests were done using a packer system in an open borehole, at the depths indicated.

3.2.5 Borehole Geophysical Logging Survey. Borehole geophysical data were collected by NGS of Bangor, Maine from the PW-08-series bedrock borings to help identify hydraulically conductive fracture zones as far down as 200 feet that might provide a pathway for groundwater flow. Borehole geophysical data was also collected from MW-06-02, to a depth of about 41 feet into the bedrock. The suite of probes utilized for logging included fluid temperature, fluid conductivity (resistivity), single-point resistance, spontaneous potential, caliper, and flowmeter measurements. Additionally, optical televiewer images were collected from the PW-08-series and acoustic televiewer images were collected from MW-06-02. Collectively, these geophysical logging probes yielded information about borehole fluid characteristics, bedrock lithologic characteristics, borehole diameter, geometric orientation and distribution of bedrock fractures, which fractures contributed to groundwater movement from or into the borehole, and the distribution of vertical flow in the borehole. Composite geophysical logs were prepared, which show a vertical depth profile of the recorded data collected in each logged borehole. The results were reviewed and the information used to identify potential hydraulically conductive zones in the boreholes for planning the operational procedures and specifications for pump tests. NGS summary reports containing a description of methods and instrumentation, and the borehole geophysical logs are in Appendix F.

The downhole geophysical logging and pump test revealed two approximately orthogonal predominant bedrock fracture sets: one striking northeast/southwest (relative to True North) and one striking northwest/southeast. This uniform finding is consistent with the outcrop fracture mapping and the observed regional photolineament pattern. There are also fractures that strike at various other directions. Many of the observed fractures dip steeply. The flowmeter, single-point resistance, and driller's logs were useful in identifying potential water-bearing fractures and zones of high groundwater transmissivity through the rock. The single-point resistance typically decreased local to fracture zones contributing groundwater flow into the borehole. The downhole flowmeter demonstrated where groundwater entered or exited a fracture, and produced a profile of vertical flow rates within the borehole.

At PW-08-01, five zones of high transmissivity were identified by NGS. The spacing between the highly transmissive zones was fairly regular. Measurements made under ambient (non-

pumping) conditions indicate that water flows into the borehole from a transmissive zone at a depth of about 193 feet below ground surface (bgs). Most of the flow is upward and gradually decreases as the water leaves the borehole through other fractures. There is also some downward flow originating from this point that appears to be increasing with depth. At PW-08-02, four highly transmissive zones were identified by NGS. The spacing between them was irregular, with two being between about 38 feet to 55 feet below the ground surface and two being between about 83 feet and 95 feet below the ground surface. Measurements made under ambient conditions indicate that water flows into the borehole from a transmissive zone at a depth of about 43 feet below the ground surface. The flow is downward and mostly decreases as water leaves the borehole through fractures at the deeper transmissive zones. No measurable flow was found between about 95 feet below the ground surface and the bottom of the bedrock boring at about 235 feet below the ground surface. At PW-08-03, four fairly regularly spaced high transmissivity zones were identified. At PW-08-04, seven fairly regularly spaced high transmissivity zones were identified. It is important to note that observed vertical movement of water through these deep bedrock boreholes can be exaggerated because the borehole acts as a non-natural conduit between the high transmissivity zones.

3.2.6 Groundwater Tracer Test in Glacial Till. A groundwater tracer test was initiated during February 2005 in an area where the till was characterized as sandy silt having a fines content of about 53 percent based on grain size analysis testing. The purpose of this test was to estimate the rate of horizontal groundwater movement through the glacial till. The test also provided data on the horizontal spreading (i.e., lateral dispersion) of the tracer. An area was selected at the lower site elevations, just north of the Expansion, where groundwater flow in the till was judged primarily horizontal based on mapping of interpreted vertical equipotential lines determined from groundwater level monitoring. A sodium bromide tracer was injected in well MW-04-111, which traveled under natural gradient conditions towards an array of observation wells (MW-05-01 through MW-05-05) screened in till. Periodic sampling of groundwater in the downgradient observation wells was performed throughout the test. Results of the test indicated a horizontal groundwater velocity of about 11 feet per year (ft/yr) in the till. The test results aided in corroborating calculated groundwater velocities based on hydraulic conductivity, horizontal seepage gradients, and effective porosity estimates. The tracer test results are documented and discussed in more detail in Appendix G.

3.2.7 Groundwater Tracer Test in Bedrock. A field-scale evaluation of the groundwater velocity in the fractured bedrock just north of the Expansion was conducted in June 2008. The bedrock underlying the tracer test site consists of metamorphosed siltstone containing steeply-dipping joints and fractures. Downhole geophysical logging of MW-06-02 revealed a principal fracture set striking to the northeast/southwest. A secondary fracture set (with fewer fractures) had an average strike in the northwest/southeast direction. Similar to the till tracer test, a sodium bromide solution was injected as a slug into well MW-06-02, and a natural gradient tracer test performed. Samples of groundwater were periodically collected from the injection well and six observation wells (OW-06-05 through OW-06-10) screened in bedrock. Although complicated by natural downward groundwater movement, the average groundwater velocity fitting the observed results was about 5 ft/day. This represents a local velocity on the scale of tens-of-feet per day. There appeared to be preferential flow controlled by the predominant northeast/southwest striking fracture set. The tracer plume also spread horizontally over an angle of at least 100 degrees as it traveled about fifty feet away from the injection well. This spreading confirmed the interconnection of various fracture sets in the bedrock. The bedrock tracer summary report is included in Appendix H.

3.2.8 Groundwater Age-Dating. The age of groundwater beneath and downgradient of the Expansion area was evaluated at two locations using the tritium-helium groundwater age-dating methodology. Groundwater samples were collected on January 25, 2005, and submitted to the University of Rochester for age-dating. The results of the helium-tritium testing are provided in Appendix I.

One location was selected at the higher site elevations where groundwater seepage gradients through the till were measured to be nearly vertical in a downward direction. This location is atop a topographic ridge, which creates a groundwater divide; groundwater migrates east and west away from this ridge or divide. By calculating the groundwater age at the base of the glacial till, an estimate of the groundwater travel time through the till to the bedrock could be made. The age of the groundwater was determined to be about 14 years in the sample obtained from slightly into the bedrock at P-04-06A. This result indicates a groundwater travel

time of greater than six years through the glacial till at a location where the till is about 28.5 feet thick and groundwater seepage gradients are nearly vertical in a downward direction.

A second groundwater age was determined from a sample collected at P-04-07B, which is located downgradient of P-04-06A and outside the western edge of the Expansion. The well is screened in the shallow bedrock. The purpose of measuring this groundwater age was to estimate the groundwater travel time across the Expansion from P-04-06A to P-04-07B, prior to its discharge to the ground surface further west. The differences in groundwater age between these two locations provides an estimate of the seepage rate of groundwater flow in the bedrock. This bedrock velocity, calculated to be in the order of about 140 feet/year, was used to corroborate travel time estimates for the sensitive receptor analyses. This seepage velocity is on a larger scale than the tracer test described in Section 3.2.7; a scale of hundreds of feet and not along the principal fracture set strike like the tracer test. The groundwater age calculated at this well was about 21 years, indicating a groundwater travel time to the surface water of more than six years.

3.2.9 Bedrock Pumping Test at MW-06-02. A groundwater pumping test was conducted at the site of the bedrock tracer test. The purpose of the test was to examine bedrock fracture interconnection and corroborate the slug test hydraulic conductivities. The test was conducted on July 10, 2006, by SME, and utilized MW-06-02 as the pumping well and OW-06-05 through OW-06-10 as the observation wells. The observation wells are about 50 feet from MW-06-02. Observation well OW-06-10 is oriented approximately along the principal fracture set from the pumping well, while wells OW-06-06 and OW-06-07 are approximately along the secondary fracture set strike. The fracture strike orientations were known based on the downhole geophysical logging of MW-06-02. Documentation and a complete description of the pumping test are in Appendix J.

Because (1) the well screen only partially penetrated into the bedrock, (2) groundwater leakage from till into the bedrock occurred during the test, and (3) groundwater flow to the pumping well was likely not uniformly radial, the calculated aquifer parameters are only approximate. The test likely overestimated the bedrock transmissivity, hydraulic conductivity, and the storage coefficient. Barker and Black (1983) note that transmissivity values are always overestimated

when applying standard type-curves to fractured bedrock. When treated individually, the estimated hydraulic conductivities for the observation wells ranged from $3x10^{-4}$ to $2x10^{-3}$ cm/sec with storage coefficients ranging from 0.0001 to 0.0008. The hydraulic conductivities from slug tests on the observation wells were lower than the values calculated from the transmissivities. This may be associated with the transmissivity value being over-estimated as stated previously, or a difference between a point-specific hydraulic conductivity (i.e., slug test value) and an average bulk value (calculated transmissivity) over the approximately 50-foot separation distance between the pumping well and observation wells.

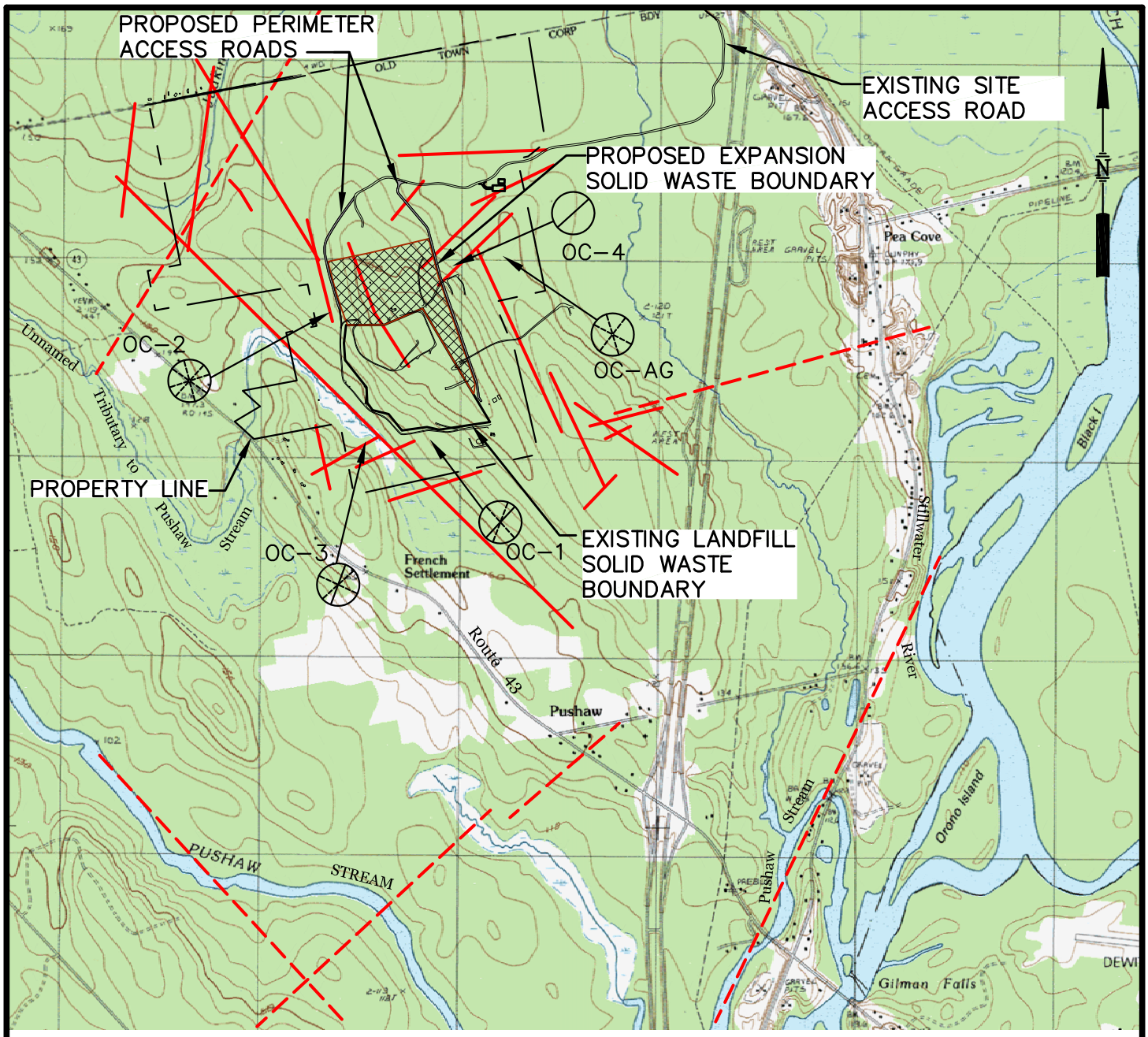
The wells along the principal fracture set appeared to respond more rapidly to pumping than those wells oriented approximately perpendicular to the principal fracture set. This is consistent with an interpretation that the principal fracture set's average hydraulic conductivity is greater than that of the secondary fracture set. Utilizing the method of Papadopoulos (1965), the two principal transmissivities were calculated for various three-well groupings of the observation wells. The orientation of the principal transmissivities could also be estimated from this method. This analysis resulted in average principal transmissivities of 0.70 and 0.04 cm^2/sec. The azimuth of the maximum transmissivity was N61E relative to True North, while that of the minimum was perpendicular to this heading. The orientation of the maximum value nearly corresponded with the orientation of the strike of the principal fracture set based on the downhole geophysical logging, which ranges between about N25E and N70E. This result suggests the bedrock is anisotropic relative to hydraulic conductivity with the greater hydraulic conductivity being to the northeast/southwest.

3.2.10 Photolineament Survey. Photolineaments were mapped for the 1991 permit application (see Section 2.6.2 herein for a discussion of the findings). The photolineament mapping was updated using currently available aerial photographs and maps as depicted in Figure 3-2. Better quality stereo pairs indicated several additional photolineament features within and near the BGS property. Three photolineaments were identified by SME within or adjacent to the Expansion as shown in Figure 3-2. Furthermore, these three photolineaments appeared to coincide or nearly coincide with low resistivity zones in the bedrock based on the earth resistivity geophysical survey. The intersection of the two photolineaments just outside the

western edge of the Expansion footprint also appears to correspond to a low resistivity zone in the bedrock.

3.2.11 Bedrock Outcrop Survey. A vertically oriented outcrop of bedrock was selected for detailed fracture mapping. The purpose of the mapping was to record fracture and joint strikes and dips, describe fracture lengths, record fracture intersections, and determine average fracture spacing (Barton and Hsieh, 1989). The outcrop selected is located on the east side of the Expansion (as shown on Figure 4-5) and was designated OC-AG. The outcrop is aligned approximately parallel to the northeast/southwest fracture set of this Site. Therefore, there is a slight negative bias in recording northeast/southwest fractures resulting in a fracture rose diagram (see Figure 3-3) that may suggest a greater relative number of northwest/southeast fractures and other orientations than northeast/southwest fractures.

Figure 3-3 shows an approximately 4-foot high by 6-foot wide area of the outcrop where every fracture greater than one foot in length was recorded. The detailed fracture strike and dip data as well as the number of fracture intersections are presented in Appendix K. A more northerly portion of the same outcrop, not shown on Figure 3-3, was mapped for fracture and joint orientation and inspected for fracture lengths. The northern section was not mapped in the detail shown in Figure 3-3. Individual fracture strike and dip information is reported in Appendix K. Fracture numbers for the northern portion of the outcrop are amended with an “A” suffix. There were several horizontally-oriented fractures in the overall outcrop that had lengths greater than 20 feet and many vertically-oriented fractures with lengths greater than the exposed height of the outcrop (at least five feet). Fracture spacing was analyzed by transecting the outcrop shown in Figure 3-3 with three straight vertical lines and two straight horizontal lines, and then identifying the fractures crossing the lines. The average fracture spacing was then calculated by dividing the line lengths by the number of crossing fractures and joints. The averages ranged from 0.22 to 0.36 feet for vertical spacing and from 0.46 to 0.55 feet for horizontal spacing. The fracture and joint intersection density for the outcrop was calculated at 5.7 intersections per square foot.



BASE MAP ADAPTED FROM 7.5 MIN USGS TOPOGRAPHIC QUADRANGLE OLD TOWN, MAINE–1988

NOTES

LOCATIONS OF OUTCROPS ARE APPROXIMATE.

LEGEND

- HIGH ALTITUDE PHOTOLINEAMENTS (CASWELL, EICHLER & HILL, 1986)
- LOW ALTITUDE PHOTOLINEAMENTS (SEVEE AND MAHER 1991, UPDATED 2008)
- BEDDING (———) AND FRACTURE (– – – – –) ORIENTATIONS MEASURED AT OUTCROPS (LOCATION APPROXIMATE)

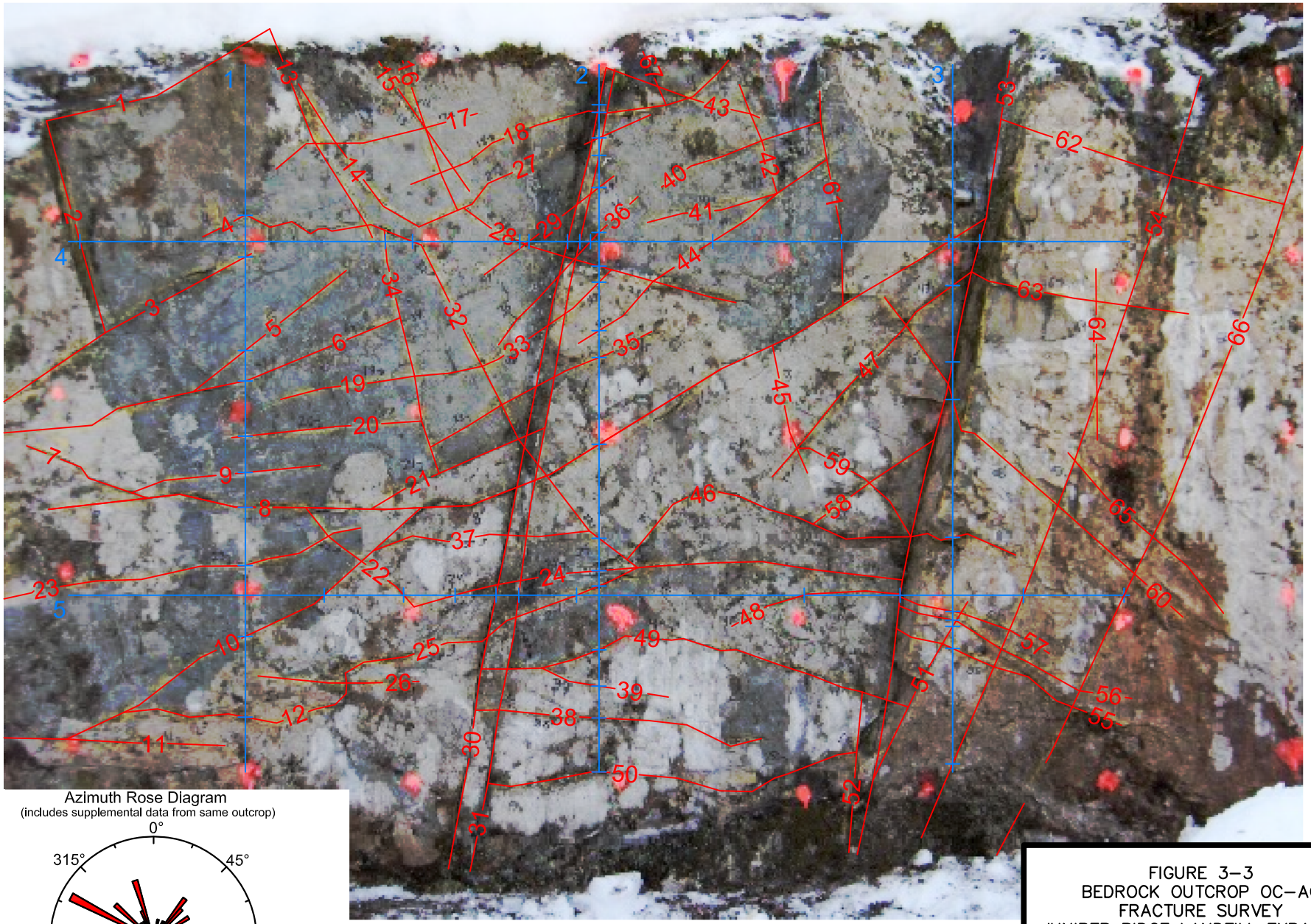
1250 0 2500 5000 FEET

DWG: SITELOC LMN:PHOTOLIN CTB: SITELOC REV: 5/28/2015

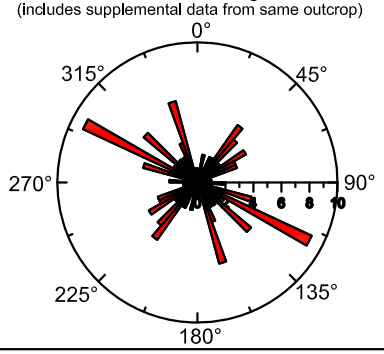
FIGURE 3–2
PHOTOLINEAMENTS AND FRACTURE TRACES
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

\\Nserver\cfs\Casella\OldTownLandfill\Expansion\9.35MCY-Expansion\Acad\Figures\SITELOC.dwg, 5/28/2015 9:19:57 AM, paf



Azimuth Rose Diagram
(includes supplemental data from same outcrop)



Approximate Scale

0.625 0 1.25 FEET

Line 1: 11 Fractures - Average Spacing 0.36 ft
Line 2: 18 Fractures - Average Spacing 0.22 ft
Line 3: 11 Fractures - Average Spacing 0.36 ft
Line 4: 13 Fractures - Average Spacing 0.46 ft
Line 5: 11 Fractures - Average Spacing 0.55 ft

FIGURE 3–3
BEDROCK OUTCROP OC–AG
FRACTURE SURVEY
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

DWG: BEDROCKFRACTURE LMN: CTB: SME–STD REV: 4/9/15

\\Nserver\cfs\Casella\OldTownLandfillExpansion\9.35MCY-Expansion\Acad\Figures\bedrock fracture.dwg, 4/9/2015 1:32:04 PM, paf

The outcrop visually demonstrated the interconnectivity of the bedrock fractures. In fact, an interesting observation of the fractures in the outcrop mapping in Figure 3-3 is that all the recorded fractures are interconnected to one another. That is to say that starting at any arbitrary fracture, a pathway exists to any other recorded fracture on the outcrop.

3.2.12 Surficial Geophysical Survey. Two electrical earth resistivity and VLF-EM geophysical surveys were performed for the proposed Expansion on separate occasions. Approximately 6,600 lineal feet of surface resistivity transects were profiled within the footprint of the Expansion between October and November 2004. An additional approximately 27,000 lineal feet of transects, located within and adjacent to the Expansion footprint, were profiled between November 2008 and January 2009. Both surficial geophysical surveys were conducted by NGS of Bangor, Maine. Transect line locations are shown on Figure 3-1. The information collected from these geophysical surveys was utilized as an aid in identifying low-resistivity zones in the bedrock and as a gauge of approximate surficial soil thickness. Zones of lower resistivity in the bedrock may indicate fracture zones or denser fracture networks. When a VLF-EM anomaly and low resistivity zone were observed in the same area, the corroborating results provided evidence of a possible bedrock fracture zone. The resistivity and VLF-EM profiles were used to select deep bedrock borehole locations where subsequent pumping tests were conducted to examine fracture interconnectivity. Higher resistivity zones in the soil overburden were useful in approximately delineating a cobble zone and sandy till zone outside the southeast side of the existing landfill. The interpreted resistivity data are presented as vertical profiles in two summary reports in Appendix L (NGS, 2004 and 2009). The methodology and instruments used are also described in Appendix L.

3.2.13 Fracture Interconnectivity Pumping Test. Between January 29 and April 19, 2009, SME conducted five groundwater pumping tests of the four deep bedrock boreholes drilled for the proposed JRL Expansion investigation. The deep bedrock boreholes were installed between December 29, 2008, and January 9, 2009 by Goodwin Well & Water, Inc. of North Turner, Maine using air rotary methodology. They are identified as pump wells PW-08-01, PW-08-02, PW-08-03, and PW-08-04. The purpose of installing the deep bedrock wells and conducting groundwater pump tests at each borehole was to enhance the understanding of groundwater

flow properties in the bedrock, particularly pertaining to the interconnectedness of the bedrock fractures through which the groundwater flows (Gernand and Heidtman, 2005). A Work Plan was prepared and submitted to MEDEP outlining the technical approach to the pumping tests. A copy of the approved Work Plan, excluding attachments that can be found in other appendices, is included in Appendix M.

The locations of the four deep bedrock boreholes were selected based on approximately 34,000 lineal feet of electrical resistivity geophysical survey data supplemented by VLF-EM survey data, as mentioned previously. Boreholes PW-08-01, PW-08-02, and PW-08-04 were selected at locations where deeper bedrock had relatively low electrical resistivity. Borehole PW-08-03 was selected at a location with relatively high electrical resistivity. Thus, measurements observed in three of these boreholes are biased toward the more permeable bedrock, which is not representative of the Site-wide average bedrock conditions where groundwater is transmitted through sparser, less transmissive fractures.

Separate short-term pump tests (24 hours to 50 hours) were conducted at PW-08-01, PW-08-02, PW-08-03, and PW-08-04 to examine the fracture interconnectivity. The intention was to dewater bedrock fractures as much as possible in a short amount of time using relatively high pumping rates. The extent of groundwater drawdown in the deep boreholes and in a network of monitoring wells and piezometers surrounding the pumped boreholes was measured and analyzed so that a better understanding of the orientation and degree of interconnectedness of bedrock fractures could be quantified. This approach has been successful at other sites and was successful here in corroborating other collected site-specific data, such as the bedrock tracer test and fracture mapping, in terms of understanding fracture interconnectivity and ultimately in interpreting the groundwater flow behavior in the bedrock. The extent of fracture interconnectivity is directly related to the presence of drawdown during a pump test, as well as the distance and direction from the pump wells that drawdown is observed. Drawdown graphs are included in Appendix M for these the pump tests. The borehole logs are included in Appendix B.

An extended pump test was later conducted during which PW-08-01 was pumped for two weeks and PW-08-02 was pumped for the second of the two weeks only. This combined test

was used to (1) create a more aggressive fracture dewatering for interconnectivity evaluation, (2) demonstrate hydraulic control of the groundwater in the bedrock, and (3) examine any delayed groundwater recharge effects. The results of this combined test are also included in Appendix M.

A summary description of the operation of each pumping test is presented below. A presentation and analysis of the pump test data is included in Appendix M and is further discussed in terms of bedrock fracture interconnectivity in Appendix U.

PW-08-01 24-Hour Pumping Test

SME conducted a 24-hour groundwater pumping test at PW-08-01 beginning at 1:00 PM on January 29, 2009 and ending at 1:00 PM on January 30, 2009. Daily average temperatures during the pump test ranged between 13 ºF and 16 ºF (based on temperatures recorded for Bangor, ME). A 0.03-inch precipitation event (snow) occurred on January 29, and there was no precipitation on January 30 (based on precipitation data recorded for Bangor, ME). PW-08-01 is a drilled 6-inch diameter bedrock well with a total depth of about 260 feet bgs. Bedrock was encountered at about 59 feet bgs in PW-08-01 and it is overlain by glacial till. The 6-inch diameter well casing is set to a depth of about 64 feet bgs.

The pumping test was run using a 7.5 horsepower (HP) pump powered by a generator. The pump was set at a depth of approximately 186 feet bgs. Groundwater was pumped from PW-08-01 through a 4-inch diameter pipe with a 2.5-inch orifice plate, and discharged approximately 300 feet away in a downslope and hydraulically downgradient direction. Groundwater pumping rates during each test were adjustable by use of a valve. During this pumping test, the pumping rate was set to the highest capacity of the pump by leaving the valve open. The pumping rate at the beginning of the test was 105 gallons per minute (gpm) and dropped to 93.4 gpm due to increased head in the pump column as the groundwater level dropped in the well. The average pump rate throughout the test was about 96 gpm. The static depth to groundwater before the pump test in PW-08-01 was 9.50 feet bgs. The maximum drawdown in PW-08-01 during this pumping test was 70.27 feet at the end of the pump test (1,440 minutes into the test). A partial loss of power from the generator to the pump resulted in a temporary decrease of the pumping rate between 1,170 minutes and 1,220 minutes into the

pump test. This was presumably caused by filling the generator with cold fuel that was stored in a fuel tank on-site overnight. Recovery from drawdown in PW-08-01 was 100 percent complete about 1,778 minutes after the conclusion of the pump test.

PW-08-02 50-Hour Pumping Test

SME conducted a 50-hour groundwater pumping test at PW-08-02 beginning at 2:00 PM on March 17, 2009 and ending at 4:00 PM on March 19, 2009. Daily average temperatures during the pump test ranged between 29 ºF and 39 ºF. There was no precipitation on March 17, 0.01 inches of precipitation on March 18, and 0.01 inches of precipitation on March 19. A modest amount of snowmelt likely contributed to groundwater recharge during this period. PW-08-02 is a drilled 6-inch diameter bedrock well with a total depth of about 235 feet bgs. Bedrock at PW-08-02 is about 35 feet bgs and is overlain by glacial till. The 6-inch diameter well casing is set to a depth of about 38 feet bgs.

The pumping test was run using a 7.5 HP pump powered by a generator. The pump was set at a depth of approximately 88 feet bgs. Groundwater was pumped from PW-08-02 through a 6-inch diameter pipe with a 3-inch orifice plate, and discharged approximately 400 feet away in a downslope and hydraulically downgradient direction. The pumping rate was initially set to 100.9 gpm. After 240 minutes of pumping, the rate was reduced and continuously adjusted between 93.8 gpm and 89.3 gpm to prevent the water level in the well from dropping to the pump intake level. The average pump rate for the test was about 92 gpm. The static depth to groundwater before the pump test in PW-08-02 was 28.67 feet bgs. The maximum drawdown in PW-08-02 during this pump test was 59.38 feet at the end of the pump test (3,000 minutes into the test). Recovery from drawdown in PW-08-02 was 100 percent complete about 1,671 minutes after the conclusion of the pump test.

PW-08-03 26.5-Hour Pumping Test

SME conducted a 26.5-hour groundwater pump test at PW-08-03 beginning at 1:00 PM on February 5, 2009 and ending at 3:30 PM on February 6, 2009. Daily average temperatures during the pump test ranged between -1 ºF and 4 ºF. There was no precipitation during the test period. PW-08-03 is a drilled 6-inch diameter bedrock well with a total depth of about 235 feet bgs. Bedrock at PW-08-03 is about 35 feet bgs and is overlain by glacial till. The 6-inch diameter well casing is set to a depth of about 38 feet bgs.

The pumping test was run using a 1.5 HP pump powered by a generator. The pump was set at a depth of about 198 feet bgs. Groundwater was pumped from PW-08-03 through a 2-inch diameter pipe with a 1-inch orifice plate, and discharged approximately 300 feet away in a downslope and hydraulically downgradient direction. Pumping well PW-08-03 was drilled in the higher resistivity bedrock and has a relatively low groundwater yield. The static depth to groundwater before the pumping test started in PW-08-03 was 10.54 feet bgs. The pumping rate was initially set to approximately 12 gpm; however, after 50 minutes the pumping rate was reduced to approximately 8 gpm to prevent the water level in the well from dropping to the pump intake level. Over the remainder of the pump test, the pump rate was varied between approximately 8 gpm and 10 gpm. The water level in PW-08-03 at the end of the test (1,590 minutes into the test) appeared to be stabilizing at a depth of 182.7 feet bgs and an average pump rate of approximately 8.2 gpm. Recovery from drawdown in PW-08-03 was 100 percent complete about 1,080 minutes after the conclusion of the pumping test.

PW-08-04 26.5-Hour Pumping Test

SME conducted a 26.5-hour groundwater pumping test at PW-08-04 beginning at 12:15 PM on February 2, 2009 and ending at 2:45 PM on February 3, 2009. Daily average temperatures during the pump test ranged between 20 ºF and 23 ºF. There was no precipitation on February 2 and a slight precipitation event of 0.005 inches (snow) on February 3. PW-08-04 is a drilled 6-inch diameter bedrock well with a total depth of about 215 feet bgs. Bedrock at PW-08-04 was encountered at about 15 feet bgs and it is overlain by glacial till. The 6-inch diameter well casing is set to a depth of about 18 feet bgs.

The pumping test was run using a 5 HP pump powered by a generator. The pump was set at a depth of about 145 feet bgs. Groundwater was pumped from PW-08-04 through a 2-inch diameter pipe with a 1.25-inch orifice plate, and discharged approximately 300 feet away in a downslope and hydraulically downgradient direction. The pumping rate was set to approximately 32 gpm for the first 24 hours and adjusted to approximately 34 gpm for the last 2.5 hours. The average pump rate for the entire test was slightly over 32 gpm. The static depth to groundwater before pumping PW-08-04 was 8.20 feet bgs. The maximum drawdown in PW-08-04 during this pump test was 77.96 feet at the end of the pump test (1,590 minutes into the test). Recovery from drawdown in PW-08-04 was 100 percent complete about 2,610 minutes after the conclusion of the pump test.

PW-08-01 and PW-08-02 (Combined) Long-Term Pumping Test

SME conducted a long-term groundwater pump test that included both pump well PW-08-01 and PW-08-02. The pump test started with pumping PW-08-01 beginning at 12:30 PM on March 23, 2009. Groundwater was also pumped from PW-08-02 beginning on March 30, 2009 at 2:15 PM. The pump test ended at both wells simultaneously on April 6, 2009 at about 1:15 PM.

Daily average temperatures during the pump test ranged between 22 ºF and 45 ºF. There were nine precipitation events during the pumping test ranging from trace amounts to 0.51 inches per day. The amount of precipitation during the two-week period totaled 1.15 inches. Recharge to groundwater during this pumping test likely occurred due to snowmelt and precipitation.

Both pumping tests were run using 7.5 HP pumps powered by generators. The pump in PW-08-01 was set at a depth of approximately 186 feet bgs. The pump in PW-08-02 was set at a depth of approximately 145 feet bgs. Groundwater was pumped from PW-08-01 through a 6-inch diameter pipe with a 3-inch orifice plate, and discharged approximately 700 feet away in a downslope and hydraulically downgradient direction. Groundwater was pumped from PW-08-02 through a 4-inch diameter pipe with a 2.5-inch orifice plate, and discharged approximately 600 feet away in a downslope and hydraulically downgradient direction. The pumped groundwater discharge from PW-08-01 was directed away from PW-08-02, and the pumped groundwater discharge from PW-08-02 was directed away from PW-08-01. The

pumping rates at PW-08-01 and PW-08-02 were set to the highest capacities of the pumps by leaving the valves open. The groundwater flow rate at the beginning of the test at PW-08-01 was greater than 200 gpm and dropped to 150.6 gpm due to increased head as the groundwater level dropped in this well. The groundwater flow rate at the beginning of the test at PW-08-02 was 96.5 gpm and dropped to 77.8 gpm due to increased head as the groundwater level dropped in this well.

The generator powering the pump at PW-08-01 was shutdown for maintenance for 3 minutes on March 24, 2009, for about 4.25 minutes on March 26, 2009, and for approximately 6 minutes on March 30, 2009. Additionally, a generator malfunction caused the pump at PW-08-01 to shut off for approximately 13 hours between 8:30 PM on March 26, 2009 and 9:30 AM on March 27, 2009.

The static depth to groundwater before the pumping test in PW-08-01 was 7.42 feet bgs. The maximum drawdown in PW-08-01 during this pumping test was 123.95 feet (14,820 minutes into the test). The static depth to groundwater before the pump test in PW-08-02 was 38.41 feet bgs (before the start of pumping at PW-08-01 on March 23, 2009). The maximum drawdown in PW-08-02 during this pumping test was 68.78 feet. Recovery from drawdown in PW-08-01 was 100 percent complete about 2,819 minutes after the conclusion of the pump test. Recovery from drawdown in PW-08-02 was 98 percent complete 3,140 minutes after the conclusion of the pump test.

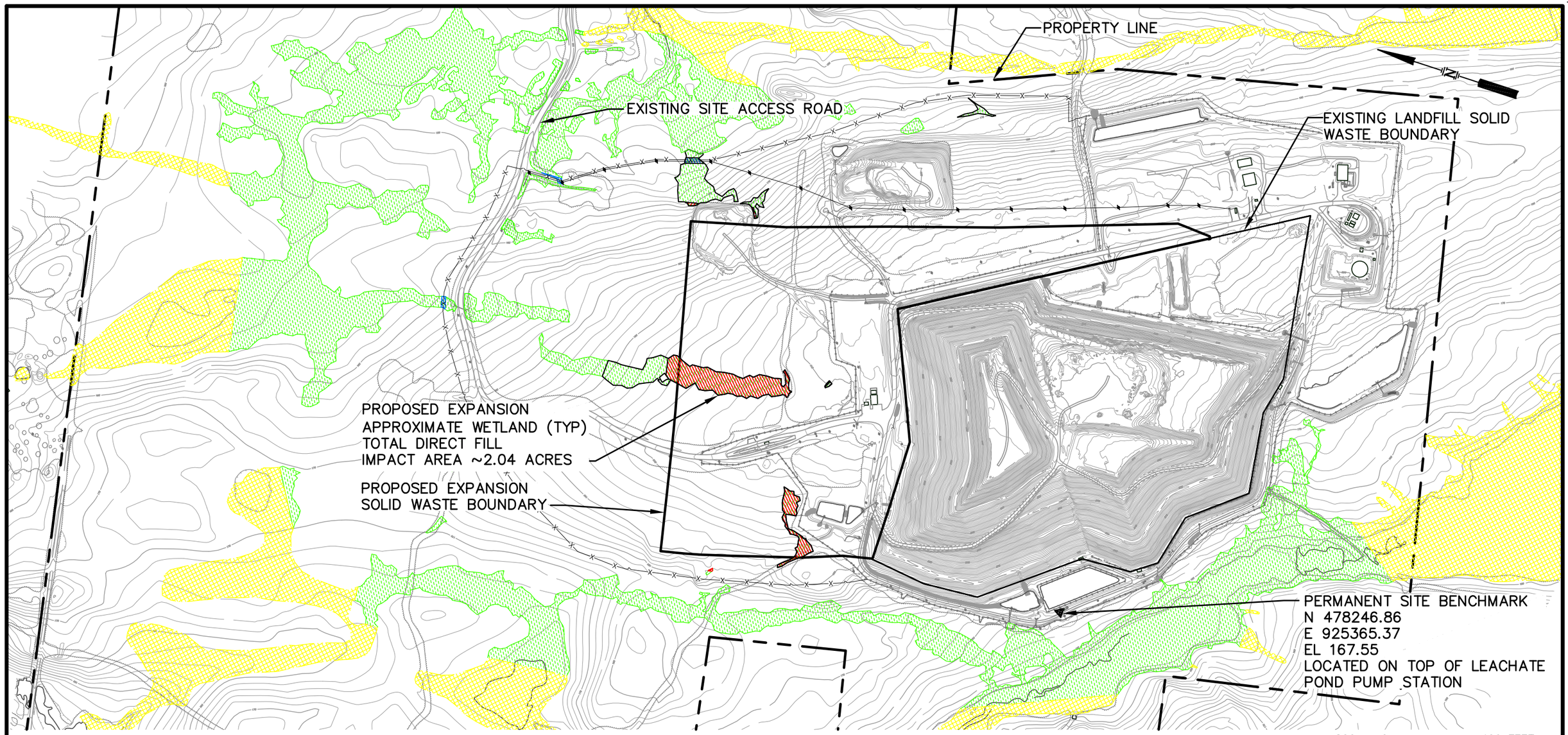
The long-term combined pump test allowed for analysis of the source of recharge to the bedrock. As indicated in Appendix M, recharge from till drainage can stabilize drawdowns if the test is run for up to a week. Analysis of the pump test data for anisotropic effects using the method of Papadopoulos (1965), showed the rock to have a slightly greater transmissivity to the northeast/southwest than to the northwest/southeast. The average calculated ratio of maximum principal transmissivity to minimum principal transmissivity was about 3.4 to 1. The azimuth of the maximum transmissivity was about N36E relative to True North. The anisotropy ratio is less than that obtained for the MW-06-02 pump test. The transmissivities were consistent with the electrical resistivity survey, which indicated a more densely fractured rock at PW-08-01 than in surrounding areas. Pumping in the more densely (i.e., more permeable)

fractured rock was helpful in extending out the area potentially affected by pumping to test fracture interconnectivity.

3.2.14 On-Site Wetlands Delineation. During the spring, summer, and fall of 2004, and during the spring of 2005, 2006, 2007, 2008, the fall of 2014, and spring of 2015, Stantec, Inc. (formerly Woodlot Alternatives, Inc. [Woodlot]) from Topsham, Maine, conducted wetland delineations at the Site using methods described by the U.S. Army Corps of Engineers (ACOE) Wetland Delineation Manual (1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Regional Supplement (2012). The delineations were conducted in accordance with the technical criteria for determining boundaries of wetlands under the jurisdiction of the ACOE and the MEDEP. The field delineation included approximately 310 acres, which encompassed the Expansion footprint and an approximately 500-foot boundary around the existing and proposed landfill footprints. An additional approximately 750 acres, which encompassed an approximately 2,000-foot boundary around the existing and proposed landfill footprints, were also delineated by aerial photograph interpretation (photo date April 2004) and field (i.e., ground truth) GPS survey, as shown on Figure 3-4.

During the course of field delineation and ground-truthing activities, potential vernal pools were identified within several wetlands. Spring surveys were conducted of these potential vernal pools in 2005, 2006, 2007, 2008, and 2015. In addition, marsh/wading bird call response surveys were conducted in June 2005 within the wetland area adjacent to the existing JRL that was identified as inland waterfowl and wading bird habitat by the Maine Department of Inland Fisheries and Wildlife (MDIF&W). The call response survey methodology was based on Gibbs and Melvin (1993).

The proposed Expansion footprint will impact approximately two acres of wooded wetlands not containing wetlands of special significance. Stantec Inc.'s wetland delineation report is presented in Appendix N.



NOTES:

1. EXISTING GROUND CONTOURS FROM DECEMBER 31, 2014 AERIAL SURVEY PERFORMED BY AERIAL SURVEY AND PHOTO, INC. OF NORRIDGEWOCK, MAINE.
2. PROPERTY LINE LOCATIONS ARE A RESULT OF FIELD SURVEY PERFORMED BY HERRICK AND SALSBURY, INC. LAND SURVEYORS, ELLSWORTH, MAINE FOR TRYTON TREE FARM PROJECT, PATTEN CORPORATION–DOWNEAST, OLD TOWN, MAINE, FEBRUARY 23, 1988, REVISED APRIL 7, 1988.
3. WETLAND BOUNDARIES DELINEATED BY WOODLOT ALTERNATIVES, INC. IN 2004 AND STANTEC CONSULTING SERVICES 2008, 2014 AND 2015..

LEGEND

- WETLAND DELINEATED IN FIELD (SEE NOTE 3)
- WETLAND PHOTO–INTERPRETED
- WETLAND BOUNDARIES/VERIFIED (2014–2015)
- WETLAND WITH DIRECT FILL IMPACTS
- WETLAND CLEANING IMPACTS (0.10 ACRES TOTAL)

FIGURE 3–4
WETLAND DELINEATION
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

DWG: FIGURES LMN: WETLAND–DELIN CTB: OVERBURDEN REV: 6/18/2015

\\Server\cfs\Casella\OldTownLandfillExpansion\9.35MCY-Expansion\Acad\Figures\FIGURES.dwg, 6/18/2015 11:44:52 AM, paf

3.3 Laboratory Testing

Soil samples collected from explorations associated with the various site investigations for the Expansion were submitted to the SME soils laboratory for physical properties testing. Soil was tested for the following characteristics: grain size distribution, water content, porosity, density, specific gravity, Atterberg Limits, and hydraulic conductivity. The physical property testing is described in this section.

3.3.1 Grain Size Analysis. At least sixty soil samples obtained from test pits and borings associated with the 2004 and 2006 site investigations, were submitted for grain size analysis, performed in accordance with ASTM Method D 422. The average percent passing the U.S. No. 200 sieve (i.e., fines content) from this testing for the basal till was approximately 56 percent for the 11 soil samples collected within the footprint of the proposed Expansion (fines content range 42 to 95 percent). The fines content of this till, along with Atterberg limits for the basal till from the 1991 site investigations (SME, 1991), indicate it to be a low-plasticity silt or clay according to the Unified Soil Classification System.

The grain size samples for the discontinuous washed till lenses had fines contents of 30 and 45 percent, while a sandy zone within the till had 22 percent fines content. Outside the Expansion footprint to the southeast the cobble zone had fines contents of 5 and 6 percent, which are likely over-estimates since the cobbles could not be sampled. Grain size analysis results for soil samples are compiled in Appendix O. Boring and test pit logs from locations where samples were tested have been annotated with the soil fraction passing the U.S. No. 200 sieve (i.e., percent fines) in Appendices A and B.

3.3.2 Soil Water Content, Specific Gravity, and Total Porosity. Natural water contents were determined in the laboratory for the till samples from ten borings and 16 test pits from the 1990 and 2004 site investigations in accordance with ASTM Method D 2216 (1998). The water contents in these samples, which were collected within or adjacent to the Expansion footprint, are presented in the respective logs in Appendices A and B. Basal till water contents (includes both above and below the water table within the Expansion footprint) ranged from 10 to 23

percent with an average of approximately 13 percent in the boring and test pit soil samples. The tills beneath the existing landfill had water contents that ranged from 6 to 16 percent, with an average of around 11 percent (SME, 1991).

Two water contents, measured for the marine clay encountered at boring B-04-13 outside of the Expansion footprint, had water contents of 26 and 29 percent.

Natural water contents were also determined in the thin-walled tube samples collected in 2008. Water contents in the 2008 undisturbed tube samples of basal till ranged from 4 to 14 percent. The 4 percent value was from a gravelly till and, as a result, may not be representative of saturated conditions. The till porosity frequency distribution was not log-normal like that of the bedrock fracture porosity. However, there is a near-normal distribution with an average porosity value of 0.25. The average water content from the thin-walled tubes for the basal till was 11.7 percent (excluding the 4 percent water content). Two tubes contained washed till with water contents of 8 and 10 percent. Washed tills tested in 1991 for the existing JRL had water contents that ranged from 8 to 22 percent (SME, 1991).

Specific gravity of the basal till was measured in accordance with ASTM Method D 854 (2006); a value of 2.77 was obtained. The specific gravity of the basal till was used along with the saturated water contents to calculate the till's total porosity (Lambe and Whitman, 1969). The total porosity of the basal till within the Expansion footprint was calculated to range between 0.21 and 0.39. The mean total porosity for the glacial till is 0.26 based on these water contents. The basal tills beneath the existing JRL had calculated total porosities of 0.19 to 0.27 (SME, 1991), which compares favorably with the Expansion results.

Water contents and specific gravity results are documented in Appendix P.

3.3.3 Atterberg Limits. One Atterberg Limit test was performed on a sample collected from a surficial layer of marine silty clay from B-04-13, which is located outside of the Expansion's footprint. Test results of the B-04-13 sample determined a Liquid Limit of 30 percent, a Plastic Limit of 20 percent, and a Plasticity Index of 10. These Atterberg Limit properties, together with the grain size of the sample, are typical for silty clays of low compressibility and medium

plasticity and the sample is classified as inorganic clay (CL) under the Unified Soil Classification System. ASTM Method D 4318 (2000) was followed for Atterberg Limit testing.

3.3.4 Laboratory Soil Hydraulic Conductivity Testing. Hydraulic conductivity tests were performed on twelve undisturbed thin-walled tube samples of the basal tills retrieved during drilling in 2008. The tubes were oriented vertically, and the samples then tested in the SME soil laboratory for hydraulic conductivity by the method described in ASTM Method D 5084 (2003). Undisturbed till samples were placed intact into a flexible membrane permeameter and then saturated by back-pressuring with de-aired water. Hydraulic conductivity results were corrected to 10 degrees Centigrade (°C), to approximate the average in situ groundwater temperature. Since the tubes were oriented vertically when the samples were collected, the hydraulic conductivity test results represent the vertical hydraulic conductivity of the tills. The laboratory hydraulic conductivity results are summarized in Table 3-3, and on the respective soil boring log in Appendix B. Table 3-3 also includes the in situ field hydraulic conductivity results from slug testing of piezometers installed in the P-08-series borings where the thin-walled tube samples were collected. The slug test results provide an estimate of the horizontal hydraulic conductivity of the tills at the tube sample position. Laboratory worksheets for the hydraulic conductivity testing are contained in Appendix Q. One sample of the washed till was tested while the remaining tests represented the basal till. Soil from the intact tube samples collected in the 2008 till investigation was also submitted to the SME soils laboratory for grain size analysis testing. The fines content averaged about 57 percent for the tube samples of basal till which compares favorably with the 56 percent average fines content for the basal till from the split-spoon samples.

TABLE 3-3

TILL HYDRAULIC PROPERTIES

Geologic Unit	Location	Soil Sample No.	Sample or Test Depth (ft)			Hydraulic Conductivity (cm/sec) Field [1]	Hydraulic Conductivity (cm/sec) Lab [2]	K_H/K_V Ratio	Passing U.S. No. 200 Sieve Size (%)	Dry Density (pcf)	Total Porosity (from dry density)	Water Content (%)	Total Porosity (from water content)[4]
Brown Basal Till	B-08-02	1S	11	-	12.4	-	7.0×10^{-8}		84	125.3	0.28	3.6[5]	0.09
		-	3.3	-	5.3	1.1×10^{-6}			-				
	B-08-03	2S[3]	14.8	-	15.5	-	6.2×10^{-7}		45	131.3	0.24	9.8	0.21
	B-08-04	1S	7	-	7.8	5.4×10^{-6}	1.8×10^{-6}	3	54	116.5	0.33	14.2	0.28
	B-08-05	1S	7.5	-	9	-	5.2×10^{-7}		59	127.3	0.26	12.4	0.26
	B-08-06	1S	13	-	14	1.6×10^{-6}	6.6×10^{-8}	24	42	127.5	0.26	11	0.23
	B-08-07	1S	10	-	11.3	1.4×10^{-6}	2.9×10^{-8}	48	55	128.9	0.25	11	0.23
	B-08-09	1S	10.8	-	11.3	-	3.0×10^{-7}		45	125.7	0.27	12.8	0.26
	B-08-10	1S	11	-	12.5	-	2.4×10^{-8}		62	123.4	0.29	13.7	0.28
	B-04-05	1R	34.6	-	35.8	-	5.5×10^{-7}		45	122.8	0.29	9.6	0.21
	B-207	4D	6.5	-	7	-	1.2×10^{-7}			125	0.28	-	-
Gray Basal Till	B-08-01	1S	16.6	-	17.8	-	1.6×10^{-7}		52	114.7	0.34	11.9	0.25
		2S	18.3	-	19.3	-	1.1×10^{-7}		57	123.5	0.29	11.9	0.25
	B-08-10	3S	15.5	-	17	-	4.1×10^{-8}		59	119.7	0.31	12.9	0.26
Basal Till: Geometric Mean Vertical Hydraulic Conductivity							1.5×10^{-7}	63[6]					
Washed Till Zone	B-08-03	2S[3]	15.5	-	16.3	8.3×10^{-4}	1.1×10^{-5}	75	30	-	-	7.9[5]	0.18

Notes:

1. Field hydraulic conductivity is interpreted to be representative of local horizontal hydraulic conductivity of till derived from in situ slug test.
2. Lab hydraulic conductivity is interpreted to be representative of local vertical hydraulic conductivity of till as derived from vertically-oriented, undisturbed samples collected according to ASTM D 5084.
3. Upper portion of tube contained basal till, lower portion contained a washed sandy till zone.
4. Using measured specific gravity of 2.77.
5. Unsaturated water content.
6. K_H/K_V ratio uses geometric mean values for Basal Till.

3.3.5 Soil Density. Undisturbed densities of the basal till were measured from the 2008 thin-walled tube samples used for hydraulic conductivity testing. Soil densities were used to support the stability analyses, as presented in Section 3.0 and Appendix F of the Design Report in Volume III of the MEDEP Expansion Application. For each test, the volume of the specimen was determined by measuring its dimension to the nearest thousandth of an inch with calipers. The density results are shown in Appendix Q on the same forms reporting the hydraulic conductivities. The total (wet) density was determined by weighing the sample and dividing its total weight by the calculated volume from the sample dimensions. A moisture content test by ASTM Method D 2216 (1998) was performed on the test specimen and used to calculate the dry density. The dry density of the till ranged from about 115 to 131 pounds per cubic foot (pcf), while the wet density ranged from about 128 to 143 pcf.

For each tube sample of basal till, the total porosity of the specimen was calculated from its dry density using the measured specific gravity of 2.77 (Lambe and Whitman, 1969). The calculated total porosities ranged from 0.24 to 0.34 and agree favorably with total porosities calculated from saturated water contents of the tube samples, which ranged from 0.21 to 0.28. The porosities calculated from densities average slightly greater than from the water contents. This may be due to some disturbance to the density during tube sampling of the dense glacial till. These ranges and their averages are similar to and consistent with the values discussed in Section 3.3.2 above, based on water contents of split-spoon samples. The mean porosity for the Shelby tube water content results was 0.25, which agrees favorably with the 0.26 calculated from the mean till water content discussed above in Section 3.3.2.

3.3.6 Effective Porosity. Transport time and groundwater velocity through soil is a function of the soil's effective porosity, as further discussed in Sections 5.0 and 7.0. Some references (e.g., de Marsily, 1986) suggest an effective porosity can be less than the total soil porosity for certain clayey soils. Effective porosity of the basal till was measured using a laboratory tracer test, as described in Appendix R. This test showed the total and effective porosities to be the same for the basal till. Thus, a mean effective porosity for the basal till of 0.25 was utilized for the groundwater velocity calculations.

Beginning with the construction of Cell 3 in the existing JRL, marine clay from an adjacent borrow pit has been used as a portion of the landfill's primary liner system (see Appendix S). This clay is compacted and tested for water content, Standard Proctor maximum dry density, and hydraulic conductivity. The compacted dry densities (ASTM Method D 698 [2000]) varied from 105 to 111 pcf with an average of 108 pcf. Using a specific gravity of 2.82 based on specific gravity testing of the marine clay from other Maine sites (SME, 2005; and SME, 1998), the dry densities yielded total porosities for the JRL clay ranging from 0.37 to 0.4, and an average of 0.39. Total porosity estimates based on saturated water contents ranged from 0.35 to 0.43, with an average of 0.41. The measured hydraulic conductivity of this compacted on-site marine clay ranged from $1.9x10^{-8}$ to $8.3x10^{-8}$ cm/sec.

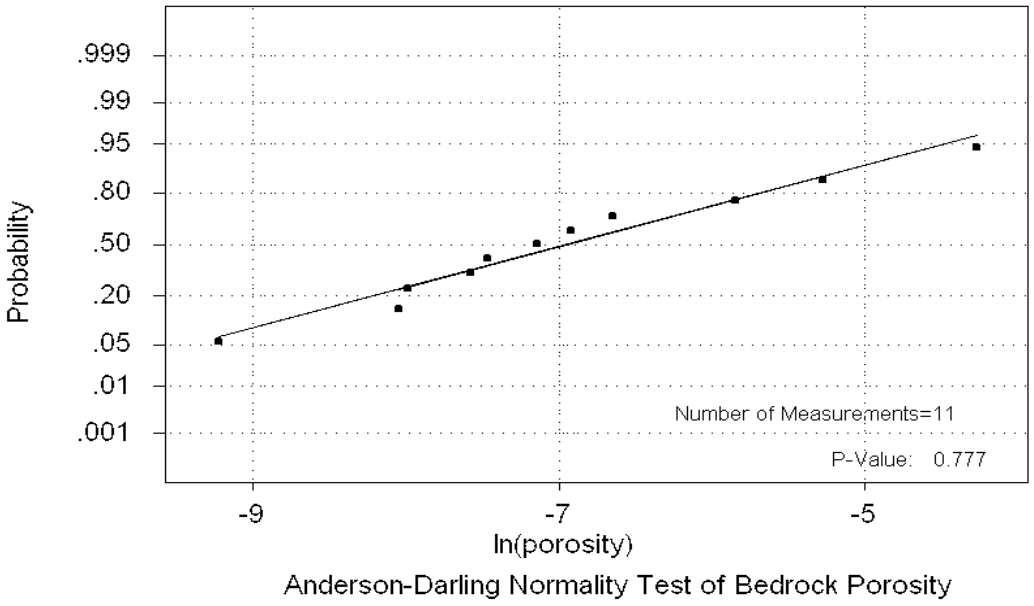
To estimate the effective porosity of this marine clay, which will be used for a portion of the landfill liner build-up, the results of laboratory column tracer tests on samples of the same marine clay from two other Maine sites, one in Hampden and another in Skowhegan, were reviewed. Two column tracer tests for the Skowhegan site yielded an effective porosity for undisturbed tube samples of 0.48 for a brown silty clay with a total porosity of 0.50, and similarly, effective and total porosities of 0.56 and 0.56, respectively, for the gray silty clay (SME, 2005). Column tracer testing for the Hampden site determined effective porosities of 0.42 and 0.45 for undisturbed tube samples of gray and brown marine clay with total porosities of 0.42 and 0.45, respectively. A remolded sample of brown clay, from the Hampden site, with a total porosity of 0.33 had an effective porosity of 0.33 (SME, 1998). Collectively, these column tracer tests showed that the effective porosity approximately equaled the total porosity for Maine marine clays similar to the JRL Site. Therefore, an average effective porosity value of 0.39 as derived from dry density measurements of the JRL marine clay was used for the Expansion. These test results are summarized in Appendix T.

The bedrock cores were used to estimate the effective porosity of the bedrock relative to groundwater movement. In those areas where hydraulic conductivities were measured in situ through a well or piezometer screen where a bedrock core with definable fractures was obtained, the method of Snow (1968) was employed to calculate total porosities. This method assumes that all observed fractures contribute equally to water flow. Bedrock porosities of 0.000099 to 0.014 were calculated and are reported on the bedrock core logs in Appendix C.

The porosity results were log-normally distributed (based on the Anderson-Darling normality test (1952), which is shown in Figure 3-5. The geometric mean of the effective bedrock porosity was 0.001. Bedrock porosities calculated for the existing JRL ranged from 0.00048 to 0.0044 with a mean value of at least 0.0017 (SME, 1991). Collectively the bedrock porosity data suggests an average effective porosity of 0.001 is reasonable for this formation since the Snow methodology uses the hydraulically connected portion of the bedrock's total porosity.

FIGURE 3-5

ANDERSON-DARLING NORMALITY TEST OF BEDROCK POROSITY



3.3.7 Summary. Table 3-4 summarizes the physical property testing results for the encountered soils and bedrock at the JRL.

TABLE 3-4

SUMMARY OF LABORATORY TEST RESULTS

Geologic Unit	Fines Content (%)	In Situ Water Content (%)	Specific Gravity	Dry Density (pcf)	Total Porosity	Average Effective Porosity
Basal Till	42 to 95 (56)	10 to 23 (13)	2.77	115 to 131(124)	0.21 to 0.39 (0.27)	0.25
Washed Till	30 to 45	8 to 10	2.77[2]		0.25[1]	0.25
Marine Clay	-	26 – 29	2.85	105 to 111 (108)[3]	0.35 to 0.43 (0.39)	0.39
Boulder Zone	<6	-	2.65[1]		0.4[1]	0.4[1]
Sandy Zone	22	-	2.65[1]	110[1]	0.25[1]	0.25[1]
Bedrock	-	-	-	-	0.000099 to 0.014	0.001

Notes:
1. Assumed value.
2. Estimate from basal till.
3. For compacted clay, ASTM Method D 698.

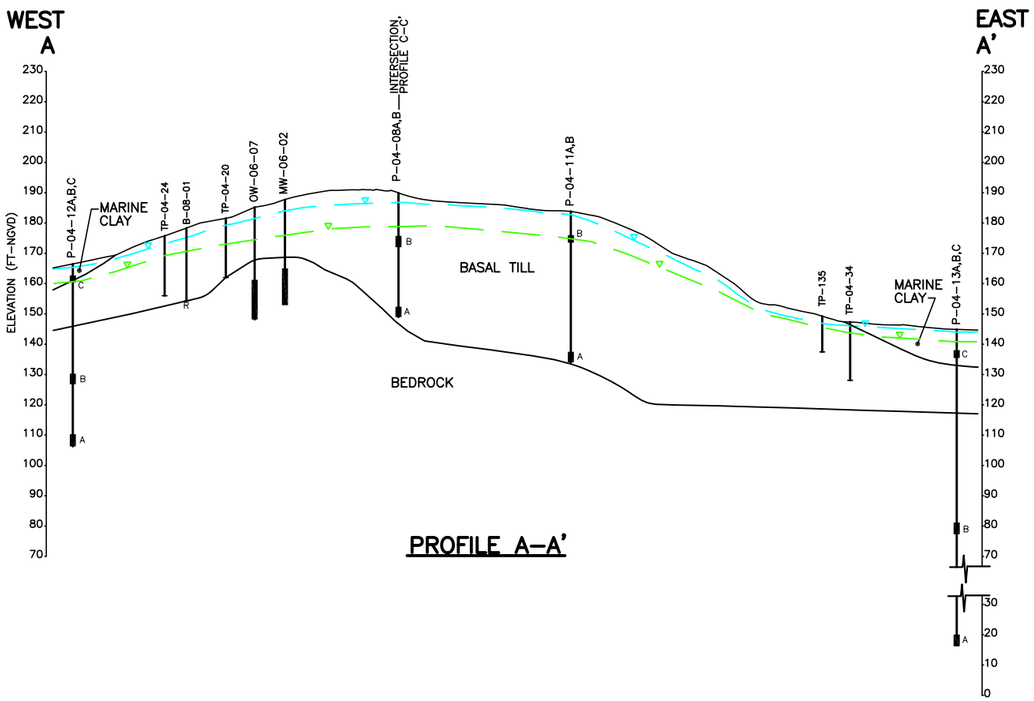
4.0 SITE GEOLOGIC CHARACTERISTICS

The geology characterizing the JRL Site is described in this section of the application, with the primary focus on the information collected from the 2004 through 2009 field investigations associated with the Expansion. The area beneath and around the existing landfill has been extensively investigated. Findings for the Expansion studies reinforce our prior interpretation of the surficial and bedrock rock geology associated with the JRL, which was described in the MEDEP permit application for the development of the existing landfill at the Facility (SME, 1991).

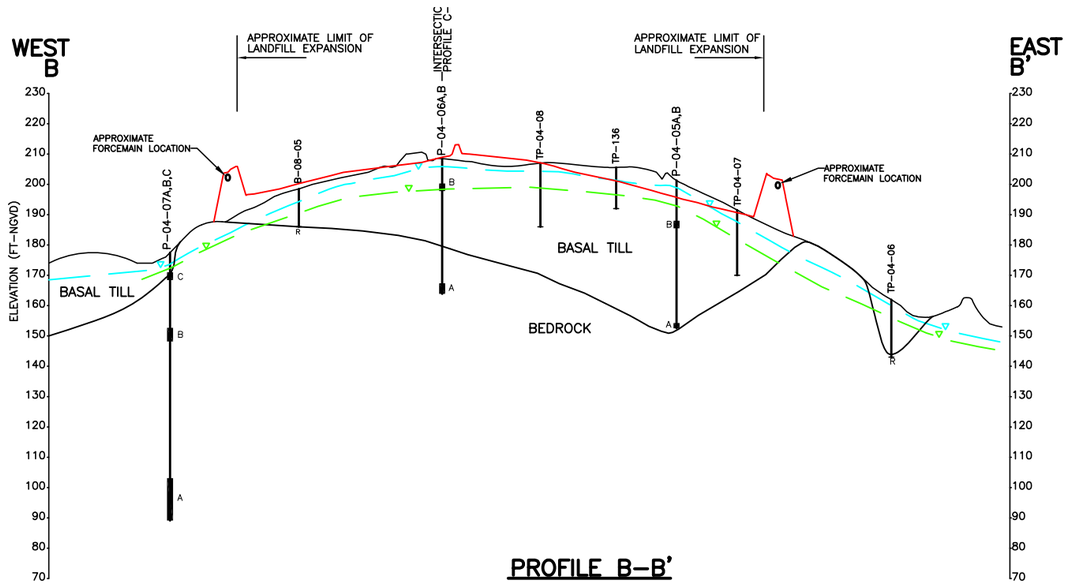
4.1 Surficial Geology

The surficial geology of the Landfill Expansion area reflects the depositional environment associated with the advance and retreat of the Laurentide Ice Sheet during the Wisconsin glaciations (Kelley and Kelley, 2008). The field investigations indicated that the surficial geologic setting at the Expansion is generally consistent with the available published information and is similar to the unconsolidated formation encountered in borings drilled for the development of the adjacent existing JRL. The predominant surficial soil directly beneath the Expansion consists of a dense, silt-clay glacial till. Thin, isolated lenses of washed till were also observed occasionally within the Expansion, typically just above the bedrock. Some marine clay was encountered atop the till beyond the Expansion boundary. Interpretive geologic profiles prepared from test pit and soil boring logs are illustrated in Figure 4-1. The profiles are oriented as shown in Figure 3-1.

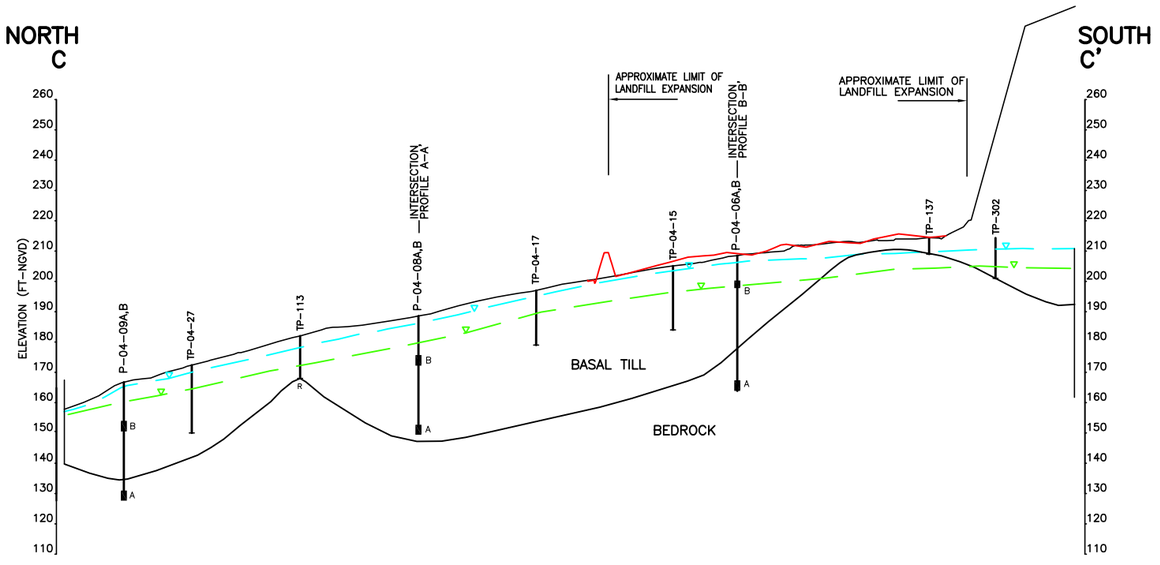
Information gathered from soil and bedrock borings drilled in 2009 was utilized to update the interpreted native soil thickness isopach map from the 2006 PIR (SME, 2006). Soil thicknesses range from less than five feet to greater than 50 feet across the Expansion as shown in Figure 4-2. The existing soil within the Expansion boundary is thinnest in three discrete areas, the southern end, adjacent to the existing landfill, on the southeast side, and on the west side of the expansion as shown on Figure 4-2.



PROFILE A–A'

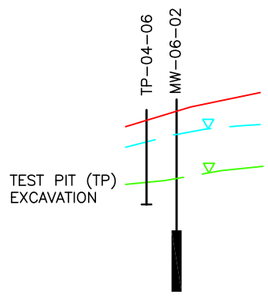


PROFILE B–B'



PROFILE C–C'

LEGEND



LANDFILL BASEGRADES

INTERPRETED WET–SEASON PHREATIC SURFACE ELEVATION (SPRING 2007 OR 2008)

INTERPRETED DRY–SEASON PHREATIC SURFACE ELEVATION (FALL 2007 OR LATE SUMMER 2008)

PIEZOMETER (P)/MONITORING WELL (MW) SCREEN INTERVAL

REFUSAL

GEOLOGIC LEGEND

MARINE CLAY – SOFT TO STIFF – GRAY TO BROWNISH GRAY SILTY CLAY WITH OCCASIONAL DISCONTINUOUS FINE SAND LENSES

BASAL TILL – VERY DENSE – COBBLY GRAVELLY SANDY SILTY–CLAY TO VERY SILTY SAND WITH FEW BOULDERS. RARE DISCONTINUOUS AND THIN (I.E.LESS THAN FEW INCHES THICK) SAND LENSES. RANDOMLY FISSILE THROUGHOUT. UPPER FEW FEET WEATHERED AND FRACTURED DUE TO FROST ACTION. TYPICALLY BROWNISH IN COLOR NEAR GROUND SURFACE AND JUST ABOVE BEDROCK. OCCASIONALLY GRAY IN DEEPER SOIL AREAS. BECOMING INTERBEDDED WITH SAND LENSES NEAR BEDROCK SURFACE IN SOME PLACES.

BEDROCK – INTERBEDDED METASILTSTONE, METAGRAYWACKE AND PHYLLITE. OCCASIONAL FRACTURES, TYPICALLY UNWEATHERED, BUT OCCASIONAL WEATHERED ZONES.

NOTES

1. GEOLOGIC UNITS ARE SHOWN SCHEMATICALLY. FIGURE SHOULD NOT BE USED FOR ENGINEERING DESIGN,QUANTITY TAKE–OFFS, GRADES, ETC.

2. THE GEOLOGIC UNITS REPRESENT AN INTERPRETATION OF THE TEST PIT AND BORING RESULTS. CONDITIONS MAY VARY FROM THAT SHOWN BETWEEN THE EXPLORATIONS. BOUNDARIES BETWEEN VARIOUS GEOLOGIC UNITS MAY VARY FROM THAT SHOWN AND MAY BE GRADATIONAL.

3. GROUND SURFACE TOPOGRAPHY TAKEN FROM DECEMBER 31, 2014 TOPOGRAPHIC MAP.

4. VERTICAL EXAGGERATION OF PROFILES IS 10 TO 1.

5. SEE FIGURE 3–1 FOR PROFILE LOCATIONS.

HORIZONTAL SCALE
250 0 500 FEET

FIGURE 4–1
INTERPRETED GEOLOGIC PROFILES
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

DWG: P–Section–Hydogeo LMN: GEO–PROF CTB: SME–STD REV: 6/17/15

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PROPOSED EXPANSION SOLID WASTE BOUNDARY

EXISTING LANDFILL SOLID WASTE BOUNDARY

250 0 500 FEET

NOTES

1. EXISTING GROUND CONTOURS FROM DECEMBER 31, 2014 AERIAL SURVEY PERFORMED BY AERIAL SURVEY AND PHOTO, INC. OF NORRIDGEWOCK, MAINE.

2. PROPERTY LINE LOCATIONS ARE A RESULT OF FIELD SURVEY PERFORMED BY HERRICK AND SALSBURY, INC. LAND SURVEYORS, ELLSWORTH, MAINE FOR TRYTON TREE FARM PROJECT, PATTEN CORPORATION–DOWNEAST, OLD TOWN, MAINE, FEBRUARY 23, 1988, REVISED APRIL 7, 1988.

3. LOCATIONS OF EXPLORATIONS ARE APPROXIMATE.

4. INTERPRETATION OF SOIL ISOPACH CONTOURS BASED ON BORINGS, TEST PITS, SURFACE RESISTIVITY SURVEY AND OUTCROP OBSERVATIONS. ACTUAL CONFIGURATION SOIL THICKNESS MAY VARY FROM THAT SHOWN.

5. DRAWING SHOULD NOT BE USED FOR DESIGN, QUANTITY TAKE–OFFS, GRADES, SURVEY ETC.

LEGEND

TP–303 7	TEST PIT LOCATION WITH SOIL THICKNESS IN FEET
MW–207 21.5	BORING LOCATION WITH SOIL THICKNESS IN FEET
XXXXX	BEDROCK OUTCROP (OUTCROPS WITH FRACTURE MEASUREMENTS ARE DESIGNATED OC–1 THRU OC–4 AND OC–AG)
—10—	INTERPRETED SOIL THICKNESS ISOPACH CONTOURS IN FEET
	TILL THICKNESS LESS THAN 5 FEET WITHIN LANDFILL EXPANSION BOUNDARIES

DWG: FIGURES LMN: OVERBURDEN CTB: OVERBURDEN REV: 4/9/15

FIGURE 4–2
INTERPRETED SOIL THICKNESS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
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ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

\\Nserver\cfs\Casella\OldTownLandfill\Expansion\9.35MCY-Expansion\Acad\Figures\FIGURES.dwg, 4/9/2015 2:59:59 PM, paf

The average till thickness between the landfill base grades and bedrock surface will be about 24.5 feet. Approximately 6.5 percent (i.e., 3.6 acres) of the Expansion footprint has an existing overburden thickness of less than 5 feet. There are four known bedrock outcrops directly adjacent to the Expansion footprint as shown on Figure 4-2. These locations are located on the southeast, eastern, and western sides of the Expansion.

The soil thickness isopach map of Figure 4-2 was compared to the vertical electrical resistivity profiles (see Appendix L). The lowest resistivity values (e.g., 50 to 800 ohm-meters) are interpreted to indicate a surficial soil layer, with clayey soils having readings of less than 200 ohm-meters (blue shading in profiles). Higher resistivity values (e.g., greater than 2,000 ohm-meters) are generally indicative of massive bedrock (red to brown shading). Intermediate resistivity values are interpreted to reflect coarser-grained soil, dry soil, or fractured bedrock. The soil depth interpreted from the vertical electrical resistivity profiles approximated the soil thickness as interpreted on the isopach map (Figure 4-2). Each of the encountered geologic soil types is discussed below.

4.1.1 Basal Till. The glacial till beneath the Expansion area consists primarily of lodgment or basal till, which typically forms a continuous layer over the bedrock surface, and overlies occasional lenses of washed till. Composed of sandy silt with occasional boulders and frequent cobbles, the basal till varies in color from brown to gray. Atterberg Limit testing of the basal till during design of the existing landfill showed the till to be a low-plasticity silt (SME, 1991). The brown till is found near the ground surface and typically grades into brownish gray to gray till with depth. Weathering and frost action has fractured the near-surface till above the frost/desiccation zone. Similarity among the results of extensive physical property testing for the permitting of the existing landfill suggested that the basal till represented the same geologic deposition regardless of its color (SME, 1991). The basal till is dense and exhibited SPT N-values usually in excess of 50 blow counts per foot. SPT sampling through the till was impeded when boulders and cobbles were present resulting in minimal split-spoon penetration. Examination of test pit walls and site reconnaissance has shown no evidence of Holocene faulting at the Site.

Till samples collected from soil borings and test pits within and adjacent to the Expansion footprint during the site investigations contained fines contents (soil fraction passing the U.S. No. 200 sieve) ranging from 42 to 95 from 21.7 to 94.3 percent with an average of approximately 56 percent. Grain size distribution curves of the basal till samples are plotted in Appendix O. The fines content of the Expansion investigations agreed closely with the grain size analysis results of the basal till analyzed for the permitting of the existing adjacent landfill, which averaged about 55 percent (SME, 1991). The dense nature of the glacial till combined with its high average fines content results in a relatively impervious soil foundation for the Expansion.

The range of fines content and grain size curve shapes suggest a till with varying textures and hydraulic conductivities. These varying textures appear to be random, but have some layered structure. This structure is likely the result of the sub-glacial deposition environment (Legget, 1976). The observed fissility is suggestive of a layering (SME, 1991). The basal till contains occasional, isolated sandy lenses, which have been observed in other Maine tills. The sandy lenses are typically only several feet thick or less. A more extensive sandy zone was encountered outside the southeast corner of the Expansion and the existing landfill. This sandy zone was encountered off the southeast corner of the existing landfill during investigations for the existing landfill MEDEP permit application in 1991. Careful examination of the split-spoon samples of the sandy zone show layers of silty till interbedded with sand layers. The presence of till layers within the sandy zone indicates the sand to be contemporaneous with the till placement.

A boulder zone was also encountered outside the eastern side of the Expansion boundary (e.g., MW-213 and MW-06-01). Both the boulder zone and stratified sand zone are overlain by basal till. The sandy and boulder zones are therefore interpreted as a portion of the drumlin and not part of a post-glacial outwash deposit such as the ones along the Stillwater River east of the JRL. The sandy outwash deposits along the river were laid down after deposition of the basal till, once the glacial ice had retreated further north (Borns and Thompson, 1981). Sandy and bouldery zones within basal till have been described elsewhere (Flint, 1957). Based on the geology, it is unlikely that there would be a direct hydraulic connection between the sandy and boulder zones in the till and the sand and gravel outwash deposits about a mile east of the JRL

along the Stillwater River. The surficial resistivity survey was useful in further delineating the location of the sandy and boulder zones. The resistivity suggested these deposits are of limited lateral extent. The sandy and boulder zones are avoided by at least 100 feet with the footprint of the Expansion and existing JRL. The subsurface investigations in 1991 showed groundwater moving toward the existing landfill from the south through the sandy zone.

4.1.2 Washed Till. Similar to the geologic setting of the existing landfill, isolated lenses of washed till were found along the top of bedrock in a few areas beneath some parts of the drumlin. These localized lenses are typically less than 10 feet thick and appear to be of limited horizontal extent. These discontinuous washed till lenses are typical in till terrains and drumlins (Thomas Weddle of MGS, 2008 personal communication). The washed till has fewer fines and, therefore, is more permeable than the basal till. However, the localized, discontinuous nature of the washed till prevents it from being important to the overall Site hydrogeology; that is, on distance scales of hundreds or thousands of feet.

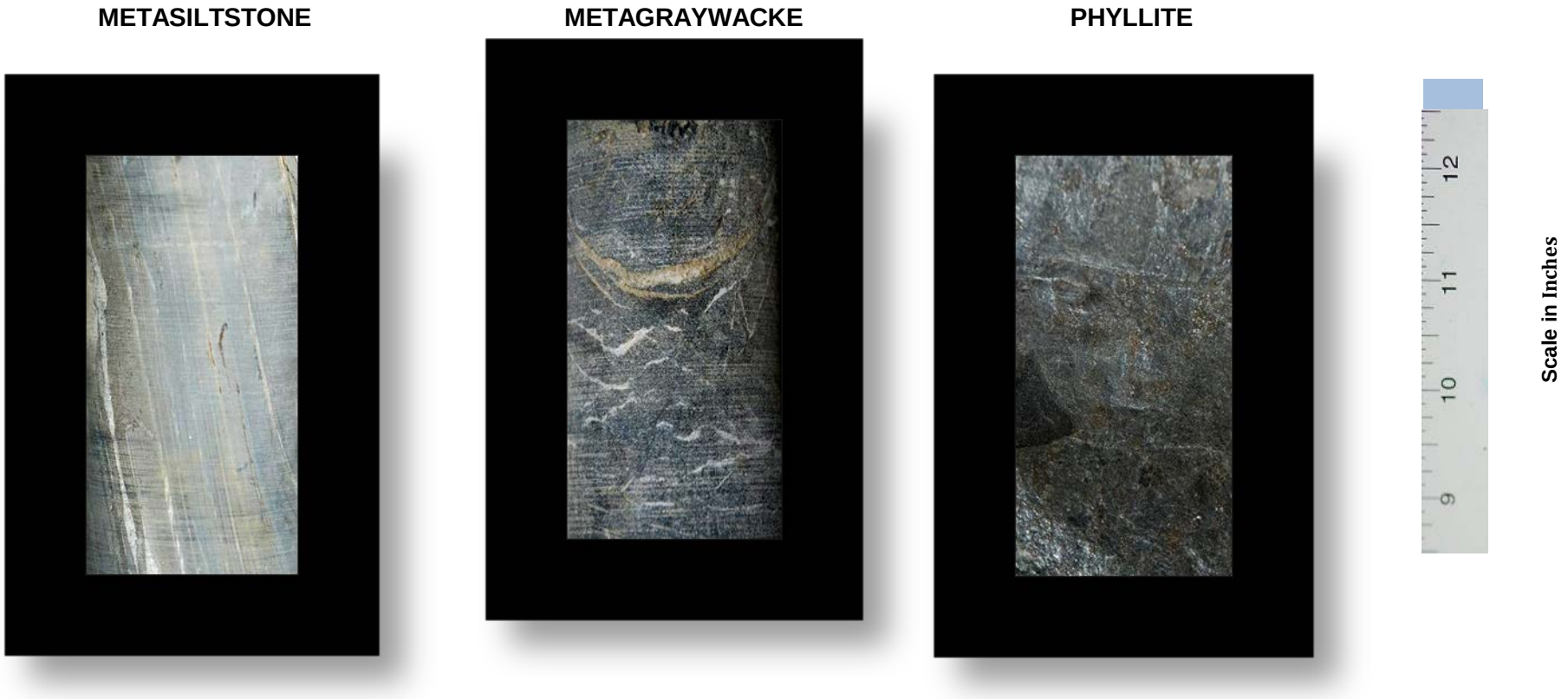
4.1.3 Marine Clay. Marine clay deposits were found outside the existing and proposed landfill boundaries to the east and west of the Expansion in low-lying areas adjacent to the streams. Where encountered, the clay is up to 10 feet thick. The clay overlies glacial till where encountered; this clay deposit is of no consequence to the Expansion. It has no effect on the stability or performance of the JRL since it lies away from the Expansion footprint.

4.2 Bedrock Geology

Bedrock cores were obtained from fifteen boring locations associated with Expansion investigations (MW-302R, MW-304A, OW-06-05 through OW-06-10, P-04-06, P-04-07, P-04-09, P-04-10, P-04-12, P-04-13, and P-04-14). The main rock types observed in the core samples are metagraywacke and phyllite, with lesser amounts of metasiltstone or fine-grained metasandstone. These rock types are consistent with bedrock encountered during the Site investigations for the original landfill (SME, 1991). Figure 4-3 shows photographs of cores of the three prominent rock types. White veins of quartz plus calcite are common throughout the rock and are abundant in some places. The condition of the rock is generally hard,

FIGURE 4-3

PHOTOGRAPHS OF CORE ROCK TYPES



unweathered, and competent. As is usually the case, the rock is somewhat more broken, weathered, and stained within the upper several feet, but this quickly disappears with depth. The mean RQD in the upper 20 feet to 30 feet of bedrock averaged over 70 percent across all the cores. In four borings that penetrated about 100 feet into bedrock, the RQD of the deeper rock (greater than 20 feet) averaged about 85 percent. A diagram of the RQD versus depth is shown in Figure 4-4. The RQDs for the existing JRL investigations averaged 70 percent (SME, 1991).

Where observed, relic bedding is generally steep at the Site, usually dipping 70° to 90° from horizontal and striking northeast/southwest. Some small-scale folding was also noted. As discussed in Section 2.6.2 herein, two primary fracture sets or groups were commonly observed in the bedrock outcrops and downhole geophysical logs. A northeast/southwest striking fracture set has varying dips but commonly dips are steep rather than flat. This northeast/ southwest fracture set is also generally parallel with the observed mineral foliation strike in the phyllite. Another set of northwest/southeast striking fractures is also observed. These two primary fracture sets are approximately perpendicular to one another, consistent with regional tectonism (Bradley, 1983; Osberg, 1978). The dips of the second fracture set vary, but are also often steep rather than flat. Other random fractures, striking and dipping at angles that vary from those of the two observed fracture sets, are also present but at a lesser frequency.

FIGURE 4-4

RQD VERSUS DEPTH BELOW BEDROCK SURFACE

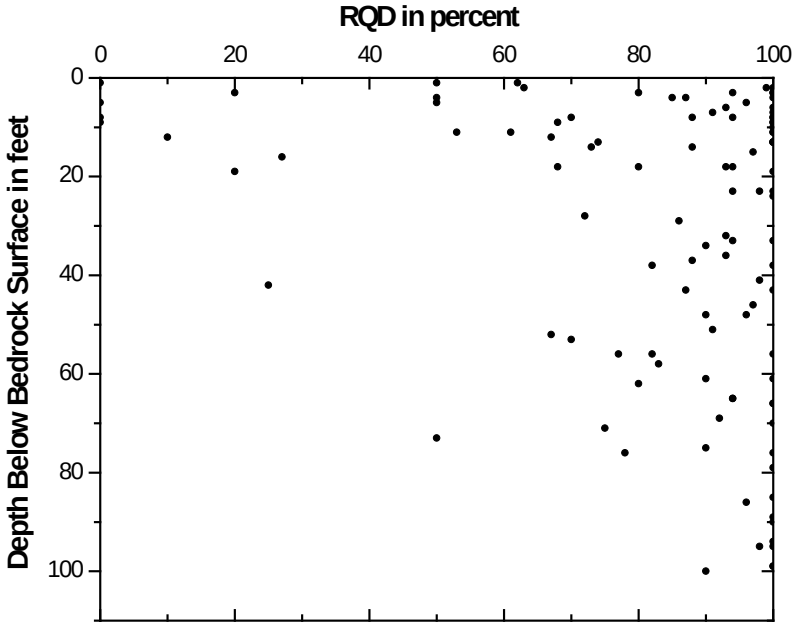
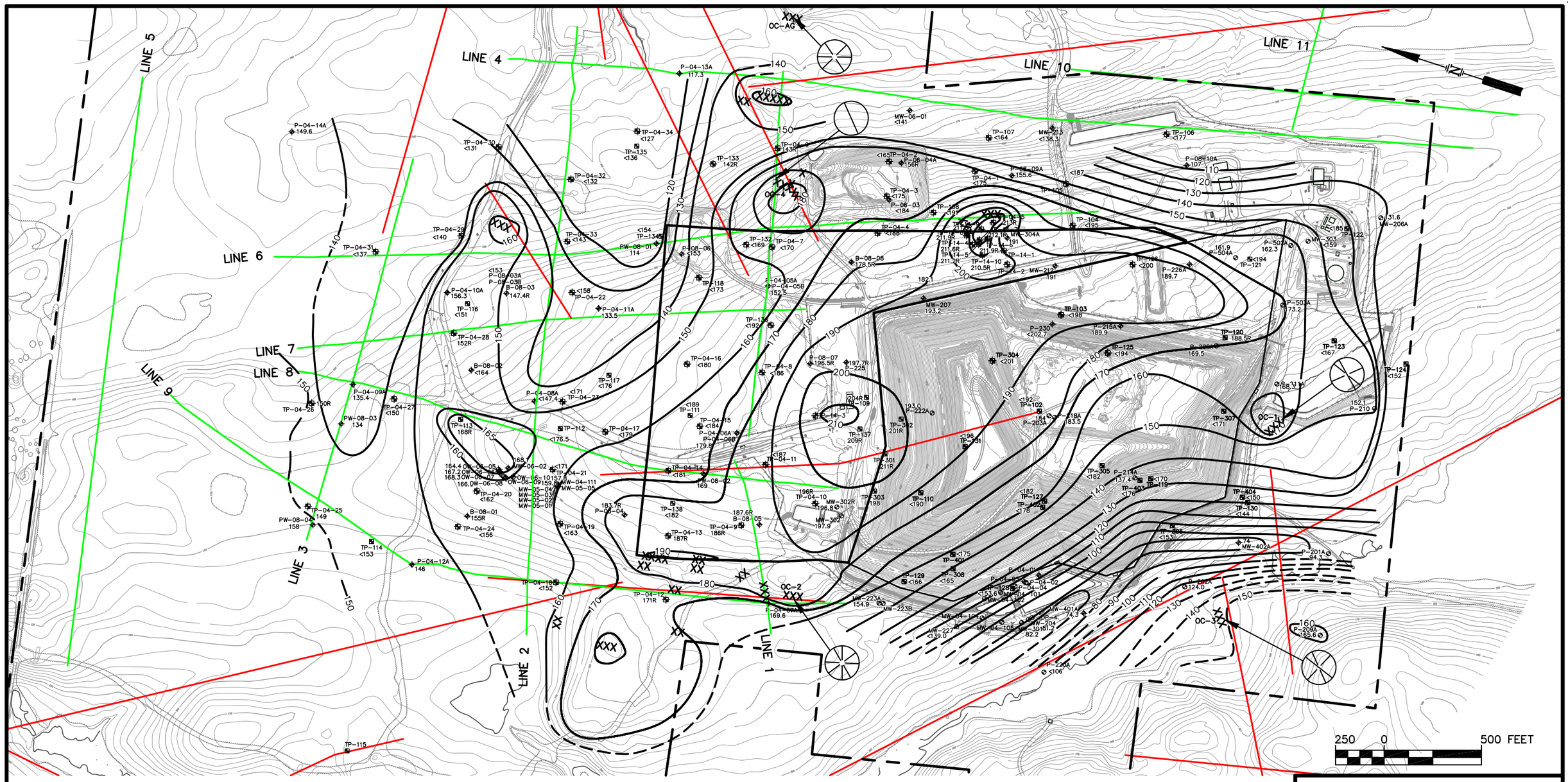


Figure 4-5 presents the interpreted bedrock surface topography using data collected from outcrops, borings, and test pits. Bedrock was found to outcrop at the locations directly adjacent to the Expansion footprint. These outcrops are shown on Figure 4-5 located to the southwest and west of the Expansion. Bedrock elevations within the Expansion boundary vary from about 120 feet above NGVD to 213 feet above NGVD, and are highest to the east directly adjacent to the eastern boundary of the proposed Cell 11. The bedrock surface contours exhibit an undulating appearance. There is a downward trending trough in the bedrock from the northeast corner. The elevation of the bedrock surface near the southwestern corner of the Expansion decreases to the southwest. The bedrock elevation contours in Figure 4-5 are for illustrative purposes, localized variations from the interpretations of Figure 4-5 may exist.



NOTES

1. EXISTING GROUND CONTOURS FROM DECEMBER 31, 2014 AERIAL SURVEY PERFORMED BY AERIAL SURVEY AND PHOTO, INC. OF NORRIDGEWOCK, MAINE.

2. PROPERTY LINE LOCATIONS ARE A RESULT OF FIELD SURVEY PERFORMED BY HERRICK AND SALSBURY, INC. LAND SURVEYORS, ELLSWORTH, MAINE FOR TRYTON TREE FARM PROJECT, PATTEN CORPORATION–DOWNEAST, OLD TOWN, MAINE, FEBRUARY 23, 1988, REVISED APRIL 7, 1988.

3. LOCATIONS OF EXPLORATIONS ARE APPROXIMATE.

4. INTERPRETATION OF BEDROCK ELEVATION CONTOURS BASED ON BORINGS, TEST PITS, SURFACE RESISTIVITY SURVEY AND OUTCROP OBSERVATIONS. ACTUAL CONFIGURATION OF BEDROCK SURFACE MAY VARY FROM THAT SHOWN.

5. DRAWING SHOULD NOT BE USED FOR DESIGN, QUANTITY TAKE–OFFS, GRADES, SURVEY ETC.

LEGEND

80 — INTERPRETED BEDROCK SURFACE CONTOUR ELEVATION IN FEET–NGVD

LINE 2 — EARTH RESISTIVITY AND VLF–EM SURVEY LINE

LOW–ALTITUDE PHOTO LINEAMENTS (SEVEE & MAHER 1991, UPDATED 2008)

BEDDING (———) AND FRACTURE (– – –) ORIENTATIONS MEASURED AT OUTCROPS; (LOCATION APPROXIMATE)

XXXXX — BEDROCK OUTCROPS (OUTCROPS WITH FRACTURE MEASUREMENTS ARE DESIGNATED OC–1 THRU OC–4 AND OC–AG)

TP–303 198 — TEST PIT LOCATION WITH ELEVATION OF BEDROCK SURFACE IN FEET–NGVD ("R" SUFFIX INDICATES BACKHOE REFUSAL)

MW–204 81.2 — BORING LOCATION WITH ELEVATION OF BEDROCK SURFACE IN FEET–NGVD ("R" SUFFIX INDICATES DRILLER REFUSAL)



FRACTURE STRIKE ROSE DIAGRAM FROM DOWNHOLE GEOPHYSICAL LOGGING. (NEG, 2009a)

DWG: FIGURES LMN: BEDROCK CTB: OVERBURDEN REV: 4/9/15

FIGURE 4–5
INTERPRETED BEDROCK SURFACE
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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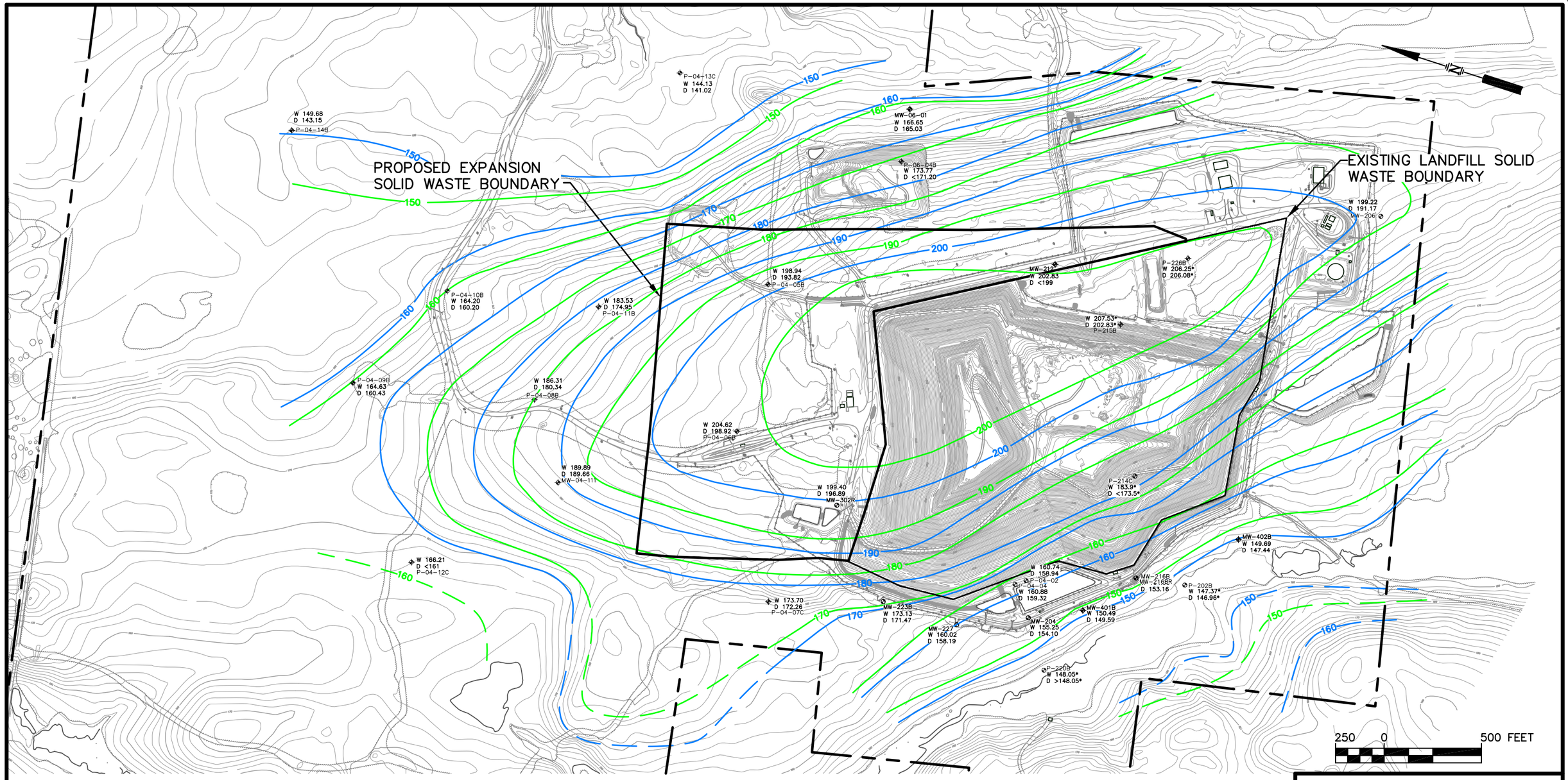
5.0 SITE HYDROGEOLOGIC CHARACTERISTICS

This section of the report describes the hydrogeologic setting of the Expansion area. Site-specific investigations have been completed to support design of the Expansion since the original landfill was permitted. Hydrologic testing has been conducted, which included: (1) pumping tests in bedrock wells; (2) in situ slug testing in till and bedrock wells and piezometers; (3) laboratory determinations of hydraulic conductivity of undisturbed tube samples of till; (4) field measurement of groundwater velocities in the till and bedrock determined from natural gradient groundwater tracer tests; (5) groundwater level monitoring; and (6) age-dating of groundwater. This information has been evaluated to describe the hydrogeologic conditions that exist at the Site and allows for design of a groundwater monitoring system that will be protective of the environment. The data shows that Expansion footprint is sited in accordance with MEDEP criteria. The available data provides confidence in the predictability of groundwater travel pathways away from the Expansion. Furthermore, this information was used to design the Expansion liner's underdrain system.

5.1 Groundwater in Soils

Water level measurements in wells and piezometers indicate that the water table generally lies within ten feet of the ground surface year-round in the basal till. A review of the water level database indicates that the groundwater table has fluctuated between about 5 to 10 feet among the wells monitored in and around the Expansion due to seasonal variations in precipitation and evapotranspiration. The upper end of this range is associated with areas closer to the crest of the drumlin, while the elevation of the water table changes less in wells and piezometers located closer to groundwater discharge zones (streams) beyond the footprint of the Expansion. The historical water level record for the JRL is tabulated in Appendix D. Water levels within the Expansion area were monitored monthly between mid-2004 and 2007. More recent (2014) groundwater levels have also been collected for the Site. During this period, the highest groundwater elevations and the greatest fluctuation between wet and dry season occurred



NOTES

1.EXISTING GROUND CONTOURS FROM DECEMBER 31, 2014 AERIAL SURVEY PERFORMED BY AERIAL SURVEY AND PHOTO, INC. OF NORRIDGEWOCK, MAINE.

2.PROPERTY LINE LOCATIONS ARE A RESULT OF FIELD SURVEY PERFORMED BY HERRICK AND SALSBURY, INC. LAND SURVEYORS, ELLSWORTH, MAINE FOR TRYTON TREE FARM PROJECT, PATTEN CORPORATION–DOWNEAST, OLD TOWN, MAINE, FEBRUARY 23, 1988, REVISED APRIL 7, 1988.

3.LOCATIONS OF EXPLORATIONS ARE APPROXIMATE.

4.GROUND WATER CONTOURS BASED ON WATER LEVEL MEASUREMENTS RECORDED DURING 2007, AND FROM HISTORICAL DATA FOR SOME LOCATIONS BEYOND THE EXPANSION FOOTPRINT.

LEGEND

150 — INTERPRETED WET–SEASON POTENTIOMETRIC SURFACE, (2007) IN BEDROCK (ELEVATION IN FEET NGVD).

150 — INTERPRETED DRY–SEASON POTENTIOMETRIC SURFACE, (2007), IN BEDROCK (ELEVATION IN FEET NGVD).

MW–227
W 160.02
D 158.19
WELL/PIEZOMETER LOCATION WITH ELEVATION OF GROUNDWATER FOR WET (W) AND DRY (D) SEASON.

FIGURE 5–1
INTERPRETED PHREATIC SURFACE
SEASONAL HIGH CONDITIONS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
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DWG: FIGURES LMN:PHREATIC–2007 CTB: OVERBURDEN REV: 4/28/15

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during 2007 and 2008. Therefore, the interpreted phreatic surface map in Figure 5-1 illustrates the seasonal-high and seasonal-low water table using water levels obtained from monthly groundwater monitoring collected during 2007 and 2008. The dry-season water table was developed from late summer to early fall (September and October) measurements. The wet-season water table was interpreted based on water level measurements from late fall or spring (November, March, and April). Data from 2008 was utilized for some of the piezometers outside of the Expansion, which were not monitored during 2007.

5.1.1 Horizontal Groundwater Flow Through Soils. The groundwater phreatic surface (i.e., water table) elevations in Figure 5-1 imply groundwater flow is to the east and west from beneath the Expansion. Schematically, the horizontal component of the groundwater flow is interpreted to be approximately perpendicular to the groundwater phreatic surface contour lines, which mimics the ground surface topography. A groundwater divide is evident, which is approximately aligned with the high-points of the drumlin's northwest/southeast longitudinal axis on which the Expansion is positioned. Therefore, shallow groundwater is interpreted to flow to the east on the east side of the groundwater divide. West of the groundwater divide, groundwater flows to the west.

Comparison of the wet- and the dry-season water tables of Figure 5-1 indicates the direction of groundwater flow remains relatively constant throughout the year. In other words, there are no significant shifts in the general directions of groundwater flow throughout the year. Therefore, the wet- and dry-season groundwater flow directions are controlled primarily by the ground surface topography. Furthermore, horizontal groundwater gradients do not vary significantly throughout the year. This suggests horizontal groundwater velocities are relatively constant throughout the year.

5.1.2 Vertical Groundwater Flow Through Soils. Groundwater elevations calculated from water levels measured in paired piezometer and well installations were utilized to evaluate the vertical component of groundwater flow through the till. Vertical gradients from these monitoring instruments are compiled in Table 5-1 using wet-seasonal water levels. The negative gradients in Table 5-1 imply downward seepage; positive values are for upward seepage. The vertical groundwater equipotential distribution throughout the Expansion for wet and dry-season conditions are shown on the geologic profiles in Figures 5-2 and 5-3, respectively. Downward

hydraulic gradients prevail in the basal till beneath the higher elevations of the drumlin. Schematically, this is reflected in the geologic profiles as nearly horizontal equipotential contour lines beneath the crest of the drumlin. Down-slope from the drumlin crest, the equipotential contour lines depict nearly horizontal flow conditions through the basal till and the bedrock. Upward vertical seepage gradients exist on the east and west lower flanks of the drumlin beyond the limits of the Expansion.

5.1.3 Groundwater Depth. During the wet season, the water table or groundwater phreatic surface depth varies between 0 and 2 feet beneath the existing ground surface, as measured in wells and piezometers in the Expansion. During the dry-season, the water table varies from approximately 5 to 10 feet below the existing ground surface. As expected, groundwater tends to drop during the dry-season as a result of the reduced precipitation, and the summer growing season.

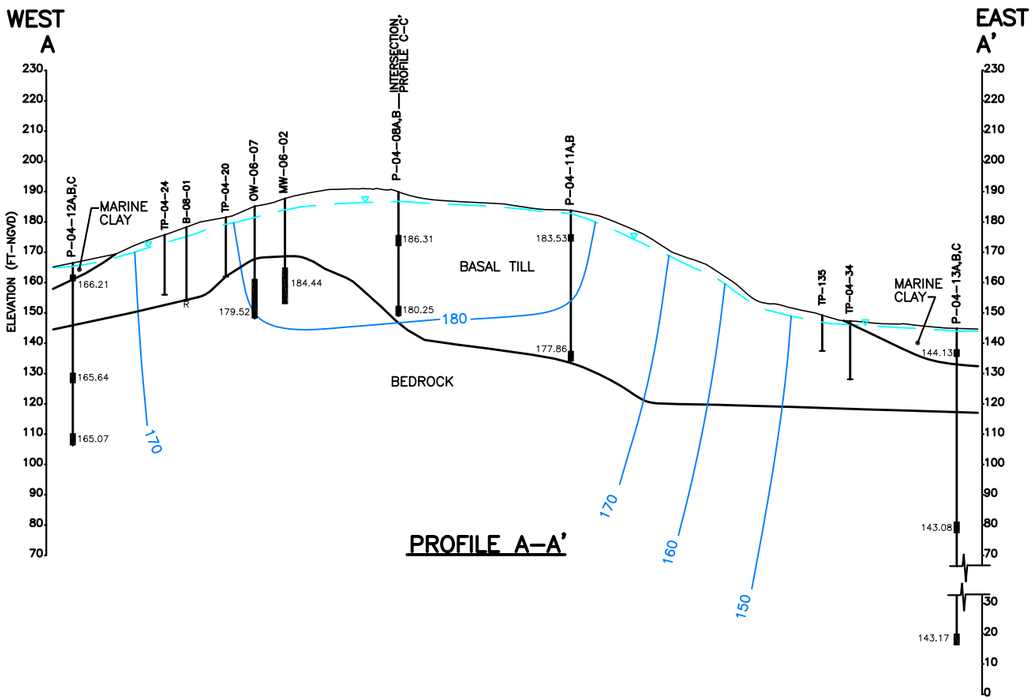
The northeast side of the Expansion will require excavation of the native soils, such that this area will be constructed near or into the water table. During the initial stages of the landfill construction, this will induce upward groundwater seepage into excavations during construction. This seepage must be controlled to allow for stable soil during construction of the underdrain and liner systems. An underdrain will be installed in this area, about 12.7 acres beneath the Expansion liner system to control the upward seeping groundwater and to prevent damage to the till soils and liner in this area. Seepage into the underdrain will continue beyond construction. However, as time passes and the Expansion cells cover the entire drumlin, these upward seepage gradients will diminish, and the water table will begin to flatten as recharge is lost due to the impervious landfill liner. During construction into the water table, it will be important to properly dewater any excavations to facilitate construction of the Expansion liner system and bottom prior to setting the sump materials. The contractor will have to stabilize any excavations for safety.

TABLE 5-1

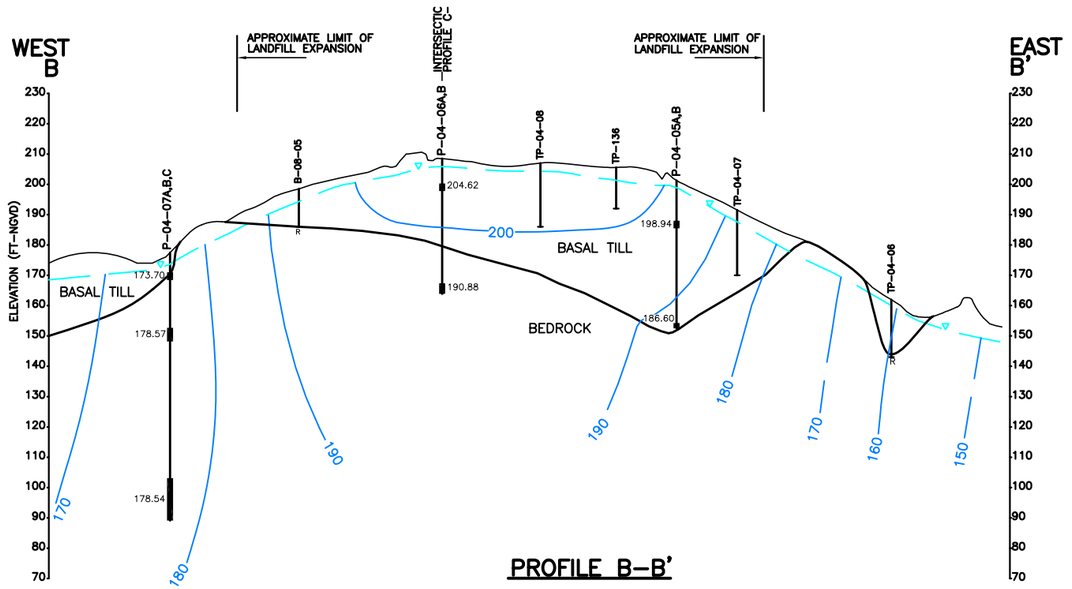
VERTICAL HYDRAULIC GRADIENTS

Area	Instrument Designation	Screened Geologic Unit	Well Pair Comparison	Vertical Separation (feet)	Potentiometric Elevation (ft)	Vertical Gradient (ft/ft)	Direction of Potential Flow
Within Expansion Footprint	P-04-05A	Basal Till	A/B	33	186.6	-0.374	down
	P-04-05B	Basal Till			198.94		
	P-04-06A	Bedrock	A/B	33.9	190.88	-0.405	down
	P-04-06B	Basal Till			204.62		
East of Expansion	P-04-13A	Bedrock	A/B	61.5	143.17	0.001	up
	P-04-13B	Bedrock	B/C	56.5	143.08	-0.019	down
	P-04-13C	Marine Clay	A/C	118	144.13	-0.008	down
	P-06-04A	Basal Till/Bedrock	A/B	15.3	177.41	0.238	up
	P-06-04B	Basal Till			173.77		
	P-08-09A	Sandy Zone	A/B	18.6	183.52	0.006	up
	P-08-09B	Washed Till			183.40		
	P-08-10A	Sandy Zone	A/B	31	182.95	0.002	up
	P-08-10B	Sandy Zone	B/C	42.4	182.88	-0.401	down
	P-08-10C	Basal Till	A/C	73.4	199.90	-0.231	down
North of Expansion	P-04-08A	Basal Till	A/B	23	180.25	-0.263	down
	P-04-08B	Basal Till			186.31		
	P-04-09A	Bedrock	A/B	24	164.07	-0.023	down
	P-04-09B	Basal Till			164.63		
	P-04-10A	Bedrock	A/B	24.9	161.44	-0.113	down
	P-04-10B	Basal Till			164.20		
	P-04-11A	Basal Till	A/B	39.5	177.86	-0.144	down
	P-04-11B	Basal Till			183.53		
	P-08-03A	Basal/Washed Till	A/B	10.2	166.26	-0.013	down
	P-08-03B	Basal Till			166.39		
	P-04-12A	Bedrock	A/B	23.5	165.07	-0.024	down
	P-04-12B	Bedrock	B/C	33.2	165.64	-0.017	down
	P-04-12C	Marine Clay	A/C	56.7	166.21	-0.020	down
	P-04-14A	Bedrock	A/B	42.5	150.61	0.022	up
	P-04-14B	Bedrock			149.68		
West of Expansion	P-04-07A	Bedrock	A/B	530.	178.54	-0.001	down
	P-04-07B	Bedrock	B/C	20.2	178.57	0.241	up
	P-04-07C	Basal Till	A/C	73.2	173.70	0.066	up
	P-220A	Basal Till	A/B	17.9	147.99	-0.003	down
	P-220B	Basal Till			148.05		
	MW-223A	Bedrock	A/B	15.5	174.97	0.119	up
	MW-223B	Basal Till			173.13		
South to Southwest of Expansion	P-202A	Bedrock	A/B	17.2	148.38	0.059	up
	P-202B	Basal Till			147.37		
	P-205A	Washed Till	A/B	22.2	197.75	-0.054	down
	P-205B	Basal Till			198.95		
	P-211A	Bedrock	A/B	12.6	177.70	0.001	up
	P-211B	Basal Till			177.69		
	P-214A	Bedrock	A/B	19.1	189.71	-0.007	down
	P-214B	Till	B/C	27.1	189.84	0.219	up
	P-214C	Basal Till	A/C	46.2	183.90	0.126	up
	P-215A	Bedrock	A/B	21	210.49	0.141	up
	P-215B	Basal Till			207.53		
	MW-216A	Basal Till	A/B	24.6	154.99	-0.013	down
	MW-216B	Basal Till			155.31		
	P-226A	Basal Till	A/B	13.6	212.21	0.438	up
	P-226B	Basal Till			206.25		
	MW-401A	Bedrock	A/B	88.8	153.26	0.031	up
	MW-401B	Basal Till			150.49		
	MW-402A	Bedrock	A/B	83.5	152.2	0.030	up
	MW-402B	Basal Till			149.69		
	P-502A	Washed Till	A/B	31.8	182.93	-0.724	down
	P-502B	Basal Till			205.94		

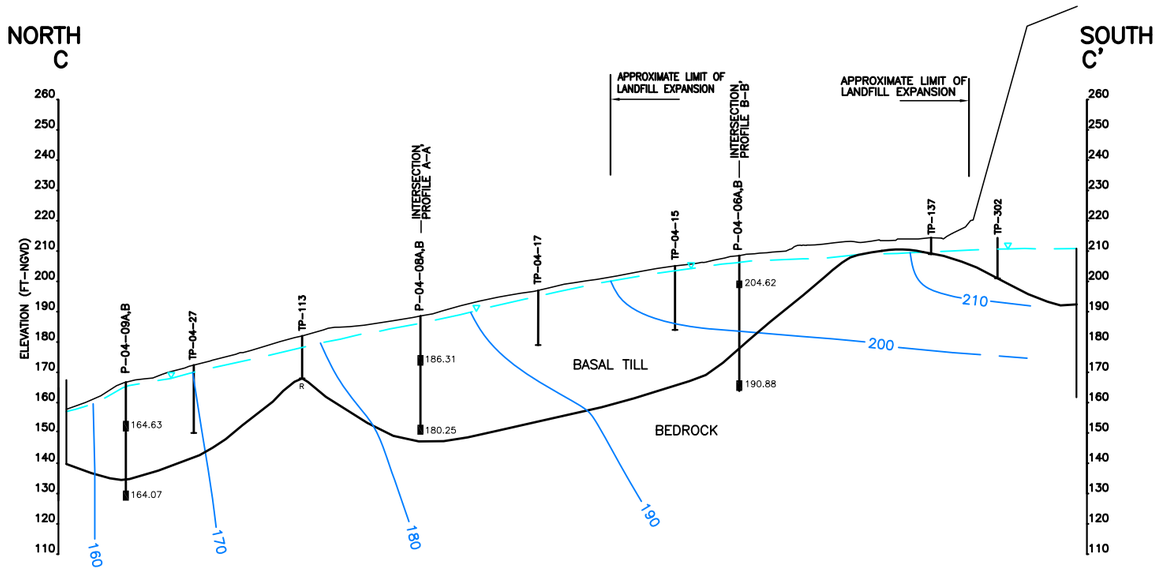
Note:
1. Groundwater elevations from 2007, as shown on Figures 5-1, 5-2, 5-3 and 5-4; or 2008 if no 2007 data are available. See Appendix D.



PROFILE A–A'

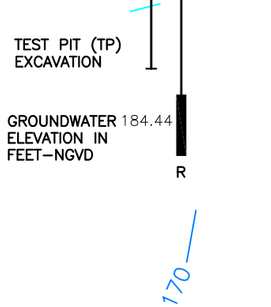


PROFILE B–B'



PROFILE C–C'

LEGEND



LANDFILL BASEGRADES

INTERPRETED WET-SEASON PHREATIC SURFACE ELEVATION (SPRING 2007 OR 2008)

PIEZOMETER (P)/MONITORING WELL (MW) SCREEN INTERVAL

REFUSAL

INTERPRETIVE GROUNDWATER EQUIPOTENTIAL CONTOUR IN FEET-NGVD

NOTES

1. GEOLOGIC UNITS ARE SHOWN SCHEMATICALLY. FIGURE SHOULD NOT BE USED FOR ENGINEERING DESIGN,QUANTITY TAKE-OFFS, GRADES, ETC.

2. THE GEOLOGIC UNITS REPRESENT AN INTERPRETATION OF THE TEST PIT AND BORING RESULTS. CONDITIONS MAY VARY FROM THAT SHOWN BETWEEN THE EXPLORATIONS. BOUNDARIES BETWEEN VARIOUS GEOLOGIC UNITS MAY VARY FROM THAT SHOWN AND MAY BE GRADATIONAL.

3. GROUND SURFACE TOPOGRAPHY TAKEN FROM DECEMBER 31, 2014 TOPOGRAPHIC MAP.

4. VERTICAL EXAGGERATION OF PROFILES IS 10 TO 1.

5. SEE FIGURE 3-1 FOR PROFILE LOCATIONS.

HORIZONTAL SCALE
250 0 500 FEET

GEOLOGIC LEGEND

MARINE CLAY – SOFT TO STIFF – GRAY TO BROWNISH GRAY SILTY CLAY WITH OCCASIONAL DISCONTINUOUS FINE SAND LENSES

BASAL TILL – VERY DENSE – COBBLY GRAVELLY SANDY SILTY-CLAY TO VERY SILTY SAND WITH FEW BOULDERS. RARE DISCONTINUOUS AND THIN (I.E.LESS THAN FEW INCHES THICK) SAND LENSES. RANDOMLY FISSILE THROUGHOUT. UPPER FEW FEET WEATHERED AND FRACTURED DUE TO FROST ACTION. TYPICALLY BROWNISH IN COLOR NEAR GROUND SURFACE AND JUST ABOVE BEDROCK. OCCASIONALLY GRAY IN DEEPER SOIL AREAS. BECOMING INTERBEDDED WITH SAND LENSES NEAR BEDROCK SURFACE IN SOME PLACES.

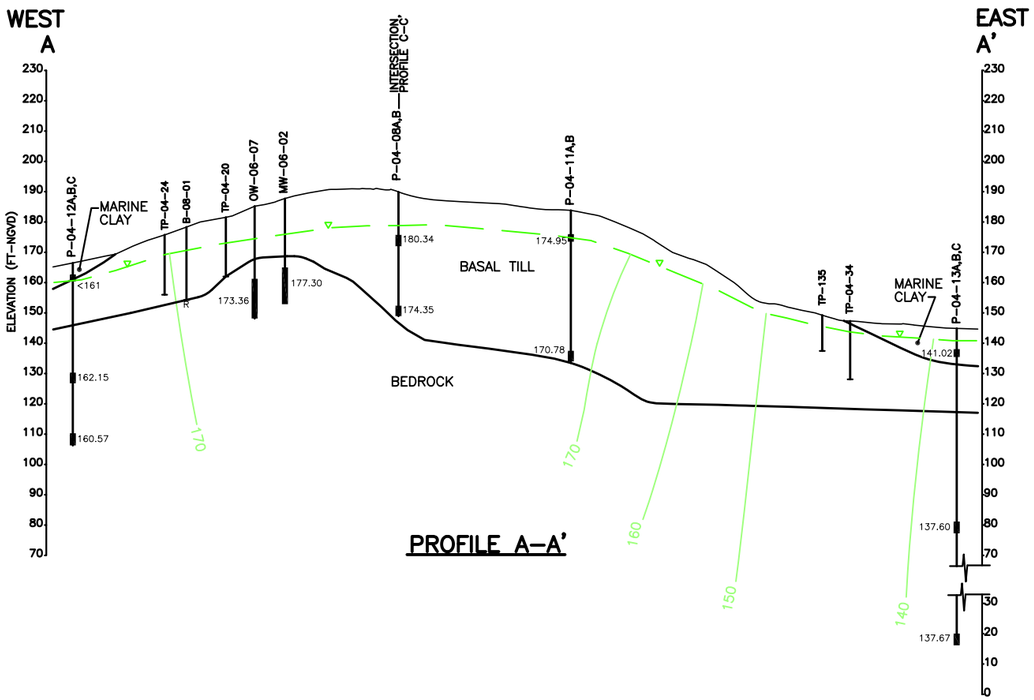
BEDROCK – INTERBEDDED METASILTSTONE, METAGRAYWACKE AND PHYLLITE. OCCASIONAL FRACTURES, TYPICALLY UNWEATHERED, BUT OCCASIONAL WEATHERED ZONES.

FIGURE 5-2
INTERPRETIVE WET-SEASON
VERTICAL EQUIPOTENTIAL PROFILES
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

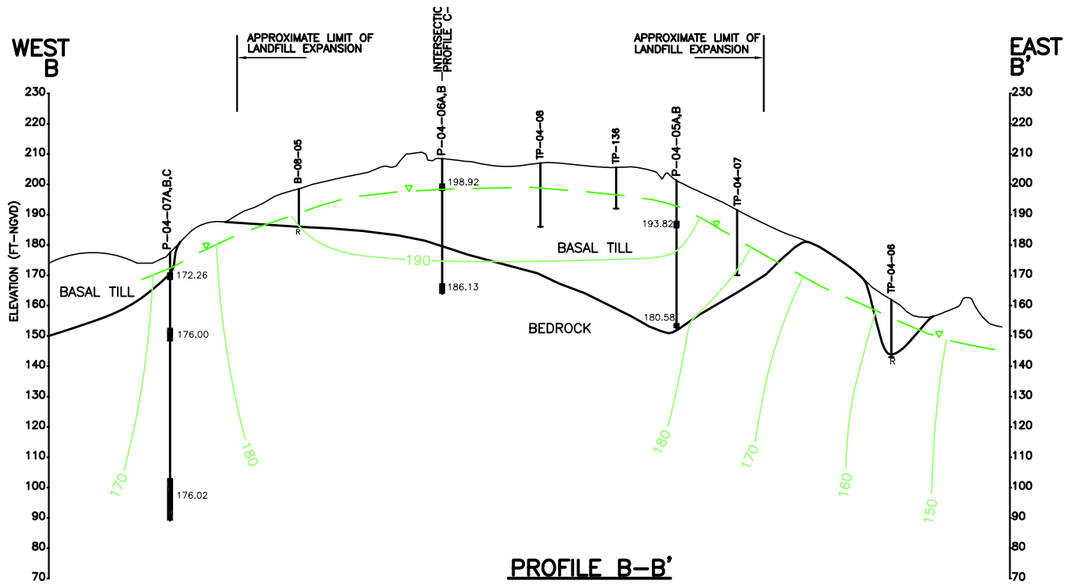
SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

DWG: P-Section-Hydrogeo LMN:EQUIPOTENTIAL-WET CTB: SME-STD REV: 5/27/15

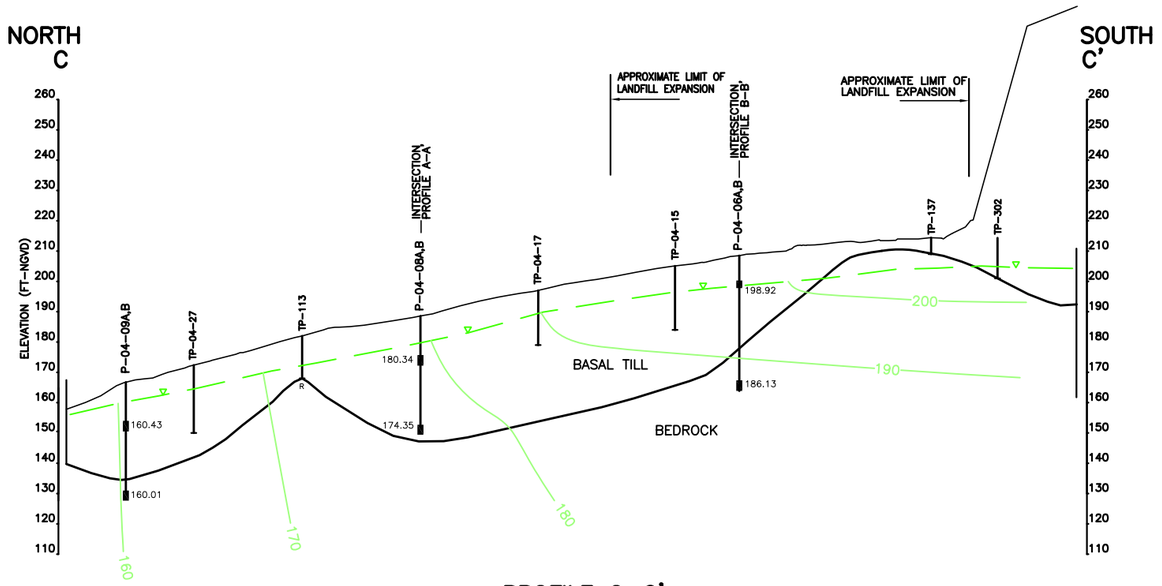
\\Nserver\cfs\Casella\OldTownLandfillExpansion\9.35MCY-Expansion\Acad\Figures\P-Section-HydoGeo.dwg, 5/27/2015 3:50:58 PM, jrl



PROFILE A–A'

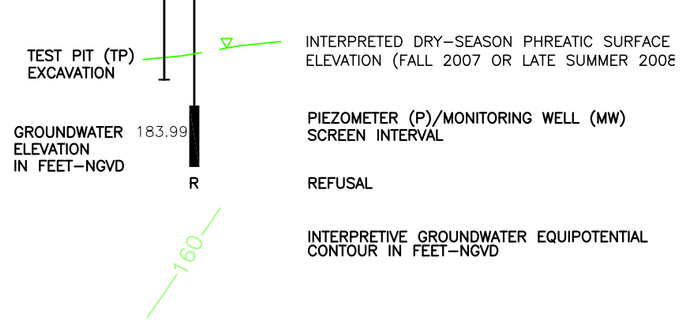


PROFILE B–B'



PROFILE C–C'

LEGEND



INTERPRETED DRY-SEASON PHREATIC SURFACE ELEVATION (FALL 2007 OR LATE SUMMER 2008

PIEZOMETER (P)/MONITORING WELL (MW) SCREEN INTERVAL

REFUSAL

INTERPRETIVE GROUNDWATER EQUIPOTENTIAL CONTOUR IN FEET-NGVD

NOTES

1. GEOLOGIC UNITS ARE SHOWN SCHEMATICALLY. FIGURE SHOULD NOT BE USED FOR ENGINEERING DESIGN,QUANTITY TAKE-OFFS, GRADES, ETC.

2. THE GEOLOGIC UNITS REPRESENT AN INTERPRETATION OF THE TEST PIT AND BORING RESULTS. CONDITIONS MAY VARY FROM THAT SHOWN BETWEEN THE EXPLORATIONS. BOUNDARIES BETWEEN VARIOUS GEOLOGIC UNITS MAY VARY FROM THAT SHOWN AND MAY BE GRADATIONAL.

3. GROUND SURFACE TOPOGRAPHY TAKEN FROM DECEMBER 31, 2014 TOPOGRAPHIC MAP.

4. VERTICAL EXAGGERATION OF PROFILES IS 10 TO 1.

5. SEE FIGURE 3-1 FOR PROFILE LOCATIONS.

HORIZONTAL SCALE
250 0 500 FEET

GEOLOGIC LEGEND

MARINE CLAY – SOFT TO STIFF – GRAY TO BROWNISH GRAY SILTY CLAY WITH OCCASIONAL DISCONTINUOUS FINE SAND LENSES

BASAL TILL – VERY DENSE – COBBLY GRAVELLY SANDY SILTY-CLAY TO VERY SILTY SAND WITH FEW BOULDERS. RARE DISCONTINUOUS AND THIN (I.E.LESS THAN FEW INCHES THICK) SAND LENSES. RANDOMLY FISSILE THROUGHOUT. UPPER FEW FEET WEATHERED AND FRACTURED DUE TO FROST ACTION. TYPICALLY BROWNISH IN COLOR NEAR GROUND SURFACE AND JUST ABOVE BEDROCK. OCCASIONALLY GRAY IN DEEPER SOIL AREAS. BECOMING INTERBEDDED WITH SAND LENSES NEAR BEDROCK SURFACE IN SOME PLACES.

BEDROCK – INTERBEDDED METASILTSTONE, METAGRAYWACKE AND PHYLLITE. OCCASIONAL FRACTURES, TYPICALLY UNWEATHERED, BUT OCCASIONAL WEATHERED ZONES.

FIGURE 5-3
INTERPRETIVE DRY-SEASON
VERTICAL EQUIPOTENTIAL PROFILES
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
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DWG: P-Section-Hydrogeo LMN:EQUIPOTENTIAL-DRY CTB: SME-STD REV: 5/27/15

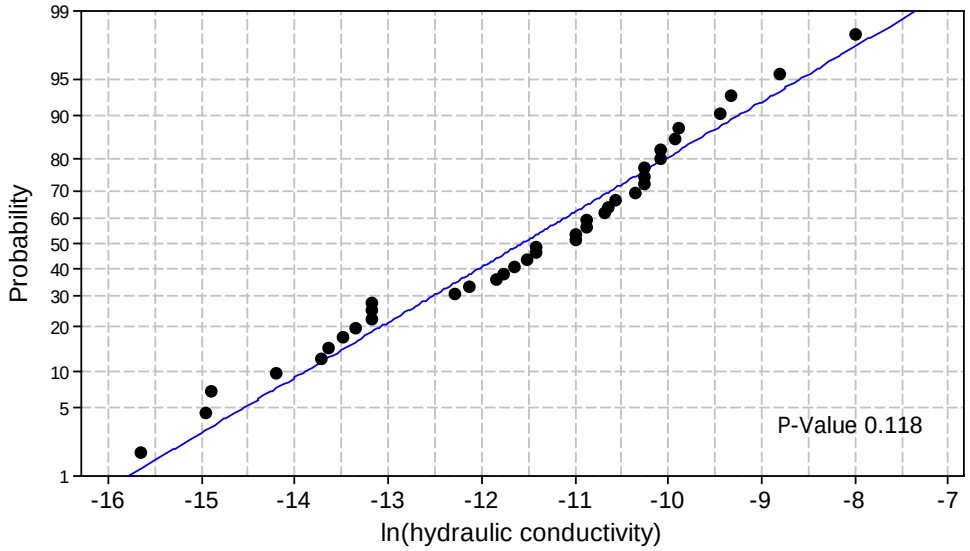
\\Nserver\cfs\Casella\OldTown Landfill\Expansion\9.35MCY-Expansion\Acad\Figures\P-Section-HydroGeo.dwg, 5/27/2015 3:51:34 PM, jrl

5.1.4 Groundwater Seepage Rates. To evaluate groundwater seepage rates through the till soil beneath and beyond the limit of the Expansion, solute tracer tests, in situ slug testing, laboratory hydraulic conductivity testing, and groundwater age-dating methodologies were utilized. Collectively, these methods show a range in values that permit evaluation of the variability in the groundwater flow rate. The groundwater seepage rate, or average linear velocity, is a function of the hydraulic conductivity, the effective porosity, and the hydraulic gradient. The nature of the geologic material and its structure affects the parameters that govern groundwater seepage rates, which in turn impacts groundwater travel times to site sensitive receptors downgradient of the Expansion.

As previously stated, the surficial soil that underlies the Expansion area consists primarily of basal till. The basal till at the site is characterized as a heterogeneous mixture of soil particles ranging in size from silts and clay to cobbles and boulders based on visual examination of samples collected from test pits and soil borings, and confirmed by numerous grain size analyses. The fine-graded nature of the till is reflected in the geometric mean in situ horizontal hydraulic conductivity value of 9.4×10^{-6} cm/sec (see Table 3-2). The geometric mean value was utilized to calculate travel time since the hydraulic conductivities are log-normally distributed as shown in Figure 5-4 (Anderson-Darling, 1952). Use of the geometric mean hydraulic conductivity is well founded for hydraulic conductivity fields with a log-normal distribution (Woodbury and Sudicky, 1991). Measured hydraulic conductivity values ranged over three orders of magnitude (i.e. 1.6×10^{-7} to 3.4×10^{-4} cm/sec) as shown on Table 3-2. Locally, lenses of washed till had measured hydraulic conductivities of 8.3×10^{-4} and 7.5×10^{-3} cm/sec. Outside of the landfill footprints, a localized boulder zone had a measured hydraulic conductivity of at least 3.1×10^{-3} cm/sec.

FIGURE 5-4

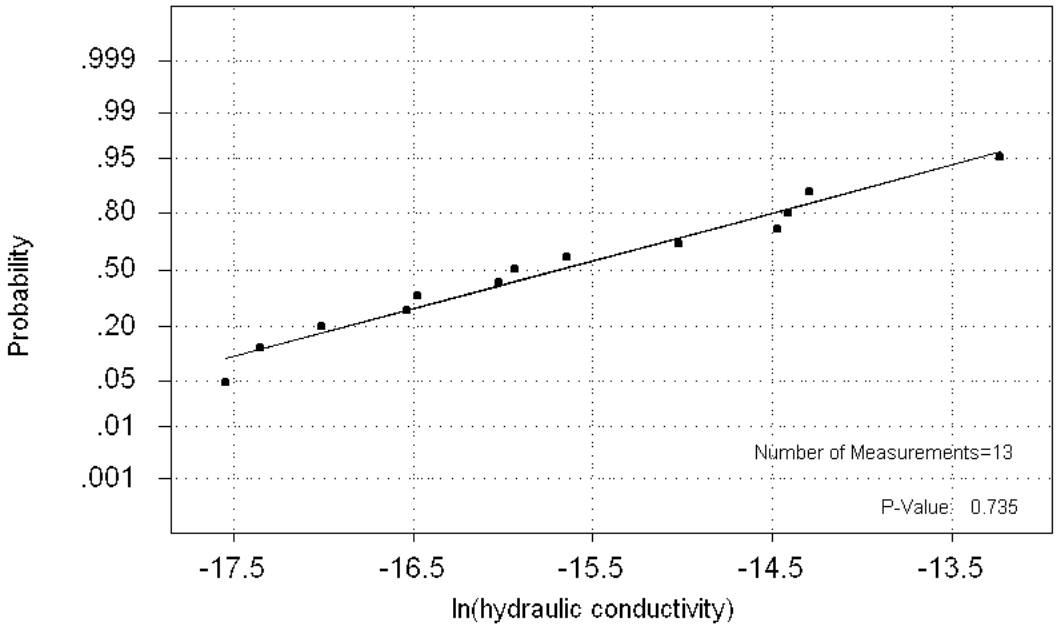
ANDERSON-DARLING NORMALITY TEST OF HORIZONTAL HYDRAULIC CONDUCTIVITY OF GLACIAL TILL



The geometric mean vertical hydraulic conductivity of the basal till was calculated to be 1.5×10^{-7} cm/sec (see Table 3-3), but measured values varied between 2.4×10^{-8} and 1.8×10^{-6} cm/sec. This mean value is less than the mean horizontal hydraulic conductivity for the till, i.e., 9.4×10^{-6} cm/sec. These hydraulic conductivities are log-normally distributed as depicted in Figure 5-5 (Anderson-Darling, 1952).

FIGURE 5-5

ANDERSON-DARLING NORMALITY TEST OF
VERTICAL HYDRAULIC CONDUCTIVITY OF GLACIAL TILL



The observed anisotropy in hydraulic conductivity for the basal till likely reflects its structure resulting from its depositional history. Coarser fragments in basal till often exhibit a preferential orientation along their long axes generally parallel to the direction of ice movement (Anderson and Borns, 1994). Furthermore, lenticular sandy lenses were occasionally encountered in the basal till which, because of their lenticular shape, enhance the bulk horizontal hydraulic conductivity of the till deposits. Fissility, where present, accentuates the horizontal hydraulic conductivity rather than the vertical hydraulic conductivity. During the original landfill permitting, it was demonstrated that the mean horizontal conductivity (K_H) was about twice the mean vertical conductivity (K_V). The K_H/K_V ratio for the three locations where both vertical and horizontal hydraulic conductivities were measured ranged from 3 to 48. Where the vertical travel time through the till was measured (P-04-06A, see Section 3.2.8), the average vertical groundwater seepage velocity suggests a hydraulic conductivity of about 1.3×10^{-6} cm/sec, which, when compared to the horizontal conductivity of the till measured at P-04-06B, the till at

this location yields an anisotropy ratio of about 1.5. Considering geometric mean horizontal and vertical hydraulic conductivity for the till, an anisotropy ratio (K_H/K_V) is calculated at 63, as shown on Table 3-3. Thus, there appears to be lower vertical hydraulic conductivity than horizontal for the glacial till geologic unit.

Horizontal groundwater seepage velocity calculations also require horizontal hydraulic gradients and effective porosity. The horizontal hydraulic gradient was determined from the phreatic surface map. The hydraulic gradient varies from approximately 0.02 to 0.05. The geometric mean effective porosity of 0.25 was estimated for the basal till based on total porosity measurements and the laboratory tracer test (see Section 3.2.7). These hydraulic parameters, along with the geometric mean horizontal hydraulic conductivity (i.e., $9.4x10^{-6}$ cm/sec), resulted in calculated horizontal seepage rates ranging from about one to two feet per year (ft/yr). This velocity may be representative of a site-wide, average horizontal groundwater velocity. However, given the range of location-specific hydraulic conductivities and variations in porosity and gradients, the local groundwater velocities can be greater or less than this average of 1 to 2 ft/yr. The horizontal seepage rate in the upper weathered brown till is likely somewhat higher due to frost action creating some fracturing of the till; this likely affects the upper several feet of till. Higher hydraulic conductivities were found in the upper weathered till within the footprint of the existing landfill (SME, 1991), and the till tracer test that was performed in the upper fifteen feet of till just north of the Expansion (see discussion below).

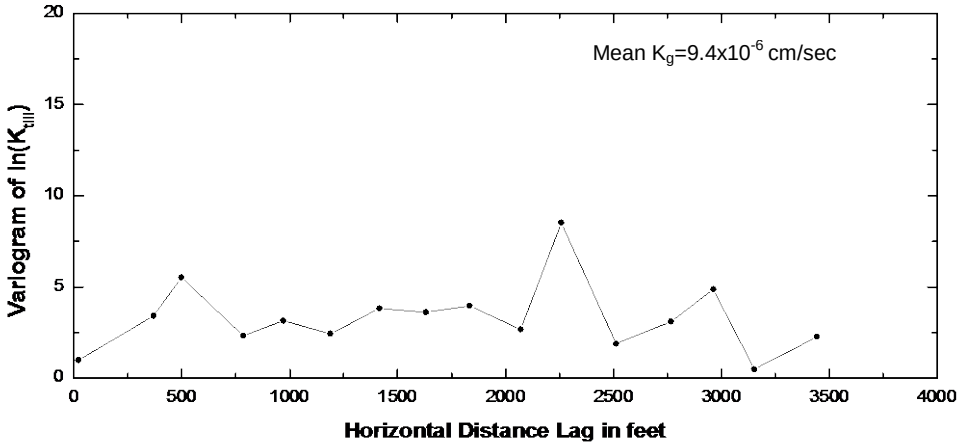
To examine the scale of the applicability of the geometric mean hydraulic conductivity of the calculated average site-wide seepage velocity, the scale-dependency of the hydraulic conductivity variation was examined geostatistically (Sudicky, 1986; Farrel et al, 1994; Kitanidis, 1993; de Marsily, 1986). Geostatistics can aid in the scale or structural description of these various geologic properties (Kitanidis, 1993; Woodbury and Sudicky, 1991; Sudicky, 1986). Geostatistics also provide qualitative and quantitative estimates of the parameter variability over space or time, justifying certain “lump-parameter” approaches.

A variogram was developed for the in situ hydraulic conductivity measurements at the wells and piezometers (Davis, 1986). The horizontal distances between these measurement points were used to calculate the lag distance between measurement values. The resulting variogram is

shown in Figure 5-6. Figure 5-6 shows that spatial variability of the hydraulic conductivity measurements is relatively consistent with scale and without any obvious drift. Therefore, over distances greater than a few hundred feet, the geometric mean value would be applicable and the average horizontal groundwater velocity in the deeper, unweathered till is in the order of 1 to 2 ft/yr. At shorter distances, the local hydraulic conductivity may be anywhere within the range of measured values and groundwater velocities in the till may be greater or less than this calculated average.

FIGURE 5-6

HORIZONTAL STRUCTURE OF THE GLACIAL TILL HYDRAULIC CONDUCTIVITY



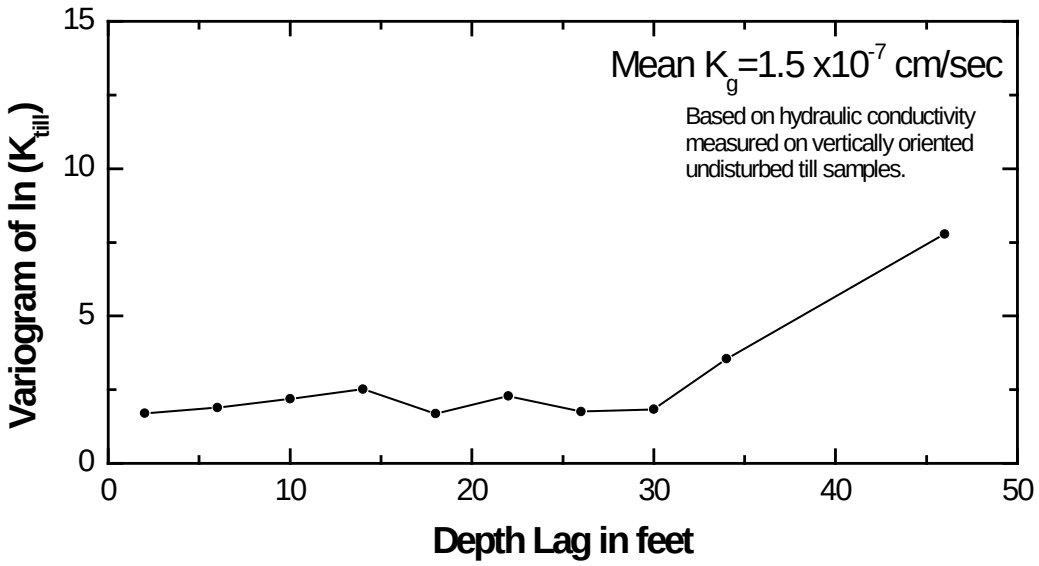
A natural gradient tracer test was performed in 2005 to provide a field scale determination of the groundwater seepage rate in the till (see Section 3.2.6 and Appendix G). Based on the distance the tracer traveled and the elapsed arrival time to the monitoring wells, the velocity of groundwater flowing through the basal till was calculated to be about 11 ft/yr where the average horizontal groundwater gradient was measured at about 0.023. When corrected for the overall site gradients, the value becomes about 10 to 24 ft/yr. This test was performed in the near-surface weathered till. Therefore, the results may reflect the effect of weathering in the upper till.

Downward vertical hydraulic gradients were greater in piezometer pairs located closer to the crest of the drumlin in the southern portion of the Expansion, and decreased with distance to the north (see Table 5-1). Vertical seepage rates through the basal till were calculated using (1) the geometric mean of the vertical hydraulic conductivity determined from the undisturbed tube samples tested in the soils laboratory (i.e., 1.5×10^{-7} cm/sec), (2) a range of downward vertical gradients calculated from nested P-04-series piezometers (0.03 to 0.40), and (3) an effective porosity of 0.25. These parameters produced downward vertical seepage velocities ranging from less than 0.05 ft/yr along the northern limit of the Expansion to about 0.3 ft/yr in the southern portion.

Piezometers P-04-06A and P-04-06B are screened in the basal till and near the top of bedrock, respectively, and the downward vertical gradient at this location (i.e., 0.45) is one of the largest values measured within the Expansion footprint (see Table 5-1). The residence time of a groundwater sample collected from piezometer P-04-06A, which is screened in bedrock just below the till, was determined by tritium/helium groundwater age-dating methodology to have an age of 14 years. A vertical flow path of about 28.5 feet between the existing ground surface and the P-04-06A well screen having a groundwater residence time of 14 years equates to a groundwater velocity of about 2 ft/yr. This calculation ignores the upper several feet of desiccated, weathered till zone that is potentially more permeable than the deeper unweathered till, as well as the fact that the groundwater at the screen may be partially mixed with groundwater that migrated through the bedrock from an upgradient location, potentially adding some age to the groundwater sample. Thus, the 2 ft/yr value should be treated as an upper limit and, as such, is consistent with the estimated average vertical velocity of 0.3 ft/yr. A variogram using the vertical hydraulic conductivity measurements from the tube samples show relative consistency of variation with depth. The depth separation distances between the tubes were used to calculate the lag distance between measurement values. The resulting variogram is shown in Figure 5-7, which shows that for separation distances of greater than a few feet, variability of the hydraulic conductivity measurements is similar. The apparent drift at the greater lag distances is likely due to the absence of samples, since the till thickness averages less than 50 feet. The geometric mean vertical hydraulic conductivity appears to be appropriate for vertical distances of more than a few feet.

FIGURE 5-7

DEPTH STRUCTURE OF GLACIAL TILL
VERTICAL HYDRAULIC CONDUCTIVITY



5.2 Bedrock

Groundwater movement through the bedrock is through fracture and joint openings within the bedrock. The matrix minerals of the bedrock that underlie the Expansion site are relatively impervious. Thus, the occurrence and orientation of fractures and joints in the bedrock is fundamental to understanding the movement of groundwater within the bedrock. Shapiro et al. (1999) suggest that because of the complexities of groundwater movement within the bedrock, multi-disciplinary investigations should be used when examining groundwater behavior in bedrock. The techniques suggested by Shapiro et al. (1999) include fracture mapping at bedrock exposures, surface geophysical techniques such as earth resistivity, borehole geophysical logging, tracer testing, and hydraulic testing, as well as chemical analysis of the groundwater. All of these methods have been utilized for the Expansion. Bedrock investigations must also include consideration of the scale of interest. Jointly, these techniques provided data to characterize the fracture network and allow confidence in the prediction of groundwater flow direction and rates within the bedrock.

5.2.1 Groundwater Potentiometric Conditions in the Bedrock. The groundwater potentiometric surface for the bedrock has been interpreted using wells in the shallow portions of the bedrock for both wet- and dry-season conditions, as illustrated in Figure 5-8. Both seasons indicate the same general groundwater potentiometric pattern, although the elevation of the dry-season potentiometric surface varied from about 3 to 6 feet lower than that of the wet-season. Thus, the directions of groundwater seepage and its rate are relatively constant throughout the year.

Figures 5-2 and 5-3 illustrate the vertical equipotential conditions in the bedrock during wet and dry-seasons, respectively. These figures indicate that the bedrock groundwater migration movement is downward beneath the higher topographic elevations at the top of the drumlin and becomes more lateral on the flanks of the drumlin. Groundwater migration beneath the adjacent stream valleys generally tends to be upward. This finding is consistent with the findings of the existing landfill hydrogeology.

5.2.2 Bedrock Fracture Interconnectivity. Bedrock fracture interconnectivity is primarily the result of: (1) the intersection of two, nearly orthogonal, nearly vertical principal sets of fractures, (2) frequent fracture intersections made possible by the relatively small fracture spacing compared to the much greater fracture lengths, (3) open fractures capable of transmitting water, and (4) the relative density of the fractures present. An analysis and discussion of these attributes of the bedrock fractures and how they explain the interconnectivity of fractures is discussed in detail in Appendix U. The pump testing of PW-08-01, PW-08-02, and PW-08-04 in the bedrock confirms that fractures are interconnected over distances of at least 2,000 feet under the pumping conditions outlined in Section 3.2.13. The integration of the fractures is further demonstrated by the travel rates and spreading of the solute during the bedrock tracer test at MW-06-02. The solute spread over an angle of approximately 100 degrees from the solute injection point after 50 feet of travel. This is conclusive evidence of the integration of the fractures and the interplay between the ordered structural features of the bedrock with the potentiometric gradients.

PROPOSED EXPANSION SOLID WASTE BOUNDARY

EXISTING LANDFILL SOLID WASTE BOUNDARY

P-04-14A
W 150.61
D 143.98

P-04-13B
W 143.06
D 137.60

W 161.44
D 157.84
P-04-10A

P-04-09A
W 164.07
D 160.01

W 190.88
D 186.13
P-04-06A

OW-06-07
W 179.52
D 173.36

MW-06-02
W 184.44
D 177.30

W 165.64
D 162.15
P-04-12B

P-04-07B
W 178.57
D 176.0

MW-223A
W 174.97
D 173.04

MW-304A
W 191.51
D 186.57

MW-207
W 211.81
D 204.85

W 210.49*
D 209.98*
P-215A

W 199.40
D 196.89
MW-302R

MW-401A
W 153.26
D 148.6

W >152
D >152
MW-402A

P-201A
W 147.90*
D >149.55*

P-202A
W 148.38*
D 147.80*

250 0 500 FEET

NOTES

1. GROUND CONTOURS FROM DECEMBER 31, 2014 AERIAL SURVEY PERFORMED BY AERIAL SURVEY AND PHOTO, INC. OF NORRIDGEWOCK, MAINE.
2. PROPERTY LINE LOCATIONS ARE A RESULT OF FIELD SURVEY PERFORMED BY HERRICK AND SALSBURY, INC. LAND SURVEYORS, ELLSWORTH, MAINE FOR TRYTON TREE FARM PROJECT, PATTEN CORPORATION–DOWNEAST, OLD TOWN, MAINE, FEBRUARY 23, 1988, REVISED APRIL 7, 1988.
3. LOCATIONS OF EXPLORATIONS ARE APPROXIMATE.
4. GROUNDWATER CONTOURS BASED ON WATER LEVEL MEASUREMENTS RECORDED DURING SPRING AND FALL OF 2007 (WET AND DRY SEASONS RESPECTIVELY) AND SPRING AND LATE SUMMER DATA FROM 2008 (WET AND DRY SEASONS RESPECTIVELY) FOR A FEW LOCATIONS TO ENHANCE COVERAGE (SHOWN WITH ASTERISK).

LEGEND

150 — INTERPRETED WET–SEASON UPPER BEDROCK POTENTIOMETRIC SURFACE CONTOUR (ELEVATION IN FEET NGVD).

150 — INTERPRETED DRY–SEASON UPPER BEDROCK POTENTIOMETRIC SURFACE CONTOUR (ELEVATION IN FEET NGVD).

MW–223A
W 174.97
D 173.04

WELL/PIEZOMETER LOCATION WITH ELEVATION OF GROUNDWATER FOR WET (W) AND DRY (D) SEASON.

DWG: FIGURES LMN:POTENTIO–BEDROCK CTB: OVERBURDEN REV: 4/9/15

FIGURE 5–8
INTERPRETED GROUNDWATER POTENTIOMETRIC SURFACE IN UPPER BEDROCK
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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\\Server\cfs\Casella\OldTownLandfillExpansion\9.35MCY-Expansion\Acad\Figures\FIGURES.dwg, 4/9/2015 4:47:01 PM, paf

Given the integration or interconnection of bedrock fractures observed during the investigations of the Site, the fractured bedrock to the north of the Expansion area is shown to behave as a heterogeneous media, much like soil, over a site-wide scale. This interconnectivity of bedrock fractures is beneficial to the Site for landfill development as it allows for predictability of groundwater movement through the bedrock over the site-wide scale. The extensive interconnection of bedrock fractures that are oriented in a wide array of directions allows groundwater in bedrock to generally flow in response to local hydraulic gradients and, in this case, topographically downslope directions. The heterogeneity of the fractured bedrock media also is beneficial by allowing for control of groundwater flow directions beneath and adjacent to the proposed Expansion by means of groundwater extraction wells in the unlikely occurrence of leachate leakage into the bedrock groundwater (which is discussed further in Section 5.5). Furthermore, fracture interconnectivity in off-site bedrock, where groundwater supply wells are used, would allow for those water supply wells to obtain groundwater local to the wells as they are pumped, rather than drawing the water from further distances through a discrete fracture in a non-uniform pattern.

5.2.3 Groundwater Flow Directions in Bedrock. Based on the extensive bedrock studies conducted at the Site, it appears that groundwater moving horizontally away from the landfill area would generally follow fractures in the bedrock, but integration of these fractures makes flow directions predictable, particularly on a site-wide scale. The integration of the many fractures allows for the migration of groundwater in a generally downgradient direction. However, the bedrock tracer test at MW-06-02 and the pumping tests at MW-06-02 and PW-08-01 indicate that the bedrock is anisotropic relative to hydraulic conductivity, with the direction of maximum hydraulic conductivity to the northeast/southwest. Groundwater would generally tend to move in a direction slightly skewed from perpendicular to the equipotential surface contour lines illustrated in Figure 5-8 due to the hydraulic conductivity anisotropy, but still in the general direction suggested by the equipotential surface. Hydraulic conductivity appears to be about 3 to 18 times greater in the northeast/southwest direction than in a northwest/southeast direction based on pump test data. Thus, even though the direction of groundwater flow would generally be downslope relative to the equipotential contours of Figure 5-8, there would be some preferred flow along the northeast/southwest direction over

site-wide scales. Therefore, groundwater attempting to move horizontally in westward and eastward directions would tend to move toward the southwest and northeast, respectively. The groundwater would tend to move laterally until it reached nearby streams, where potentiometric conditions could cause it to move upwards toward the ground surface. Based on the fracture network characteristics described above, groundwater beneath the eastern portion of the Expansion would be expected to flow horizontally to the northeast, as influenced by the northeast/southwest fracture set.

A groundwater divide currently exists near the top of the drumlin where the topography is at its highest elevation. East of this groundwater divide, groundwater should flow to the east and toward the tributaries that eventually drains into Judkins Brook. West of this groundwater divide, groundwater should flow west toward the tributaries to Pushaw Stream. Along the southwest corner of the Expansion, groundwater flow would be expected to be predominantly to the southwest, with some flow to the west through fracture interconnections. In the northwest corner of the landfill, groundwater flow would be expected to be more toward the northwest.

Precipitation falling within the Site would drain vertically downward beneath the higher elevations and move laterally towards the flanks of the drumlin and ridges in their respective directions and eventually discharge into regional streams or rivers. Downward migrating groundwater beneath the central portion of the landfill would move along dipping fracture surfaces. Because of the integration of the fractures and their steep dip, downward migration would likely be nearly vertical, but along the preferential dips of fractures in the bedrock. In the deeper bedrock (up to a few hundred feet), groundwater is expected to migrate horizontally and along the same flow directions as that of the shallow bedrock groundwater.

5.2.4 Bedrock Groundwater Seepage Rates. Hydraulic conductivity of the in situ bedrock was measured using slug testing as well as a pumping test. Slug testing showed the hydraulic conductivity to range from 1.3×10^{-7} to 6.6×10^{-3} cm/sec, with a geometric mean of 3.5×10^{-5} cm/sec. The geometric mean value was utilized since the hydraulic conductivities are log-normally distributed, as shown in Figure 5-9 (Anderson-Darling, 1952). The MW-06-02 pump test analysis resulted in hydraulic conductivities in the above-mentioned range of values. The

range and mean value of bedrock hydraulic conductivity are generally consistent with the existing JRL investigations.

The pumping tests on the bedrock demonstrated it to be anisotropic in the horizontal plane relative to hydraulic conductivity (see Sections 3.2.9 and 3.2.13). The calculated geometric mean hydraulic conductivity of the bedrock, therefore, represents a composite or effective conductivity of the principal horizontal hydraulic conductivities. The effective conductivity can be expressed as the square root of the product of the two principal conductivities in the horizontal plane (Freeze and Cherry, 1979). Since the long-term bedrock pump test suggests a principal conductivity ratio of about 3.4:1, the geometric mean conductivity can be resolved into the two principal horizontal hydraulic conductivities by this relationship. This yields a maximum conductivity of about 7.8×10^{-5} cm/sec and a minimum value of about 2.3×10^{-5} cm/sec. From the bedrock pump test, the maximum value is oriented about N36E (relative to True North) and the minimum conductivity approximately at a right angle to the maximum's orientation. In the vertical direction, principal hydraulic conductivity will be intermediate between the other two principal values because of the fracture orientations (deMarsily, 1987). Since most of the fractures are nearly vertical, the vertical conductivity will be closer to the 7.8×10^{-5} cm/sec value. We have selected a value of 7×10^{-5} cm/sec for the vertical hydraulic conductivity of the bedrock. These principal hydraulic conductivities were used in simulating the regional groundwater behavior (in Appendix V).

FIGURE 5-9

ANDERSON-DARLING NORMALITY TEST OF BEDROCK HYDRAULIC CONDUCTIVITY

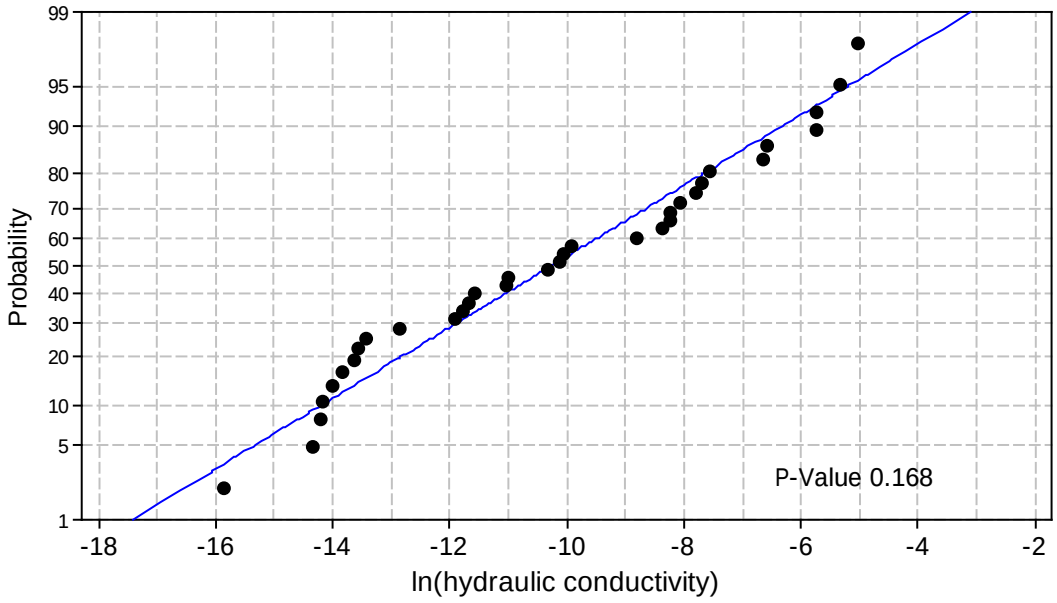
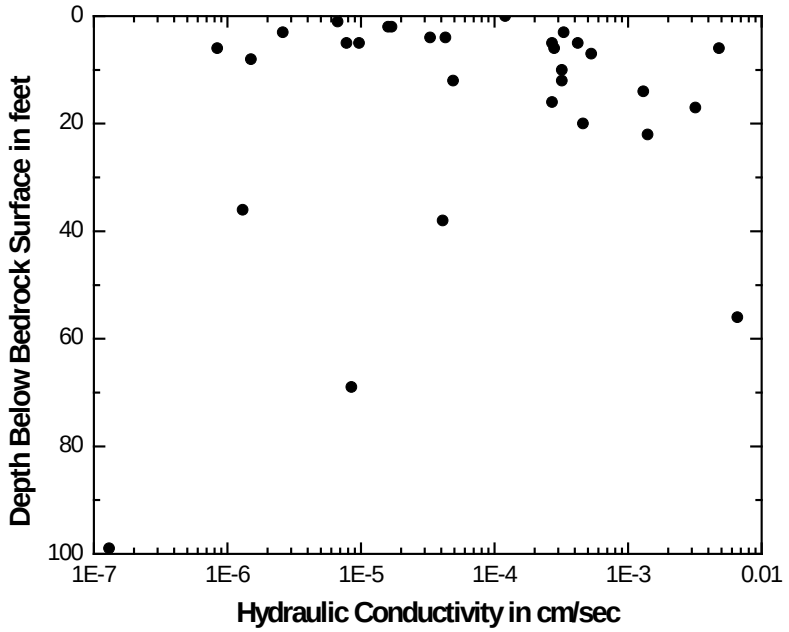


Figure 5-10 illustrates the measured bedrock hydraulic conductivities at various depths beneath the bedrock surface. The data appears random and does not show any trend with depth.

FIGURE 5-10

BEDROCK HYDRAULIC CONDUCTIVITY VERSUS DEPTH INTO BEDROCK



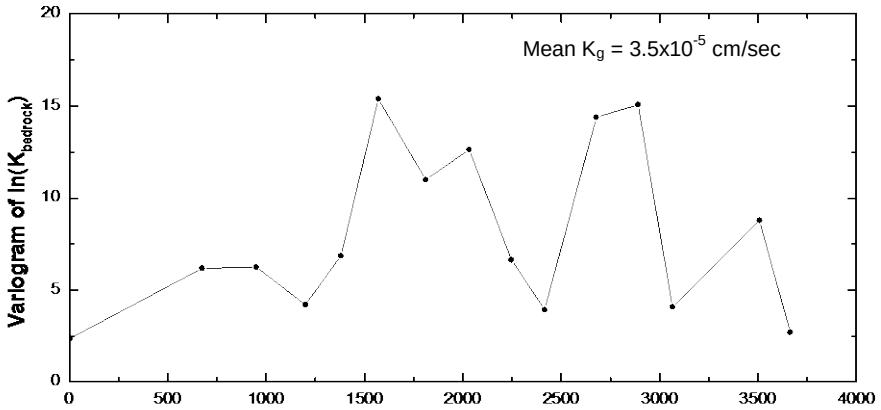
The porosity of the bedrock was calculated from cores and slug tests results. The average effective porosity of 0.001 was selected from these results. Utilizing the typical horizontal hydraulic gradients for the site of 0.02 to 0.05 with a geometric mean hydraulic conductivity and an average effective porosity, a site-wide average horizontal bedrock groundwater velocity of about 2 to 6 feet per day is calculated. However, given the range of hydraulic conductivities, the velocity of individual fractures can vary significantly around this average value. The bedrock tracer tests indicated a local groundwater velocity in the order of 5 ft/day. This tracer test result is within the general range of calculated average site-wide groundwater velocities.

Similar to examining the glacial till hydraulic conductivity horizontal variability, a variogram was developed for the bedrock slug test hydraulic conductivities. The horizontal separation distances between the wells and piezometers where slug tests were performed were used to calculate the lag distance between measurement values; screen depths were ignored for this analysis. The resulting variogram is shown in Figure 5-11. This figure shows that variability of the hydraulic conductivity measurements is not constant. Therefore, the horizontal groundwater

velocity through the bedrock will vary spatially and the geometric mean value should be used with caution. The local groundwater velocities in individual bedrock fractures may be greater or less than this calculated average.

FIGURE 5-11

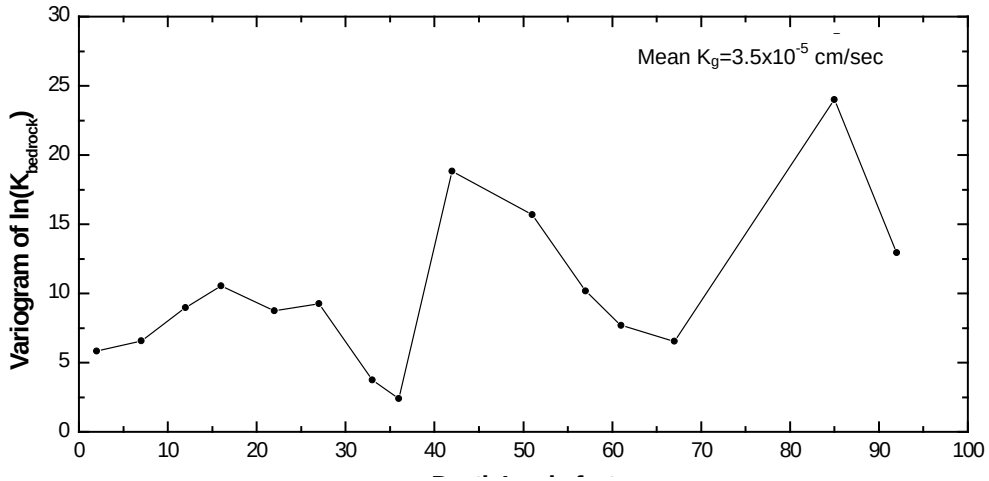
HORIZONTAL STRUCTURE OF BEDROCK HYDRAULIC CONDUCTIVITY



To examine the vertical depth variability of the bedrock hydraulic conductivities, a variogram was developed using the slug test hydraulic conductivities accounting for the different screen depths below the surface of the bedrock. The vertical depth separation distances between the screens of the wells and piezometers where the slug tests were performed were used to calculate the lag distance between measurement values. The resulting variogram is shown in Figure 5-12. Similar to the horizontal bedrock hydraulic conductivity structure, Figure 5-12 shows significant variability exists over the vertical depths investigated for the Expansion (i.e., a hundred feet or so). Thus, a geometric mean hydraulic conductivity should be used with caution when estimating groundwater velocities in the vertical direction even over short distances.

FIGURE 5-12

DEPTH STRUCTURE OF BEDROCK HYDRAULIC CONDUCTIVITY



5.3 Regional Hydrologic Setting

The humid climate associated with the Site's location in Maine, along with the hydraulic characteristics of the soil and bedrock, cause groundwater to remain relatively close to the natural ground surface. Given this, the direction of groundwater flow away from the Expansion footprint will largely be controlled by the regional topography as demonstrated by the Site-specific data. The Expansion occupies an elevated area of the topography with the ground dropping in the east and west directions. The existing JRL abuts the Expansion to the south. Therefore, one would anticipate the groundwater flow away from the Expansion, as the site currently exists, to be towards the west and the east. Even though the Expansion ground surface topography drops slightly to the north, groundwater will flow away from this divide due to precipitation recharge along the ridge of the divide. This causes groundwater beneath the northern edge of the Expansion to migrate northeast and southwest rather than directly northward.

Unnamed tributaries to Pushaw Stream are located approximately 950 feet to the southwest of the proposed Expansion footprint. To the west of the unnamed tributary to Pushaw Stream, ground surface rises to form a ridge of several tens of feet above the stream surface. Because

the geology of that ridge, and along Route 43, is similar to the geology of the Expansion, groundwater is expected to be close to the ground surface. Therefore, shallow groundwater would generally be directed east from this ridge towards the unnamed tributary of Pushaw Stream by the regional topography. Groundwater enters this "valley" setting and flows to the tributary from both sides. The opposing easterly flow prevents shallow groundwater from the Expansion from moving beyond the tributary, creating a hydraulic buffer protecting groundwater wells along Route 43. Thus, there is not a direct hydraulic connection under existing conditions between the shallow and deep groundwaters beneath the Expansion and the water supply wells along Route 43. This interpretation is supported by the groundwater simulation presented in Appendix V. The simulation supports the conclusion that the unnamed tributary to Pushaw Stream is a sensitive receptor, but the wells beyond the tributary are not.

The referenced groundwater simulation utilizes a numerical computer-based model to recreate the regional and site-specific hydrogeologic setting. The ability to incorporate deep bedrock, as well as topographic features, makes this a useful tool for extending the interpretation of the groundwater flow pathways away from the landfill Site toward property boundaries, streams, and groundwater supply wells. It complements and supports interpretations of groundwater flow pathways based on common hydrogeologic principles. It also allows incorporation of complex features such as the anisotropic hydraulic conductivity properties of the bedrock. Appendix V describes the simulation approach in detail. Table 5-2 summarizes the hydraulic properties utilized for the encountered soils and bedrock at and around the JRL. These values are based on the testing and the above discussions.

TABLE 5-2

SUMMARY OF HYDRAULIC PROPERTIES

Geologic Unit	Average Hydraulic Conductivity (cm/sec)	Average Annual Recharge (in/year)	Average Effective Porosity
Basal Till	9.4×10^{-6}	0.5 to 10	0.25
Stratified Sand	4.4×10^{-5}	Not Applicable	0.25
Bedrock	Northeast-Southwest: 7.8×10^{-5} Northwest-Southeast: 2.3×10^{-5} Vertical: 7.0×10^{-5}	Not Applicable	0.001
Sand and Gravel Esker	1.0×10^{-1}	10	0.25

Northwest of the Expansion, groundwater enters both sides of Judkins Brook. Judkins Brook flows to the northeast in this area and occupies a low area in the local topography. The "valley" setting in this geologic terrain prevents northwesterly moving shallow groundwater from the direction of the Expansion to migrate beyond the brook to homes along the western end of Stagecoach Road. It also causes groundwater moving toward Judkins Brook to discharge into the brook. The above-referenced regional groundwater simulation incorporated pumping residential bedrock wells along Route 43 and Stagecoach Road and supports the interpretation of the absence of a groundwater pathway to these wells from the Expansion.

On the east side of the Expansion, the ground elevations drop towards the east. The geology of this easterly area, which is similar to that of the Expansion site, results in groundwater moving eastward from the Expansion toward tributaries to Pushaw Stream and Judkins Brook. This eastward moving groundwater would be opposed by westward moving groundwater from the topographically higher terrain between the tributary and Route 16. Shallow groundwater flow to the northeast from the Expansion toward Route 16 is prevented by the "hill and valley" topography. Thus, groundwater supply wells along Route 16, as well as the mapped regional sand and gravel deposit along Route 16, are similarly protected from direct shallow groundwater migration from the Expansion. This hydraulic isolation from water supply wells

along Routes 16 and 43 is one of the reasons this Site was originally selected for landfill development. The groundwater simulation shows that the streams and their tributaries to the east are site sensitive receptors and that groundwater flow through the deeper bedrock does not reach the sand and gravel deposit along Route 16.

Shallow groundwater movement directly to the north from the Expansion encounters a hill, which limits its ability to migrate regionally northward. Furthermore, the topographic "saddle" created by the hill redirects shallow groundwater moving north from the Expansion towards the east or west. As explained above, groundwater cannot migrate northward along the groundwater divide (i.e., drumlin axis) and is forced to migrate east or west. This interpretation, as well as the others stated herein, are supported by the groundwater simulations presented in Appendix V. This simulation illustrates the importance of the hilly topography and stream/wetland features in limiting the distance of deeper groundwater migration from the proposed Expansion under existing conditions.

In summary, the groundwater supply wells along Routes 16 and 43 (e.g., residential, business, and industrial groundwater use) are separated from the proposed Expansion by surface water bodies and hilly topography. The properties along Stagecoach Road that are nearest to the proposed Expansion are at about the same elevation as the northern Expansion footprint boundary, but are hydraulically isolated by the regional topography and the topographic saddle just north of the Expansion boundary. The existing natural hydrogeologic setting, distance, low domestic usage, and landfill setbacks provide a high degree of security to the existing residences and their wells in the unlikely event of a failure of the landfill's engineered systems.

5.4 Post-Construction Groundwater Flow Directions

The groundwater flow directions beneath the Expansion will be modified once the Expansion and the existing Landfill have been fully constructed to cover the drumlin. With the impervious landfill liner system in place, surficial recharge to the groundwater beneath the Expansion will be eliminated. This will result in a lowering of the groundwater table beneath the liner system. Over time, as the groundwater table drains due to the loss of recharge, the groundwater table will begin to flatten. The controlling features for the future water table will be the elevations of

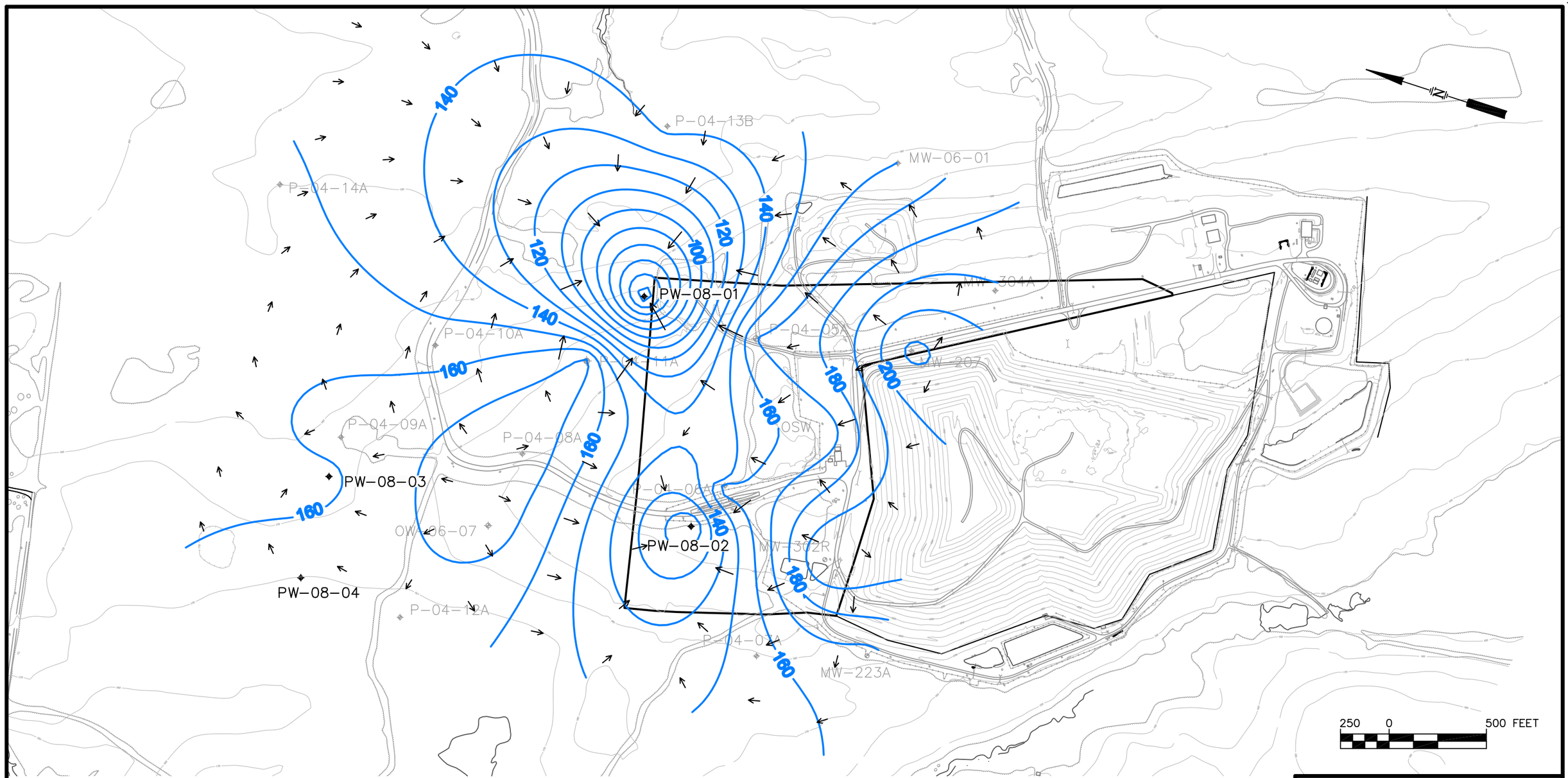
the groundwater surrounding the perimeter of the Expansion and existing landfill areas. Since the topography along the southeast side is generally higher than along the northwest and northeast sides of the combined landfill, groundwater will generally tend to flow from the southeast beneath the Expansion and discharge to the west and northeast.

5.5 Protection of Off-Site Groundwater and Surface Water

An important finding from the pump testing of the bedrock is the interconnectedness of the bedrock fractures over site-wide distances. This finding is consistent with other data collected at bedrock outcrops and cores. The measured fracture spacing is typically in the order of a few feet or less and fracture lengths of over 20 feet have been observed in outcrops. The fracture mapping at OC-AG showed a dense network of fractures that were all interconnected with one another. During four of the five bedrock pump tests (excluding the pump test at PW-08-03, which was pumped at only a few gallons per minute), groundwater drawdowns during pumping extended greater than 2,000 feet from the pumping wells. In fact, after pumping PW-08-01 for seven days, a drawdown of about 1.8 feet at PW-08-04 was observed 2,280 feet away from the pump well and a drawdown of about 2.9 feet at MW-223A was observed 2,173 feet away from the pump well.

These findings suggest that in the unlikely occurrence of leachate leakage from the landfill into the bedrock, the bedrock groundwater can be extracted, and groundwater flow directions controlled, using pumping wells. Bedrock groundwater pumping can be conducted, based on the available test results, in a way that would draw any leakage toward the well and prevent it from migrating off-site through bedrock fractures. Figure 5-13 illustrates the groundwater drawdowns based on the groundwater elevations measured in wells at the end of the long-term simultaneous pump test of PW-08-01 and PW-08-02. The results show a widespread zone of groundwater drawdown (i.e., groundwater capture) that encompasses the majority of the proposed Expansion area. The success of locating and drilling into more permeable zones in the bedrock by means of geophysical investigation (i.e., electrical resistivity and VLF-EM)

demonstrates that such a method could be used, in the unlikely event that it becomes necessary, to position bedrock extraction wells to control groundwater migration pathways away from the proposed Expansion. This finding is beneficial to development of this particular site for landfilling and provides an additional assurance that adverse environmental impacts due to an unlikely leak can be prevented.



NOTES

1. GROUNDWATER POTENTIOMETRIC SURFACE SHOWN INTERPRETED BY WATER LEVEL ELEVATIONS MEASURED IN WELLS INCLUDED IN THIS FIGURE AT THE END OF THE LONG-TERM SIMULTANEOUS PUMP TEST OF PW-08-01 AND PW-08-02. THE HYDRAULIC GRADIENTS SHOWN IN THE VICINITY OF THE PUMP WELLS ARE POTENTIALLY EXAGGERATED SINCE MONITORING WELLS WERE NOT AVAILABLE IMMEDIATELY ADJACENT TO THE PUMP WELLS.

2. PW-08-01 PUMPED AT AVERAGE 149 gpm FOR 337 HOURS AND PW-08-02 PUMPED AT AVERAGE 81 gpm FOR 167 HOURS.

3. IGNORES BEDROCK ANISOTROPY AND TREATS BEDROCK AS A CONTINUUM.

4. REPRESENTS ONE OF MANY POSSIBLE WELL CONFIGURATIONS.

LEGEND

200 — POTENTIOMETRIC GROUNDWATER ELEVATION CONTOURS IN FEET (NGVD)

↖ ESTIMATED GROUNDWATER FLOW DIRECTIONS SIZED BY RELATIVE GROUNDWATER GRADIENT

DWG: PumpTests LMN: EQUIPOTENTIAL CTB: PumpTests REV: 4/16/15

FIGURE 5-13
INTERPRETED POTENTIAL GROUNDWATER CAPTURE ZONES IN BEDROCK UNDER PUMPING CONDITIONS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
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6.0 WATER QUALITY AND FUTURE MONITORING

Water quality has been monitored at JRL since 1990 when the site was first selected for the development of the existing landfill. Currently, samples are collected from 22 groundwater monitoring wells, three pore-water, six surface water, ten landfill or leachate pond underdrains, and one leachate location. A detailed evaluation of JRL's water quality is compiled each year and included in the Facility's Annual Report. A copy of the 2014 Annual Water Quality Report (SME, 2015) is included in Appendix W. It documents background and existing groundwater quality at the JRL Site. The current water quality data demonstrates the effectiveness and integrity of the existing landfill liner system. With the Expansion the current water quality monitoring program will continue with yearly adjustments to reflect the operational status of the existing cells (i.e., operational or final covered), Expansion development, and the previous year's site water quality evaluation. Any changes to the JRL water quality monitoring program will be proposed in the Annual Report, and not implemented until approved by the MEDEP.

6.1 Expansion Water Quality Monitoring Locations.

Water quality at JRL is currently monitored in accordance with the requirements of Chapter 405 of the Rules following the MEDEP-approved Environmental Monitoring Plan (EMP). The EMP, which was last updated in 2015, outlines the protocols and parameters for sampling of the groundwater, surface water, leachate, landfill leak detection systems, and landfill underdrains. The current sampling protocols, and procedures, as outlined in the EMP will be applied to the Expansion monitoring locations. The Expansion's EMP, which defines the sampling protocol and parameters, is included in Volume IV of this Application.

The Expansion will include the establishment of a total of 43 monitoring locations consisting of: (1) background and downgradient piezometers and wells; (2) additional surface water sampling points; and, (3) leak detection and underdrain monitoring points. Since the Expansion will be developed in a series of cells beginning in 2018, and continuing for a period of about 12 years, the locations included in the monitoring program will be phased as landfill development proceeds. The proposed monitoring locations associated with the Expansion are as shown on Figure 6-1.

6.1.1 Leachate Monitoring for the Expansion. Leachate from the Expansion's leachate collection system will be pumped via a force main to the leachate storage tank located in the southeastern portion of the JRL Facility. Discharge from the Expansion's leachate pump stations will be combined with the leachate from the existing landfill cells in the storage tank. Site leachate will be sampled routinely (i.e., three times per year) to characterize the leachate quality and provide information useful in assessing the results from the other monitoring locations. This sample will be collected from the leachate storage tank. Each of the individual Expansion pump stations will be constructed with the ability to monitor flow and collect leachate samples from their discharge. The discharge from the pump stations will be measured monthly for specific conductance and flow.

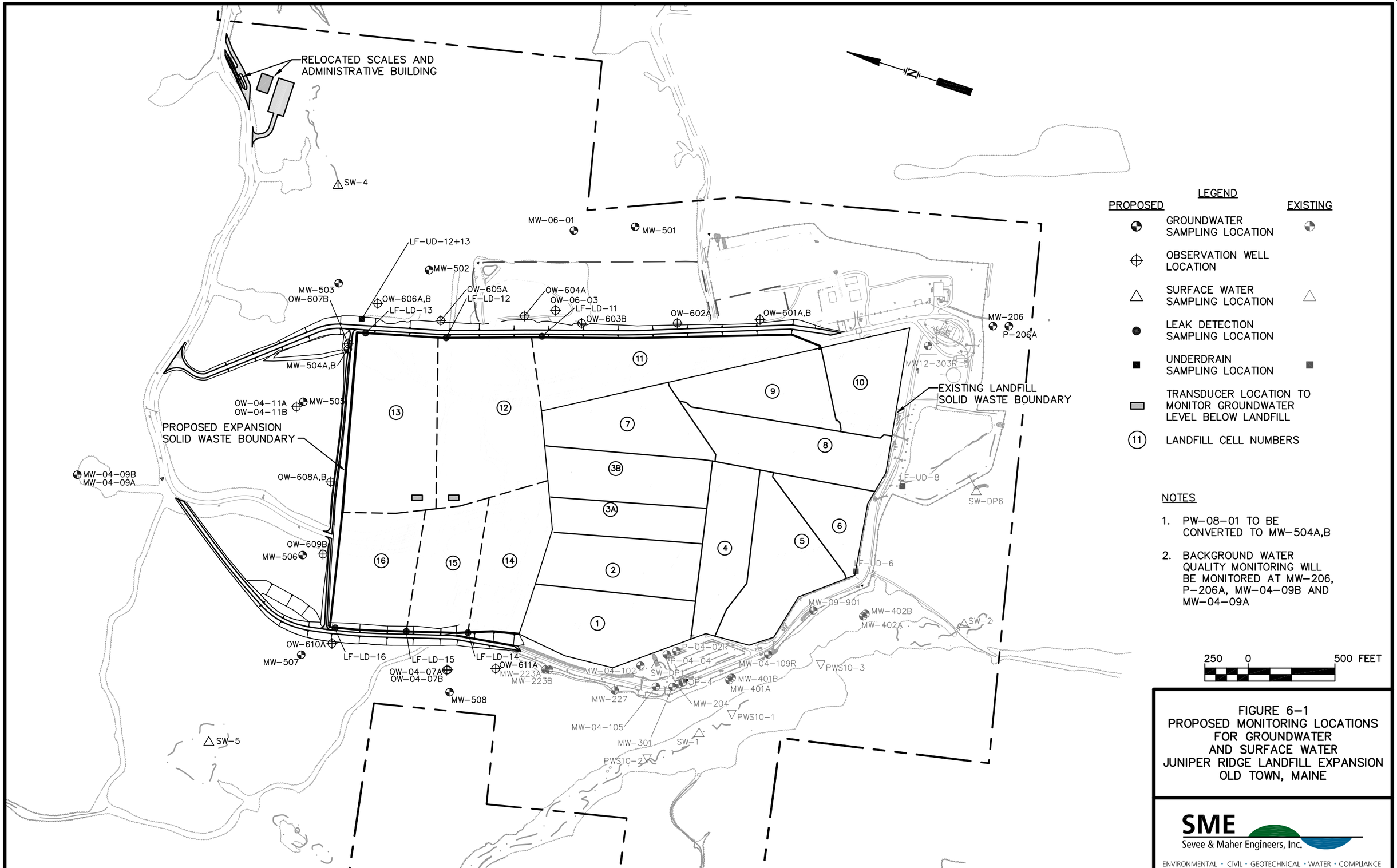
6.1.2 Leak Detection and Underdrain Monitoring for the Expansion. The principal evaluation of the Expansion's primary liner performance will be from monitoring the Expansion's leak detection system located between the primary and secondary liners. The ability to monitor both the quantity and quality of the water collected from the leak detection layer makes the leak detection system the primary method for detecting potential primary landfill liner leaks. Each cell will have an individual leak detection sump, and pump system that will discharge into the leachate collection system. Each leak detection sump discharge will be sampled separately such that the performance of each Expansion cell will be monitored. This monitoring will provide the data necessary to confirm the integrity of the primary liner system. The discharge from the leak detection sumps will be routinely monitored for both flow and water quality. This program will include monthly measurement for specific conductance and flow. A liner action plan (LAP) has been prepared for the Expansion cells, which outlines the procedures to evaluate the data collected from the leak detection systems, and actions that will be implemented if the water quality data suggests the primary liner is not performing as designed. In those cases, the routine sampling program may be expanded. The LAP is found in Volume IV of the Application.

The underdrain system that will exist under approximately 12.7 acres of Cells 12 and 13 provides an additional location to monitor the Expansion's liner performance. Therefore, the discharge location for the underdrain will also be included in the routine monitoring program.

The proposed underdrain monitoring location is described in the revised EMP contained in Volume IV and shown on Figure 6-1.

6.1.3 Groundwater Monitoring Locations Around the Expansion. Twenty-three new monitoring wells, and the sampling of 11 existing wells and piezometers, are proposed for the Expansion. They will be located around the perimeter of the Expansion, positioned as shown on Figure 6-1. The screen locations at each monitoring well location will be a function of the local geology. The well locations have been selected based on (1) groundwater flow directions in both the soil and bedrock, as defined by the Site investigation; (2) the location of potential site sensitive receptors; (3) the location of the major site leachate pumping stations. The proposed locations of the monitoring wells are shown on Figure 6-1 and their tentative screened intervals and geologic units screened are summarized on Table 6-1.

One of the useful results of the bedrock fracture mapping, groundwater pump testing, and bedrock tracer test, was that these investigation provided information about the degree of integration or interconnectivity of the bedrock fractures. The close fracture spacing, elongated fracture lengths, and integration of several sets of fractures at different orientations are the reasons the bedrock fractures are so well hydraulically interconnected. This interconnectivity of bedrock fractures results in groundwater behavior in the bedrock similar to that in an anisotropic soil for scales of hundreds of feet or larger (see Section 5.2.3).



LEGEND

PROPOSED		EXISTING
◔	GROUNDWATER SAMPLING LOCATION	◔
⊕	OBSERVATION WELL LOCATION	
△	SURFACE WATER SAMPLING LOCATION	△
●	LEAK DETECTION SAMPLING LOCATION	
■	UNDERDRAIN SAMPLING LOCATION	■
▭	TRANSDUCER LOCATION TO MONITOR GROUNDWATER LEVEL BELOW LANDFILL	
(11)	LANDFILL CELL NUMBERS	

NOTES

1. PW-08-01 TO BE CONVERTED TO MW-504A,B
2. BACKGROUND WATER QUALITY MONITORING WILL BE MONITORED AT MW-206, P-206A, MW-04-09B AND MW-04-09A

250 0 500 FEET

FIGURE 6-1
PROPOSED MONITORING LOCATIONS FOR GROUNDWATER AND SURFACE WATER
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.
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DWG: BASE LMN: FIG-SITEPLAN-MONITORING CTB: SME-STD REV: 6/18/2015

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TABLE 6-1

PROPOSED MONITORING WELLS

Landfill Expansion Boundary	Monitoring Well	Geologic Unit Screened	Tentative Screen Interval Depth (feet bgs)
Background	MW-206	Overburden	15 - 20
Background	P-206A	Bedrock	85 - 90
Background	MW-04-09A	Bedrock	36 - 39
Background	MW-04-09B	Overburden	13 - 15.5
Eastern	MW-501	Shallow Bedrock	57 - 67
	MW-06-01	Overburden	10 - 20
	MW-502	Bedrock	36 - 46
	MW-503	Bedrock	65 - 75
	OW-601A	Bedrock	88 - 98
	OW-601B	Overburden	51 - 61
	OW-602A	Bedrock	52 - 62
	OW-603B	Overburden	34 - 44
	OW-604A	Bedrock	39 - 49
	OW-605A	Bedrock	32 - 42
	OW-606A	Bedrock	44 - 54
	OW-606B	Overburden	7 - 17
	OW-06-03	Overburden	10 - 15
Northern	MW-504A	Bedrock	117 - 127
	MW-504B	Bedrock	69 - 79
	MW-505	Bedrock	76 - 86
	MW-506	Bedrock	55 - 65
	OW-607B	Overburden	61 - 71
	OW-608A	Bedrock	69 - 79
	OW-608B	Overburden	32 - 42
	OW-609B	Overburden	19 - 29
	OW-04-11A	Overburden	48 - 49
	OW-04-11B	Overburden	9 - 10
Western	MW-507	Bedrock	33 - 43
	MW-508	Bedrock	40 - 50
	OW-610A	Bedrock	27 - 37
	OW-611A	Bedrock	31 - 41
	OW-04-07A	Bedrock	73 - 83
	OW-04-07B	Bedrock	24.5 - 25.5

Furthermore, the bedrock tracer test demonstrated how the intersecting fractures, with their variable apertures, cause solute to spread over a wide arc as it moves through the bedrock. For instance, in the tracer test, the solute plume spread over an angle of about 100 degrees after fifty feet of travel through the bedrock. These characteristics make bedrock monitoring more reliable. In selecting new groundwater monitoring locations, lower resistivity zones in the bedrock, based on the earth electrical resistivity survey, were targets for positioning the bedrock wells, particularly for the monitoring wells located further from the Expansion boundary.

The solute spreading and near-continuous behavior of groundwater flow over travel distances away from the Expansion footprint of 150 to 1,000 feet (i.e., the range of downgradient distances to monitoring wells from positions within the Landfill) can be used to calculate perimeter monitoring well spacing. Applying this range of distances gives 350 to 2,000 feet well separation distances around the Expansion perimeter. However, to enhance the monitoring program, a total of 18 observation wells will be located directly adjacent to the landfill perimeter dikes. These locations provide monitoring locations directly adjacent to the landfill boundary and have a conservative average distance between wells of about 500 to 600 feet. This assumes use of three existing instrument locations (P-06-03, P-04-11A , B, and P-04-07A, B, C), which will be renamed using the prefix (OW). These observation wells are screened in both the overburden and bedrock as shown on Table 6-1. The final monitoring well locations will be selected in cooperation with MEDEP.

Currently, wells MW-207R and MW-304A along the southeastern edge of the existing landfill are routinely monitored under the existing EMP as background monitoring locations. However, the area where these wells are located is where the first cell of the Expansion (i.e., Cell 11) will be developed. Therefore, these wells will be abandoned with the development of Cell 11.

The existing monitoring wells MW-206 and P-206A, which are positioned to the south of the existing JRL on the ridge of the drumlin away from current and future JRL operations, will be considered background wells for both the current landfill and the Expansion. Two additional piezometers, P-04-09A and B, located to the north of the Expansion, away from the groundwater flow lines from the Expansion will also be monitored to provide background water quality for the Expansion. The piezometers will be renamed using the prefix MW to reflect their

status in the monitoring program. The locations for the background monitoring wells and piezometers are indicated on Figure 6-1.

In addition to new well installations, several wells, piezometers, and open-boreholes currently located within the footprint of the Expansion footprint will need to be abandoned as landfill cells are developed. These boreholes, piezometers, and wells will be decommissioned in accordance with guidance provided in Chapter 405 of the Rules. Proper removal and sealing of these existing boreholes, wells, and piezometers is necessary to prevent leachate or leachate-impacted groundwater from entering these boreholes in the remote possibility of a liner leak.

6.1.4 Surface Water Monitoring Locations Around the Expansion. Two additional surface water locations will be monitored for potential shallow groundwater discharge and runoff impacts to nearby streams and wetland areas. One new location (SW-4) will monitor water quality in an unnamed or mapped tributary located about 800 feet beyond the northeastern edge of the Expansion footprint. One new surface water monitoring location (SW-5) is proposed for an open water feature that eventually forms an unnamed tributary of Pushaw Stream about 950 feet (SW-5) from the northwestern edge of the Expansion. The final surface water locations will be selected in cooperation with MEDEP.

6.2 Future Sampling Parameters.

The Expansion's monitoring locations will be tested on a periodic basis as described in Section 6.3, for a combination of field and laboratory parameters. The parameters included in the testing program are summarized in Table 6-2. These parameters are those included in the current analytical sampling program for the Facility established with input from MEDEP based on the results of the ongoing water quality sampling program. Initial water quality characterization at the Expansion monitoring locations will include four rounds of site characterization monitoring, for the parameters included on Table 6-2 at all monitoring locations. After the initial two rounds, parameters not detected during the first two rounds will not be included in the subsequent characterization rounds.

The detection monitoring program will be implemented to detect changes in water quality throughout the active life of the Facility and during the closure and post closure periods. The parameters included in the detection monitoring program will vary depending on the monitoring locations. The observation wells (designated with the prefix OW) will be sampled for the completed list of parameters included on Table 6-2 once per year and for field parameters only for two additional sampling rounds. The same sampling program will be followed for the underdrains and leak detection locations during the operational life of the individual cells. The leak detection locations will also be tested monthly for specific conductance and flow. The monitoring wells, designated with the prefix MW, will be sampled three times per year for the complete list of parameters included on Table 6-2.

TABLE 6-2

ANALYTICAL PROGRAM

Water Quality Parameter	Method	PQL[1] (mg/l)
Total Dissolved Solids (TDS)	STM 2540C	10
Total Suspended Solids (TSS)	STM 2540D	4
Ammonia (NH3-N)	STM 4500 NH3 E	0.5
Arsenic (As)	SW846/6010B/3010A	0.005
Calcium (Ca)	SW846/6010B/3010A	0.3
Iron (Fe)	SW846/6010B/3010A	0.05
Magnesium (Mg)	SW846/6010B/3010A	0.3
Manganese (Mn)	SW846/6010B/3010A	0.05
Potassium (K)	SW846/6010B/3010A	0.3
Sodium (Na)	SW846/6010B/3010A	0.3
Total Organic Carbon (TOC)	SW846/9060A	2.0
Chloride (Cl^-)	SW846/E300/9056	1.0
Sulfate (SO_4)	SW846/E300/9056	2.0
Volatile Organic Compounds (VOCs)[3]	U.S.EPA 8260B	0.001 – 0.01
Sulfide	SW846/9030B	2.5
Total Kjeldahl Nitrogen (TKN)[4]	STM 4500 NH_3E	0.3
Total Phosphorous[5]	U.S.EPA 365.3	0.04
Biological Oxygen Demand (BOD)[6]	STM 5210B	5
Copper (Cu)	SW846/6010B/3010A	0.003
Bromide	SW9056	0.1
Nitrate and Nitrite	EPA 353.2	0.05
Total Alkalinity	STM 2320B	1.5
Field Parameters		
Groundwater Elevation	Field Measurement	NA
Specific Conductance	Field Measurement	NA
Dissolved Oxygen	Field Measurement	NA
pH	Field Measurement	NA
Temperature	Field Measurement	NA
Turbidity	Field Measurement (APHA 2130)	NA
Eh	Field Measurement	NA
Monitoring Well Pumping Rate	Field Measurement	NA
Surface Water Flow Rate	Field Measurement	NA
Field Observations	Field Observations	NA

TABLE 6-2 (cont'd)

Notes:
1. Practical Quantitation Limits (PQLs) have been defined by U.S.EPA as up to 10 times the method or instrument detection limit and therefore may vary between laboratories.
2. NA = Not Applicable.
3. VOCs are the 47 organic constituents listed in Appendix I of 40 CFR Part 258. PQLs for VOCs are reported as μg/L. Only included in the Site Characterization Monitoring
4. Monitoring wells and leachate only.
5. Surface waters and underdrain only.
6. Surface waters only

Method Reference: The analytical methods selected are presented in Test Methods for Evaluating Solid Waste, OSWER, SW-846, Third Edition, as revised; Methods for Chemical Analysis of Water and Wastes, EMSL, EPA-600/4-79-020, revised March 1983; and Standard Methods for the Examination of Water and Wastewater, APHA, 19th Edition, 1995. Equivalent and appropriate analytical methods may be substituted with Juniper Ridge Landfill approval, e.g. manual for automated and vice versa.

6.3 Future Sampling Frequencies

Samples will be collected from the observation, and monitoring wells, and the underdrain and leak detection points at a frequency of three times per year for water quality testing, which is the current sampling frequency for the existing landfill. This sampling frequency is consistent with the site sampling history and calculated groundwater velocities for the Site. The leachate pumping leak detection and underdrain systems will be tested for specific conductance and flow on a monthly basis for evaluating the Expansion liner performance.

6.4 Groundwater Level Monitoring

In addition to the water quality monitoring, monitoring of future groundwater levels beneath the Expansion is proposed. The purpose is to confirm the directions of groundwater flow beneath the Expansion in the future as groundwater levels drop due to loss of precipitation recharge. Such monitoring will confirm the downgradient directions and assure that future groundwater monitoring wells are properly positioned. In order to accomplish this, vibrating-wire water pressure transducers will be positioned at the locations shown in Figure 6-1. The transducers will be vertically positioned at an approximate Elevation of 150 feet NGVD. The transducers will be installed when the landfill cell they underlie is constructed. The transducers should be read monthly using data acquisition storage devices. This data can be used with the manual groundwater level measurements obtained from site monitoring well locations to construct a

potentiometric surface map for beneath and around the landfill. This data will be reported in the Annual Water Quality Report. The transducers beneath the liner will not be replaced once they become inoperable.

7.0 TRAVEL TIME ANALYSIS

To demonstrate conformance with the Rule's six-year groundwater travel time performance standard (Section 401.2.C.2) SME has performed a travel time analysis for the Expansion. Travel times were calculated from several locations in the Expansion area to site sensitive receptors. The selection of site sensitive receptors is discussed in Section 7.1. The calculated travel times from the bottom of the landfill's secondary liner system to site sensitive receptors incorporate improvement allowance offsets for the Expansion containment system design as allowed by Section 401.2.D.2 of the Rules. In addition, one foot of imported compacted clay with a maximum hydraulic conductivity of $1x10^{-7}$ cm/sec will be placed directly beneath the secondary liner system. As allowed by Section 401.2.C.2 of the Rules, this imported soil layer is also included in the travel-time calculations, which are included in Appendix X.

The travel time analysis used data collected from site investigations that have defined both the direction and rate of groundwater flow from beneath the Expansion to the identified site sensitive receptors. Potential site sensitive receptors were identified using the definition of sensitive receptors in Section 400.1 of the Rules and then each potential site sensitive receptor was evaluated for inclusion as a site sensitive receptor based on the hydrogeologic setting of the Site. Travel times were then calculated from the various points of analysis to the applicable site sensitive receptor. As part of this analysis, SME also completed a sensitivity analysis to evaluate the hypothetical effect on travel times due to the inherent variability of hydraulic properties of the soils and bedrock.

7.1 Selection of Site Sensitive Receptors

MEDEP Chapter 400 defines "sensitive receptor" as: *"public and private water supply aquifers and wellhead protection zone; public and private drinking water supplies; significant ground water aquifers and primary sand and gravel recharge areas; sand and gravel deposits; and Class AA, A, and B surface water bodies and great ponds."* Based on site setting and site-specific hydrogeologic data, the following features, which lie in the general vicinity of the Expansion, were evaluated as potential site sensitive receptors:

- The nearest existing water supply well;
- Off-site groundwater in the soils and bedrock that could be used as a water supply;
- The mapped sand and gravel aquifer along Route 16;
- The stratified sandy zone outside the southeast corner of the Expansion footprint; and,
- The closest surface waters bodies.

Each of these five potential sensitive receptors are discussed and their selection as site sensitive receptors are summarized below.

Nearest Existing Water Supply Well

No existing water supplies or water supply springs are located within 1,000 feet of the Expansion. The closest existing water supply well is associated with a residence located approximately 2,100 feet to the west of the Expansion footprint along Route 43. This water supply well, and others located along Route 43, are protected from groundwater flow emanating from the Expansion area by both regional topography, and groundwater flow regimes from the Expansion area as described in Section 5.3 of this report. The water used by residential wells along Route 43 is from local recharged. Assuming that residential wells to the west of the Expansion along Route 43 need about 270 gpd (e.g., 270 gpd for a single-family, three-bedroom home based on the Maine Subsurface Wastewater Disposal Rules), the demand for well water can be satisfied by precipitation recharge (e.g., 3 inches per year according to Section 2.3) over an approximately 300-foot diameter area around each well. This analysis

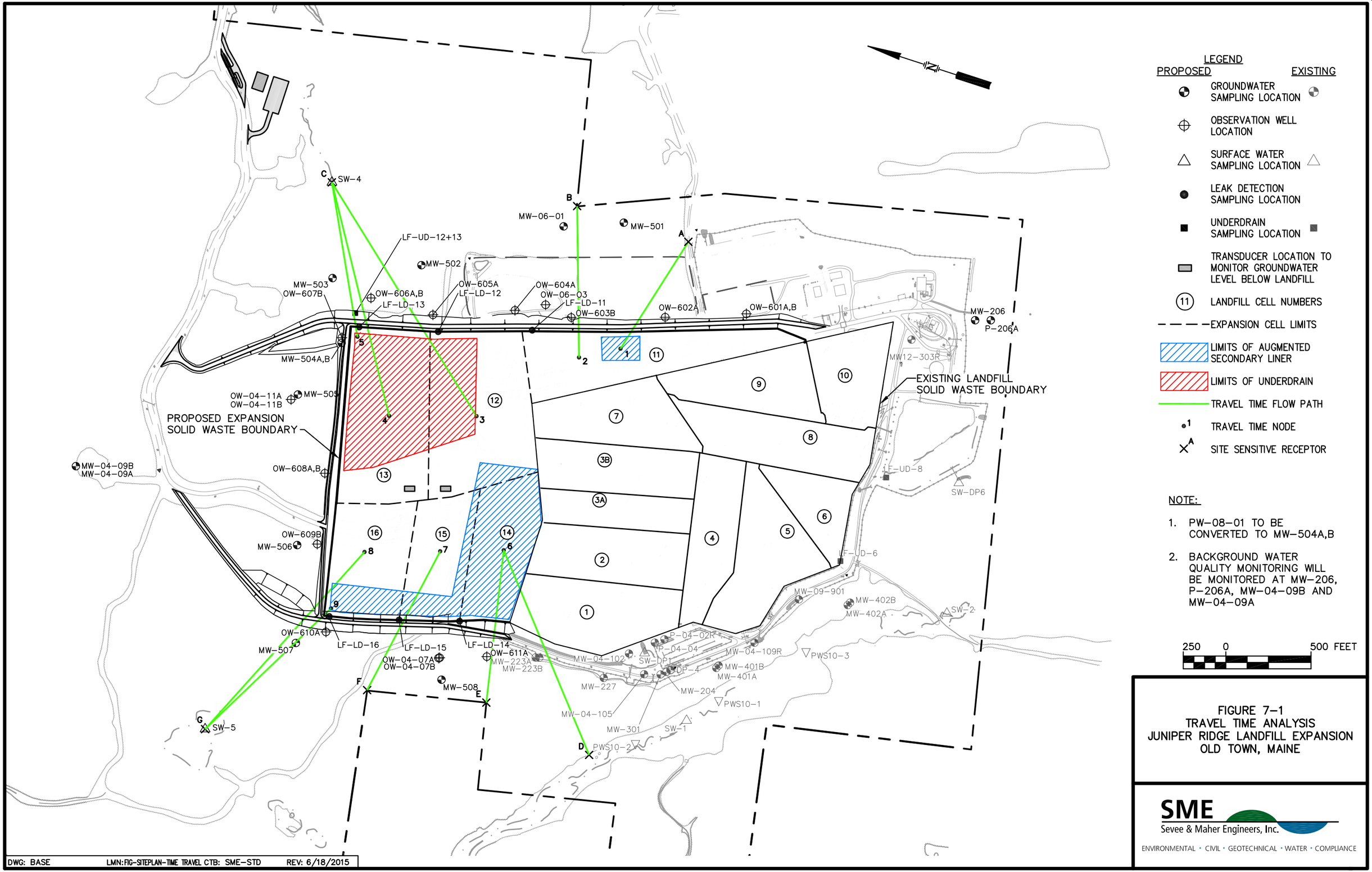
indicates that the wells do not need to rely on recharge from greater distances. In addition, as described in Section 5.3, these wells are hydraulically separated from the groundwater flow regime for the existing and expanded JRL by the regional topographic setting. Therefore, the residential wells along Route 43 are not site sensitive receptors. The next closest existing water supply wells are along Old Stagecoach Road about 3,000 feet to the northwest of the Expansion. Groundwater attempting to migrate northward from the Expansion would be directed by the topography (i.e., drumlin ridge) to flow east or west (see Section 5.3) away from the wells. Therefore, the residential wells along Route 43 or the Old Stagecoach Road are not site sensitive receptors.

Off-site Groundwater in Soils and Bedrock That Could be Used as a Water Supply

Groundwater at the site property boundary was assumed to be a site sensitive receptor, because wells located at these locations would be within the flow path of groundwater emanating from the Expansion, and a future water supply well could theoretically be developed on an adjoining property. A total of three locations (i.e., B, E, and F), two at the closest corners of the closest property boundary on the western side of the site, and one on the eastern side representing the closest property lines to the Expansion were evaluated as shown on Figure 7-1. Bedrock water supply wells were assumed to be installed at these locations for purpose of the analysis.

Mapped Sand and Gravel Aquifer Along Route 16

The MGS has mapped the nearest significant sand and gravel aquifer approximately one mile east of the JRL along Maine Route 16, as shown on Figure 2-9. The natural hydrogeology and remoteness prevent groundwater that originates at the Expansion from migrating to the aquifer. Groundwater flowing away from the existing landfill and the Expansion will not affect the aquifer because groundwater leaving the site discharges into adjacent tributaries to Pushaw Stream and Judkins Brook, never reaching the aquifer. This behavior is confirmed by the groundwater simulations performed for this application, which are discussed and contained in Section 5.3, and Appendix V of this Report. Therefore, this significant sand and gravel aquifer is not a site sensitive receptor.



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Primary Sand and Gravel Recharge Area and Sand and Gravel Deposit

According Section 400.1.F. f of the Rules, a "primary sand and gravel recharge area" means "*the surface area directly overlying sand and gravel formations that provide direct replenishment of ground water in sand and gravel and fractured bedrock aquifers. The term does not include areas overlying formations that have been identified as unsaturated and are not contiguous with saturated formations*." The MGS has mapped the nearest significant sand and gravel aquifer approximately one mile east of the Expansion footprint along Maine Route 16, as previously described and shown on Figure 2-9. Neither the existing Landfill, nor the Expansion, overlies the significant sand and gravel aquifer. Therefore, the Expansion has no effect on the recharge area of that remote deposit. Therefore, no primary sand and gravel recharge areas have been identified as potential sensitive receptors. Section 401.1.C.3.a.iv of the Rules also requires a minimum 100-foot setback between the solid waste boundary and stratified sand and gravel deposits that are *capable of providing sufficient water for domestic use*, or are a contaminant migration pathway to a significant groundwater aquifer, a significant sand and gravel aquifer, a fractured bedrock aquifer, or a surface water body. A stratified sand zone, within the basal till, was identified outside the southeast side of the Expansion at MW-06-01, MW-213, P-08-9, and P-08-10 greater than 100 ft from the proposed solid waste boundary. The sandy zone outside the southeast corner of the JRL lies within the basal till and does not appear to be a regional stratified sand and gravel deposit, based on previous investigations for the existing landfill (SME, 1991) and more recent investigations for the Expansion. As described in Section 4.1.1 of the Report till layers were observed within the thicker portions of the sandy zone. The earth resistivity survey suggested a limited lateral extent to this sandy zone to the east. Furthermore, this sandy zone within the till was deposited during till deposition beneath glacial ice and not contemporaneously with the remote sand and gravel deposit one mile east of JRL. This limited zone is not mapped by MGS as a regional stratified sand and gravel deposit. However, because of its stratified sandy texture, it could be capable of providing sufficient water for domestic use[2] and therefore it has been included as a site sensitive receptor as shown on Figure 7-1.

[2] This is highly unlikely, however, since this location is on State-owned property acquired in 2004 for the Juniper Ridge Landfill. The location used in the analysis was at MW-213 since this is outside of areas currently permitted for landfill-related activities.

Surface Water Bodies

No Class AA or A surface water bodies or great ponds are located within 1,000 feet of the Expansion. The closest classified body of surface water to the west of the Expansion is an unnamed tributary to Pushaw Stream, which is approximately 950 feet from the northwest (G) and southwest (D) boundary of the Expansion footprint and is designated as Class B by MEDEP. Another unnamed and unmapped tributary to Judkins Brook lies about 800 feet to the northeast of the nearest Expansion boundary. Because groundwater from beneath the Expansion discharges to these tributaries, they are site sensitive receptors as shown on Figure 7-1.

In total, there are seven identified site sensitive receptors as summarized on Table 7-1, and their locations are shown on Figure 7-1.

TABLE 7-1

IDENTIFIED SITE SENSITIVE RECEPTORS

Location Identification	Site Sensitive Receptors
Point A	Southeast sandy zone
Point B	Hypothetical Groundwater Supply Well at Closest Property Boundary on Eastern Side.
Point C	Surface Water Discharge to the East. An Unnamed tributary to Judkins Brook.
Point D	Surface Water Discharge to the Southwest, An Unnamed Tributary to Pushaw Stream.
Point E	Hypothetical Groundwater Supply Well at Closest Northern Corner of Property Boundary on Western Side.
Point F	Hypothetical Groundwater Supply Well at Closest Southern Corner of Property Boundary on Western Side.
Point G	Surface Water Discharge to the Northwest, An Unnamed Tributary to Pushaw Stream.

7.2 Improvement Allowances

The Expansion's liner system includes several features for which the Rules (See Table 1 in Section 401.2.D.2) allow for travel time credit, in the form of improvement allowance offsets, which can be used in the travel time analysis. The number of offsets allowed by the Rules varies depending on the actual design, monitoring, or contingency planning improvements with each offset equal to one year of groundwater travel time. These improvements include incorporating and monitoring a leak detection layer and a secondary liner system below the Expansion primary liner system. The Expansion's liner system will be constructed with a

primary composite liner, consisting of an 80 mil HDPE geomembrane, a geosynthetic clay liner (GCL), and one foot of compacted clay. This primary liner will be underlain by a leak detection system and a secondary 60-mil HDPE geomembrane liner. An offset of two years was applied in the travel-time calculations for those areas of the Expansion were the primary liner is improved with a leak detection system, which will be monitored, and 60-mil HDPE liner. In those areas were the soil depth between the bottom of the secondary liner and the bedrock surface is generally less than 10 feet the secondary liner will be augmented by adding a geosynthetic clay liner (GCL), and one foot of compacted clay transforming the secondary liner into a composite liner systems as defined by the Rules. An offset of three years was applied in the travel-time calculations for those areas of the Expansion where the primary liner is improved with a leak detection system and the composite secondary liner system, Section 401.2.D(2) Table 1 of the Rules.

7.3 Imported Soil Travel Time

The Section 401.1.2.C(2) of the Rules also allow for inclusion of the travel time through an imported soil layer in the travel time analysis. A 12-inch layer of imported, compacted, low permeability, marine clay will be installed directly below the secondary liner system over the entire Expansion area. Testing of the similar marine clay used to construct the existing landfill cells has demonstrated that the material specified for the Expansion can be placed and compacted to have hydraulic conductivities ranging from 1.9×10^{-8} to 8.3×10^{-8} cm/sec. However, the Rules, (Section 401.2.C.2) specify that the minimum hydraulic conductivity value allowed for calculating travel time through the imported soil is 1×10^{-7} cm/sec. Therefore, given the minimum hydraulic conductivity specified in the Rules, and an effective porosity of 0.39 for the marine clay (see Section 3.3.6), and a worst–case unit gradient through the specified one foot thickness of the compacted marine clay, the calculated travel time through the imported soil layer is greater than three years (i.e., 3.8 years). Consistent with the Rules, see Section 401.2.C.2, however a travel time of three years was applied to this layer.

7.4 Calculated Travel Time to Site Identified Sensitive Receptors

In addition to the travel time offsets, and the three-year travel time through the imported soil layer incorporated into the Expansion design, travel times have been calculated. The groundwater travel times through the soils and bedrock to the site sensitive receptors determined in the analysis have been calculated using the following relationships:

- Travel Time (years) = Distance (feet) ÷ Velocity (ft/year)
- Velocity (feet/year) = {Hydraulic Conductivity (ft/year) * Hydraulic Gradient} ÷ Effective Porosity

Groundwater flow velocity is controlled by the hydraulic conductivity and effective porosity of the material through which the groundwater is moving and by the hydraulic gradient in the direction of groundwater flow (Freeze and Cherry, 1979). Even though there are lateral seepage gradients in the till, direct downward vertical migration through the till was assumed as the shortest route to bedrock and lateral groundwater movement in the till was not included in the evaluation. Downward flow path through the till estimates the shortest travel time to the site sensitive receptors because travel time through the bedrock is relatively short compared to travel time through the till (due primarily to the low porosity of the bedrock). The till and bedrock hydraulic conductivities used in the analysis represent the calculated geometric means from locations in and around the Expansion area and utilize the more permeable horizontal conductivity values applied in all flow directions. A summary of hydraulic properties applied in the travel time analysis is presented in Table 7-2. These values represent geometric means calculated from site-specific data, as discussed in Sections 3.0 and 5.0 of this report. As described in Section 5.1.4 the average K_H/K_V ratio of the soils on-site was calculated to be 63, so using the geometric mean of horizontal hydraulic conductivities provides a conservative estimate of travel time, since the horizontal hydraulic conductivity is higher than the measured vertical hydraulic conductivities.

TABLE 7-2

SUMMARY OF HYDRAULIC PROPERTIES APPLIED IN TRAVEL TIME ANALYSIS

Unit	Hydraulic Conductivity (cm/sec)	Effective Porosity
EXISTING SOILS		
Till	9.4×10^{-6}	0.25
BEDROCK	3.5×10^{-5}	0.001
IMPORTED SOILS (1)		
Clay Soils	1×10^{-7}	0.39

Notes:
1. Imported soil hydraulic conductivity reflect the maximum value allowed.

The effects of varying the soil's hydraulic conductivity on the travel-time calculations was evaluated as part of a sensitivity analysis performed and discussed in Section 7.5 In addition to the soil and bedrock hydraulic properties the travel-time calculations also incorporated the following components:

- The travel time through the soils, that underlie the Expansion, are assumed to originate at the base of the imported soil layer. The hydraulic gradients were calculated between the site's existing wet season phreatic surface as shown on Figure 5-1 and the potentiometric surface in the shallow bedrock shown on Figure 5-8. The flow is assumed to occur in saturated soils (i.e., assumed saturated hydraulic conductivities) as required by the Rules, regardless of the amount of unsaturated soils between the landfill base and the bedrock surface.

- Flow in bedrock was assumed to occur horizontally and to be driven by the hydraulic gradient in the potentiometric surface in shallow bedrock as shown on Figure 5-8, from the leakage point to the appropriate site sensitive receptor, as shown on Figure 7-1. In calculating the travel time to hypothetical water supply wells, located at the property lines. The water level in the well was assumed to be 100 feet lower than the potentiometric surface in the shallow bedrock at the well location to represent active pumping of the well.

- The travel-time calculations for the soils overlying bedrock beneath surficial sensitive receptors, such as the tributaries to Pushaw Stream, were assumed to be vertical and driven by the head difference between the potentiometric surface in shallow bedrock and the phreatic surface at the receptor.

- The travel-time calculations for the sand and gravel deposit on the southeastern side of the site includes vertical travel through soil and horizontal travel through bedrock driven by the head difference between the potentiometric surface in shallow bedrock at the analysis node and the site sensitive receptor shown on Figure 7-1.

- For the analysis of the travel times for the long-term post-closure conditions the hydraulic conditions assume that the only recharge is due to a hypothetical leak and the resulting travel time is based on that leakage rate and the effective porosity of the till. Flow from the bedrock surface was assumed to be the same as under the existing conditions, as described above, although the horizontal gradient will reduce as the existing groundwater mound below the landfill dissipates due to removal of recharge.

The time of travel analysis was performed from a total of nine nodes. The location of these nodes are shown on Figure 7-1, and consist of the center point for each of the six Expansion cells, as well as the two permanent leachate sumps in Cells 13, and 16. At each node, the till thickness was calculated from the proposed base grades of the constructed liner, and the interpreted bedrock surface map. Once in the bedrock, groundwater seepage is assumed to move horizontally towards the nearest downgradient identified sensitive receptor along the lines shown on Figure 7-1. Flow to potential water supply wells was stopped in bedrock and flow to surface water locations was continued vertically upward through till to the surface water. Groundwater discharge into the landfill underdrain, located over about 12.7 acres on the northeast side of the site was ignored so that groundwater would pass vertically in the till soils toward the sensitive receptor beneath the underdrain. Table 7-3 summarizes the calculated time of Travel to site sensitive receptors using the criteria described.

TABLE 7-3

CALCULATED TRAVEL TIME TO SITE SENSITIVE RECEPTORS – EXISTING CONDITIONS

Landfill Node	Site Sensitive Receptors	Offset Credits (Yrs)	Imported Soils (Yrs)	Calculated Travel Time In Soil And Bedrock (Yrs)	Total Travel Time (Yrs)
Cell 11 Southern End	Point A	2	3	10.5	15.5
Center of Cell 11	Point B	2	3	3.9	8.9
Center of Cell 12	Point C	2	3	11.3	16.3
Center of Cell 13	Point C	2	3	11.0	16.0
Cell 13 Leachate Sump	Point C	3	3	35.8	41.8
Center of Cell 14	Point D	3	3	47.7	53.7
Center of Cell 14	Point E	3	3	3.3	9.3
Center of Cell 15	Point F	2	3	1.2	6.2
Center of Cell 16	Point G	2	3	4.7	9.7
Cell 16 Leachate Sump.	Point G	3	3	10.3	16.3

Appendix X documents the calculations used to generate the values in Tables 7-3. A re-analysis of the travel times under future conditions where the groundwater table flattens due to the cutoff of precipitation recharge is presented in Table 7-4. Calculations are contained in Appendix X. Travel times are slightly greater; however, groundwater flow directions away from the landfill are primarily the same.

TABLE 7-4

CALCULATED TRAVEL TIMES TO SITE SENSITIVE RECEPTORS – FUTURE CONDITIONS

Landfill Location Of Origin	Site Sensitive Receptors	Offset Credits (Yrs)	Imported Soils (Yrs)	Calculated Travel Time In Soil And Bedrock (Yrs)	Total Travel Time (Yrs)
Cell 11 Southern End	Point A	2	3	10.5	15.5
Center of Cell 11	Point B	2	3	3.9	8.9
Center of Cell 12	Point C	2	3	11.4	16.4
Center of Cell 13	Point C	2	3	11.2	16.2
Cell 13 Leachate Sump	Point C	3	3	36.1	42.1
Center of Cell 14	Point D	3	3	62.2	68.2
Center of Cell 14	Point E	3	3	17.7	23.7
Center of Cell 15	Point F	2	3	1.4	6.4
Center of Cell 16	Point G	2	3	5.3	10.3
Cell 16 Leachate Sump.	Point G	3	3	10.3	16.3

As Tables 7-3 and 7-4 demonstrate, the Expansion meets the 6-year minimum specified in the Rules using conservative assumptions described herein. Table 7-3 also indirectly indicates that

groundwater sampling frequencies of three times per year are appropriate for detecting leaks to the groundwater and surface waters outside the Landfill due to the travel times calculated. Furthermore, the analyses show that groundwater and surface water monitoring on the east and west sides of the Expansion will be important because that is where the shortest travel times are calculated. The potential source areas for these locations of shortest travel times are where bedrock is most shallow and the extent of low permeability base till is reduced.

7.5 Sensitivity Analysis

Anderson and Woosner, (2001) state that the purpose of a sensitivity analysis is to "quantify uncertainty in the calibrated model caused by uncertainty in the estimates of the aquifer parameters." The many sample measurements of hydraulic conductivity and porosity provide a way to quantify that uncertainty in the travel-time calculations. The calculated mean values for the various parameters were used to obtain a reasonable estimate of the times-of-travel to the selected sensitive receptors, as presented in Section 7.4. The error most commonly associated with the estimate of the mean is the Standard Error of the Mean, which is the standard deviation of the sample measurements divided by the square root of the number of sample measurements. The Standard Error of the Mean represents a statistical uncertainty associated with the mean. Thus, the Standard Error of the Mean was calculated for the hydraulic conductivity and porosity data and applied to the travel-time calculations. A confidence interval (95 percent) for the hydraulic conductivity and porosity sample means was determined by utilizing the Standard Error of the Mean and the appropriate Student's t value for the number of data measurements (Zar, 1974). This resulted in a range (lower and upper confidence limit for the mean) for the hydraulic conductivity and porosity that provided a 95 percent certainty that their population means lie within their stated intervals. The hydraulic conductivities for the fill soil and imported soil were not varied since the maximum allowable hydraulic conductivity is specified for each material by the Rules.

A sensitivity analysis is useful here to examine how varying the hydraulic conductivities and porosities around their respective means causes the times-of-travel to vary. Groundwater migrating over distances of several hundred or thousands of feet will encounter many local zones of differing hydraulic conductivity and porosity. Thus, the geometric mean values provide

a reasonable estimate of travel times when examining travel time to off-site receptors and streams; but locally, beneath the Expansion or around its perimeter, conditions will vary from this overall mean condition. Varying hydraulic conductivity and porosity input parameters over their respective ranges defined by the Standard Error of the Mean for the 95 percent confidence level provides a useful way of developing a sense of the degree of variability of travel time outside of the liner system and barrier layer.

The same assumptions presented above were applied and each hydraulic conductivity and porosity value was independently varied to calculate travel time due to variation of the soil and bedrock properties. The sensitivity analysis is also helpful in evaluating the controlling factor(s) for the calculated times-of-travel. The range of the hydraulic properties used for the sensitivity analysis is shown in Table 7-5.

TABLE 7-5

SUMMARY OF HYDRAULIC PROPERTIES APPLIED IN SENSITIVITY ANALYSIS

Unit	Horizontal Hydraulic Conductivity (cm/sec) Minimum/Maximum	Effective Porosity Minimum/Maximum
Till Horizontal	5.2×10^{-6} / 1.7×10^{-5}	0.30 / 0.18
Bedrock	2.9×10^{-5} / 4.2×10^{-5}	0.016 / 0.000059

The range of hydraulic conductivities for till and bedrock was calculated using the log-transformed data. The range of porosities was also based on two standard deviations of the log-transformed, normalized results for bedrock. Hydraulic gradients were not varied but the same average conditions were approximated as for the mean travel time analysis. Over time, the groundwater gradients will flatten as precipitation recharge is eliminated by the landfill liner. Thus, over time, travel times will increase due to gradient flattening, all other parameters remaining the same.

The travel time through the till and bedrock reduces to less than a year when using the maximum till horizontal hydraulic conductivity or porosities on Table 7-5. The results of the sensitivity analysis are included in Appendix X.

8.0 CONCLUSIONS

The proposed Expansion Site has been heavily investigated since 2004. Additionally, investigations at the Site beginning in 1990 through 2014 for permitting of the existing landfill, and subsequent monitoring, have provided an excellent understanding of the Site and its regional surroundings. The Expansion Site is well understood and is suitable for landfill development in accordance with the MEDEP Landfill siting criteria.

An EMP has been developed for the existing Landfill and proposed Expansion, which properly specifies the locations for monitoring the groundwater, surface water, landfill underdrain, leachate pond underdrain, landfill and landfill leachate pond leak detection systems, and leachate collection locations. This EMP is based on (1) an extensive study of the natural soil and bedrock at the Site, (2) the engineered designs of the existing Landfill and proposed Expansion, and (3) conformance with minimum requirements for travel time from potential leaks to identified sensitive receptors. The leachate leak detection systems underlying both proposed and existing Landfills are an integral component of the EMP, as they will detect leachate leaks long before potentially impacted groundwater would be detected at Landfill perimeter groundwater monitoring locations. In the unlikely occurrence of a leachate leak, the EMP will allow for early detection and remedial action to protect all identified sensitive receptors.

The closest existing off-site water supply well is associated with a residence located approximately 2,200 feet to the west of the Expansion footprint along Route 43. Off-site groundwater supply wells and mapped regional sand and gravel aquifers are protected both by the natural hydrogeologic setting of the Expansion Site, and by the Landfill design and EMP. A regional groundwater flow simulation further demonstrated natural protection of off-site wells by means of natural hydraulic boundaries associated with Judkins Brook, tributaries to Pushaw Stream and Judkins Brook, and local topography.

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APPENDIX A

TEST PIT LOGS

TEST PIT NO. 104

GROUND SURFACE ELEV. 212

LOCATION OT-3 (SEE PLAN)

PROJECT NO: 90060

DATE: 03.14.90

DEPTH - FEET	SAMPLES	DESCRIPTION (___ WALL FACE)	REMARKS
1		0.2 ORGANICS 0.7± REDDISH BROWN SILTY SANDY GRAVEL (TILL)	
3			
5		BROWN, SANDY GRAVELLY SILT-CLAY W/ COBBLES (BASAL TILL)	DENSE TO VERY DENSE W/ DEPTH
7			
9			
11			
13			
15			
17		17.5 T.O.E.	
19			

COMPLETION DEPTH 17.5 FEET

DEPTH TO WATER NONE FEET OBSERVED

SURFACE DIMENSION _____ FEET x _____ FEET

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 105

GROUND SURFACE ELEV. 194

LOCATION OT-3 (SEE PLAN)

PROJECT NO: 9006

DATE: 03·14·90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.2 ORGANICS	
		1.0 RED BROWN SANDY GRAVEL TR SILT & COBBLES (TILL)	
3	X	3.0 BROWN SANDY GRAVEL TR SILT & COBBLES	
5	X		
7		BROWN SANDY GRAVELLY SILT-CLAY TR COBBLES (BASAL TILL)	DENSE TO VERY DENSE W/ DEPTH
9	X		
11			
13	X		
15			
17		GRAY BROWN SILTY GRAVELLY SAND TR COBBLES (TILL)	VERY DENSE
		18.0 BOE	
19			

COMPLETION DEPTH 18.0 FEET

DEPTH TO WATER 9.0 & 13.0 FEET SEEPAGE

SURFACE DIMENSION _____ FEET x _____ FEET

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 106

GROUND SURFACE ELEV. 185

LOCATION OT-3 (SEE PLAN)

PROJECT NO: 3006

DATE: 03.14.90

DEPTH - FEET	SAMPLES	DESCRIPTION (___ WALL FACE)	REMARKS
1		0.3 ORGANICS 1.0 RED BROWN SILTY SAND [illegible] COBBLES (TILL)	
3		3.5 [illegible] (TILL)	
5		BROWN SANDY GRAVELLY SILT-CLAY TR COBBLES (BASAL TILL)	
7			DENSE
9			
11			
13		13.0	
15		15.0 B.O.E	VERY DENSE
17			
19			

COMPLETION DEPTH 15.0 FEET

DEPTH TO WATER 1-3.5 FEET SEEPAGE

SURFACE DIMENSION _____ FEET x _____ FEET

TEST PIT NO. 107

GROUND SURFACE ELEV. _____ **PROJECT NO:** 9006

LOCATION OT-3 (SEE PLAN) **DATE:** 03·14·90

DEPTH - FEET	SAMPLES	DESCRIPTION (____WALL FACE)	REMARKS
1		0.2 ORGANICS	½+/- CY BOULDER 0-2'
		RED BROWN SAND TRACE SILT	12' GRADES TO BROWN SAND
3		2.5	
		MOTTLED SILTY GRAVELLY SAND TR COBBLES	
5	X		
		6.0	
7		BROWN SILTY GRAVELLY SAND TR COBBLES	
9	X		9.0 TWO 3/4+/-CY BOULDERS
11			
		12.0	BOULDERS
13		B.O.E.	TERMINATED IN BOULDERS
15			
17			
19			

COMPLETION DEPTH 12.0 **FEET** **DEPTH TO WATER** 2.5 **FEET**
SEEPAGE

SURFACE DIMENSION _____ **FEET x** _____ **FEET**

TEST PIT NO. 108

GROUND SURFACE ELEV. 205 (ESTIMATED) **PROJECT NO:** 9006

LOCATION OT-3 (SEE PLAN) **DATE:** 03·15·90

DEPTH – FEET	SAMPLES	DESCRIPTION (___ WALL FACE)	REMARKS
1		0.3 ORGANICS 0.7 RED BROWN SILTY SAND TR GRAVEL (TILL)	
3	X		
5		BROWN V. SILTY GRAVELLY SAND TRACE COBBLES (BASAL TILL)	DENSE TO VERY DENSE W/ DEPTH
7			
9	X		
11			
13	X		
15		14.5 B.O.E	
17			
19			

COMPLETION DEPTH 14.5 FEET **DEPTH TO WATER** NONE FEET OBSERVED

SURFACE DIMENSION ____ FEET x ____ FEET

TEST PIT NO. 109

GROUND SURFACE ELEV. 213 (ESTIMATED)

LOCATION OT-3 (SEE PLAN)

PROJECT NO: 9006

DATE: 03.15.90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.2 ORGANICS	
		0.5 RED BROWN SILTY SAND TR GRAVEL (TILL)	
3	X	BROWN SANDY GRAVELLY SILT-CLAY TR COBBLES (BASAL TILL)	
		4.0	4.0 WEATHERED ROCK?
5		REFUSAL	
7			
9			
11			
13			
15			
17			
19			

COMPLETION DEPTH 4.0 FEET

DEPTH TO WATER NONE FEET OBSERVED

SURFACE DIMENSION _____ FEET x _____ FEET

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 111

GROUND SURFACE ELEV. 200 (ESTIMATED)

LOCATION OT-3 / SEE PLAN

PROJECT NO: 9006

DATE: 03·15·90

DEPTH - FEET	SAMPLES	DESCRIPTION (___ WALL FACE)	REMARKS
1		0.2 ORGANICS 1.0 RED BROWN SILTY SAND TR GRAVEL (TILL)	
3		BROWN SANDY GRAVELLY SILT-CLAY TR COBBLES & BOULDERS (BASAL TILL)	DENSE TO VERY DENSE W/ DEPTH
5			
7			
9	X		
11			
13			
15		15.5 REFUSAL	
17			
19			

COMPLETION DEPTH 15.5 FEET

DEPTH TO WATER 1st 8-10 FEET SEEPAGE

SURFACE DIMENSION ____ FEET x ____ FEET

BEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 112

GROUND SURFACE ELEV. _____

LOCATION OT-3 (SEE PLAN

PROJECT NO: 9006

DATE: 03·15·90

DEPTH - FEET	SAMPLES	DESCRIPTION (____WALL FACE)	REMARKS
1		0.2 ORGANICS 0.5 RED BROWN SILTY SAND TR GRAVEL MOTTLED BROWN/GRAY SILTY GRAVELLY SAND TR COBBLES	
3	X		
5		4.0	DENSE TO VERY DENSE W/ DEPTH
7	X	BROWN SILTY GRAVELLY SAND TR COBBLES	
9	X		
11			
13			
15		15.0 GRAY BROWN SILTY GRAVELLY SAND TR COBBLES	
17		17.5	
19		B.O.E.	

COMPLETION DEPTH 17.5 FEET

DEPTH TO WATER 1-2 FEET SEEPAGE

SURFACE DIMENSION _____ FEET x _____ FEET

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 113

GROUND SURFACE ELEV. _____

LOCATION OT-3 (SEE PLAN)

PROJECT NO: 9006

DATE: 03.15.90

DEPTH - FEET	SAMPLES	DESCRIPTION (____WALL FACE)	REMARKS
1		0.2 ORGANICS RED BROWN/BROWN GRAVELLY	
3		2.0 SAND TR SILT MOTTLED SILTY GRAVELLY SAND	
5		5.0	VERY DENSE
7		BROWN SILTY GRAVELLY SAND TR COBBLES	
9			
11			
13	X	13.0 14.0 BROWN SAND TR SILT	
15		REFUSAL	
17			
19			

COMPLETION DEPTH 14.0 **FEET**

DEPTH TO WATER 0-2 / ▽ 13.0 **FEET**
SEEPAGE

SURFACE DIMENSION _____ **FEET** x _____ **FEET**

TEST PIT NO. TP 114

GROUND SURFACE ELEV. _____

LOCATION OT-3 (SEE PLAN)

PROJECT NO: 9006

DATE: 03.15.90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.5 ORGANICS	
3		MOTTLED BROWN/GRAY SANDY SILT TR GRAVEL	DENSE BOULDER @ 3' 1+/- CY
5		5.0	
7	X	BROWN SILTY GRAVELLY SAND TR COBBLES	DENSE TO VERY DENSE W/ DEPTH
9	X		
11			
13			
15			
		16.0	
17		B.O.E	
19			

COMPLETION DEPTH 16.0 **FEET**

DEPTH TO WATER HEAVY SURFACE SEEPAGE **FEET**

SURFACE DIMENSION _____ **FEET x** _____ **FEET**

TEST PIT NO. 115

GROUND SURFACE ELEV. _____ **PROJECT NO:** 9006

LOCATION OT-3 (SEE PLAN) **DATE:** 03·15·90

DEPTH - FEET	SAMPLES	DESCRIPTION (____WALL FACE)	REMARKS
1		0.3 ORGANICS RED BROWN SILTY SAND TR GRAVEL 1.0	
2		BROWN SILTY GRAVELLY SAND TR COBBLES	DENSE
3			
4			
5			
6			
7		7.0	
8		REFUSAL	

COMPLETION DEPTH 7.0 **FEET** **DEPTH TO WATER** NONE **FEET** OBSERVED

SURFACE DIMENSION _____ **FEET x** _____ **FEET**

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 116

GROUND SURFACE ELEV. _____

LOCATION OT-3 (SEE PLAN)

PROJECT NO: 9006

DATE: 03·16·90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.5 ORGANICS	
3		MOTTLED BROWN/GRAY SANDY SILT TR GRAVEL	
		4.0	
5		BROWN SILTY GRAVELLY SAND TR COBBLES	DENSE TO VERY DENSE
7			
9			
11			
		12.0	
13	X	BROWN GRAVELLY SAND LITTLE SILT	SAND LAYERS
15			CAVED 12-17'
			MODERATE SEEPAGE
17		17.0	
		B.O.E.	
19			

COMPLETION DEPTH 17.0 **FEET**

DEPTH TO WATER 0.5 ± **FEET**

12-17 SEEPAGE

SURFACE DIMENSION _____ **FEET x** _____ **FEET**

TEST PIT NO. 117

GROUND SURFACE ELEV. _____ **PROJECT NO:** 9006

LOCATION OT-3 (SEE PLAN) **DATE:** 03·16·90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.2 ORGANICS	
		0.75 RED BROWN SILTY SAND TR GRAVEL	
3		3.0 MOTTLED BROWN/GRAY SILTY GRAVELLY SAND TR COBBLES	DENSE
5			
7		BROWN SILTY GRAVELLY SAND TR COBBLES	DENSE
9			
11			
13		13.0 GRAY/BROWN SILTY GRAVELLY SAND TR COBBLES	
15			
17		16.5 TB.O.E	
19			

COMPLETION DEPTH 16.5 FEET **DEPTH TO WATER** 0-0.75 FEET SEEPAGE

SURFACE DIMENSION _____ FEET x _____ FEET

TEST PIT NO. 118

GROUND SURFACE ELEV. _____ **PROJECT NO:** 9006

LOCATION OT-3 (SEE PLAN) **DATE:** 03·16·90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.2 ORGANICS	
		RED BROWN SILTY SAND	
		2.5	1/4 +/- C.Y BOULDER 1'
3		MOTTLED BROWN/GRAY SILTY GRAVELLY SAND TR COBBLES	DENSE
5	X	5.0	
7		BROWN SILTY GRAVELLY SAND TR COBBLES	VERY DENSE
9			
11			
13			
15			
17		16.5	
19			

COMPLETION DEPTH 16.5 FEET **DEPTH TO WATER** 0.5 FEET SEEPAGE

SURFACE DIMENSION _____ FEET x _____ FEET

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. TP6

GROUND SURFACE ELEV. 214 (ESTIMATED) **PROJECT NO:** 9006

LOCATION OT-3 (SEE PLAN) **DATE:** 03 26 90

DEPTH - FEET	SAMPLES	DESCRIPTION (___ WALL FACE)	REMARKS
1		0.2 ORGANICS RED BROWN / GRAY BROWN GRAVELLY SAND LITTLE SILT TR COBBLES & BOULDERS	TOP 1' RED BROWN BOTTOM 2' GRAY BROWN (TILL)
3		3.0	
5		BROWN SANDY GRAVELLY SILT-CLAY TR COBBLES & BOULDERS	
7			
9			
11		(BASAL TILL)	
13			
15			
17		16.0 B.O.E.	
19			

COMPLETION DEPTH 16.0 **FEET** **DEPTH TO WATER** 0-3.0 **FEET**
MODERATE SEEPAGE

SURFACE DIMENSION _____ **FEET** x _____ **FEET**

TEST PIT NO. 132

GROUND SURFACE ELEV. —

LOCATION OT-3 (SEE PLAN)

PROJECT NO: 9006

DATE: 03·27·90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.2 ORGANICS 1.0 REDDISH BROWN SILTY SAND (TILL)	
3			
5		BROWN VERY SILTY GRAVELLY SAND TR COBBLES (BASAL TILL)	DENSE TO
7			VERY DENSE
9			W/ DEPTH
11			
13			
15		15.0	
17	X	BROWN GRAVELLY SAND TR SILT (TILL)	LOOSE
19		18.0 B.O.E.	

COMPLETION DEPTH 18.0 **FEET**

SURFACE DIMENSION _____ **FEET x** _____ **FEET**

DEPTH TO WATER SURFACE **FEET**
15.0-18.0
SEEPAGE

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 133

GROUND SURFACE ELEV. _____ PROJECT NO: 9006

LOCATION OT-3 (SEE PLAN) DATE: 03.27.90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.2 ORGANICS	
		1.0 DARK BROWN SILTY SAND	
3		MOTTLED BROWN/GRAY	
		3.5 SILTY GRAVELLY SAND	
5			
		BROWN SILTY GRAVELLY SAND TR COBBLES	DENSE TO VERY DENSE W/ DEPTH
7			
9			
11			
13		13.0	
		14.0 BROWN GRAVELLY SAND LITTLE SILT	
15		REFUSAL	
17			
19			

COMPLETION DEPTH 14.0 FEET DEPTH TO WATER 0-1.0 FEET

SURFACE DIMENSION _____ FEET x _____ FEET ± 13-14 MODERATE SEEPAGE

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 134

GROUND SURFACE ELEV. _____ **PROJECT NO:** 9000

LOCATION OT-3 (SEE PLAN) **DATE:** 03.27.90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.5 ORGANICS 1.0 GRAY SILTY SAND MOTTLED BROWN/GRAY 3.0 SILTY GRAVELLY SAND	
3			
5			DENSE TO VERY DENSE W/ DEPTH
7		BROWN SILTY GRAVELLY SAND TR COBBLES	
9			
11			
13			
15			
17		16.5 B.O.E.	

COMPLETION DEPTH 16.5 **FEET** **DEPTH TO WATER** 0-1.0 **FEET**
SEEPAGE

SURFACE DIMENSION _____ **FEET x** _____ **FEET**

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 135

GROUND SURFACE ELEV. _____ **PROJECT NO:** 9001

LOCATION OT-3 (SEE PLAN) **DATE:** 03.27.90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		1.0 ORGANICS	
3		MOTTLED BROWN SILTY CLAY	STIFF
5		6.0	
7		BROWN SILTY GRAVELLY SAND TO COBBLES	MEDIUM DENSE
9		10.5	
11		BROWN SANDY GRAVEL TO SILT	LOOSE
13		14.0	
15		B.O.E.	
17			

COMPLETION DEPTH 14.0 **FEET** **DEPTH TO WATER** SURFACE **FEET**

@ 10.5', 14.0

HEAVY SEEPAGE

SURFACE DIMENSION _____ **FEET x** _____ **FEET**

TEST PIT NO. 136

GROUND SURFACE ELEV. 211 (ESTIMATED) **PROJECT NO:** 9006

LOCATION GT-3 (SEE PLAN) **DATE:** 03·27·90

DEPTH - FEET	SAMPLES	DESCRIPTION (___ WALL FACE)	REMARKS
1		0.2 ORGANICS	
		1.2 REDDISH BROWN SILTY SAND (TILL)	
3		MOTTLED BROWN/GRAY SILTY GRAVELLY SAND TR COBBLES (TILL)	
5		BROWN SANDY GRAVELLY SILT-CLAY TR COBBLES & BOULDERS (BASAL TILL)	DENSE TO VERY DENSE W/ DEPTH
7			
9			
11			
13		13.0 BROWN/GRAY SANDY GRAVELLY SILT-CLAY W/ COBBLES - BOULDERS	VERY DENSE (BASAL TILL)
15		15.5 E.O.E	
17			
19			

COMPLETION DEPTH 15.5 FEET **DEPTH TO WATER** NONE FEET OBSERVED

SURFACE DIMENSION _____ FEET x _____ FEET

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 137

GROUND SURFACE ELEV. 2.2 (ESTIMATED) **PROJECT NO:** 9006

LOCATION OT-3 (SEE PLAN) **DATE:** 03-27-90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.2 ORGANICS	
2		BROWN SILTY GRAVELLY SAND (TILL)	
3		3.0	
4		REFUSAL	

COMPLETION DEPTH 3.0 FEET **DEPTH TO WATER** NONE FEET OBSERVED

SURFACE DIMENSION _____ FEET x _____ FEET

TEST PIT NO. 138

GROUND SURFACE ELEV. _____ **PROJECT NO:** 9006

LOCATION OT-3 (SEE PLAN) **DATE:** 03-27-90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.5 ORGANICS	
3		MOTTLED BROWN/GRAY SILTY GRAVELLY SAND ± COBBLES ± BOULDERS	
5		3.5	DENSE TO VERY DENSE w/ DEPTH
7		BROWN SILTY GRAVELLY SAND ± COBBLES ± BOULDERS	
9			
11			
13			
15			
17		16.0 B.O.E.	

COMPLETION DEPTH _____ FEET **DEPTH TO WATER** 0-1.5 FEET HEAVY SEEPAGE

SURFACE DIMENSION _____ FEET x _____ FEET

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 301

GROUND SURFACE ELEV. 211 (ESTIMATED) **PROJECT NO:** 9006

LOCATION SEE PLAN **DATE:** 11.27.90

DEPTH – FEET	SAMPLES	DESCRIPTION (___ WALL FACE)	REMARKS
1		0.5 TOPSOIL	
2		REDDISH BROWN	
		1.5 GRAVELLY SAND (TILL)	
3		BROWN SANDY GRAVELLY	
4		SILT-CLAY TRACE OF	
5		COBBLES	
6		(BASAL TILL)	
7		7.0	
		REFUSAL	

COMPLETION DEPTH 7.0 FEET **DEPTH TO WATER** SEEPAGE FEET @ 7.0'

SURFACE DIMENSION ____ FEET x ____ FEET

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 302

GROUND SURFACE ELEV. 214 (ESTIMATED) **PROJECT NO:** 9006

LOCATION SEE PLAN **DATE:** 11-27-90

DEPTH - FEET	SAMPLES	DESCRIPTION (___ WALL FACE)	REMARKS	γ_d (pcf)	M.C (%)
1		0.2 TOPSOIL 1.0 REDDISH BROWN SILTY SAND TRACE OF GRAVEL (TILL)			
3					
5	X			126 (n_L=0.29)	12
7		BROWN SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES (BASAL TILL)	DENSE		
9					
11	X	... BECOMING BROWNISH GRAY		132 (n_L=0.20)	12
13		13.5			
15		REFUSAL			

COMPLETION DEPTH 13.5 FEET **DEPTH TO WATER** SURFACE FEET SEEPAGE

SURFACE DIMENSION ____ FEET x ____ FEET

SEVEE & MAHER ENGINEERS, INC.

TEST PIT NO. 303

GROUND SURFACE ELEV. 205 (ESTIMATED) **PROJECT NO:** 9006

LOCATION SEE PLAN **DATE:** 11·27·90

DEPTH - FEET	SAMPLES	DESCRIPTION (____ WALL FACE)	REMARKS
1		0.5 TOPSOIL	
2			
3		BROWN SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES	
4			DENSE
5		(BASAL TILL)	
6			
7		7.0	
		REFUSAL	

COMPLETION DEPTH 7.0 FEET **DEPTH TO WATER** 0-1.0 FEET SEEPAGE

SURFACE DIMENSION _____ FEET x _____ FEET

SEVEE & MAHER ENGINEERS, INC.

TEST PIT LOG

PROJECT: **WOTLF- FUTURE EXP**		LOCATION: see plan	JOB NO. 03076	TEST PIT NO **TP-04-01**
CONTRACTOR Sargent & Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/10/2004	GROUND ELEV.(FT)	LOGGED BY KPN
				GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		1.5 Reddish brown gravelly sandy silt (TILL)			
5	X	Brown gravelly sandy silt trace of cobbles and boulders dense to very dense	slight seepage at 5.5 ft	13.3	
		fractured			
		8.0			
10	X	Brown silty sandy gravel trace of cobbles loose	moderate seepage	8.7	4.9
				10.8	
15	X	15.0 (COBBLE ZONE)			
		light brown sandy clayey silt trace of gravel		22.2	83.3
		18.0 (basal till)			
20		B.O.E.			
25					

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO: TP-04-02				
PROJECT: WOTLF- FUTURE EXP	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent & Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/10/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS, LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		1.3 Reddish brown gravelly sandy silt tr cobblesand boulders			
5		Brown gravelly sandy silt trace of cobbles and boulders medium dense			
		7.0 fractured (TILL)			
10	X		estimate 60-70 % gravel 1/4 to 2 inch	4.1	
	X	Brown silty sandy gravel trace of cobbles loose		5.6	5.8
		14.6 (COBBLE ZONE)			
15		16.5 Light brown sandy clayey silt			
		Brown cobbley silty sandy gravel	heavy seepage 16.5-17		
20	X	20.0 (basal till)		11.1	
		B.O.E.			
25					

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO **TP-04-03**

PROJECT:	LOCATION:	JOB NO.	LOGGED BY
WOTLF- FUTURE EXP	see plan	03076	KPN

CONTRACTOR	EXCAVATION EQUIPMENT	DATE	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT)
Sargent &Sargent	Cat 330L	6/10/2004		see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		1.0 Reddish brown silty sandy gravel			
5		Brown gravelly sandy silt trace of cobbles dense		12.9	
		7.0 fractured - blocky structure		9.1	43.4
10		Brown silty sandy gravel trace of cobbles			
		12.0 loose			
		13.0 fine to medium sand trace of silt		9.1	
15				19.2	92.2
		light brown sandy silt trace of gravel			
20				16.6	
		22.0 (basal till)			
25		B.O.E.			

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TEST PIT LOG

TEST PIT NO **TP-04-04**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/10/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		1.5 Reddish brown silty sandy gravel	
5		Brown gravelly sandy silt trace of cobbles dense many boulders fractured - blocky structure	
		9.0	
10		becoming grayish brown with manganese staining very dense	
15		16.0	slight seepage
		18.0 light brown sandy silt trace of gravel (basal till)	
20		REFUSAL	
25			

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TEST PIT LOG

TEST PIT NO **TP-04-05**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/10/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		Forest litter	
0.5			none observed
		REFUSAL	
5			
10			
15			
20			
25			

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TEST PIT LOG

TEST PIT NO **TP-04-06**

PROJECT:	LOCATION:	JOB NO.	LOGGED BY
WOTLF- FUTURE EXP	see plan	03076	KPN

CONTRACTOR	EXCAVATION EQUIPMENT	DATE	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT)
Sargent &Sargent	Cat 330L	6/11/2004		see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		1.0 Reddish brown gravelly sandy silt tr cobbles			
5	X	Mottled brown gravelly sandy silt trace of cobbles medium dense		10.6	
		6.0			
		8.0 Brown gravelly sandy silt trace of cobbles			
10	X			12.6	
	X	becoming grayish brown with manganese staining with trace of clay	soil sticking in excavator bucket (clayey) @ 12 feet	13.1	39.2
15		very dense			
	X	19.0 (basal till)		10.8	
20		REFUSAL			
25					

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TEST PIT LOG

TEST PIT NO **TP-04-07**

PROJECT:	LOCATION:	JOB NO.	LOGGED BY
WOTLF- FUTURE EXP	see plan	03076	KPN

CONTRACTOR	EXCAVATION EQUIPMENT	DATE	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT)
Sargent &Sargent	Cat 330L	6/11/2004		see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		Dark brown sandy silt tr of gravel			
		0.75 and cobbles			
		Mottled brown gravelly sandy silt trace of cobbles	fractured		
5		5.0 medium dense			
		***** becoming very dense and no mottling			
10					
		13.0			
		Brown sandy silty gravel- loose	moderate seepage	12.4	
15		16.0		13.0	
		**** becoming light brown silty sand	medium dense	19.0	
		w/ iron cemented gravelly layers			
20			dense		
		22.0 (basal till)		22.6	94.6
		B.O.E.			
25					

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TEST PIT LOG

TEST PIT NO **TP-04-08**

PROJECT:	LOCATION:	JOB NO.	LOGGED BY
WOTLF- FUTURE EXP	see plan	03076	KPN

CONTRACTOR	EXCAVATION EQUIPMENT	DATE	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT)
Sargent &Sargent	Cat 330L	6/11/2004		see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		Dark brown sandy silt tr of gravel	
		0.75 and cobbles	slight seepage at 2.0 ft
		4.5 Mottled brown gravelly sandy silt trace of cobbles	fractured, medium dense
5		***** becoming dense and no mottling	
		7.0	
10		***** becoming grayish brown	very dense, blocky structure, manganese staining
		**** cemented	
15			
		18.0	
20		dark gray gravelly sandy clayey silt	
		22.0 (basal till)	
		B.O.E.	
25			

TEST PIT LOG

TEST PIT NO **TP-04-09**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/11/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		1.3 Dark brown sandy silt trace of gravel w/ gleyed zones	wet area surface seepage
5		Mottled brown gravelly sandy silt trace of cobbles 5.5	
10		Brown gravelly sandy silt	test pit excavated east to west . Refusal surface drops sharply to the east
		12.5 (basal till)	
15		REFUSAL	
20			
25			

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TEST PIT LOG

PROJECT: **WOTLF- FUTURE EXP**		LOCATION: see plan	JOB NO. 03076	TEST PIT NO **TP-04-10** / LOGGED BY KPN
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/11/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		1.3 Reddish brown gravelly sandy silt trace of cobbles	
		Mottled brown gravelly sandy silt trace of cobbles medium dense	
		4.0	
5		6.6 Brown gravelly sandy silt trace of cobbles (basal till)	dense
		REFUSAL	no seepage observed
10			
15			
20			
25			

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TEST PIT LOG

TEST PIT NO: **TP-04-11**

PROJECT:	LOCATION:	JOB NO.	LOGGED BY
WOTLF- FUTURE EXP	see plan	03076	KPN

CONTRACTOR	EXCAVATION EQUIPMENT	DATE	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT)
Sargent &Sargent	Cat 330L	6/11/2004		see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		1.5 Reddish brown sandy silt trace of gravel w/ gleyed zones			
5		Mottled brown gravelly sandy silt trace of cobbles medium dense	slight seepage	12.7	42.2
		7.0			
10		Brown gravelly sandy silt trace of boulders and cobbles dense to very dense			
15		**** becoming grayish brown very dense			
20		20.0 (basal till)			
		B.O.E.			
25					

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TEST PIT LOG

TEST PIT NO **TP-04-12**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/14/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		1.3 Reddish brown sandy silt trace of gravel w/ gleyed zones	many boulders at the surface bedrock outcrops to the west and south
5		Mottled brown gravelly sandy silt trace of cobbles and boulders	
		6.5 (basal till)	slight seepage at 6.5
10		REFUSAL	
15			
20			
25			

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TEST PIT LOG

PROJECT: **WOTLF- FUTURE EXP**		LOCATION: see plan	JOB NO. 03076	TEST PIT NO **TP-04-13** / LOGGED BY KPN
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/14/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		0.8 Dark brown organic layer	many boulders and cobbles at the surface
5		4.5 Mottled brown gravelly sandy silt trace of cobbles and boulders (basal till)	slight seepage at surface and 4.5
		REFUSAL	
10			
15			
20			
25			

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TEST PIT LOG

TEST PIT NO **TP-04-14**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/14/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		1.0 Dark brown gravelly sandy silt trace of cobbles	no seepage observed		
5		Mottled brown gravelly sandy silt trace of cobbles medium dense			
		6.0			
		8.0 Brown gravelly sandy silt trace of cobbles dense		12.6	55.0
10		11.0			
		becoming grayish brown with manganese staining very dense			
15					
		18.0			
		Gray gravelly sandy silt trace of cobbles			
20		20.0 (basal till)			
		B.O.E.			
25					

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO **TP-04-15**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/14/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		1.5 Reddish brown sandy silty gravel	
5		Mottled brown gravelly sandy silt trace of cobbles medium dense 5.0	fractured
10		Grayish/brown gravelly sandy silt trace of cobbles and boulders dense to very dense	slight seepage at 8 ft blocky structure
15			
20		*** becoming clayey gravelly sandy silt trace of cobbles and boulders 21.5 (basal till)	
25		B.O.E.	

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TEST PIT LOG

TEST PIT NO **TP-04-16**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/14/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		1.0 Dark brown gravelly sandy silt trace of cobbles	no seepage observed		
5		Mottled brown gravelly sandy silt trace of cobbles medium dense			
		6.0			
10		Brown gravelly sandy silt trace of cobbles dense	fractured appears drier than soils above		
		12.0			
15		****becoming grayish brown with manganese staining very dense		10.8	51.9
		**** becoming clayey			
20		19.0 Blue/gray gravelly sandy silt trace of cobbles			
		21.0 (basal till)			
		B.O.E.			
25					

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO **TP-04-17**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/14/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		1.3 Reddish brown gravelly sandy silt trace of cobbles	
5		Mottled brown gravelly sandy silt trace of cobbles medium dense 5.0	
10		Brown gravelly sandy silt trace of cobbles dense- very dense	moderate seepage at 12 ft
15		13.5 **** becoming grayish brown with blocky structure very dense	
20		19.0 (basal till)	
25		B.O.E.	

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TEST PIT LOG

TEST PIT NO **TP-04-18**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/15/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		1.0 Dark brown/ reddish brown gravelly sandy silt trace of cobbles	
5		Mottled brown gravelly sandy silt trace of cobbles dense	fractured
		9.0	appears drier than soils above
10		Brown silty fine sand	hole caving 8- 12 ft
		14.0	slight seepage at 14 ft
15		Brown gravelly sandy silt trace of cobbles and boulders	excavation staying open
		18.5 Gray gravelly sandy silt - very dense (basal till)	
20		B.O.E.	
25			

Sevee Maher Engineers

TEST PIT LOG

PROJECT: WOTLF- FUTURE EXP		LOCATION: see plan	JOB NO. 03076	TEST PIT NO TP-04-19 / LOGGED BY KPN
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/15/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		1.0 Reddish brown gravelly sandy silt	many surficial cobblews and boulders
		Mottled brown gravelly sandy silt trace of cobbles and boulders	
		4.0	
5			slight seepage at 5 ft
		Brown gravelly sandy silt trace of cobbles dense- very dense blocky structure	
10			
		12.0	moderate seepage at 12 ft
15		**** becoming grayish brown with blocky structure very dense	
		**** becoming clayey	
20		21.5 (basal till)	
		B.O.E.	
25			

TEST PIT LOG

TEST PIT NO **TP-04-20**

PROJECT:	LOCATION:	JOB NO.	LOGGED BY
WOTLF- FUTURE EXP	see plan	03076	KPN

CONTRACTOR	EXCAVATION EQUIPMENT	DATE	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT)
Sargent &Sargent	Cat 330L	6/15/2004		see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		1.0 Reddish brown gravelly sandy silt trace of cobbles	surficial bolders		
5		5.5 Mottled brown gravelly sandy silt trace of cobbles dense		11.2	52.6
10		Brown gravelly sandy silt trace of cobbles dense- very dense blocky structure	slight seepage at 8 ft		
15					
20		20.0 (basal till)			
25		B.O.E.			

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO **TP-04-21**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/15/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		1.2 Dark grayish brown gravelly sandy silt trace of cobbles	surficial bolders wet area slight seepage at 3 ft
5		Mottled brown gravelly sandy silt trace of cobbles and boulders 5.5	
10		Brown gravelly sandy silt trace of cobbles and many boulders dense	
15		15.0	
20		*** becoming grayish brown very dense 21.5 (basal till)	
25		B.O.E.	

TEST PIT LOG

TEST PIT NO **TP-04-22**

PROJECT:	LOCATION:	JOB NO.	LOGGED BY
WOTLF- FUTURE EXP	see plan	03076	KPN

CONTRACTOR	EXCAVATION EQUIPMENT	DATE	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT)
Sargent &Sargent	Cat 330L	6/15/2004		see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		1.2 Reddish brown gravelly sandy silt			
5		4.5 Mottled brown gravelly sandy silt trace of cobbles and boulders		13.6	44.7
10		Brown gravelly sandy silt trace of cobbles and many boulders very dense **** has more gravel	many 1-2-inch rocks		
15		15.0 fine to medium sand with iron staining and silt layers			
20		(basal till)	heavy seepage at 21.5 (boiling up from bottom)		
		21.5 B.O.E.			
25					

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO **TP-04-23**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/15/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		1.0 Reddish brown gravelly sandy silt	
		Mottled brown gravelly sandy silt trace of cobbles	
5		4.0 and boulders medium dense	
		Brown gravelly sandy silt trace of cobbles and boulders	
10		10.0	
		**** becoming grayish brown very dense	many 1-2-inch rocks
15		15.0	
		fine to medium sand with iron staining and silt layers	
20		20.0 (basal till)	
		B.O.E.	
25			

TEST PIT LOG

TEST PIT NO **TP-04-24**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/15/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		0.8 Reddish brown gravelly sandy silt	surficial boulders		
		Mottled brown gravelly sandy silt trace of cobbles and boulders			
5		5.5	moderate seepage at 6 ft	14.2	63.0
		Brown gravelly sandy silt trace of cobbles and boulders			
10		**** becoming grayish brown very dense blocky structure and manganese staining			
15					
20		20.0 (basal till)			
		B.O.E.			
25					

TEST PIT LOG

TEST PIT NO **TP-04-25**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/16/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		0.8 Reddish/dark brown gravelly sandy silt	surficial cobbles
5		Mottled brown gravelly sandy silt trace of cobbles and boulders 4.0	slight seepage at 6 ft
10		Brown gravelly sandy silt trace of cobbles and boulders blocky structure and very dense **** more gravel (difficult to excavate)	
15			moderate seepage at 17 ft
20		21.5 (basal till)	
25		B.O.E.	

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO **TP-04-26**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/16/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		0.8 dark brown organic layer	surficial cobbles
		Mottled brown gravelly sandy silt trace of cobbles	
		4.0	slight seepage at 4 ft
5		Brown sandy silty gravel trace of cobbles	
10		12.5 (basal till)	heavy seepage at 12.5
		REFUSAL	
15			
20			
25			

Sevee Maher Engineers

TEST PIT LOG

PROJECT: **WOTLF- FUTURE EXP**		LOCATION: see plan	JOB NO. 03076	TEST PIT NO **TP-04-27** LOGGED BY KPN
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/16/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		1.3 Reddish brown gravelly sandy silt			
5		4.0 Brown gravelly sandy silt trace of cobbles	no mottling observed		
			slight seepage at 8 ft		
10		10.0 *** becoming grayish brown blocky structure and manganese staining	slight seepage at 10 ft		
15		15.0 *** becoming light brown blocky structure slightly sandier		14.3	58.9
20		(basal till) 22.2			
25		B.O.E.			

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO **TP-04-28**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/16/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		0.5 Dark brown organic layer	slight surface seepage
		Mottled brown gravelly sandy silt trace of cobbles and boulders	
5		5.0	slight seepage at 4 ft
		Brown gravelly sandy silt trace of cobbles	
10			
		**** becoming sandier at 14 ft	
15		16.0 (basal till)	
		REFUSAL	moderate seepage at 17 ft
20			
25			

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO **TP-04-29**

PROJECT:	LOCATION:	JOB NO.	LOGGED BY
WOTLF- FUTURE EXP	see plan	03076	KPN

CONTRACTOR	EXCAVATION EQUIPMENT	DATE	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT)
Sargent &Sargent	Cat 330L	6/16/2004		see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		0.5 Dark brown sandy silt trace of gravel			
		Mottled brown gravelly sandy silt trace of cobbles and boulders	many 1-2 inch rocks difficult to excavate slight seepage at 5 ft		
5		5.0			
		*** less gravel			
10		11.0			
		*** becoming silty gravel with little sand trace of cobbles			
		14.0			
15		Brown gravelly sandy silt trace of cobbles		10.0	41.3
		18.0			
		**** becoming clayey (basal till)			
20		B.O.E.			
25					

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO **TP-04-30**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/16/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		0.5 Dark brown sandy silt trace of gravel	
5		Mottled brown clayey silt and boulders 4.5	seepage along clay prisms
		Brown clyey silt	
10		9.0 (marine ~~deposit~~ CLAY)	moderate seepage at 9 ft
		Brown gravelly sandy clayey silt medium dense	
15			hole caving
		18.0 (basal till)	
20		B.O.E.	
25			

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO **TP-04-31**				
PROJECT: **WOTLF- FUTURE EXP**	LOCATION: see plan	JOB NO. 03076	LOGGED BY KPN	
CONTRACTOR Sargent &Sargent	EXCAVATION EQUIPMENT Cat 330L	DATE 6/16/2004	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT) see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		0.8 Dark brown sandy silt	
5		Mottled brown gravelly sandy silt trace of cobbles and boulders 4.5	medium dense
10		Brown gravelly sandy silt trace of cobbles and boulders	slight seepage 8-9 ft
15		12.0 **** becoming grayish brown trace of clay	
20		(basal till)	
25		B.O.E.	

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TEST PIT LOG

TEST PIT NO **TP-04-32**

PROJECT:	LOCATION:	JOB NO.	LOGGED BY
WOTLF- FUTURE EXP	see plan	03076	KPN

CONTRACTOR	EXCAVATION EQUIPMENT	DATE	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT)
Sargent &Sargent	Cat 330L	6/17/2004		see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA
		1.0 Dark brown sandy silt	many surficial boulders and cobbles heavy surface seepage
		Mottled brown gravelly sandy silt trace of cobbles	
		4.5	
5		Brown gravelly sandy silt trace of cobbles and boulders	
10		**** becoming slightly sandier	
15			
20		20.5 (basal till)	
		B.O.E.	
25			

Sevee Maher Engineers

TEST PIT LOG

TEST PIT NO **TP-04-33**

PROJECT:	LOCATION:	JOB NO.	LOGGED BY
WOTLF- FUTURE EXP	see plan	03076	KPN

CONTRACTOR	EXCAVATION EQUIPMENT	DATE	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT)
Sargent &Sargent	Cat 330L	6/17/2004		see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		0.5 Dark brown sandy silt			
		1.0 ~~Gleyed~~ sandy silt	slight surface seepage		
		Mottled brown gravelly sandy silt trace of cobbles			
5		5.0			
		Brown gravelly sandy silt trace of cobbles and boulders	blocky structure		
		9.0 dense			
10		**** becoming grayish brown very dense			
15					
		18.0			
		*** becoming brown clayey gravelly sandy silt trace of		13.7	60.3
20		21.0 cobbles- medium dense (basal till)			
		B.O.E.			
25					

TEST PIT LOG

TEST PIT NO **TP-04-34**

PROJECT:	LOCATION:	JOB NO.	LOGGED BY
WOTLF- FUTURE EXP	see plan	03076	KPN

CONTRACTOR	EXCAVATION EQUIPMENT	DATE	GROUND ELEV.(FT)	GROUNDWATER DEPTH(FT)
Sargent &Sargent	Cat 330L	6/17/2004		see remarks

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION AND CLASSIFICATION	REMARKS,LAB TEST RESULTS, WATER DATA	MC %	% Passing # 200 sieve
		1.0 Dark brown sandy silt			
		Mottled brown clayey silt			
5		5.0	moderae seepage at 6 ft		
		Olive brown silty clay			
10			slight seepage at 10 ft		
15		15.0 (marine ~~sediments~~ CLAY)			
		Brown clayey gravelly sandy silt trace of cobbles medium dense		12.1	54.8
20		20.5 (basal till)			
		B.O.E.			
25					

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TEST PIT No.: TP14-1

PROJECT: JRL Expansion

EQUIPMENT: Kubota kx080-3
GROUND SURFACE ELEV. (ft): 216
TEST PIT DATE: 8/7/2014
SME JOB NO.: 14101

EXCAVATION CONTRACTOR: Sargent
LOGGED BY: P Monroe

DEPTH (FT)	DESCRIPTION	SAMPLE	RESULTS
1	Light brown till w/ 6 to 12" cobble to 6.5'		
2			
3		No seepage noted	
4			
5			
6			
7			
8			
9	Darker brown densly compacted silt with few small stones to 11'		
10			
11	11.0	No samples taken	
12	Bottom of test pit 11.0 feet		
13			
14			
15			
16			
17			
18			
19			
20			

NOTES:

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TEST PIT No.: TP14-2

PROJECT: JRL Expansion

EQUIPMENT: Kubota kx080-3
GROUND SURFACE ELEV. (ft): 216
TEST PIT DATE: 8/7/2014
SME JOB NO.: 14101

EXCAVATION CONTRACTOR: Sargent
LOGGED BY: P Monroe

DEPTH (FT)	DESCRIPTION	SAMPLE	RESULTS
1	Light brown till w/ 6 to 12" cobble to 8.5'	No seepage noted	
2			
3			
4			
5			
6			
7			
8	Darker brown densly compacted silt with few small stones to 11'		
9			
10			
11	11.0	No samples taken	
12	Bottom of test pit 11.0 feet		
13			
14			
15			
16			
17			
18			
19			
20			

NOTES:

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TEST PIT No.: TP14-3

PROJECT: JRL Expansion

EQUIPMENT: Kubota kx080-3
GROUND SURFACE ELEV. (ft): 211
TEST PIT DATE: 10/16/2014
SME JOB NO.: 14101

EXCAVATION CONTRACTOR: Sargent
LOGGED BY: Mbooth

DEPTH (FT)	DESCRIPTION	SAMPLE	RESULTS
1	Boulders encountered.		
2			
3	Mottled brown gravelly sandy slit trace of cobbles		
4	Becoming dense with depth		No seepage noted
5			
6			No samples taken
7	7.0 No bedrock encountered		
8	Bottom of test pit at 7 feet		
9			
10	Test pit completed near previously interpreted bedrock outcrop NW of operations building. No bedrock encountered, boulders were encountered shallow.		
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

NOTES:
-Test pit made approximately 12 ft. off edge of pavement and approximately 25 ft. north of pond. Bulk samples recovered from 1-2 foot depth and 2-4 foot depth.
-Possible bedrock encountered at 8 ft.
-Test Pit backfilled following completion of excavation
-Test pit dimensions = 3 x 13 x 8.3 ft.

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TEST PIT No.: TP14-4

PROJECT: JRL Expansion

EQUIPMENT: Kubota kx080-3
GROUND SURFACE ELEV. (ft): 213.6
TEST PIT DATE: 11/4/2014
SME JOB NO.: 14101

EXCAVATION CONTRACTOR: Sargent
LOGGED BY: P Monroe

DEPTH (FT)	DESCRIPTION	SAMPLE	RESULTS
1	SOILS NOT LOGGED	No samples taken	
2			
3	Refusal at 2'	No seepage noted	
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

NOTES:

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TEST PIT No.: TP14-5

PROJECT: JRL Expansion

EQUIPMENT: Kubota kx080-3
GROUND SURFACE ELEV. (ft): 214
EXCAVATION CONTRACTOR: Sargent
TEST PIT DATE: 11/4/2014
LOGGED BY: P Monroe
SME JOB NO.: 14101

DEPTH (FT)	DESCRIPTION	SAMPLE	RESULTS
1	SOILS NOT LOGGED	No samples taken	
2			
3	Refusal at 1.8'	No seepage noted	
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

NOTES:

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TEST PIT No.: TP14-6

PROJECT: JRL Expansion

EQUIPMENT: Kubota kx080-3
GROUND SURFACE ELEV. (ft): 213.2
EXCAVATION CONTRACTOR: Sargent
TEST PIT DATE: 11/4/2014
LOGGED BY: P Monroe
SME JOB NO.: 14101

DEPTH (FT)	DESCRIPTION	SAMPLE	RESULTS
1	SOILS NOT LOGGED	No samples taken	
2			
3	Refusal at 1.3'	No seepage noted	
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

NOTES:

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TEST PIT No.: TP14-7

PROJECT: JRL Expansion

EQUIPMENT: Kubota kx080-3
GROUND SURFACE ELEV. (ft): 212.6
TEST PIT DATE: 11/4/2014
SME JOB NO.: 14101

EXCAVATION CONTRACTOR: Sargent
LOGGED BY: P Monroe

DEPTH (FT)	DESCRIPTION	SAMPLE	RESULTS
	SOILS NOT LOGGED		
1	Refusal at 0.5'		No samples taken
2			
3			No seepage noted
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

NOTES:

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TEST PIT No.: TP14-8

PROJECT: JRL Expansion

EQUIPMENT: Kubota kx080-3
GROUND SURFACE ELEV. (ft): 211.7
EXCAVATION CONTRACTOR: Sargent
TEST PIT DATE: 11/4/2014
LOGGED BY: P Monroe
SME JOB NO.: 14101

DEPTH (FT)	DESCRIPTION	SAMPLE	RESULTS
1	SOILS NOT LOGGED	No samples taken	
2			
3		No seepage noted	
4	Refusal at 3.3'		
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

NOTES:

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TEST PIT No.: TP14-9

PROJECT: JRL Expansion

EQUIPMENT: Kubota kx080-3
GROUND SURFACE ELEV. (ft): 212.8
EXCAVATION CONTRACTOR: Sargent
TEST PIT DATE: 11/4/2014
LOGGED BY: P Monroe
SME JOB NO.: 14101

DEPTH (FT)	DESCRIPTION	SAMPLE	RESULTS
1	SOILS NOT LOGGED	No samples taken	
2	Refusal at 1.0'		
3		No seepage noted	
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

NOTES:

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TEST PIT No.: TP14-10

PROJECT: JRL Expansion

EQUIPMENT: Kubota kx080-3
GROUND SURFACE ELEV. (ft): 214.6
EXCAVATION CONTRACTOR: Sargent
TEST PIT DATE: 11/4/2014
LOGGED BY: P Monroe
SME JOB NO.: 14101

DEPTH (FT)	DESCRIPTION	SAMPLE	RESULTS
1	SOILS NOT LOGGED	No samples taken	
2			
3		No seepage noted	
4			
5	Refusal at 4.1'		
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

NOTES:

APPENDIX B

BORING, WELL, AND PIEZOMETER LOGS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 2 HOLE NO. P-04-05 ~~P-04-01~~
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, Job# 03-076.08	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
07/19/04 7:15am Water @ 4.7'

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	HQ
SIZE I.D.	4"	1 3/8"	2.5"
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 07/16/04 Start — DATE 07/20/04 Finish

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.2	Topsoil
"	1D	2"	24"	13"	2.0	1	1	2	6		2.5	Brown Silty F/M Sand, w/Little Coarse Sand & Gravel
"											6.0	Mottled Silty F/M Sand, w/Trace of Clayey Silt, Coarse Sand & Gravel
"												
"												
"												
"	2D	2"	24"	20"	7.0	16	28	35	35			
"												
48												
78												
30												
18	3D	2"	24"	18"	12.0	12	29	32	38			
24												
51												
28	4D	2"	24"	18"	15.0	24	32	55	50		15.0	Olive Silty F/M Sand w/Little Coarse Sand & Gravel, w/Trace of Cobbles & Clay
11	5D	2"	5"	5"	15.4	75						
17												
31												
65	6D	2"	16"	10"	18.3	26	54	50			19.0	Olive Clayey Silty F/M Sand, w/Little Coarse Sand, Gravel & Cobbles
72												
12	7D	2"	24"	14"	21.0	22	24	52	70			
9												
19	8D	2"	24"	17"	23.0	18	23	24	38			
23												
30	9D	2"	24"	22"	25.0	21	25	27	33		25.0	Olive Silty Fine Sand, w/Little Coarse Sand, Gravel & Cobbles
15												
15	10D	2"	24"	23"	27.0	19	27	34	62			
21												
24	11D	2"	19"	7"	28.6	23	52	67	50			Olive Silty Fine Sand, w/Little Coarse Sand, Gravel & Clay, w/Trace of Cobbles
35												
22	12D	2"	24"	24"	31.0	16	30	42	57		31.0	
23												
25	13D	2"	14"	1"	32.2	30	69	50				
75												
Open	14D	2"	5"	4"	34.4	50					34.4	Olive Silty Fine Sand, w/Some Gravel & Cobbles, w/Trace of Coarse Sand & Clay
Hole	1R	3.78"	1.2'	1.1'	35.8	92%					34.8	Cobble
"												
"											37.0	Olive Silty Fine Sand w/Some Gravel & Cobbles, w/Trace of Coarse Sand & Clay
"	15D	2"	7"		38.6	42	50					
"											40.9	Brown Silty F/M Sand, w/Coarse Sandy Gravel & Cobbles

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Washed ahead from 10.0' to 48.5'

HOLE NO. P-04-01

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 2 HOLE NO. P-04-05 ~~P-04-01~~
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, Job# 03-076.08	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
07/19/04 7:15am Water @ 4.7'

	CASING	SAMPLER	CORE BARREL	DATE	DATE
TYPE	HW	SS	HQ	07/16/04 Start	07/20/04 Finish
SIZE I.D.	4"	1 3/8"	2.5"		
HAMMER WT.	300#	140#		SURFACE ELEVATION	
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
"	16D	2"	5"		40.9	50						
"												
"												
"	17D	2"	14"	11"	43.7	35	75				42.4	Boulder
"	18D	2"	7"		44.6	60	50					
"												Brown Fine Sandy Silt, w/Little Coarse Sand, Gravel & Cobbles, w/Trace of Clay
"	19D	2"	6"		46.5	65					47.5	
"											48.5	Rock
"												

Bottom of Boring @ 48.5'
Piezometer Installed @ 48.0'
Piezometer Installed @ 15.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

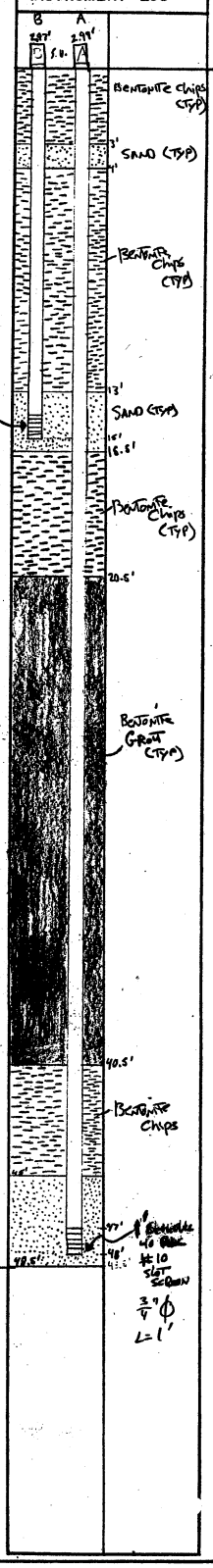
REMARKS:
Washed ahead from 10.0' to 48.5'

HOLE NO. P-04-01

PROJECT	West Old Town Landfill Expansion	JOB NO. 03076.09	BORING NO. P-04-05
DATE COMPLETED 7/20/04	DATE WELLS INSTALLED 7/20/04	DRILLING METHOD Wash-Rotary	
GROUND SURFACE ELEVATION (FT) 201.0'	DRILLING CONTRACTOR M.T.B	LOGGED BY T. Riley / JGS	
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	% Passing #200 Screen	K cm/sec	Water Content %
0	1D	0.1' 0-0.2' Topsoil	8			
		Mottled silty fine to medium sandy silt with a trace of clay, gravel				
5	2D	6.1'	70			
		Becoming... olive w/ trace of cobbles.				
10	3D		70	60.2%		10.2%
	4D		50/0.1'			
15	5D	15'	75/0.4'			
	6D	Increased clay content	50/0.3'			
20	7D		122			
	8D		62			
	9D		60			
25	10D		96			
	11D	..	50/0.1			
30	12D	31'	99			
	13D	Olive silty fine sand w/ some gravel, cobbles	50/0.2'			
	14D	sand a trace of course sand	50/0.4'		K_v =	
35	BR			44.5%	5.5×10^{-7}	9.6%
	15D	Brown silty fine to medium sand w/ course sand gravel and cobbles.	50/0.1'			
40	16D	41'	86/0.4'			
		42' Boulder				
	17D	Brown fine sandy silt w/ little course sand and gravel, trace of clay and cobbles.	50/0.2' 50/0.1'	67%		14.3%
45	18D		65/0.5'			
		48.5' (Basal Till) B.O.E.				
50						
55						
60						

INSTRUMENT LOG



NOTES

5/90

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 2 HOLE NO. P-04-06 ~~P-04-02~~
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, Job# 03-076.08	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	HQ
SIZE I.D.	4"	1 3/8"	2.5"
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 07/20/04 Start — DATE 07/21/04 Finish

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.2	Topsoil
"	1D	2"	24"		2.0	2	5	5	7			Brown Silty Gravelly F/M Sand,
"											2.5	w/Trace of Cobbles
"	2D	2"	24"		4.0	18	18	32	40			
"												
"	3D	2"	24"		6.0	21	30	38	38			
"												
"	4D	2"	13"		7.1	20	30	50				Olive Silty F/M Sand,
130												w/Little Coarse Sand & Gravel,
58	5D	2"	20"		9.7	18	22	35	50			w/Trace of Cobbles
24												
45	6D	2"	20"		11.7	20	33	45	50		12.0	
53												
48	7D	2"	24"		14.0	25	38	53	70			Olive Silty F/M Sand,
92	8D	2"	7"		14.6	27	50					w/Little Coarse Sand, Gravel & Clay,
50											16.0	w/Trace of Cobbles
47												
52	9D	2"	18"		17.5	48	60	85				
60												
88	10D	2"	24"		20.0	24	30	38	50			
38												
40	11D	2"	24"		22.0	12	12	20	27			
35												
32	12D	2"	24"		24.0	12	18	18	18			Olive Clayey Silty F/M Sand,
40												w/Little Coarse Sand & Gravel,
34	13D	2"	24"		26.0	7	16	30	42			w/Trace of Cobbles
44												
35	14D	2"	24"		28.0	26	35	52	50			
58	15D	2"	6"		28.5	70					28.5	
50												
	1R	3.78"	4.7'	4.7'	34.4	100%						
												Rock
	2R	3.78"	5.0'	4.7'	39.4	94%						

SAMPLES
D = SPLIT SPOON — R = ROCK CORE
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE — V = VANE TEST
U = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Washed ahead from 1.0' to 29.7'

HOLE NO. P-04-02

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 2 HOLE NO. P-04-06 ~~P-04-02~~
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, Job# 03-076.08	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 07/20/04 Start	DATE 07/21/04 Finish
TYPE	HW	SS	HQ	SURFACE ELEVATION	
SIZE I.D.	4"	1 3/8"	2.5"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
												Rock
	3R	3.78"	5.0'	5.0'	44.4	100%					44.4	
												Bottom of Boring @ 44.4'
												Piezometer Installed @ 43.9'
												Piezometer Installed @ 10.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

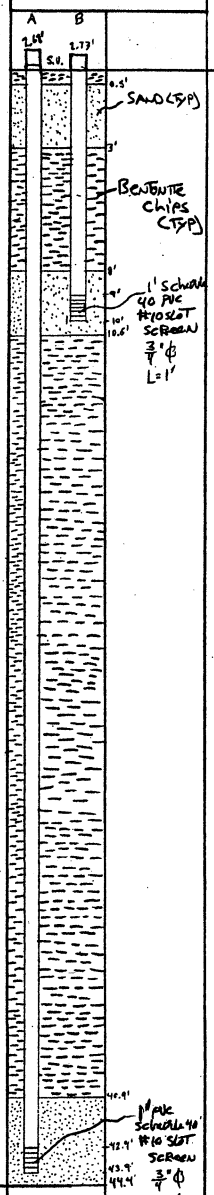
REMARKS:
Washed ahead from 1.0' to 29.7'

HOLE NO. P-04-02

PROJECT WEST OLD TOWN LANDFILL EXPANSION	JOB NO. 03076.09	BORING NO. P-04-06	
DATE COMPLETED 7/22/04	DATE WELLS INSTALLED 7/21/04	DRILLING METHOD WASH ROTARY	
GROUND SURFACE ELEVATION (FT) 208.63'	DRILLING CONTRACTOR M.T.B	LOGGED BY T. Riley / JGS	
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.5"	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% PASSING #200 SCREEN	WATER CONTENT %
0	1D	0-0.3 Topsoil Brown sandy, gravelly Fine to Medium Sand w/ Trace of Cobbles	12			
	2D	2'	72			
6	3D	Olive Fine to Medium Sandy Silt w/ Little Course Sand and Gravel & Trace of Cobbles	76		62%	12.0%
	4D		50/0.1'			
	5D		50/0.2'			
10	6D		50/0.2'			
	7D		123			
	8D		50/0.1'			
15		16'				
	9D		145			
	10D	Olive Clayey Silt w/ Fine to Medium Sand w/ Little Course Sand and gravel. Trace of Cobbles.	88			
20	11D		88			
	12D		36		49.8%	12.4%
25	13D		72			
	14D		102			
	15D	28.5' (Basal Till)	70/0.5'			
30	1R	20% Gray Meta-Gray Wacke ... WX		20%		
35	2R	100%? ... with Siltstone Laminae		100%?		
40	3R			100%		
		44.4' (Bedrock) B.O.E				
45						
50						
55						
60						

INSTRUMENT LOG



NOTES

5/90

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 3 HOLE NO. P-04-07 ~~P-04-03~~
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-A	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE	DATE
TYPE	HW	SS	NQ2	07/22/04 Start	07/28/04 Finish
SIZE I.D.	4"	1 3/8"	2"	SURFACE ELEVATION	
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.2	Topsoil
"	1D	2"	24"	22"	2.0	3	3	9	20		0.5	Gray Brown Fine Sandy Silt
"											3.0	Mottled Silty Fine Sand, w/Little Coarse Sand & Gravel
"	2D	2"	24"		4.0	28	46	32	32		4.0	Olive Silty Fine Sand w/Little Coarse Sand, Gravel & Cobbles
130	3D	2"	10"		4.8	24	50				4.8	Olive Silty Fine Sand, w/Little Coarse Sand & Gravel
Spun												
Casing												
	1R	3"	4.5'	4.5'	11.5	100%						
	2R	3"	5.0'	5.0'	16.5	100%						
	3R	3"	5.0'	5.0'	21.5	100%						Rock
	4R	3"	5.0'	5.0'	26.5	100%						
	5R	3"	5.0'	5.0'	31.5	100%						
	6R	3"	5.0'	5.0'	36.5	100%						

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Washed ahead from 4.0' to 7.0';
Artesian Pressure @ 25.0'

HOLE NO. P-04-03

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 3 HOLE NO. P-04-07 ~~P-04-03~~
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-A	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 07/22/04 Start	DATE 07/28/04 Finish
TYPE	HW	SS	NQ2	SURFACE ELEVATION	
SIZE I.D.	4"	1 3/8"	2"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	7R	3"	5.0'	5.0'	41.5	100%						
	8R	3"	5.0'	4.0'	46.5	80.%						
	9R	3"	4.2'	4.7'	50.7	111.9%						
	10R	3"	4.3'	5.0'	55.0	116.3%						
	11R	3"	3.2'	3.2'	58.2	100%						Rock
	12R	3"	5.0'	5.0'	63.2	100%						
	13R	3"	5.0'	4.8'	68.2	96%						
	14R	3"	5.0'	5.2'	73.2	104%						
	15R	3"	4.5'	4.5'	77.7	100%						

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Washed ahead from 4.0' to 7.0';
Artesian Pressure @ 25.0'

HOLE NO. P-04-03

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 3 OF 3 HOLE NO. P-04-07 ~~P-04-03~~
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-A	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE	DATE
TYPE	HW	SS	NQ2	07/22/04 Start	07/28/04 Finish
SIZE I.D.	4"	1 3/8"	2"	SURFACE ELEVATION	
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	16R	3"	5.0'	5.0'	82.7	100%						
	17R	3"	5.0'	5.0'	87.7	100%						
	18R	3"	5.0'	4.8'	92.7	96%						Rock
	19R	3"	4.8'	5.0'	97.5	104%						
	20R	3"	5.0'	4.9'	102.5	98%						
	21R	3"	5.0'	4.8'	107.5	96%					107.5	

Bottom of Boring @ 107.5'
Piezometer Installed @ 83.0'
Piezometer Installed @ 25.4'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

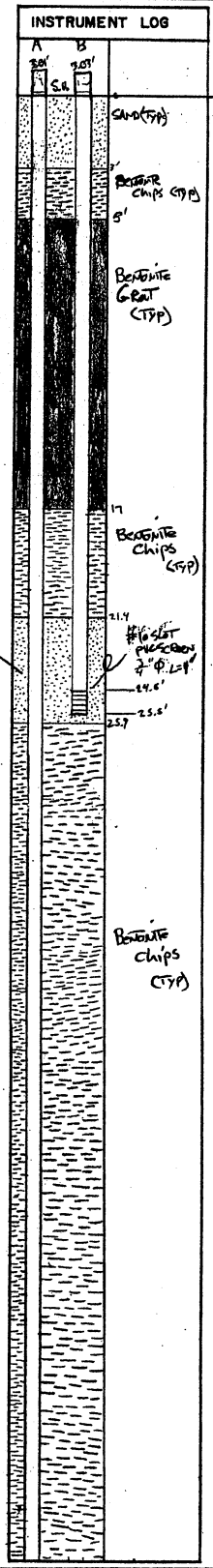
SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Washed ahead from 4.0' to 7.0';
Artesian Pressure @ 25.0'

HOLE NO. P-04-03

PROJECT West Old Town Landfill Extension	JOB NO. 03076.09	BORING NO. P-04-07	Piezometers A&B
DATE COMPLETED 7/29/04	DATE WELLS INSTALLED 7/28/04	DRILLING METHOD Wash-Rotary	
GROUND SURFACE ELEVATION (FT) 174.1'	DRILLING CONTRACTOR M.T.B	LOGGED BY T. Riley / JLS	
BOREHOLE DIAMETER (IN) 4.5" O.D. / 3.5" O.D. in Rock	ROCK CORE DIAMETER (IN.) 2"	SHEET 1 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% Passing #200 Screen	Water Content %
0	1D	Gray Brown Fine Sandy Silt Mottled Silty Fine Sand with little Coarse Sand and Gravel	29		60.2%	11.6%
	2D	MOTTLED BROWN SILT 4' ... Increased Gravel Content (Basalt)	64			
5	3D	Olive Silty Fine Sand w/ little Coarse Sand & Gravel	50/0.3'		60%	11.4%
		Roller Cone. - No Sample.				
10	1R			100%		
	2R	DARK GRAY PHYLLITE AND GRAY SILTSTONE		100%		
15		... WX				
20	3R			88%		
	4R	... FRACTURE ZONE 25.5'		20%		
25	5R	GRAY META-GRAY WACKE		100%		
30	6R			86%		
35	7R	... OCCASIONAL PHYLLITE LAYERS		90%		
40	8R			93%		
45	9R			87%		
50	10R	... WX ZONE		90%		
55	11R			67%		
60		(Bedrock)				



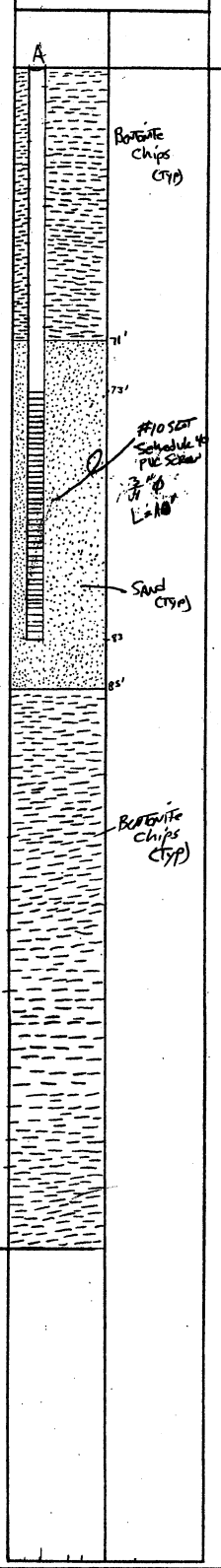
NOTES

SEVEE & MAHER ENGINEERS

PROJECT West Old Town Landfill Extension	JOB NO. 03076.09	BORING NO. P-04-07	
DATE COMPLETED 7/29/04	DATE WELLS INSTALLED 7/28/04	DRILLING METHOD Wash-Rotary	
GROUND SURFACE ELEVATION (FT) 174.1'	DRILLING CONTRACTOR M.E.B.	LOGGED BY T. Riley / JES	
BOREHOLE DIAMETER (IN) 4.5" O.D. / 3.5" O.D. in Rock	ROCK CORE DIAMETER (IN.) 2"	SHEET 2 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	RQD
60			
65	12R	METAGRAY-WACKE WITH PHYLLITE INTERBEDDING	82%
	13R		100%
70	14R		100%
75	15R		75%
80	16R		78%
85	17R		96%
90	18R		100%
95	19R		100%
100	20R		100%
105	21R		100%
		107.5' (Bedrock) B.O.E.	

INSTRUMENT LOG



DEPTH (FT)
60
65
70
75
80
85
90
95
100
105

NOTES

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. P-04-07 ~~P-04-07~~
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-A	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 07/28/04 Start	DATE 07/28/04 Finish
TYPE	HW			SURFACE ELEVATION	
SIZE I.D.	4"				
HAMMER WT.	300#				
HAMMER FALL	16"				

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												Same as P-04-03
"												
"											4.5	
											5.5	Rock
												Bottom of Boring @ 5.5'
												Piezometer Installed @ 5.3'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R =ROCK CORE
V = VANE TEST

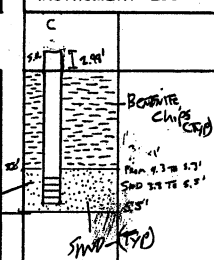
SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Augered from surface to 5.0';
Put down casing,
Rollerconed & Washed ahead from 5.0' to 5.5',
Installed Piezometer

HOLE NO. P-04-07

PROJECT West Old Town Landfill Expansion	JOB NO. 03076.09	BORING NO. P-04-07C
DATE COMPLETED 7/24/04	DATE WELLS INSTALLED 7/28/04	DRILLING METHOD Auger
GROUND SURFACE ELEVATION (FT) 174.0'	DRILLING CONTRACTOR M.T.B.	LOGGED BY T. Riley / JGS
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) N/A:	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION						INSTRUMENT LOG	DEPTH (FT)
0		See Log P-04-07 for stratigraphy.							0
5		5.5' (BASAL Till) B.O.E					#10 slot Schedule 40 PVC screen 3/4 φ L=1'		5
10									10



NOTES

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 2 HOLE NO. P-04-08
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-A	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 07/29/04 Start	DATE 08/02/04 Finish
TYPE	HW	SS	HQ	SURFACE ELEVATIO	
SIZE I.D.	4"	1 3/8"	2.5"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.2	Topsoil
"	1D	2"	24"		2.0	4	6	7	9			Brown Silty F/M Sand,
"											2.0	w/Little Coarse Sand & Gravel
"	2D	2"	16"		3.3	12	65	50				
88												Olive Silty Fine Sand,
12	3D	2"	24"		6.0	15	23	27	35			w/Little M/C Sand,
20	4D	2"	11"		6.9	27	50				7.0	w/Trace of Gravel
48												
17	5D	2"	5"		8.4	50						
27												
35	6D	2"	8"		10.7	34	50					
32												
32												
33	7D	2"	24"		14.0	26	28	52	55			Olive Silty F/M Sand,
85												w/Some Coarse Sand & Gravel,
27	8D	2"	24"		16.0	22	40	40	38			w/Little Cobbles
30												
30	9D	2"	14"		17.2	25	52	50				
24												
35	10D	2"	19"		19.6	28	43	45	50		19.6	
68											20.4	Cobble
90	11D	2"	11"		21.4	30	50					
92												
48	12D	2"	20"		23.7	27	48	61	50			Olive Silty F/M Sand,
55												w/Some Coarse Sandy Gravel,
40	13D	2"	6"		25.5	105					25.5	w/Little Cobbles
43	14D	2"	7"		26.6	65	50					
40											28.0	Brown Fine Sandy Silt w/Little Gravel
51												
88	D	2"	1"	0"	29.1	50					30.0	Brown Fine Sandy Silt w/Some Gravel & Cobbles
52												
32	1R	3.78"	2.0'	1.0'	32.0	50.%						
60	D	2"	0"	0"	32.0	25						
55	16D	2"	7"		33.6	70	50					
60												Olive Sandy Silt
	17D	2"	6"		35.5	110						w/Some Gravel & Cobbles,
												w/Trace of Clay
	18D	2"	4"		37.3	100						
	D	2"	5"	0"	39.4	100						

SAMPLES
D = SPLIT SPOON R = ROCK
C = 2" SHELBY TUBE CORE
S = 3" SHELBY TUBE V = VANE
U = 3¼" SHELBY TUBE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Washed ahead from 4.0' to 41.0';
Lost spoon shoe @ 41.2'

HOLE NO. P-04-08

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 2 HOLE NO. P-04-08
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-A	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 07/29/04 Start	DATE 08/02/04 Finish
TYPE	HW	SS	HQ	SURFACE ELEVATIO	
SIZE I.D.	4"	1 3/8"	2.5"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
												Olive Sandy Silt w/Some Gravel & Cobbles
	19D	2"	2"		41.2	100					41.2	w/Trace of Clay
												Bottom of Boring @ 41.2'
												Piezometer Installed @ 39.5'
												Piezometer Installed @ 16.5'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R =ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

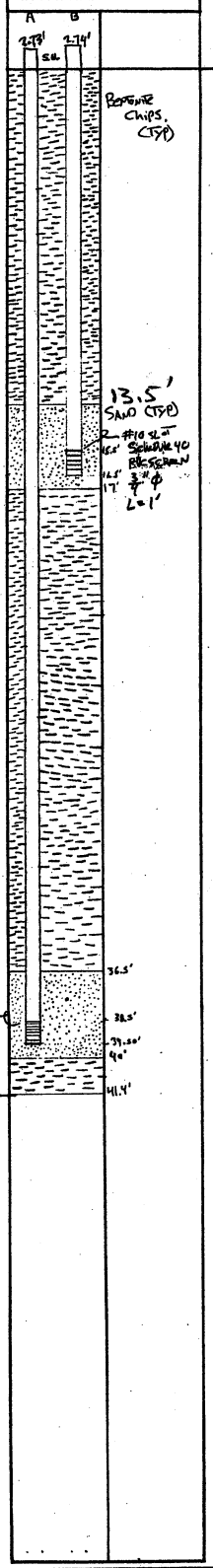
REMARKS:
Washed ahead from 4.0' to 41.0';
Lost spoon shoe @ 41.2'

HOLE NO. P-04-08

PROJECT West Oldtown Landfill Extension	JOB NO. 03076.09	BORING NO. P-04-08	
DATE COMPLETED 8/2/04	DATE WELLS INSTALLED 8/2/04	DRILLING METHOD WASH-ROTARY	
GROUND SURFACE ELEVATION (FT) 188.8'	DRILLING CONTRACTOR M.T.B	LOGGED BY T. Riley / JES	
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	% Passing #200 Screen	Water Content %
0	1D	0-0.2 TOPSOIL Brown Silty Fine Sand w/ Little Coarse Sand and Gravel	16		
	2D	2'	50/0.3'		
		Olive Silt/Fine Sand w/ Little Medium to Coarse Sand, Trace of Cobbles.		63.7%	13.3%
5	3D		62		
	4D	6.5'	54/0.4'		
	5D		50/0.4'		
10	6D	....Increased Gravel and Cobbles	50/0.2'		
	7D		107		
15	8D		78		
	9D		50/0.3'		
	10D	19.8'	50/0.1'		
20		Coarse Boulder			
	11D		50/0.4'		
	12D	Olive Silt w/ Fine to Medium Sand w/ some Coarse Sand, and Gravel. Little Cobble.	50/0.2'	60.1%	13.0%
25	13D	25.5'	105/0.5'	61.1%	14.3%
	14D		50/0.1'		
		BROWN FINE SANDY SILT/CLAY			
			NA		
30		30'			
		CLAYEY Olive Sandy Silt w/ Some Gravel and Cobbles			
	16D		50/0.1'		
35	17D	— Dense —	110/0.5'		
			100/0.3'		
40		41.4 (BASAL TILL) B.O.E			
45					

INSTRUMENT LOG



NOTES

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SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 2 HOLE NO. P-04-09
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-A	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 08/02/04 Start	DATE 08/03/04 Finish
TYPE	HW	SS	NQ2	SURFACE ELEVATIC	
SIZE I.D.	4"	1 3/8"	2"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.3	Topsoil
"	1D	2"	24"		2.0	1	2	2	10			
"												
"	2D	2"	24"		4.0	14	35	33	40			
25												
3	3D	2"	24"		6.0	12	17	23	28			
5												
9	4D	2"	17"		7.4	29	45	50				
17												Olive Silty Fine Sand,
22	5D	2"	24"		10.0	21	30	51	48			w/Little Coarse Sand & Gravel,
2												w/Trace of Cobbles
7	6D	2"	24"		12.0	17	34	47	40			
27												
52	7D	2"	24"		14.0	21	28	29	37			
135												
14	8D	2"	17"		15.4	25	33	50				
16												
14	9D	2"	20"		17.7	14	18	33	50		18.0	
20	10D	2"	11"		18.9	22	50				18.9	Gray Fine Sandy Silt w/Trace of Gravel
50											19.9	Boulder
Spun	11D	2"	10"		20.8	30	50					
Casing												
"	12D	2"	11"		22.9	35	50					Gray Fine Sandy Silt w/Some Gravel & Cobbles
"												
"											25.0	
"	13D	2"	8"		25.7	35	50					
"												
"												Gray Silty Very Fine Sand
"	14D	2"	6"		28.5	125						w/Little M/C Sand,
"												Some Gravel & Cobbles
"	D	2"	2"	0"	30.2	50						
"	15D	2"	7"		31.6	55	50				31.6	
	1R	3"	3.0'	3.0'	35.1	100%						Rock
	2R	3"	4.9'	4.9'	40.0	100%						

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
4" Casing refusal @ 19.2', Boulder from 18.9' to 19.9', Went open hole to 25.0', some cave in, Changed over to 3" casing & spun 3" casing to 28.0', pulled 4" casing out

HOLE NO. P-04-09

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 2 HOLE NO. P-04-09
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-A	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 08/02/04 Start	DATE 08/03/04 Finish
TYPE	HW	SS	NQ2		
SIZE I.D.	4"	1 3/8"	2"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"		SURFACE ELEVATION	

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	3R	3"	5.0'	5.0'	45.0	100%						Rock
	R	3"	2.0'	0.0'	47.0	0%	Very	Hard	Rock		47.0	
												Bottom of Boring @ 47.0'
												Piezometer Installed @ 39.0'
												Piezometer Installed @ 15.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

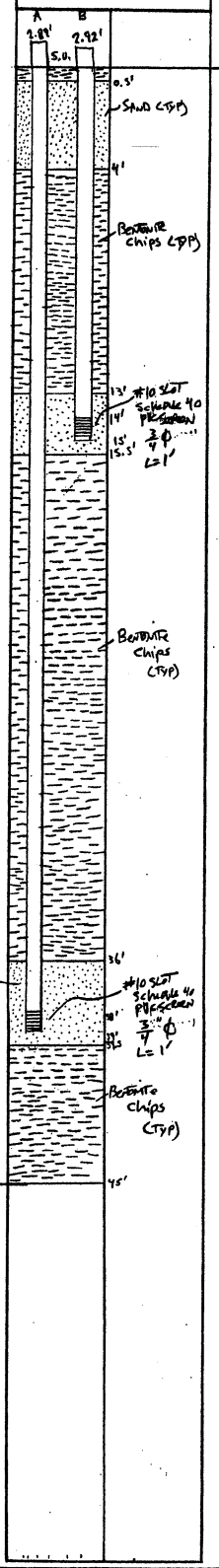
REMARKS:
4" Casing refusal @ 19.2', Boulder from 18.9' to 19.9', Went open hole to 25.0', some cave in, Changed over to 3" casing & spun 3" casing to 28.0', pulled 4" casing out

HOLE NO. P-04-09

PROJECT WEST OLDTOWN LANDFILL EXPANSION	JOB NO. 03016.09	BORING NO. P-04-09	
DATE COMPLETED 8/5/04	DATE WELLS INSTALLED 8/5/04	DRILLING METHOD WASH-ROTARY	
GROUND SURFACE ELEVATION (FT) 167.0'	DRILLING CONTRACTOR M.T.B	LOGGED BY T. RILEY / JES	
BOREHOLE DIAMETER (IN) 4.5" O.D. / 3.5" O.D. IN ROCK.	ROCK CORE DIAMETER (IN.) 2"	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% PASSING #200 SCREEN	WATER CONTENT %
0		0-0.5' TOPSOIL				
	1D		12			
	2D		73			
5	3D	OLIVE SILTY FINE SAND WITH LITTLE GRAVEL, COARSE SAND AND A TRACE OF COBBLES.	51		51.4%	11.4%
	4D		50/0.4'			
	5D		99			
10	6D		87			
	7D		66			
15	8D		50/0.4'			
	9D		50/0.2'			
	10D	19'	50/0.4'			
20		20' BOULDER				
	11D	GRAY FINE SANDY SILT / CLAY WITH SOME GRAVEL AND COBBLES	50/0.3'			
	12D		50/0.4'			
25	13D	VERY GRAY SILTY VERY FINE SAND W/ LITTLE MEDIUM TO COARSE SAND AND SOME GRAVEL AND COBBLES	50/0.2'			
	14D		125/2.5"		46.9%	13.0%
30	15D	31.6' (BASAL TILL)	56/0.1'			
	1R	INTACT BEDDED PHYLLITE, SILTSTONE, METAGRAY WACKE		50%		
35	2R			50%		
40	3R	META-GRAY WACKE		100%		
45		45' (BEDROCK) B.O.E.				
50						
55						
60						

INSTRUMENT LOG



K_F = 9.7 x 10^-6 cm/s

NOTES

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SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. P-04-10
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-A	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 08/05/04 Start	DATE 08/05/04 Finish
TYPE	HW	SS	HQ		
SIZE I.D.	4"	1 3/8"	2.5"		
HAMMER WT.	300#	140#		SURFACE ELEVATI	
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.2	Topsoil
"	1D	2"	24"		2.0	2	2	3	4		0.5	Gray Silty F/M Sand w/Little Gravel
"												Mottled Silty Fine Sand,
"	2D	2"	19"		3.6	33	40	46	50		2.0	w/Little M/C Sand & Gravel
28												
4	3D	2"	24"		6.0	16	16	28	40			
7												Brown Silty Fine Sand,
11												w/Little M/C Sand & Gravel,
19	4D	2"	18"		8.5	19	53	65				w/Trace of Cobbles
40											9.7	
Wash												
Ahead												
	1R	3.78"	5.0'	5.0'	15.7	100%						
	2R	3.78"	5.0'	5.0'	20.7	100%						Rock
	3R	3.78"	5.0'	5.0'	25.7	100%						
	4R	3"	4.3'	4.0'	30.0	93%						
	5R	3"	5.0'	5.0'	35.0	100%					35.0	
												Bottom of Boring @ 35.0'
												Piezometer Installed @ 34.1'
												Piezometer Installed @ 9.2'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

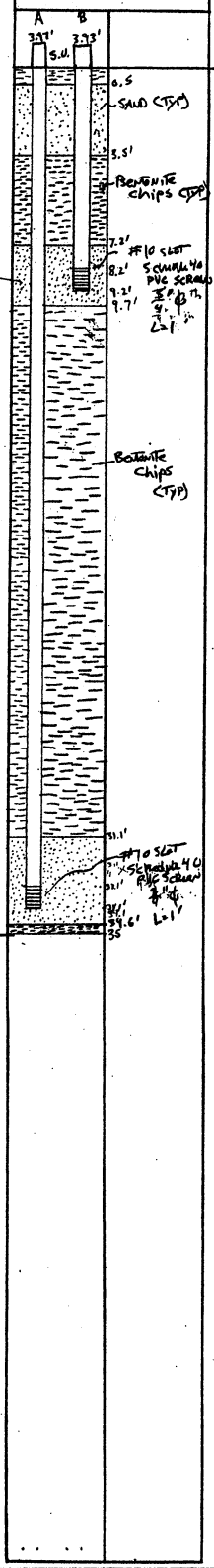
REMARKS:
Switched from HW casing to NW casing at 9.7';
Washed ahead from 5.0' to 7.0' and from 9.7' to 10.7';
Sample 3D was moist;
Water @ 5.9'

HOLE NO. P-04-10

PROJECT West Old Town Landfill Extension	JOB NO. 03076.09	BORING NO. P-04-10	
DATE COMPLETED 8/6/04	DATE WELLS INSTALLED 8/5/04	DRILLING METHOD WASH ROTARY	
GROUND SURFACE ELEVATION (FT) 166.0'	DRILLING CONTRACTOR M.T.B	LOGGED BY T. Riley / JES	
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.5"	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% PASSING #200 SCREEN	WATER CONTENT %	
0	1D	0-0.2' TOPSOIL 0.2-0.5' GRAY SILTY FINE SAND W/ GRAVEL 0.5-2' MOTTLED SILTY FINE SAND W/ LITTLE MEDIUM TO COURSE SAND AND GRAVEL 2'-9.7'	7				
	2D	VERY TO CLAYEY BROWN SILTY FINE SAND WITH LITTLE MEDIUM TO COURSE SAND AND GRAVEL WITH A TRACE OF COBBLES.	50/0.1'		57%	12.9%	
5	3D	NOTED MOIST SAMPLE AT 5.9'	68				KF: 5.1×10^{-5} cm/s
	4D						
	5D	9.7' (BASAL TILL)	118		42.3%	13.2%	
10	1R	INTERBEDDED PHYLLITE, SILTSTONE AND METAGRAYWACKE		80%			
15	2R	METAGRAYWACKE		94%			
20	3R			100%			
25	4R			94%			
30	5R			94%			KF: 1.4×10^{-3} cm/s
35		35' (Bedrock.) B.O.E					

INSTRUMENT LOG



NOTES

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SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 2 HOLE NO. P-04-11
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-B	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
09/08/04 7:15am Water @ 1.2', Hole Depth=10.9';
09/09/04 7:30am Water @ 3.8', Hole depth= 39.5'

	CASING	SAMPLER	CORE BARREL	DATE 09/07/04 Start	DATE 09/09/04 Finish
TYPE	HW	SS	HQ		
SIZE I.D.	4"	1 3/8"	2.5"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"		SURFACE ELEVATION	

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING
Auger										
"	1D	2"	24"		2.0	1	3	2	2	
"										
"	2D	2"	17"		3.4	6	27	50		
62										
15	3D	2"	14"		5.2	28	70	50		
28										
34	4D	2"	17"		7.4	35	60	50		
25	5D	2"	2"		8.2	50				
52										
15	6D	2"	23"		10.9	38	40	52	50	
18										
23										
27	7D	2"	24"		14.0	20	45	45	52	
30	D	2"	0"	0"	14.0	25				
29	8D	2"	10"		15.8	38	50			
40										
31										
92	9D	2"	8"		18.7	30	50			
54										
25										
22	10D	2"	23"		21.9	24	47	58	50	
25										
25	11D	2"	24"		24.0	20	40	53	46	
18										
17	12D	2"	24"		26.0	20	35	35	40	
18										
29	13D	2"	22"		27.8	22	48	68	50	
78										
122	14D	2"	16"		29.3	38	42	50		
53										
45	15D	2"	12"		32.0	32	70			
48	D	2"	0"	0"	33.0	25				
105										
190	16D	2"	6"		34.5	75				
68										
45	17D	2"	6"		36.5	80				
165										
25										
58	18D	2"	6"		39.5	85				

DEPTH	STRATUM DESCRIPTION
0.2	Topsoil
2.0	Brown Fine Sandy Silt
5.2	Brown Silty F/M Sand, w/Little Coarse Sand, w/Trace of Gravel
14.0	Brown Silty F/M Sand, w/Some Coarse Sand & Gravel, w/Trace of Cobbles
20.5	Brown Silty F/M Sand, w/Some Coarse Sand, Gravel & Cobbles, w/Trace of Clay
22.0	Brown Silty F/M Sand, w/Little Coarse Sand, Gravel & Cobbles
28.0	Brown Silty Fine Sand, w/Fine Sandy Silt & F/M Sand Layers
29.0	Brown Silty Fine Sand w/Little Gravel
36.0	Brown Silty Gravelly Sand w/Some Cobbles
	Olive Silty Cobbley Gravelly Sand

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Washed ahead from 5.0' to 28.0' and from 30.0' to 50.0'

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 2 HOLE NO. P-04-11
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-B	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
09/08/04 7:15am Water @ 1.2', Hole Depth=10.9';
09/09/04 7:30am Water @ 3.8', Hole depth= 39.5'

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	HQ
SIZE I.D.	4"	1 3/8"	2.5"
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 09/07/04 Start
DATE 09/09/04 Finish
SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
35												
45	19D	2"	12"		41.5	40	78					
80												
60	20D	2"	6"		43.5	110						
80												
40	D	2"	24"	0"	45.2	100						Olive Silty Cobbley Gravelly Sand
58	22D	2"	7"		46.6	60	50					
80												
42	23D	2"	6"		48.5	85						
45												
	24D	2"	6"		50.5	90/					50.5	
												Bottom of Boring @ 50.5'
												Caved @ 50.0'
												Piezometer Installed @ 49.5'
												Piezometer Installed @ 10.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R =ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

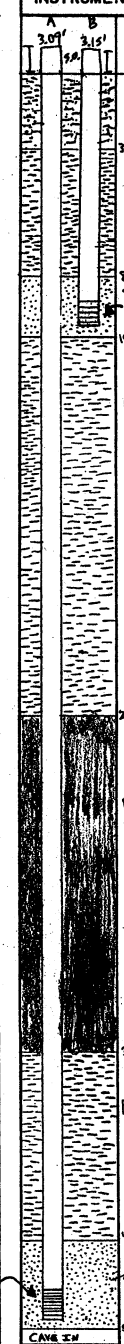
REMARKS:
Washed ahead from 5.0' to 28.0' and from 30.0' to 50.0'

HOLE NO. P-04-11

PROJECT West Oldtown Landfill Expansion	JOB NO. 0307609	BORING NO. P-04-11	Pezometers A+B
DATE COMPLETED 9/14/04	DATE WELLS INSTALLED 9/9/04	DRILLING METHOD Wash-Rotary	
GROUND SURFACE ELEVATION (FT) 184.0'	DRILLING CONTRACTOR M.T.B	LOGGED BY T. Riley / JES	
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	% Passing #200 Screen	Water Content %		
0	1D	0-0.2' Topsoil; Brown Sandy Silt	4				
	2D	2' Brown Silt / Clay w/ Little Coarse Sand and a Trace of Gravel.	50/0.4'				
5	[illegible]		50/0.2'	55.1%	13.2%		
	4D		50/0.4'				
	[illegible]		50/0.2'				
10	6D		50/0.4'				
	7D		97				
15	8D		50/0.3'				
	9D	... Becoming Clayey	50/0.2'				
20	10D	22'	50/0.4'				
	11D	Brown Silt / Clay w/ Fine Sandy Silt and Fine to Medium Sand Layers.	99				
25	12D		75	50.3%	20.6%		
	13D		50/0.3'				
	14D	29'	50/0.3'				
30	15D	Brown Silt gravely Sand with some Cobbles	102				
	16D		75/0.5'				
35	17D	36'	80/0.5'				
	18D	Very to Clayey Olive Silty Cobbley Gravely Sand.	85/0.6'				
40	19D		118	32.9%	10.4%		
	20D		110/0.5'				
45	21D		100/0.2'				
	22D		50/0.1'				
	23D		85/0.5'				
50	24D	50.5' (Basal Till) B.O.E.	90/0.5'				
55							
60							

INSTRUMENT LOG



Bentonite Chips & Sand (Typ) 0-3'

Bentonite Chips (Typ) 3'-8'

Sand 8'-10.5'

#10 Slot Schedule 40 PVC Screen 3/4" Φ L=1'

Bentonite Chips (Typ)

Bentonite Grout (Typ)

Bentonite Chips (Typ)

Sand (Typ)

#10 Slot Schedule 40 PVC Screen 3/4" Φ L=1'

NOTES

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 4 HOLE NO. P-04-12
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-B	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
09/13/04 8:30am Water @ 0.9', Hole depth= 10.9'

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	NQ2
SIZE I.D.	4"	1 3/8"	2"
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 09/10/04 Start
DATE 09/21/04 Finish
SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.2	Topsoil
"	1D	2"	24"		2.0	1	4	17	21			
"											2.5	Mottled Fine Sandy Silt
"	2D	2"	14"		3.2	18	28	50				
12*												Mottled Silty Sandy Silt
46	3D	2"	18"		6.0	8	16	25			6.0	w/Trace of Gravel & Clay
49												
65	4D	2"	16"		7.3	12	32	75				Brown Silty Fine Sand,
107												w/Little Coarse Sand & Gravel
160	5D	2"	14"		9.7	55	62	50			10.0	w/Trace of Cobbles
35	6D	2"	11"		10.9	32	75					
70												Olive Clayey Silty F/M Sand,
48											13.1	w/Little Coarse Sand & Gravel & Cobbles
75	7D	2"	13"		13.1	35	37	50			14.4	Boulder
Spun											14.7	Olive Clayey Gravelly Sand w/Some Cobbles
Casing	1R	3"	1.0'	0.7'	16.0	70%					15.7	Boulder
"	8D	2"	12"		17.0	35	80					
"											18.0	Olive Clayey Gravelly Sand w/Some Cobbles
"												
"												Gray Clayey Silty Fine Sand,
"	9D	2"	14"		20.2	29	47	50			20.2	w/Coarse Sand & Gravel, w/Trace of Cobbles
	2R	3"	1.8'	1.8'	22.8	100%						
	3R	3"	5.0'	5.0'	27.8	100%						
												Rock
	4R	3"	4.4'	3.1'	32.2	70.5%						
	5R	3"	4.3'	4.0'	37.0	93%						

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
12* for 6"
Washed ahead from 10.0' to 15.0'

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 4 HOLE NO. P-04-12
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-B	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
09/13/04 8:30am Water @ 0.9', Hole depth= 10.9'

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	NQ2
SIZE I.D.	4"	1 3/8"	2"
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 09/10/04 Start | DATE 09/21/04 Finish

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	6R	3"	4.1'	4.5'	40.6	110%						
	7R	3"	5.0'	5.0'	45.6	100%						
	8R	3"	5.0'	5.3'	50.6	106%						
	9R	3"	5.0'	5.0'	55.6	100%						
	10R	3"	5.0'	5.0'	60.6	100%						Rock
	11R	3"	2.4'	2.3'	63.0	96%						
	12R	3"	1.0'	0.8'	64.0	80%						
	13R	3"	4.0'	4.2'	68.0	105%						
	14R	3"	5.0'	4.8'	73.0	96%						
	15R	3"	5.0'	5.2'	78.0	104%						

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
12" for 6"
Washed ahead from 10.0' to 15.0'

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 3 OF 4 HOLE NO. P-04-12
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-B	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
09/13/04 8:30am Water @ 0.9', Hole depth= 10.9'

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	NQ2
SIZE I.D.	4"	1 3/8"	2"
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 09/10/04 Start
DATE 09/21/04 Finish
SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	16R	3"	5.0'	5.0'	83.0	100%						
	17R	3"	5.0'	5.0'	88.0	100%						
	18R	3"	5.0'	5.0'	93.0	100%						
	19R	3"	5.0'	5.0'	98.0	100%						Rock
	20R	3"	5.0'	5.0'	103.0	100%						
	21R	3"	5.0'	5.0'	108.0	100%						
	22R	3"	5.0'	5.0'	113.0	100%						
	23R	3"	5.0'	4.9'	118.0	98%						

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
12" for 6"
Washed ahead from 10.0' to 15.0'

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 4 OF 4 HOLE NO. P-04-12
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-B	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
09/13/04 8:30am Water @ 0.9', Hole depth= 10.9'

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	NQ2
SIZE I.D.	4"	1 3/8"	2"
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 09/10/04 Start
DATE 09/21/04 Finish
SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	24R	3"	4.0'	4.0'	122.0	100%					122.0	Rock
												Bottom of Boring @ 122.0'
												Piezometer Installed @ 64.0'
												Piezometer Installed @ 39.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

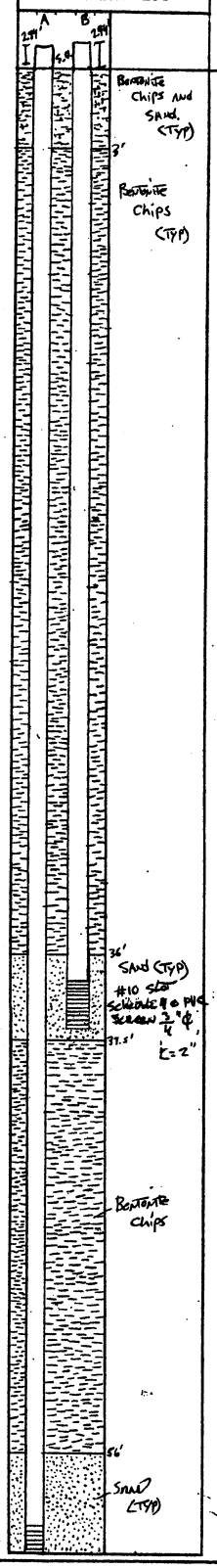
REMARKS:
12" for 6"
Washed ahead from 10.0' to 15.0'

HOLE NO. P-04-12

PROJECT West Old Town Landfill Expansion	JOB NO. 0307609	BORING NO. P-04-12	Piezometers A+B
DATE COMPLETED 9/22/04	DATE WELLS INSTALLED 9/21/04	DRILLING METHOD (WASH-ROTARY)	
GROUND SURFACE ELEVATION (FT) 166.33	DRILLING CONTRACTOR MTB	LOGGED BY T. Riley / JTS	
BOREHOLE DIAMETER (IN) 4.5" / 3.5" in Rock (O.D.)	ROCK CORE DIAMETER (IN.) 2"	SHEET 1 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% Passing #200 Screen	Water Content %
0	1D	0-0.2' TOP SOIL MOTTLED FINE SANDY SILT	38			
	2D	3'	50 for 0.2'			
	3D	(MARINE CLAY) 6' BECOMING CLAYEY	41			
5	4D	VERY BROWN SILTY FINE SAND WITH LITTLE COARSE SAND AND GRAVEL, TRACE OF COBBLES.	75 for 0.3'		~~54.6%~~ 59.6%	~~13.3%~~ 13.3%
	5D		50 for 0.2'			
10	6D		75 for 0.4'			
	7D	11'	50 for 1'			
		Boulder 13.1' to 14.4'				
15	1R	15' Bedrock				
	8D	DARK CLAYEY GREENISH SAND WITH SOME COBBLES.	115		38.4% 53.5%	10.9% 10.3%
		18'				
	9D	GRAY CLAYEY SILTY FINE SAND W/ COARSE SAND, GRAVEL AND A TRACE OF COBBLES. (BASAL TILL)	50/0.2'			
20		20.2' Refusal - no sample.				
	2R	INTERBEDDED PHYLLITE, SILTSTONE		100%		
25	3R			96%		
30	4R			68%		
35	5R			73%		
	6R			93%		
40	7R			100%		
45	8R			72%		
50	9R			94%		
55	10R			82%		
60						

INSTRUMENT LOG



DEPTH (FT)

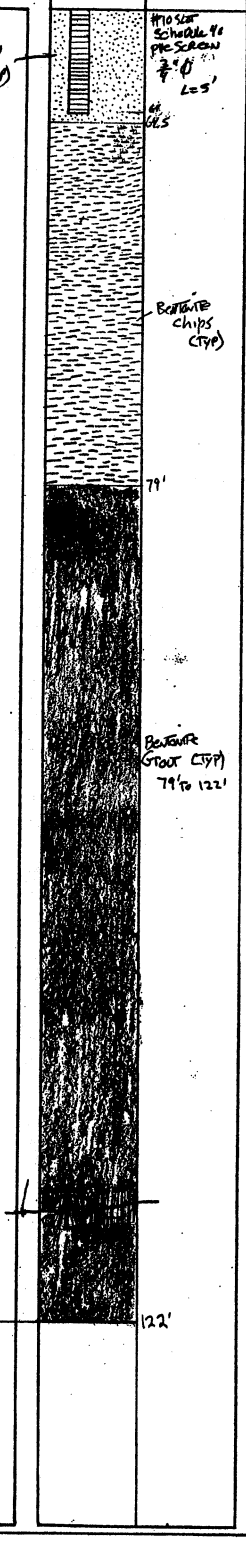
NOTES

SEVEE & MAHER ENGINEERS

PROJECT West Old Town Landfill Expansion	JOB NO. 03076.09	BORING NO. P-04-12	
DATE COMPLETED 9/22/04	DATE WELLS INSTALLED 9/21/04	DRILLING METHOD Wash-Rotary	
GROUND SURFACE ELEVATION (FT) 166.3'	DRILLING CONTRACTOR MTB	LOGGED BY T. Riley	
BOREHOLE DIAMETER (IN) 4.5"/3.5" in Rock (O.D.)	ROCK CORE DIAMETER (IN.) 2"	SHEET 2 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	RQD
60			
65	10R ↑		
	11R	63' GOUGE, POSSIBLE FAULT ZONE	85%
	12R	SILTSTONE WITH	0%
	13R	PHYLLITE LAYERS	100%
70	14R		100%
75	15R		100%
80	16R		100%
85	17R		100%
90	18R		94%
95	19R		100%
100	20R		100%
105		21R - 103' To 108'	100%
		22R 108' To 113'	100%
120		23R 113 To 118'	100%
		24R 118 To 122'	100%
125		122' B.B.E (Bedrock)	

INSTRUMENT LOG



DEPTH (FT)
60
65
70
75
80
85
90
95
100

NOTES

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. P-04-12-C
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-B	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 09/21/04 Start	DATE 09/21/04 Finish
TYPE	SSA				
SIZE I.D.					
HAMMER WT.				SURFACE ELEVATION	
HAMMER FALL					

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												
"												Same as P-04-12
"												
											6.0	
												Bottom of Boring @ 6.0'
												Piezometer Installed @ 5.3'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

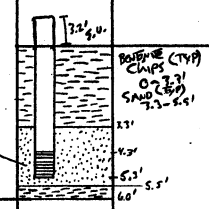
SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
No Samples Taken

HOLE NO. P-04-12-C

PROJECT West Old Town Landfill Extension	JOB NO. 03076.09	BORING NO. P-04-12C Piezometer C.
DATE COMPLETED 9/22/04	DATE WELLS INSTALLED 9/21/04	DRILLING METHOD Auger
GROUND SURFACE ELEVATION (FT) 166.3'	DRILLING CONTRACTOR M.T.B.	LOGGED BY T. Riley / JGS
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.)	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION						INSTRUMENT LOG	DEPTH (FT)
0									0
5		see P-04-112 for soil description (MARINE CLAY) 6' B.O.E.					#10 Slot Schedule 40 PVC Screen 3/4" ϕ 2=1'		5
10									10



NOTES

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

Sevee & Maher Engineering, Inc.

SHEET 1 OF 4

HOLE NO. P-04-13

DRILLER: Tom Schaefer	PROJECT NAME: West Old Town Landfill, 03076.09	LINE & STATION:
M.T.B. JOB NUMBER: 04-095-B	LOCATION: Old Town, ME	OFFSET:

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 09/22/04 Start	DATE 09/27/04 Finish
TYPE	HW	SS	NQ2	SURFACE ELEVATION	
SIZE I.D.	4"	1 3/8"	2"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.2	Topsoil
"	1D	2"	24"		2.0	1	3	4	6		2.5	Mottled Fine Sandy Silt
"	2D	2"	24"		4.0	8	15	22	24		7.0	Mottled Clayey Sandy Silt
"	3D	2"	24"		6.0	9	11	15	16		10.0	Gray Clayey Silt
"	4D	2"	24"		8.0	6	8	8	8		12.4	Gray Silty Clay, w/Gray Fine Sandy Silt Layers
6	5D	2"	24"		10.0	3	3	3	4		14.0	Gray Silty Fine Sand, w/Little Coarse Sand, Gravel & Cobbles
9	6D	2"	24"		12.0	WOH	WOH	WOH	2			
19	7D	2"	24"		14.0	1	30	28	35			
12	8D	2"	24"		16.0	18	18	20	20			
45	9D	2"	24"		19.0	8	14	17	12			
37	10D	2"	24"		22.0	15	15	19	32			
68	11D	2"	24"		24.0	24	33	43	55			
27	12D	2"	24"		26.0	16	19	23	25			
27	13D	2"	13"		27.1	30	24	50			27.1	Gray Clayey Silty F/M Sand, w/Some Coarse Sand, Gravel & Cobbles
	1R	3"	4.3'	4.1'	31.5	95%						Rock
	2R	3"	5.0'	4.5'	36.5	90.%						

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3¼" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Sevee & Maher Engineering, Inc.

SHEET 2 OF 4

HOLE NO. P-04-13

DRILLER: Tom Schaefer	PROJECT NAME: West Old Town Landfill, 03076.09	LINE & STATION:
M.T.B. JOB NUMBER: 04-095-B	LOCATION: Old Town, ME	OFFSET:

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 09/22/04 Start	DATE 09/27/04 Finish
TYPE	HW	SS	NQ2		
SIZE I.D.	4"	1 3/8"	2"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"		SURFACE ELEVATIO	

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	3R	3"	4.6'	4.5'	41.1	97.8%						
	4R	3"	4.3'	5.1'	45.4	118.6%						
	5R	3"	2.0'	2.0'	47.4	100%						
	6R	3"	5.0'	5.0'	52.4	100%						
	7R	3"	5.0'	5.0'	57.4	100%						Rock
	8R	3"	5.0'	4.2'	62.4	84.%						
	9R	3"	4.3'	5.1'	66.7	118.6%						
	10R	3"	5.0'	4.6'	71.7	92%						
	11R	3"	4.9'	5.0'	76.6	102%						

SAMPLES
D = SPLIT SPOON R = ROCK CORE
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE V = VANE TEST
U = 3/4" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. P-04-13

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	Sevee & Maher Engineering, Inc.	SHEET 3 OF 4 HOLE NO. P-04-13
DRILLER: Tom Schaefer	PROJECT NAME: West Old Town Landfill, 03076.09	LINE & STATION:
M.T.B. JOB NUMBER: 04-095-B	LOCATION: Old Town, ME	OFFSET:

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	NQ2
SIZE I.D.	4"	1 3/8"	2"
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 09/22/04 Start; DATE 09/27/04 Finish

SURFACE ELEVATIOI

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	12R	3"	5.0'	5.0'	81.6	100%						
	13R	3"	5.0'	5.3'	87.0	106%						
	14R	3"	5.0'	4.1'	91.6	82.%						
	15R	3"	2.0'	1.9'	93.6	95%						
	16R	3"	4.7'	4.7'	98.3	100%						Rock
	17R	3"	5.0'	5.0'	103.3	100%						
	18R	3"	5.0'	5.0'	108.3	100%						
	19R	3"	5.0'	5.0'	113.3	100%						
	20R	3"	5.0'	5.0'	118.3	100%						

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Sevee & Maher Engineering, Inc.

SHEET 4 OF 4

HOLE NO. P-04-13

DRILLER: Tom Schaefer	PROJECT NAME: West Old Town Landfill, 03076.09	LINE & STATION:
M.T.B. JOB NUMBER: 04-095-B	LOCATION: Old Town, ME	OFFSET:

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 09/22/04 Start	DATE 09/27/04 Finish
TYPE	HW	SS	NQ2		
SIZE I.D.	4"	1 3/8"	2"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	PID READING	DEPTH	STRATUM DESCRIPTION
	21R	3"	5.0'	5.0'	123.3	100%						Rock
	22R	3"	5.0'	5.0'	128.3	100%					128.3	

Bottom of Boring @ 128.3'
Piezometer Installed @ 127.3'
Piezometer Installed @ 66.0'

SAMPLES
D = SPLIT SPOON R = ROCK CORE
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE V = VANE TEST
U = 3¼" SHELBY TUBE

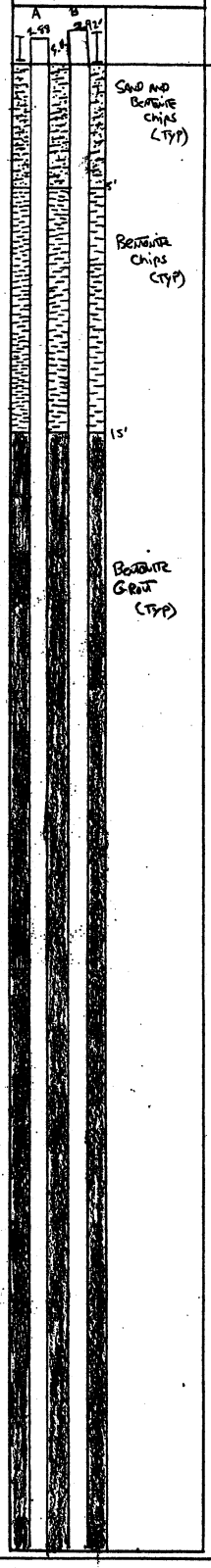
SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

PROJECT West Old Town Landfill Expansion	JOB NO. 03076.09	BORING NO. P-04-13	Piezometers A & B
DATE COMPLETED 9/29/04	DATE WELLS INSTALLED 9/29/04	DRILLING METHOD Wash-Rotary	
GROUND SURFACE ELEVATION (FT) 144.4'	DRILLING CONTRACTOR MTB	LOGGED BY T. Riley / JES	
BOREHOLE DIAMETER (IN) 4.5" O.D. / 3.5" O.D. in Rock.	ROCK CORE DIAMETER (IN.) 2"		SHEET 1 OF 2

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	% PASSING #200 SIEVE	RQD	WATER CONTENT %	
0	1D	0-2.5' Top Soil Mottled Fine Sandy Silt	10				
	2D	2' " Becoming clayey	46				
5	3D		31	99.8%		25.6%	LL = 30% PL = 20%
	4D		16				
	5D	10'	9				
10	6D	Gray Silty Clay w/ Gray Fine Sand Layers. (MARINE CLAY)	W.O.H.	99.3%		29.4%	
	7D	Gray Silty Fine Sand with Little Coarse Sand, Gravel and Cobbles.	63				
15	8D	14' V Gray Clayey	40				
	9D	Gray Clayey Silty Fine To Medium Sand w/ Some Coarse Sand, Gravel and Cobbles	29				
20	10D		51				
	11D		98				
25	12D		48	55%		10.4%	
	13D	27.1 (BASAL TILL)	50/0.1'				
30	1R	META GRAYWACKE			100%		
	2R				96%		
35	3R				100%		
40	4R				100%		
45	5R				100%		
	6R				100%		
60	7R				100%		
65	8R				93%		

INSTRUMENT LOG



DEPTH (FT)

NOTES

5/90

SEVEE & MAHER ENGINEERS

PROJECT	JOB NO.	BORING NO.	
West Old Town Landfill Expansion	03076.09	P-04-13	Piezometers A & B

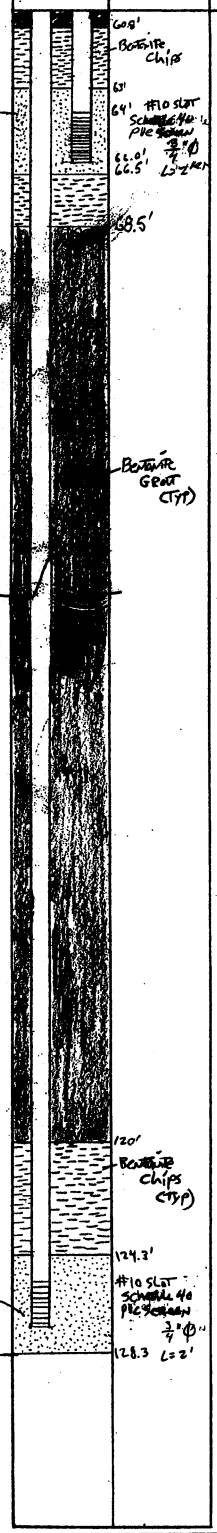
DATE COMPLETED	DATE WELLS INSTALLED	DRILLING METHOD
9/29/04	9/29/04	Wash-Rotary

GROUND SURFACE ELEVATION (FT)	DRILLING CONTRACTOR	LOGGED BY
144.4'		T. Riley / JES

BOREHOLE DIAMETER (IN)	ROCK CORE DIAMETER (IN.)	SHEET
4.5" O.D. / 3.5" O.D. in Rock	2"	2 OF 2

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	RQD
60		META GRAY WACKE	
65	9R		88%
70	10R		98%
75	11R		97%
80	12R		91%
	13R	81' To 86.4'	77%
	14R	86.4' To 91.3'	80%
	15R	91.3 To 93.1'	94%
	16R	93.1 To 98.1	82%
100	17R	98.1 To 103.1	50%
		... becoming shaley	
105	18R		100%
110	19R		100%
		... less Shaley	
115	20R		100%
120	21R		100%
125	22R		100%
		128.3' (Bedrock) B.O.E.	
130			

INSTRUMENT LOG

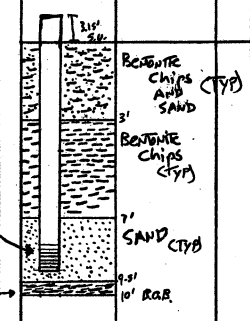


NOTES

SEVEE & MAHER ENGINEERS

PROJECT West Old Town Landfill Expansion	JOB NO. 03076.09	BORING NO. P-04-13C Piezometer C
DATE COMPLETED 11/29/04	DATE WELLS INSTALLED 11/29/04	DRILLING METHOD Wash-Rotary
GROUND SURFACE ELEVATION (FT) 144.8'	DRILLING CONTRACTOR MTB	LOGGED BY T. Riley / JES
BOREHOLE DIAMETER (IN) 4.5' O.D.	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION						INSTRUMENT LOG	DEPTH (FT)
0		See Log P-04-13 for stratigraphy							0
5									5
10		10' B.O.E. (~~BARREN~~ MARINE CLAY)							10



NOTES

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 3 HOLE NO. P-04-14 A
RILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
.T.B. JOB NUMBER 04-095-B	LOCATION Old Town, ME	OFFSET 6.0' Ahead

ROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 09/30/04 Start	DATE 10/06/04 Finish
TYPE	HW		NQ2	SURFACE ELEVATIOI	
SIZE I.D.	4"		2"		
HAMMER WT.	300#				
HAMMER FALL	16"				

ASING LOWS PER OOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Spun											0.2	Topsoil
Casing											0.6	Gray Silty Gravelly Sand
	1R	3"	5.0'	5.0'	6.8	100%						
	2R	3"	5.0'	5.0'	11.8	100%						
	3R	3"	5.0'	5.0'	16.8	100%						
	4R	3"	4.6'	4.4'	21.4	95.7%						Rock
	5R	3"	4.9'	4.9'	26.3	100%						
	6R	3"	5.0'	5.0'	31.3	100%						
	7R	3"	5.0'	5.0'	36.3	100%						

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R =ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. P-04-14 A

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 3 HOLE NO. P-04-14 A
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
M.T.B. JOB NUMBER 04-095-B	LOCATION Old Town, ME	OFFSET 6.0' Ahead

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 09/30/04 Start	DATE 10/06/04 Finish
TYPE	HW		NQ2		
SIZE I.D.	4"		2"		
HAMMER WT.	300#				
HAMMER FALL	16"			SURFACE ELEVATIO	

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	8R	3"	5.0'	5.0'	41.3	100%						
	9R	3"	5.0'	5.0'	46.3	100%						
	10R	3"	5.0'	5.0'	51.3	100%						
	11R	3"	5.0'	5.0'	56.3	100%						
	12R	3"	4.7'	4.6'	61.0	98%						Rock
	13R	3"	3.0'	3.1'	64.0	103%						
	14R	3"	5.0"	4.6'	69.0	92%						
	15R	3"	4.8'	5.0'	73.8	104%						
	16R	3"	5.0'	5.2'	78.8	104%						

SAMPLES
S = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
J = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 3 OF 3 HOLE NO. P-04-14 A
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill, 03076.09	LINE & STATION
T.B. JOB NUMBER 04-095-B	LOCATION Old Town, ME	OFFSET 6.0' Ahead

ROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BARREL	DATE 09/30/04 Start	DATE 10/06/04 Finish
	TYPE	HW		NQ2	SURFACE ELEVATIO	
	SIZE I.D.	4"		2"		
	HAMMER WT.	300#				
	HAMMER FALL	16"				

ASING LOWS PER OOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	17R	3"	5.0'	4.9'	83.8	98%						
	18R	3"	5.0'	5.0'	88.8	100%						
	19R	3"	5.0'	5.0'	93.8	100%						Rock
	20R	3"	5.0'	5.0'	98.8	100%						
	21R	3"	5.0'	5.0'	103.8	100%					103.8	
												Bottom of Boring @ 103.8' Piezometer Installed @ 59.0' Piezometer Installed @ 16.5'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
J = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

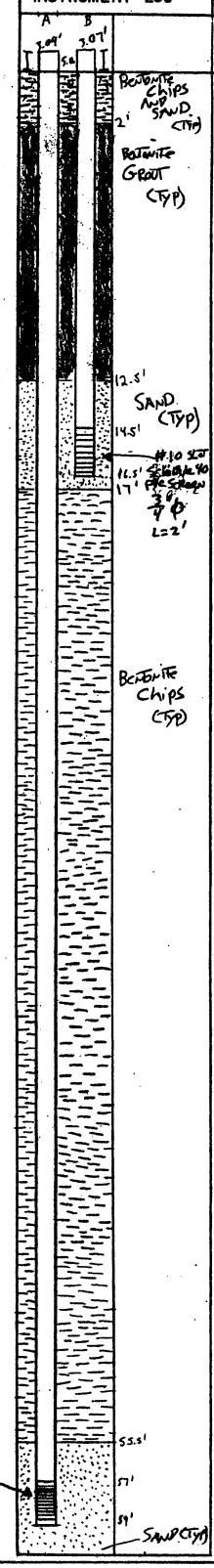
REMARKS:

HOLE NO. P-04-14 A

PROJECT West Old Town Land Fill Expansion	JOB NO. 03076.09	BORING NO. P-04-14
DATE COMPLETED 10/7/04	DATE WELLS INSTALLED 10/7/04	DRILLING METHOD Wash-Rotary
GROUND SURFACE ELEVATION (FT) 150.2'	DRILLING CONTRACTOR M.T.B	LOGGED BY T. Riley / JBS
BOREHOLE DIAMETER (IN) 3.5" O.D. in Rock	ROCK CORE DIAMETER (IN.) 2"	SHEET 1 OF 2

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD			
0	1D	0-0.3' Topsoil; 0.3-5.0' Silt Gravel Sandy Sand; GRAY META GRAYWACKE	50/0.3'				
		← Rollercone. No Sample.					
5	1R			85%			
10	2R			70%			
15	3R			74%			
20	4R			80%			
25	5R			98%			
30	6R			100%			
35	7R			100%			
40	8R			100%			
45	9R			100%			
50	10R			96%			
55	11R			70%			
60	12R			83%			

INSTRUMENT LOG



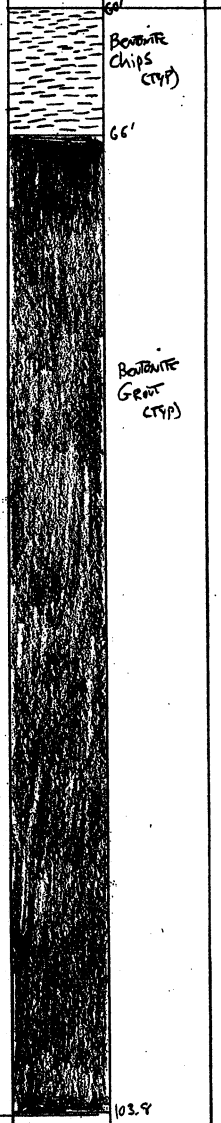
NOTES

SEVEE & MAHER ENGINEERS

PROJECT West Old Town Landfill Expansion	JOB NO. 03076.09	BORING NO. P-04-14	
DATE COMPLETED 10/7/04	DATE WELLS INSTALLED 10/7/04	DRILLING METHOD Wash-Rotary	
GROUND SURFACE ELEVATION (FT) 150.2'	DRILLING CONTRACTOR M.T.B.	LOGGED BY T. Riley / JES	
BOREHOLE DIAMETER (IN) 3.6" O.D. in Rock	ROCK CORE DIAMETER (IN.) 2"	SHEET 2 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	RQD
60			
	13R		90%
65	14R		94%
70	15R		100%
75	16R		98%
80	17R		100%
85	18R		100%
90	19R		98%
95	20R		80%
100	21R		100%?
		103.8' (Bedrock) B.O.E.	
105			

INSTRUMENT LOG



DEPTH (FT): 60, 65, 70, 75, 80, 85, 90, 95, 100, 105

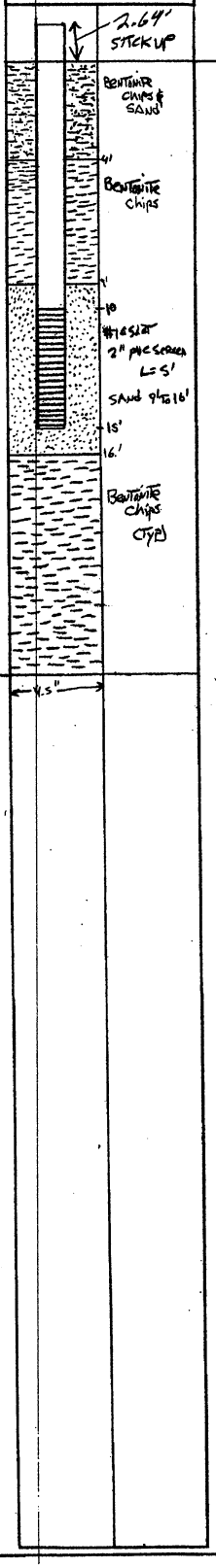
NOTES

SEVEE & MAHER ENGINEERS

PROJECT West Old Town Landfill	JOB NO. 04119.00	BORING NO. B-04-102	MW-04-102
DATE COMPLETED 12/29/04	DATE WELLS INSTALLED 12/29/04	DRILLING METHOD Auger + ~~Rotary~~ w/MSB	
GROUND SURFACE ELEVATION (FT) 167.68'	DRILLING CONTRACTOR M.T.B	LOGGED BY T. Riley	
BOREHOLE DIAMETER (IN) 4.5"	ROCK CORE DIAMETER (IN) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	DRILLING METHOD	DRILLING NOTES
0	1D 0-2.5'	Brown silty fine sand w/ little coarse sand, gravel & cobbles	Auger	25
5	2D 5-6.2'			57-50/0.2'
10	3D 10-11.7'		Rotary wash	55-50/0.2'
13'		Gray fine sandy silt w/ coarse sand, gravel, trace of clay		
15	4D 16-17.2'			50-50/0.2'
19'		Gray clayey sandy silt w/ coarse sand + gravel	Open hole	36
20	5D 22-23'			
22.5				
23'		Gray fine sandy silt w/ coarse sand + gravel, trace clay		
25	6D 23-25'			64
		BOE 25'		

INSTRUMENT LOG



DEPTH (FT)

NOTES

SEVEE & MAHER ENGINEERS

PROJECT West Bethlehem Landfill | JOB NO. 04197.00 | BORING NO. B-04-105 MW-04-105

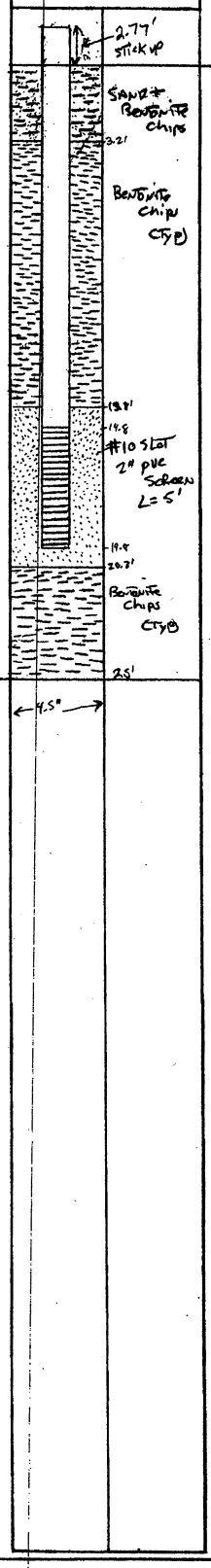
DATE COMPLETED 12/21/04 | DATE WELLS INSTALLED 12/21/04 | DRILLING METHOD Auger + Rotary wash

GROUND SURFACE ELEVATION (FT) 1628.86' | DRILLING CONTRACTOR M.T.B. | LOGGED BY T. Riley

BOREHOLE DIAMETER (IN) 4.5" | ROCK CORE DIAMETER (IN.) N/A | SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	Drilling Sequence
0	1D	Brown silty Fine To Medium sand w/ little Course Sand + gravel	5	Auger
4.5'				
5	2D	Mottled Clayie Sandy Silt	20	
8'				Rotary wash
10	3D	Brown Fine To Medium Sand w/ little silt, Course Sand, and gravel, Trace of Cobbles.	42	
13'				
15	4D	Becoming.. And a Trace of Silt.	90	
20	5D	20.3'	100/0.5'	
25	6D	Olive Clayie Silt w/ Fine To Medium Sand and some Course Sand, gravel and a Trace of Cobbles. 25' B.O.E	98	Open Hole

INSTRUMENT LOG



DEPTH (FT)

NOTES

5/90

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. MW-304-A
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
07/15/04 Water @ 25.4' Hole depth= 34.0'

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	HQ
SIZE I.D.	4"	1 3/8"	2.5"
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 07/14/04 Start — DATE 07/15/04 Finish

SURFACE ELEVATIO

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.2	Topsoil
"	1D	2"	24"		2.0	1	1	3	3			
"												
"											3.5	Brown Silty Fine Sand, w/Trace of Medium Sand, Gravel & Cobbles
"												
"	2D	2"	6"		5.5	75						
"												
"												Olive Silty F/M Sand, w/Little Gravel & Cobbles
12												
75												
6											10.5	
4	3D	2"	24"		11.5	27	35	45	45			
4												
5												Brown F/M Sand, w/Little Coarse Sand, w/Trace of Silt
12												
7											15.5	
5	4D	2"	24"		17.0	23	38	47	55			
6												
5												Brown Silty Fine Sand, w/Med-Coarse Sand & Clayey Silt Layers
8											19.5	
24	5D	2"	4"		20.3	50						
20											20.2	Brown Silty F/M Sand w/Little Coarse Sand w/Trace of Weathered Rock
14												
12											24.0	Weathered Rock
30												
	1R	3.78"	4.4'	4.1'	29.0	93%						
												Rock
	2R	3.78"	5.0'	4.7'	34.0	94%						
	3R	3.78"	3.0'	3.6'	37.0	120.%						
	4R	3.78"	3.0'	3.0'	40.0	100%					40.0	

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

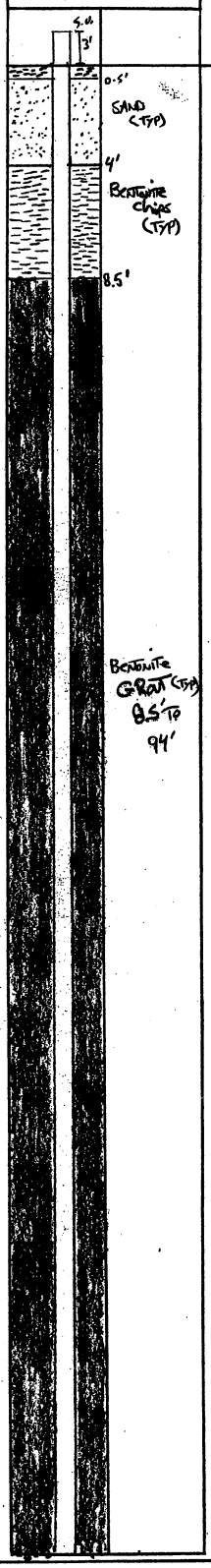
REMARKS:
Bottom of Boring @ 40.0';
Well Installed @ 39.5';
Washed ahead from 10.0' to 24.6';
Lost water while coring @ 33.0'

HOLE NO. MW-304-A

PROJECT West Old Town Land Fill Expansion	JOB NO. 03076.09	BORING NO. 401A	
DATE COMPLETED 7/13/04	DATE WELLS INSTALLED 7/12/04	DRILLING METHOD Wash Rotary	
GROUND SURFACE ELEVATION (FT) 153.8'	DRILLING CONTRACTOR MTB	LOGGED BY T. Riley	
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.6"	SHEET 1 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% Passing #200 Sieve	Water Content %
0	1D	0-0.5' Topsoil Mottled silty Very Fine SAND w/ Trace of Clay	18			
3.5'						
5	2D	Brown Silty Fine To Medium SAND w/ Little Gravel and Trace of Cobbles	25			
10	3D	10' Brown Fine to medium SAND w/ Little silt, course sand and gravel. Trace of Cobbles.	50 - 0.1'		27.7%	11.9%
13.5'		Increased olive color silts.				
15	4D	13.5' Coarse silt w/ Very Fine Sand and some Cobbles	115			
18'		Boulder				
21'						
25	5D	Gray Clayie Silty Fine To Medium SAND with Little gravel and Cobbles	68			
30	6D		56			
35		35'				
	7D	Increased Clay Content.	48			
40	8D		50 - 0.4'			
45	9D		50 - 0.2'			
50	10D		50 - 0.4'			
55	11D	56' UA Gray Clayey, Silt, with some Gravel and Cobbles	50 - 0.3'		62.3%	11.1%
60		Basal Till				

INSTRUMENT LOG



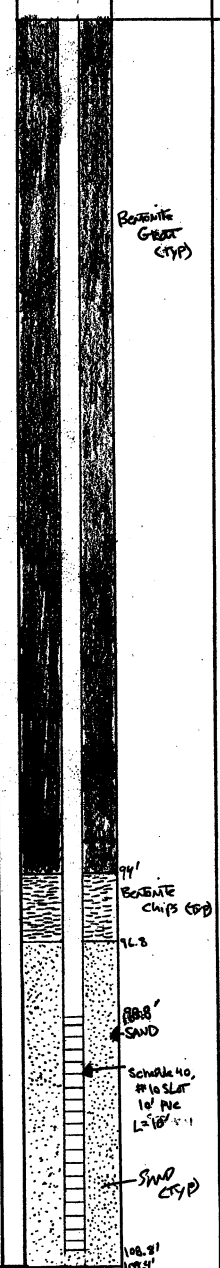
NOTES

SEVEE & MAHER ENGINEERS

PROJECT West Old Town Expansion	JOB NO. 0307609	BORING NO. 401A
DATE COMPLETED 7/13/04	DATE WELLS INSTALLED 7/12/04	DRILLING METHOD Wash Rotary
GROUND SURFACE ELEVATION (FT) 153.8'	DRILLING CONTRACTOR MTB	LOGGED BY T. Riley
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.5"	SHEET 2 OF 2

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD			
60	12D	Gray Clayey Silt w/ some gravel and cobbles.	50-0.1'				
65	13D	65'	90-0.5'				
	14D	Brown Gravely Silt, [illegible] w/ trace cobbles.	NA				
70							
75	15D		NA				
	16D		50-0.2'				
		78.5' BASAL Till					
	Roller Cone	No Sample [illegible]					
80	1R			0%			
85	2R			48%			
90	3R			86%			
95	4R			62%			
100	5R			30%			
105	6R			0%			
	7R			50%			
		109.4' Bedrock					
110		B.O.E.					

INSTRUMENT LOG



NOTES

SEVEE & MAHER ENGINEERS

PROJECT West Old Town Landfill Expansion	JOB NO. 03076.09	BORING NO. 401B
DATE COMPLETED 7/13/04	DATE WELLS INSTALLED 7/13/04	DRILLING METHOD Wash-Rotary
GROUND SURFACE ELEVATION (FT) 154.6'	DRILLING CONTRACTOR M.T.B	LOGGED BY T. Riley
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) N/A"	SHEET 1 OF 1

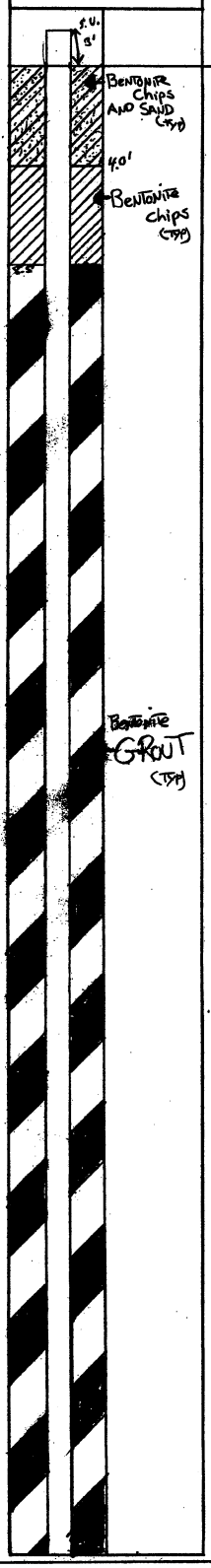
DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	INSTRUMENT LOG	DEPTH (FT)
0			S.D. 2.9'	0
5		See Log 401A for Stratigraphy.	Sand and Bentonite Chips (Typ) 4' Bentonite Chips (Typ) 8'	5
10			10' Sand (Typ) 2" Schedule 40 #10 Slot PVC L=10'	10
15				15
20		20.5' B.O.E, BASAL Till	20' 20.5	20
25				25

NOTES

PROJECT West Oldtown Landfill Expansion	JOB NO. 03076.09	BORING NO. 402A
DATE COMPLETED 6/29/04	DATE WELLS INSTALLED 6/29/04	DRILLING METHOD Wash-Rotary
GROUND SURFACE ELEVATION (FT) 149.5'	DRILLING CONTRACTOR MTB	LOGGED BY T. Riley / JES
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.5"	SHEET 1 OF 2

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% Passing #200 Screen	Water Content %	
		0.3' Top Soil					
	1D	Mottled Clayey Silty Fine Sand	10				
5		5.5'					
	2D	Gray Silty Sandy Clay (MARINE CLAY) ~~Marine Sediments~~	14		86.9%	21.9%	
10	3D	11'	50-0.2'				
		Brown Gravely Sandy Silt with a Trace of Cobbles.					
15	4D	...Becoming gray with a Trace of Clay.	50-0.1'				
20		20'					
	5D		53				
25	6D		50-0.1'				
		Gray Gravely Sandy Clayey Silt. Trace of Cobbles.					
30	7D		50-0.2'				
35	8D		78				
40	9D		92				
45		45'					
	10D	...Becoming, Trace of Clay (0.9' Thick Cobble)	50-0.2'				
50							
55	11D		106		65.5%	11.0%	
60		Basal Till					

INSTRUMENT LOG

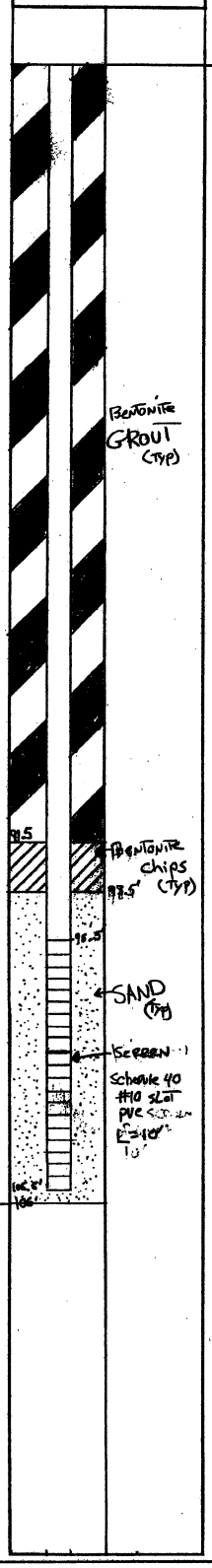


NOTES

PROJECT	WESTOLDTOWN LANDFILL EXPANSION	JOB NO. 03076.09	BORING NO. 402A
DATE COMPLETED 6/29/04	DATE WELLS INSTALLED 6/29/04	DRILLING METHOD WASH - ROTARY	
GROUND SURFACE ELEVATION (FT) 147.5'	DRILLING CONTRACTOR MTB	LOGGED BY TCR / JES	
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.5"	SHEET 2 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% <200	K cm/sec
60	12D	FROM ABOVE... Gray Gravelly Sandy Clayey Silt. Trace of cobbles. Trace of clay	50-0.1'			
65	13D		50-0.1'			
70	14D	(BASAL TILL)	100-0.4'		59%	9.6×10^{-7}
75	15D	1' thick Boulder BASAL TILL	100-0.3'			
80	3R			63%		
	4R			76%		
85	5R			10%		
90	6R			60%		
95	7R			56%		
100	8R			80%		
105	9R	106' Bedrock B.O.E.		92%		
110						

INSTRUMENT LOG



NOTES

PROJECT West Old Town Landfill Expansion	JOB NO. 03076.09	BORING NO. 402B
DATE COMPLETED 6/29/04	DATE WELLS INSTALLED 6/29/04	DRILLING METHOD Wash-Rotary
GROUND SURFACE ELEVATION (FT) 149.8'	DRILLING CONTRACTOR MTB	LOGGED BY T. Riley
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.5"	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	INSTRUMENT LOG	DEPTH (FT)
0		See LoG 402A for STRATIGRAPHY.	S.U. 3.1'	0
5			Bentonite chips (Typ)	5
10			SAND (Typ)	10
15			SCREEN Schedule 40 #10 SLOT PVC L=10'	15
20		22.5' BASAL TILL	22.5'	20
25		B.O.E.		25

NOTES

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. MW-04-111 ~~MW-04-11~~
DRILLER Tom Schaefer.	PROJECT NAME West Old TownLandfill	LINE & STATION
.T.B. JOB NUMBER 04-237	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 12/30/04 Start	DATE 12/30/04 Finish
TYPE	HW	SS		SURFACE ELEVATION	
SIZE I.D.	4"	1 3/8"			
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												
"												
35												
193												
210												
32												
60												
Wash												Brown Silty Fine Sand,
Ahead												w/Some Cobbles, Little Gravel
"												
"	1D	2"	17"		12.4	34	45	65				
"												
											15.5	
												Bottom of Boring @ 15.5'
												2" PVC Well Installed @ 15.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Pound 4" to 9.0',
Went Open Hole to 15.5',
Flushed out 9.0' to 15.5',
Installed 2" PVC Well using 5' screen

HOLE NO. MW-04-11

PROJECT West Old Town Landfill	JOB NO. 04119.00	BORING NO. B-04-111 MW-04-111	
DATE COMPLETED 12/30/09	DATE WELLS INSTALLED 12/30/09	DRILLING METHOD Auger + Rotary Wash	
GROUND SURFACE ELEVATION (FT) 192.13	DRILLING CONTRACTOR M.T.R.	LOGGED BY T. Riley / JCS	
BOREHOLE DIAMETER (IN) 4.5"	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	Drilling Sequence	INSTRUMENT LOG	DEPTH (FT)
0				AUGER	STICKUP 2.81	0
5				ROTARY WASH	BENTONITE chips (TYP)	5
10	1D 11' 12.9'	BROWN SILTY FINE SAND w/ Some COBBLES & Gravel	45-60/0.4'	OPEN Hole	9.5' SAND 9.5-BOE #10 SLOT 2" PVC SCREEN L=6'	10
15		(BASALTIC) R.O.E 15.5'			4.5"	15
20						20

NOTES

5/90

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. MW-05-01
RILLER Tom Schaefer.	PROJECT NAME West Old TownLandfill	LINE & STATION
I.T.B. JOB NUMBER 04-237	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 01/03/05 Start	DATE 01/03/05 Finish
TYPE	HW	SS		SURFACE ELEVATIOI	
SIZE I.D.	4"	1 3/8"			
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"											2.0	Brown Silty Fine Sand, w/Surface Boulders & Roots
"												
"												
"												
47												
92												
112												
98												
Open												Brown Silty Fine Sand, w/Coarse Sand & Gravel, w/Trace of Cobbles
Hole												
"												
"	1D	2"	18"		12.5	32	30	37				
"												
"												
"											15.5	
												Bottom of Boring @ 15.5'
												2" PVC Well Installed @ 15.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R =ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
XX DRILLER-VISUALLY
SOIL TECHNICIAN-VISUALLY
LABORATORY TESTS

REMARKS:

HOLE NO. MW-05-01

PROJECT West old Town Landfill	JOB NO. 030609	BORING NO. B-05-01 MW-05-01	
DATE COMPLETED 1/3/05	DATE WELLS INSTALLED 1/3/05	DRILLING METHOD Auger + Wash Rotary	
GROUND SURFACE ELEVATION (FT) 19677'	DRILLING CONTRACTOR M.T.B.	LOGGED BY T. Riley / JES	
BOREHOLE DIAMETER (IN) 4.5"	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	DRILLING SEQUENCE	INSTRUMENT LOG	DEPTH (FT)
0		Brown silty fine sand w/ surface boulders + roots		Auger	Stick up 3.08'	0
5		Brown silty fine sand w/ coarse sand gravel + trace of cobbles.		Rotary wash	Bentonite chips	5
10	1D 11' 12.0'		67	Open hole	9.5 10' Filo slot 2" PVC screen LS 5' Sand 9.5'-15.5'	10
15		(Basal Till) 15.5' B.O.E			15' 16.5' 4.5"	15
20						20

NOTES

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. MW-05-02
RILLER Tom Schaefer.	PROJECT NAME West Old TownLandfill	LINE & STATION
I.T.B. JOB NUMBER 04-237	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 01/03/05 Start	DATE 01/03/05 Finish
TYPE	HW	SS		SURFACE ELEVATIOI	
SIZE I.D.	4"	1 3/8"			
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"											2.0	Brown Silty Fine Sand
"												
"												
"												
39												
77												
170												
65												Brown Silty Fine Sand,
Open												w/Coarse Sand & Gravel,
Hole												w/Trace of Cobbles
"												
"												
"	1D	2"	18"		13.5	28	40	58				
"												
"											15.5	
												Bottom of Boring @ 15.5'
												2" PVC Well Installed @ 15.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R =ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

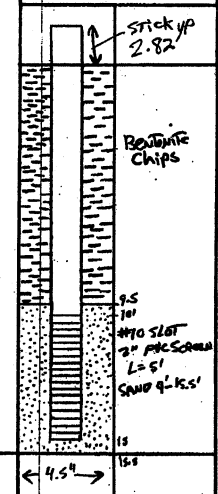
REMARKS:
Augered from surface to 5.0';
Washed ahead from 7.5' to 15.5'

HOLE NO. MW-05-02

PROJECT West old Town Landfill	JOB NO. 0307609	BORING NO. B-05-02 MW-05-02
DATE COMPLETED 1/3/05	DATE WELLS INSTALLED 1/3/05	DRILLING METHOD Auger + Wash Rotary
GROUND SURFACE ELEVATION (FT) 191.81'	DRILLING CONTRACTOR M.T.B.	LOGGED BY T. Riley / JCS
BOREHOLE DIAMETER (IN) 4.5"	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	DRILLING SEQUENCE			
0		Brown silty Fine Sand		Auger			
5		Brown silty Fine Sand w/ Coarse Sand, gravel and a trace of cobbles.		Rotary wash			
10	12 ID 13.5		98	Open Hole			
15		(BASAL TILL) 15.5'					
		B.O.E.					
20							

INSTRUMENT LOG



DEPTH (FT): 0, 5, 10, 15, 20

NOTES

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. MW-05-03
DRILLER Tom Schaefer.	PROJECT NAME West Old TownLandfill	LINE & STATION
I.T.B. JOB NUMBER 04-237	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	
SIZE I.D.	4"	1 3/8"	
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 01/04/05 Start | DATE 01/04/05 Finish

SURFACE ELEVATIOI

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"											2.0	Brown Silty Fine Sand
"												
"												
"												
30												
69												
165												
210												Brown Silty Fine Sand,
Wash												w/Coarse Sand & Gravel,
Ahead												w/Trace of Cobbles
"												
"												
"	1D	2"	18"		13.5	26	38	40				
"												
"											15.5	
												Bottom of Boring @ 15.5'
												2" PVC Well Installed @ 15.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R =ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
XX DRILLER-VISUALLY
SOIL TECHNICIAN-VISUALLY
LABORATORY TESTS

REMARKS:

HOLE NO. MW-05-03

PROJECT West old Town Landfill	JOB NO. 030609	BORING NO. B-05-03	MW-05-03
DATE COMPLETED 1/4/05	DATE WELLS INSTALLED 1/4/05	DRILLING METHOD Auger + Wash Rotary	
GROUND SURFACE ELEVATION (FT) 192.21'	DRILLING CONTRACTOR M.T.B.	LOGGED BY T. Riley / JES	
BOREHOLE DIAMETER (IN) 4.5"	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	DRILLING RESISTANCE				INSTRUMENT LOG	DEPTH (FT)
0								Stick Up 2.67'	0
		Brown silty Fine Sand		Auger				Bentonite Chips	
5		5' Brown silty Fine Sand w/ Coarse Sand, gravel and A Trace of Cobbles.		Rotary wash					5
10	1D		78	Open Hole				9.5 10' #10 SLOT 2" PVC Screen L=5' Sand 9'-15.5'	10
15		(BASAL TILL) 15.5' B.O.E.						15 15.5	15
20									20

NOTES

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. MW-05-04
DRILLER Tom Schaefer.	PROJECT NAME West Old TownLandfill	LINE & STATION
I.T.B. JOB NUMBER 04-237	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 01/04/05 Start	DATE 01/05/05 Finish
TYPE	HW	SS		SURFACE ELEVATIOI	
SIZE I.D.	4"	1 3/8"			
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"											1.5	Brown Silty Fine Sand
"											2.5	Brown Silty Fine Sand w/Cobbles
"												
"												Brown Silty Fine Sand,
41												w/Coarse Sand & Gravel,
72											7.0	w/Trace of Cobbles
135												
180												
30												
22												Brown Silty Fine Sand
22												w/Coarse Sand, Gravel & Cobbles
25	1D	2"	18"		12.5	25	37	43				
42												
75												
											15.5	
												Bottom of Boring @ 15.5'
												2" PVC Well Installed @ 15.0'

SAMPLES

D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:

XX DRILLER-VISUALLY
SOIL TECHNICIAN-VISUALLY
LABORATORY TESTS

REMARKS:

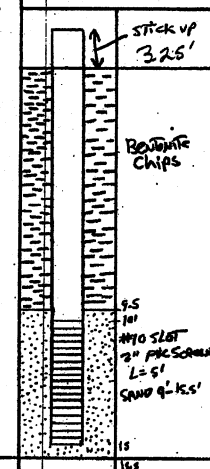
Augered from surface to 5.0';
Washed ahead from 8.0' to 15.5';
Casing @ 9.0', washed ahead to 15.5' Twice;
Hole caved @ 13.2'; Had to put casing down.

HOLE NO. MW-05-04

PROJECT West old Town Landfill	JOB NO. 03076.09	BORING NO. B-05-04 MW-05-04	
DATE COMPLETED 1/5/04	DATE WELLS INSTALLED 1/5/04	DRILLING METHOD Auger + Wash Rotary	
GROUND SURFACE ELEVATION (FT) 192.16'	DRILLING CONTRACTOR M.T.B.	LOGGED BY T Riley / JES	
BOREHOLE DIAMETER (IN) 4.5"	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	Drilling Sequence			
0							
	1.5'	Brown silty fine sand		Auger			
	2.5'	Becoming... w/ cobbles					
		Brown silty fine sand w/ coarse sand, gravel and a trace of cobbles					
5							
	7'			Rotary wash			
10	11'	Brown silty fine sand w/ coarse sand gravel and cobbles.					
	ID 12.5'		80				
15		(BASAL TILL) 15.5'					
		B.O.E.					
20							

INSTRUMENT LOG



DEPTH (FT): 0, 5, 10, 15, 20

NOTES

Attempted to go open hole at 10' twice. Hole caved each time. Due to the use of casing to B.O.E., this borehole was flush three times. Once w/ each attempt to go open hole and then again at the install.

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. MW-05-05
DRILLER Tom Schaefer.	PROJECT NAME West Old TownLandfill	LINE & STATION
M.T.B. JOB NUMBER 04-237	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 01/05/05 Start	DATE 01/05/05 Finish
TYPE	HW	SS		SURFACE ELEVATION	
SIZE I.D.	4"	1 3/8"			
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"											1.5	Brown Silty Fine Sand w/Cobbles &Roots
"												
"												
12												
26												
62												
98												
190												
Open												
Hole												
"												
"	1D	2"	18"		12.5	42	58	60				Brown Silty Fine Sand, w/Coarse Sand & Gravel, w/Trace of Cobbles
"												
"	2D	2"	18"		14.5	36	60	60				
"											15.5	
												Bottom of Boring @ 15.5'
												2" PVC Well Installed @ 15.0'

SAMPLES

D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R =ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:

XX DRILLER-VISUALLY
SOIL TECHNICIAN-VISUALLY
LABORATORY TESTS

REMARKS:

Augered from surface to 5.0';
Washed ahead from 9.0' to 15.5'

HOLE NO. MW-05-05

PROJECT West old Town Landfill	JOB NO. 03076.09	BORING NO. B-05-08 MW-05-08	
DATE COMPLETED 1/5/05	DATE WELLS INSTALLED 1/5/05	DRILLING METHOD AUGER + WASH ROTARY	
GROUND SURFACE ELEVATION (FT) 191.95'	DRILLING CONTRACTOR M.T.B.	LOGGED BY T.Riley / JBS	
BOREHOLE DIAMETER (IN) 4.5"	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	DRILLING METHOD	INSTRUMENT LOG	DEPTH (FT)
0		BROWN SILTY FINE SAND W/ COBBLES AND BOULDERS 1.5'		AUGER	STICK UP 2.91'	0
5		BROWN SILTY FINE SAND W/ COARSE SAND + GRAVEL W/ TRACE COBBLES.		ROTARY WASH	BENTONITE CHIPS	5
10	1D 12.5'-15'		118	OPEN HOLE	9.5 10' #10 SLOT 2" PVC SCREEN L=5' SAND 9'-15.5'	10
15	2D 17.5'	(BASAL TILL) 15.5' B.O.E.	120		15 15.5	15
20					4.5"	20

NOTES

R/00

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. MW06-01
DRILLER Darrel McKeen	PROJECT NAME Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 2/28/06 Start	DATE 2/28/06 Finish
TYPE	HW	SS		SURFACE ELEVATIC	
SIZE I.D.	4"	1 3/8"			
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.3	Topsoil
"											2.0	Brown Silty Sand w/Trace of Cobbles
"												
"	1D	2"	24"		4.0	4	5	8	18			Gray Brown Sandy Clayey Silt w/Trace of Gravel
"												
"	2D	2"	12"		6.0	45	50				6.0	
"											6.5	Cobble
"												
"												
"												
30												Gray Brown Sandy Clayey Silt w/Trace of Gravel
100	3D	2"	24"		12.0	24	27	63	30			
95											13.0	
80												
85												
90												
90	4D	2"	24"		17.0	13	11	11	12			Brown Gravelly Sand w/Trace of Silt
85												
80												
80												
	5D	2"	24"		22.0	19	17	16	17		22.0	
												Bottom of Boring @ 22.0'
												2" PVC Well Installed @ 20.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

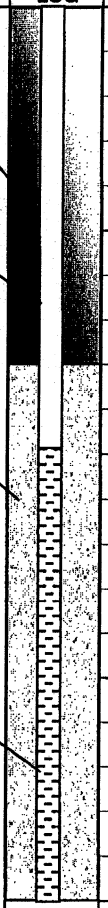
SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Washed ahead from 10.0' to 15.0'

HOLE NO. MW06-01

PROJECT: WOTL Expansion		**JOB NO.:** 05055.00	**BORING NO.:** MW06-01A
DATE STARTED: 2-28-06	**DATE FINISHED:** 3-1-06	**DRILLING METHOD:** Auger (0-5 ft) Drive & Wash (5-20 ft)	
GROUND SURFACE ELEVATION (FT): 163.3	**DRILLING CONTRACTOR:** Maine Test Borings		**LOGGED BY:** JAB JBS
BOREHOLE DIA. (IN): 4	**ROCK CORE DIA. (IN):** NA		**SHEET 1 OF 1**

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	Blows/ .5'	Recovery (%)
		0.3 ft Topsoil		
	D-1	(BASAL TILL)	4-5-8-18	100
5				
	D-2		45-50	100
10				
	D-3		24-27-63-30	10
		Brown gravelly silt transitioning to silty gravel transitioning to silty sand with trace of cobble		
15				
	D-4		13-11-11-12	12
20				
	D-5	22 ft BOE (COBBLE ZONE)	15-11-16-17	90



WELL LOG	DEPTH (FT)
	5
	10
	15
	20

NOTES:

Artesian flow through casing @ 15'

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 2 HOLE NO. MW06-02
DRILLER Darrel McKeen	PROJECT NAME Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 02/22/06 Start	DATE 02/24/06 Finish
TYPE	SW	SS	HQ	SURFACE ELEVATIC	
SIZE I.D.	6"	1 3/8"	2.5"		
HAMMER WT.		140#			
HAMMER FALL		30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.5	Topsoil
"											3.0	Brown Silty Sandy Gravel
"												
"												
"												
"	1D	2"	24"		7.0	20	23	31	32			Olive Gravelly Sandy Silt
"												
"												
"											10.0	
"												
"	2D	2"	24"		12.0	35	34	30	36			Olive Gravelly Sandy Clayey Silt
"												
"											13.5	
Wash											14.0	Cobble
Ahead												
"												
"	3D	2"	24"		18.0	10	12	14	21			Olive Gravelly Sandy Clayey Silt
"												
"												
"	4D	2"	8"		20.7	20	50				20.7	
"												
"												
"												
"												
"												
"	1R	3.78"	4.5'	1.5'	26.8	33.3%						
"												
"												
"	2R	3.78"	2.4'	1.8'	29.2	75%						
"												Rock
"	3R	3.78"	2.7'	3.0'	31.9	111%						
"												
"												
"												
"	4R	3.78"	3.2'	2.8"	35.1	88%						
"												
"												
"	5R	3.78"	3.4'	3.5'	38.5	102.9%						
"												

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Reamed HQ hole to 6"
Rollerconed from 22.3' to 42.1'

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 2 HOLE NO. MW06-02
DRILLER Darrel McKeen	PROJECT NAME Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 02/22/06 Start	DATE 02/24/06 Finish
TYPE	SW	SS	HQ	SURFACE ELEVATIC	
SIZE I.D.	6"	1 3/8"	2.5"		
HAMMER WT.		140#			
HAMMER FALL		30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
"												
"	6R	3.78"	3.0'	3.0'	41.5	100%						Rock
"											42.1	
												Bottom of Boring @ 42.1'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Reamed HQ hole to 6"
Rollerconed from 22.3' to 42.1'

HOLE NO. MW06-02

PROJECT: WOTL Expansion		**JOB NO.:** 05055.00	**BORING NO.:** MW-0602
DATE STARTED: 4-3-06	**DATE FINISHED:** 4-3-06	**DRILLING METHOD:** Auger (0-14 ft) Drive & Wash (14-42 ft)	
GROUND SURFACE ELEVATION (FT): 188.8	**DRILLING CONTRACTOR:** Maine Test Borings		**LOGGED BY:** JAB / JCB
BOREHOLE DIA. (IN): 6	**ROCK CORE DIA. (IN):** 2.5" ID (H)		**SHEET 2 OF 2**

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	Blows/ .5'	Recovery (%)	WELL LOG	DEPTH (FT)
		0.5 ft Topsoil				
5						5
	D-1		20-23-31-32	100		
10						10
	D-2		35-34-30-36	100	2" Schedule 40 PVC Riser	
		Olive gravelly sandy silt, traces of clay and cobble				
15						15
	D-3		10-12-14-21	100	Bentonite Chips (typ)	
20		(BASAL TILL)				20
	D-4	20.7ft	20-50/.2'	36		
25						25
	R-1			33	Sand (typ)	
	R-2			75		
30						30
	R-3			90		
35	R-4	meta Gray siltstone with quartz seams		111	2" Schedule 40 PVC Screen No. 10 Slot L=10'	35
	R-5			100	Bentonite Chips (typ)	
40						40
	R-6	41.5 ft BOE (Bedrock)		100		

NOTES:

Auger refusal @ 14 feet due to cobble, switch to roller cone.
Begin bedrock core @ 22.3 ft
Bedrock highly fractured to a depth of 35 feet
TOPVC Elevation = 191.71
Original boring done on 2-22-06. Well installed on 4-3-06

PROJECT: WOTL Expansion	**JOB NO.:** 05055.00	**BORING NO.:** OW-0605
DATE STARTED: 3-27-06	**DATE FINISHED:** 3-27-06	**GROUND SURFACE ELEVATION (FT):** 187.6
DRILLING CONTRACTOR: Maine Test Borings	**DRILLING METHOD:** Auger (0-20 ft) Drive & Wash (20-23.2 ft)	
BOREHOLE DIA. (IN): 4 inch	**ROCK CORE DIA. (IN):** 2.5" ID (H)	**LOGGED BY:** JAB **SHEET** 1 OF 1

JCS

Depth (ft)	Sample No.	Recovery (%)	RQD (%)	Material Description	Well Log	Depth (ft)
				.2 ft Topsoil		
5				Gravelly Sandy Clayey Silt	2" Schedule 40 PVC Riser	5
10						10
15					Bentonite Chips (typ)	15
20						20
				23.2 ft (BASAL TILL)		
25	R-1	100	94	GRAY SILTSTONE	Sand (typ)	25
30	R-2	98	88		2" Schedule 40 PVC Screen No. 10 Slot L=10'	30
35	R-3	100	10			35
				36.8 ft (Bedrock)		
				BOE		

Notes:

No soil samples taken. Description of till is based on observations of cuttings.

Bedrock fractures with staining observed in cores at approximately 29.5' and 33.0'.

TOPVC Elevation = 190.53

Sand Pack: 36.8' - 25.2'

MAINE TEST BORINGS, INC. **BREWER, MAINE 04412**	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. OW-06-06
DRILLER Darrel McKeen	PROJECT NAME Juniper Ridge Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044A	LOCATION Old Town, ME.	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 3/28/06 Start	DATE 3/28/06 Finish
TYPE	HW		HQ	SURFACE ELEVATIO	
SIZE I.D.	4"		2.5"		
HAMMER WT.	300#				
HAMMER FALL	16"				

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												
"												
"												
"												
"												
"												
"												
"												Same As OW-06-05
"												
"												
"												
"												
"												
"												
"												
"												
											20.0	
	1R	3.78"	3.7'	3.7'	23.8	100%						
	2R	3.78"	5.1'	5.1'	28.9	100%						
												Rock
	3R	3.78"	4.0'	4.0'	32.9	100%						
	4R	3.78"	5.2'	5.2'	38.1	100%					38.1	

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Bottom of Boring @ 38.1'
2" PVC Well Installed @ 37.9'
Using 10.0' screen.
No spoon samples taken.

HOLE NO. OW-06-06

PROJECT: WOTL Expansion	**JOB NO.:** 05055.00	**BORING NO.:** OW-0606
DATE STARTED: 3-28-06	**DATE FINISHED:** 3-28-06	**GROUND SURFACE ELEVATION (FT):** 187.3
DRILLING CONTRACTOR: Maine Test Borings	**DRILLING METHOD:** Auger (0-20 ft) Drive & Wash (20-20.1 ft)	
BOREHOLE DIA. (IN): 4 inch	**ROCK CORE DIA. (IN):** 2.5" ID (H)	**LOGGED BY:** JAB/JES **SHEET** 1 OF 1

Depth (ft)	Sample No.	Recovery (%)	RQD (%)	Material Description	Well Log	Depth (ft)
				.2 ft Topsoil		
5				Gravelly Sandy Clayey Silt	2" Schedule 40 PVC Riser	5
10					Bentonite Chips (typ)	10
15						15
20				20.1 ft (BASAL TILL) GRAY SILTSTONE		20
	R-1	100	100% 95			
25	R-2	100	100% 95		Sand (typ)	25
30	R-3	96	100% 75		2" Schedule 40 PVC Screen No. 10 Slot L=10'	30
35	R-4	100	27% 23	38.1 (Bedrock)		35
				BOE		

Notes:

No soil samples taken. Description of till is based on observations of cuttings.

Bedrock fractures with staining observed in cores at approximately 26.5', 34.5', 35.1', and 37.2'.

TOPVC Elevation = 190.12

Sand Pack: 25.5' - 38.1'

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. OW-06-07
DRILLER Darrel McKeen	PROJECT NAME Juniper Ridge Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044A	LOCATION Old Town, ME.	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 3/28/06 Start	DATE 3/28/06 Finish
TYPE	HW		HQ		
SIZE I.D.	4"		2.5"		
HAMMER WT.	300#				
HAMMER FALL	16"			SURFACE ELEVATIO	

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												
"												
"												
"												
"												
"												
"												Same As OW-06-05
"												
"												
"												
"												
"												
"												
"												
"												
											18.3	
	1R	3.78"	4.9'	4.9'	23.2	100%						
	2R	3.78"	5.0'	5.0'	28.2	100%						Rock
	3R	3.78"	5.0'	5.0'	33.2	100%						
	4R	3.78"	5.1'	5.1'	38.3	100%					38.3	

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

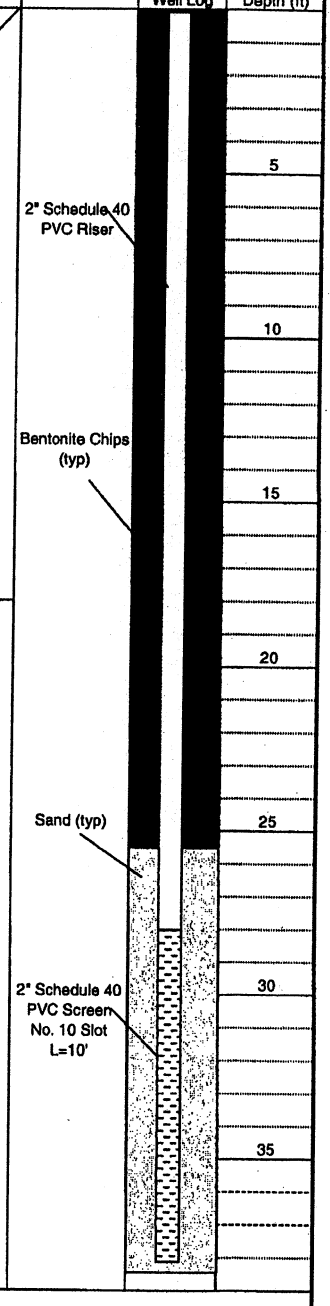
SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Bottom of Boring @ 38.3'.
2" PVC Well Installed @ 38.0'.
Using 10.0' screen. No spoon samples taken .
Augered from surface to 18.3'.

HOLE NO. OW-06-07

PROJECT: WOTL Expansion	**JOB NO.:** 05055.00	**BORING NO.:** OW-0607
DATE STARTED: 3-29-06	**DATE FINISHED:** 3-29-06	**GROUND SURFACE ELEVATION (FT):** 186.6
DRILLING CONTRACTOR: Maine Test Borings	**DRILLING METHOD:** Auger (0-18.3 ft)	
BOREHOLE DIA. (IN): 4 inch	**ROCK CORE DIA. (IN):** 2.5" ID (H)	**LOGGED BY:** JAB **SHEET** 1 OF 1

Depth (ft)	Sample No.	Recovery (%)	RQD (%)	Material Description
				.2 ft Topsoil
5				Gravelly Sandy Clayey Silt
10				
15				
				18.3 ft (BASAL TILL)
20	R-1	100	100	GRAY SILTSTONE
25	R-2	100	100	
30	R-3	100	100	
35	R-4	94	68	38.5' (Bedrock)



BOE

Notes:

No soil samples taken. Description of till is based on observations of cuttings.

Bedrock fractures with staining observed in cores at approximately 18.8', 19.6', 20.5', 21.2', 36.0', 36.8' and 37.8'

TOPVC Elevation = 189.16

Sand Pack: 25.5'-38.5'

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. OW-06-08
DRILLER Darrel McKeen	PROJECT NAME Juniper Ridge Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044A	LOCATION Old Town, ME.	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 3/29/06 Start	DATE 3/30/06 Finish
TYPE	HW		HQ	SURFACE ELEVATIO	
SIZE I.D.	4"		2.5"		
HAMMER WT.	300#				
HAMMER FALL	16"				

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												
"												
"												
"												
"												
"												
"												
"												Same As OW-06-05
"												
"												
"												
"												
"												
"												
"												
"												
"												
											20.5	
	1R	3.78"	3.4'	3.0'	24.0	88%						
	2R	3.78"	2.0'	2.0'	26.0	100%						
												Rock
	3R	3.78"	3.0'	3.4'	29.0	113%						
	4R	3.78"	1.7'	1.4'	30.7	82.4%						
	5R	3.78"	3.5'	3.5'	34.2	100%					34.2	
												Bottom of Boring @ 34.2'
												2" PVC Well Installed @ 33.8'
												Using 10.0' screen

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. OW-06-08

PROJECT: WOTL Expansion	**JOB NO.:** 05055.00	**BORING NO.:** OW-0608
DATE STARTED: 3-29-06	**DATE FINISHED:** 3-30-06	**GROUND SURFACE ELEVATION (FT):** 187.1
DRILLING CONTRACTOR: Maine Test Borings	**DRILLING METHOD:** Auger (0-20 ft), Drive and Wash (20.0-20.6 ft)	
BOREHOLE DIA. (IN): 4 inch	**ROCK CORE DIA. (IN):** 2.5" ID (H)	**LOGGED BY:** JAB/JES **SHEET** 1 OF 1

Depth (ft)	Sample No.	Recovery (%)	RQD (%)	Material Description	Well Log	Depth (ft)
				.2 ft Topsoil	2" Schedule 40 PVC Riser	
5						5
10				Gravelly Sandy Clayey Silt		10
15					Bentonite Chips (typ)	15
20				20.6 ft (BASAL TILL)		20
	R-1	88	62	GRAY SILTSTONE		
25	R-2	100	50 ?		Sand (typ)	25
	R-3	113	93			
30	R-4	76	100		2" Schedule 40 PVC Screen No. 10 Slot L=10'	30
	R-5	106	100	34.0 (Bedrock)		
				BOE		

Notes:

No soil samples taken. Description of till is based on observations of cuttings.

Bedrock cores highly fractured from 20.6' to 25.0'.

Fracture in bedrock core observed at 26.5'.

TOPVC Elevation = 189.72

Seam of brown clay encountered between approxiamately 30' and 32'.

Sand Pack: 21.5'-34.0'

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. OW-06-09
DRILLER Darrel McKeen	PROJECT NAME Juniper Ridge Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044A	LOCATION Old Town, ME.	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 3/30/06 Start	DATE 3/31/06 Finish
TYPE	HW		HQ	SURFACE ELEVATIO	
SIZE I.D.	4"		2.5"		
HAMMER WT.	300#				
HAMMER FALL	16"				

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												
"												
"												
"												
"												
"												
"												
"												
"												
"												
"												OW-06-05
"												
"												
"												
"												
"												
Wash												
Ahead												
"												
"												
"												
"												
"												
"											27.2	
	1R	3.78"	3.0'	3.0'	30.4	100%						
	2R	3.78"	2.5'	2.5'	32.9	100%						Rock
	3R	3.78"	0.8'	0.7'	33.7	88%						
	4R	3.78"	1.4'	1.2'	35.1	86%						
	5R	3.78"	1.4'	1.3'	36.5	93%						
	6R	3.78"	1.0'	0.9'	37.5	100%						
	7R	3.78"	1.9'	1.9'	39.4	100%					39.4	

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Bottom of Boring @ 39.4'. 2" PVC Well Installed @ 39.0'.
Using 10.0' screen. No spoon samples taken.
Augered from surface to 20.0'.
Washed ahead from 20.0' to 27.4'

HOLE NO. OW-06-09

PROJECT: WOTL Expansion	**JOB NO.:** 05055.00	**BORING NO.:** OW-0609	
DATE STARTED: 3-30-06	**DATE FINISHED:** 3-31-06	**GROUND SURFACE ELEVATION (FT):** 187.2	
DRILLING CONTRACTOR: Maine Test Borings	**DRILLING METHOD:** Auger (0-20 ft), Drive and Wash (20.0-20.6 ft)		
BOREHOLE DIA. (IN): 4 inch	**ROCK CORE DIA. (IN):** 2.5" ID (H)	**LOGGED BY:** JAB	**SHEET** 1 OF 1

/JBS

Depth (ft)	Sample No.	Recovery (%)	RQD (%)	Material Description	Well Log	Depth (ft)
				.2 ft Topsoil		
5					2" Schedule 40 PVC Riser	5
10				Gravelly Sandy Clayey Silt		10
15					Bentonite Chips (typ)	15
20						20
25				27.4 ft (BASAL TILL)	Sand (typ)	25
30	R-1	100	63?	GRAY SILTSTONE ... WX	2" Schedule 40 PVC Screen No. 10 Slot L=10'	30
	R-2	100	0	... clay seam		
	R-3	75	0			
35	R-4	93	0			35
	R-5	107	0			
	R-6	100	0			
40	R-7	100	53	39.4 ft (Bedrock)		40
				BOE		

Notes:

No soil samples taken. Description of till is based on observations of cuttings.

Bedrock cores highly fractured with brown mud from 27.4' to 37.0'.

Brown clay seam encountered between approximately 33.0' and 34.0'.

Bedrock cores become less fractured and less muddy between 37.0' and 39.4'.

TOPVC Elevation = 190.10

Sand Pack: 27.5' - 39.4'

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 2 HOLE NO. OW-06-10
DRILLER Darrel McKeen	PROJECT NAME Juniper Ridge Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044A	LOCATION Old Town, ME.	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 3/31/06 Start	DATE 4/3/06 Finish
TYPE	HW		HQ	SURFACE ELEVATIO	
SIZE I.D.	4"		2.5"		
HAMMER WT.	300#				
HAMMER FALL	16"				

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												
"												
"												
"												
"												
"												
"												
"												
"												
"												
"												
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Wash												
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"												
"											30.5	
	1R	3.78"	1.5'	1.5'	32.1	100%						Rock
	2R	3.78"	5.3'	5.3'	37.4	100%						
	3R	3.78"	1.3'	1.3'	38.7	100%						
	4R	3.78"	1.2'	1.2'	39.9	100%						

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
No spoon samples taken
Augered from surface to 20.0'
Washed ahead from 20.0' to 30.5'

HOLE NO. OW-06-10

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 2 HOLE NO. OW-06-10
DRILLER Darrel McKeen	PROJECT NAME Juniper Ridge Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044A	LOCATION Old Town, ME.	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 3/31/06 Start	DATE 4/3/06 Finish
TYPE	HW		HQ		
SIZE I.D.	4"		2.5"		
HAMMER WT.	300#				
HAMMER FALL	16"				

SURFACE ELEVATIO

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	5R	3.78"	1.2'	1.2'	41.1	100%						Rock
	6R	3.78"	1.5'	1.5'	42.6	100%						
	7R	3.78"	1.0'	1.0'	43.6	100%					43.6	
												Bottom of Boring @ 43.6'
												2" PVC Well Installed @ 43.4'
												Using 10.0' screen

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
XX DRILLER-VISUALLY
SOIL TECHNICIAN-VISUALLY
LABORATORY TESTS

REMARKS:
No spoon samples taken
Augered from surface to 20.0'
Washed ahead from 20.0' to 30.5'

HOLE NO. OW-06-10

PROJECT: WOTL Expansion	**JOB NO.:** 05055.00	**BORING NO.:** OW-0610	
DATE STARTED: 3-31-06	**DATE FINISHED:** 4-3-06	**GROUND SURFACE ELEVATION (FT):** 188.4	
DRILLING CONTRACTOR: Maine Test Borings	**DRILLING METHOD:** Auger (0-20 ft), Drive and Wash (20-30.6 ft)		
BOREHOLE DIA. (IN): 4 inch	**ROCK CORE DIA. (IN):** 2.5" ID (H)	**LOGGED BY:** JAB	**SHEET** 1 OF 1

Depth (ft)	Sample No.	Recovery (%)	RQD (%)	Material Description	Well Log	Depth (ft)
				.2 ft Topsoil		
5					2" Schedule 40 PVC Riser	5
10						10
					Bentonite Chips (typ)	
15				Gravelly Sandy Clayey Silt		15
20						20
25						25
30						30
				30.6 ft (BASAL TILL)	Sand (typ)	
	R-1	100	0	GRAY SILTSTONE		
35	R-2	100	87	... wx	2" Schedule 40 PVC Screen No. 10 Slot L=10'	35
	R-3	100	0			
40	R-4	100	0	... clay seam		40
	R-5	100	0			
	R-6	100	67			
	R-7	100	100	43.6 ft (Bedrock)		
				BOE		

Notes:

No soil samples taken. Description of till is based on observations of cuttings.

Bedrock cores highly fractured from approximately 30.6' to 32.0' and 37.0' to 41.0'.

Quartz seams observed in bedrock cores between approximately 32.0' and 37.0'.

Fractures observed in bedrock cores at approximately 32.7', 35.7' and 37.0'.

TOPVC Elevation = 191.07

Sand Pack: 30.5' - 43.6'

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. ~~P06-01~~ P-06-03
DRILLER Darrel McKeen	PROJECT NAME Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 3/1/06 Start	DATE 3/1/06 Finish
TYPE	NW	SS		SURFACE ELEVATIC	
SIZE I.D.	3"	1 3/8"			
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.3	Topsoil
"												
"												
"	1D	2"	24"		4.0	15	26	45	40			
"												
Wash												
Ahead	2D	2"	17"		6.4	23	50	100				
"												
"												Brown Gravelly Silty Sand w/Trace of Cobbles
"												
"												
"	3D	2"	24"		12.0	27	30	40	64			
"												
"												
"												
	4D	2"	24"		17.0	19	30	33	55		17.0	
												Bottom of Boring @ 17.0'
												3/4" PVC Well Installed @ 15.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
XX DRILLER-VISUALLY
SOIL TECHNICIAN-VISUALLY
LABORATORY TESTS

REMARKS:

HOLE NO. P06-01

PROJECT: WOTL Expansion		**JOB NO.:** 05055.00	**BORING NO.:** P-06-03
DATE STARTED: 2-27-06	**DATE FINISHED:** 2-28-06	**DRILLING METHOD:** Auger (0-5 ft) Drive & Wash (5-15 ft)	
GROUND SURFACE ELEVATION (FT): 198.9	**DRILLING CONTRACTOR:** Maine Test Borings		**LOGGED BY:** JAB / JCS
BOREHOLE DIA. (IN): 3	**ROCK CORE DIA. (IN):** NA		**SHEET 1 OF 1**

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	Blows/ .5'	Recovery (%)	WELL LOG	DEPTH (FT)
		0.3 ft Topsoil			Bentonite Chips (typ)	
	D-1		15-26-45-40	100		
5					3/4" schedule 40 pvc pipe	5
	D-2		23-50-100/.4'	79		
		Brown sandy gravelly silt, transitioning to gravelly v, silty sand @ 12'			Sand (typ)	
10						10
	D-3		27-30-40-64	100		
		(BASAL TILL)			3/4" sched. 40 PVC screen No. 10 slot (L=5')	
15						15
		** SANDY ZONE				
	D-4	17 ft BOE	19-30-33-55	85		

NOTES:

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. ~~P06-02~~ P-06-04
DRILLER Darrel McKeen	PROJECT NAME Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044	LOCATION Old Town, ME.	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 2/27/06 Start	DATE 2/28/06 Finish
TYPE	HW	SS		SURFACE ELEVATIC	
SIZE I.D.	4"	1 3/8"			
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.2	Topsoil
"												
"												
"	1D	2"	14"		3.2	20	40	50				
"												Brown Silty Sandy Gravel w/Trace of Cobbles
16												
35	2D	2"	24"		7.0	70	78	60	80			
185											8.0	
90												
100												
70												
94	3D	2"	24"		12.0	42	60	47	35			Brown Sandy Gravel w/Trace of Silt
160												
167												
125											15.0	
95												
65	4D	2"	24"		17.0	53	33	21	19			
63												Brown Sandy Silt w/Trace of Clay
70												
70												
150	5D	2"	12"		21.0	20	150				21.0	
64											21.5	Cobble
43												
60												Brown Sandy Clayey Silt w/Shale
80												
	6D	2"	24"		27.0	100	35	26	60		27.0	
												Weathered Rock
	D	2"	2"	0"	30.2	100					30.2	
												Refusal @ 30.2'
												3/4" PVC Well Installed @ 30.0'
												3/4" PVC Well Installed @ 15.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Washed ahead from 5.0' to 10.0' and from 20.0' to 30.0'.

HOLE NO. P06-02

PROJECT: WOTL Expansion		JOB NO.: 05055.00	BORING NO.: P-06-04
DATE STARTED: 2-27-06	DATE FINISHED: 2-28-06	DRILLING METHOD: Auger (0-5 ft) Drive & Wash (5-30 ft)	
GROUND SURFACE ELEVATION (FT): 186.2	DRILLING CONTRACTOR: Maine Test Borings		LOGGED BY: JAB / JCS
BOREHOLE DIA. (IN): 4	ROCK CORE DIA. (IN): NA		SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	Blows/ .5'	Recovery (%)	WELL LOG	DEPTH (FT)
		0.2 ft Topsoil			Bentonite Chips (Typ)	
	D-1		20-40-50/.2'	67	3/4" schedule 40 pvc pipe	
5						5
	D-2	Brown sandy gravelly silt	70-78-60-80	100	Sand (Typ)	
10						10
	D-3		42-60-47-35	55		
15		Silty sandy gravel layer @ 12'-15'			3/4" sched. 40 PVC screen No. 10 slot (L=5')	15
	D-4		53-33-21-19	70		
20					3/4" sched. 40 PVC pipe	20
	D-5		20-100-50/0'	100		
25		(BASAL TILL)			Bentonite Chips (Typ)	25
	D-6	Color change to mottled gray-brown w/ trace of weathered shale @ 26'	100-35-26-60	90	Sand (Typ)	
30	D-7	30.2 ft Refusal WX ROCK PHYLLITE (BEDROCK)	100/.2'	100	3/4" sched. 40 PVC screen No. 10 slot (L=2')	30

NOTES:

Cobble @ 21' stopped spoon
04A P-0602A is deep and has a short pipe (relative to ground surface)
04B P-0602B is shallow and has a tall pipe (relative to ground surface)

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. OW-06-05
DRILLER Darrel McKeen	PROJECT NAME Juniper Ridge Landfill	LINE & STATION
M.T.B. JOB NUMBER 06-044A	LOCATION Old Town, ME.	OFFSET

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BARREL	DATE 3/27/06 Start	DATE 3/27/06 Finish
	TYPE	HW		HQ	SURFACE ELEVATION	
	SIZE I.D.	4"		2.5"		
	HAMMER WT.	300#				
	HAMMER FALL	16"				

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.4	Topsoil
"												
"												
"												
"												Brown Gravelly Silty Sand w/Trace of Cobbles
"												
"												
"												
"											10.0	
"												
"												
"												
"												
"												
"												
"												
"												
"												
												Gray Brown Gravelly Sandy Clayey Silt w/Trace of Cobbles
											23.2	
	1R	3.78"	5.2'	5.2'	28.4	100%						Rock
	2R	3.78"	5.0'	5.0'	33.4	100%						
	3R	3.78"	3.4'	3.4'	36.8	100%					36.8	
												Bottom of Boring @ 36.8'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
2" PVC Well Installed @ 36.3'
Using 10.0' screen
No spoon samples taken

HOLE NO. OW-06-05

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-01

Start	Finish
6/30/2008	6/30/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Augers											1.0	Brown Silty Fine to Coarse Sand w/Organics
"												
"												
"												Brown Fine to Coarse Sand,
"												w/Silt, Some Gravel & Cobbles
36											5.5	
54	1D	2"	24"		7.0	11	21	24	28			
141												
121												
30												
Wash												
Ahead	2D	2"	24"		12.0	22	28	40	60			
"												
"												
"												
"												Brown Silty Fine to Coarse Sandy Gravel
"	3D	2"	24"		17.0	25	24	36	47			w/Some Cobbles
"												
"												
"												
"												
"	4D	2"	24"		22.0	20	24	32	26			
"											22.4	
												Refusal @ 22.4'

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Augered from surface to 5.0';
Washed ahead from 9.0' to 22.4'

PROJECT CASELLA - JRLF - OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-01	
DATE COMPLETED 6/30/08	DATE WELLS INSTALLED NA	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 177	DRILLING CONTRACTOR MTB	LOGGED BY WCM / JBS	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)	INSTRUMENT LOG
5	1D	BROWN SANDY SILT WITH TRACE GRAVEL, POCKETS OF FINE SAND	46	
10	2D		68	BENTONITE CHIPS
15	3D	OLIVE TO GRAY SANDY CLAYEY SILT WITH LITTLE GRAVEL	60	
20	4D	(BASAL TILL)	56	
25		22.4' REFUSAL BOE @ 22.4		BOE

NOTES DRILLED B-08-01 TO REFUSAL. BACKFILLED TO GROUND SURFACE WITH BENTONITE CHIPS

REFERENCE: FIELD BOOK #508

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-1A

Start	Finish
6/30/2008	6/30/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	Shelby	
Size I.D.	4"		
Hammer Wt.	300#		
Hammer Fall	16"		

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Augers											1.0	Brown Silty Fine to Coarse Sand w/Organics
"												
"												
"												Brown Silty Fine to Coarse Sandy Gravel
"												
67											6.0	
79												
Wash												
Ahead												
"												
"												
"												
"												
"												Brown Silty Fine to Coarse Sandy Gravel
"												w/Cobbles & Trace of Clay
"												
"												
'	1S	3"	14"	14"	17.8	Hydr.	Push	&	Spin			
"												
"	2S	3"	12"	12"	19.3	Hydr.	Push				19.3	
												Bottom of Boring @ 19.3'

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Augered from surface to 5.0';
Washed ahead from 8.0' to 19.3'

PROJECT CASELLA - JRLF - OLD TOWN	JOB NO. 18097.01	BORING NO. B-08-01A	
DATE COMPLETED 7/1/08	DATE WELLS INSTALLED 7/1/08	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 177.2	DRILLING CONTRACTOR MTB	LOGGED BY WCM / JES	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	REC (FT)	WC (%)	>200 (%)	K_V (CM/S)
		SEE B-08-01 FOR MATERIAL DESCRIPTION				
15	15	GRAY SANDY CLAYEY SILT WITH LITTLE GRAVEL (BASAL (TILL)	0.7	11.9	52	1.6×10^{-7}
20	25		0.4	11.9	57	1.1×10^{-7}
		19.3' BOE @ 19.3'				

INSTRUMENT LOG: BENTONITE CHIPS; BOE

NOTES: OFF-SET ± 5' FROM B-08-01. COLLECTED TUBE SAMPLES OF TILL. BACKFILLED BORING TO GROUND SURFACE WITH BENTONITE CHIPS.

REFERENCE: FIELD BOOK #508

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-02

Start	Finish
7/1/2008	7/1/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Hydr												Brown Silty Fine to Coarse Sand,
Push											1.0	w/Organics, Some Cobbles
20												
97												
104												
Wash												
Ahead	1D	2"	18"		6.5	26	54	39				
"												
"												Brown Silty Fine to Coarse Sandy Gravel,
"												w/Some Cobbles
"	2D	2"	18"		10.6	15	25	23				
"												
"	1S	3"	17"	17"	12.4	Hydr.	Push				12.4	
												Bottom of Boring @ 12.4'

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Hydr. Push to 2.0'
Washed ahead from 6.0' to 12.4'

PROJECT CASELLA - JRLF - OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-02	
DATE COMPLETED 7/1/08	DATE WELLS INSTALLED NA	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 176.6	DRILLING CONTRACTOR MTB	LOGGED BY WCM / JES	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)	REC (FT)	WC (%)	>200 (%)	K v-l (CM/SEC)	INSTRUMENT LOG	DEPTH (FT)
								08-02	
5	1D	BROWN SANDY SILT WITH LITTLE CLAY	93					BENTONITE CHIPS	5
10	2D	OLIVE CLAYEY SILT WITH LITTLE FINE SAND AND TRACE GRAVEL (BASAL TILL)	48						10
	1S			1.2	3.6	84	7×10^{-8}		
15		BOE @ 12.4 FT						BOE 12.4	15

NOTES COLLECTED TUBE SAMPLE OF TILL. BACKFILL BORING WITH BENTONITE CHIPS

REFERENCE: FIELD BOOK #508

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-03

Start	Finish
7/1/2008	7/1/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

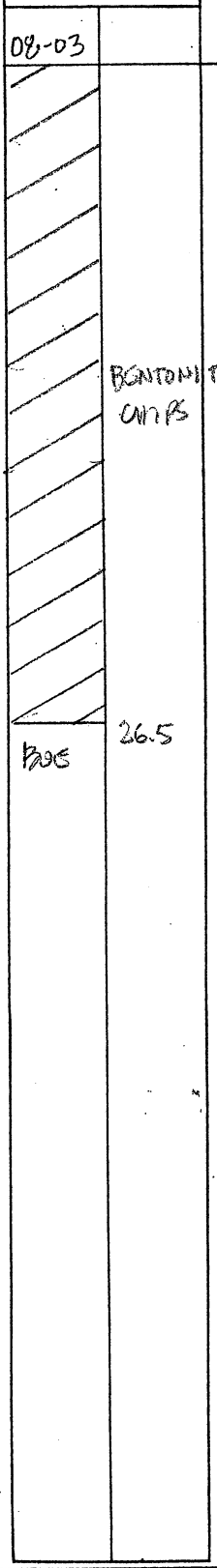
	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Hydr .												Brown Silty Fine to Coarse Sand,
Push											1.5	w/Organics, Some Cobbles
12												
41												
34												
10												
20	1D	2"	18"		6.5	39	30	22				Brown Fine to Coarse Sandy Gravel,
22												w/Cobbles & Trace of Silt
79											9.0	
Wash												
Ahead	2D	2"	18"		10.5	25	41	44				
"												
"												
"	3D	2"	18"		14.0	18	14	21				
"												
"												
"												
"												
"	4D	2"	18"		18.5	23	29	35				Brown Coarse to Fine Sand,
"												w/Some Gravel & Cobbles
"												
"												
"	5D	2"	8"		22.2	70	50					
"												
"												
"												
"												

PROJECT CASELLA - JRLF - OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-03	
DATE COMPLETED 7/1/08	DATE WELLS INSTALLED NA	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 172.6	DRILLING CONTRACTOR MTB	LOGGED BY WCM / JGS	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)
5	1D	BROWN SANDY SILT WITH TRACE GRAVEL AND COBBLES	52
10	2D	BROWN FINE SAND OVER FINE SANDY SILT WITH TRACE GRAVEL	85
	3D		35
15	4D	BROWN TO OLIVE WITH DEPTH FINE SANDY SILT WITH TRACE CLAY AND LITTLE GRAVEL	64
20	5D	(BASAL TILL)	120/0.7'
25		25.2' (BEDROCK)	
		26.5' REFUSAL	
30		BOE @ 26.5'	

INSTRUMENT LOG



NOTES

BACKFILLED BORING TO GROUND SURFACE WITH BENTONITE CHIPS AFTER DRILLING 1.3' INTO ROCK WITH ROLLER CONE

REFERENCE: FIELD BOOK # 508

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-03A

Start	Finish
7/2/2008	7/2/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Hydr.											1.0	Brown Silty Fine to Medium Sand w/Organics
Push												Brown Silty Coarse to Fine Sand,
"											3.0	w/Some Organics & Gravel
"												
												Brown Silty Coarse to Fine Sand,
												w/Gravel, Some Cobbles & Boulders
49												
28												
37											10.0	
1												
8	1D	2"	18"		11.5	20	12	22				
40												Brown Silty Coarse to Fine Sandy Gravel,
42											14.0	w/Cobbles
73												
78												
133	2D	2"	18"		16.5	32	47	43				Brown Fine to Coarse Sandy Gravel,
Wash	1S	3"	5"	5"	17.5	30						w/Some Silt & Cobbles
Ahead	3D	2"	6"		18.5	100					18.5	
												Refusal @ 18.5'

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Washed ahead from 11.0' to 18.5'
Took sample out of tube & reused tube on B08-03B

PROJECT CASELLA-JRLF - OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-03A	
DATE COMPLETED 7/2/08	DATE WELLS INSTALLED NA	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) ± 169	DRILLING CONTRACTOR MTB	LOGGED BY WCM/JES	
BOREHOLE DIAMETER (IN) 4.5" (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)	REC (FT)	WC (%)	>200 (%)	Kv-L (CM/S)	INSTRUMENT LOG	DEPTH (FT)
								08-03A	
5		BROWN SANDY SILT, TRACE CLAY AND GRAVEL							5
		... COLOR CHANGES TO OLIVE GRAY (BASAL TILL)						BENTONITE CHIPS	
10	1D	TRACE COBBLES WITH INCREASING SAND	34						10
15	2D		90						15
	1S	(WASHED TILL)		0.2	7.9	30	1.1×10^{-5}	18.5	
20	3D	18.5' REFUSAL	100/0.5					BOE	20
		BOE @ 18.5'							

NOTES OFF-SET ± 12.5' DOWNSLOPE FROM B-08-03. BACKFILL TO GROUND SURFACE WITH BENTONITE CHIPS.

REFERENCE: FIELD BOOK # 508

MAINE TEST BORINGS INC.
BREWER, ME

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-03B

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Start	Finish
7/2/2008	7/2/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	Shelby	
Size I.D.	4"		
Hammer Wt.	300#		
Hammer Fall	16"		

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Hydr.												
Push												
"												
31												
62												
28												
36												
74												Same as B08-03A
36												
38												
12												
43	1S	3"	6"	6"	11.7	Hydr.						
116												
Wash	S	3"	12"	24"	13.2	15	25					
Ahead												
"												
"	2S	3"	18"	18"	16.3	37	34	45			16.3	
												Bottom of Boring @ 16.3'
												1" PVC Well Installed @ 15.5'
												Using 2.0' Screen
												1" PVC Well Installed @ 5.3'
												Using 2.0' Screen

SAMPLES
D = Split Spoon
C = 2" Shelby Tube
S = 3" Shelby Tube
R = Rock Core
V = Vane Test

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Drilled to 4.8', hit boulder;
Moved, Drilled to 4.8', hit boulder;
Moved to this hole.
Took sample 1S out of tube & reused tube on 2S
Washed ahead from 11.0' to 13.0'

PROJECT CASELLA - JRLF - OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-03B	
DATE COMPLETED 7/2/08	DATE WELLS INSTALLED 7/2/08	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 168.9	DRILLING CONTRACTOR MTB	LOGGED BY WCM / JES	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	REC (FT)	WC (%)	>200 (%)	K (cm/s)	
		SEE B-08-03A FOR MATERIAL DESCRIPTION				$K_F = 1.1 \times 10^{-6}$	P-08-3B
10	1S		0.4'			BASAL TILL → $K_V = 6.2 \times 10^{-7}$	
	MS		0				
		(BASAL TILL)					
15	2S	15.5 WASHED TILL ZONE	1.2'	9.8	45	$K_F = 8.3 \times 10^{-4}$	
		BOE @ 16.3'					
20							

INSTRUMENT LOG

B | A

3.0
3.3
5.3
5.5
1" ϕ RISER PVC
BENTONITE CHIPS
P-08-3A
13.1
13.5
15.5
15.7
16.0
16.3
1" ϕ SLOTTED (0.01) PVC
CAVE

NOTES

OFF-SET FROM B-08-03A AND DRILLED BORING B-08-03B. COLLECTED TUBE SAMPLES AND INSTALLED TWO 1-INCH DIA. SCH 40 PVC PIEZOMETERS P-08-03A & 03B IN BORING.

REFERENCE: FIELD BOOK #508

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-04

Start	Finish
7/2/2008	7/2/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW		
Size I.D.	4"		
Hammer Wt.	300#		
Hammer Fall	16"		

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading
Hydr.										
Push										
"										
72										
57										
65										
82										
89										
105										

Depth	STRATUM DESCRIPTION
1.0	Brown Silty Fine to Coarse Sand, w/Organics, Some Gravel
6.0	Brown Silty Fine to Coarse Sand, w/Gravel, Some Cobbles
9.0	Brown Silty Fine to Coarse Sand, w/Gravel, Some Clay
10.6	Rock
	Refusal @ 10.6'

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

No spoon samples taken

PROJECT CASELLA-JRLF-OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-04
DATE COMPLETED 7/2/08	DATE WELLS INSTALLED NA	DRILLING METHOD DRIVE & WASH
GROUND SURFACE ELEVATION (FT) 193	DRILLING CONTRACTOR MTB	LOGGED BY WCM / JES
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	INSTRUMENT LOG	DEPTH (FT)
5		OLIVE BROWN CLAYEY SILT WITH TRACE SAND AND GRAVEL (BASAL TILL)	BENTONITE CHIPS	5
10		9' (BEDROCK?)		10
		10.6' REFUSAL	10.6'	
		BOE @ 10.6'	BOE	

NOTES: REFUSAL WITH HW CASING AT 9 FEET. ROLLER CONE 1.6' INTO ROCK. BACKFILLED WITH BENTONITE CHIPS. NO SPLIT SPOON SAMPLES COLLECTED

REFERENCE: FIELD BOOK # 503

MAINE TEST BORINGS INC.
BREWER, ME

Driller: Gerard Rudnicki

MTB Job#: 2008-107

Sevee & Maher Engineers, Inc.
Steve Patch
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Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-04A

Start	Finish
7/3/2008	7/3/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading
Hydr.										
Push										
"										
71										
78										
73										
Wash	1D	2"	12"		7.0	27	31			
Ahead	1S	3"	8"	8"	8.0	Hydr.	25			
	S	3"	0"	0"	9.0	50				

Depth	STRATUM DESCRIPTION
0.8	Brown Silty F/C Sand w/Organics & Some Gravel
5.5	Brown Silty Fine to Coarse Sandy Gravel, w/Some Cobbles
7.7	Brown Silty Fine-Coarse Sand, w/Gravel & Trace of Clay
8.0	Rock

Refusal @ 8.0'
1" PVC Well Installed @ 7.7'
Using 2.0' screen

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Hydr. Push to 3.0'
Washed ahead from 7.0' to 8.0'

PROJECT CASELLA-JRLF- OLD TOWN	JOB NO. 03097.01	BORING NO. B-08-04A P-08-04	
DATE COMPLETED 7/3/08	DATE WELLS INSTALLED 7/3/08	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 192.7	DRILLING CONTRACTOR MTB	LOGGED BY WCM / JES	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)	REC (FT)	WC (%)	>200 (%)	K (cm/s)
0							
5	1D	OLIVE BROWN SANDY CLAYEY SILT WITH TRACE GRAVEL	58				
	1S	7.7' (BASAL FILL)		0.9	14.2	54	
	2D	8.0' (BEDROCK?)	50/0				
10		REFUSAL					
		BOE @ 8 FEET					

SAND PACK

1" Ø SLOTTED (0.01")

K_V = 1.8×10^{-6}

K_F = 5.4×10^{-6}

INSTRUMENT LOG

BENTONITE CHIPS

4.5

5.2

7.2

7.5

BOE 8.0

NOTES

OFF-SET FROM BORING B-08-04 AND DRILLED B-08-04A. COLLECTED TUBE SAMPLE OF FILL AND INSTALLED 1-INCH DIA. SCH 40 PVC PIEZOMETER P-08-04 IN BORING.

REFERENCE: FIELD BOOK #508

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-04B

Start	Finish
7/3/2008	7/3/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Hydr.											1.0	Brown Silty F/C Sand w/Some Organics
Push												
36												
31												Brown Silty F/C Sandy Gravel w/Some Cobbles
43												
92											5.5	
126												
Wash												
Ahead												
"												
"												
"	1D	2"	24"		12.0	17	20	22	29			Brown Silty F/C Sand, w/Gravel, Some Cobbles & Trace of Clay
"												
"	S	3"	1"	0"	13.6	Hydr.	Push				14.0	
"											15.0	Rock
												Refusal @ 15.0'

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Hydr. Push to 2.0'
Washed ahead from 8.0' to 15.0'

PROJECT CASELLA - JRLF - OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-04B	
DATE COMPLETED 7/3/08	DATE WELLS INSTALLED NA	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) ±193	DRILLING CONTRACTOR MTB	LOGGED BY WCM / JES	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)	INSTRUMENT LOG	DEPTH (FT)
5		OLIVE BROWN CLAYEY SILT WITH TRACE SAND AND GRAVEL		BENTONITE CHIPS	5
10	1D	(BASAL TILL)	42		10
	MS				
15	14' 15'	(BED ROCK?) REFUSAL		BOE 15'	15

BOE @ 15'

NOTES: OFF-SET ± 48 FEET FROM B-08-04A AND DRILLED B-08-04B. COULD ONLY PUSH/DRIVE TUBE 0.1 FOOT IN TILL. ROLLER CONE 1 FOOT INTO ROCK. BACKFILL TO GROUND SURFACE WITH BENTONITE CHIPS.

REFERENCE: FIELD BOOK #509

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Groundwater Observations:

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Sheet 1 of 1

Hole No. B08-05

Start	Finish
7/3/2008	7/3/2008

Line and Station:

Offset:

Surface Elevation

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Hydr.												Brown Silty Fine-Coarse Sand,
Push											1.0	w/Organics, Some Gravel and Cobble
"												
42												Brown Silty F/C Sandy Gravel w/Cobbles
38											4.5	
Wash	1D	2"	12"		6.0	11	17					
Ahead												
"												
"	1S	3"	18"	18"	9.0	10	21	32				Brown Silty Fine-Coarse Sand,
"												w/Gravel, Some Clay & Cobbles
"	2D	2"	24"		11.0	16	34	32	31			
"											11.5	
											12.0	Rock
												Refusal @ 12.0'

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Hydr. Push to 3.0'
Washed ahead from 5.0' to 12.0'

PROJECT CASELLA-JRLF-OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-05	
DATE COMPLETED 7/3/08	DATE WELLS INSTALLED NA	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 199.1	DRILLING CONTRACTOR MTB	LOGGED BY WCM / JCS	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)	REC (FT)	WC (%)	>200 (%)	K_V (CM/S)	INSTRUMENT LOG	DEPTH (FT)
5	1D	OLIVE BROWN SANDY CLAYEY SILT WITH TRACE GRAVEL	28					BENTONITE CHIPS	5
	1S	(BASAL TILL)		1.37	12.4	53	5.2×10^{-7}		
10	2D	... COBBLE	66						10
		11.5' (BEDROCK?) REFUSAL						12 BOG	
15		BOE @ 12'							15

NOTES: COLLECT TUBE SAMPLE OF TILL. ROLLER CONE 0.5' INTO ROCK. BACKFILL TO GROUND SURFACE WITH BENTONITE CHIPS

REFERENCE: FIELD BOOK # 509

MAINE TEST BORINGS INC.
BREWER, ME

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-06

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Start	Finish
7/7/2008	7/7/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Augers												
"												Brown Silty F/C Sand w/Some Organics
"											3.0	& Trace of Gravel
"												
"												Gray Silty F/C Sand w/Gravel
64											5.5	Some Clay & Trace of Wood
62	1D	2"	24"		7.0	18	20	18	23			
112												Gray Silty Fine-Coarse Sand
111											9.0	w/Gravel & Some Clay
100												
62												
51	2D	2"	18"		11.5	15	20	20				
40												
37												Brown Silty F/C Sand,
36												w/Gravel & Some Clay & Cobbles
52												
81	3D	2"	24"		17.0	16	40	34	35			
54												
40											19.0	
55												
28												Brown Silty Fine Sand,
24	4D	2"	24"		22.0	13	17	18	19			w/some Medium to Coarse Sand & Some Gravel
19											22.5	
15												
55												
Wash	S	3"	7"	0"	25.6	7	10					Brown F/C Sandy Gravel,
Ahead	5D	2"	24"		27.0	5	27	33	27			w/Trace of Silt & Cobbles
"												
"	6D	2"	12"		29.0	23	27				29.0	
												Bottom of Boring @ 29.0'

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Washed ahead from 11.0' to 29.0'

PROJECT CASELLA-JRLF- OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-06	
DATE COMPLETED 7/7/08	DATE WELLS INSTALLED NA	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 182	DRILLING CONTRACTOR MTB	LOGGED BY WGM / JGS	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)	TUBE REC (FT)	INSTRUMENT LOG	DEPTH (FT)
		OLIVE GRAY CLAYEY SILT WITH FINE SAND				
5	1D	(FILL?)	38			5
		OLIVE BROWN CLAYEY SILT WITH SAND AND TRACE GRAVEL				
10	2D		90			10
15	3D		74			15
		... DECREASING CLAY				
20	4D		35			20
		OLIVE BROWN TO BROWN SAND, TRACE SILT AND GRAVEL				
25	MS/5D		60	0		25
	6D	(BASAL TILL)	50			
30		BOE @ 29'				30

NOTES BACKFILL BORING TO GROUND SURFACE WITH BENTONITE CHIPS

REFERENCE: FIELD BOOK WE 508

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-06A

Start	Finish
7/7/2008	7/7/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	Shelby	
Size I.D.	4"		
Hammer Wt.	300#		
Hammer Fall	16"		

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Hydr.												
Push												
"												
"												
"												
Wash												
Ahead												Same as B08-06
"												
"												
"												
"												
"												
"												
"	1S	3"	12"		14.0	16	51				14.0	
												Bottom of Boring @ 14.0'
												1" PVC Well Installed @ 13.2'
												Using 2.0' Screen

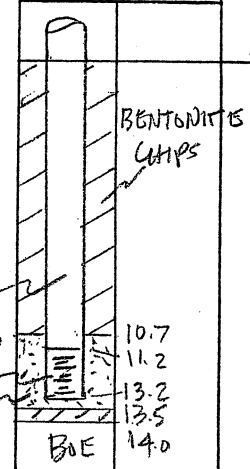
SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
[XX] Driller Visually
[ ] Soil Tech Visually
[ ] Lab Tests

PROJECT CASELLA - JRLF - OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-6A P-08-6	
DATE COMPLETED 7/7/08	DATE WELLS INSTALLED 7/7/08	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 182.2	DRILLING CONTRACTOR MTB	LOGGED BY WCM / JES	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	REC (FT)	WC (%)	>200 (%)	K (CM/S)	
		SEE B-08-6 FOR MATERIAL DESCRIPTION					
5							
10						KHF = 1.6 x 10^{-6}	1" Ø SCH 40 PVC RISER
	MS	(BASAL TILL)	0				SLOTTED (0.01")
	1S		0.65	11	42	KV = 6.6 x 10^{-8}	SAND PACK
15		BOE @ 14'					

INSTRUMENT LOG



NOTES OFF-SET 3 FEET FROM B-08-06 AND DRILLED B-08-06A. COLLECTED TUBE SAMPLE OF TILL AND INSTALLED 1-INCH DIA. SCH 40 PVC PIEZOMETER P-08-06 IN BORING

REFERENCE: FIELD BOOK # 508

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-07

Start	Finish
7/7/2008	7/7/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Hydr.											1.0	Brown Silty F/C Sand w/Organics
Push												
"											3.0	Brown Silty F/C Sand w/Gravel
59												
61												
Wash												
Ahead	1D	2"	24"		7.0	13	20	18	26			
"												
"												
"												Brown Silty F/C Sand w/Gravel Some Clay
"												
"	1S	3"	16"		11.3	18	39	50				
"												
"												
"												
"	D	3"	2"		15.2	150					15.2	
											15.6	Rock
												Refusal @ 15.6'
												1" PVC Well Installed @ 12.0'
												Using 2.0' Screen

PROJECT CASELLA JRLF - OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-07	
DATE COMPLETED 7/8/08	DATE WELLS INSTALLED 7/8/08	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 211.7	DRILLING CONTRACTOR MTB	LOGGED BY WCM / JES	
BOREHOLE DIAMETER (IN) 4.5" (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)	REC (FT)	WC (%)	>200 (%)	K (CM/S)
5	1D	OLIVE BROWN CLAYEY SILT WITH TRACE SAND AND GRAVEL (BASAL TILL)	38				
10	1S			1.3	11	55	
15		15.2'					
	2D	(BEDROCK?) 15.6 REFUSAL	150/0.2				
20		BOE @ 15.6					

INSTRUMENT LOG

1" Ø SCH 40 PVC RISER

BENTONITE CHIPS

SAND PACK

2' LONG Y 1" Ø SLOTTED (0.01") PVC

9.6
10.0
12.0
12.4
15.6

BOE

1S: $K_V = 2.9 \times 10^{-8}$

$K_F = 1.4 \times 10^{-6}$

NOTES

COLLECTED TUBE SAMPLE OF TILL. ROLLER CONE 0.4' INTO ROCK. INSTALLED 1-INCH DIAMETER SCH 40 PVC PIEZOMETER P-08-07 IN BORING.

REFERENCE: FIELD BOOK # 508

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-107

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Landfill
Old Town , ME

Sheet 1 of 1

Hole No. B08-08

Start	Finish
7/8/2008	7/8/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Hydr.											0.8	Brown Silty F/C Sand w/Some Organics
Push												
"											3.0	Brown Silty F/C Sandy Gravel w/Cobbles
26												
54												
Wash												
Ahead	1D	2"	24"		7.0	15	23	24	30			Brown Silty F/C Sand,
"												w/Gravel Some Clay & Cobble
"												
"												
"												
"	1S	3"	12"		12.0	Hydr.	22					
"											13.0	
"	2D	2"	24"		13.2	22	25	31	56			Brown Silty F/C Sand w/Gravel & Some Cobbles
"												
"												
"												
"												
"	3D	3"	12"		19.0	33	58					
"												
"												
"												
"											22.1	
"												
"	4D	2"	24"		25.0	34	36	44	41			Brown Silty C-F Sand w/Some Gravel
"												
"											26.4	
"	5D	2"	12"		28.0	51	72					Brown Silty F/C Sandy Gravel w/Some Cobbles
"												
"											29.3	
											30.0	Rock
												Refusal @ 30.0'

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Washed ahead from 6.0' to 30.0'

PROJECT CASELLA - JRLF - OLD TOWN	JOB NO. 08097.01	BORING NO. B-08-08	
DATE COMPLETED 7/8/08	DATE WELLS INSTALLED NA	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 207.8	DRILLING CONTRACTOR MTB	LOGGED BY WLM / JES	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)	TUBE REC (FT)	INSTRUMENT LOG	DEPTH (FT)
5	1D	OLIVE BROWN CLAYEY SILT / SILTY CLAY WITH SOME SAND AND TRACE GRAVEL	47			5
10	1S			0.9		10
	2D		56		BENTONITE CHIPS	
15	3D	ooo INCREASING SAND	91			15
20						20
25	4D	ooo SILTY ZONE	80			25
	5D	CLAYEY SILT AND SAND (BASAL TILL)	123			
30		29.3' (BEDROCK?) 30			30' BOE	30
		REFUSAL				
		BOE @ 30'				

NOTES

COLLECTED TUBE SAMPLE OF TILL. ROLLER CONE 0-7' INTO ROCK. BACKFILL TO GROUND SURFACE WITH BENTONITE CHIPS.

REFERENCE = FIELD BOOK #508

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-119

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Job 2
Old Town , ME

Sheet 1 of 2

Hole No. B08-09

Start	Finish
7/8/2008	7/8/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	SS	NQ2
Size I.D.	4"	1-3/8"	2"
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Augers											1.0	Brown Silty F/C Sand w/Organics & Cobbles
"											2.0	Brown Silty F/C Sand w/Trace of Organics
"												
"												
"												Brown Silty F/C Sand w/Gravel & Cobbles
"											6.0	
14												
9	1D	2"	24"		8.0	24	18	25	31			
16												
19												
33												Brown Silty F/C Sand w/Gravel &Trace of Cobbles
79	1S	3"	7"		11.4	Hydr.	12					
108												
99											14.0	
130												
37	2D	2"	11"		15.9	29	50					
82												Brown Fine to Coarse Sandy Gravel
110												w/Cobbles & Trace of Silt
159	3D	2"	24"		19.0	29	27	55	61		19.0	
51												
29	4D	2"	24"		21.0	21	21	21	46		21.0	Brown M/C Sand w/Fine Sand Layers
84												
112	5D	2"	24"		23.0	38	31	36	36			
58	6D	2"	12"		24.0	28	97					Brown Silty F/C Sandy Gravel
158											25.0	w/Fine-Medium Sand Layers
51												
110	7D	2"	24"		27.0	44	37	64	64			
146												Brown Silty F/C Sandy Gravel
148	8D	2"	24"		29.0	30	53	39	45			w/Trace of Cobbles
155											30.0	
30	9D	2"	24"		31.0	82	37	40	43			
21												Brown Silt w/Fine Sand Layers
28	10D	2"	24"		33.0	23	24	23	28		33.0	
52												
92	11D	2"	24"		35.0	13	19	19	23			
34												Brown Fine Sand w/Silt Layers
26	12D	2"	24"		37.0	15	21	25	31			
175	13D	2"	12"		38.0	26	126				37.9	
92												Weathered Rock
110												

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Washed ahead from 7.0' to 42.6'

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-119

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Job 2
Old Town , ME

Sheet 2 of 2

Hole No. B08-09

Start	Finish
7/8/2008	7/8/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

	Casing	Sampler	Core Barrel
Type	HW	SS	NQ2
Size I.D.	4"	1-3/8"	2"
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
	14D	2"	12"		41.5	28	104					Weathered Rock
											42.6	
	1R	3"	3.0'	2.5'	45.6	83.3%						Refusal @ 42.6 1" PVC Well Installed @ 37.3' Using 2.0' Screen 1" PVC Well Installed @ 20.2' Using 5.0' Screen 1" PVC Well Installed @ 9.8' Using 3.0' Screen

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

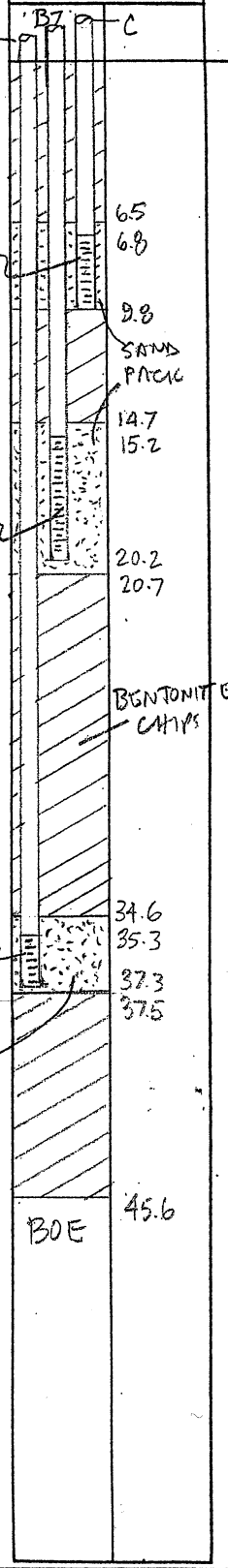
Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Washed ahead from 7.0' to 42.6'

PROJECT CASELLA - JRLF - OLD TOWN	JOB NO. 08097.03	BORING NO. B-08-09	
DATE COMPLETED 7/9/08	DATE WELLS INSTALLED 7/9/08	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 198.2	DRILLING CONTRACTOR MTB	LOGGED BY WCM/JGS	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) 2 (NQ-2)	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)	REC (FT)	WC (%)	>200 (%)
		BROWN SILTY SAND AND COBBLES				
	1D	OLIVE BROWN CLAYEY SILT WITH SOME SAND AND TRACE GRAVEL (BROWN TILL)	43			
	1S			0.35	12.8	45
	2D	LAYERED OLIVE BROWN SILTY SAND / FINE TO MEDIUM SAND, LITTLE GRAVEL, TRACE COBBLES (WASHED TILL)	29/50-0.4'			
	3D		82			
	4D		42			
	5D		67			
25'	6D		125			
	7D	... ZONE OF SANDY GRAVEL WITH LITTLE SILT	101			
	8D		92			
	9D	LAYERED OLIVE BROWN SILTY SAND / FINE SAND (SANDY ~~ZONE~~)	77			
	10D		47			
	11D		38			
	12D		46			
	13D		>126			
38'		OLIVE BROWN SILTY CLAY WITH PIECES OF WEATHERED ROCK (TILL?)				
	14D		132	RQD (%)		
	1R	(WEATHERED BEDROCK)		30		
42.6		(BEDROCK)				
		BOE @ 45.6				

INSTRUMENT LOG



1S: K_v = 3 x 10^{-7} cm/s

NOTES

COLLECTED TUBE SAMPLE OF TILL. INSTALLED THREE 1-INCH DIA. SCH 40 PVC PIEZOMETERS P-08-09A, 09B & 09C IN BORING

REFERENCE: FIELD BOOK #508

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-119

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Job 2
Old Town , ME

Sheet 1 of 3

Hole No. B08-10

Start	Finish
7/9/2008	7/9/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

7/11/08 7:00AM Water @ 14.0' w/ 60.0' Casing, Hole depth= 65.0'

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
Augers											0.8	Brown Silty F/C Sand w/Some Organics & Gravel
"												
"												Brown Silty F/C Sandy Gravel w/Some Cobbles
"											3.5	
"												
39												
49	1D	2"	24"		7.0	9	9	12	20			
62												
81												Brown Silty F/C Sand, w/Gravel Some Clay & Cobbles
89												
40	2D	2"	12"		11.0	12	17					
30												
22	1S	3"	18"		12.5	Hydr.	Push					
28											13.5	
83	2S	3"	5"		14.5	Hydr.	Push					
67												
58	3S	3"	18"		17.0	Hydr.	Push					
44												
47												
42												Gray Silty F/C Sand w/Gravel & Some Clay
50												
38												
54												
38												
37												
53	3D	2"	18"		26.5	19	32	69				
28	4D	2"	24"		27.0	25	26	21	26		27.0	
33												
86	S	3"	14"	0"	28.7	Hydr.	Push					Brown Coarse to Fine Sandy Gravel
110	5D	3"	18"		29.0	17	22	66			29.5	
78												
79	6D	2"	24"		32.0	21	22	23	29			
52												
76												
90	7D	2"	30"		34.5	21	24	24	23	26		Brown F/M Sand w/Trace of Gravel
38												
31												
47	8D	2"	30"		37.5	19	21	24	24	25		
71												
84	9D	2"	30"		40.0	11	18	26	24	27		

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Washed ahead from 11.0' to 95.0'

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-119

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Job 2
Old Town , ME

Sheet 2 of 3

Hole No. B08-10

Start	Finish
7/9/2008	7/9/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

7/11/08 7:00AM Water @ 14.0' w/ 60.0' Casing, Hole depth= 65.0'

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading	Depth	STRATUM DESCRIPTION
36												
28												
44	10D	2"	30"		42.5	13	20	20	24	22		
62												Brown F/M Sand w/Trace of Gravel
76	11D	2"	30"		45.0	12	18	20	21	26		
40											45.5	
30												
102	12D	2"	30"		47.5	14	24	35	46	34		Brown F/C Sand w/Gravel & Trace of Silt
71											49.0	
53	13D	2"	30"		50.0	33	34	19	24	30		
47												Brown F/M Sand w/Trace of Silt & Coarse Sand
52												
76	14D	2"	30"		52.5	18	18	21	22	24	53.0	
83												
89	15D	2"	30"		55.0	19	26	26	24	35		
33												
46												Brown F/M Sand w/Gravel
71	16D	2"	24"		57.5	23	26	26	28			Trace of Silt & Cobbles
95												
125	17D	2"	30"		60.0	22	22	24	22	40	59.8	
79	18D	2"	6"		60.5	79						
58												
118												
152												Brown F/M Sand w/Gravel, Some Cobbles
168	19D	2"	30"		65.0	39	32	42	49	40		& Trace of Silt
47												
45												
82	20D	2"	30"		67.5	29	28	40	69	61	68.0	
149												
197	21D	2"	24"		69.5	48	61	62	87			
61												Brown Silty F/C Sandy Gravel
41	22D	2"	18"		71.5	44	61	129				
43												
66											74.0	
84												
65												
46												
73	23D	2"	30"		77.5	35	46	48	48	43		
76												Brown F/M Sand
129	24D	2"	30"		80.0	16	32	33	33	48		

SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Washed ahead from 11.0' to 95.0'

MAINE TEST BORINGS INC.
BREWER, ME

Driller:	Gerard Rudnicki
MTB Job#:	2008-119

Sevee & Maher Engineers, Inc.
Steve Patch
P.O. Box 85A
Cumberland Center ME
Ref No: PO No:
Juniper Ridge Job 2
Old Town , ME

Sheet 3 of 3

Hole No. B08-10

Start	Finish
7/9/2008	7/9/2008

Line and Station:

Offset:

Surface Elevation

Groundwater Observations:

7/11/08 7:00AM Water @ 14.0' w/ 60.0' Casing, Hole depth= 65.0'

	Casing	Sampler	Core Barrel
Type	HW	SS	
Size I.D.	4"	1-3/8"	
Hammer Wt.	300#	140#	
Hammer Fall	16"	30"	

Casing blows per ft.	SAMPLE INFORMATION No.	O.D.	Pen.	Rec.	Bottom depth	BLOWS PER 6" on Sampler 0-6	6-12	12-18	18-24	Vane Reading
68										
52										
46										
48										
48										
56										
40	25D	2"	24"		87.0	20	31	53	44	
50										
88										
116										
Wash	26D	2"	7"		90.6	35	100			
Ahead										
"										
"										
"										

Depth	STRATUM DESCRIPTION
	Brown F/M Sand
84.0	
	Brown F/M Sand w/Some Silt Layers
87.0	
	Brown F/C Sandy Gravel
91.5	
	Weathered Rock
95.0	
	Refusal @ 95.0'
	1" PVC Well Installed @ 89.0'
	Using 2.0' Screen
	1" PVC Well Installed @ 58.0'
	Using 2.0' Screen
	1" PVC Well Installed @ 17.9'
	Using 5.5' Screen

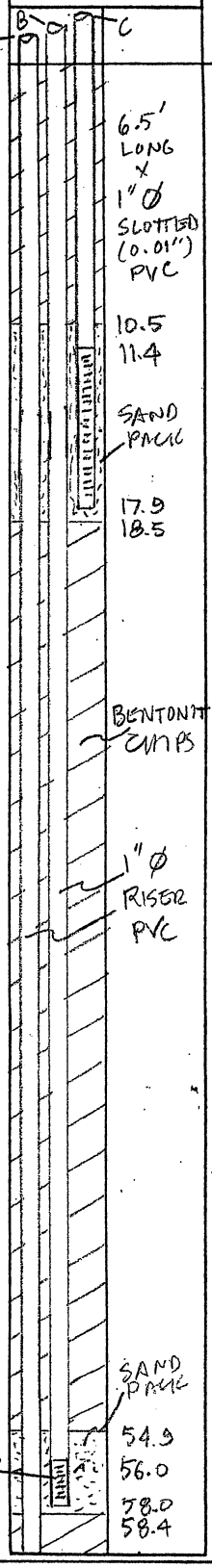
SAMPLES
D = Split Spoon R = Rock Core
C = 2" Shelby Tube V = Vane Test
S = 3" Shelby Tube

Soil Classified by:
XX Driller Visually
Soil Tech Visually
Lab Tests

Washed ahead from 11.0' to 95.0'

PROJECT	CASELLA-JRLF-OLD TOWN	JOB NO.	08097.03	BORING NO.	B-08-10
DATE COMPLETED	7/11/08	DATE WELLS INSTALLED	7/11/08	DRILLING METHOD	DRIVE & WASH
GROUND SURFACE ELEVATION (FT)	202.2	DRILLING CONTRACTOR	MTB	LOGGED BY	WCM / [illegible]
BOREHOLE DIAMETER (IN)	4.5 (HW)	ROCK CORE DIAMETER (IN.)	NA	SHEET	1 OF 2

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N (BPF)	REC (FT)	WC (%)	>200 (%)	Ky-L (CM/S)
		BROWN SILTY SANDY GRAVEL WITH COBBLES					
5	1D	OLIVE BROWN CLAYEY SILT WITH SOME SAND AND TRACE GRAVEL	21				
10	2D		29				
	1S	... CHANGE IN COLOR TO GRAY WITH DEPTH		1.35	13.7	62	2.4 X 10^-8
15	2S			0.3			
	3S			1.5	12.9	59	4.1 X 10^-8
20	3D	... SOME COBBLES BETWEEN 19 & 24 FEET	47				
25	4D	(BASAL TILL) 27.0'	101				
	MS						
30	5D		88				
	6D	BROWN FINE TO MEDIUM SAND WITH TRACE TO LITTLE SILT AND GRAVEL	45				
	7D		48				
35	8D		45				
	9D		44				
40	10D		40				
	11D		38				
45	12D	... GRAVELLY SAND LAYER BETWEEN 46 TO 48 FEET	59				
	13D		53				
50	14D		39				
	15D		52				
55	16D		52				
60	17D	(SANDY ZONE)	46				



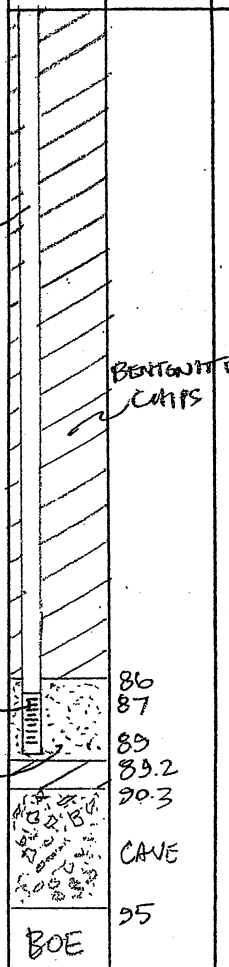
NOTES

COLLECTED TUBE SAMPLES OF TILL. INSTALLED THREE 1-INCH DIAMETER SCH 40 PVC PIEZOMETERS P-08-10A, 10B & 10C IN BORING.

REFERENCE: FIELD BOOK # 508

PROJECT CASELLA - JRLF - OLD TOWN	JOB NO. 08097.03	BORING NO. B-08-10	
DATE COMPLETED 7/11/08	DATE WELLS INSTALLED 7/11/08	DRILLING METHOD DRIVE & WASH	
GROUND SURFACE ELEVATION (FT) 202.2	DRILLING CONTRACTOR MTR	LOGGED BY WCM	
BOREHOLE DIAMETER (IN) 4.5 (HW)	ROCK CORE DIAMETER (IN.) NA	SHEET 2 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N
65	18D	BROWN FINE TO MEDIUM SAND WITH TRACE TO LITTLE SILT AND GRAVEL	29/50-0
	19D		74
	20D		68
70	21D	... SANDY GRAVEL LAYER	130
	22D		100
75	23D	LAYERED BROWN SILTY SAND/ FINE-MEDIUM SAND	94
	24D		65
80			
85	25D		84
		(SANDY ZONE)	
90	26D		35/100-0.1'
		91.5' (WEATHERED BED ROCK)	
95		95' REFUSAL	
		BOE @ 95'	



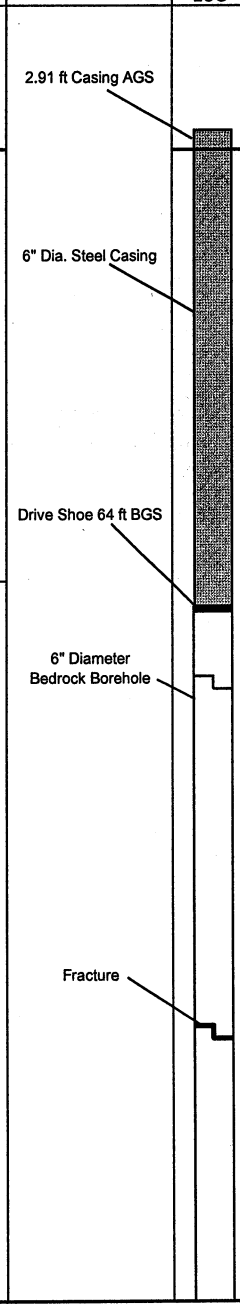
NOTES

COLLECTED TUBE SAMPLES OF TILL. ROLLER CONE 4.5' INTO ROCK. INSTALLED THREE 1-INCH DIAMETER SCH 40 PIEZOMETERS P-08-10A, 10B & 10C IN BORING

REFERENCE: FIELD BOOK # 508

PROJECT: Juniper Ridge Landfill		**JOB NO.:** 08097.03	**BORING NO.:** PW-08-01
DATE STARTED: 12/29/2008	**DATE FINISHED:** 12/30/2008	**DRILLING METHOD:** Mud Rotary (0 to 64 ft), Air Rotary (64 to 260 ft)	
GROUND SURFACE ELEVATION (FT): 173.10	**DRILLING CONTRACTOR:** Goodwin Well & Water Inc.		**LOGGED BY:** APG
CASING BOREHOLE DIA.: 8&3/4"	**OPEN BEDROCK BOREHOLE DIA.:** 6"		**SHEET 1 OF 2**

DEPTH (FT)	MATERIAL DESCRIPTION	CUTTING SAMPLE DEPTH	FRACTURE DEPTH (FT)
0			
20	Glacial Till Overburden - Not sampled - Loose to compact and poorly sorted to weakly stratified clay, silt, sand, gravel. (Maine Geological Survey, Surficial Geology, Old Town Quadrangle, Maine. Open File No. 08-47 2008)		
40			
60	Top of Bedrock at 59 feet BGS		
	- 59 ft to 129 ft BGS - Dark gray to gray slate to phyllite - Mineral foliation includes parallel alignment of minerals and distribution of mineral types (compositional layering)	59 ft to 64 ft	
80	- Very fine grained with high degree of foliation at this depth range - High in sulfide minerals (i.e. pyrite) - Calcite seams present and calcite veins have formed in water bearing fractures	64 ft to 78 ft	73 ft to 75 ft
100	- Sulfide minerals oxidized at water bearing features	78 ft to 98 ft	
120		98 ft to 118 ft	
		122 ft to 125 ft	122 ft
140	- 129 ft to 260 ft BGS - Gray meta-graywacke (low grade metamorphism) - Signinficant decrease in planar texture and compositional layering of minerals - Very fine to fine grained with low degree to absence of schistosity - High in sulfide minerals (i.e. pyrite)		
160	- Calcite seams abundant and calcite veins have formed in water bearing fractures - Sulfide minerals oxidized at water bearing features	148 ft to 149 ft	



NOTES:

Top of bedrock 59 ft below ground surface (BGS)

Bottom of permanent casing 64 ft BGS

Top of permanent casing 2.91 ft above ground surface (AGS)

MP Elevation = 176.01 ft (top of permanent casing)

PROJECT: Juniper Ridge Landfill		JOB NO.: 08097.03	BORING NO.: PW-08-01
DATE STARTED: 12/29/2008	DATE FINISHED: 12/30/2008	DRILLING METHOD: Mud Rotary (0 to 59 ft), Air Rotary (59 to 260 ft)	
GROUND SURFACE ELEVATION (FT): NA	DRILLING CONTRACTOR: Goodwin Well & Water Inc.		LOGGED BY: APG
CASING BOREHOLE DIA.: 8&3/4"	OPEN BEDROCK BOREHOLE DIA.: 6"		SHEET 2 OF 2

DEPTH (FT)	MATERIAL DESCRIPTION	CUTTING SAMPLE DEPTH	FRACTURE DEPTH (FT)		WELL LOG	DEPTH (FT)
	see above	167 ft to 168 ft				
180						
		188 ft to 189 ft				
			195 ft	6" Diameter Bedrock Borehole		
200						200
		208 ft to 210 ft	208 ft			
220						220
		221 ft	221 ft			
			225 ft			
			229 ft			
240						240
		240 ft				
260		258 ft				260
	Bottom of Exploration at 260 ft BGS					
280						280
300						300
320						320
340						340

NOTES:

GOODWIN WELL & WATER, INC.

DRILLERS LOG

CUSTOMER: SEVEE & MAHER

OWNER: JUNIPER RIDGE LANDFILL

TOWN: OLD TOWN, MAINE

DATE STARTED: 12/29/08

DATE FINISHED: 12/30/08

JOB #: 2008-443 HOLE: PW-08-01

DRILLER: BOB CUSHMAN

HELPER: RALPH RIDER III

LOCATION

TAKE I 95 NORTH TO SECOND OLD TOWN EXIT, EXIT 199. TURN LEFT ONTO RT. 16 TOWARDS LAGRANGE. ACCESS RD TO LANDFILL IS ON LEFT ABOUT 500' FROM INTERSECTION. TAKE ACCESS RD. ABOUT TWO MILES TO SITE.

PW-08-01

DATE & TIME	INTERVAL FROM	INTERVAL TO	DESCRIPTION
12/29/2008			
10:50-12:10			SETTING UP THE RIG
12:10			DRILLING A 8 3/4" BOREHOLE DOWN TO 64'
	0'	12'	BOULDERS
	12'	30'	GRAVEL
	30'	59'	BOULDERS
	59'	64'	BEDROCK, SET 67' OF 6" STEEL CASING WITH A SHOE
	64'	73'	BLACK SHALEY ROCK
	73'	75'	SOFT SPOT - NO WATER
4:50	75'	120'	SOFT BLACK SHALEY ROCK, BLEW ON THE WELL
12/30/2008			
10:00	120'	122'	CHECKED STATIC - CONTINUED TO DRILL
	122'	123'	FRACTURE - THE FRACTURE MOVING A LOT OF MATERIAL
			CLEANED OUT THE BEST WE COULD AND THE FRACTURE WAS DIRTY BUT
			CLEARED UP BY BLOWING ON IT
	123'	130'	SOFT BLACK IRON ROCK
	130'	165'	BLACK SHALEY ROCK WITH WHITE QUARTZ

GOODWIN WELL & WATER, INC.
DRILLERS LOG

DATE & TIME	INTERVAL FROM	INTERVAL TO	DESCRIPTION
12/30/2008	165'	166'	SOFT SPOT
	166'	180'	BLACK SHALEY ROCK WITH WHITE QUARTZ
	180'	194'	BLACK SHALEY ROCK WITH WHITE QUARTZ.
	194'	196'	FRACTURE
	196'	200'	BROWN AND BLACK SHALEY ROCK
	200'	210'	BLACK SHALEY ROCK WITH WHITE QUARTZ.
	210'	215'	SOFT SPOT
	215'	227'	BLACK SHALEY ROCK WITH WHITE QUARTZ.
	227'	228'	FRACTURE
	228'	235'	BLACK SHALEY ROCK WITH WHITE QUARTZ.
	235'	237'	SOFT SPOT
	237'	260'	BLACK SHALEY ROCK WITH WHITE QUARTZ.
			TOTAL DEPTH - 260'
			INSTALLED 6" LOCKING WELL CAP WITH PADLOCK
			TORE DOWN AND PULLED OFF HOLE

PROJECT: Juniper Ridge Landfill		**JOB NO.:** 08097.03	**BORING NO.:** PW-08-02
DATE STARTED: 1/2/2009	**DATE FINISHED:** 1/5/2009	**DRILLING METHOD:** Mud Rotary (0 to 38 ft), Air Rotary (38 to 235 ft)	
GROUND SURFACE ELEVATION (FT): 203.98	**DRILLING CONTRACTOR:** Goodwin Well & Water Inc.		**LOGGED BY:** APG
CASING BOREHOLE DIA.: 8&3/4"	**OPEN BEDROCK BOREHOLE DIA.:** 6"		**SHEET 1 OF 2**

DEPTH (FT)	MATERIAL DESCRIPTION	CUTTING SAMPLE DEPTH	FRACTURE DEPTH (FT)	WELL LOG	DEPTH (FT)
0				2.49 ft Casing AGS	0
20	Glacial Till Overburden - Not sampled - Loose to compact and poorly sorted to weakly stratified clay, silt, sand, gravel. (Maine Geological Survey, Surficial Geology, Old Town Quadrangle, Maine. Open File No. 08-47 2008)			6" Dia. Steel Casing	20
40	Top of Bedrock at 35 feet BGS - 35 ft to 61 ft BGS			Drive Shoe 38 ft BGS	40
60	- Highly weathered, very fine to fine grained sedimentary rock with low grade metamorphism, light gray - Very high calcite concentration - Calcite veins abundant from 46 ft to 61 ft BGS, however, calcite has dissolved from fractures from 46 ft to 35 ft BGS (near bedrock surface)	49 ft	55 ft to 56 ft	6" Diameter Bedrock Borehole	60
80	- 61 ft to 235 ft BGS - Gray meta-graywacke (low grade metamorphism) - Little to no planar mineral texture and compositional layering of minerals - Fine to medium grained with low degree to absence of schistosity - High in sulfide minerals (i.e. pyrite)	69 ft		Fracture	80
100	- Calcite seams abundant and calcite veins have formed in water bearing fractures - Sulfide minerals oxidized at water bearing features	85 ft	85 ft 94 ft to 97 ft		100
120		109 ft			120
140		129 ft			140
160					160

NOTES:

Top of bedrock 35 ft below ground surface (BGS)

Bottom of permanent casing 38 ft BGS

Top of permanent casing 2.49 ft above ground surface (AGS)

MP Elevation = 206.47 ft (top of permanent casing)

PROJECT: Juniper Ridge Landfill		JOB NO.: 08097.03	BORING NO.: PW-08-02
DATE STARTED: 1/2/2009	DATE FINISHED: 1/5/2009	DRILLING METHOD: Mud Rotary (0 to 38 ft), Air Rotary (38 to 235 ft)	
GROUND SURFACE ELEVATION (FT): NA	DRILLING CONTRACTOR: Goodwin Well & Water Inc.		LOGGED BY: APG
CASING BOREHOLE DIA.: 8&3/4"	OPEN BEDROCK BOREHOLE DIA.: 6"		SHEET 2 OF 2

DEPTH (FT)	MATERIAL DESCRIPTION	CUTTING SAMPLE DEPTH	FRACTURE DEPTH (FT)		WELL LOG	DEPTH (FT)
	see above	189 ft		Bedrock Borehole		
180						
200						200
		209 ft				
220						220
		229 ft				
240	Bottom of Exploration at 235 ft BGS					240
260						260
280						280
300						300
320						320
340						340

NOTES:

GOODWIN WELL & WATER, INC.

DRILLERS LOG

CUSTOMER: SEVEE & MAHER ENGINEERING

OWNER: JUNIPER RIDGE LANDFILL

TOWN: OLD TOWN, ME

DATE STARTED: 12/30/08

DATE FINISHED: 1/5/09

JOB #: 2008-444 HOLE: PW-08-02

DRILLER: BOB CUSHMAN

HELPER: RALPH RYDER III

LOCATION

TAKE I 95 NORTH TO SECOND OLD TOWN EXIT, EXIT 199. TURN LEFT ONTO RT. 16 TOWARDS LAGRANGE. ACCESS RD TO LANDFILL IS ON LEFT ABOUT 500' FROM INTERSECTION. TAKE ACCESS RD. ABOUT TWO MILES TO SITE.

PW-08-02

DATE & TIME	INTERVAL FROM	INTERVAL TO	DESCRIPTION
12/30/2008			DRILLED A 8 3/4" BOREHOLE DOWN TO 38'
	0'	10'	BOULDERS
	10'	20'	GRAVEL
	20'	35'	CLAY
	35'	38'	BUSTED UP LEDGE - SET 40' OF CASING ANYWAY BECAUSE SME GEOLOGIST
			WANTED TO TEST THE TOP FRACTURES.
	38'	55'	SOFT AND BUSTED UP BLACK SHALEY WITH IRON ROCK
	55'	56'	FRACTURE
	56'	60'	BLACK SHALEY ROCK
	60'	85'	BLACK SHALEY ROCK
	85'	86'	FRACTURE
	86'	94'	BLACK SHALEY ROCK
	94'	97'	BIG FRACTURE. BIG PIECES OF BEDROCK, CAVING IN, SPENT 45 MINS. CLEANING
			IT OUT. IT WAS STILL STRIPPING THE HOLE VERY LITTLE AS WE CONTINUED TO
			DRILL. NOT ENOUGH TO CAUSE ANY PROBLEMS.
	97'	180'	BLACK SHALEY ROCK - PULLED HAMMER UP BEYOND THE TWO FRACTURES

GOODWIN WELL & WATER, INC.
DRILLERS LOG

DATE & TIME	INTERVAL FROM	INTERVAL TO	DESCRIPTION
12/30/2008			TO SEE HOW MUCH THE HOLE CAVES IN OVER THE WEEKEND.
1/5/2009			CHECKED STATIC - WENT BACK TO THE BOTTOM OF THE HOLE WITH THE
			HAMMER. AFTER THE WEEKEND THERE WAS ONLY 6" OF MATERIAL IN THE
			BOTTOM FROM THE 94' TO 97' FRACTURE. CONTINUED TO DRILL
	180'	228'	BLACK SHALEY ROCK WITH WHITE QUARTZ. NO SOFT SPOT
	228'	230'	SOFT SPOT
	230'	235'	BLACK SHALEY ROCK WITH WHITE QUARTZ.
			TOTAL DEPTH - 235'
			INSTALLED A 6" LOCKING WELL CAP WITH PADLOCK
			TORE DOWN AND PULLED OFF THE HOLE

PROJECT: Juniper Ridge Landfill		**JOB NO.:** 08097.03	**BORING NO.:** PW-08-03
DATE STARTED: 1/5/2009	**DATE FINISHED:** 1/6/2009	**DRILLING METHOD:** Mud Rotary (0 to 38 ft), Air Rotary (38 to 235 ft)	
GROUND SURFACE ELEVATION (FT): 169.40	**DRILLING CONTRACTOR:** Goodwin Well & Water Inc.		**LOGGED BY:** APG
CASING BOREHOLE DIA.: 8&3/4"	**OPEN BEDROCK BOREHOLE DIA.:** 6"		**SHEET 1 OF 2**

DEPTH (FT)	MATERIAL DESCRIPTION	CUTTING SAMPLE DEPTH	FRACTURE DEPTH (FT)		WELL LOG	DEPTH (FT)
				1.72 ft Casing AGS		
0						0
	Glacial Till Overburden - Not sampled - Loose to compact and poorly sorted to weakly stratified clay, silt, sand, gravel. (Maine Geological Survey, Surficial Geology, Old Town Quadrangle, Maine. Open File No. 08-47 2008)			6" Dia. Steel Casing		
20						20
				Drive Shoe 38 ft BGS		
	Top of Bedrock at 35 feet BGS					
40	- 35 ft to 60 ft BGS	39 ft				40
	- Gray meta-graywacke (low grade metamorphism)					
	- Little to no planar mineral texture and compositional layering of minerals			Fracture		
	- Very fine grained with low degree to absence of schistosity	50 ft	52 ft			
	- High in sulfide minerals (i.e. pyrite), oxidized in fractures					
60	- Calcite seams abundant		57 ft			60
	- 60 ft to 100 ft BGS					
	- Dark gray to gray slate to phyllite					
	- Mineral foliation includes parallel alignment of minerals and	70 ft		6" Diameter Bedrock Borehole		
	distribution of mineral types (compositional layering)					
80	- Very fine grained with high degree of foliation at this depth range					80
	- High in sulfide minerals (i.e. pyrite)		83 ft			
	- Calcite seams present	94 ft				
	- Sulfide minerals oxidized at water bearing features					
100						100
	- 100 ft to 235 ft BGS					
	- Gray meta-graywacke (low grade metamorphism)					
	- Little to no planar mineral texture and compositional layering of minerals	111 ft				
	- Very fine grained with low degree to absence of schistosity					
120	- High in sulfide minerals (i.e. pyrite), oxidized in fractures					120
	- Calcite seams abundant and calcite veins present (especially at					
	193 ft to 200 ft BGS)					
		129 ft				
			133 ft			
140						140
		148 ft	145 ft			
160			160	Soft Zone		160

NOTES:

Top of bedrock 35 ft below ground surface (BGS)

Bottom of permanent casing 38 ft BGS

Top of permanent casing 1.72 ft above ground surface (AGS)

MP Elevation = 171.12 ft (top of permanent casing)

PROJECT: Juniper Ridge Landfill		JOB NO.: 08097.03	BORING NO.: PW-08-03
DATE STARTED: 1/5/2009	DATE FINISHED: 1/6/2009	DRILLING METHOD: Mud Rotary (0 to 38 ft), Air Rotary (38 to 235 ft)	
GROUND SURFACE ELEVATION (FT): NA	DRILLING CONTRACTOR: Goodwin Well & Water Inc.		LOGGED BY: APG
CASING BOREHOLE DIA.: 8&3/4"	OPEN BEDROCK BOREHOLE DIA.: 6"		SHEET 2 OF 2

DEPTH (FT)	MATERIAL DESCRIPTION	CUTTING SAMPLE DEPTH	FRACTURE DEPTH (FT)		WELL LOG	DEPTH (FT)
	see above		192	Bedrock Borehole		
180						
200						200
220		219 ft				220
		230 ft				
240	Bottom of Exploration at 235 ft BGS					240
260						260
280						280
300						300
320						320
340						340

NOTES:

GOODWIN WELL & WATER, INC.
DRILLERS LOG

CUSTOMER: SEVEE & MAHER ENGINEERING

OWNER: JUNIPER RIDGE LANDFILL

TOWN: OLD TOWN, ME

DATE STARTED: **1/5/09**

DATE FINISHED: **1/6/09**

JOB #: 2008-445 **HOLE:** **PW-08-03**

DRILLER: BOB CUSHMAN

HELPER: RALPH RYDER III

LOCATION

TAKE I 95 NORTH TO SECOND OLD TOWN EXIT, EXIT 199. TURN LEFT ONTO RT. 16 TOWARDS LAGRANGE. ACCESS RD TO LANDFILL IS ON LEFT ABOUT 500' FROM INTERSECTION. TAKE ACCESS RD. ABOUT TWO MILES TO SITE.

PW-08-03

DATE & TIME	INTERVAL FROM	INTERVAL TO	DESCRIPTION
1/5/2009			
2:00-4:40	0'	38'	DRILLED A 8 3/4" BOREHOLE DOWN TO 38'
	0'	10'	BOULDERS
	10'	35'	CLAY
	35'	38'	BEDROCK, SET 40' OF 6" STEEL CASING WITH A DRIVE SHOE.
1/6/2009			
10:00	40'	60'	BLACK SHALEY ROCK, TWO SOFT SPOTS, 52' & 57'
	60'	83'	BLACK SHALEY ROCK, ONE SOFT SPOT, 67'
	83'	83.5'	FRACTURE
	83.5'	98'	BLACK SHALEY ROCK
	98'	100'	SOFT SPOT
	100'	127'	BLACK SHALEY ROCK
	127'	128'	SOFT SPOT
	128'	133'	BLACK SHALEY ROCK
	133'	134'	FRACTURE
	134'	140'	BLACK SHALEY ROCK
	140'	145'	BLACK SHALEY ROCK

GOODWIN WELL & WATER, INC.
DRILLERS LOG

DATE & TIME	INTERVAL FROM	INTERVAL TO	DESCRIPTION
1/6/2009	145'	146'	SOFT SPOT
	146'	160'	BLACK SHALEY ROCK
	160'	175'	BLACK SHALEY ROCK, NO SOFT SPOTS
	175'	192'	BLACK SHALEY ROCK WITH WHITE QUARTZ.
	192'	193'	FRACTURE
	193'	200'	SOFT BLACK SHALEY ROCK
	200'	219'	SOFT BLACK SHALEY ROCK
	219'	220'	FRACTURE
	220'	235'	BLACK SHALEY ROCK, NO SOFT SPOTS
			SPENT ONE EXTRA HOUR WASHING AND SURGING HOLE OUT
			THEY WANTED TO MAKE SURE WE GOT ALL THE MATERIAL OUT OF THE HOLE.
			TOTAL DEPTH - 235'
			INSTALLED A 6" LOCKING WELL CAP WITH PADLOCK
			TORE DOWN

PROJECT: Juniper Ridge Landfill		**JOB NO.:** 08097.03	**BORING NO.:** PW-08-04
DATE STARTED: 1/8/2009	**DATE FINISHED:** 1/9/2009	**DRILLING METHOD:** Mud Rotary (0 to 18 ft), Air Rotary (18 to 215 ft)	
GROUND SURFACE ELEVATION (FT): 172.52	**DRILLING CONTRACTOR:** Goodwin Well & Water Inc.		**LOGGED BY:** APG
CASING BOREHOLE DIA.: 8&3/4"	**OPEN BEDROCK BOREHOLE DIA.:** 6"		**SHEET 1 OF 2**

DEPTH (FT)	MATERIAL DESCRIPTION	CUTTING SAMPLE DEPTH	FRACTURE DEPTH (FT)	WELL LOG	DEPTH (FT)
0				1.92 ft Casing AGS	0
	Glacial Till Overburden - Not sampled - Loose to compact and poorly sorted to weakly stratified clay, silt, sand, gravel. (Maine Geological Survey, Surficial Geology, Old Town Quadrangle, Maine. Open File No. 08-47 2008) Top of Bedrock at 15 feet BGS			6" Dia. Steel Casing	
20	- 15 ft to 215 ft BGS - Dark gray to gray phyllite to very fine grained meta-graywacke - Mineral foliation in phyllites includes parallel alignment of minerals and distribution of mineral types (compositional layering) - Mineral foliation is weak to absent in the very fine grained meta-graywacke - High in sulfide minerals (i.e. pyrite) - Calcite seams present and calcite veins have formed in water bearing fractures - Sulfide minerals oxidized at water bearing features	30 ft 50 ft	50 ft 63 ft 68 ft	Drive Shoe 18 ft BGS	20
40					40
60					60
		70 ft		6" Diameter Bedrock Borehole	
80					80
		90 ft	95 ft	Fracture	
100					100
		110 ft			
120					120
		130 ft	130 ft 135 ft 139 ft		
140					140
		150 ft	150 ft		
160					160

NOTES:

Top of bedrock 15 ft below ground surface (BGS)

Bottom of permanent casing 18 ft BGS

Top of permanent casing 1.92 ft above ground surface (AGS)

MP Elevation = 174.44 ft (top of permanent casing)

PROJECT: Juniper Ridge Landfill		JOB NO.: 08097.03	BORING NO.: PW-08-04
DATE STARTED: 1/8/2009	DATE FINISHED: 1/9/2009	DRILLING METHOD: Mud Rotary (0 to 18 ft), Air Rotary (18 to 215 ft)	
GROUND SURFACE ELEVATION (FT): NA	DRILLING CONTRACTOR: Goodwin Well & Water Inc.		LOGGED BY: APG
CASING BOREHOLE DIA.: 8&3/4"	OPEN BEDROCK BOREHOLE DIA.: 6"		SHEET 2 OF 2

DEPTH (FT)	MATERIAL DESCRIPTION	CUTTING SAMPLE DEPTH	FRACTURE DEPTH (FT)		WELL LOG	DEPTH (FT)
	see above	175 ft				
180						
		190 ft				
200				Bedrock Borehole		200
		210 ft				
220	Bottom of Exploration at 215 ft BGS					220
240						240
260						260
280						280
300						300
320						320
340						340

NOTES:

GOODWIN WELL & WATER, INC.

DRILLERS LOG

CUSTOMER: SEVEE & MAHER ENGINEERS

OWNER: JUNIPER RIDGE LANDFILL

TOWN: OLD TOWN, ME

DATE STARTED: 1/6/09

DATE FINISHED: 1/9/09

JOB #: 2008-446 **HOLE:** **PW-08-04**

DRILLER: BOB CUSHMAN

HELPER: RALPH RYDER III, DANNY CAMIRE

LOCATION

TAKE I 95 NORTH TO SECOND OLD TOWN EXIT, EXIT 199. TURN LEFT ONTO RT. 16 TOWARDS LAGRANGE. ACCESS RD TO LANDFILL IS ON LEFT ABOUT 500' FROM INTERSECTION. TAKE ACCESS RD. ABOUT TWO MILES TO SITE.

PW-08-04

DATE & TIME	INTERVAL FROM	INTERVAL TO	DESCRIPTION
1/8/2009	0'	18'	8 3/4" BOREHOLE
1:00-3:10	0'	3'	GRAVEL
	3'	15'	CLAY
	15'	18'	BEDROCK, SET 20' OF 6" STEEL CASING WITH DRIVE SHOE
3:10	18'	40'	BLACK SHALEY ROCK
	40'	50'	BLACK SHALEY ROCK
	50'	51'	SOFT SPOT
	51'	63'	BLACK SHALEY ROCK
	63'	64'	SOFT SPOT
	64'	68'	BLACK SHALEY ROCK
	68'	69'	SOFT SPOT
4:20	69'	80'	BLACK SHALEY ROCK
1/9/2009		80'	CHECKED STATIC
			CONTINUED TO DRILL
	80'	95'	BLACK SHALEY ROCK
	95'	96'	FRACTURE

GOODWIN WELL & WATER, INC.
DRILLERS LOG

DATE & TIME	INTERVAL FROM	INTERVAL TO	DESCRIPTION
1/9/2009	96'	100'	BLACK SHALEY ROCK
	100'	120'	SOFT BLACK SHALEY ROCK WITH WHITE QUARTZ
	120'	139'	BLACK SHALEY ROCK WITH WHITE QUARTZ, TWO SOFT SPOTS, 130' - 135'
	139'	140'	FRACTURE
	140'	150'	SOFT BLACK SHALEY ROCK WITH WHITE QUARTZ
	150'	151'	FRACTURE
	151'	160'	SOFT BLACK SHALEY ROCK WITH WHITE QUARTZ
			ONE SOFT SPOT AT 157'
	160'	215'	SOFT BLACK SHALEY ROCK WITH WHITE QUARTZ
			NO FRACTURES
			TOTAL DEPTH - 215'
			SPENT 1 HR EXTRA BLOWING AND SURGING TO MAKE SURE EVERYTHING IS
			CLEANED OUT GOOD.
			INSTALLED LOCKING WELL CAP WITH PADLOCK

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 1 OF 2

HOLE NO. 201-B

DRILLER: CHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION:

S.T.B. NUMBER: 90

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	NQ2/BQ
SIZE I.D.	4"	1 3/8"	2/1 7/16
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 07/09/90

DATE FINISH: 07/11/90

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER										1.5	PEAT, ORGANIC SILT
"											
"											
"											
"											
"											
"											
"											GRAY SILTY CLAY
"											
4											
7											
[illegible]										14.1	
68											
41											
70											
43											
45											
57											BROWN SILTY SAND W/COARSE SANDY GRAVEL, LITTLE COBBLES
96											
88											
135											
132											
115											
65										26.0	
110											
95											
115											
95											
65											
68											
40											GRAY SILTY FINE SAND W/GRAVEL AND COBBLES
70											
48											
30											
98											
200											
[illegible]											

SAMPLES
D= SPLIT SPOON
C= 2" SHELBY TUBE
S= 3" SHELBY TUBE
P= 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. 201-B

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 2 OF 2

HOLE NO. 201-B

DR: CHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION:

M.T.: UMBER

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	NQ2/BQ
SIZE I.D.	4"	1 3/8"	2/1 7/16
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 07/09/90

DATE FINISH: 07/11/90

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6 ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
40											
45											
70											
35											
55											
28											GRAY SILTY SAND W/GRAVEL AND COBBLES
38											
70											
64											
33											
37											
45										52.5	
15											BROWN SILTY SAND W/GRAVEL AND COBBLES AND BOULDERS
34											
7											
9	1R	3"	4.3'	1.0'	58.6	23%					
38										59.0	
48											GRAY/BROWN SILTY FINE SAND W/LITTLE GRAVEL, TRACE
13	1D	2"	18"		61.5	34	78	122		61.7	OF COBBLES
42											
75											
											ROCK
	2R	2 3/8"	4.7'	4.7'	66.8	100%					
	3R	2 3/8"	3.3'	3.3'	70.1	100%				70.1	
											BOTTOM OF BORING @ 70.1'
											INSTALL WELL @ 69.7' & 39.9'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO.

PROJECT: WEST OLD TOWN LANDFILL	JOB NO. 9006	BORING NO. B201B
DATE COMPLETED 07.11.90	WELLS INSTALLED P-201A, P201D	DRILLING METHOD WASHED BORING
GROUND SURFACE ELEVATION (FT) 148.2	DRILLER MAINE TEST BORINGS	LOGGED BY KPN
BOREHOLE DIAMETER (IN) 0 - 54.3 4.5 O.D. 54.3 - 61.7 3.5 O.D.	ROCK CORE DIAMETER (IN.) 1.615	SHEET 1 OF 2

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% PASS #200	ATTERBERG LIMIT	PERMEABILITY (FT/DAY)
		PEAT & ORGANIC SILT 1.5					
5		GRAY SILTY CLAY (MARINE CLAY)					
10							
15		14.1					
20		BROWN SILTY SAND w/ BROWN GRAVELLY SAND LAYERS AND COBBLES (BASAL TILL)					
25		26.0					
30							
35		GRAY SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES (BASAL TILL)					K_F=0.031
40							
45							
50							
55		52.5 BROWN SILTY GRAVELLY SAND TRACE OF COBBLES AND RARE BOULDERS BECOMING STRATIFIED JUST ABOVE BEDROCK (BASAL TILL)					
60	1D	61.7 GRAY METAGRAYWACKE					

INSTRUMENT LOG



WATER LEVEL

5.03 AG P201D

6.37 AG P201A

3.0

SAND BENTONITE MIXTURE

9.0

GROUT (TYP)

33.0

5' SCREEN (3/4" Φ) P201D

41.0

BENTONITE (TYP)

43.8

SAND (TYP)

57.0

53.2

BENTONITE/CAVE

58.4

CAVED (TYP)

59.7

DEPTH (FT): 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60

NOTES

WEST OLD TOWN LANDFILL | 5006 | B 201 B

DATE COMPLETED 07.11.90	WELLS INSTALLED P-201A, P-201D	DRILLING METHOD WASHED BORING
GROUND SURFACE ELEVATION (FT) 148.2	DRILLER MAYNE TEST BORINGS	LOGGED BY KPN
BOREHOLE DIAMETER (IN)	ROCK CORE DIAMETER (IN.)	SHEET 2 OF 2

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC(%)	% PASS #200	ATTER-BERG LIMIT	PERME-ABILITY (FT/DAY)	INSTRUMENT LOG	WATER LEVEL	DEPTH (FT)
		BASAL TILL 61.7								
65	2R	GRAY METAGRAYWACKE (BEDROCK) RQD=0%					K_F = 1.3		66.0'	65
	3R	RQD: 0%						2' SCREEN (3/4" Ø) P201A		
70		70.1 B.O.E.							69.7 70.1	70
75										75

NOTES

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 1 OF 2

HOLE NO. B-204

BY: CHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION:

M.T.B. NUMBER: 9

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 05/14/90

DATE FINISH: 05/15/90

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	WATER READING	DEPTH	STRATUM DESCRIPTION
AUGER										0.5	TOPSOIL
"	10	2"	24"		2.0	1	3	5	7		MOTTLED SILTY FINE SAND W/TRACE OF GRAVEL
"											
"	20	2"	24"		4.0	5	12	24	32	4.5	
8											
AUGER	30	2"	24"		6.0	7	12	12	15	6.0	MOTT SILTY FINE SAND W/MOTTLED CLAYEY SILT LAYERS
"										7.5	BROWN SILTY FINE SAND W/LITTLE GRAVEL
"	40	2"	24"		8.0	41	32	40	37	8.0	BROWN FINE SAND W/GRAY SILTY FINE SAND LAYERS
"											
"	50	2"	24"		10.0	8	18	25	27		BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL, TRACE OF COBBLES
8											
40	60	2"	24"		12.0	20	30	32	61	12.0	
—	70	2"	6"		12.5	110				13.5	GRAY/BROWN SANDY GRAVEL, TRACE OF COBBLES
—	80	2"	10"		14.3	80	100				
76											
190	90	2"	11"		16.9	58	100				GRAY/BROWN SILTY FINE SAND W/SOME COARSE SAND AND GRAVEL, LITTLE COBBLES
55											
60										18.5	
112	100	2"	12"		19.0	40	110				
90										20.0	GRAY FINE SANDY SILT
150											
23	110	2"	18"		22.0	29	45	38			
26											
28	120	2"	18"		24.5	23	22	25			
40											
62											
36	130	2"	18"		27.5	28	36	30			
40											
95											
225	140	2"	18"		30.3	26	27	30			GRAY SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL, TRACE OF COBBLES
95											
62											
30	150	2"	18"		33.5	27	19	21			
36											
50	160	2"	18"		35.5	45	72	43			
67											
23	170	2"	18"		37.8	38	38	55			
—	180	2"	6"		38.9	140					
—											
	190	2"	2"		40.9	100					

SAMPLES
D= SPLIT SPOON
C= 2" SHELBY TUBE
S= 3" SHELBY TUBE
P= 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-204

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 2 OF 2

HOLE NO. B-204

DRI[illegible] CHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION:

M.T.B. [illegible]UMBER 9[illegible]

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 05/14/90

DATE FINISH: 05/15/90

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
29											
82	20D	2"	6"		42.0	150					GRAY SILTY FINE SAND W/LITTLE COARSE SAND & GRAVEL TRACE OF COBBLES
	21D	2"	12"		44.0	82	125				
										45.0	

BOTTOM OF BORING @ 45.0'
HOLE CAVED @ 35.0'
INSTALL WELLS @ 34.0' & 18.8'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-204

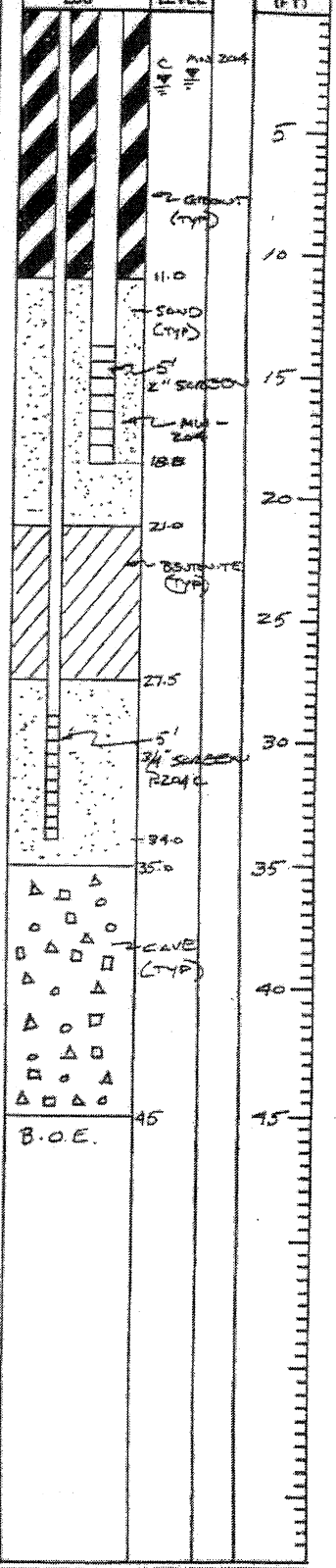
MW-204
P-204c

GROUND SURFACE ELEVATION (FT) 158.5 | DRILLER MAINE TEST BORINGS | LOGGED BY MWM

BOREHOLE DIAMETER (IN) 3.5 O.D. | ROCK CORE DIAMETER (IN) —— | SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% PASS #200	ATTERBERG LIMITS	PERMEABILITY (FT/DAY)
		TOPSOIL					
	1D		8				
	2D		36				
5	3D	BROWN SANDY GRAVELLY SILT TO SILTY SAND W/ TRACE OF COBBLES (BASAL TILL)	24				
	4D		72				
	5D		43	14			
10	6D		62				
	7D		—				
	8D		—				
		15.0		6	43		
15	9D		116				K_p = 0.029
	10D		80				
20							
	11D		74	10			
	12D	GRAY SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES (BASAL TILL)	45				
25							
	13D		64	11			
	14D		55				
30							K_p = 0.025
	15D		46	10			
	16D		117				
35	17D		76	9	59		
	18D		—				
		19D	—				
40	20D		—				
	21D		164	9			
		45.0					
45		B.O.E.*					

INSTRUMENT LOG / WATER LEVEL



NOTES * Bottom of Boring 45.0'; Drive shoe broke off

5/90

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT
JAMER RIVER CORPORATION

SHEET 1 OF 1

HOLE NO. P-205A E

DR [redacted] SCHAEFER

PROJECT NAME
PROPOSED LANDFILL SITE

LINE & STATION

M.T. [redacted] NUMBER

LOCATION
OLD TOWN, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT FT. AFTER HOURS

AT FT. AFTER HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 12/07/90 DATE FINIS 12/07/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER											
										14.0	

BOTTOM OF BORING @ 14.0'
INSTALL PIEZOMETER @ 10.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. P-205A

PROJECT WEST OLD TOWN LANDFILL	JOB NO. 9006	BORING NO. B-205B
DATE COMPLETED 12-07-90	WELLS INSTALLED P-205B	DRILLING METHOD WASHED BORING
GROUND SURFACE ELEVATION (FT) 209.7	DRILLING CONTRACTOR MAINE TEST BORING INC.	LOGGED BY RBC
BOREHOLE DIAMETER (IN) 4.5" OD.	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC(%)	% PASS #200	ATTERBERG LIMIT	PERMEABILITY (FT/DAY)	INSTRUMENT LOG	DEPTH (FT)
								2.7 TOP OF PVC	
5		BROWN SANDY GRAVELLY SILT - CLAY TRACE OF COBBLES (BASAL TILL)						BENTONITE (TYP) 3.2 P-205B 5' SCREEN (3/4" Ø) SAND (TYP) 10.7 12.0	5
10									10
14.0		B.O.E.						14.0	
15									15

NOTES

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 1 OF 3

HOLE NO. B-206

DRI[illegible] SCHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION

W.T. [illegible] UMBER

LOCATION: OLD TOWN, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW/NW	SS	NQ2
SIZE I.D.	4"/3"	1 3/8"	2"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 05/02/90

DATE FINIS: 05/09/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER										0.5	TOPSOIL
"	1D	2"	24"		2.0	1	2	9	5	2.0	MOTTLED SILTY FINE-MED SAND, LITTLE GRAVEL
"											
"	2D	2"	24"		4.0	7	17	52	75		MOTTLED SILTY FINE SAND W/LITTLE COARSE SAND,
"	3D	2"	18"		5.5	65	54	68		5.2	TRACE OF GRAVEL
38										6.0	BROWN SILTY FINE SAND W/LITTLE COARSE SAND, TRACE
70	4D	2"	18"		7.0	20	55	90			OF GRAVEL
8	5D	2"	18"		8.9	25	47	53			
7											BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND
36	6D	2"	18"		10.8	42	65	115			GRAVEL
15	D	2"	4"		11.6	100				11.6	
104											
[illegible]	7D	2"	18"		13.5	41	70	97			GRAY/BROWN SILTY FINE SAND W/LITTLE COARSE SAND
											AND GRAVEL, TRACE OF COBBLES
75	8D	2"	18"		15.3	27	59	80		15.6	
20											
17	9D	2"	18"		17.1	24	41	65			GRAY/BROWN SILTY FINE SAND W/LITTLE COARSE SAND
15	10D	2"	18"		18.8	28	49	65			AND GRAVEL, TRACE OF COBBLES AND CLAY
18										19.0	
93	11D	2"	12"		20.2	42	112				GRAY/BROWN SILTY FINE SAND W/LITTLE COARSE SAND
1											SAND AND GRAVEL, TRACE OF COBBLES
WOH	12D	2"	18"		22.1	50	97	100		22.5	
17											
48	13D	2"	18"		24.2	58	80	132			GRAY SILTY FINE SAND W/LITTLE COARSE SAND AND
150	14D	2"	7"		25.9	53	50				GRAVEL, TRACE OF COBBLES
57										26.4	
78	15D	2"	6"		27.4	110					
40	D	2"	0"		28.5	25				28.5	BROWN SILTY FINE-MED SAND W/SOME COARSE SAND,
62											LITTLE GRAVEL AND COBBLES
152	16D	2"	1"		30.3	75				30.2	BROWN SILTY FINE-MED SAND W/SOME COARSE SAND AND
70											GRAVEL, LITTLE COBBLES
48										32.6	GRAY/BROWN SILTY FINE SAND W/SOME COARSE SAND,
67	17D	2"	18"		33.1	65	65	65			LITTLE GRAVEL AND COBBLES
134										33.5	BROWN MED-FINE SAND W/SOME COARSE SAND, LITTLE
168	18D	2"	18"		35.5	45	85	105			GRAVEL AND SILT
32										36.0	BROWN MED-FINE SAND
35	19D	2"	18"		37.5	55	95	100			
											BROWN MED-FINE SAND W/SILTY FINE SAND LAYERS
[illegible]	20D	2"	18"		39.5	38	52	67		39.8	
[illegible]											

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-206

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 2 OF 3

HOLE NO. B-206

DR: SCHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION:

M.T. NUMBER:

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW/NW	SS	NQ2
SIZE I.D.	4"/3"	1 3/8"	2"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 05/02/90 DATE FINIS: 05/09/90

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	WATER READING	DEPTH	STRATUM DESCRIPTION
12	210	2"	18"		41.3	46	62	60		41.5	BROWN MED-FINE SAND W/TRACE OF COARSE SAND AND SILTY FINE SAND LAYERS
19											
30	220	2"	18"		43.0	32	49	50			BROWN MED-FINE SAND W/SOME COARSE SAND, LITTLE GRAVEL AND SILT
80	230	2"	18"		44.6	37	47	64			
110										46.8	
22	240	2"	18"		46.5	41	50	56			
40										48.0	BROWN SILTY GRAVELY SAND W/TRACE OF COBBLES
135	250	2"	18"		48.7	50	48	48			
102											BROWN MED-FINE SAND W/SOME SILT
26											
25	260	2"	18"		51.5	32	52	58			
26											
	270	2"	18"		53.5	35	50	60		54.0	
	280	2"	7"		54.6	97	100			55.2	BROWN FINE SILTY SAND
108	290	2"	11"		55.9	130	100				
56											
42											
95	300	2"	12"		58.5	68	150				BROWN SILTY GRAVELY SAND W/TRACE OF COBBLES
102											
170											
28	310	2"	12"		61.2	112	125				
32											
50	320	2"	18"		63.5	67	90	92			
79	0	2"	0"		64.0	50				64.0	
172											
31	330	2"	18"		66.5	57	58	60			BROWN SILTY GRAVELY SAND W/SOME COBBLES
45											
50											
105										69.9	
215											
75											
	1R	3"	4.0'	4.0'	74.5	100%					ROCK
	2R	3"	5.0'	5.0'	79.5	100%					

SAMPLES
D= SPLIT SPOON
C= 2" SHELBY TUBE
S= 3" SHELBY TUBE
P= 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-206

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 3 OF 3

HOLE NO. B-206

DRI[illegible] SCHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION:

M.T.[illegible] NUMBER

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW/NW	SS	NQ2
SIZE I.D.	4"/3"	1 3/8"	2"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 05/02/90

DATE FINISH: 05/09/90

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE SHEAR READING	DEPTH	STRATUM DESCRIPTION
	3R	3"	5.0'	4.9'	84.5	98%					ROCK
	4R	3"	5.0'	5.0'	89.5	100%					
	5R	3"	1.0'	1.0'	90.5	100%				90.5	
											BOTTOM OF BORING @ 90.5'
											INSTALL WELL @ 90.5'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

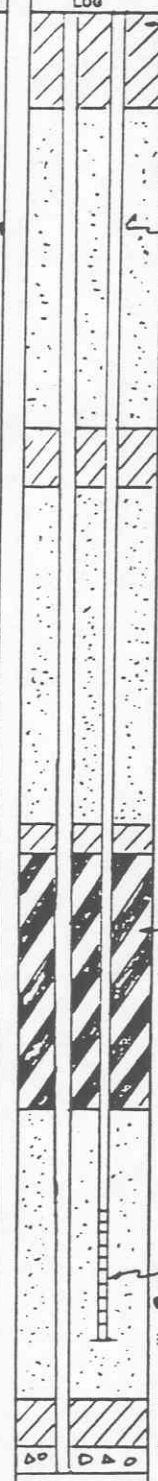
REMARKS:

HOLE NO. B-206

PROJECT West Old Town Landfill	JOB NO. 9006	BORING NO. B206
DATE COMPLETED 05 08 90	WELLS INSTALLED B206 A & B	DRILLING METHOD Washed Boring
GROUND SURFACE ELEVATION (FT) 201.5	DRILLER Maing Test Borings	LOGGED BY KPN
BOREHOLE DIAMETER (IN) 0-13' 4.5" O.D. 13-70.5 3.5" O.D.	ROCK CORE DIAMETER (IN.) 2.0 I.D.	SHEET 1 OF 2

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% PASSING #200	ATTERBERG LIMIT	PERMEABILITY (FT/DAY)
		0.5 TOPSOIL					
	1D	Brown Sandy Gravelly Silt-Clay w/ Cobbles (Basal Till)	11				
	2D		69				
5	3D		122				
	4D		145				
	5D		100				
10	6D		180	10			K_U = 0.00074
	D	11.6		11		LL=22 PI=6	K_U = 0.00028
	7D	Brownish Gray Sandy Gravelly Silt-Clay Trace of Cobbles (Basal Till)	167				
15	8D		133				
	9D		106				
	10D		114	11	60		
20	11D		—	11	57		
	12D	22.5 [illegible]	197		36		
	13D	Gray Sandy Gravelly Silt-Clay w/ Cobbles (Basal Till)	212		62		
25	14D		100	8	59		
	15D				50		
		Brown Silty Gravelly Sand Trace of Cobbles (Washed Till)					
30	16D		—				
	31D	32.6					
	17D		130				
35	18D	Brown Gravelly Sand Some Silt Trace of Cobbles w/ Silty Sand Layers	190		12		
	19D		195		23		
	20D		119	22	10		K_R = 0.59
40	21D	41.5	122		10		
	22D	Brown Very Silty Gravelly Sand Has Till-Like Appearance	99	17	10		
	23D		111	17	9		
45	24D		106	18	10		
	25D	49.0	96		8		
50	26D	Black to Gray Silty Sand	110		12		$K_F \geq 7.0$
	27D	54.0	110	21	14		
	28D	Brown Silt			67		
55	29D	Brown Silty Gravelly Sand	— 200		24		
	30D		136	8	9		
60	31D	(Washed Till)	237		11		

INSTRUMENT LOG



WATER LEVEL: 2 Bentonite Pellets (Typ); 4.0; Sand (Typ); A B; 17.5; 20.0; 34.0; 35.0; Grout (Typ); 40.5; 5' 3/4" Screen B206B; 54.7; 55; 57

CONTINUED FROM PG 2

NOTES

Revised as per Inter Correspond

SEVEE & MAHER ENGINEERS

PROJECT West Old Town Landfill	JOB NO. 9006	BORING NO. B206	
DATE COMPLETED 05.08.90	WELLS INSTALLED P-206 A & B	DRILLING METHOD Washed Boring	
GROUND SURFACE ELEVATION (FT) 201.5	DRILLER Maine Test Borings	LOGGED BY KPN	
BOREHOLE DIAMETER (IN) 0-19' 4.5" O.D. 19-70.5' 3.5" O.D.	ROCK CORE DIAMETER (IN.) 2.0 I.D.	SHEET 2 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	M(%)	% PASS #200	ATTERBERG LIMIT	PERMEABILITY (FT/DAY)
	32D	Brown Gravelly Sand some silt trace of cobbles w/ silty sand layers (washed till)	182	9	10		
65	33D		118		11		
70		69.9					
	1-R	RQD=100% Interbedded metagraywacke and phyllite (bedrock)					
75	2-R	RQD: 96%					
80	3-R	RQD: 28%					
85	4-R	RQD=68% ... many pegmatite veins					K_F = 0.027
90	5-R	90.5					
		B.O.E.					
95							

INSTRUMENT LOG



WATER LEVEL

DEPTH (FT): 65, 70, 75, 80, 85, 90, 95

NOTES

MAINE TEST BORINGS, INC
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 1 OF 1

HOLE NO. B-206A

DR: SCHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION

M.T. NUMBER

LOCATION: OLD TOWN, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	HQ
SIZE I.D.	4"	1 3/8"	2 1/2"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 05/10/90

DATE FINIS: 05/10/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	SAND HOLDING	DEPTH	STRATUM DESCRIPTION
AUGER											
"											
"											
"											
"											
"											
"											
"											
3											
30											
17										11.1	
260	1R	(+)	1.0'	0.4'	12.5	40%				11.9	COBBLES
78											
12											
31											
40											
38											
41											
										22.0	

BOTTOM OF BORING @ 22.0'
INSTALL WELLS @ 20.0' & 11.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

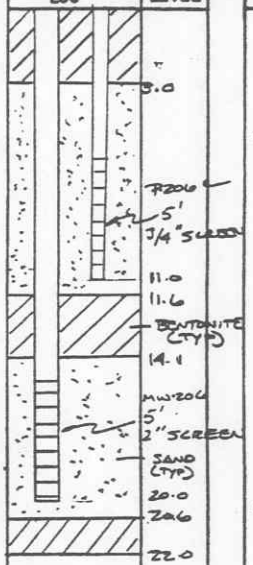
REMARKS:
HQ - 3 25/32"

HOLE NO. B-206A

PROJECT West Old Town Landfill	JOB NO. 2006	BORING NO. B206A	
DATE COMPLETED 05.10.90	WELLS INSTALLED MW206 PZ06C	DRILLING METHOD WASHED BORING	
GROUND SURFACE ELEVATION (FT) 201.2	DRILLER MANG TEST BORINGS	LOGGED BY KPN	
BOREHOLE DIAMETER (IN) 4.5 O.D.	ROCK CORE DIAMETER (IN.) —	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC(%)	% PASS #200	ATTER-BERG LIMIT	PERME-ABILITY (FT/DAY)
		BROWN SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES (BASAL TILL)					K_E = 0.03
		11.9					
		BROWNISH-GRAY SANDY GRAVELLY SILT-CLAY W/ COBBLES (BASAL TILL)					K_P = 0.00096
		22.0 B.O.E					

INSTRUMENT LOG / WATER LEVEL



NOTES

SEVEE & MAHER ENGINEERS

5/90

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 1 OF 1

HOLE NO. B-207

DR: [redacted] SCHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION:

W.T. [redacted] UMBER 9[redacted]

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	NQ2
SIZE I.D.	3"	1 3/8"	2"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 04/30/90 DATE FINISH: 05/02/90

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	DEPTH OF SAMPLE / BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER										0.3	TOPSOIL
*	1D	2"	24"		2.0	1	1	7	8.		
*	2D	2"	18"		3.5	20	48	115		4.0	MOTTLED SILTY FINE SAND W/LITTLE GRAVEL
*											
32	3D	2"	18"		5.5	30	47	72			
4											
8	4D	2"	18"		7.5	19	28	41			BROWN SILTY FINE SAND W/LITTLE COARSE SAND, TRACE OF GRAVEL (TILL)
9											
31	5D	2"	18"		9.5	30	40	72		10.0	
48											
16	6D	2"	14"		11.2	50	62	100		11.2	BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL, TRACE OF COBBLES
4'											
	1R	3"	1.4'	0.4'	13.0	29%					
	7D	2"	4"		13.3	50					
117	2R	3"	1.6'	0.4'	15.0	25%					BROWN SILTY FINE SAND W/LITTLE COARSE SANDY GRAVEL SOME COBBLES
56	8D	2"	11"		16.4	85	100				
51	9D	2"	5"		17.6	100					
56										18.2	
58	10D	2"	12"		19.6	32	112				
80											
42	11D	2"	6"		21.5	100				21.5	GRAY/BROWN SILTY FINE SAND W/SOME GRAVEL, LITTLE COARSE SAND AND COBBLES
100											
	1R	3"	3.5'	2.8'	25.1	80%					ROCK
	2R	3"	4.6'	3.8'	29.7	83%					
	3R	3"	2.0'		31.7					31.7	
											BOTTOM OF BORING @ 31.7' HOLE CAVED @ 30.0' INSTALL WELL @ 30.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

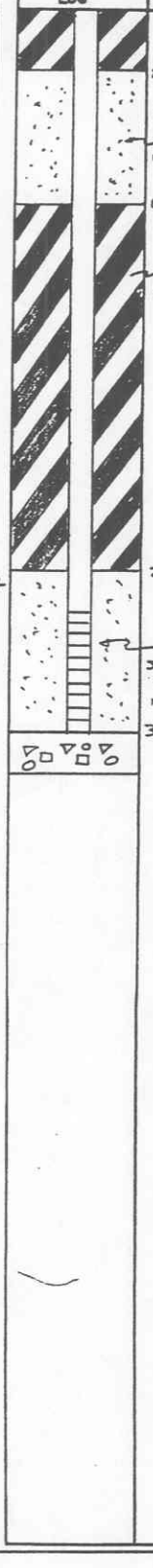
SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-207

PROJECT West Old Town Landfill	JOB NO. 9006	BORING NO. B207	
DATE COMPLETED 05-02-90	WELLS INSTALLED MW 207	DRILLING METHOD WASHED BORING	
GROUND SURFACE ELEVATION (FT) 214.7	DRILLER Mains Test Borings	LOGGED BY KPN	
BOREHOLE DIAMETER (IN) 3.5 O.D.	ROCK CORE DIAMETER (IN) 2.0 I.D.	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% Passing # 200	Atterberg Limit	Permeability (ft/day)	INSTRUMENT LOG	WATER LEVEL
0		0.3 TOPSOIL							
	1D	BROWN GRAVELLY VERY SILTY SAND (BASAL TILL)	8						
	2D		96						
5	3D	5.5	119						
	4D	BROWNISH GRAY SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES (BASAL TILL)	69						
	5D		112				K_U = 0.00039		
10	6D		124	12	60				
	CLEAN OUT	~7D	—						
	CLEAN OUT								
15	8D	16.5	130	13	66				
	9D	GRAY GRAVELLY SANDY 18.2 SILT (BASAL TILL)	—						
	10D	G... BECOMING STRATIFIED WITH GRAVELLY	—	8	21				
20	11D	21.5 SILTY SAND (WASHED TILL)							
	1-R	RQD=69% INTERBEDDED METAGRAYWACKE AND PHYLLITE (BGO ROCK)					K_F = 0.047		
25	2-R	RQD=83%							
30	3-R	31.7 RQD=100%							
		B.O.E.							
35									



NOTES

5/90

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sargent Corp. Doug Barnes PO BOX 435 STILLWATER ME 04489-0435	SHEET 1 OF 2 HOLE NO. MW11-207-R
DRILLER Thomas Schaefer	PROJECT NAME Juniper Ridge Landfill, Cell 7, Ph 2	LINE & STATION
T.B. JOB NUMBER 2011-069	LOCATION Old Town , ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE	DATE
TYPE	HW	SS	HQ	5/11/2011 Start	5/12/2011 Finish
SIZE I.D.	4"	1-3/8"	2.5"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"		SURFACE ELEVATIC	
				212.5 (H.E.S.)	

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												Brown Sandy Silt
"											4.0	
"												
38												
52	1D	2"	24"		7.0	10	14	15	20			Olive Sandy Silt,
152											7.4	w/Some Gravel & Trace of Cobbles
65											8.6	Boulder
32												
30												
32	2D	2"	24"		12.0	12	28	39	35			Olive Sandy Silt w/Some Gravel
120											12.7	
32											13.1	Boulder
28												
32												
26	3D	2"	8"		16.2	38	50					Olive Sandy Silt w/Some Gravel
43												
50												
70											20.0	
38												
52	4D	2"	24"		22.0	21	31	23	32			Black Silty Fine Sand w/Clayey Silt Layers
37												
37												
48											26.0	
38												
42	5D	2"	24"		27.0	11	15	18	38			Brown Fine Sandy Silt w/Trace of Gravel
70												
Spun												
NW												
Casing											30.4	
"	1R	3.78"	3.8'	2.4'	31.8	63.2%						
"												
"												
"												
"												Rock
"	2R	3"	5.0'	3.8'	36.8	76.%						
"												
"												
"												

SAMPLES
D = SPLIT SPOON R = ROCK
C = 2" SHELBY TUBE CORE
S = 3" SHELBY TUBE V = VANE
U = 3½" SHELBY TUBE TEST

SOIL CLASSIFIED BY:
[X] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Note: 2R & 3R were NQ2 core size
HW to 28' HQ Core to 31.8', Caved @ 29'
Spun NW Casing to 31.8', NQ Core to 41.8', Caved @ 32.6'
Spun NW Casing to 36.5', Washed out to 41.8',
Flushed Clean and Installed Well.

HOLE NO. MW11-207-R

MAINE TEST BORINGS, INC. **BREWER, MAINE 04412**	CLIENT Sargent Corp. Doug Barnes PO BOX 435 STILLWATER ME 04489-0435	SHEET 2 OF 2 HOLE NO. MW11-207-R
DRILLER Thomas Schaefer	PROJECT NAME Juniper Ridge Landfill, Cell 7, Ph 2	LINE & STATION
T.B. JOB NUMBER 2011-069	LOCATION Old Town , ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 5/11/2011 Start	DATE 5/12/2011 Finish
TYPE	HW	SS	HQ		
SIZE I.D.	4"	1-3/8"	2.5"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"		SURFACE ELEVATIC	

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
"												
"	3R	3"	5.0'	4.8'	41.8	96%					41.8	Rock

Bottom of Boring @ 41.8'
2" PVC Well Installed @ 41.8'
Using 5.0' Screen

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[X] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Note: 2R & 3R were NQ2 core size
HW to 28' HQ Core to 31.8', Caved @ 29'
Spun NW Casing to 31.8', NQ Core to 41.8', Caved @ 32.6'
Spun NW Casing to 36.5', Washed out to 41.8'.
Flushed Clean and Installed Well.

HOLE NO. MW11-207-R

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CORP

SHEET 1 OF 1

HOLE NO. B-211

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION:

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	NQ2
SIZE I.D.	4"	1 3/8"	2"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 06/07/90 DATE FINISH: 06/08/90

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER										0.5	TOPSOIL
"	1D	2"	24"		2.0	1	1	1	5		
"	2D	2"	7"		2.6	21	50				BROWN SILTY GRAVELY SAND W/TRACE OF COBBLES
"										4.8	
14											
35	3D	2"	18"		6.5	20	22	27			
57											BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL, COBBLES
6											
15	4D	2"	18"		9.0	22	31	52		9.5	
17											
15										11.6	COBBLES AND BOULDERS
41	5D	2"	8"		12.3	37	50			12.3	BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL, COBBLES
										//	
	1R	3"	3.4'	3.4'	16.0	100%					ROCK
	2R	3"	5.0'	5.0'	21.0	100%					
	3R	3"	1.6'	1.6'	22.6	100%				22.6	
											BOTTOM OF BORING @ 22.6'
											INSTALL WELL @ 22.6' & 10.0'

SAMPLES
D= SPLIT SPOON
C= 2" SHELBY TUBE
S= 3" SHELBY TUBE
P= 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-211

PROJECT West Old Town Landfill	JOB NO. 9006	BORING NO. B211	
DATE COMPLETED 06.07.30	WELLS INSTALLED P211 A and B	DRILLING METHOD Washed Boring	
GROUND SURFACE ELEVATION (FT) 180.6	DRILLER MAINE TEST BORINGS	LOGGED BY KPN	
BOREHOLE DIAMETER (IN) 4.5 O.D.	ROCK CORE DIAMETER (IN.) 2.0 I.D.	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% -#200	ATTER-BERG LIMIT	PERME-ABILITY (FT/DAY)	INSTRUMENT LOG	WATER LEVEL	DEPTH (FT)
		0-3 TOPSOIL								
	1D		2						P211A 07.20 P211B 07.10	
	2D		42							
5		BROWN VERY SILTY GRAVELLY SAND							3.5	5
	3D	TRACE OF COBBLES (BASAL TILL)	49				K_F = 0.099			
	4D		83	9	48				5' 3/4" SCREEN P-211B	
10									10 10.5	10
	5D	12.3	74						GROUT (TYP)	
	1R	INTERBEDDED PHYLLITE AND META-GRAYWACKE (BEDROCK) RQD: 88%								
15									15.6	15
							K_F = 1.2		SAND (TYP)	
	2R	RQD: 82%							5' 3/4" SCREEN P211A	
20									21.6	20
	3R	22.6								
		B.O.E.								
25										25

NOTES

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT
JAMES RIVER CO

SHEET 1 OF 1

HOLE NO. B-212

DR
T CHAEFER

PROJECT NAME
PROPOSED LANDFILL SITE

LINE & STATION

M.T.
90 UMBER

LOCATION
OLD TOWN, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW/NW	SS	NQ2
SIZE I.D.	4"/3"	1 3/8"	2"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 06/08/90

DATE FINISH 06/11/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	CANE READING	DEPTH	STRATUM DESCRIPTION
AUGER										1.5	BROWN SILTY FINE SAND
"	1D	2"	24"		2.0	1	1	2	28		
"	2D	2"	2"		3.2	100					BROWN SILTY FINE-MED SAND W/LITTLE GRAVEL AND COBBLES
"	3D	2"	6"		4.7	115				5.0	
"	4D	2"	4"		5.8	100					
"											
"											
"	5D	2"	18"		8.3	29	45	110			BROWN SILTY FINE SAND W/LITTLE GRAVEL, COBBLES AND BOULDERS
"										9.1	
"											
52											COBBLES AND BOULDERS
54	1R	3"	2.0'	1.6'	12.0	80%				12.0	
	6D	2"	18"		13.5	21	39	38			BROWN SILTY FINE SAND W/LITTLE GRAVEL, TRACE OF COBBLES AND BOULDERS
9										15.0	
70	7D	2"	18"		15.5	23	39	68			BROWN SILTY FINE-MED SAND
17										17.5	
23	8D	2"	18"		17.5	25	26	30			BOULDERS
40										19.7	
NW											BROWN SILTY FINE SAND
NW	2R	3"	2.0'	1.7'	20.0	85%				22.2	
36	9D	2"	18"		21.5	21	33	65			BROWN SILTY FINE SAND W/TRACE OF GRAVEL
66										24.0	
12	10D	2"	18"		23.5	22	22	28			BROWN SILTY FINE SAND W/TRACE OF GRAVEL AND COBBLE
14										26.3	
16	11D	2"	6"		25.5						
22											
50											
	3R	3"	5.0'	5.0'	31.3	100%					ROCK
										36.3	
	4R	3"	5.0'	5.0'	36.3	100%					
											BOTTOM OF BORING @ 36.3'
											INSTALL WELL @ 36.3' & 17.0'

SAMPLES
D= SPLIT SPOON
C= 2" SHELBY TUBE
S= 3" SHELBY TUBE
P= 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

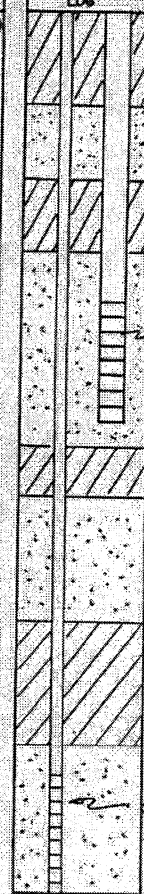
REMARKS:

HOLE NO. B-212

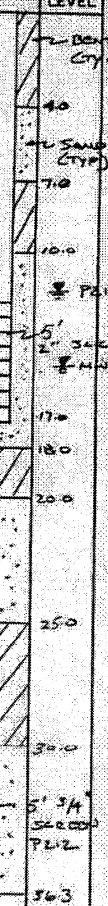
PROJECT West Old Town Landfill	JOB NO. 9006	BORING NO. B212	
DATE COMPLETED 06.12.90	WELLS INSTALLED MW212, P212	DRILLING METHOD Washed Boring	
GROUND SURFACE ELEVATION (FT) 217.4	DRILLER Maine Test Borings	LOGGED BY KPN	
BOREHOLE DIAMETER (IN) 45 O.D.	ROCK CORE DIAMETER (IN) 2.0 I.D.	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC(%)	% PASS #200	ATTERBERG LIMIT	PERMEABILITY (FT/DAY)
	1D	0.5 TOPSOIL	3				
	2D		—				
5	3D	Brown Sandy Gravelly Silt-Clay with Cobbles (Basal Till)					
	4D		—				
	5D		155				
10		... Becoming Brownish Gray with Depth					
	6D		77	11	53		
15	7D	15.0	107				
	8D	... Becoming Boulderly and Gray	86				
20	9D	21.5	98	16			
	10D	Brown Silty Gravelly Sand Trace of Cobbles (Basal Till)	50				
25	11D	26.3	—	11			
30	3R	Interbedded Phylite and Metagraywacke (Bedrock) RQD=76%					K_F = 0.022
35	4R	RQD=66%					
		36.3					
40							

INSTRUMENT LOG



WATER LEVEL



DEPTH (FT)

NOTES

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 1 OF 2

HOLE NO. B-213

F. [redacted] HARPER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION

T.F. [redacted] UMBER

LOCATION: OLD TOWN, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	NQ2/SQ
SIZE I.D.	4"	1 3/8"2"	"/1 7/16
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 06/12/90

DATE FINISH: 06/14/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC	DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	PANETRONIC	DEPTH	STRATUM DESCRIPTION
AUGER	1D	2"	18"		1.5	1	2	5		0.5	TOPSOIL
										1.3	BROWN FINE-COARSE SAND
"	2D	2"	18"		3.0	5	3	20			
"	3D	2"	18"		5.3	26	27	20		6.5	MOTTLED SILTY FINE SAND W/LITTLE GRAVEL, TRACE OF COBBLES
34											
75	4D	2"	18"		7.0	18	25	52			
16	5D	2"	12"		8.2	42	100				
24											
24											
16	6D	2"	12"		11.2	19	70				GRAY/BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL, TRACE OF COBBLES
[redacted]	7D	2"	18"		13.5	32	38	43			
17	8D	2"	18"		15.5	26	29	38			
15											
13	9D	2"	18"		17.0	35	35	35		17.0	
23											
20	10D	2"	18"		19.1	18	17	23		20.6	GRAY/BROWN SILTY FINE SAND W/SOME GRAVEL, TRACE OF CLAY AND COBBLES
24											
17	11D	2"	18"		21.6	9	14	15			
34										23.8	BROWN SILTY FINE SAND W/LITTLE GRAVEL
45	12D	2"	18"		23.7	25	54	102			
(DO(NW)											
WOH											
6	1R	3"	2.0'	2.0'	26.2	100%					GRAY/BROWN SANDY GRAVEL W/COBBLES AND BOULDERS
106											
148											
89	2R	3"	2.7'	1.4'	29.1	52%					
153	13D	2"	6"		30.5	75					
40	14D	2"	6"		31.7	110				31.2	
700										32.4	BROWN SILTY GRAVEL W/COBBLES AND BOULDERS
119											
40											
78	3R	2 3/8"	3.0'	2.0'	35.4	67%					
102											
83											GRAVEL AND COBBLES, TRACE OF SILT
[redacted]	15D	2"	18"		38.2	34	43	90			
[redacted]	4R	2 3/8"	1.0'	0.6'	39.3	60%					

SAMPLES
D= SPLIT SPOON
C= 2" SHELBY TUBE
S= 3" SHELBY TUBE
P= 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-213

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 2 OF 2

HOLE NO. B-213

DR[illegible] CHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION:

W.T. [illegible] NUMBER

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	NQ2
SIZE I.D.	4"	1 3/8"	2"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 06/12/90

DATE FINIS: 06/14/90

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
											GRAVEL AND COBBLES, TRACE OF SILT
	16D	2"	18"		42.0	37	40	48		42.0	
											BOTTOM OF BORING @ 42.0'
											LOST SPOON IN HOLE
											INSTALL WELL @ 38.3' & 19.6'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-213

PROJECT WEST OLD TOWN LANDFILL	JOB NO. 9006	BORING NO. B213
DATE COMPLETED 06-15-90	WELLS INSTALLED MW213, P213	DRILLING METHOD WASHED BORING
GROUND SURFACE ELEVATION (FT) 1803.-	DRILLER MAINE TEST BORINGS	LOGGED BY KPN
BOREHOLE DIAMETER (IN) 4.5 OD 0-23.8; 3.5 OD 23.8-40.5	ROCK CORE DIAMETER (IN) —	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC(%)	% PASS #200	ATTERBERG LIMIT	PERMEABILITY (FT/DAY)
	1D	0.5 TOPSOIL	8				
	2D	BROWN SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES (BASAL TILL)	23				
5	3D		47				
	4D	6.5	77				
	5D		84				
10	6D	BROWNISH GRAY SANDY GRAVELLY SILT-CLAY W/ TRACE OF COBBLES (BASAL TILL)	89	12			
	7D		81				
15	8D		67	11			
	9D		70				K_F = 0.067
	10D		40				
20	11D		29	12			
	12D		79				
25	1R	2.0' REC (GRAVEL & COBBLES)					
	2R	1.4' REC. (BOULDER) ...VERY BOULDERY					
30	13D		—				
	14D		—				
	3R	2.0' REC (GRAVEL & COBBLES)					$K_F \geq 27$
35	15D		86				
40	16D	...BECOMING BROWN AND STRATIFIED WITH SANDS * 42.0	88				
		B.O.E					
45							

INSTRUMENT LOG



WATER LEVEL	DEPTH (FT)
7.18 AG P213	
4.23 AG MW213 07-10-90	
12.7	
5' 3/4" SCREEN MW213	
19.6	
22.8	
BENTONITE (TYP)	
26.2	
CAVE (TYP)	
28.0	
31.2	
SAND (TYP)	
3/4" 5' SCREEN P213	
38.3	
42.0	

NOTES

* SPLIT SPOON DISCONNECTED FROM RODS; COULD NOT RETRIEVE

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT
JAMES RIVER CO

SHEET 1 OF 2

HOLE NO. B-214

DR' T. CHAEFER

PROJECT NAME
PROPOSED LANDFILL SITE

LINE & STATION

W.T.B. NUMBER
90

LOCATION
OLD TOWN, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	BQ
SIZE I.D.	4"	1 3/8"	1 7/16"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 06/18/90

DATE FINISH 06/19/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE SPACING	DEPTH	STRATUM DESCRIPTION
AUGER											
"	1D	2"	24"		2.0	1	3	6	9	3.4	BROWN SILTY FINE-MED SAND W/LITTLE GRAVEL
"											
"	2D	2"	24"		4.0	22	24	28	34	6.5	MOTTLED SILTY FINE SAND W/LITTLE GRAVEL, TRACE OF COBBLES
"											
"	3D	2"	24"		6.0	22	22	38	39		
"											
"	4D	2"	18"		8.0	21	34	48		10.2	BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL, TRACE OF COBBLES
170										10.5	BROWN FINE-MED SAND
40	5D	2"	18"		10.9	38	48	65			
17											
17	6D	2"	18"		12.5	34	48	60			
275	7D	2"	18"		15.1	46	63	102			
29	8D	2"	14"		16.9	44	55	100		17.7	BROWN SILTY FINE SAND W/LITTLE CAORSE SAND AND GRAVEL, TRACE OF COBBLES
34											
52	1R	2 3/8"	0.6'	0.3'	18.0	50%					
22	9D	2"	18"		19.5	52	50	45			
30											
20	10D	2"	18"		21.5	34	42	42			
13											
20	11D	2"	17"		23.4	18	22	50		24.0	BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL, TRACE OF COBBLES
32											
41	12D	2"	18"		25.5	25	38	45			
12											
21	13D	2"	16"		27.3	50	75	50			
24											
46	14D	2"	18"		29.5	24	16	19			
26											
24	15D	2"	10"		31.6	21	100				GRAY SILTY FINE SAND W/LITTLE CAORSE SAND AND GRAVEL, TRACE OF COBBLES
39											
60											
41	16D	2"	18"		34.1	72	90	82			
39	17D	2"	6"		35.8	120					
33											
30											
	18D	2"	18"		38.0	49	69	90		38.0	GRAY SILTY FINE SAND W/SOME GRAVEL, LITTLE COARSE SAND AND COBBLES
	19D	2"	8"		39.7	62	75				
	20D	2"	4"		40.8	150					

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-214

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

JAMES RIVER CO

SHEET 2 OF 2

HOLE NO. B-214

R" SCHAEFER

PROJECT NAME
PROPOSED LANDFILL SITE

LINE & STATION

T.B. 90 NUMBER

LOCATION
OLD TOWN, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	BQ
SIZE I.D.	4"	1 3/8"	1 7/16"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 06/18/90

DATE FINISH 06/19/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
58											
91	21D	2"	14"		42.0	48	65	100			
58											
72	22D	2"	10"		44.4	68	100				GRAY SILTY FINE SAND W/SOME GRAVEL, LITTLE COARSE SAND AND COBBLES
62	23D	2"	10"		45.8	63	100				
140											
97	24D	2"	11"		47.9	57	100				
69										48.0	
73	25D	2"	12"		49.5	72	125				BROWN SILTY FINE SAND W/SOME GRAVEL, LITTLE COARSE SAND AND COBBLES
85											
72	D	2"	0"		51.0	50				51.8	
88	D	2"	0"		51.8	100					
1[illegible]											
	2R	2 7/8"	3.2'	3.2'	55.2	100%					ROCK
	3R	2 7/8"	5.0'	5.0'	60.2	100%					
	4R	2 7/8"	2.0'	2.0'	62.2	100%				62.2	
											BOTTOM OF BORING @ 62.2' INSTALL WELL @ 62.2' & 43.1' & 16.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-214

PROJECT West Old Town Landfill	JOB NO. 9006	BORING NO. B214	
DATE COMPLETED 06.21.90	WELLS INSTALLED P214 A, B & C	DRILLING METHOD Washed Boring	
GROUND SURFACE ELEVATION (FT) 189.2	DRILLER Maine Test Borings	LOGGED BY KPN	
BOREHOLE DIAMETER (IN) 0-17.0 4.5 O.D. 17.0-51.8 3.5 O.D.	ROCK CORE DIAMETER (IN.) 1.615	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% PASSING #200	ATTERBERG LIMIT	PERMEABILITY (FT/DAY)
	1D	0.5 TOPSOIL	9				
	2D		52				
5	3D		60				
	4D	Brown Very Silty Gravelly Sand Trace of Cobbles (Basal Till)	82				
10	5D		113		45		
	6D		108	9			K_F = 0.0054
	7D	... becoming Brownish Gray with Depth	165				
15	8D		99	10			
	"H" CLEANOUT						
	9D		95				
20	10D		84	10			
	11D		72				
		24.0					
25	12D		83				
	13D		125				
	14D	Gray Sandy Gravelly Silt-Clay Trace of Cobbles (Basal Till)	35		52		
30	15D		—	10			
	16D		172				
35	17D		—	10		LL: 24 PI: 9	
	18D		159				
	19D		—			LL: 20 PI: 4	K_F = 0.048
40	20D	CEC = 4.58 meq/100 gm pH = 8.53	—				
	21D		113	11			
	22D		—				
45	23D		—		50		
	24D		—				
		48.0					
	25D	... becoming Brown and Stratified with Sand	—				
50		51.8					
	2R	RQD = 17% Interbedded Phyllite and Metagraywacke (Bedrock)					
55	3R	RQD = 30%					K_F = 0.42
60	4R	RQD = 0%					
		62.2 B.O.E.					

INSTRUMENT LOG

WATER LEVEL

- 2.99 AG P214A
- 2.77 AG P214B
- P214C 07 16 90 0900
- 5.0
- BENTONITE (TYP)
- 8.0
- SAND (TYP)
- 5' 3/4" SCREEN P214C
- 16.0
- 17.5
- GROUT (TYP)
- 35.8
- 5' 3/4" SCREEN P214B
- 43.1
- 44.6
- 55.2
- 5' 3/4" SCREEN P214A
- 62.2

NOTES

5/90

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT
JAMES RIVER CO

SHEET 1 OF 1

HOLE NO. B-215

THO[illegible]NEFER

PROJECT NAME
PROPOSED LANDFILL SITE

LINE & STATION

T.B[illegible]UMBER
90[illegible]

LOCATION
OLD TOWN, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	NQ2
SIZE I.D.	4"	1 3/8"	2"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 06/21/90

DATE FINISH 06/22/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
IGER										0.2	TOPSOIL
"	1D	2"	24"		2.0	1	2	3	4	2.5	BROWN SILTY FINE-COARSE SAND W/LITTLE GRAVEL
"	2D	2"	24"		4.0	10	29	37	44	4.1	BROWN SILTY FINE SAND W/LITTLE GRAVEL, TRACE OF COBBLES
"	3D	2"	15"		6.5	27	48	100		5.2	BOULDER
"	4D	2"	18"		8.5	21	42	35		9.2	BROWN SILTY FINE SAND W/LITTLE GRAVEL, TRACE OF COBBLES
14	5D	2"	18"		10.7	19	28	35			GRAY/BROWN SILTY FINE SAND W/LITTLE GRAVEL, TRACE OF COBBLES
14	6D	2"	18"		12.9	29	35	60		15.5	
52	7D	2"	18"		15.0	41	32	35		17.9	BROWN SILTY FINE SAND W/LITTLE COARSE SAND, TRACE OF GRAVEL AND COBBLES
6 9 12	8D	2"	18"		17.5	24	34	38		20.5	BOULDER (WEATHERED)
92 210										21.8	BROWN SILTY FINE-MED SAND W/LITTLE COARSE SAND AND GRAVEL, TRACE OF COBBLES
58 95	9D	2"	12"		21.5	60	105				
ASHED HEAD											
"	1R	3"	2.0'	2.0'	25.0	100%					ROCK
"	2R	3"	2.3'	2.3'	27.3	100%					
"	3R	3"	1.4'	0.8'	28.7	57%					
	4R	3"	4.3'	4.0'	33.0	93%				33.0	
											BOTTOM OF BORING @ 33.0' INSTALL WELL @ 33.0' & 12.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-215

PROJECT WEST OLD TOWN LANDFILL	JOB NO. 9006	BORING NO. B215	
DATE COMPLETED 06.25.90	WELLS INSTALLED PZ15 A & B	DRILLING METHOD WASHED BORING	
GROUND SURFACE ELEVATION (FT) 211.7	DRILLER MAINE TEST BORINGS	LOGGED BY KPN	
BOREHOLE DIAMETER (IN) 0-17.9 4.5 O.D. 17.9-21.8 3.5 OD	ROCK CORE DIAMETER (IN.) 2.0	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% PASSING #200	ATTER-BERG LIMIT	PERME-ABILITY (FT/DAY)
		0.2 TOPSOIL					
	1D		5				
	2D	BROWN SILTY GRAVELLY SAND TRACE OF COBBLES AND BOULDERS (BASAL TILL)	66				
5	3D		75				
	4D	9.2	77				
10	5D	BROWNISH GRAY GRAVELLY SILTY SAND TO SAND SILT-CLAY W/ COBBLES (BASAL TILL)	63	10	57		
	6D		95		48		$K_E = 0.013$
	7D	15.5	67	12		LL: 22 PI: 7	
15	8D	BROWN SILTY GRAVELLY SAND TRACE OF COBBLES AND BOULDERS (BASAL TILL)	72		32		
20	9D	21.8	—				
	1R	INTERBANDED PHYLLITE AND METAGRAY WACKE (BEDROCK) RQD = 0%					
25	2R	RQD = 17%					$K_E = 9.1$
	3R						
30	4R	RQD = 93%					
		33.0 B.O.E					
35							

INSTRUMENT LOG

WATER LEVEL

1.0
PZ15A
PZ15B
4.0
6.0
5' 3/4" SCREEN PZ15B
12.0
13.0
15.0
SAND (TYP)
17.5
BENTONITE (TYP)
26.0
5' 3/4" SCREEN PZ15A
33.0

DEPTH (FT)

NOTES

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT
JAMES RIVER CO

SHEET 1 OF 1

HOLE NO. B-216A

[illegible] HAEFER

PROJECT NAME
PROPOSED LANDFILL SITE

LINE & STATION

A.T.B. [illegible] UMBER
90[illegible]

LOCATION
OLD TOWN, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	
SIZE I.D.	4"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 07/02/90

DATE FINISH 07/02/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER											
"											
"											
"											
"											
"											
"											
"											
"											
63											
75											
[illegible]											
9[illegible]											
17											
31											
220											
245										20.4	

BOTTOM OF BORING @ 20.4'
INSTALL WELL @ 19.0' & 10.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-216A

PROJECT WEST OLD TOWN LANDFILL	JOB NO. 3006	BORING NO. B216A
DATE COMPLETED	WELLS INSTALLED MW216B, P216B	DRILLING METHOD WASHED BORING
GROUND SURFACE ELEVATION (FT) 157.3	DRILLER ~~MAINE TEST BORINGS~~	LOGGED BY KPN
BOREHOLE DIAMETER (IN) 4.5 O.D.	ROCK CORE DIAMETER (IN) ———	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% PASS #200	ATTER-BERG LIMITS	PERME-ABILITY (FT/DAY)	INSTRUMENT LOG	WATER LEVEL	DEPTH (FT)
		1.0 TOPSOIL								
5		BROWN SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES AND BOULDERS (BASAL TILL)					K_F = 0.14		3.0 ▽ P216B ▽ MW216B 07-16-99	5
10									25' 5" SCREEN P216B 10.0 10.5 BENTONITE (TYP)	10
15							K_F = 0.96		13.0 SAND (TYP) 5'2" SCREEN MW216B	15
		18.8							19.0 19.5	
20		20.4 B.O.E. GRAY SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES (BASAL TILL)							20.4	20
25										25

NOTES

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT JAMES RIVER CORP	SHEET 1 OF 1 HOLE NO. B-222
BY T HAEFER	PROJECT NAME PROPOSED LANDFILL SITE	LINE & STATION
T.B. NUMBER 90-	LOCATION OLD TOWN, MAINE	OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	BQ
SIZE I.D.	3"	1 3/8"	1 7/16"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 09/05/90 | DATE FINISH 09/06/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6"	6-12"	12-18"	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER	1D	2"	18"		1.5	2	2	5		0.5	TOPSOIL
"											
"	2D	2"	18"		3.0	6	20	36			MOTTLED SILTY FINE SAND W/TRACE OF GRAVEL
"	3D	2"	18"		4.5	34	42	47		4.0	
"											
"	4D	2"	18"		6.0	18	45	40			
"	5D	2"	18"		7.5	25	35	48			BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL
	6D	2"	18"		9.2	17	24	35			
22	7D	2"	18"		11.5	38	32	45		12.5	
56											
											BROWN SILTY FINE SAND W/LITTLE COARSE SAND, SOME GRAVEL AND COBBLES
59	8D	2"	18"		15.5	40	53	62		16.0	
30											
72											
67	9D	2"	18"		18.0	17	17	55			BROWN SILTY FINE SAND W/FINE SANDY SILT LAYERS,
51	10D	2"	9"		19.4	77	100			19.4	LITTLE GRAVEL AND COBBLES
75										20.4	WEATHERED ROCK
	1R	2 3/8"	3.6	3.3'	24.0	92%					ROCK
	2R	2 3/8"	3.0	2.4'	27.0	80%					
	3R	2 3/8"	3.4	2.5'	30.4	74%				30.4	
											BOTTOM OF BORING @ 30.4' HOLE CAVED @ 28.7' INSTALL WELL @ 28.7' & 10.2'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

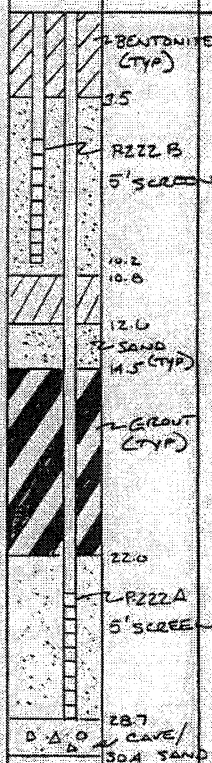
REMARKS:

HOLE NO. B-222

PROJECT West Old Town Landfill	JOB NO. 3806	BORING NO. B222	
DATE COMPLETED 07.06.90	WELLS INSTALLED P222A,B	DRILLING METHOD WASHED BORING	
GROUND SURFACE ELEVATION (FT) 212.4	DRILLING CONTRACTOR MAINE TEST BORINGS, INC	LOGGED BY KPN	
BOREHOLE DIAMETER (IN) 3.5" O.D.	ROCK CORE DIAMETER (IN) 1.615"	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% PASS #200	ATTERBERG LIMIT	PERMEABILITY (FT/DAY)
0	1D	TOPSOIL	7				
	2D		56				
	3D		87				
5	4D	BROWN VERY SILTY	85				
	5D	GRAVELLY SAND	83				K_P = 0.0033
	6D	TRACE OF COBBLES WITH RARE WASHED ZONES	59				
10	7D	(GLACIAL TILL)	87	9	44		
		... BECOMING BROWNISH GRAY WITH DEPTH					
15	8D		105				
	9D		72	16		LL: 23 PI: 4	
	10D	19.4	—				
20		20.9 WEATHERED BEDROCK					
	1R	RQD=86% INTERBEDDED PHYLLITE AND METAGRAYWACKE (BEDROCK)					
25	2R	RQD=97%					K_P = 0.91
	3R	RQD=74%					
30		30.4 B.O.E.					
35							

INSTRUMENT LOG



NOTES

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT
JAMES RIVER CO

SHEET 1 OF 1

HOLE NO. B-223

DR
L. HAEFER

PROJECT NAME
PROPOSED LANDFILL SITE

LINE & STATION

A.T.B. NUMBER
90-

LOCATION
OLD TOWN, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	HQ
SIZE I.D.	4"	1 3/8"	2 1/2"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 09/07/90 | DATE FINISH 09/07/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	WATER READING	DEPTH	STRATUM DESCRIPTION
AUGER	1D	2"	18"		1.5	7	19	25		0.5	TOPSOIL
"										2.2	MOTTLED SILTY FINE SAND W/TRACE OF COARSE SAND AND GRAVEL
"	2D	2"	18"		3.0	26	18	15		4.0	MOTTLED FINE SANDY SILT W/TRACE OF COARSE SAND AND COBBLES
"										7.5	BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL, TRACE OF COBBLES
"	3D	2"	18"		5.0	15	26	21		9.5	BROWN FINE SANDY SILT W/LITTLE COARSE SAND AND GRAVEL, TRACE OF COBBLES
"											
"	4D	2"	18"		7.0	16	25	35			BROWN FINE SANDY SILT W/SOME GRAVEL AND COBBLES LITTLE COARSE SAND
16											
32	5D	2"	18"		9.0	19	27	35			
35	6D	2"	18"		10.9	54	52	72			
21											
20											
	7D	2"	18"		13.8	30	30	35			
14	8D	2"	8"		14.8	31	100				
125											
35	9D	2"	18"		16.8	18	26	35			
39											
28	10D	2"	13"		18.6	33	45	50		18.6	
27											
95											
	1R	(±)	2.0'	1.7'	21.2	85%					
	2R	(±)	2.6'	2.6'	23.8	100%					ROCK
	3R	(±)	4.7'	4.7'	28.5	100%					
	4R	(±)	4.8'	4.8'	33.3	100%				33.3	
											BOTTOM OF BORING @ 33.3'
											INSTALL WELL @ 33.0'

SAMPLES
D= SPLIT SPOON
C= 2" SHELBY TUBE
S= 3" SHELBY TUBE
P= 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
(±) 3 25/32"

HOLE NO. B-223

PROJECT West Old Town Landfill	JOB NO. 9006	BORING NO. B223
DATE COMPLETED 09.10.90	WELLS INSTALLED MW-223A	DRILLING METHOD WASHED BORING
GROUND SURFACE ELEVATION (FT) 173.5	DRILLING CONTRACTOR MAINE TEST BORING, INC	LOGGED BY KPN / MWM
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 3 25/32" O.D.	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% PASS #200	ATTERBERG LIMIT	PERMEABILITY (FT/DAY)
0	1D	0.5 TOPSOIL	44				
	2D		33				
	3D	BROWN SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES AND (BOULDERS) (BASAL TILL)	47				
5	4D		51				
	5D		56	10			
10	6D		124				
	7D		65				
	8D		—				
15	9D		71	12	59		
	10D	18.6	—				
20	1R	INTERBEDDED PHYLLITE AND METAGRAYWACKE (BEDROCK) RQD = 46%					
	2R						
25	3R	RQD = 66%					K_F = 0.77
30	4R	RQD = 56%					
		33.3					
35							

INSTRUMENT LOG

- BENTONITE (TYP) — 3.0
- GROUT (TYP)
- 25.0
- MW-223A 5' SCREEN
- SAND (TYP) — 33.0

NOTES

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 1 OF 1

HOLE NO. B-223A

BY: [redacted] CHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION:

T.B. [redacted] MBER: 90-1[redacted]

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	
SIZE I.D.	4"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 09/11/90

DATE FINISH: 09/11/90

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER											
"											
"											
"											
"											
"											BROWN SILTY FINE SAND, W/SOME GRAVEL
"											
"											
"											
27											
51											
7[redacted]										12.0	
[redacted]											
110											
WASHED											BROWN FINE SANDY SILT W/SOME BOULDERS AND COBBLES
HEAD											
"										17.6	
											BOTTOM OF BORING @ 17.6'
											INSTALL WELL @ 17.6'
[redacted]											

SAMPLES
- D = SPLIT SPOON
- U = 2" SHELBY TUBE
- S = 3" SHELBY TUBE
- P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
- [XX] DRILLER-VISUALLY
- [ ] SOIL TECHNICIAN-VISUALLY
- [ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-223A

PROJECT West Old Town Landfill	JOB NO. 90060	BORING NO. B223A
DATE COMPLETED 09.11.90	WELLS INSTALLED MW-223B	DRILLING METHOD WASHED BORING
GROUND SURFACE ELEVATION (FT) 173.5	DRILLING CONTRACTOR MAINE TEST BORINGS, INC	LOGGED BY MWM
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	M (%)	LIQUID LIMIT	ATTER-BERG LIMITS	PERME-ABILITY (FT/DAY)	INSTRUMENT LOG	DEPTH (FT)
0	SEE B223A FOR SOIL SAMPLES	0.5 TOPSOIL						BENTONITE (TYP)	0
5		BROWN SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES AND BOULDERS (BASAL TILL)							5
10							$K_F = 0.12$	9.0 SAND (TYP)	10
15								MW-223B 5' SCREEN	15
20		17.6 B.O.E						17.6	20

NOTES

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT
JAMES RIVER CORP

SHEET 1 OF 1

HOLE NO. B-225

DRILLER
T. HAEFER

PROJECT NAME
PROPOSED LANDFILL SITE

LINE & STATION

A.T.B. NUMBER
90

LOCATION
OLD TOWN, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 09/14/90

DATE FINISH 09/14/90

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER	1D	2"	18"		1.5	1	4	8		0.2	TOPSOIL
"										1.0	GRAY FINE SANDY SILT
"										3.0	BROWN FINE SANDY SILT
"											
"											
"	2D	2"	18"		6.5	32	48	61			
"											
"											
"											
17											BROWN SILTY FINE SAND W/LITTLE GRAVEL AND COBBLES
60	3D	2"	13"		11.1	37	80	100			
WASHED											
AH										14.9	
"										15.1	ROCK
											REFUSAL @ 15.1'
											INSTALL WELL @ 12.7'

SAMPLES
D= SPLIT SPOON
C= 2" SHELBY TUBE
S= 3" SHELBY TUBE
P= 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS

HOLE NO. B-225

PROJECT West Old Town Landfill	JOB NO. 9006	BORING NO. B225	
DATE COMPLETED 09.17.90	WELLS INSTALLED P-225	DRILLING METHOD Washed Boring	
GROUND SURFACE ELEVATION (FT) 212.8	DRILLING CONTRACTOR Maine Test Boring, Inc	LOGGED BY KAN	
BOREHOLE DIAMETER (IN) 3.5" O.D.	ROCK CORE DIAMETER (IN) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% PASS #200	ATTERBERG LIMIT	PERMEABILITY (FT/DAY)	INSTRUMENT LOG	DEPTH (FT)
0	1D	0.5 TOPSOIL	12					3.0 4.0 6.0 P-225 5' screen 12.7 13.5 15.1	0
5	2D	Brown Sandy Gravelly Silt-Clay Trace of Cobbles (Basal Till)	109				K_F = 0.073		5
10	3D		—	10.					10
15		15.1 REFUSAL B.O.E							15
20									20

NOTES

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 1 OF 1

HOLE NO. B-226

DRI: CHAEFER

PROJECT NAME: PROPOSED LANDFILL SITE

LINE & STATION:

W.T.B. NUMBER: 90

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 09/13/90

DATE FINIS.: 09/13/90

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER	1D	2"	18"		1.5	2	7	35		0.2	TOPSOIL
										2.5	BROWN FINE SANDY SILT W/LITTLE GRAVEL & COBBLES
										4.0	BROWN SILTY FINE SAND W/SOME GRAVEL & COBBLES
										6.5	MOTTLED FINE SANDY SILT W/LITTLE GRAVEL
	2D	2"	18"		7.0	22	28	30			
											GRAY/BROWN FINE SANDY SILT W/LITTLE GRAVEL & COBBLES
31	3D	2"	18"		11.2					11.2	
50											
WO											
&HE											
	4D	2"	14"		16.3	48	72	50			
											GRAY FINE SANDY SILT W/SOME COBBLES & LITTLE COARSE SAND & GRAVEL
	5D	2"	18"		21.5	25	32	56			
										25.3	
											REFUSAL @ 25.3'
											INSTALL WELL @ 25.3'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

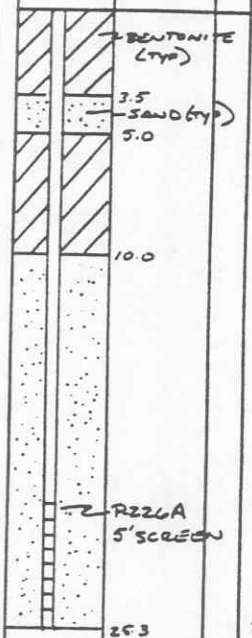
REMARKS:

HOLE NO. B-226

PROJECT West Old Town Landfill	JOB NO. 9006	BORING NO. B226	
DATE COMPLETED 09.13.90	WELLS INSTALLED P-226A	DRILLING METHOD Washed Boring	
GROUND SURFACE ELEVATION (FT) 215.0	DRILLING CONTRACTOR Maine Test Boring, Inc	LOGGED BY MWM	
BOREHOLE DIAMETER (IN) 3.5" O.D.	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% Wash #7.7	Atterberg Limit	Permeability (ft/day)
	1D	0.2 TOPSOIL	42				
5	2D	Brown Very Silty Gravelly Sand Trace of Cobbles (Basal Till) ... Becoming Brownish Gray with Depth	58		61		
10	3D	11.2	—	10	55		
15	4D	Gray Gravelly Silty Sand to Sandy Silt-Clay with Trace of Cobbles (Basal Till)	—	9	49		
20	5D		88	11	63		K_f = 0.022
25		25.3 REFUSAL B.O.E					

INSTRUMENT LOG



NOTES

Revised as per later corresp.

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT
JAMES RIVER CORP

BORING LOG

DRILLER
T HAEFER

PROJECT NAME
PROPOSED LANDFILL SITE

AUGER PROBE
SIZE O.D. 4"

M.T.B. NUMBER
90

LOCATION
OLD TOWN, MAINE

BORING NO.: P-226A
LINE & STA.:
OFFSET:
GR. ELEV.:
DATE: 12/07/90

BORING NO.:
LINE & STA.:
OFFSET:
GR. ELEV.:
DATE: / /

DEPTH	STRATUM DESCRIPTION
	BROWN SILTY FINE SAND W/LITTLE GRAVEL, SOME COBBLE
12.0	
	BOTTOM OF BORING @ 12.0'
	INSTALL PIEZOMETER @ 10.0'

DEPTH	STRATUM DESCRIPTION

SOIL CLASSIFIED BY:

XX DRILLER VISUALLY

SOIL TECHNICIAN

☐ LABORATORY TESTS

REMARKS:

PROJECT WEST OLD TOWN LANDFILL	JOB NO. 9006	BORING NO. B-226A	
DATE COMPLETED 12-07-90	WELLS INSTALLED B-226B	DRILLING METHOD AUGER	
GROUND SURFACE ELEVATION (FT) 215.5	DRILLING CONTRACTOR MAINE TEST BORING INC.	LOGGED BY RSC	
BOREHOLE DIAMETER (IN) 4.0" OD.	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	INSTRUMENT LOG	DEPTH (FT)
			2.5' TOP OF PVC	
5		BROWN SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES (BASAL TILL)	BENTONITE (TYP) 3.5 B-226B 5' SCREEN (3/4" Ø) SAND (TYP)	5
10		... BECOMING BROWNISH GRAY WITH DEPTH	10.5	10
15		12.0 B.O.E	12.0	15

NOTES

SEVEE & MAHER ENGINEERS

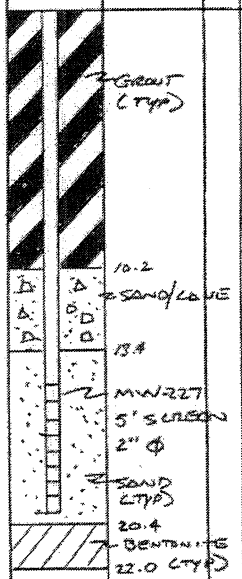
5/90

PROJECT WEST OLD TOWN LANDFILL — 20058

DATE COMPLETED 09.17.90	WELLS INSTALLED MW-227	DRILLING METHOD WASHED BORING
GROUND SURFACE ELEVATION (FT) 161.0	DRILLING CONTRACTOR MAINE TEST BORING, INC	LOGGED BY KAN
BOREHOLE DIAMETER (IN) 3.5" O.D.	ROCK CORE DIAMETER (IN) N/A	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	MC (%)	% PASS #200	ATTERG. LIMIT	PERMEABILITY (FT/DAY)
0	1D	0.2 TOPSOIL	103				
		BROWN VERY SILTY GRAVELLY SAND TRACE OF COBBLES (BASAL TILL)					
5	2D		51				
10	3D		—	11			
		13.0					
		GRAY SANDY GRAVELLY SILT-CLAY TRACE OF COBBLES (BASAL TILL)					
15	4D		116	11	67		K_F = 0.00046
	5D	22.0	60	10			
		B.O.E					

INSTRUMENT LOG



DEPTH (FT)

NOTES

SEVEE & MAHER ENGINEERS

PROJECT West Old Town Landfill	JOB NO. 9006	BORING NO. B-228
DATE COMPLETED 12-07-90	WELLS INSTALLED P-228	DRILLING METHOD Auger
GROUND SURFACE ELEVATION (FT) 215.0	DRILLING CONTRACTOR Maine Test Boring Inc	LOGGED BY RBC
BOREHOLE DIAMETER (IN) 4.0" OD	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION						INSTRUMENT LOG	DEPTH (FT)
								2.5 TOP OF PVC	
		Brown Sandy Gravelly Silt-Clay Trace of Cobble (Basal Till) ... Becoming Brownish Gray with Depth						Bentonite (Typ) 3.5	
5								P-228 5' Screen (3/4" ø)	5
								Sand (Typ)	
10								10.5	10
		12.0						12.0	
		BOE.							
15									15

NOTES

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

JAMES RIVER CORP

BORING LOG

RILLER HAEFER	PROJECT NAME PROPOSED LANDFILL SITE	AUGER PROBE SIZE O.D. 4"
T.B. 90- MBER	LOCATION OLD TOWN, MAINE	

BORING NO.: P-230
LINE & STA.:
OFFSET:
GR. ELEV.:
DATE: 12/07/90

BORING NO.:
LINE & STA.:
OFFSET:
GR. ELEV.:
DATE: / /

DEPTH	STRATUM DESCRIPTION
4.0	BROWN SILTY FINE SAND W/LITTLE GRAVEL
12.0	GRAY/BROWN SILTY FINE SAND W/LITTLE GRAVEL &COBBLE
	OTTOM OF BORING @ 12.0' INSTALL PIEZOMETER @ 10.0'

DEPTH	STRATUM DESCRIPTION

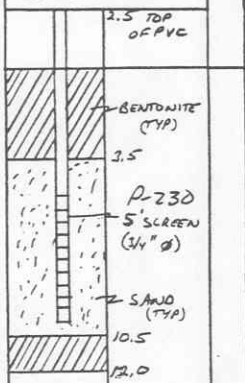
SOIL CLASSIFIED BY:
DRILLER VISUALLY
SOIL TECHNICIAN
☐ LABORATORY TESTS

REMARKS:

PROJECT WEST OLD TOWN LANDFILL	JOB NO. 9006	BORING NO. B-230
DATE COMPLETED 12-07-90	WELLS INSTALLED A-230	DRILLING METHOD AUGER
GROUND SURFACE ELEVATION (FT) 214.7	DRILLING CONTRACTOR MAINE TEST BORING INC.	LOGGED BY RBC
BOREHOLE DIAMETER (IN) 4.0" OD	ROCK CORE DIAMETER (IN.) N/A	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION
0		
5		BROWN SANDY GRAVELLY SILT-CLAY
		TRACE OF COBBLES
		(BASAL TILL)
10		... BECOMING BROWNISH GRAY WITH DEPTH
		12.0
		BOE.
15		

INSTRUMENT LOG



DEPTH (FT): 0, 5, 10, 15

NOTES

SEVEE & MAHER ENGINEERS

PROJECT WEST OLD TOWN LANDFILL JOB NO. 90006 BORING NO. MW 301

DATE COMPLETED 07.02.96	DATE WELLS INSTALLED 07.02.96	DRILLING METHOD SPIN CASING
GROUND SURFACE ELEVATION (FT)	DRILLING CONTRACTOR Maine Test Borings, Inc	LOGGED BY Tom Schaefer / KAN
BOREHOLE DIAMETER (IN) 4 1/2"	ROCK CORE DIAMETER (IN) 3 25/32	SHEET 1 OF 4

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION						INSTRUMENT LOG	DEPTH (FT)
		MOTTLED BROWN SILT, CLAY, AND GRAVEL						3.0	
5		6 FILL							
		OLIVE CLAYEY SILT TRACE OF GRAVEL							
		9							
10									
15		BROWN SANDY GRAVELLY SILT W/ COBBLES						17.0	
								BENTONITE CHIPS (TYP)	
20								21.0	
25		27							
30									
		GRAY SANDY GRAVELLY SILT W/ COBBLES							
35									
40									
45									
50									
55									
60									

NOTES

9/90

SEVEE & MAHER ENGINEERS

PROJECT WEST OLD TOWN LANDFILL **JOB NO.** **BORING NO.** MW 301

DATE COMPLETED	DATE WELLS INSTALLED	DRILLING METHOD
GROUND SURFACE ELEVATION (FT)	DRILLING CONTRACTOR	LOGGED BY
BOREHOLE DIAMETER (IN)	ROCK CORE DIAMETER (IN.)	SHEET 2 OF 4

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	RQD (%)	INSTRUMENT LOG	DEPTH (FT)
		... BECOMING Gray Clayey Sandy Silt w/ Gravel & Cobbles		65	
70				Bentonite Chips (Typ)	
				73	
75					
80		81.3 BASAL TILL			
85	1R		92	Bentonite Grout (Typ)	
90	2R	BEDROCK	99		
	3R		100		
100	4R		100		
105	5R		100		
110	6R		100		
115	7R		100		
120					

NOTES

SEVEE & MAHER ENGINEERS

5/90

PROJECT WEST OLD TOWN LANDFILL JOB NO. BORING NO. MW 301

DATE COMPLETED	DATE WELLS INSTALLED	DRILLING METHOD
GROUND SURFACE ELEVATION (FT)	DRILLING CONTRACTOR	LOGGED BY
BOREHOLE DIAMETER (IN) Approx 163	ROCK CORE DIAMETER (IN)	SHEET 3 OF 4

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	RQD %	Kmax cm/sec				INSTRUMENT LOG	DEPTH (FT)
	8R		100						
125	9R		100						
130	10R		100	7.0 x10⁻⁷ cm/sec (146.9-182.7 TEST INTERVAL)					
135	11R		100						
140	12R		100						
145	13R		100	6.8x10⁻⁷ cm/sec (146.9-182.7) TEST INTERVAL					
150	14R		76						
155	15R		86	6.0 x10⁻⁷ cm/sec (151.7-182.7) TEST INTERVAL				155.0 "00" SAND (TYP) 157.5	
160	16R		94					"0" SAND (TYP)	160
165	17R		100						
170	18R		100	1.2x10⁻⁶ cm/sec (TEST INTERVAL 161.5-182.7)				2" ϕ SCH 40 PVC SCREEN No 10 SLOT L=20 FT	
175	19R		86						
180									

NOTES

5/90

SEVEE & MAHER ENGINEERS

PROJECT WEST OLD TOWN LANDFILL **JOB NO.** **BORING NO.** MW 301

DATE COMPLETED	DATE WELLS INSTALLED	DRILLING METHOD
GROUND SURFACE ELEVATION (FT)	DRILLING CONTRACTOR	LOGGED BY
BOREHOLE DIAMETER (IN)	ROCK CORE DIAMETER (IN.)	SHEET 4 OF 4

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	Rad(%)					INSTRUMENT LOG	DEPTH (FT)
	20R	1830	94						
		B.O.E.							
185									

NOTES

SEVEE & MAHER ENGINEERS

5/90

PROJECT: CASELLA - JRL DETENTION POND #5		JOB NO.: 07086	BORING NO.: B-302R
DATE STARTED: 10/01/07	DATE FINISHED: 10/01/07	DRILLING METHOD: DRIVE & WASH	
GROUND SURFACE ELEVATION (FT): 204.49	DRILLING CONTRACTOR: MTB	LOGGED BY: EJL /JES	
BOREHOLE DIA. (IN): 41/4 in.	ROCK CORE DIA. (IN): 2 1/2	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N-VALUE (bpf)	RECOVERY (ft.)	RQD %	WELL LOG	DEPTH (FT)
		0.4 Dark brown silty SAND with organics				1	
5		Brown silty c-f SAND, trace gravel, dense				cuttings sand b-chips	5
	1D	(basil till)	136	2			
10	1R	Refusal at 7.7 ft. Drive casing to 7.4 ft. Wash to 8.0 ft. and begin coring		3.9	100	9.4 bentonite chips 12.9	10
15	2R			5.0	88	filter sand	15
		Interbedded PHYLLITE and Metagray WACKE					
20	3R			5.0	92	19.5	20
25	4R			5.0	94	schedule 40 #10 slot well screen L=10 ft.	25
	5R	(bedrock)		3.0	100	29.5	
30		29.9 BOTTOM OF EXPLORATION					30
35							35
40							40
45							45
50							50
55							55
60							60

NOTES:	Installed 2" PVC Piezometer with 10 ft.	Filter Sand
	screened interval at 29.5 ft.	Bentonite Chips
	Elevation MW-302R = 206.86 TPVC	Mixture of borehole cuttings, sand, and chips
	Wire line system used for rock coring (HQ)	

PROJECT WEST OLD TOWN LANDFILL JOB NO. 90006 BORING NO. MW 303

DATE COMPLETED 07 09 96 | DATE WELLS INSTALLED 07-10-96 | DRILLING METHOD SPIN CASING

GROUND SURFACE ELEVATION (FT) 213 | DRILLING CONTRACTOR Maine Test Boring, Inc. | LOGGED BY Tim Schaffer/EM

BOREHOLE DIAMETER (IN) 4 1/4" | ROCK CORE DIAMETER (IN) N/A | SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO	MATERIAL DESCRIPTION
0		Top Soil
5		Brown Sand Silt w/ Gravel / Cobbles
10		
15		
18.5		
20		Gray Sandy Gravelly Silt Mass of Cobbles becoming coarser with depth
25		
29.0		
30		Brown Silty Gravelly Sand w/ cobbles
35		
40		
45		
46.5		Weathered Till
		B.O.E.
50		

INSTRUMENT LOG

Bentonite Chips (typ)

3.0

Sand (typ)

7.0

9.0

Bentonite Grout (typ)

20.7

31.2

2" Ø Sch 40 PVC No. 10 Slot Screen L=10 ft.

44.7

45.0

DEPTH (FT)

NOTES

SEVEE & MAHER ENGINEERS

5/90

SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

PROJECT
Replacement Well
CASELLA - Juniper Ridge Landfill
West Old Town, ME

REPORT OF BORING No. MW-303R
SHEET 1 OF 2
JOB No. 12064.00
CHKD. BY

Driller: MAINE TEST BORINGS
18 Mack Lane, Hermon, ME

INSPECTOR: Brian Johnson

BORING LOCATION N 477517.1 E 927635.5 Maine State Plane

GROUND SURFACE ELEVATION 206.1 feet DATUM (Site Datum)

DATE START 9/11/2012 DATE END 9/11/2012

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 In.

AUGER: NA

HAMMER: High-speed winch and safety hammer

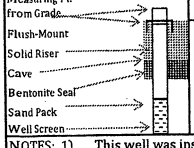
CASING SIZE: 4-inch OTHER: NA

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME
9/19/2012		28.72 ft BTOC		

DEPTH	WELL DETAILS (See Below)	SAMPLE NO.	PEN./ REC	DEPTH (Ft.)	BLOWS/6"	SAMPLE DESCRIPTION	SPT N Value	STRATUM DESCRIPTION
0						Surface has topsoil and grass.		
5		S-1	2.0/2.0	5-7	19/17/25/28	Brown Silt; little coarse sand to fine gravel; trace clay; subrounded to rounded.	42	
10		S-2	1.6/2.0	10-12	17/26/31/36	Simmilar to above.	57	BROWN SANDEY SILT WITH GRAVEL AND COBBLES (TILL)
						Encountered Cobble		
15		S-3	1.8/2.0	15-17	17/29/33/41	Brown; Silt; little clay; little to trace fine sand to fine gravel; rounded to subrounded.	62	
20		S-4	1.5/1.5	20-21.5	15/67/98	Brown; Silt, little clay; little fine sand to fine gravel; trace fine gravel; rounded to subrounded.	>100	
25		S-5	1.2/1.5	25-26.5	36/126/65	Gray, black and rust colored; Coarse to medium SAND; little to some fine gravel; trace to little silt; subangular to angular.	>100	GRAY SAND, GRAVEL AND SILT WITH COBBLES (TILL)
						Cobbles encountered.		
30		S-6	0.5/1.5	30-31.5	58/93/63	Rust colored, brown and gray; Sandy GRAVEL; little sand and silt; trace clay; angular.	>100	
						Cobbles encountered.		

PIEZOMETER DETAILS



GRANULAR SOILS

Blows/Ft	Rel. Density
0 - 4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
>50	Very Dense

COHESIVE SOILS

Blows/Ft	Rel. Density	Approx Su. (psf)
<2	Very Soft	0-250
2-4	Soft	250-500
4-8	Med. Stiff	500-1000
8-15	Stiff	1000-2000
15-30	Very Stiff	2000-4000
>30	Hard	>4000

MODIFIED BERMISTER SYSTEM

Descriptive Term	Portion of Total
Trace	0% - 10%
Little	10% - 20%
Some	20% - 35%
Adjective (e.g., clayey)	35% - 49%

Well Details
Screen: 40.4 to 30.4 ft bgs
Sand: 41.5 to 28.3 ft bgs
Chips: 28.3 to 19 and 11 to 1 ft bgs
Cuttings: 19 to 11 ft bgs
Stickup = 2.9 feet

NOTES: 1) This well was installed to replace MW-303, which was damaged in the summer of 2012.

BORING No. MW-303R

P:\Casella\OldTownLandfill\GeneralSiteInfo\SSI\Boring Log\2012\MW-303R.xls

SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

PROJECT
Replacement Well
CASELLA - Juniper Ridge Landfill
West Old Town, ME

REPORT OF BORING No. MW-303R
SHEET 2 OF 2
JOB No. 12064.00
CHKD. BY

Driller: MAINE TEST BORINGS
18 Mack Lane, Hermon, ME

INSPECTOR: Brian Johnson

BORING LOCATION See Page 1

GROUND SURFACE ELEVATION See Page 1

DATE START 9/11/2012 DATE END 9/11/2012

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 In.

AUGER NA

HAMMER:

CASING SIZE: OTHER:

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME
See Pg 1				

DEPTH	WELL DETAILS (See Pg 1)	SAMPLE NO.	PEN./ REC	DEPTH (Ft.)	BLOWS/6"	SAMPLE DESCRIPTION	SPT N Value	STRATUM DESCRIPTION
32								
35		S-7	1.5/2.0	35-37	53/48/50/61	Mixed- Brown and Black; Medium SAND; SILT and Gravelly Zones;; angular.	98	BROWN AND BLACK (MIXED) SANDY SILTY GRAVEL (TILL)
40		S-8	0.8/1.1	40-41.1	16/100/50(0.1')	Brown Fine to Medium SAND.	NA	SAND
						Roller coned to 41.5 feet		INTERPRETED AS BEDROCK
45						BOTTOM OF EXPLORATION AT 41.5 feet BGS		
50								
55								
60								

PIEZOMETER DETAILS
Measuring Pt. from Grade
Flush-Mount
Solid Riser
Cave
Bentonite Seal
Sand Pack
Well Screen

GRANULAR SOILS Blows/Ft	Rel. Density
0 - 4	Very Loose
4-10	Loose
10-30	Medium Dens
30-50	Dense
>50	Very Dense

COHESIVE SOILS Blows/Ft	Rel. Density	Approx Su. (psf)
<2	Very Soft	0-250
2-4	Soft	250-500
4-8	Med. Stiff	500-1000
8-15	Stiff	1000-2000
15-30	Very Stiff	2000-4000
>30	Hard	>4000

MODIFIED BERMISTER SYSTEM

Descriptive Term	Portion of Total
Trace	0% - 10%
Little	10% - 20%
Some	20% - 35%
Adjective (e.g., clayey)	35% - 49%

Well Details
See Page 1

NOTES: 1) This well was installed to replace MW-303, which was damaged in the summer of 2012.

BORING No. MW-303R

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MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Sevee & Maher Engineering, Inc.

SHEET 1 OF 3

HOLE NO. MW-401-A

DRILLER: Tom Schaefer

PROJECT NAME: West Old Town Landfill

LINE & STATION:

M.T.B. JOB NUMBER: 04-095

LOCATION: Old Town, ME

OFFSET:

GROUND WATER OBSERVATIONS
06/30/04 Water @ 5.3' Hole depth=7.0';
07/01/04 7:15am Water @ 4.9';
07/02/04 7:30am Water @ 4.6';
07/12/04 7:30am Water @ 3.6'

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	HQ
SIZE I.D.	4"	1 3/8"	2.5"
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 06/30/04 Start — DATE 07/13/04 Finish

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.2	Topsoil
"	1D	2"	24"	16"	2.0	2	2	5	13			
"											3.5	Mottled Silty Very Fine Sand w/Trace of Clay
"												
"												
"												
"	2D	2"	24"	13"	7.0	18	52	10	15			
24												
48												
28												
12											10.0	*Brown Silty F/M Sand,* w/Little Gravel, w/Trace of Cobbles
17	3D	2"	19"	16"	11.6	12	18	28	50			
35												
39												
60											13.0	Brown F/M Sand, w/Little Silt, Coarse Sand & Gravel, w/Trace of Cobbles
Spun												
Casing	4D	2"	24"	11"	17.0	33	68	65	50			
"											15.5	Olive Silty Gravelly Sand
"												
"												
"											18.2	Gray Silty Very Fine Sand, w/Some Gravel, w/Trace of Cobbles
"												
"	1R	3.78"	3.0'	2.1'	22.0	70.%						
"											21.1	Boulder
"												
"												
"											25.0	Gray Clayey Silty F/M Sand, w/Little Gravel & Cobbles
"	5D	2"	24"		27.0	32	35	28	40			
"												
"												
"												
"												
"	D	2"	24"	0"	32.0	25	25	24	32			
"												
"												
"												
"											35.0	Gray Fine Sandy Silt, w/Little Gravel, w/Trace of Cobbles
"	7D	2"	24"		37.0	30	38	25	23			
"												
"												
"												Gray Clayey Silty F/M Sand, w/Little Gravel, w/Trace of Cobbles

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
* Sample from Core
Washed ahead from 10' to 19', 53.0' to 53.3', 65.0' to 66.5', 70.0' to 73.2', and from 75.0' to 82.4'; Pulled casing at 19.0' & switched to spinning shoe;

HOLE NO. MW-401-A

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 3 HOLE NO. MW-401-A
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
06/30/04 Water @ 5.3' Hole depth=7.0';
07/01/04 7:15am Water @ 4.9';
07/02/04 7:30am Water @ 4.6';
07/12/04 7:30am Water @ 3.6'

	CASING	SAMPLER	CORE BARREL	DATE 06/30/04 Start	DATE 07/13/04 Finish
TYPE	HW	SS	HQ		
SIZE I.D.	4"	1 3/8"	2.5"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"		SURFACE ELEVATION	

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
"	8D	2"	11"		40.9	22	50					
"	9D	2"	20"		46.7	38	42	60	50			
"	10D	2"	23"		51.9	20	31	50	50			
"	2R	3.78"	1.0'	0.4'	54.3	40%						
"	11D	2"	16"		56.3	15	30	50			56.3	Gray Clayey Silty F/M Sand, w/Little Gravel, w/Trace of Cobbles
"	12D	2"	7"		60.6	38	50					
"	13D	2"	6"		65.5	90					65.0	Gray Clayey Silty Gravelly F/M Sand, w/Some Cobbles
"	14D*										66.2	Gray Fine Sandy Silt w/Little Gravel & Cobbles
											67.1	Boulder
"	3R	3.78"	5.0'	2.8'	71.5	56.%						
"	15D*										75.5	Gray Fine Sandy Silt w/Little Gravel & Cobbles
"	4R	3.78"	2.3'	0.8'	75.5	34.8%						
"	16D	2"	8"		76.7	85	50				78.5	Brown Gravelly Silty F/M Sand w/Some Cobbles
												Rock

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
* Sample from Core
Washed ahead from 10' to 19', 53.0' to 53.3', 65.0' to 66.5', 70.0' to 73.2', and from 75.0' to 82.4'; Pulled casing at 19.0' & switched to spinning shoe;

HOLE NO. MW-401-A

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 3 OF 3 HOLE NO. MW-401-A
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
06/30/04 Water @ 5.3' Hole depth=7.0';
07/01/04 7:15am Water @ 4.9';
07/02/04 7:30am Water @ 4.6';
07/12/04 7:30am Water @ 3.6'

	CASING	SAMPLER	CORE BARREL	DATE 06/30/04 Start	DATE 07/13/04 Finish
TYPE	HW	SS	HQ		
SIZE I.D.	4"	1 3/8"	2.5"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"		SURFACE ELEVATION	

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
"												
"												
	5R	3.78"	3.0'	2.6'	82.4	87%						
	6R	3.78"	5.0'	4.4'	87.4	88.%						
	7R	3.78"	4.8'	5.4'	92.2	113%						Rock
	8R	3.78"	5.0'	5.0'	97.2	100%						
	9R	3.78"	5.0'	4.9'	102.2	98%						
	10R	3.78"	4.0'	1.6'	106.2	40.%						
	11R	3.78"	3.2'	3.2'	109.4	100%					109.4	
												Bottom of Boring @ 109.4' Well Installed @ 108.8'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R =ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
* Sample from Core
Washed ahead from 10' to 19', 53.0' to 53.3', 65.0' to 66.5', 70.0' to 73.2', and from 75.0' to 82.4'; Pulled casing at 19.0' & switched to spinning shoe;

HOLE NO. MW-401-A

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. 401A PAGE 1 OF 3

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5 ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL 78.5-109.4

AZIMUTH _____ INCLINATION 90° LOGGED BY M. Scully (NAME) 12/29/04 (DATE)

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D CORE BROKEN BY DRILLER; M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED-WEATHERING SL - SLIGHT MOD - MODERATE SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
78						78.5' - Top of bedrock rollerconed to 79.4'
			0			
80	79.4-82.4 - Broken + weathered core. - fissile at steep angles 75-90°.	75° -90°	77	0		79.4-87.6': Phyllite - interbedded greenish-gray and black. Bedding is steep + undulating in thin beds. - Rock is more fissile than wacke below. - Highly fractured + weathered from 79.4-82' + 85.3-87.4'
82	not recovered	-	0	0		- Parting + fracture surfaces show Fe and Mn staining. Some pyrolucite dendrites on parting surfaces - eg. - @ 81'
	28° D					
84	46° - weathered	75° -90°	84	48		
	85.3-87.4' - Rubbly core - weathered w clays, FeO_x + MnO					
86						
	10° D					87.6' - 109.4' TD - Meta-graywacke - medium bluish gray to greenish gray. - Rock is generally hard + competent but is fractured + weathered in places. - Fracture zones are generally weathered with clays, FeO_x + MnO_2 - w. pyrolucite dendrites - Thin white Qtz + Ca veinlets are common throughout at various angles
88	50° - Rubbly + weathered	70° -80°	106	86		
90						
92						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. 401A PAGE 2 OF 3

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) 12/29/04 (DATE)

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D CORE BROKEN BY DRILLER; M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING; SL - SLIGHT; MOD - MODERATE; SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
92	60°					
	70°					
	75° - Weathered					
	20° - Weathered					
	25° "					
94		75° -85°	98	62		
	70° clean					
	70° tr. weathering					
96	20° " "					
	10° - weathered					
	30° "					
98	30° - weathered					
		70° -90°				
	70° - weathered		96	30		
100	20° - D					
	70° MnO2					
	45° - minor weathering					
102	15° " " MnO2					
	102.2 - 106' - Rubbly & weathered core. - mostly small angular pieces					
104		7	25	0		
106						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. 401A PAGE 3 OF 3

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) 12/29/04 (DATE)

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

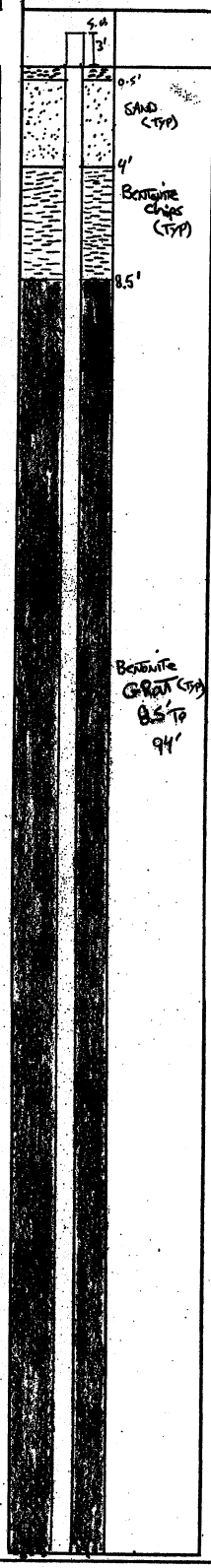
DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	BREAKS IN CORE	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	ROD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
106							
		20°					
		50°	50°				
			75°	98	50		
108		30° - weathered					
		30° "					
		50° "					
							109.4' TD
110							

PROJECT West Old Town Land Fill Expansion	JOB NO. 03676.09	BORING NO. 401A	
DATE COMPLETED 7/13/04	DATE WELLS INSTALLED 7/12/04	DRILLING METHOD Wash Rotary	
GROUND SURFACE ELEVATION (FT) 153.8' ±	DRILLING CONTRACTOR MTB	LOGGED BY T. Riley	
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.6"	SHEET 1 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% Passing #200 Sieve	Water Content %
0	1D	0-0.5' Topsoil Mottled silty Very Fine SAND w/ Trace of clay	18			
3.5'						
5	2D	Brown Silty Fine to Medium SAND w/ Little Gravel and Trace of Cobbles	25			
10	3D	10' Brown Fine to Medium SAND w/ Little silt, Coarse Sand and Gravel, Trace of Cobbles.	50 - 0.1'		27.7%	11.9%
13'		Becoming Increased Olive Color Silts.				
15	4D	13.5' Coarse silt w/ Very Fine Sand and some Cobbles	115			
18'		Boulder				
21'						
25	5D	Gray Clayie Silty Fine to Medium SAND with Little gravel and Cobbles	68			
30	6D		56			
35'						
35	7D	Becoming Increased Clay Content.	48			
40	8D		50-0.4'			
45	9D		50-0.2'			
50	10D		50-0.4'			
55	11D	56' UA Gray Clayey Silt with Some Gravel and Cobbles	50-0.3'		62.3%	11.1%
60		BASAL TILL				

INSTRUMENT LOG



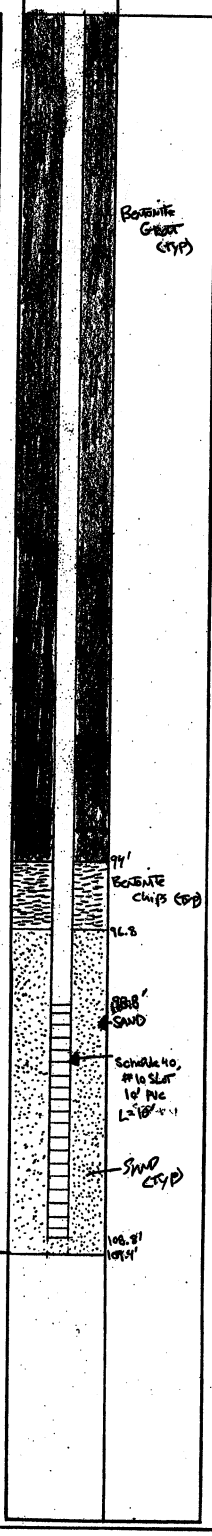
NOTES

SEVEE & MAHER ENGINEERS

PROJECT West old Town Expansion	JOB NO. 0307609	BORING NO. 401A	
DATE COMPLETED 7/13/04	DATE WELLS INSTALLED 7/12/04	DRILLING METHOD Wash Rotary	
GROUND SURFACE ELEVATION (FT) 153.8'	DRILLING CONTRACTOR MTB	LOGGED BY T. Riley	
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.5"	SHEET 2 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD
60	12D	Gray Clayey SILT w/ some gravel and cobbles.	50-0.1'	
65	65' 13D		90-0.5'	
70	14D	Brown Gravelly SILT, [illegible]	NA	
75	15D 16D		NA 50-0.2'	
80	78.5' Roller cone	BASAL TILL		
85	1R			0%
90	2R			48%
95	3R			86%
100	4R			62%
105	5R			30%
110	6R			0%
	7R			80%
	109.4'	Bedrock B.O.E.		

INSTRUMENT LOG



DEPTH (FT)

NOTES

5/90

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. MW-401-B
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 07/13/04 Start	DATE 07/13/04 Finish
TYPE	HW				
SIZE I.D.	4"				
HAMMER WT.	300#				
HAMMER FALL	16"			SURFACE ELEVATION	

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												
"												
"												
Spun												
Casing												
"												
"												
"												
"												
"												Same as MW-401-A
"												
"												
"												
"												
"												
"												
"												
"												
Wash												
Ahead												
											20.5	
												Bottom of Boring @ 20.5'
												Well Installed @ 20.0'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
No Samples Taken

HOLE NO. MW-401-B

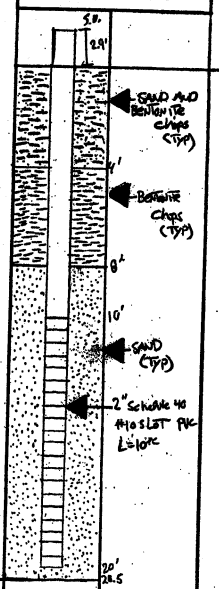
PROJECT West Old Town Landfill Expansion	JOB NO. 03076.09	BORING NO. 401B	
DATE COMPLETED 7/13/04	DATE WELLS INSTALLED 7/13/04	DRILLING METHOD Wash-Rotary	
GROUND SURFACE ELEVATION (FT) 154.6'	DRILLING CONTRACTOR M.T.B	LOGGED BY T. Riley	
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) N/A"	SHEET 1 OF 1	

DEPTH (FT) | SAMPLE NO. | MATERIAL DESCRIPTION

See Log 401A for Stratigraphy.

20.5' B.O.E. — BASAL TILL

INSTRUMENT LOG



DEPTH (FT)

NOTES

5/90

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 3 HOLE NO. MW-402-A
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
06/23/04 7:00am Water @ 4.1';
06/24/04 5:15pm Water @ 8.2', Hole depth= 70.0';
06/25/04 7:00am Water @ 1.9'

	CASING	SAMPLER	CORE BARREL	DATE 06/22/04 Start	DATE 06/28/04 Finish
TYPE	HW	SS	HQ		
SIZE I.D.	4"	1 3/8"	2.5"		
HAMMER WT.	300#	140#		SURFACE ELEVATION	
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger											0.3	Topsoil
"	1D	2"	24"		2.0	1	2	4	6			
"											3.0	Gray Brown Silty Fine Sand
"												
"												
8												
12	2D	2"	24"		7.0	6	4	6	8		6.5	Mottled Clayey Silty Fine Sand
20												
18												
18												
7											10.5	Gray Silty Clay
30	3D	2"	14"		11.2	WOH	7	50			11.0	*Brown Silty Clay*
27												
64												
120												
19											15.5	Brown Silty Gravelly Sand w/Some Cobbles
30	4D	2"	13"		16.6	21	30	50				
52												
58												
52											20.0	Gray Silty Gravelly Sand, w/Trace of Cobbles & Clay
26												
20	5D	2"	24"		22.0	11	20	23	30			
20												
23												
45												
35												
120	6D	2"	13"		26.1	17	38	50				
85												
50												
78												
65												
35	7D	2"	14"		31.2	42	82	50				Gray Clayey Silty Fine Sand, *w/Coarse Sandy Gravel & Cobbles*
42												
37												
37												
38												
45	8D	2"	24"		37.0	15	24	48	30			
55												
50												
53												

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R =ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Casing refusal @ 48.1' (boulder)- Changed over to spinning;
Started spinning at 18.0';
Washed ahead from 10.0' to 75.0'

HOLE NO. MW-402-A

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 2 OF 3 HOLE NO. MW-402-A
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
06/23/04 7:00am Water @ 4.1';
06/24/04 5:15pm Water @ 8.2', Hole depth= 70.0';
06/25/04 7:00am Water @ 1.9'

	CASING	SAMPLER	CORE BARREL	DATE 06/22/04 Start	DATE 06/28/04 Finish
TYPE	HW	SS	HQ	SURFACE ELEVATION	
SIZE I.D.	4"	1 3/8"	2.5"		
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

CASING BLOWS PER FOOT	SAMPLE NO	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
45												
58												Gray Clayey Silty Fine Sand
65	9D	2"	24"		43.0	30	24	47	45			w/Coarse Sandy Gravel & Cobbles
74												
90											45.0	
52												Gray Silty Fine Sand,
55	10D	2"	14"		46.2	53	82	50				w/Little Clay, Coarse Sand & Gravel,
50											47.7	w/Trace of Cobbles
25											48.8	Boulder
100	1R	3.78"	2.0'	1.6'	50.0	80%						Gray Silty Fine Sand
Spun												w/Little Clay, Coarse Sandy Gravel & Cobbles
Casing												
"												
"												
"												
"												
"												
"	11D	2"	24"		57.5	20	33	53	53			
"												
"												
"												
"	12D	2"	19"		61.6	32	43	65				
"												
"												
"												
"	13D	2"	7"		65.6	45	50					
"												Gray Silty Fine Sand,
"												w/Little Coarse Sandy Gravel,
"												w/Trace of Clay, Some Cobbles
"												
"												
"												
"	14D	2"	5"		71.4	100					72.0	
"											73.0	Boulder
"												
"												Olive Silty Gravelly Sand,
	15D	2"	4"		75.3						75.4	w/Some Coarse Sand & Cobbles
	2R	3.78"	3.0'	3.0'	79.0	100%						Rock

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Casing refusal @ 48.1' (boulder)- Changed over to spinning;
Started spinning at 18.0';
Washed ahead from 10.0' to 75.0'

HOLE NO. MW-402-A

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 3 OF 3 HOLE NO. MW-402-A
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS
06/23/04 7:00am Water @ 4.1';
06/24/04 5:15pm Water @ 8.2', Hole depth= 70.0';
06/25/04 7:00am Water @ 1.9'

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	HQ
SIZE I.D.	4"	1 3/8"	2.5"
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 06/22/04 Start | DATE 06/28/04 Finish
SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
	3R	3.78"	5.0'	5.0'	84.0	100%						
	4R	3.78"	3.0'	3.0'	87.0	100%						
	5R	3.78"	5.0'	5.0'	92.0	100%						Rock
	6R	3.78"	5.0'	5.0'	97.0	100%						
	7R	3.78"	5.0'	5.0'	102.0	100%						
	8R	3.78"	4.0'	4.0'	106.0	100%					106.0	
												Bottom of Boring @ 106.0' 2" PVC Well Installed @

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Casing refusal @ 48.1' (boulder)- Changed over to spinning;
Started spinning at 18.0';
Washed ahead from 10.0' to 75.0'

HOLE NO. MW-402-A

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. MW-402A PAGE 1 OF 3

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5 ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M.V. Scully (NAME) 12/29/04 (DATE)

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D CORE BROKEN BY DRILLER; M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING SL - SLIGHT MOD - MODERATE SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
						-75.4' Top of Bedrock Recovery begins at 76'
76						Bedrock:
	20° clean					- Medium to coarse grained quartz wacke, medium to dark bluish gray color, locally abundant white Qtz+Ca veins
	70° D Bedding?	60				
	50° D, on Qtz-Ca vein	-70°	97%	63		
78	40°					
	D - Rubbly - clean					
	} - Rubbly core minor FeOx					
80						
		60-				
	D	70°	100	76		
82	30°					
	55°					
*	50°. on Calcite veinlet					83': MnO_2 dendrites on parting surface - calcite veinlet.
	10° w. MnO_2 Dendrites					
84	D					83-86': Abundant small qtz-ca veinlets (1/16-1/4") at various angles
	20° D					
	40° - on Qtz-Ca vein	60°				
	40° D	-75°	100	53		
86						86-86.5' Possible fracture zone. Rubbly core, rock is sheared? blackish phyllite
→	Rubbly core w. Qtz-Ca vein - tr. FeOx.					
	70° - Minor FeOx.					
88	20° D					

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. MW-402A PAGE 2 OF 3

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) 12/29/04 (DATE)

BREAKS IN CORE

- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
88	5° D					
	40° minor FeOx	65 -75°				
90			100	60		
	50° D					
	30° D					
	50°					
92	D					
	40° D					
		60° -70°				
94						
	50° D		100	56		
	55-60° - multiple breaks w. clayey gouge in breccia zone w. abund. Qtz-Ca veins					95-97.5': Fault Zone? Brecciated rock with some clayey gouge on surfaces, abund. Qtz-Ca veins + masses, 55-60° to horiz.
96						
98						97.5-100.8': Abundant Qtz-Ca veins at various angles, 1/8" - 1/2" wide.
	70° D	65°	98	80		
100	45° D					
	35°					
102	D in Qtz-Ca vein					

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. MW40ZA PAGE 3 OF 3

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) 12/29/04 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

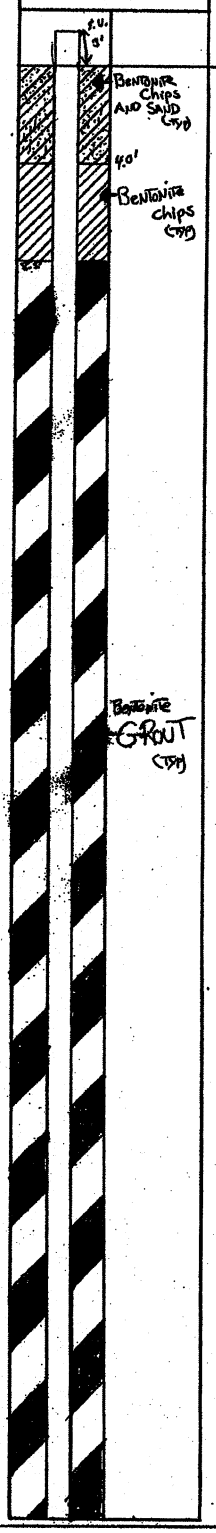
DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
102	65°-D - Bedding.					
	10° D					
104		65 -70°	100	92		
	45° D					
	D					
106						106': TD

PROJECT: WEST MIDTOWN LANDFILL EXPANSION	JOB NO. 03076.09	BORING NO. 402A	
DATE COMPLETED: 6/29/04	DATE WELLS INSTALLED: 6/29/04	DRILLING METHOD: WASH-ROTARY	
GROUND SURFACE ELEVATION (FT): 149.5'	DRILLING CONTRACTOR: MTB	LOGGED BY: T. Riley / JES	
BOREHOLE DIAMETER (IN): 4.5" O.D.	ROCK CORE DIAMETER (IN.): 2.5"	SHEET 1 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% Passing #200 Sieve	WATER CONTENT %
		0.3' TOP SOIL				
5	1D	Mottled clayey SILTY FINE SAND	10			
	2D	5.5' — — — — Gray SILTY SANDY CLAY (MARINE CLAY)	14		86.9%	21.9%
10	3D	11' MARINE SEDIMENTS.	60-0.2'			
15	4D	BROWN GRAVELLY SANDY SILT WITH A TRACE OF COBBLES. — — ...Becoming gray with a TRACE of clay.	50-0.1'			
20		20' — — — —				
	5D		53			
25	6D		60-0.1'			
		Gray GRAVELLY SANDY CLAYEY SILT. TRACE of COBBLES.				
30	7D		50-0.2'			
35	8D		78			
40	9D		92			
45		45' — — — —				
	10D	...Becoming, TRACE of clay (0.9' thick cobbles)	60-0.2'			
50						
55	11D		106		65.6%	11.0%
60		BASAL TILL				

INSTRUMENT LOG



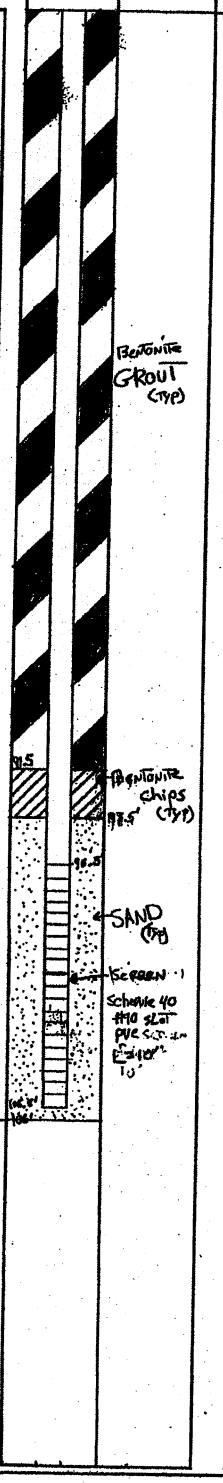
NOTES

SEVEE & MAHER ENGINEERS

PROJECT WEST OLDTOWN LANDFILL EXPANSION	JOB NO. 03076.09	BORING NO. 402A	
DATE COMPLETED 6/27/04	DATE WELLS INSTALLED 6/29/04	DRILLING METHOD WASH - ROTARY	
GROUND SURFACE ELEVATION (FT) 147.5'	DRILLING CONTRACTOR MTB	LOGGED BY TCR / JES	
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.5"	SHEET 2 OF 2	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% < 200	K cm/sec
60	12D	From Above... Gray Gravelly Sandy Clayey Silt. Trace of Cobbles. Trace of Clay	50-0.1'			
65	13D		60-0.1'			
70	14D	(BASALTIC)	100-0.4'		53%	9.6×10^{-4}
		1' Thick Boulder				
75	15D	Basal Till	100-0.3'			
	3R			63%		
80	4R			76%		
85	5R			10%		
	6R			60%		
90						
95	7R			56%		
100	8R			80%		
105	9R	106' B.O.E. Bedrock		92%		
110						

INSTRUMENT LOG



NOTES

5/90

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Sevee & Maher Engineering, Inc.	SHEET 1 OF 1 HOLE NO. MW-402-B
DRILLER Tom Schaefer	PROJECT NAME West Old Town Landfill	LINE & STATION
M.T.B. JOB NUMBER 04-095	LOCATION Old Town, ME	OFFSET

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE	DATE
TYPE	HW		HQ	06/29/04 Start	06/29/04 Finish
SIZE I.D.	4"		2.5"	SURFACE ELEVATION	
HAMMER WT.	300#				
HAMMER FALL	16"				

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												
"												
"												
"												
"												
"												
Spun												
Casing												
"												Same as MW-402-A
"												
"												
"												
"												
"												
Wash Ahead	1R	3.78"	1.0'	0.9'	18.0	90%						
"												
"												
"												
"												
											22.5	
												Bottom of Boring @ 22.5'
												Well Installed @ 22.0'

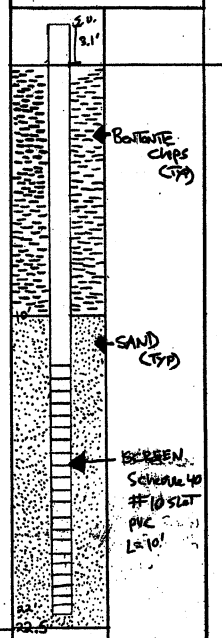
SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3½" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. MW-402-B

PROJECT WEST OLD TOWN LANDFILL EXPANSION	JOB NO. 03076.09	BORING NO. 402B
DATE COMPLETED 6/29/04	DATE WELLS INSTALLED 6/29/04	DRILLING METHOD WASH-ROTARY
GROUND SURFACE ELEVATION (FT) 149.8'	DRILLING CONTRACTOR MTB	LOGGED BY T. Riley
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.5"	SHEET 1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	INSTRUMENT LOG	DEPTH (FT)
0		See LOG 402A for STRATIGRAPHY.		0
5				5
10				10
15				15
20		22.5' BASAL TILL		20
25		B.O.E.		25

NOTES

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 1 OF 2

HOLE NO. B-502

OF: SCHAEFER

PROJECT NAME: LANDFILL

LINE & STATION:

M T B JOB NUMBER: 92-28

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT FT. AFTER HOURS

AT FT. AFTER HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	H/N/B	SS	NQ/BQ
SIZE I.D.	3/2/	1 3/8"	2:1 7/16
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 02/24/92

DATE FINIS: 02/27/92

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER											
"										2.5	BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL
"	1D	2"	24"		3.0	4	11	33	82	3.5	MOTTLED SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL
"	2D	2"	24"		5.0	25	32	45	45		
"	3D	2"	12"		6.0	37	90			6.0	OLIVE SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL
"											
"											
36											
62	4D	2"	24"		10.0	40	67	108	94		
26											
7	5D	2"	24"		12.0	58	58	97	90		
20	6D	2"	24"		15.0	53	57	55	120		
24											
26	7D	2"	24"		17.0	69	60	72	95		OLIVE SILTY FINE SAND W/SOME GRAVEL, LITTLE COARSE SAND COBBLES
29	8D	2"	12"		18.3	117	120				
31											
24											
24											
39	9D	2"	24"		22.0	35	37	31	52		
36	10D	2"	8"		22.7	74	100				
60	11D	2"	2"		24.4	100					
62										25.0	
48											
47	12D	2"	18"		27.0	70	90	130			BROWN FINE-MED SAND W/SOME COARSE SAND AND SILT, LITTLE GRAVEL
50										28.0	
77 -NW											
26	13D	2"	4"		30.5	115					
90											
SPIN	1R	3"	2.0'	0.5'	32.5	25%					
"											
"	14D	2"	12"		34.6	120	120				BROWN SILTY SANDY GRAVEL W/SOME COBBLES
"	15D	2"	4"		35.3	100					
"											
"											
"	2R	3"	2.0'	1.0'	38.0	50%					

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

HOLE NO. B-502

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CO

SHEET 2 OF 2

HOLE NO. B-502

DRI: T. SCHAEFER

PROJECT NAME: LANDFILL

LINE & STATION:

M.T.B. JOB NUMBER: 92-28

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT FT. AFTER HOURS

AT FT. AFTER HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	H/N/B	SS	NQ/BQ
SIZE I.D.	3/2/	1 3/8"	2:1 7/16
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 02/24/92

DATE FINIS: 02/27/92

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READINGS	DEPTH	STRATUM DESCRIPTION
19 -BW											
112											
115	16D	2"	8"		43.7	105	100			43.7	BROWN SILTY SANDY GRAVEL W/SOME COBBLES
110											
											ROCK
	3R	2 3/8"	5.3'	4.3'	50.8	81%				50.8	
											BOTTOM OF BORING @ 50.8'
											INSTALL WELL @ 42.6' & 11.3'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

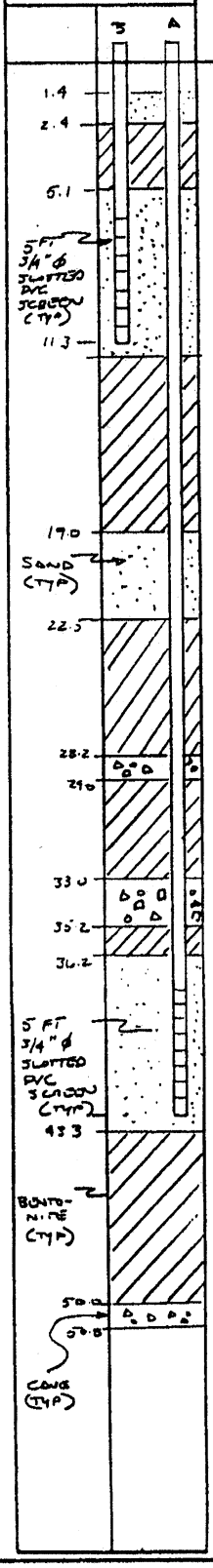
REMARKS:

HOLE NO. B-502

PROJECT West Old Town Landfill	JOB NO. 9000	BORING NO. B-5D	
DATE COMPLETED 02-27-92	DATE WELLS INSTALLED 02-27-92	DRILLING METHOD WASHED BORING	
GROUND SURFACE ELEVATION (FT) 208.4	DRILLING CONTRACTOR Maine Test Borings, Inc.	LOGGED BY KPN	
BOREHOLE DIAMETER (IN) 4" ID	ROCK CORE DIAMETER (IN.) 1.13" O.D.	SHEET ___ OF ___	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	% RECOVERY @ 200	RQD %			DEPTH (FT)
0								0
5	1D	Brown Silty Gravelly Sand to Sandy Silt-Clay trace of cobbles	44					5
	2D		77					
	3D		90(0.5)				Kp = 0.10 ft/day	
10	4D		175					10
	5D		155					
	6D		112					
15	7D		131					15
		17.0						
	8D	... Becoming Greyish Brown Very Silty trace of clay (Basal Till)	120(0.5)					
20	9D		69					20
	10D		100(0.2)	52				
		21.0						
25			100(0.2)					25
	12D	Brown Silty Sand trace of gravel	220	17				
		28.0						
30	13D		* 40(0.3)					30
	1R	Brown Silty Sandy Gravel trace of cobbles (Washed Till)						
	14D		*40(0.5)	13				
35	15D		*25(0.3)					35
	2R							
40							Kf = 13 ft/day	40
	16D	43.7	+30(0.2)	27				
45		Bedrock						45
	3R				9			
50		50.8						50
		B.O.C.						
55								55

INSTRUMENT LOG



NOTES

* used 300 lb hammer 18" Drop

SEVEE & MAHER ENGINEERS

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CORP

SHEET 1 OF 2

HOLE NO. B-504

DF: T. SCHAEFER

PROJECT NAME: LANDFILL

LINE & STATION:

M.T.B. JOB NUMBER: 92-28

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT FT. AFTER HOURS

AT FT. AFTER HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	BQ
SIZE I.D.	4"	1 3/8"	1 7/16"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 03/03/92 DATE FINIS: 03/06/92

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	WATER CONTENT %	DEPTH	STRATUM DESCRIPTION
AUGER											
"										2.0	BROWN SILTY FINE SAND, TRACE OF GRAVEL
"	1D	2"	24"		3.0	3	1	4	24	3.0	MOTTLED SILTY FINE SAND W/LITTLE GRAVEL
"	2D	2"	7"		3.6	65	100				
"											
"	3D	2"	12"		6.0	42	90				
"											
"											
107	4D	2"	8"		9.0	52	100				OLIVE SILTY FIEN SAND W/LITTLE GRAVEL AND COBBLES
68											
19	5D	2"	2"		11.2	100					
17^											
	6D	2"	7"		13.6	75	100				
33	7D	2"	10"		15.8	112	100				
80											
73	8D	2"	7"		17.4	105	60				
55										18.0	
67											
70											
84	9D	2"	24"		21.0	40	46	74	142		
75											
102	10D	2"	10"		23.0	23	50				GRAY FINE SANDY SILT W/SOME GRAVEL AND COBBLES, TRACE OF CLAY
77											
85	11D	2"	12"		25.0	32	47			25.5	
50	12D	2"	6"		26.5	50					GRAY/BROWN SILTY FINE SAND W/LITTLE COARSE SAND AND GRAVEL, TRACE OF COBBLES
60											
53	13D	2"	6"		28.5	65					
50										29.0	
60											
63											BROWN FINE-COARSE SAND W/LITTLE GRAVEL AND SILT, TRACE OF SANDY SILT LAYERS
56	14D	2"	24"		32.0	35	44	49	50		
62	15D	2"	12"		33.3	25	60			33.3	
108											
108										35.0	BROWN FINE-COARSE SAND W/LITTLE GRAVEL AND COBBLES AND SILT
50											
41	1R	(*	2.0	0.0'	37.0	0%					
12^	16D	2"	11"		36.9	35	100				BROWN SILTY SANDY GRAVEL W/SOME COBBLES
	17D	2"	2"		38.7	55					
	18D	2"	7"		40.0	48	50				

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
USED HW 0-35.0' CHANGED TO NW 35.0-45.0'
CHANGED TO BW 45.0-49.6'

HOLE NO. B-504

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: JAMES RIVER CORP

SHEET 2 OF 2

HOLE NO. B-504

DRI: T. SCHAEFER

PROJECT NAME: LANDFILL

LINE & STATION:

M T B. JOB NUMBER: 92-28

LOCATION: OLD TOWN, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT FT. AFTER HOURS

AT FT. AFTER HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	BQ
SIZE I.D.	4"	1 3/8"	1 7/16"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START: 03/03/92 DATE FINISH: 03/06/92

SURFACE ELEVATION:

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	ELEV. DEPTH	STRATUM DESCRIPTION
93										
140										
139	19D	2"	6"		43.3	150				BROWN SILTY SANDY GRAVEL W/SOME COBBLES
200									44.8	
92										
103										
33										BROWN SILTY SANDY GRAVEL W/SOME COBBLES & BOULDERS
823	2R	(*	3.7	2.4'	48.5	65%				TRACE OF BROWN TILL
100										
155									50.0	
										ROCK
	3R	(*	4.1	3.9'	54.2	95%			54.2	
										BOTTOM OF BORING @ 54.2'
										INSTALL WELLS @ 48.0' & 23.3' & 10.0'

SAMPLES
- = SPLIT SPOON
- = 2" SHELBY TUBE
- = 3" SHELBY TUBE
- = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
- [XX] DRILLER-VISUALLY
- [ ] SOIL TECHNICIAN-VISUALLY
- [ ] LABORATORY TESTS

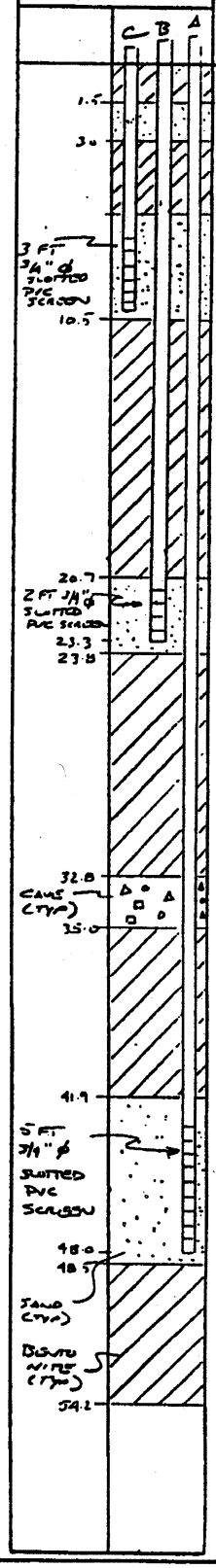
REMARKS:

HOLE NO. B-504

PROJECT West Old Town Landfill	JOB NO. 7006	BORING NO. 8504	
DATE COMPLETED 03.06.92	DATE WELLS INSTALLED 03.06.92	DRILLING METHOD Washed Boring	
GROUND SURFACE ELEVATION (FT) 212.8	DRILLING CONTRACTOR Maine Test Borings, Inc	LOGGED BY KPN	
BOREHOLE DIAMETER (IN) 4"	ROCK CORE DIAMETER (IN.) 1.43"	SHEET 1 OF 1	

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	% Passing # 200	RQD %		
	1D	Brown Silty Gravelly Sand Trace of Cobbles (Basal Till)	5				
	2D		100(0.1)				
5	3D		90(0.5)				
	4D		100(0.2)				
10	5D		100(0.2)				
	6D		100(0.1)				
15	7D		100(0.3)				
	8D	18.0	*60(0.1)				
20	9D	Gray Gravelly Sandy Silt Clay Trace of Cobbles & Clay (Basal Till)	120				
	10D		*50(0.3)				
25	11D	25.5	*47(0.5)				
	12D	Mixed w/ Brown Sandy Silt; (Basal Till) 27.5	*50(0.5)	58			
	13D	Brown Silty Gravelly Sand Trace of Cobbles (Washed Till) 29.0	*65(0.5)	33			
30	14D	... w/ Layers Silty Sand (0.02 to 0.15' thick).	*73	32			
	15D	33.3 (Washed Till)	*60(0.5)	12			
35	1R 16D	Brown Silty Gravelly Sand Trace of Cobbles (Washed Till)					
	17D		*18(0.2)				
40	18D		*50(0.3)	16			
	19D		150(0.5)	18			
45	2R	48.2					K_F=21 FT/DAY
		Brown Silty Gravelly Sand Trace of Cobbles (Basal Till) 50.1					
50	3R	Bedrock 54.2			85		
55		B.O.E					

INSTRUMENT LOG



NOTES

* 3" ϕ Spoon; 300 lb Hammer 18" Drop

PROJECT WEST OLD TOWN LANDFILL JOB NO. 90006 BORING NO. B505 (MW 302)

DATE COMPLETED 03.10.92	DATE WELLS INSTALLED 03.10.92	DRILLING METHOD HOLLOW STEM AUGER
GROUND SURFACE ELEVATION (FT) 206.1	DRILLING CONTRACTOR MAINE TEST BORING, INC.	LOGGED BY KPN
BOREHOLE DIAMETER (IN) 4" ID	ROCK CORE DIAMETER (IN) 3.875" OD (HQ)	SHEET ___ OF ___

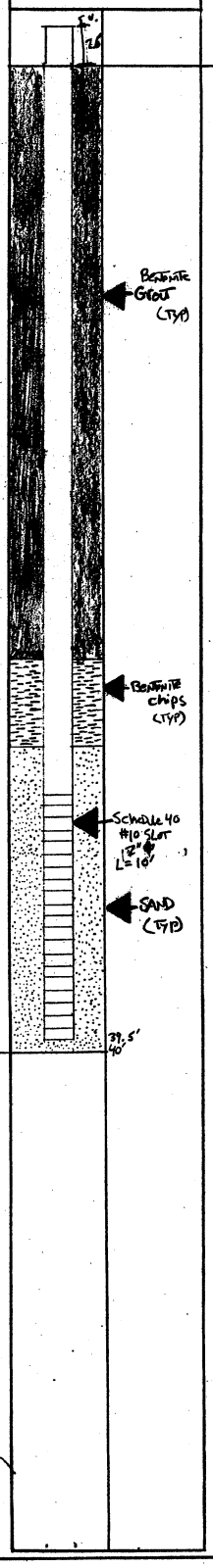
DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	REC %				INSTRUMENT LOG	DEPTH (FT)
0	1D	Brown Silty Gravelly Sand Trace of Cobbles	32						0
	2D		98					BENTONITE 2.0	5
	1R	BEDROCK		25				15.0 SAND	10
15	2R			95					15
	3R			95					20
20	4R			100				10 FT 2" Ø SLOTTED PVC SCREEN	25
	5R			82				29.8 29.3 30.4 ROCK CORE NOT RECOVERED	30
30		30.9 BOE							

NOTES

PROJECT West OldTown Landfill Expansion	JOB NO. 03876.09	BORING NO.	MW-304A
DATE COMPLETED 7/16/04	DATE WELLS INSTALLED 7/15/04	DRILLING METHOD	Wash-Rotary
GROUND SURFACE ELEVATION (FT) 214.71	DRILLING CONTRACTOR M.T.B.	LOGGED BY	T. Riley / JES
BOREHOLE DIAMETER (IN) 4.5" O.D.	ROCK CORE DIAMETER (IN.) 2.5"	SHEET	1 OF 1

DEPTH (FT)	SAMPLE NO.	MATERIAL DESCRIPTION	N	RQD	% Passing #200 Screen	Water Content (%)
0		0-0.2' Topsoil				
	1D	Brown SILT / Clay w/ A Trace of Medium Sand, Gravel and Cobbles	6			
		3.5'				
5	2D	Olive silt w/ Fine to Medium Sand w/ Little Gravel and Cobbles.	75/3.5'		57.7%	11.6%
10	3DA	10.5' (BASAL TILL)	61			
	3DB	Brown Fine to Medium Sand w/ Little Coarse Sand (SAND LENSE)	90			
15		15.5'				
	4D	Becoming ... VERY SILTY with clayey layers	102		21.7%	18.2%
		17.5' (BASAL TILL)				
20	5D	BROWN SILTY TO CLAYEY SAND	50/0.3'			
		24' (WASHED TILL)				
25	1R	GRAY PHYLLITE ... WX		100%		
30	2R			91%		
35	3R			61%		
40	4R	40' (Bedrock) B.O.E		97%		
45						
50						
55						
60						

INSTRUMENT LOG



NOTES

SEVEE & MAHER ENGINEERS

APPENDIX C

ROCK CORE LOGS

BEDROCK CORE LOG

PROJECT West Old Town Landfill Expansion BORING NO. 304A PAGE 1 OF 2

JOB NO. 03076.09 DRILLER M.T.B.

CORE DIAMETER (IN.) 2.5" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL 24-37

AZIMUTH _____ INCLINATION _____ LOGGED BY T. Riley (NAME) 8/9/09 (DATE)

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	BREAKS IN CORE	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
24		Bedrock 24'					
25							
26		40° stained		93%	100%	IR	
27							
28							
29							
30		30° Drillers Fracture Along A quartzite vein.					
31							

BEDROCK CORE LOG

PROJECT West Old Town Land Fill Expansion BORING NO. 304A PAGE 2 OF 2

JOB NO. 03076.09 DRILLER M.T.B.

CORE DIAMETER (IN.) 2.6" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL 24-37

AZIMUTH _____ INCLINATION _____ LOGGED BY T. Riley (NAME) 8/9/04 (DATE)

BREAKS IN CORE

- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
31	85° - STAINED					
32			94%	91%	2R	
33	50°					
34						
35			120%	61	3R	
36	60° - STAINED					
	STAINED CHIPS.					
37						
38						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. 304A PAGE 1 OF 2

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5" ELEVATION (FT) _____ DEPTH (FT) _____
INTERVAL INTERVAL

AZIMUTH _____ INCLINATION _____ LOGGED BY M. Scully / BS (NAME) 1/3/05 (DATE)

BREAKS IN CORE

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
24						24'-40' TD - Bedrock - see below R1-R3 Box is missing.
26						FROM FIELD LOGS: R1-R3 CONSISTS OF GRAY PHYLLITE ALSO SEE T. RILEY LOGS
28						
30						
32						
34						
36						
38	60°- Weathered w. Qtz-Ca vein	70°-85°	97%	9[illegible]	R4	Greenish to bluish gray weathered phyllite w. thin Qtz-Ca veins + occassional pyrite grains.

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. 304A PAGE 2 OF 2

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5" ELEVATION (FT) _____ DEPTH (FT) _____
INTERVAL INTERVAL

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) 1/3/05 (DATE)

BREAKS IN CORE

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
36		70°-85°	97%	97	R4	
40	70° D					40': TD

BEDROCK CORE LOG

PROJECT West Old Town BORING NO. P-04-06 PAGE 1 OF 2

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5" ELEVATION (FT) _____ DEPTH (FT) 28.5-44.4'
INTERVAL INTERVAL

AZIMUTH - INCLINATION 90 LOGGED BY M. Scully (NAME) 12/30/04 (DATE)

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D CORE BROKEN BY DRILLER; M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING SL - SLIGHT MOD - MODERATE SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
28	Rollerreamed - no recovery	-	0	0		28.5 - Top of Bedrock. Recovery begins at 29.7'
30	15° 30.3-32.3': Rock is Rubbly due to several fractures - 2 sets 1 fx set at 5-15° 1 fx set at 50-60° FeOx + Mn staining	80° -90°	100	20	R1	29.7 - 36.5': Medium to dark greenish gray medium-grained meta-graywacke. - Rock is hard and competent - moderate weathing on fracture surfaces to FeOx, MnO + clays - occassional thin white Qtz+Ca veins throughout
32	10° - stained					
34	- Broken zone 5° stained 50 - stn					34-38.5': Contact at ~ 85° sharp contact surface
36	Rock contact at 85° D	85°	94	100?	R2	36.5 laminated black and medium to dark gray siltstone/graywacke - lighter thin laminae show cross-bedding - occassional disseminated Py
38	D					
40	D 5° D 5° - stained	85-90°	100	100	R3	$n_{TOT} = 0.0013$
42						

BEDROCK CORE LOG

PROJECT West Old Town Land Fill BORING NO. P-04-06 PAGE 2 OF 2

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) 12/30/04 (DATE)

BREAKS IN CORE

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
42	5° D	85° -90°	100	100	R3	
44						
46						

BEDROCK CORE LOG

PROJECT West old Town Land Fill — BORING NO. P-04-07 — PAGE 1 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" — ELEVATION (FT) INTERVAL _____ — DEPTH (FT) INTERVAL 4.8-107.5'

AZIMUTH — — INCLINATION 90° — LOGGED BY M. Scully (NAME) — 12/30/04 (DATE)

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D = CORE BROKEN BY DRILLER; M = CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED-WEATHERING — SL - SLIGHT, MOD - MODERATE, SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	ROD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
4						4.8' - Top of Bedrock
6	Rollerconed No recovery	-	0	-	X	Rollerconed to 7.0' no recovery
8	2° D	88° -90°	100	100	R1	7'-25.5': Rock is interbedded dark gray to black sulfidic, carbonaceous shale/phyllite and light to medium gray siltstone. - weathered fracture surfaces have abundant FeOx staining. - Black phyllite beds occassionally have abundant disseminated pyrite. - Bedding is nearly vertical
10	D					
12						
14	10° w. FeOx stain	88° -90°	100	100	R2	
16	D No stain					
18	10° w. FeOx stain 20° " "	80 -90°	100	88		17'-23': several thin white quartz-Ca veinlets, weathered fractures have small cavities due to dissolution of calcite.

BEDROCK CORE LOG

PROJECT West Old Town Land Fill BORING NO. B-04-07 PAGE 2 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) 12/30/04 (DATE)

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	BREAKS IN CORE	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
18							
		35° D	80°			R3	
20		40° D	-90°	100	88		
		15° D					
22		50° - stained					
		5° "					
		50° "					
→		20° - Rubbly core - stained	80°				23.3-23.7': Fracture zone - rubbly + FeOx - stained core.
24			-90°	96		R4	24.1-25.2': "
→		Rubbly core - stained w. FeOx			20		
		20° FeOx					
26		20° D					25.5' Rock shows abrupt change to medium gray, fine to medium grained meta-graywacke
		D					- rock is generally hard and competent
28							- whitish Qtz+Ca veins are common at various angles.
		40° D		100	100	R5	
30							
		10° D					
		D					
32							31.8-32.2': Qtz-Ca vein

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-07 PAGE 3 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) _____ DEPTH (FT) _____
INTERVAL INTERVAL

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) 12/30/04 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D: CORE BROKEN BY DRILLER
- M: CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
32	D					Same
	20° stained	80°				
34	10° weathered	-90°	98	86	R6	
	Rubbly - weathered					
	70° - on contact					35.3': Thin layer of black phyllite at ~ 80°
36	D					
						37'-40': several thin, whitish Qtz-Ca veins.
38		80°				
		-90°	100		R7	
	5° D			100		
40	D					
42	75° - FeOx stained					
		85°				
	5° D	-90°	100	93	R8	
44	D					
	25° - FeOx stained					
46						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-07 PAGE 4 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) (DATE) 12/30/04

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D CORE BROKEN BY DRILLER; M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING SL - SLIGHT MOD - MODERATE SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	ROD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
46						Same
	15° D	85°				
	5° 50° clean	-90°				
48			100	87	R9	
	5° D					
	D - clean					
50						
		80°				
52		-90°	100	90	R10	
	20° D					
	20° FeOx stain					
54	Rubbly - weathered to reddish-brown					54.2' - 55.3': Rock is rubbly and bleached to a medium reddish brown.
	"					
56	10°	85°				
		-90°	81	67	R11	
	5° w. FeOx Stain					
58	- Rubble - D					
		85°				
	22°	-90°				
60	40° > w. FeOx Stain					

BEDROCK CORE LOG

PROJECT West Old Town Land Fill BORING NO. P-04-07 PAGE 5 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) 12/30/04 (DATE)

BREAKS IN CORE

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
60	0° 20° staining	85° -90°	96	82	R12	60'- Rock begins to show a fragmental texture + has some layers and lenses of black phyllite.
62	D					
64	70° FeOx stain.	80° -90°	98	100	R13	
66	5° - FeOx. D					
68	D					
70	85° D	80° -90°	102	100	R14	
72	D 20° D					
74						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-07 PAGE 6 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) (DATE) 12/30/04

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
74						same
	5° stained, Rubbly	85°				
76	70° FeOx	-90°	96	75	R15	n_{TOT} = 0.00057
	10° FeOx					
	D					
	D					
78	15° D					
	50° stained					
	25° "					
80		85°	98	78	R16	
		-90°				
	5° FeOx					
82						
	D?					
	5° D					
84						
	10° D					
		85°		96%		
		-90°	100		R17	
86						
88						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-07 PAGE 7 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) 12/30/04 (DATE)

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
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MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	BREAKS IN CORE	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
88							Schist
		20° D					
90			85° 90°	100	100	R18	
		30° D					
		20° D					
92		D					
94			85° 90°	100	100	R19	
96		D					
98			85° 90°	100	100	R20	
100		15° D					
102							

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-07 PAGE 8 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) 12/30/04 (DATE)

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D = CORE BROKEN BY DRILLER; M = CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING; SL - SLIGHT; MOD - MODERATE; SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
102	75° - on Qtz-Ca vein					same
		85°				
104		90°	95	100	R21	
106	20° D					
108						107.5': TD

BEDROCK CORE LOG

PROJECT West Old Town Landfill — BORING NO. P-04-09 — PAGE 1 OF 1

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" — ELEVATION (FT) INTERVAL _____ — DEPTH (FT) INTERVAL 31.6-45'

AZIMUTH — — INCLINATION 90° — LOGGED BY M. Scully (NAME) — 1/3/05 (DATE)

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D = CORE BROKEN BY DRILLER; M = CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING; SL - SLIGHT; MOD - MODERATE; SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
31		—	0	0		31.6': Top of Bedrock - rolled core no recovery to 32'.
	80° - minor FeOx					32'-40': Interbedded black sulfidic phyllite & med. gray siltstone/graywacke - same as P-04-10.
	80° " "	75°				
33	80° " "	-80°	94	50	R1	
	D					- thin Qtz-Ca veinlets common.
	75° w. FeOx					
35	D w. minor FeOx					
	5°	70°				
37		-75°	100	50	R2	n_{TOT} = 0.00099
	80° - w FeOx + silt					
	70° D					
39	75° w. FeOx					
	75° w. FeOx					40': Rock changes to med. gray massive-bedded, fine grained meta-graywacke. as P-04-07
41		65-75°	100	100	R3	
43	25° D - on Qtz vein					
	20° D					
45						45': End of Core: TD?

5/90

SEVEE & MAHER ENGINEERS

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-10 PAGE 1 OF 2

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL 9.7-35'

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) 1/3/05 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D: CORE BROKEN BY DRILLER
- M: CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
9						9.7': Top of Bedrock - roller cone. no recovery to 10.7'.
11	80° D					10.7'-15': Interbedded black sulfidic phyllite + med. gray siltstone + graywacke. - several white Qtz-Ca veins
-7	-85° stained	70° -85°				
13	70° D		100	80	R1	
15	D D					15'-29.7': Rock changes to med gray, massive-bedded, fine gr. graywacke. - as P-04-07
17						
	5° D	80° -90°	100	94	R2	
19	5° Fe ox 5° 5° 15° D D					
21		75° -85°	100	100	R3	22.2' 1" white Qtz+Ca vein at 60°
23						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-10 PAGE 2 OF 2

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2.5" ELEVATION (FT) _____ DEPTH (FT) _____
INTERVAL INTERVAL

AZIMUTH _____ INCLINATION 90° LOGGED BY M. Scully (NAME) (DATE) 1/3/05

BREAKS IN CORE

MEASURED BREAKS OR PARTINGS ACROSS CORE	D CORE BROKEN BY DRILLER
CHIPS, CAVITY, LOST CORE	
MEASURED HIGH-ANGLE JOINT (JT = JOINT)	M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
23	~20° D	75° -85°	100	100	R3	same
25	D					
27	50° D	70° -85°	100	94?	R4	
29	- D - lost					- 29.7': similar to 10.7'-15'
31	0° - stained + weathered --> 50° Fe Ox 40° - on qtz-ca vein	70° -85°	100	94	R5	n_{TOT} = 0.0051
33	D					
35	- Minor Fe Ox					35': TD

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-12 PAGE 1 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL 20.2-122'

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) 1/4/05 (DATE)

BREAKS IN CORE

- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
20		-	0	-	X	20.2' Bedrock - no recovery to 21'
22	45° D	80° -85°	100	100	R2	Rock is interbedded dark gray to black phyllite & light to medium gray, fine grained meta-siltstone (calcareous) that shows graded & cross bedding & minor folding. - Whitish Qtz + Ca veins are common & abundant in some places
24	80° D, 40° D Bedding	80° -90°	100	96	R3	
26	25° D					
28	70° D - bedding 20° FeOx stain					
30	65° FeOx stain 70° " " -65° " "	50° -85°	66	68	R4	
32						
34	45° FeOx 60° FeOx	20° -90°	97	73	R5	

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-12 PAGE 2 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) 1/4/05 (DATE)

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	BREAKS IN CORE / CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
34	50° FeOx 60° "	20° 90°	97	73	R5	Same
36	35° D 50° 60° D - bedding	15°				
38	60° D " 10° 45° > w. FeOx Stain 60° - D	-85°	100	93	R6	n_{TOT} = 0.0029
40	D 50° D					
42	D 50° D - bedding	60° -90°	100	100	R7	
44	D					
46	60° w. FeOx 20° " " D 30° w. FeOx 30° - D	20° -80°	96	72	R8	
48	50° - D					

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-12 PAGE 3 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) _____ DEPTH (FT) _____
INTERVAL INTERVAL

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) 1/4/05 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D: CORE BROKEN BY DRILLER
- M: CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	ROD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
48	40° D					same
		20°				
	70° D	-80°	96	72	R8	
50	D					
	D					
52		75				
	70° - FeOx stained + weathered	-90°	98	94	R9	
54						
	80° D - bedding					
	D					
56						
		45°				
	80° w. FeOx stain n bedding	-80°	100	82	R10	
58						
	60° - v. FeOx					
	50° D - bedding					
60						60-63': Possible Fault zone. Rubbly core w. abund. Qtz-Ca veins + FeOx staining.
→	Rubbly core w. FeOx staining.					
	61.3-62.5': abund. Qtz veining w. FeOx stain		79	25	R11	- Rock change below to non-calcareous S.g. siltstone w. minor black phyllite.
62						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-12 PAGE 4 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) (DATE) 1/4/05

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	BREAKS IN CORE	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
62	D	Rubbly core w. some FeOx stain		80	0	R12	Same
64	20° D		70° -90°	103	100	R13	64.5-66.5': Abund. Qtz-Ca veins
	40° D						
66	50° D						
	D						
68	D		70° -90°	96	100	R14	
	10° D - Qtz vein						
70	60° D						
	60° D						
	30° D						
72	50° D						72.5-73': Abund. Qtz-Ca. veins
	D		70° -85°	104	100	R15	
74	50° D						
76							

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. R-04-12 PAGE 5 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) 1/4/05 (DATE)

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	BREAKS IN CORE / CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
76					R15	Some
78						
80		70° -85°	100	100	R16	
82	50° D; 40° D " "; 30° D					
84	50° D	70 -85°	100	100	R17	
86	15° - Qtz-Ca vein; 20° D					
88	D		100		R18	
90	10° D					

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-12 PAGE 6 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) (DATE) 1/4/05

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
90						Same
	50° D	70°				
	10° D	-90°	100		R18	
92				100		
	D					
	30° D					
94		70°				
		-				
		90°	100	100	R19	
96						
	20° D					
	30° D - on Qtz-Ca vein					
98						
	10° D					99-102': Abund. Qtz-Ca veins
	40° D	75°				
100	40° D					
		-90°	100		R20	
				100		
	D					
102	10° D					
	20° D on Qtz-Ca vein					
104						

BEDROCK CORE LOG

PROJECT West Old Town Lands, II BORING NO. P-04-12 PAGE 7 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH – INCLINATION 90° LOGGED BY M. Scully (NAME) 1/4/05 (DATE)

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D CORE BROKEN BY DRILLER; M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
104	15° D	75° -90°	100	100	R21	SAME
106	20° D " " 30° D					
108	D	75° -90°	100	100	R22	
110	20° D					
112						
114	10° D 10° D	75° -90°	100	100	R23	
116	30° D 20° D					
118						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-12 PAGE 8 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) (DATE) 1/4/05

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
118						Schist
		75°				
		90°	100	100	R24	-
120						
	70° D					
	20° JT					
122						122': TD

BEDROCK CORE LOG

PROJECT West Old Town Land Fill BORING NO. P-04-13 PAGE 1 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL 128.3

AZIMUTH — INCLINATION 90° LOGGED BY M.V. Scully (NAME) 12/28/04 (DATE)

BREAKS IN CORE

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
26			0			27.2' Top of Bedrock
28	5° D	55°-75°	100	100		Rock is medium gray, fine to medium grained, massively-bedded, calcareous meta-graywacke. Rock is generally hard + competent and thin whitish qtz-ca veins are common.
30	D					30'-32.5' - Abund. Qtz-Ca veins.
32		65°-85°	100	96		
34						
36	35° - on Qtz Ca vein					
38		50°-65°	100	100		
40						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-13 PAGE 2 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) (DATE) 12/28/04

BREAKS IN CORE

- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
40	60° D - on Qtz vein					Same
	0° D	60-75°	100	100		
42	D					
44	D					
46	5° D	45-65°	100	100		
48	20° D	60-75°	100	100		
50	20° D					
52	D					
	D					
54						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-13 PAGE 3 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) 12/28/04 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
54						Same 54.7' - ¼" Qtz vein at 45°
	20° D, along Qtz-Ca Vn.	65-85°	100	100		55.5' - 1" Qtz vein at 40°
56	40° D					56.8' - ½" Qtz+Ca Vein at 50°
58						58.2' - ½" Qtz+Ca vn at 35°
	15° D 10° D	70-85°	100	93		58.8' - Qtz-Ca vn 50° 59.5 - Qtz-Ca vn - 45°
60	20° w. minor FeOx + open space					
62						
	30° D on vein	70-85°	98	88		
64	10° micro stringers					n_{TOT} = 0.00051
	75° w. trace FeOx 15° w. FeOx staining					
66	D					
68						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-13 PAGE 4 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) _____ DEPTH (FT) _____
INTERVAL INTERVAL

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully (NAME) 12/28/04 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
68						same
	15° · Minor FeOx Stn.	75				
	25°	-90°	100	98		
70						
72		75				
		-90°	100	97		
74						
	15° minor staining					
	25° - on vein					
76						
						-76.4' - 3/4" Qtz-Ca vein at 30°
	35° - in Qtz-Ca vein					-77.3' - 1/2" Qtz-Ca vein ~ 35°
78		65-				
	10° D - in Qtz-Ca vein	80°	100	91		-78.1' - 1" Qtz-Ca vein ~ 25°
	30° D " " "					78.3' - 1/2" " " " 35°
	30° D					78.6' 1/2" " " " 45°
80						
	10° Trace Stain					
	20° - w. FeOx Stain					
	20° - along Qtz-Ca vein					80.9' 1/2" Qtz-Ca vein ~ 20°
82						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-13 PAGE 5 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH – INCLINATION 90° LOGGED BY M. Scully (NAME) 12/28/04 (DATE)

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D = CORE BROKEN BY DRILLER; M = CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED-WEATHERING; SL. - SLIGHT; MOD - MODERATE; SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
82						same
	5° D					-82.5'. 1/2" Qtz-Ca veiy ~ 30°
	50° Minor FeOx	55-65°	92	77		
84	10° 60° " "					
	10° D					
	30° - Minor FeOx Stain					85.4' 3/4" Qtz-Ca vein ~ 15°
	35° " " "					
86	D					
	D					
	0-10° D					
	"					
88	"	50-60°	86			
	25° - D			80		
	10° D					
90	10°					90-93': Rock shows change to more shaley composition - i.e. - becomes finer-grained and slightly more fissile. Bedding laminations are more obvious. - medium greenish gray color.
→	45-55° - Rubbly core w. minor FeOx stain					
92		55°	100	94		
	55° w. minor FeOx // to bedding					
	D					
94		55°	100	92		
	10° - on thin Qtz vein					
96						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-13 PAGE 6 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH – INCLINATION 90° LOGGED BY M. Scully (NAME) 12/28/04 (DATE)

BREAKS IN CORE

MEASURED BREAKS OR PARTINGS ACROSS CORE	D CORE BROKEN BY DRILLER
CHIPS, CAVITY, LOST CORE	
MEASURED HIGH-ANGLE JOINT (JT = JOINT)	M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
96						same
	10°. on Qtz-Ca vein	55°				
98	D					
	D					
	20° weathered calcite vein					
	10°					
→ 100	70° – w. FeOx stain	50-60°	98			
	10-20° Rubbly core w. minor FeOx Stain			50		
→	10° D					
102	15°					
→	10°					
	10° - minor FeOx					
	60°					
104						
	60° D - Bedding	50-60°	104	100		
106	40° D					
	10° Fx. staining					
	70° D					
108	D					
	D					
	20° D	50-60°				
110						

BEDROCK CORE LOG

PROJECT West Old Town Land Fill BORING NO. P-04-13 PAGE 7 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) 12/28/04 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
110	50° D - Bedding					Same
		50-60°	98			111' - TD: Rock gradually becomes less shaley again - returning to original texture of wacke.
112				100		
	70° D					
	D 50°					
114						
		55-60°	100	100		
116	D					
118						118.1' - small Qtz-ca vein ~25°
120		50-60°	100	100		
122						
	70° D					
124						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-13 PAGE 8 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (NAME) 12/28/04 (DATE)

BREAKS IN CORE

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
124	D					$n_{tot} = 0.000099$
126	75° w. minor Fe Ox stain		100	100		
128						128.3' TD
130						

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-14 PAGE 1 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH – INCLINATION 90° LOGGED BY M. Scully / JES (NAME) 12/21/04 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
0						0.6': Top of Bedrock
			0		X	
2	45° D					Rock is primarily medium gray, fine to medium grained, massively bedded meta-graywacke,
	30° D					- bedding laminations are visible in places.
4	55° w. minor FeOx stain.		100	95		- rock is commonly calcareous & whitish Qtz+Ca veinlets are common.
	20° D					
6	85°					- rock is generally hard & competent.
	10° - minor FeOx stain					
	45°					
8	45, 35 } multiple fractures w. minor FeOx					
	60° Break along thin Qtz-Ca vein.		100	70		
10	60° D					
	35° w minor FeOx					
	10° D					
	30° - Qtz Vein.					
12	D 20°					
	10° - w. Qtz vein + FeOx		100	74		13.25' - 0.6" Qtz-Ca vein at 10°
14						

BEDROCK CORE LOG

PROJECT West Old Town Land Fill BORING NO. P-04-14 PAGE 2 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH – INCLINATION 90° LOGGED BY M. Scully / JSB (NAME) 12/21/04 (DATE)

BREAKS IN CORE

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
14	55° w. minor FeOx 70° " " 15° - Rubbly w. FeOx stn + gouge? 60° w. FeOx stain D		100	74		14.0-14.3' - irregular qtz-ca veining. 13.25-29.0': abundant qtz-ca masses + broken veinlets throughout rock. n_{TOT} = 0.0013 same rock type
16						
18	15° w. FeOx		100	80		
20	10° D					
22	50 w minor FeOx.					
24	D		100	98		
26	5° D - along qtz vein					
28	60° D along qtz vein.		100			

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-14 PAGE 3 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully, JBS (NAME) 12/21/04 (DATE)

BREAKS IN CORE

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
28						same
	15° D		100			
30				100		
	20° D					
	20° D along qtz vein					
32						
			100	100		
34						
36						
	30° D? along qtz vein					
	D					
38	D					
	36.3 - 42.3' - ~ vertical fracture.		100			
40				100		
42						

BEDROCK CORE LOG

PROJECT West Old Town Land Fill BORING NO. P-04-14 PAGE 4 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH - INCLINATION 90° LOGGED BY M. Scully / JS (NAME) 12/21/04 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D: CORE BROKEN BY DRILLER
- M: CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
42	20° D					Same
		75° -90°	100	100		
44						
46	10° D					46'-74': Abundant qtz+ca veining in this section. Veins range from <1mm to ~2" thick - Some veins have FeOx staining + cavities due to dissolution of Calcite
	15° w. FeOx Qtz. Vn w FeOx					
48		60° -80°	100	96		
	15° Rubbly w. minor FeOx					
50	10° D					
	20° minor FeOx					
-->	- dissolved Ca vein + FeOx					
	10° minor FeOx					
52	D					
	D					
		75° -90°	100	70		
54	30° along qtz vein					54.7-56.1': several white qtz+ca veins, ~.5-2" thick, 0-10-20° Several breaks in core associated with veins.
	10° - w FeOx					
	25° - qtz vein					
	10-20° - in qtz veins					
56	D					

BEDROCK CORE LOG

PROJECT West old Town Landfill BORING NO. P-04-14 PAGE 5 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully (JBS) 12/21/84 (NAME) (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED-WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
56	D					same
	D					$n_{TOT} = 0.014$
-->	10° Rubbly core with FeOx staining					
58		60° - 90°	98%	83		
→	20-25° - Rubbly core w. abund. FeOx stain. + some Ca dissolution in veins					
60	20° D					
	D					
	D					
-->	20°					61.5-67': Rock has abundant whitish lenses or fragments of Qtz in matrix
62	20° > some FeOx stain	80° - 90°	100+	90		
64						
66	20°	80° - 90°	100	94		
	20° minor FeOx					
	D					
	D					
68						
			100	100		
70						

BEDROCK CORE LOG

PROJECT: West Old Town Land Fill BORING NO. B-04-14 PAGE 6 OF 9

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH – INCLINATION 90° LOGGED BY M. Scully / JES (NAME) 12/21/04 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D: CORE BROKEN BY DRILLER
- M: CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
70						same
		75°-85°	100	100		
72	20° D					
74	30° D					
		75°-90°	100	90		
76	30° D					
78	Rubbly core - D? No staining					
80		75°-85°	96	100		
82	40° D + on Qtz vein					
	D					
84	D					

BEDROCK CORE LOG

PROJECT West Old Town Landfill BORING NO. P-04-14 PAGE 7 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully / JBS (NAME) 12-21-04 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D: CORE BROKEN BY DRILLER
- M: CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
84						84.8-86.3': Abund. Qtz veining + Ca.
	50° D	80°				
86	20° D - Qtz vein	-90°	100	100		Same rock type
88						
90						
	30° D - on Qtz vein	80° -90°	98	98		
92	D					
	Rubbly - D?					
94	~85° - along bedding?					
		80°				
96		-90°	100	80		
	D					
98	D					

BEDROCK CORE LOG

PROJECT West Old Town Lands, II BORING NO. P-04-14 PAGE 8 OF 8

JOB NO. _____ DRILLER _____

CORE DIAMETER (IN.) 2" ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH — INCLINATION 90° LOGGED BY M. Scully / JTS (NAME) 12/21/04 (DATE)

BREAKS IN CORE

- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D CORE BROKEN BY DRILLER
- M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
98	~10° D					same
	D					
100	TD					
	D	75°				
	100.7 - 103.8' - Rock is broken in several places due to being drilled-over by drillers - mislatch.	-90°	95%	100%		
102						
104						103.8' - TD

BEDROCK CORE LOG

PROJECT WOTL Expansion BORING NO. OW-0605 PAGE 1 OF 1

JOB NO. 05055.00 DRILLER MTB (Darrel McKeon)

CORE DIAMETER (IN.) 2.5" (H-Core) ELEVATION (FT) INTERVAL ____ DEPTH (FT) INTERVAL ____

AZIMUTH ____ INCLINATION ____ LOGGED BY JAB (NAME) 3-27-05 (DATE)

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	BREAKS IN CORE	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
23							
23.2	D?						
		No Natural Fractures (All Drilled/ mechanical)		100	94	R-1	Gray Silt Stone w/ Quartz Seams
25	D						
	D						
27							
	D						
28.4							
29	85°						
	10°						
	D	Moderatly Fractured Vertically & Horizontally		98	88	R-2	Gray Silt Stone w/ Quartz Seams
31							
	85°						
33	10°						
33.4							
		Highly Fractured w/ mud		100	10	R-3	Gray Silt Stone w/ Mud in Fractures
35	90°						
	D						
	D						
36.8							

5/90

SEVEE & MAHER ENGINEERS

BEDROCK CORE LOG

PROJECT WOTL Expansion BORING NO. OW-0606 PAGE 1 OF 1

JOB NO. 05055.00 DRILLER MTB (Darrel McKeen)

CORE DIAMETER (IN.) 2.5" (H-Core) ELEVATION (FT) INTERVAL DEPTH (FT) INTERVAL

AZIMUTH INCLINATION LOGGED BY JAB (NAME) 3-28-06 (DATE)

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D = CORE BROKEN BY DRILLER; M = CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING; SL - SLIGHT; MOD - MODERATE; SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
18						
20.1						
22	No Natural Fractures		100	100	R-1	Gray Silt Stone w/ Quartz Seams. Trace of erosion in Quartz seams.
23.8						
26	Mostly Intact	85°	100	100	R-2	Brown Mud in Fracture
28.8						
30	No Natural Fractures		96	100	R-3	Gray Silt Stone. Trace of Quartz in seams. $n_{TOT} = 0.00032$
32.8		55°				
34	Moderately fractured	55°, 10°, 10°, 55°	100	27	R-4	Gray Silt Stone w/ Quartz Seams. Erosion of Quartz. Seam of mud & pebbles @ ~37'
38 38.1						

BEDROCK CORE LOG

PROJECT WOTL Expansion BORING NO. OW-0607 PAGE 1 OF 1

JOB NO. 05055.00 DRILLER MTB (Darrel McKeen)

CORE DIAMETER (IN.) 2.5" (H-Core) ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH _____ INCLINATION _____ LOGGED BY JAB (NAME) 3-29-06 (DATE)

BREAKS IN CORE
- MEASURED BREAKS OR PARTINGS ACROSS CORE
- CHIPS, CAVITY, LOST CORE
- MEASURED HIGH-ANGLE JOINT (JT = JOINT)
- D: CORE BROKEN BY DRILLER
- M: CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
18	18.3					
	50°					Gray Siltstone w/ quartz seams
	D 10°		100	100	R-1	
22	23.2					
	D No Natural Fractures					Gray Siltstone w/ Thin quartz Seams
26			100	100	R-2	
	28.5					
	D					Gray Siltstone
30	D Mostly Intact		100	100	R-3	w/ Thin quartz Seams
	70°					$n_{TOT} = 0.00034$
	33.5					
	90°					Gray Silt Stone
34	Vertical and Horizontal Fractures		94	68	R-4	Traces of white mineral which has been eroded from Core Sample (Dissimilar to quartz)
	50° 100 50° 100					
38	50°					
	38.5					

BEDROCK CORE LOG

PROJECT WOTL Expansion BORING NO. OW-0608 PAGE 1 OF 1

JOB NO. 05055.00 DRILLER MTB (Darrel McKeen)

CORE DIAMETER (IN.) 2.5" (H-Core) ELEVATION (FT) INTERVAL ____ DEPTH (FT) INTERVAL ____

AZIMUTH ____ INCLINATION ____ LOGGED BY JAB (NAME) 3-30-06 (DATE)

BREAKS IN CORE

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED-WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
20						
20.6						
22	Verical Fracture Through entire core length		88	62	R-1	Gray Siltstone w/ Brown mud in fractures
24						
	55° Vertical Fractures Through entire core		100	50?	R-2	Gray Siltstone w/ Thin Quartz seams Brown mud in fractures
26						
	Mostly Intact 2 Driller's Breaks ~80°		113	93	R-3	Gray Siltstone w/ Thin Quartz seams
28	D					
	D					
29.0						
	Mostly Intact		76		R-4	Gray Siltstone w/ Thin Quartz seams
30	80°			100		Clay seam @ ~30'
30.7						Clay seam to ~32'
32			106		R-5	Gray Siltstone w/ Thin Quartz seams
				100		
34.0						

5/90

SEVEE & MAHER ENGINEERS

BEDROCK CORE LOG

PROJECT WOTL Expansion BORING NO. OW-0609 PAGE 1 OF 1

JOB NO. 05055.00 DRILLER M.T.B. (Darrel McKeen)

CORE DIAMETER (IN.) 2.5" (H-core) ELEVATION (FT) INTERVAL _____ DEPTH (FT) INTERVAL _____

AZIMUTH _____ INCLINATION _____ LOGGED BY JAB (NAME) 04/03/06 (DATE)

BREAKS IN CORE: MEASURED BREAKS OR PARTINGS ACROSS CORE; CHIPS, CAVITY, LOST CORE; MEASURED HIGH-ANGLE JOINT (JT = JOINT); D = CORE BROKEN BY DRILLER; M = CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING; SL - SLIGHT; MOD - MODERATE; SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
26						
27.4						
28	Highly Fractured; 10° Vertical Fracture Down entire Length; 10°		100	63?	R-1	Gray Siltstone w/ Brown mud in fractures
30						
30.4	75° 15° 75° Highly Fractured		100	0	R-2	Gray Siltstone w/ Brown mud in fractures
32						
32.9	80° Highly Fractured		75	0	R-3	Brown clay Seam
33.7						
34	90° Highly Fractured		93	0	R-4	Gray Siltstone
35.1						
36	Highly Fractured		107	0	R-5	Gray Silt Stone
36.5						
37.5	Highly Fractured		100	0	R-6	Fe Staining
38	60° Highly Fractured; 10° 10°		100	53	R-7	Gray Siltstone w/ Quartz Seams
39.4						

5/90

SEVEE & MAHER ENGINEERS

BEDROCK CORE LOG

PROJECT WOTL Expansion

BORING NO. OW-0610 PAGE 1 OF 1

JOB NO. 05055.00 DRILLER MTB (Darrel McKeen)

CORE DIAMETER (IN.) 2.5 (H-Core) ELEVATION (FT) INTERVAL ____ DEPTH (FT) INTERVAL ____

AZIMUTH ____ INCLINATION ____ LOGGED BY JAB (NAME) 4-4-06 (DATE)

MEASURED BREAKS OR PARTINGS ACROSS CORE
CHIPS, CAVITY, LOST CORE
MEASURED HIGH-ANGLE JOINT (JT = JOINT)
D CORE BROKEN BY DRILLER
M CORE PARTED ALONG MICA CONCENTRATION

WX: WEATHERED - WEATHERING
SL - SLIGHT
MOD - MODERATE
SEV - SEVERE

DIP: DIP OF LAYERING, TEXTURE, FOLIATION, BEDDING, ETC.

DEPTH	BREAKS IN CORE	CONDITION OF CORE, WX, ETC.	DIP	RECOVERY (%)	RQD (%)	GRAPHIC LOG	ROCK TYPE, GRAIN SIZE, COLOR, TEXTURE, ETC.
30							
30.6		75° Highly Fractured, Vertically & Horizontal 10°		100	0	R-1	Gray Silt Stone w/ Brown mud in fractures
32							
32.1		10° Mostly Intact		100	87	R-2	Gray Silt Stone Seams of white quartz
34							
36		D					
37.4							
38		80° Highly Fractured one Long vertical Fracture and many Horizontal.		100	0	R-3	Gray Silt Stone No quartz Brown mud in fractures
38.7		Highly Fractured very Small Pieces		100	0	R-4	Brown clay/mud in fractures
39.9							
40		80° 10° 10° 10° Highly Fractured Vertically & Horizontally		100	0	R-5	Brown Clay Seam
41.1							
42		60° 80° 70° Highly Fractured Vertically & Horizontally		100	67	R-6	Purplish Staining and Greenish/Buff Tinge in Fractures
42.6							
43.6		Mostly Intact		100	100 SL	R-7	

APPENDIX D

GROUNDWATER LEVEL MONITORING

All Locations - Water Levels

Juniper Ridge Landfill

(DP-3)

WELL	DATE	Water Depth	MP Elev	Water Elev
DP-3				
	5/9/2005	15.1	165.8	150.7
DP-4				
	5/9/2005	13.25	169.37	156.12
	8/1/2005	13.8	169.37	155.57
	9/20/2005	14.38	169.37	154.99
	5/22/2006	14.59	169.37	154.78
	7/24/2006	14.52	169.37	154.85
	9/11/2006	14.96	169.37	154.41
	5/14/2007	15	169.37	154.37
	7/23/2007	15.28	169.37	154.09
	9/10/2007	15.65	169.37	153.72
	5/19/2008	14.4	169.37	154.97
	7/29/2008	17.19	169.37	152.18
	10/27/2008	15.3	169.37	154.07
	4/13/2009	14.55	169.37	154.82
	7/6/2009	14.59	169.37	154.78
	10/26/2009	13.68	169.37	155.69
	4/26/2010	14.8	169.37	154.57
	7/19/2010	15.41	169.37	153.96
	10/18/2010	14.98	169.37	154.39
	4/25/2011	13.9	169.37	155.47
	7/18/2011	14.35	169.37	155.02
	10/24/2011	16.95	169.37	152.42
	4/25/2012	14.1	169.37	155.27
	7/25/2012	15.3	169.37	154.07
	10/24/2012	14.08	169.37	155.29
	4/24/2013	14.38	169.37	154.99
	10/30/2013	14.9	169.37	154.47
	10/21/2014	14.65	169.37	154.7
MH#1				
	5/9/2005	10.6	166.34	155.74
MH#2				
	5/9/2005	3.65	167.09	163.44
MH#3				
	5/9/2005	11.43	173.85	162.42
MH#5				
	5/9/2005	4.04	167.08	163.04
MH#6				
	5/9/2005	10.81	162.19	151.38
MH#7				
	5/9/2005	10.85	161.99	151.14
MH#8				
	5/9/2005	5.21	167.61	162.4
MH#9				
	5/9/2005	3.68	167.06	163.38
MH#A				
	5/9/2005	0.55	162.54	161.99
MW04-101				
	1/18/2005	5.6	167.92	162.32
	3/1/2005	4.1	167.92	163.82
	3/21/2005	4.8	167.92	163.12
	5/9/2005	4.15	167.92	163.77
	7/25/2005	6.16	167.92	161.76
	9/20/2005	5.56	167.92	162.36
	10/27/2009	4.1	167.92	163.82
	10/18/2010	5.1	167.92	162.82
	10/25/2011	5.7	167.92	162.22
	10/22/2012	5.45	167.92	162.47
	10/28/2013	6.42	167.92	161.5
	10/21/2014	5.86	167.92	162.06
MW04-102				
	1/18/2005	5.45	170.22	164.77
	3/1/2005	4.86	170.22	165.36
	3/21/2005	4.9	170.22	165.32
	5/9/2005	4.35	170.22	165.87
	7/25/2005	6.7	170.22	163.52
	9/20/2005	5.52	170.22	164.7
	5/23/2006	4.8	170.22	165.42
	7/25/2006	5.13	170.22	165.09
	9/12/2006	5.54	170.22	164.68
	5/15/2007	5.67	170.22	164.55
	7/24/2007	6.3	170.22	163.92
	9/11/2007	7.42	170.22	162.8
	5/20/2008	6.05	170.22	164.17
	7/29/2008	5.81	170.22	164.41
	10/27/2008	5.5	170.22	164.72
	4/14/2009	5.47	170.22	164.75
	7/7/2009	5	170.22	165.22
	10/27/2009	5.27	170.22	164.95
	4/27/2010	5.97	170.22	164.25
	7/21/2010	7.58	170.22	162.64
	10/19/2010	5.85	170.22	164.37
	4/25/2011	5.02	170.22	165.2
	7/19/2011	6.65	170.22	163.57
	10/25/2011	6.5	170.22	163.72
	4/24/2012	6	170.22	164.22
	7/24/2012	8	170.22	162.22
	10/22/2012	5.78	170.22	164.44
	4/23/2013	5.8	170.22	164.42
	7/31/2013	6.5	170.22	163.72
	10/28/2013	7.1	170.22	163.12
	4/23/2014	5.6	170.22	164.62

WELL	DATE	Water Depth	MP Elev	Water Elev
	7/30/2014	6.3	170.22	163.92
	10/21/2014	6.58	170.22	163.64
MW04-103				
	3/9/2005	6.62	165.81	159.19
	3/21/2005	4.48	165.81	161.33
	7/25/2005	6.1	165.81	159.71
	9/22/2005	5.23	165.81	160.58
MW04-104				
	1/18/2005	8.41	168.06	159.65
	3/1/2005	7.56	168.06	160.5
	3/22/2005	7.7	168.06	160.36
	5/9/2005	6.73	168.06	161.33
	7/25/2005	9.1	168.06	158.96
	9/20/2005	8.75	168.06	159.31
	10/27/2009	7.3	168.06	160.76
	10/18/2010	8	168.06	160.06
	10/25/2011	8	168.06	160.06
	10/22/2012	7.5	168.06	160.56
	10/29/2013	9	168.06	159.06
	10/22/2014	8.2	168.06	159.86
MW04-105				
	1/17/2005	7.31	165.59	158.28
	3/1/2005	6.62	165.59	158.97
	3/21/2005	6.85	165.59	158.74
	5/9/2005	5.9	165.59	159.69
	7/25/2005	8.08	165.59	157.51
	9/20/2005	7.69	165.59	157.9
	5/23/2006	7.08	165.59	158.51
	7/25/2006	7.05	165.59	158.54
	9/12/2006	6.85	165.59	158.74
	5/14/2007	7.8	165.59	157.79
	7/24/2007	8.02	165.59	157.57
	9/10/2007	8.48	165.59	157.11
	5/19/2008	8.13	165.59	157.46
	7/29/2008	7.32	165.59	158.27
	10/27/2008	7	165.59	158.59
	4/15/2009	7.67	165.59	157.92
	7/7/2009	5.91	165.59	159.68
	10/26/2009	5.8	165.59	159.79
	4/27/2010	7.32	165.59	158.27
	7/19/2010	7.5	165.59	158.09
	10/18/2010	6.9	165.59	158.69
	4/26/2011	6.46	165.59	159.13
	7/18/2011	7.1	165.59	158.49
	10/25/2011	6.9	165.59	158.69
	4/23/2012	7.6	165.59	157.99
	7/24/2012	8.6	165.59	156.99
	10/22/2012	6.6	165.59	158.99
	4/24/2013	7.55	165.59	158.04
	10/29/2013	8.43	165.59	157.16
	10/22/2014	7.28	165.59	158.31
MW04-106				
	1/20/2005	2.1	174.31	172.21
	3/1/2005	F		
	3/22/2005	3.15	174.31	171.16
	5/9/2005	0.85	174.31	173.46
	7/25/2005	4.98	174.31	169.33
	9/20/2005	2	174.31	172.31
MW04-107				
	3/1/2005	2.4	159.65	157.25
	3/9/2005	4.39	159.65	155.26
	3/24/2005	4.4	159.65	155.25
	5/9/2005	A		
	7/26/2005	5.05	159.65	154.6
	9/21/2005	4.9	159.65	154.75
MW04-109				
	1/19/2005	10.95	164.59	153.64
	3/1/2005	10.7	164.59	153.89
	3/23/2005	10.8	164.59	153.79
	5/9/2005	10.39	164.59	154.2
	7/26/2005	11.65	164.59	152.94
	9/20/2005	11.72	164.59	152.87
	5/23/2006	10.17	164.59	154.42
	7/25/2006	10.15	164.59	154.44
	9/12/2006	10.53	164.59	154.06
	5/15/2007	9.8	164.59	154.79
	7/24/2007	10.45	164.59	154.14
	9/10/2007	11.47	164.59	153.12
	5/19/2008	9.52	164.59	155.07
	7/29/2008	9.61	164.59	154.98
	10/28/2008	9.9	164.59	154.69
	4/15/2009	10	164.59	154.59
	7/7/2009	DE	164.59	
	10/27/2009	!		
	10/18/2010	!		
	10/25/2011	!		
MW04-109R				
	12/8/2009	6.15	160.13	153.98
	4/27/2010	6.35	160.13	153.78
	7/20/2010	7.49	160.13	152.64
	10/19/2010	6.6	160.13	153.53
	4/26/2011	6.25	160.13	153.88
	7/19/2011	7.25	160.13	152.88
	10/25/2011	6.62	160.13	153.51
	4/24/2012	6.36	160.13	153.77
	7/24/2012	7.27	160.13	152.86
	10/23/2012	6.4	160.13	153.73
	4/23/2013	6.68	160.13	153.45
	7/30/2013	6.92	160.13	153.21
	10/29/2013	7.41	160.13	152.72
	4/22/2014	6.22	160.13	153.91
	7/29/2014	6.79	160.13	153.34
	10/21/2014	7.07	160.13	153.06
MW04-110				
	1/18/2005	10.89	164.95	154.06
	3/1/2005	10.65	164.95	154.3
	3/23/2005	10.75	164.95	154.2
	5/9/2005	10.35	164.95	154.6
	7/26/2005	11.75	164.95	153.2
	9/20/2005	11.75	164.95	153.2
	10/27/2009	DE		

WELL	DATE	Water Depth	MP Elev	Water Elev
	10/18/2010	DE		
	10/24/2011	DE		
MW04-111				
	2/3/2005	5.24	194.93	189.69
	2/10/2005	5.18	194.93	189.75
	2/17/2005	3.99	194.93	190.94
	3/2/2005	4.69	194.93	190.24
	3/17/2005	4.24	194.93	190.69
	3/29/2005	3.29	194.93	191.64
	4/15/2005	3.98	194.93	190.95
	4/28/2005	3.44	194.93	191.49
	5/12/2005	4	194.93	190.93
	5/25/2005	3.92	194.93	191.01
	6/22/2005	4.43	194.93	190.5
	7/20/2005	6.48	194.93	188.45
	8/17/2005	6.79	194.93	188.14
	9/21/2005	5.9	194.93	189.03
	10/21/2005	4.2	194.93	190.73
	11/21/2005	3.95	194.93	190.98
	12/27/2005	3.94	194.93	190.99
	4/27/2006	4.21	194.93	190.72
	5/25/2006	4.21	194.93	190.72
	12/18/2007	4.75	194.93	190.18
	5/19/2008	5.04	194.93	189.89
	7/30/2008	5.27	194.93	189.66
	11/6/2014	3.95	194.93	190.98
MW05-01				
	2/3/2005	5.37	194.86	189.49
	2/10/2005	5.32	194.86	189.54
	2/17/2005	4.19	194.86	190.67
	3/2/2005	4.83	194.86	190.03
	3/17/2005	4.43	194.86	190.43
	3/29/2005	3.48	194.86	191.38
	4/15/2005	4.12	194.86	190.74
	4/28/2005	3.61	194.86	191.25
	5/12/2005	4.19	194.86	190.67
	5/25/2005	4.1	194.86	190.76
	6/22/2005	4.63	194.86	190.23
	7/20/2005	6.59	194.86	188.27
	8/17/2005	6.9	194.86	187.96
	9/21/2005	5.6	194.86	189.26
	10/21/2005	4.35	194.86	190.51
	11/21/2005	4.12	194.86	190.74
	12/27/2005	4.12	194.86	190.74
	4/27/2006	4.4	194.86	190.46
	5/25/2006	4.35	194.86	190.51
	7/30/2008	5.46	194.86	189.4
	11/6/2014	4.17	194.86	190.69
MW05-02				
	2/3/2005	5.14	194.63	189.49
	2/10/2005	5.08	194.63	189.55
	2/17/2005	3.92	194.63	190.71
	3/2/2005	4.59	194.63	190.04
	3/17/2005	4.19	194.63	190.44
	3/29/2005	3.25	194.63	191.38
	4/15/2005	3.87	194.63	190.76
	4/28/2005	3.39	194.63	191.24
	5/12/2005	3.93	194.63	190.7
	5/25/2005	3.85	194.63	190.78
	6/22/2005	4.37	194.63	190.26
	7/20/2005	6.32	194.63	188.31
	8/17/2005	6.65	194.63	187.98
	9/21/2005	5.67	194.63	188.96
	10/21/2005	4.1	194.63	190.53
	11/21/2005	3.88	194.63	190.75
	12/27/2005	3.87	194.63	190.76
	4/27/2006	4.15	194.63	190.48
	5/25/2006	4.1	194.63	190.53
	7/30/2008	5.1	194.63	189.53
	11/6/2014	3.82	194.63	190.81
MW05-03				
	2/3/2005	5.35	194.88	189.53
	2/10/2005	5.3	194.88	189.58
	2/17/2005	4.16	194.88	190.72
	3/2/2005	4.81	194.88	190.07
	3/17/2005	4.4	194.88	190.48
	3/29/2005	3.49	194.88	191.39
	4/15/2005	4.09	194.88	190.79
	4/28/2005	3.62	194.88	191.26
	5/12/2005	4.16	194.88	190.72
	5/25/2005	4.07	194.88	190.81
	6/22/2005	4.58	194.88	190.3
	7/20/2005	6.55	194.88	188.33
	8/17/2005	6.9	194.88	187.98
	9/21/2005	6.05	194.88	188.83
	10/21/2005	4.35	194.88	190.53
	11/21/2005	4.08	194.88	190.8
	12/27/2005	4.1	194.88	190.78
	4/27/2006	4.34	194.88	190.54
	5/25/2006	4.38	194.88	190.5
	5/19/2008	5.2	194.88	189.68
	7/30/2008	5.4	194.88	189.48
	11/6/2014	4.02	194.88	190.86
MW05-04				
	2/3/2005	5.74	195.41	189.67
	2/10/2005	5.68	195.41	189.73
	2/17/2005	4.53	195.41	190.88
	3/2/2005	5.2	195.41	190.21
	3/17/2005	4.78	195.41	190.63
	3/29/2005	3.84	195.41	191.57
	4/15/2005	4.46	195.41	190.95
	4/28/2005	3.99	195.41	191.42
	5/12/2005	4.53	195.41	190.88
	5/25/2005	4.47	195.41	190.94
	6/22/2005	4.95	195.41	190.46
	7/20/2005	6.95	195.41	188.46
	8/17/2005	7.31	195.41	188.1
	9/21/2005	6.45	195.41	188.96
	10/21/2005	4.69	195.41	190.72
	11/21/2005	4.45	195.41	190.96
	12/27/2005	4.49	195.41	190.92
	4/27/2006	4.74	195.41	190.67
	5/25/2006	4.75	195.41	190.66
	7/30/2008	5.82	195.41	189.59
	11/6/2014	4.43	195.41	190.98
MW05-05				
	2/3/2005	5.3	194.86	189.56
	2/10/2005	5.26	194.86	189.6
	2/17/2005	4.14	194.86	190.72
	3/2/2005	4.82	194.86	190.04
	3/17/2005	4.16	194.86	190.7
	3/29/2005	3.22	194.86	191.64

WELL	DATE	Water Depth	MP Elev	Water Elev
	4/15/2005	4.06	194.86	190.8
	4/28/2005	3.55	194.86	191.31
	5/12/2005	4.13	194.86	190.73
	5/25/2005	4.05	194.86	190.81
	6/22/2005	4.56	194.86	190.3
	7/20/2005	6.5	194.86	188.36
	8/17/2005	6.84	194.86	188.02
	9/21/2005	5.95	194.86	188.91
	10/21/2005	4.3	194.86	190.56
	11/21/2005	4.06	194.86	190.8
	12/27/2005	3.95	194.86	190.91
	4/27/2006	4.3	194.86	190.56
	5/25/2006	4.35	194.86	190.51
	7/30/2008	5.33	194.86	189.53
	11/6/2014	4.01	194.86	190.85
MW06-01				
	3/1/2006	^		
	3/15/2006	^		
	4/27/2006	-0.4 ^	166.131	166.531
	5/25/2006	-0.3 ^	166.131	166.431
	6/13/2006	-0.5 ^	166.131	166.631
	7/26/2006	-0.3 ^	166.131	166.431
	8/16/2006	-0.32 ^	166.131	166.451
	9/13/2006	-0.21 ^	166.131	166.341
	10/19/2006	-0.2 ^	166.131	166.331
	11/21/2006	-0.19 ^	166.131	166.321
	12/7/2006	-0.22 ^	166.131	166.351
	1/24/2007	-0.4 ^	166.131	166.531
	2/22/2007	-1.6 ^	166.131	167.731
	3/21/2007	-1.7 ^	166.131	167.83
	4/26/2007	-0.58 ^	166.131	166.711
	5/16/2007	-0.52 ^	166.131	166.651
	6/20/2007	-0.06 ^	166.131	166.191
	7/25/2007	-0.1 ^	166.131	166.231
	8/16/2007	-0.31 ^	166.131	166.441
	9/11/2007	1.1	166.131	165.031
	10/24/2007	1.6	166.131	164.531
	11/27/2007	-0.19 ^	166.131	166.321
	12/18/2007	-0.14 ^	166.131	166.271
	5/19/2008	-0.5 ^	166.131	166.631
	7/30/2008	-0.2 ^	166.131	166.331
	11/6/2014	-2.31 ^	166.131	168.44
MW06-02				
	2/27/2006	8 TOC	191.71	183.71
	2/28/2006	7.4 TOC	191.71	184.31
	3/1/2006	7.9 TOC	191.71	183.81
	3/15/2006	6.42 TOC	191.71	185.29
	4/27/2006	6.52 TOC	191.71	185.19
	5/25/2006	6.15 TOC	191.71	185.56
	6/13/2006	5.75 TOC	191.71	185.96
	7/26/2006	6.98 TOC	191.71	184.73
	8/16/2006	8.05 TOC	191.71	183.66
	9/13/2006	8.91 TOC	191.71	182.8
	10/19/2006	7.2 TOC	191.71	184.51
	11/21/2006	6.1 TOC	191.71	185.61
	12/7/2006	6.5	191.71	185.21
	1/24/2007	6.98	191.71	184.73
	2/22/2007	8.87	191.71	182.84
	3/21/2007	6.3	191.71	185.41
	4/26/2007	6.38	191.71	185.33
	5/16/2007	7.27	191.71	184.44
	6/20/2007	9.65	191.71	182.06
	7/25/2007	10.65	191.71	181.06
	8/16/2007	12.81	191.71	178.9
	9/11/2007	14.41	191.71	177.3
	10/24/2007	15.71	191.71	176
	11/27/2007	6.41	191.71	185.3
	12/18/2007	6.49	191.71	185.22
	5/19/2008	7.72	191.71	183.99
	7/30/2008	8.8	191.71	182.91
	11/6/2014	7.79	191.71	183.92
MW09-901				
	12/8/2009	7.95	165.1	157.15
	4/27/2010	8.86	165.1	156.24
	7/20/2010	10.8	165.1	154.3
	10/19/2010	9.25	165.1	155.85
	4/26/2011	8.6	165.1	156.5
	7/19/2011	10.5	165.1	154.6
	10/25/2011	9.35	165.1	155.75
	4/24/2012	8.6	165.1	156.5
	7/24/2012	10.6	165.1	154.5
	10/23/2012	8.8	165.1	156.3
	4/23/2013	9.42	165.1	155.68
	7/30/2013	9.94	165.1	155.16
	10/29/2013	10.63	165.1	154.47
	4/22/2014	8.07	165.1	157.03
	7/29/2014	9.31	165.1	155.79
	10/21/2014	9.7	165.1	155.4
MW11-207R				
	7/20/2011	12	215.13	203.13
	10/24/2011	11.5	215.13	203.63
	4/23/2012	11.7		
	7/23/2012	12.1	215.13	203.03
	10/22/2012	6.57	215.13	208.56
	4/22/2013	8.2	215.13	206.93
	7/29/2013	11.97	215.13	203.16
	10/28/2013	14.54	215.13	200.59
	4/21/2014	6.1	215.13	209.03
	7/28/2014	12.3	215.13	202.83
	10/20/2014	16.6	215.13	196.53
	11/6/2014	13.14	215.13	201.99
MW12-303R				
	10/23/2012	27.47		
	4/22/2013	25.63	209	183.37
	7/29/2013	25.98		
	10/28/2013	27.43		
	4/21/2014	24.35		
	7/28/2014	26.08		
	10/20/2014	30.08		
MW-204				
	3/1/2005	8.88	164.75	155.87
	5/9/2005	8.35	164.75	156.4
	8/1/2005	9.23	164.75	155.52
	9/20/2005	9.68	164.75	155.07
	5/23/2006	9.05	164.75	155.7
	7/24/2006	8.92	164.75	155.83
	9/11/2006	9.2	164.75	155.55
	5/14/2007	9.5	164.75	155.25
	7/23/2007	9.71	164.75	155.04
	9/10/2007	10.65	164.75	154.1

WELL	DATE	Water Depth	MP Elev	Water Elev
	5/21/2008	9.72	164.75	155.03
	7/30/2008	9.52	164.75	155.23
	10/28/2008	9.12	164.75	155.63
	4/13/2009	9.1	164.75	155.65
	7/6/2009	8.4	164.75	156.35
	10/26/2009	8.7	164.75	156.05
	4/28/2010	9.22	164.75	155.53
	7/19/2010	9.82	164.75	154.93
	10/19/2010	9.32	164.75	155.43
	4/26/2011	8.74	164.75	156.01
	7/19/2011	9.43	164.75	155.32
	10/26/2011	9.1	164.75	155.65
	4/24/2012	9	164.75	155.75
	7/23/2012	10.15	164.75	154.6
	10/24/2012	9.05	164.75	155.7
	4/24/2013	9.22	164.75	155.53
	10/30/2013	9.95	164.75	154.8
	10/22/2014	9.45	164.75	155.3
MW-206				
	5/11/2005	4.13	204.67	200.54
	7/28/2005	5.06	204.67	199.61
	9/19/2005	5.8	204.67	198.87
	5/24/2006	4.43	204.67	200.24
	7/25/2006	4.3	204.67	200.37
	9/12/2006	6.92	204.67	197.75
	5/14/2007	5.45	204.67	199.22
	7/25/2007	9.77	204.67	194.9
	9/11/2007	13.5	204.67	191.17
	5/20/2008	5.83	204.67	198.84
	7/29/2008	5.84	204.67	198.83
	10/27/2008	4.8	204.67	199.87
	4/13/2009	5.11	204.67	199.56
	7/6/2009	5.49	204.67	199.18
	10/28/2009	6.05	204.67	198.62
	4/26/2010	5.3	204.67	199.37
	7/19/2010	10.4	204.67	194.27
	10/18/2010	6.85	204.67	197.82
	4/25/2011	4.56	204.67	200.11
	7/18/2011	8	204.67	196.67
	10/24/2011	4.67	204.67	200
	4/23/2012	4.41	204.67	200.26
	7/23/2012	8.35	204.67	196.32
	10/22/2012	4.55	204.67	200.12
	4/22/2013	4.8	204.67	199.87
	7/29/2013	6.78	204.67	197.89
	10/28/2013	8.05	204.67	196.62
	4/21/2014	4.7	204.67	199.97
	7/28/2014	6.95	204.67	197.72
	10/20/2014	7.8	204.67	196.87
MW-207				
	1/25/2005	4.92	217.96	213.04
	5/12/2005	3.7	217.96	214.26
	8/1/2005	4.6	217.96	213.36
	9/19/2005	4.35	217.96	213.61
	3/15/2006	5.37	217.96	212.59
	5/22/2006	3.91	217.96	214.05
	6/13/2006	3.65	217.96	214.31
	7/25/2006	4	217.96	213.96
	7/26/2006	4	217.96	213.96
	8/16/2006	5.85	217.96	212.11
	9/11/2006	6.59	217.96	211.37
	9/13/2006	6.59	217.96	211.37
	10/19/2006	6.1	217.96	211.86
	11/21/2006	5.2	217.96	212.76
	12/7/2006	5.4	217.96	212.56
	1/24/2007	6.78	217.96	211.18
	2/22/2007	10.02	217.96	207.94
	3/21/2007	5.68	217.96	212.28
	4/26/2007	5.34	217.96	212.62
	5/14/2007	6.15	217.96	211.81
	5/16/2007	6.06	217.96	211.9
	6/20/2007	7.8	217.96	210.16
	7/25/2007	8.85	217.96	209.11
	8/16/2007	11.23	217.96	206.73
	9/10/2007	13.11	217.96	204.85
	10/24/2007	13.3	217.96	204.66
	11/27/2007	5.2	217.96	212.76
	12/18/2007	7.2	217.96	210.76
	5/19/2008	5.6	217.96	212.36
	7/29/2008	6.7	217.96	211.26
	10/28/2008	6.25	217.96	211.71
	4/13/2009	5.25	217.96	212.71
	7/6/2009	4.82	217.96	213.14
	10/26/2009	8.27	217.96	209.69
	4/26/2010	5.75	217.96	212.21
	7/19/2010	14.1	217.96	203.86
	10/18/2010	12.87	217.96	205.09
	4/25/2011	5.5	217.96	212.46
MW-212				
	5/12/2005	12.77	220.08	207.31
	8/1/2005	18.25	220.08	201.83
	9/20/2005	19.78	220.08	200.3
	5/22/2006	16.4	220.08	203.68
	6/13/2006	14.16	220.08	205.92
	7/25/2006	17.21	220.08	202.87
	7/26/2006	17.21	220.08	202.87
	8/16/2006	18.03	220.08	202.05
	9/11/2006	I	220.08	I
	9/13/2006	D		
	10/19/2006	18.6	220.08	201.48
	11/21/2006	14.4	220.08	205.68
	12/7/2006	D		
	1/24/2007	18.4	220.08	201.68
	2/22/2007	D		
	3/21/2007	18.25	220.08	201.83
	4/26/2007	15.3	220.08	204.78
	5/14/2007	17.2	220.08	202.88
	5/16/2007	17.25	220.08	202.83
	6/20/2007	19.78	220.08	200.3
	7/24/2007	D	220.08	
	7/25/2007	D		
	8/16/2007	D		
	9/10/2007	D	220.08	
	9/11/2007	D		
	10/24/2007	D		
	11/27/2007	18.2	220.08	201.88
	12/18/2007	19.3	220.08	200.78
	5/19/2008	17.2	220.08	202.88
	7/29/2008	D	220.08	D
	10/28/2008	D	220.08	
	4/13/2009	15.5	220.08	204.58

WELL	DATE	Water Depth	MP Elev	Water Elev
	7/6/2009	16.3	220.08	203.78
	10/26/2009	D	220.08	
	4/26/2010	17.8	220.08	202.28
	7/19/2010	D	220.08	
	10/18/2010	D	220.08	
	4/25/2011	15.2	220.08	204.88
	7/18/2011	D	220.08	
	10/24/2011	D	220.08	
	4/23/2012	D	220.08	
	7/23/2012	D	220.08	
	10/22/2012	D	220.08	
	4/22/2013	D	220.08	
	10/20/2014	D	D	D
	11/6/2014	D		
MW-213				
	7/31/2008	1.1	184.36	183.26
MW-216A				
	3/1/2005	A		
	5/9/2005	5.59	160.31	154.72
	5/10/2005	5.65	160.31	154.66
	7/27/2005	7.25	160.31	153.06
	9/22/2005	7.11	160.31	153.2
	5/23/2006	5.92	160.31	154.39
	7/25/2006	5.9	160.31	154.41
	9/12/2006	6.4	160.31	153.91
	5/15/2007	5.61	160.31	154.7
	7/24/2007	6.35	160.31	153.96
	9/10/2007	7.4	160.31	152.91
	5/20/2008	5.32	160.31	154.99 W
	7/28/2008	5.29	160.31	155.02
	10/28/2008	5.5	160.31	154.81
	4/14/2009	5.6	160.31	154.71
	7/7/2009	DE	160.31	
	10/27/2009	!		
	10/18/2010	!		
	10/24/2011	!		
MW-216B				
	3/1/2005	A		
	5/9/2005	5.33	160.31	154.98
	5/10/2005	5.38	160.31	154.93
	7/27/2005	6.96	160.31	153.35
	9/22/2005	6.93	160.31	153.38
	5/23/2006	5.68	160.31	154.63
	7/25/2006	5.6	160.31	154.71
	9/12/2006	6.2	160.31	154.11
	5/15/2007	5.38	160.31	154.93
	7/24/2007	6	160.31	154.31
	9/10/2007	7.15	160.31	153.16
	5/20/2008	5	160.31	155.31 W
	7/28/2008	5.04	160.31	155.27
	10/28/2008	5.2	160.31	155.11
	4/14/2009	5.2	160.31	155.11
	7/7/2009	DE	160.31	
	10/27/2009	!		
	10/18/2010	!		
MW-216BR				
	12/8/2009	5	159.4	154.4
	4/27/2010	5.22	159.4	154.18
	7/20/2010	6.47	159.4	152.93
	10/19/2010	5.51	159.4	153.89
	4/26/2011	5.13	159.4	154.27
	7/19/2011	6.15	159.4	153.25
	10/25/2011	5.48	159.4	153.92
	4/24/2012	5.22	159.4	154.18
	7/24/2012	6.21	159.4	153.19
	10/23/2012	5.2	159.4	154.2
	4/23/2013	5.5	159.4	153.9
	7/30/2013	5.79	159.4	153.61
	10/29/2013	6.35	159.4	153.05
	10/21/2014	6	159.4	153.4
MW-216C				
	5/9/2005	5.7		
MW-223A				
	3/1/2005	F		
	5/9/2005	0.53	176.54	176.01
	5/10/2005	0.6	176.54	175.94
	7/26/2005	2.04	176.54	174.5
	9/21/2005	1.59	176.54	174.95
	5/24/2006	1.1	176.54	175.44
	7/26/2006	1.25	176.54	175.29
	9/13/2006	1.6	176.54	174.94
	5/15/2007	1.57	176.54	174.97
	7/24/2007	2.05	176.54	174.49
	9/11/2007	3.5	176.54	173.04
	5/19/2008	4.22	176.54	172.32
	5/20/2008	1.85	176.54	174.69
	7/30/2008	1.87	176.54	174.67
	10/28/2008	1.35	176.54	175.19
	4/14/2009	0.9	176.54	175.64
	7/7/2009	0.71	176.54	175.83
	10/27/2009	1.35	176.54	175.19
	4/27/2010	1.35	176.54	175.19
	7/20/2010	3.9	176.54	172.64
	10/19/2010	2.2	176.54	174.34
	4/26/2011	0.75	176.54	175.79
	7/19/2011	2.25	176.54	174.29
	10/25/2011	0.7	176.54	175.84
	4/24/2012	0.4	176.54	176.14
	7/24/2012	2.1	176.54	174.44
	10/23/2012	0.5	176.54	176.04
	4/23/2013	0.31	176.54	176.23
	7/30/2013	1.09	176.54	175.45
	10/29/2013	1.95	176.54	174.59
	4/22/2014	0.4	176.54	176.14
	7/29/2014	1.15	176.54	175.39
	10/20/2014	2.43	176.54	174.11
	10/21/2014	2.43	176.54	174.11
	11/6/2014	0.68	176.54	175.86
MW-223B				
	3/1/2005	F		
	5/9/2005	1.82	175.93	174.11

WELL	DATE	Water Depth	MP Elev	Water Elev
	5/10/2005	2	175.93	173.93
	7/26/2005	4.03	175.93	171.9
	9/21/2005	2.85	175.93	173.08
	5/24/2006	2.41	175.93	173.52
	7/26/2006	2.52	175.93	173.41
	9/13/2006	2.92	175.93	173.01
	5/15/2007	2.8	175.93	173.13
	7/24/2007	3.28	175.93	172.65
	9/11/2007	4.46	175.93	171.47
	5/19/2008	3.7	175.93	172.23
	5/20/2008	3.2	175.93	172.73
	7/30/2008	3.17	175.93	172.76
	10/28/2008	2.6	175.93	173.33
	4/14/2009	2.5	175.93	173.43
	7/7/2009	2	175.93	173.93
	10/27/2009	2.65	175.93	173.28
	4/27/2010	2.67	175.93	173.26
	7/20/2010	4.92	175.93	171.01
	10/19/2010	3.45	175.93	172.48
	4/26/2011	2.2	175.93	173.73
	7/19/2011	3.7	175.93	172.23
	10/25/2011	2.2	175.93	173.73
	4/24/2012	1.95	175.93	173.98
	7/24/2012	3.8	175.93	172.13
	10/23/2012	2.1	175.93	173.83
	4/23/2013	2.18	175.93	173.75
	7/30/2013	2.77	175.93	173.16
	10/29/2013	3.3	175.93	172.63
	4/22/2014	2	175.93	173.93
	7/29/2014	2.7	175.93	173.23
	10/20/2014	3.5	175.93	172.43
	10/21/2014	3.5	175.93	172.43
	11/6/2014	2.19	175.93	173.74
MW-227				
	3/1/2005	F		
	5/9/2005	3.9	164.23	160.33
	7/27/2005	7.14	164.23	157.09
	9/21/2005	4.34	164.23	159.89
	5/24/2006	4.25	164.23	159.98
	7/26/2006	4.33	164.23	159.9
	9/13/2006	4.9	164.23	159.33
	5/15/2007	4.21	164.23	160.02
	7/24/2007	4.6	164.23	159.63
	9/11/2007	6.04	164.23	158.19
	5/20/2008	4.38	164.23	159.85
	7/30/2008	4.36	164.23	159.87
	10/27/2008	4	164.23	160.23
	4/14/2009	4.12	164.23	160.11
	7/7/2009	3.85	164.23	160.38
	10/27/2009	4.1	164.23	160.13
	4/27/2010	4.23	164.23	160
	7/20/2010	6.65	164.23	157.58
	10/19/2010	4.42	164.23	159.81
	4/26/2011	4.1	164.23	160.13
	7/19/2011	5.75	164.23	158.48
	10/25/2011	4.05	164.23	160.18
	4/24/2012	3.64	164.23	160.59
	7/24/2012	6.45	164.23	157.78
	10/23/2012	4.23	164.23	160
	4/23/2013	4.33	164.23	159.9
	7/30/2013	4.39	164.23	159.84
	10/29/2013	4.65	164.23	159.58
	4/22/2014	4.2	164.23	160.03
	7/29/2014	4.43	164.23	159.8
	10/20/2014	4.6	164.23	159.63
	10/21/2014	4.6	164.23	159.63
MW-301				
	3/1/2005	F		
	5/9/2005	0.6	166.36	165.76
	8/1/2005	2.32	166.36	164.04
	9/22/2005	2.73	166.36	163.63
	5/22/2006	4.25	166.36	162.11
	7/24/2006	4.03	166.36	162.33
	9/11/2006	3.93	166.36	162.43
	5/14/2007	4.7	166.36	161.66
	7/23/2007	4.3	166.36	162.06
	9/10/2007	4.76	166.36	161.6
	5/19/2008	4.53	166.36	161.83
	7/30/2008	4.4	166.36	161.96
	10/28/2008	4.3	166.36	162.06
	4/15/2009	4.84	166.36	161.52
	7/7/2009	4.1	166.36	162.26
	10/26/2009	4.25	166.36	162.11
	4/26/2010	5.2	166.36	161.16
	7/19/2010	5.16	166.36	161.2
	10/19/2010	4.96	166.36	161.4
	4/27/2011	4.31	166.36	162.05
	7/20/2011	5.1	166.36	161.26
	10/26/2011	4.11	166.36	162.25
	4/25/2012	3.93	166.36	162.43
	7/25/2012	5	166.36	161.36
	10/24/2012	4.56	166.36	161.8
	4/22/2013	!	166.36	
	7/31/2013	0.04	165.91	165.87
	10/30/2013	0.1	165.91	165.81
	4/23/2014	F1	165.91	165.91
	7/30/2014	F1	165.91	165.91
	10/22/2014	0.3	165.91	165.61
MW-302				
	5/10/2005	3.78	205.22	201.44
	7/27/2005	7.76	205.22	197.46
	9/19/2005	8.16	205.22	197.06
	5/23/2006	4.47	205.3	200.83
	7/24/2006	4.89	205.3	200.41
	9/12/2006	7.27	205.3	198.03
	5/14/2007	5.9	205.3	199.4
	7/25/2007	8.41	205.3	196.89
	9/10/2007	DE	205.3	DE
MW-302R				
	5/19/2008	7.08	206.86	199.78
	5/20/2008	7.3	206.86	199.56
	7/29/2008	8.27	206.86	198.59
	10/27/2008	7.72	206.86	199.14
	4/13/2009	5.75	206.86	201.11
	7/6/2009	5	206.86	201.86
	10/27/2009	8.46	206.86	198.4

WELL	DATE	Water Depth	MP Elev	Water Elev
	4/26/2010	7.53	206.86	199.33
	7/19/2010	15.91	206.86	190.95
	10/18/2010	8.05	206.86	198.81
	4/25/2011	5.3	206.86	201.56
	7/18/2011	11.2	206.86	195.66
	10/24/2011	6.6	206.86	200.26
	4/23/2012	9.02	206.86	197.84
	7/23/2012	11.25	206.86	195.61
	10/22/2012	4.12	206.86	202.74
	4/22/2013	7.15	206.86	199.71
	7/29/2013	8.39	206.86	198.47
	10/28/2013	14.15	206.86	192.71
	4/21/2014	5.55	206.86	201.31
	7/28/2014	9.48	206.86	197.38
	10/20/2014	15.75	206.86	191.11
	11/6/2014	6.53	206.86	200.33
MW-303				
	5/11/2005	19.75	207.87	188.12
	8/1/2005	23.2	207.87	184.67
	9/19/2005	25.3	207.87	182.57
	5/23/2006	22.5	207.87	185.37
	7/24/2006	22.45	207.87	185.42
	9/12/2006	23.36	207.87	184.51
	5/14/2007	21.48	207.87	186.39
	7/25/2007	25.9	207.87	181.97
	9/11/2007	28.7	207.87	179.17
	5/19/2008	21.18	207.87	186.69
	7/29/2008	24.82	207.87	183.05
	10/27/2008	26.2	207.87	181.67
	4/13/2009	21	207.87	186.87
	7/6/2009	21.6	207.87	186.27
	10/28/2009	26.45	207.87	181.42
	4/26/2010	21.6	207.87	186.27
	7/19/2010	26.8	207.87	181.07
	10/18/2010	30.9	207.87	176.97
	4/25/2011	21.1	207.87	186.77
	7/18/2011	24.35	207.87	183.52
	10/24/2011	26.4	207.87	181.47
	4/23/2012	24.95	207.87	182.92
	7/24/2012	!	207.87	
MW-304A				
	1/4/2005	27.69	217.32	189.63
	5/11/2005	23	217.32	194.32
	7/28/2005	26.95	217.32	190.37
	9/19/2005	26.45	217.32	190.87
	5/24/2006	27.1	217.31	190.21
	5/25/2006	27.1	217.31	190.21
	6/13/2006	30.78	217.31	186.53
	7/25/2006	26.95	217.31	190.36
	7/26/2006	26.95	217.31	190.36
	8/16/2006	26.48	217.31	190.83
	9/12/2006	27.7	217.31	189.61
	9/13/2006	27.2	217.31	190.11
	10/19/2006	28.71	217.31	188.6
	11/21/2006	25.77	217.31	191.54
	12/7/2006	25.7	217.31	191.61
	1/24/2007	26.5	217.31	190.81
	2/22/2007	27.3	217.31	190.01
	3/21/2007	28.8	217.31	188.51
	4/26/2007	25.1	217.31	192.21
	5/15/2007	25.8	217.31	191.51
	5/16/2007	25.8	217.31	191.51
	6/20/2007	27.55	217.31	189.76
	7/24/2007	29.25	217.31	188.06
	7/25/2007	29.25	217.31	188.06
	8/16/2007	30.05	217.31	187.26
	9/11/2007	29.74	217.31	186.57
	10/24/2007	32.25	217.31	185.06
	11/27/2007	30.44	217.31	186.87
	12/18/2007	30.79	217.31	186.52
	5/19/2008	25.08	217.31	192.23
	5/20/2008	25.3	217.31	192.01
	7/29/2008	28.76	217.31	188.55
	10/27/2008	29.2	217.31	188.11
	4/13/2009	25.62	217.31	191.69
	7/6/2009	26.42	217.31	190.89
	10/27/2009	30.08	217.31	187.23
	4/26/2010	26.1	217.31	191.21
	7/19/2010	29.9	217.31	187.41
	10/18/2010	32.81	217.31	184.5
	4/25/2011	24.65	217.31	192.66
	7/18/2011	28	217.31	189.31
	10/24/2011	29.65	217.31	187.66
	4/23/2012	29.3	217.31	188.01
	7/23/2012	28.85	217.31	188.46
	10/22/2012	29.75	217.31	187.56
	4/22/2013	29.65	217.31	187.66
	7/29/2013	29.46	217.31	187.85
	10/28/2013	30.15	217.31	187.16
	4/21/2014	28.65	217.31	188.66
	7/28/2014	29.65	217.31	187.66
	10/20/2014	32.2	217.31	185.11
	11/6/2014	32.2	217.31	185.11
MW-401A				
	1/4/2005	F		
	3/1/2005	A		
	5/9/2005	0.86	156.83	155.97
	5/10/2005	0.87	156.83	155.96
	7/28/2005	5.85	156.83	150.98
	9/21/2005	5.84	156.83	150.99
	5/23/2006	1.95	156.83	154.88
	7/25/2006	3.15	156.83	153.68
	9/12/2006	5.16	156.83	151.67
	5/14/2007	3.57	156.83	153.26
	7/24/2007	6.71	156.83	150.12
	9/11/2007	8.23	156.83	148.6
	5/20/2008	4.15	156.83	152.68
	7/28/2008	5.7	156.83	151.13
	10/27/2008	4.75	156.83	152.08
	4/13/2009	1.3	156.83	155.53
	7/7/2009	1.55	156.83	155.28
	10/28/2009	4.12	156.83	152.71
	4/27/2010	4.45	156.83	152.38
	7/20/2010	7.78	156.83	149.05
	10/20/2010	5.52	156.83	151.31
	4/25/2011	1.6	156.83	155.23
	7/18/2011	6.15	156.83	150.68
	10/24/2011	3.62	156.83	153.21
	4/23/2012	4.42	156.83	152.41
	7/23/2012	6.03	156.83	150.8
	10/22/2012	0.93	156.83	155.9

WELL	DATE	Water Depth	MP Elev	Water Elev
	4/22/2013	2.9	156.83	153.93
	7/29/2013	5.6	156.83	151.23
	10/28/2013	6.1	156.83	150.73
	4/21/2014	1.14	156.83	155.69
	7/28/2014	5.1	156.83	151.73
	10/20/2014	7.15	156.83	149.68
MW-401B				
	1/4/2005	7.21	157.32	150.11
	3/1/2005	A		
	5/9/2005	6.95	157.32	150.37
	5/10/2005	6.94	157.32	150.38
	7/27/2005	8.85	157.32	148.47
	9/21/2005	7.55	157.32	149.77
	5/23/2006	6.67	157.32	150.65
	7/25/2006	6.38	157.32	150.94
	9/12/2006	6.82	157.32	150.5
	5/14/2007	6.83	157.32	150.49
	7/24/2007	7.14	157.32	150.18
	9/11/2007	7.73	157.32	149.59
	5/20/2008	6.8	157.32	150.52
	7/28/2008	6.68	157.32	150.64
	10/27/2008	6.5	157.32	150.82
	4/13/2009	6.4	157.32	150.92
	7/7/2009	6.35	157.32	150.97
	10/28/2009	6.6	157.32	150.72
	4/27/2010	6.7	157.32	150.62
	7/20/2010	7.55	157.32	149.77
	10/20/2010	6.82	157.32	150.5
	4/25/2011	6.56	157.32	150.76
	7/18/2011	7.33	157.32	149.99
	10/24/2011	6.63	157.32	150.69
	4/23/2012	6.63	157.32	150.69
	7/23/2012	7.4	157.32	149.92
	10/22/2012	6.35	157.32	150.97
	4/22/2013	6.7	157.32	150.62
	7/29/2013	6.94	157.32	150.38
	10/28/2013	7.2	157.32	150.12
	4/21/2014	6.39	157.32	150.93
	7/28/2014	6.92	157.32	150.4
	10/20/2014	7.14	157.32	150.18
MW-402A				
	1/4/2005	F		
	5/9/2005	F1		
	5/11/2005	0	152.2	152.2
	8/1/2005	F1	152.2	
	9/21/2005	F1	152.2	
	5/23/2006	F1	152.2	
	7/26/2006	F1	152.2	
	9/12/2006	F1	152.2	
	5/15/2007	F1	152.2	
	7/25/2007	F1	152.2	
	9/12/2007	F1	152.2	
	5/20/2008	F1	152.2	
	7/28/2008	0	152.2	152.2
	10/27/2008	F1	152.2	
	4/14/2009	F1	152.2	
	7/8/2009	F1	152.2	
	10/28/2009	F1	152.2	
	4/27/2010	F1	152.2	
	7/21/2010	F1	152.2	
	10/20/2010	F1	152.2	
	4/27/2011	F1	152.2	
	7/20/2011	F1	152.2	
	10/26/2011	F1	152.2	152.2
	4/24/2012	F1	152.2	
	7/25/2012	F1	152.2	
	10/24/2012	F1	152.2	
	4/22/2013	0.13	152.2	152.07
	7/31/2013	0.05	152.2	152.15
	10/30/2013	F1	152.2	152.2
	4/23/2014	F1	152.2	152.2
	7/30/2014	0.2	152.2	152
	10/22/2014	0.25	152.2	151.95
MW-402B				
	1/4/2005	F		
	5/9/2005	2.02	152.74	150.72
	5/11/2005	2.18	152.74	150.56
	8/1/2005	3.12	152.74	149.62
	9/21/2005	3.07	152.74	149.67
	5/23/2006	2.88	152.74	149.86
	7/26/2006	3.24	152.74	149.5
	9/12/2006	3.8	152.74	148.94
	5/15/2007	3.05	152.74	149.69
	7/25/2007	4.22	152.74	148.52
	9/12/2007	5.3	152.74	147.44
	5/20/2008	3.3	152.74	149.44
	7/28/2008	3.6	152.74	149.14
	10/27/2008	3	152.74	149.74
	4/14/2009	2.9	152.74	149.84
	7/8/2009	2.9	152.74	149.84
	10/28/2009	2.98	152.74	149.76
	4/27/2010	3	152.74	149.74
	7/21/2010	5.11	152.74	147.63
	10/20/2010	3.4	152.74	149.34
	4/27/2011	2.72	152.74	150.02
	7/20/2011	4.55	152.74	148.19
	10/26/2011	2.95	152.74	149.79
	4/24/2012	2.65	152.74	150.09
	7/25/2012	4.62	152.74	148.12
	10/24/2012	2.9	152.74	149.84
	4/22/2013	3	152.74	149.74
	7/31/2013	3.92	152.74	148.82
	10/30/2013	3.8	152.74	148.94
	4/23/2014	2.62	152.74	150.12
	7/30/2014	3.71	152.74	149.03
	10/22/2014	3.87	152.74	148.87
OW06-05				
	4/27/2006	6.42	190.53	184.11
	5/25/2006	6	190.53	184.53
	6/13/2006	5.6	190.53	184.93
	7/26/2006	6.6	190.53	183.93
	8/16/2006	7.7	190.53	182.83
	9/13/2006	8.6	190.53	181.93
	10/19/2006	6.8	190.53	183.73
	11/21/2006	5.8	190.53	184.73
	12/7/2006	6.17	190.53	184.36
	1/24/2007	6.73	190.53	183.8

WELL	DATE	Water Depth	MP Elev	Water Elev
	2/22/2007	8.6	190.53	181.93
	3/21/2007	6.03	190.53	184.5
	4/26/2007	5.94	190.53	184.59
	5/16/2007	6.87	190.53	183.66
	6/20/2007	9.2	190.53	181.33
	7/25/2007	10.14	190.53	180.39
	8/16/2007	12.17	190.53	178.36
	9/11/2007	13.75	190.53	176.78
	10/24/2007	14.94	190.53	175.59
	11/27/2007	6	190.53	184.53
	12/18/2007	6.12	190.53	184.41
	7/30/2008	8.49	190.53	182.04
	11/6/2014	7.43	190.53	183.1
OW06-06				
	4/27/2006	6.35	190.12	183.77
	5/25/2006	5.97	190.12	184.15
	6/13/2006	5.28	190.12	184.84
	7/26/2006	6.45	190.12	183.67
	8/16/2006	7.39	190.12	182.73
	9/13/2006	8.45	190.12	181.67
	10/19/2006	7.1	190.12	183.02
	11/21/2006	5.7	190.12	184.42
	12/7/2006	6.2	190.12	183.92
	1/24/2007	6.68	190.12	183.44
	2/22/2007	8.43	190.12	181.69
	3/21/2007	5.91	190.12	184.21
	4/26/2007	5.8	190.12	184.32
	5/16/2007	6.77	190.12	183.35
	6/20/2007	8.98	190.12	181.14
	7/25/2007	9.94	190.12	180.18
	8/16/2007	12.04	190.12	178.08
	9/11/2007	13.6	190.12	176.52
	10/24/2007	14.8	190.12	175.32
	11/27/2007	6.48	190.12	183.64
	12/18/2007	6.62	190.12	183.5
	7/30/2008	7.78	190.12	182.34
	11/6/2014	7.69	190.12	182.43
OW06-07				
	4/27/2006	8.91	189.16	180.25
	5/25/2006	8.62	189.16	180.54
	6/13/2006	8.15	189.16	181.01
	7/26/2006	9.1	189.16	180.06
	8/16/2006	10.23	189.16	178.93
	9/13/2006	10.95	189.16	178.21
	10/19/2006	9.4	189.16	179.76
	11/21/2006	8.48	189.16	180.68
	12/7/2006	8.82	189.16	180.34
	1/24/2007	9.5	189.16	179.66
	2/22/2007	11.15	189.16	178.01
	3/21/2007	8.75	189.16	180.41
	4/26/2007	8.75	189.16	180.41
	5/16/2007	9.64	189.16	179.52
	6/20/2007	11.62	189.16	177.54
	7/25/2007	12.3	189.16	176.86
	8/16/2007	14.17	189.16	174.99
	9/11/2007	15.8	189.16	173.36
	10/24/2007	16.2	189.16	172.96
	11/27/2007	8.9	189.16	180.26
	12/18/2007	9	189.16	180.16
	5/19/2008	9.72	189.16	179.44
	7/30/2008	10.07	189.16	179.09
	11/6/2014	8.69	189.16	180.47
OW06-08				
	4/27/2006	4.54	189.72	185.18
	5/25/2006	4.41	189.72	185.31
	6/13/2006	4.12	189.72	185.6
	7/26/2006	4.8	189.72	184.92
	8/16/2006	5.71	189.72	184.01
	9/13/2006	6.4	189.72	183.32
	10/19/2006	4.77	189.72	184.95
	11/21/2006	4.2	189.72	185.52
	12/7/2006	4.45	189.72	185.27
	1/24/2007	4.8	189.72	184.92
	2/22/2007	6.23	189.72	183.49
	3/21/2007	4.21	189.72	185.51
	4/26/2007	4.25	189.72	185.47
	5/16/2007	4.91	189.72	184.81
	6/20/2007	6.95	189.72	182.77
	7/25/2007	7.71	189.72	182.01
	8/16/2007	9.95	189.72	179.77
	9/11/2007	11.5	189.72	178.22
	10/24/2007	12.31	189.72	177.41
	11/27/2007	4.02	189.72	185.7
	12/18/2007	4.12	189.72	185.6
	7/30/2008	5.93	189.72	183.79
	11/6/2014	5	189.72	184.72
OW06-09				
	4/27/2006	5.2	190.1	184.9
	5/25/2006	5	190.1	185.1
	6/13/2006	4.63	190.1	185.47
	7/26/2006	5.39	190.1	184.71
	8/16/2006	6.33	190.1	183.77
	9/13/2006	7.03	190.1	183.07
	10/19/2006	5.45	190.1	184.65
	11/21/2006	4.74	190.1	185.36
	12/7/2006	5.05	190.1	185.05
	1/24/2007	5.42	190.1	184.68
	2/22/2007	6.96	190.1	183.14
	3/21/2007	4.83	190.1	185.27
	4/26/2007	4.88	190.1	185.22
	5/16/2007	5.6	190.1	184.5
	6/20/2007	7.65	190.1	182.45
	7/25/2007	8.5	190.1	181.6
	8/16/2007	10.71	190.1	179.39
	9/11/2007	12.28	190.1	177.82
	10/24/2007	13.13	190.1	176.97
	11/27/2007	4.77	190.1	185.33
	12/18/2007	4.89	190.1	185.21
	7/30/2008	6.78	190.1	183.32
	11/6/2014	6.24	190.1	183.86
OW06-10				
	4/27/2006	6.05	191.07	185.02
	5/25/2006	5.77	191.07	185.3
	6/13/2006	5.37	191.07	185.7
	7/26/2006	6.18	191.07	184.89
	8/16/2006	7.11	191.07	183.96
	9/13/2006	7.85	191.07	183.22
	10/19/2006	6.22	191.07	184.85
	11/21/2006	5.5	191.07	185.57
	12/7/2006	5.78	191.07	185.29
	1/24/2007	6.15	191.07	184.92
	2/22/2007	7.7	191.07	183.37
	3/21/2007	5.5	191.07	185.57
	4/26/2007	5.56	191.07	185.51

WELL	DATE	Water Depth	MP Elev	Water Elev
	5/16/2007	6.32	191.07	184.75
	6/20/2007	8.39	191.07	182.68
	7/25/2007	9.24	191.07	181.83
	8/16/2007	11.48	191.07	179.59
	9/11/2007	14.41	191.07	176.66
	10/24/2007	14.1	191.07	176.97
	11/27/2007	5.4	191.07	185.67
	12/18/2007	5.5	191.07	185.57
	7/30/2008	7.6	191.07	183.47
	11/6/2014	6.58	191.07	184.49
P-04-01				
	5/9/2005	6.65	169.34	162.69
P-04-02				
	5/9/2005	7.02	168.74	161.72
	7/27/2005	9.11	168.74	159.63
	9/22/2005	9.16	168.74	159.58
	5/22/2006	7.8	168.74	160.94
	7/24/2006	8.55	168.74	160.19
	9/11/2006	8.38	168.74	160.36
	5/14/2007	8	168.74	160.74
	7/23/2007	9.25	168.74	159.49
	9/10/2007	9.8	168.74	158.94
	5/21/2008	7.98	168.74	160.76
	7/30/2008	9.63	168.74	159.11
	10/29/2008	8.73	168.74	160.01
	4/13/2009	8.25	168.74	160.49
	7/6/2009	7.95	168.74	160.79
	10/27/2009	7.55	168.74	161.19
	4/26/2010	7.81	168.74	160.93
	7/21/2010	8.25	168.74	160.49
	10/20/2010	8.5	168.74	160.24
	4/27/2011	7.28	168.74	161.46
	7/20/2011	7.81	168.74	160.93
	10/26/2011	!	168.74	
	4/25/2012	10.55	168.74	158.19
	7/25/2012	11.56	168.74	157.18
	10/24/2012	6.65	168.74	162.09
	4/22/2013	!	168.74	
P-04-03				
	5/9/2005	8.18	169.46	161.28
P-04-04				
	5/9/2005	7.5	169.35	161.85
	7/27/2005	9.71	169.35	159.64
	9/22/2005	9.6	169.35	159.75
	5/22/2006	8.28	169.35	161.07
	7/24/2006	8.88	169.35	160.47
	9/11/2006	8.85	169.35	160.5
	5/14/2007	8.47	169.35	160.88
	7/23/2007	9.52	169.35	159.83
	9/10/2007	10.03	169.35	159.32
	5/21/2008	8.41	169.35	160.94
	7/30/2008	9.34	169.35	160.01
	10/29/2008	9.1	169.35	160.25
	4/13/2009	8.8	169.35	160.55
	7/6/2009	8.4	169.35	160.95
	10/27/2009	7.96	169.35	161.39
	4/26/2010	8.45	169.35	160.9
	7/21/2010	8.9	169.35	160.45
	10/20/2010	9	169.35	160.35
	4/27/2011	7.82	169.35	161.53
	7/20/2011	8.44	169.35	160.91
	10/26/2011	9.3	169.35	160.05
	4/25/2012	9.62	169.35	159.73
	7/25/2012	10.05	169.35	159.3
	10/24/2012	8.9	169.35	160.45
	4/24/2013	9.05	169.35	160.3
	7/31/2013	9.12	169.25	160.13
	10/30/2013	10.01	169.25	159.24
	4/23/2014	8.4	169.25	160.85
	7/30/2014	8.96	169.25	160.29
	10/22/2014	9.35	169.25	159.9
P-04-05A				
	1/4/2005	16.11	204	187.89
	2/21/2005	16.6	204	187.4
	3/24/2005	15.9	204	188.1
	4/27/2005	15.31	204	188.69
	5/25/2005	16.99	204	187.01
	6/22/2005	15.78	204	188.22
	7/26/2005	19.22	204	184.78
	8/29/2005	19.65	204	184.35
	9/19/2005	19	204	185
	10/21/2005	15.9	204	188.1
	11/21/2005	15.37	204	188.63
	12/27/2005	15.65	204	188.35
	1/23/2006	14.96	204	189.04
	2/23/2006	16.39	204	187.61
	4/27/2006	15.75	204	188.25
	5/25/2006	16	204	188
	6/13/2006	15	204	189
	7/26/2006	15.9	204	188.1
	8/16/2006	16.3	204	187.7
	9/13/2006	17.2	204	186.8
	10/19/2006	15.4	204	188.6
	11/21/2006	15	204	189
	12/7/2006	15.25	204	188.75
	1/24/2007	15.95	204	188.05
	2/22/2007	18.3	204	185.7
	3/21/2007	15.1	204	188.9
	4/26/2007	15.3	204	188.7
	5/16/2007	17.4	204	186.6 W
	6/20/2007	18.11	204	185.89
	7/25/2007	18.3	204	185.7
	8/16/2007	20.9	204	183.1
	9/11/2007	23.42	204	180.58
	10/24/2007	22	204	182
	11/27/2007	15.25	204	188.75
	12/18/2007	16	204	188
	5/19/2008	16.1	204	187.9
	7/31/2008	16.89	204	187.11
	11/6/2014	16.41	204	187.59
P-04-05B				
	1/4/2005	4.89	204.02	199.13
	2/21/2005	4.73	204.02	199.29
	3/24/2005	4.27	204.02	199.75
	4/27/2005	4.37	204.02	199.65
	5/25/2005	4.55	204.02	199.47
	6/22/2005	4.2	204.02	199.82
	7/26/2005	7.51	204.02	196.51

WELL	DATE	Water Depth	MP Elev	Water Elev
	8/29/2005	8	204.02	196.02
	9/19/2005	7.05	204.02	196.97
	10/21/2005	4.53	204.02	199.49
	11/21/2005	4.5	204.02	199.52
	12/27/2005	5.14	204.02	198.88
	1/23/2006	4.49	204.02	199.53
	2/23/2006	5.58	204.02	198.44
	4/27/2006	4.75	204.02	199.27
	5/25/2006	4.52	204.02	199.5
	6/13/2006	4.31	204.02	199.71
	7/26/2006	5.05	204.02	198.97
	8/16/2006	5.6	204.02	198.42
	9/13/2006	6.4	204.02	197.62
	10/19/2006	5	204.02	199.02
	11/21/2006	4.35	204.02	199.67
	12/7/2006	4.8	204.02	199.22
	1/24/2007	5.18	204.02	198.84
	2/22/2007	7.03	204.02	196.99
	3/21/2007	4.5	204.02	199.52
	4/26/2007	4.4	204.02	199.62
	5/16/2007	5.08	204.02	198.94 W
	6/20/2007	6.95	204.02	197.07
	7/25/2007	7.11	204.02	196.91
	8/16/2007	8.75	204.02	195.27
	9/11/2007	10.2	204.02	193.82
	10/24/2007	9.8	204.02	194.22
	11/27/2007	4.5	204.02	199.52
	12/18/2007	4.92	204.02	199.1
	5/19/2008	5.13	204.02	198.89
	7/31/2008	5.93	204.02	198.09
	11/6/2014	5.23	204.02	198.79
P-04-06A				
	1/4/2005	19.95	210.98	191.03
	1/26/2005	20.43	210.98	190.55
	2/21/2005	20.31	210.98	190.67
	3/23/2005	19.47	210.98	191.51
	4/27/2005	19.2	210.98	191.78
	5/25/2005	19.73	210.98	191.25
	6/22/2005	19.56	210.98	191.42
	7/26/2005	22	210.98	188.98
	8/29/2005	22.65	210.98	188.33
	9/19/2005	22.18	210.98	188.8
	10/21/2005	19	210.98	191.98
	11/21/2005	19.7	210.98	191.28
	12/27/2005	19.3	210.98	191.68
	1/23/2006	18.8	210.98	192.18
	2/23/2006	19.92	210.98	191.06
	3/15/2006	20.05	210.98	190.93
	4/27/2006	19.52	210.98	191.46
	5/25/2006	19.4	210.98	191.58
	6/13/2006	18.9	210.98	192.08
	7/26/2006	19.6	210.98	191.38
	8/16/2006	20.3	210.98	190.68
	9/13/2006	20.8	210.98	190.18
	10/19/2006	19.55	210.98	191.43
	11/21/2006	19.1	210.98	191.88
	12/7/2006	19.5	210.98	191.48
	1/24/2007	20	210.98	190.98
	2/22/2007	21.8	210.98	189.18
	3/21/2007	19.3	210.98	191.68
	4/26/2007	19.2	210.98	191.78
	5/16/2007	20.1	210.98	190.88 W
	6/20/2007	21.33	210.98	189.65
	7/25/2007	21.4	210.98	189.58
	8/16/2007	23.1	210.98	187.88
	9/11/2007	24.85	210.98	186.13
	10/24/2007	23.7	210.98	187.28
	11/27/2007	18.82	210.98	192.16
	12/18/2007	19.9	210.98	191.08
	5/19/2008	19.64	210.98	191.34
	7/31/2008	20.32	210.98	190.66
	11/6/2014	22.47	210.98	188.51
P-04-06B				
	1/4/2005	5.89	211.02	205.13
	1/26/2005	6.9	211.02	204.12
	2/21/2005	F		
	3/23/2005	F		
	4/27/2005	4.93	211.02	206.09
	5/25/2005	5.24	211.02	205.78
	6/22/2005	5.2	211.02	205.82
	7/26/2005	9.67	211.02	201.35
	8/29/2005	10.85	211.02	200.17
	9/19/2005	10.2	211.02	200.82
	10/21/2005	5.31	211.02	205.71
	11/21/2005	5.1	211.02	205.92
	12/27/2005	6.01	211.02	205.01
	1/23/2006	5.11	211.02	205.91
	2/23/2006	6.88	211.02	204.14
	3/15/2006	6.83	211.02	204.19
	4/27/2006	5.85	211.02	205.17
	5/25/2006	5.5	211.02	205.52
	6/13/2006	4.8	211.02	206.22
	7/26/2006	6.02	211.02	205
	8/16/2006	7.61	211.02	203.41
	9/13/2006	8.2	211.02	202.82
	10/19/2006	5.8	211.02	205.22
	11/21/2006	5.45	211.02	205.57
	12/7/2006	6	211.02	205.02
	1/24/2007	6.85	211.02	204.17
	2/22/2007	9.6	211.02	201.42
	3/21/2007	5.41	211.02	205.61
	4/26/2007	5.41	211.02	205.61
	5/16/2007	6.4	211.02	204.62
	6/20/2007	8.29	211.02	202.73
	7/25/2007	8.31	211.02	202.71
	8/16/2007	10.35	211.02	200.67
	9/11/2007	12.1	211.02	198.92
	10/24/2007	10.3	211.02	200.72
	11/27/2007	4.51	211.02	206.51
	12/18/2007	6.63	211.02	204.39
	5/19/2008	6.5	211.02	204.52
	7/31/2008	6.95	211.02	204.07
	11/6/2014	4.9	211.02	206.12
P-04-07A				
	1/4/2005	-1.85 ^	177.12	178.97
	2/21/2005	-0.6 ^	177.12	177.72
	3/24/2005	1.6	177.12	175.52
	4/27/2005	F1		
	5/25/2005	0.4	177.12	176.72
	6/22/2005	1.43	177.12	175.69
	7/26/2005	1.33	177.12	175.79
	8/29/2005	1.95	177.12	175.17
	9/19/2005	1.73	177.12	175.39
	10/21/2005	1.46	177.12	175.66
	11/21/2005	1.11	177.12	176.01
	12/27/2005	F		
	1/23/2006	F1		
	2/23/2006	1.5	177.12	175.62
	3/15/2006	2.03	177.12	175.09
	4/27/2006	-1.72 ^	177.12	178.84

WELL	DATE	Water Depth	MP Elev	Water Elev
	5/25/2006	-1.49 ^	177.12	178.61
	6/13/2006	-1.8 ^	177.12	178.92
	7/26/2006	-1.6 ^	177.12	178.72
	8/16/2006	0.23	177.12	176.89
	9/13/2006	0.2	177.12	176.92
	10/19/2006	-1.7 ^	177.12	178.82
	11/21/2006	0.26	177.12	176.86
	12/7/2006	0.3	177.12	176.82
	1/24/2007	-1.5 ^	177.12	178.62
	2/22/2007	-1.9 ^	177.12	179.02
	3/21/2007	0.2	177.12	176.92
	4/26/2007	-1.78 ^	177.12	178.9
	5/16/2007	-1.42 ^	177.12	178.54
	6/20/2007	-1.1 ^	177.12	178.22
	7/25/2007	0.29	177.12	176.83
	8/16/2007	-2.1 ^	177.12	179.22
	9/11/2007	1.1	177.12	176.02
	10/24/2007	1.1	177.12	176.02
	11/27/2007	-1.58 ^	177.12	178.7
	12/18/2007	-1.6 ^	177.12	178.72
	5/19/2008	-1.3 ^	177.12	178.42
	7/30/2008	-1.15 ^	177.12	178.27
	11/6/2014	F1		
P-04-07B				
	1/4/2005	-1.72 ^	177.15	178.87
	1/25/2005	F1		
	2/21/2005	-0.78 ^	177.15	177.93
	3/24/2005	-0.5 ^	177.15	177.65
	4/27/2005	2.4	177.15	174.75
	5/25/2005	Q		
	6/22/2005	0.6	177.15	176.55
	7/26/2005	0.3	177.15	176.85
	8/29/2005	1.93	177.15	175.22
	9/19/2005	0.92	177.15	176.23
	10/21/2005	0.3	177.15	176.85
	11/21/2005	0.28	177.15	176.87
	12/27/2005	0.6	177.15	176.55
	1/23/2006	0.11	177.15	177.04
	2/23/2006	0.84	177.15	176.31
	3/15/2006	0.72	177.15	176.43
	4/27/2006	2.72	177.15	174.43
	5/25/2006	-1.6 ^	177.15	178.75
	6/13/2006	-1.72 ^	177.15	178.87
	7/26/2006	-1.6 ^	177.15	178.75
	8/16/2006	0.3	177.15	176.85
	9/13/2006	0.28	177.15	176.87
	10/19/2006	-1.6 ^	177.15	178.75
	11/21/2006	0.32	177.15	176.83
	12/7/2006	0.38	177.15	176.77
	1/24/2007	-1.38 ^	177.15	178.53
	2/22/2007	-1.8 ^	177.15	178.95
	3/21/2007	0.38	177.15	176.77
	4/26/2007	-1.59 ^	177.15	178.74
	5/16/2007	-1.42 ^	177.15	178.57
	6/20/2007	-1.15 ^	177.15	178.3
	7/25/2007	0.35	177.15	176.8
	8/16/2007	-2.35 ^	177.15	179.5
	9/11/2007	1.15	177.15	176
	10/24/2007	1	177.15	176.15
	11/27/2007	-1.45 ^	177.15	178.6
	12/18/2007	-1.52 ^	177.15	178.67
	5/19/2008	-1.13 ^	177.15	178.28
	7/30/2008	-1.05 ^	177.15	178.2
	11/6/2014	F1		

P-04-07C				
	1/4/2005	F		
	2/21/2005	F		
	3/24/2005	3	177	174
	4/27/2005	2.93	177	174.07
	5/25/2005	2.98	177	174.02
	6/22/2005	2.8	177	174.2
	7/26/2005	3.11	177	173.89
	8/29/2005	3.33	177	173.67
	9/19/2005	3.06	177	173.94
	10/21/2005	3.15	177	173.85
	11/21/2005	3.13	177	173.87
	12/27/2005	3.25	177	173.75
	1/23/2006	F		
	2/23/2006	F		
	3/15/2006	3.09	177	173.91
	4/27/2006	3.23	177	173.77
	5/25/2006	3.25	177	173.75
	6/13/2006	3.13	177	173.87
	7/26/2006	3.37	177	173.63
	8/16/2006	3.82	177	173.18
	9/13/2006	3.78	177	173.22
	10/19/2006	3.2	177	173.8
	11/21/2006	3	177	174
	12/7/2006	3.2	177	173.8
	1/24/2007	F		
	2/22/2007	2.2	177	174.8
	3/21/2007	3.45	177	173.55
	4/26/2007	3.18	177	173.82
	5/16/2007	3.3	177	173.7
	6/20/2007	3.33	177	173.67
	7/25/2007	3.51	177	173.49
	8/16/2007	3.53	177	173.47
	9/11/2007	4.74	177	172.26
	10/24/2007	3.2	177	173.8
	11/27/2007	3.2	177	173.8
	12/18/2007	3.22	177	173.78
	5/19/2008	3.37	177	173.63
	7/30/2008	3.34	177	173.66
	11/6/2014	3.2	177	173.8
P-04-08A				
	1/4/2005	9.95	191.55	181.6
	2/21/2005	11.4	191.55	180.15
	3/23/2005	11	191.55	180.55
	4/27/2005	10.27	191.55	181.28
	5/25/2005	10.43	191.55	181.12
	6/22/2005	11.25	191.55	180.3
	7/26/2005	13.88	191.55	177.67
	8/29/2005	14.9	191.55	176.65
	9/19/2005	13.75	191.55	177.8
	10/21/2005	10.65	191.55	180.9
	11/21/2005	10.32	191.55	181.23
	12/27/2005	10.85	191.55	180.7
	1/23/2006	10.38	191.55	181.17
	2/23/2006	11.88	191.55	179.67
	3/15/2006	11.6	191.55	179.95
	4/27/2006	10.9	191.55	180.65
	5/25/2006	10.7	191.55	180.85
	6/13/2006	10.26	191.55	181.29
	7/26/2006	10.8	191.55	180.75
	8/16/2006	11.9	191.55	179.65
	9/13/2006	12.3	191.55	179.25
	10/19/2006	10.8	191.55	180.75
	11/21/2006	10.12	191.55	181.43
	12/7/2006	10.6	191.55	180.95

WELL	DATE	Water Depth	MP Elev	Water Elev
	1/24/2007	11.3	191.55	180.25
	2/22/2007	13	191.55	178.55
	3/21/2007	10.2	191.55	181.35
	4/26/2007	10.4	191.55	181.15
	5/16/2007	11.3	191.55	180.25 W
	6/20/2007	13.1	191.55	178.45
	7/25/2007	13.5	191.55	178.05
	8/16/2007	15.31	191.55	176.24
	9/11/2007	17.2	191.55	174.35
	10/24/2007	17.7	191.55	173.85
	11/27/2007	10.52	191.55	181.03
	12/18/2007	11.47	191.55	180.08
	5/19/2008	11.7	191.55	179.85
	7/29/2008	12.1	191.55	179.45
	11/6/2014	10.85	191.55	180.7
P-04-08B				
	1/4/2005	4.96	191.56	186.6
	2/21/2005	4.3	191.56	187.26
	3/23/2005	4.15	191.56	187.41
	4/27/2005	5.4	191.56	186.16
	5/25/2005	4.47	191.56	187.09
	6/22/2005	4.12	191.56	187.44
	7/26/2005	7.5	191.56	184.06
	8/29/2005	8.53	191.56	183.03
	9/19/2005	6.15	191.56	185.41
	10/21/2005	4.8	191.56	186.76
	11/21/2005	4.65	191.56	186.91
	12/27/2005	4.4	191.56	187.16
	1/23/2006	4.57	191.56	186.99
	2/23/2006	5.75	191.56	185.81
	3/15/2006	4.43	191.56	187.13
	4/27/2006	4.85	191.56	186.71
	5/25/2006	4.9	191.56	186.66
	6/13/2006	4.48	191.56	187.08
	7/26/2006	4.91	191.56	186.65
	8/16/2006	6.1	191.56	185.46
	9/13/2006	6.12	191.56	185.44
	10/19/2006	4.32	191.56	187.24
	11/21/2006	4.64	191.56	186.92
	12/7/2006	4.9	191.56	186.66
	1/24/2007	5.51	191.56	186.05
	2/22/2007	6.9	191.56	184.66
	3/21/2007	4.4	191.56	187.16
	4/26/2007	4.75	191.56	186.81
	5/16/2007	5.25	191.56	186.31 W
	6/20/2007	6.75	191.56	184.81
	7/25/2007	6.9	191.56	184.66
	8/16/2007	8.9	191.56	182.66
	9/11/2007	11.22	191.56	180.34
	10/24/2007	12.83	191.56	178.73
	11/27/2007	3.85	191.56	187.71
	12/18/2007	4.65	191.56	186.91
	5/19/2008	5.7	191.56	185.86
	7/29/2008	6.04	191.56	185.52
	11/6/2014	3.92	191.56	187.64
P-04-09A				
	1/4/2005	5.59	169.89	164.3
	2/21/2005	6.1	169.89	163.79
	3/23/2005	5.4	169.89	164.49
	4/27/2005	5.25	169.89	164.64
	5/25/2005	5.18	169.89	164.71
	6/22/2005	5.79	169.89	164.1
	7/26/2005	8	169.89	161.89
	8/29/2005	9	169.89	160.89
	9/19/2005	7.19	169.89	162.7
	10/21/2005	5.5	169.89	164.39
	11/21/2005	5.2	169.89	164.69
	12/27/2005	5.33	169.89	164.56
	1/23/2006	5.3	169.89	164.59
	2/23/2006	6.32	169.89	163.57
	3/15/2006	5.75	169.89	164.14
	4/27/2006	5.45	169.89	164.44
	5/25/2006	5.48	169.89	164.41
	6/13/2006	5.16	169.89	164.73
	7/26/2006	5.68	169.89	164.21
	8/16/2006	6.74	169.89	163.15
	9/13/2006	6.5	169.89	163.39
	10/19/2006	5.22	169.89	164.67
	11/21/2006	5.3	169.89	164.59
	12/7/2006	5.5	169.89	164.39
	1/24/2007	5.82	169.89	164.07
	2/22/2007	6.43	169.89	163.46
	3/21/2007	5.12	169.89	164.77
	4/26/2007	5.35	169.89	164.54
	5/16/2007	5.82	169.89	164.07
	6/20/2007	7.05	169.89	162.84
	7/25/2007	7.1	169.89	162.79
	8/16/2007	8.4	169.89	161.49
	9/11/2007	9.88	169.89	160.01
	10/24/2007	8.2	169.89	161.69
	11/27/2007	5	169.89	164.89
	12/18/2007	5.15	169.89	164.74
	5/19/2008	6	169.89	163.89
	7/29/2008	6.45	169.89	163.44
	11/6/2014	5.39	169.89	164.5
P-04-09B				
	1/4/2005	4.91	169.93	165.02
	2/21/2005	5.11	169.93	164.82
	3/23/2005	4.4	169.93	165.53
	4/27/2005	4.34	169.93	165.59
	5/25/2005	4.43	169.93	165.5
	6/22/2005	5.2	169.93	164.73
	7/26/2005	7.6	169.93	162.33
	8/29/2005	8.5	169.93	161.43
	9/19/2005	6.7	169.93	163.23
	10/21/2005	4.75	169.93	165.18
	11/21/2005	4.56	169.93	165.37
	12/27/2005	4.44	169.93	165.49
	1/23/2006	4.55	169.93	165.38
	2/23/2006	6.11	169.93	163.82
	3/15/2006	4.9	169.93	165.03
	4/27/2006	4.74	169.93	165.19
	5/25/2006	4.8	169.93	165.13
	6/13/2006	4.42	169.93	165.51
	7/26/2006	5.02	169.93	164.91
	8/16/2006	6.3	169.93	163.63
	9/13/2006	6.12	169.93	163.81
	10/19/2006	4.44	169.93	165.49
	11/21/2006	4.51	169.93	165.42
	12/7/2006	4.81	169.93	165.12
	1/24/2007	5.28	169.93	164.65
	2/22/2007	5.98	169.93	163.95
	3/21/2007	4.4	169.93	165.53
	4/26/2007	4.6	169.93	165.33
	5/16/2007	5.3	169.93	164.63
	6/20/2007	6.69	169.93	163.24
	7/25/2007	6.53	169.93	163.4
	8/16/2007	8.01	169.93	161.92
	9/11/2007	9.5	169.93	160.43
	10/24/2007	7.8	169.93	162.13

WELL	DATE	Water Depth	MP Elev	Water Elev
	11/27/2007	4.23	169.93	165.7
	12/18/2007	4.5	169.93	165.43
	5/19/2008	5.37	169.93	164.56
	7/29/2008	5.97	169.93	163.96
	11/6/2014	4.52	169.93	165.41
P-04-10A				
	1/4/2005	8.4	169.94	161.54
	2/21/2005	8.2	169.94	161.74
	3/23/2005	8.35	169.94	161.59
	4/27/2005	8.04	169.94	161.9
	5/25/2005	8.13	169.94	161.81
	6/22/2005	8.2	169.94	161.74
	7/26/2005	10.4	169.94	159.54
	8/29/2005	11.3	169.94	158.64
	9/19/2005	9.75	169.94	160.19
	10/21/2005	8.2	169.94	161.74
	11/21/2005	7.91	169.94	162.03
	12/27/2005	8.18	169.94	161.76
	1/23/2006	8.08	169.94	161.86
	2/23/2006	8.86	169.94	161.08
	3/15/2006	8.42	169.94	161.52
	4/27/2006	8.32	169.94	161.62
	5/25/2006	8.21	169.94	161.73
	6/13/2006	8.02	169.94	161.92
	7/26/2006	8.35	169.94	161.59
	8/16/2006	9.1	169.94	160.84
	9/13/2006	8.96	169.94	160.98
	10/19/2006	8.2	169.94	161.74
	11/21/2006	8	169.94	161.94
	12/7/2006	8.1	169.94	161.84
	1/24/2007	8.5	169.94	161.44
	2/22/2007	9.1	169.94	160.84
	3/21/2007	8.05	169.94	161.89
	4/26/2007	8.1	169.94	161.84
	5/16/2007	8.5	169.94	161.44
	6/20/2007	9.35	169.94	160.59
	7/25/2007	9.3	169.94	160.64
	8/16/2007	10.37	169.94	159.57
	9/11/2007	12.1	169.94	157.84
	10/24/2007	10.52	169.94	159.42
	11/27/2007	8.15	169.94	161.79
	12/18/2007	8.9	169.94	161.04
	5/19/2008	8.65	169.94	161.29
	7/29/2008	8.92	169.94	161.02
	11/6/2014	8.16	169.94	161.78
P-04-10B				
	1/4/2005	5.64	169.9	164.26
	2/21/2005	5.2	169.9	164.7
	3/23/2005	F		
	4/27/2005	5.1	169.9	164.8
	5/25/2005	5.14	169.9	164.76
	6/22/2005	5.12	169.9	164.78
	7/26/2005	7.86	169.9	162.04
	8/29/2005	8.91	169.9	160.99
	9/19/2005	6.55	169.9	163.35
	10/21/2005	5.6	169.9	164.3
	11/21/2005	5.31	169.9	164.59
	12/27/2005	5.3	169.9	164.6
	1/23/2006	5.11	169.9	164.79
	2/23/2006	7.2	169.9	162.7
	3/15/2006	5.55	169.9	164.35
	4/27/2006	5.48	169.9	164.42
	5/25/2006	5.45	169.9	164.45
	6/13/2006	5.08	169.9	164.82
	7/26/2006	5.4	169.9	164.5
	8/16/2006	6.81	169.9	163.09
	9/13/2006	6.3	169.9	163.6
	10/19/2006	5	169.9	164.9
	11/21/2006	5.2	169.9	164.7
	12/7/2006	5.35	169.9	164.55
	1/24/2007	6.25	169.9	163.65
	2/22/2007	7.45	169.9	162.45
	3/21/2007	5.1	169.9	164.8
	4/26/2007	5.35	169.9	164.55
	5/16/2007	5.7	169.9	164.2
	6/20/2007	6.93	169.9	162.97
	7/25/2007	6.6	169.9	163.3
	8/16/2007	8.02	169.9	161.88
	9/11/2007	9.7	169.9	160.2
	10/24/2007	7.59	169.9	162.31
	11/27/2007	5.4	169.9	164.5
	12/18/2007	6.8	169.9	163.1
	5/19/2008	6.2	169.9	163.7
	7/29/2008	6.39	169.9	163.51
	11/6/2014	5.47	169.9	164.43
P-04-11A				
	1/4/2005	8.94	187.08	178.14
	2/21/2005	9.12	187.08	177.96
	3/24/2005	8.47	187.08	178.61
	4/27/2005	8.41	187.08	178.67
	5/25/2005	8.49	187.08	178.59
	6/22/2005	9	187.08	178.08
	7/26/2005	12.3	187.08	174.78
	8/29/2005	13.6	187.08	173.48
	9/19/2005	12.7	187.08	174.38
	10/21/2005	9.1	187.08	177.98
	11/21/2005	9.13	187.08	177.95
	12/27/2005	9.03	187.08	178.05
	1/23/2006	8.56	187.08	178.52
	2/23/2006	F		
	3/15/2006	9.54	187.08	177.54
	4/27/2006	8.95	187.08	178.13
	5/25/2006	8.87	187.08	178.21
	6/13/2006	8.55	187.08	178.53
	7/26/2006	8.68	187.08	178.4
	8/16/2006	10	187.08	177.08
	9/13/2006	9.9	187.08	177.18
	10/19/2006	8.75	187.08	178.33
	11/21/2006	8.5	187.08	178.58
	12/7/2006	8.6	187.08	178.48
	1/24/2007	9.2	187.08	177.88
	2/22/2007	11	187.08	176.08
	3/21/2007	8.4	187.08	178.68
	4/26/2007	8.6	187.08	178.48
	5/16/2007	9.22	187.08	177.86 W
	6/20/2007	11.35	187.08	175.73
	7/25/2007	11.95	187.08	175.13
	8/16/2007	11.52	187.08	175.56
	9/11/2007	16.3	187.08	170.78
	10/24/2007	17.2	187.08	169.88
	11/27/2007	9	187.08	178.08
	12/18/2007	9.2	187.08	177.88
	5/19/2008	10	187.08	177.08
	7/29/2008	10.52	187.08	176.56
	11/6/2014	9.35	187.08	177.73
P-04-11B				
	1/4/2005	F		
	2/21/2005	F		

WELL	DATE	Water Depth	MP Elev	Water Elev
	3/24/2005	F		
	4/27/2005	3.31	187.14	183.83
	5/25/2005	3.27	187.14	183.87
	6/22/2005	3.5	187.14	183.64
	7/26/2005	6.2	187.14	180.94
	8/29/2005	7.5	187.14	179.64
	9/19/2005	5.83	187.14	181.31
	10/21/2005	3.6	187.14	183.54
	11/21/2005	3.4	187.14	183.74
	12/27/2005	3.45	187.14	183.69
	1/23/2006	F		
	2/23/2006	10.28	187.14	176.86
	3/15/2006	F		
	4/27/2006	3.9	187.14	183.24
	5/25/2006	3.5	187.14	183.64
	6/13/2006	3.42	187.14	183.72
	7/26/2006	3.41	187.14	183.73
	8/16/2006	4.4	187.14	182.74
	9/13/2006	4.75	187.14	182.39
	10/19/2006	3.63	187.14	183.51
	11/21/2006	3.3	187.14	183.84
	12/7/2006	3.3	187.14	183.84
	1/24/2007	F		
	2/22/2007	F		
	3/21/2007	F		
	4/26/2007	3.34	187.14	183.8
	5/16/2007	3.61	187.14	183.53 W
	6/20/2007	5.55	187.14	181.59
	7/25/2007	6.23	187.14	180.91
	8/16/2007	7.81	187.14	179.33
	9/11/2007	12.19	187.14	174.95
	10/24/2007	12.75	187.14	174.39
	11/27/2007	3.65	187.14	183.49
	12/18/2007	3.68	187.14	183.46
	5/19/2008	4.35	187.14	182.79
	7/29/2008	4.63	187.14	182.51
	11/6/2014	4.1	187.14	183.04
P-04-12A				
	1/4/2005	3.8	169.17	165.37
	2/21/2005	F		
	3/23/2005	F		
	4/27/2005	3.45	169.17	165.72
	5/25/2005	3.51	169.17	165.66
	6/22/2005	3.47	169.17	165.7
	7/26/2005	6.2	169.17	162.97
	8/29/2005	6.87	169.17	162.3
	9/19/2005	5.8	169.17	163.37
	10/21/2005	3.15	169.17	166.02
	11/21/2005	3.5	169.17	165.67
	12/27/2005	3.61	169.17	165.56
	1/23/2006	F		
	2/23/2006	F		
	3/15/2006	F		
	4/27/2006	4.45	169.17	164.72
	5/25/2006	3.9	169.17	165.27
	6/13/2006	4.12	169.17	165.05
	7/26/2006	4	169.17	165.17
	8/16/2006	4.88	169.17	164.29
	9/13/2006	4.8	169.17	164.37
	10/19/2006	3.72	169.17	165.45
	11/21/2006	3.58	169.17	165.59
	12/7/2006	3.5	169.17	165.67
	1/24/2007	4	169.17	165.17
	2/22/2007	5.98	169.17	163.19
	3/21/2007	3.7	169.17	165.47
	4/26/2007	3.7	169.17	165.47
	5/16/2007	4.1	169.17	165.07 W
	6/20/2007	5.29	169.17	163.88
	7/25/2007	5	169.17	164.17
	8/16/2007	6.8	169.17	162.37
	9/11/2007	8.6	169.17	160.57
	10/24/2007	6.7	169.17	162.47
	11/27/2007	3.4	169.17	165.77
	12/18/2007	4.08	169.17	165.09
	5/19/2008	4.3	169.17	164.87
	7/30/2008	4.61	169.17	164.56
	11/6/2014	3.8	169.17	165.37
P-04-12B				
	1/4/2005	3.7	169.27	165.57
	2/21/2005	3.82	169.27	165.45
	3/23/2005	4.4	169.27	164.87
	4/27/2005	3.43	169.27	165.84
	5/25/2005	3.48	169.27	165.79
	6/22/2005	3.27	169.27	166
	7/26/2005	5.33	169.27	163.94
	8/29/2005	5.86	169.27	163.41
	9/19/2005	6.55	169.27	162.72
	10/21/2005	4	169.27	165.27
	11/21/2005	4.1	169.27	165.17
	12/27/2005	3.7	169.27	165.57
	1/23/2006	3.51	169.27	165.76
	2/23/2006	F		
	3/15/2006	F		
	4/27/2006	3.61	169.27	165.66
	5/25/2006	3.55	169.27	165.72
	6/13/2006	3.38	169.27	165.89
	7/26/2006	4.05	169.27	165.22
	8/16/2006	4	169.27	165.27
	9/13/2006	4.3	169.27	164.97
	10/19/2006	4.3	169.27	164.97
	11/21/2006	3.6	169.27	165.67
	12/7/2006	3.56	169.27	165.71
	1/24/2007	3.6	169.27	165.67
	2/22/2007	4.2	169.27	165.07
	3/21/2007	3.53	169.27	165.74
	4/26/2007	3.41	169.27	165.86
	5/16/2007	3.63	169.27	165.64
	6/20/2007	4.32	169.27	164.95
	7/25/2007	4.85	169.27	164.42
	8/16/2007	5.71	169.27	163.56
	9/11/2007	7.12	169.27	162.15
	10/24/2007	7.61	169.27	161.66
	11/27/2007	4	169.27	165.27
	12/18/2007	3.83	169.27	165.44
	5/19/2008	3.6	169.27	165.67
	7/30/2008	4.66	169.27	164.61
	11/6/2014	5.61	169.27	163.66
P-04-12C				
	1/4/2005	F		
	2/21/2005	F		
	3/23/2005	F		
	4/27/2005	3.14	169.51	166.37
	5/25/2005	3.21	169.51	166.3
	6/22/2005	3.19	169.51	166.32
	7/26/2005	5.65	169.51	163.86
	8/29/2005	6.11	169.51	163.4
	9/19/2005	4.65	169.51	164.86
	10/21/2005	2.45	169.51	167.06
	11/21/2005	3.11	169.51	166.4
	12/27/2005	F		

WELL	DATE	Water Depth	MP Elev	Water Elev
	1/23/2006	F		
	2/23/2006	F		
	3/15/2006	F		
	4/27/2006	3.31	169.51	166.2
	5/25/2006	3.35	169.51	166.16
	6/13/2006	3	169.51	166.51
	7/26/2006	3.41	169.51	166.1
	8/16/2006	4.63	169.51	164.88
	9/13/2006	4.15	169.51	165.36
	10/19/2006	3.3	169.51	166.21
	11/21/2006	3.41	169.51	166.1
	12/7/2006	3.38	169.51	166.13
	1/24/2007	F		
	2/22/2007	F		
	3/21/2007	F		
	4/26/2007	3.32	169.51	166.19
	5/16/2007	3.3	169.51	166.21
	6/20/2007	4.48	169.51	165.03
	7/25/2007	4.13	169.51	165.38
	8/16/2007	5.9	169.51	163.61
	9/11/2007	D		
	10/24/2007	5.51	169.51	164
	11/27/2007	3	169.51	166.51
	12/18/2007	F		
	5/19/2008	3.65	169.51	165.86
	7/30/2008	3.96	169.51	165.55
	11/6/2014	3.41	169.51	166.1
P-04-13A				
	1/4/2005	5.35	147.27	141.92
	2/21/2005	5.42	147.27	141.85
	3/24/2005	6.1	147.27	141.17
	4/27/2005	5.49	147.27	141.78
	5/25/2005	5.43	147.27	141.84
	6/22/2005	5.79	147.27	141.48
	7/26/2005	6.67	147.27	140.6
	8/29/2005	7.25	147.27	140.02
	9/19/2005	8.5	147.27	138.77
	10/21/2005	5.65	147.27	141.62
	11/21/2005	6.2	147.27	141.07
	12/27/2005	5.4	147.27	141.87
	1/23/2006	5.26	147.27	142.01
	2/23/2006	5.12	147.27	142.15
	3/15/2006	5.14	147.27	142.13
	4/27/2006	1.1	147.27	146.17
	5/25/2006	3.62	147.27	143.65
	6/13/2006	3.3	147.27	143.97
	7/26/2006	4.2	147.27	143.07
	8/16/2006	1.98	147.27	145.29
	9/13/2006	2	147.27	145.27
	10/19/2006	1	147.27	146.27
	11/21/2006	1	147.27	146.27
	12/7/2006	1.1	147.27	146.17
	1/24/2007	5.1	147.27	142.17
	2/22/2007	6	147.27	141.27
	3/21/2007	5.9	147.27	141.37
	4/26/2007	3.6	147.27	143.67
	5/16/2007	4.1	147.27	143.17 W
	6/20/2007	5.44	147.27	141.83
	7/25/2007	6	147.27	141.27
	8/16/2007	7.48	147.27	139.79
	9/11/2007	9.6	147.27	137.67
	10/24/2007	8.75	147.27	138.52
	11/27/2007	4	147.27	143.27
	12/18/2007	4.15	147.27	143.12
	5/19/2008	4.1	147.27	143.17
	7/29/2008	5.1	147.27	142.17
	11/6/2014	4.61	147.27	142.66
P-04-13B				
	1/4/2005	4.07	147.3	143.23
	2/21/2005	4.96	147.3	142.34
	3/24/2005	3.95	147.3	143.35
	4/27/2005	3.65	147.3	143.65
	5/25/2005	3.66	147.3	143.64
	6/22/2005	3.6	147.3	143.7
	7/26/2005	6.48	147.3	140.82
	8/29/2005	7.05	147.3	140.25
	9/19/2005	7.2	147.3	140.1
	10/21/2005	4.28	147.3	143.02
	11/21/2005	3.51	147.3	143.79
	12/27/2005	4.11	147.3	143.19
	1/23/2006	3.85	147.3	143.45
	2/23/2006	4.95	147.3	142.35
	3/15/2006	4.96	147.3	142.34
	4/27/2006	3.72	147.3	143.58
	5/25/2006	3.7	147.3	143.6
	6/13/2006	3.41	147.3	143.89
	7/26/2006	4.5	147.3	142.8
	8/16/2006	4.2	147.3	143.1
	9/13/2006	4.5	147.3	142.8
	10/19/2006	3.52	147.3	143.78
	11/21/2006	3.46	147.3	143.84
	12/7/2006	3.4	147.3	143.9
	1/24/2007	4.2	147.3	143.1
	2/22/2007	4.75	147.3	142.55
	3/21/2007	3.92	147.3	143.38
	4/26/2007	3.6	147.3	143.7
	5/16/2007	4.22	147.3	143.08 W
	6/20/2007	5.48	147.3	141.82
	7/25/2007	6	147.3	141.3
	8/16/2007	7.7	147.3	139.6
	9/11/2007	9.7	147.3	137.6
	10/24/2007	8.7	147.3	138.6
	11/27/2007	3.9	147.3	143.4
	12/18/2007	4.38	147.3	142.92
	5/19/2008	4.2	147.3	143.1
	7/29/2008	5.09	147.3	142.21
	11/6/2014	4	147.3	143.3
P-04-13C				
	1/4/2005	F		
	2/21/2005	F		
	3/24/2005	F		
	4/27/2005	3.47	147.93	144.46
	5/25/2005	3.53	147.93	144.4
	6/22/2005	3.48	147.93	144.45
	7/26/2005	5.16	147.93	142.77
	8/29/2005	5.62	147.93	142.31
	9/19/2005	4.51	147.93	143.42
	10/21/2005	2.25	147.93	145.68
	11/21/2005	3.55	147.93	144.38
	12/27/2005	F		
	1/23/2006	F		
	2/23/2006	F		
	3/15/2006	F		
	4/27/2006	3.64	147.93	144.29
	5/25/2006	3.7	147.93	144.23
	6/13/2006	3.56	147.93	144.37
	7/26/2006	4.35	147.93	143.58
	8/16/2006	3.98	147.93	143.95
	9/13/2006	4.53	147.93	143.4
	10/19/2006	3.5	147.93	144.43

WELL	DATE	Water Depth	MP Elev	Water Elev
	11/21/2006	3.4	147.93	144.53
	12/7/2006	3.38	147.93	144.55
	1/24/2007	F		
	2/22/2007	F		
	3/21/2007	F		
	4/26/2007	3.41	147.93	144.52
	5/16/2007	3.8	147.93	144.13
	6/20/2007	4.36	147.93	143.57
	7/25/2007	4.05	147.93	143.88
	8/16/2007	7.48	147.93	140.45
	9/11/2007	6.91	147.93	141.02
	10/24/2007	4.5	147.93	143.43
	11/27/2007	3.68	147.93	144.25
	12/18/2007	3.92	147.93	144.01
	5/19/2008	3.96	147.93	143.97
	7/29/2008	3.99	147.93	143.94
	11/6/2014	3.82	147.93	144.11
P-04-14A				
	1/4/2005	F		
	2/21/2005	F		
	3/24/2005	F		
	4/27/2005	1.01	153.26	152.25
	5/25/2005	1.13	153.26	152.13
	6/22/2005	2.24	153.26	151.02
	7/26/2005	2.85	153.26	150.41
	8/29/2005	3.43	153.26	149.83
	9/19/2005	4.75	153.26	148.51
	10/21/2005	2	153.26	151.26
	11/21/2005	1.1	153.26	152.16
	12/27/2005	F		
	1/23/2006	F		
	2/23/2006	F		
	3/15/2006	F		
	4/27/2006	2.22	153.26	151.04
	5/25/2006	1.4	153.26	151.86
	6/13/2006	2.11	153.26	151.15
	7/26/2006	1.8	153.26	151.46
	8/16/2006	3.1	153.26	150.16
	9/13/2006	3.2	153.26	150.06
	10/19/2006	2.15	153.26	151.11
	11/21/2006	2.02	153.26	151.24
	12/7/2006	2	153.26	151.26
	1/24/2007	F		
	2/22/2007	F		
	3/21/2007	F		
	4/26/2007	2.6	153.26	150.66
	5/16/2007	2.65	153.26	150.61
	6/20/2007	3.1	153.26	150.16
	7/25/2007	3.15	153.26	150.11
	8/16/2007	7.41	153.26	145.85
	9/11/2007	9.28	153.26	143.98
	10/24/2007	7.63	153.26	145.63
	11/27/2007	1.5	153.26	151.76
	12/18/2007	F		
	5/19/2008	3.5	153.26	149.76
	7/30/2008	2.63	153.26	150.63
	11/6/2014	2.05	153.26	151.21
P-04-14B				
	1/4/2005	F		
	2/21/2005	F		
	3/24/2005	F		
	4/27/2005	1.15	153.28	152.13
	5/25/2005	2.21	153.28	151.07
	6/22/2005	1.5	153.28	151.78
	7/26/2005	1.76	153.28	151.52
	8/29/2005	2.11	153.28	151.17
	9/19/2005	4	153.28	149.28
	10/21/2005	1.45	153.28	151.83
	11/21/2005	2.27	153.28	151.01
	12/27/2005	F		
	1/23/2006	F		
	2/23/2006	F		
	3/15/2006	F		
	4/27/2006	3.05	153.28	150.23
	5/25/2006	2.61	153.28	150.67
	6/13/2006	2.85	153.28	150.43
	7/26/2006	2.65	153.28	150.63
	8/16/2006	3.75	153.28	149.53
	9/13/2006	3.97	153.28	149.31
	10/19/2006	2.95	153.28	150.33
	11/21/2006	2.78	153.28	150.5
	12/7/2006	2.7	153.28	150.58
	1/24/2007	F		
	2/22/2007	F		
	3/21/2007	F		
	4/26/2007	2.95	153.28	150.33
	5/16/2007	3.6	153.28	149.68
	6/20/2007	3.85	153.28	149.43
	7/25/2007	3.85	153.28	149.43
	8/16/2007	8.52	153.28	144.76
	9/11/2007	10.13	153.28	143.15
	10/24/2007	4.63	153.28	148.65
	11/27/2007	2.2	153.28	151.08
	12/18/2007	F		
	5/19/2008	4.1	153.28	149.18
	7/30/2008	3.13	153.28	150.15
	11/6/2014	2.76	153.28	150.52
P-06-01				
	3/1/2006	13.43	201.84	188.41
	4/27/2006	D		
	5/25/2006	D		
	6/13/2006	17.82	201.84	184.02
	7/26/2006	D		
	8/16/2006	D		
	9/13/2006	D		
	10/19/2006	D		
	11/21/2006	17.13	201.84	184.71
	12/7/2006	D		
	1/24/2007	D		
	2/22/2007	D		
	3/21/2007	D		
	4/26/2007	D		
	5/16/2007	D		
	6/20/2007	D		
	7/25/2007	D		
	8/16/2007	D		
	9/11/2007	D		
	10/24/2007	D		
	11/27/2007	D		
	12/18/2007	D		
	5/19/2008	D		
	7/30/2008	D		
P-06-04A				
	2/28/2006	12.33	189.06	176.73
	3/1/2006	12.43	189.06	176.63
	5/25/2006	11.42	189.06	177.64
	6/13/2006	9.6	189.06	179.46
	7/26/2006	32.28	189.06	156.78

WELL	DATE	Water Depth	MP Elev	Water Elev
	8/16/2006	11.87	189.06	177.19
	9/13/2006	13.9	189.06	175.16
	10/19/2006	14.11	189.06	174.95
	11/21/2006	9.45	189.06	179.61
	12/7/2006	9.4	189.06	179.66
	1/24/2007	13.03	189.06	176.03
	2/22/2007	14.1	189.06	174.96
	3/21/2007	15.2	189.06	173.86
	4/26/2007	9.63	189.06	179.43
	5/16/2007	11.65	189.06	177.41 W
	6/20/2007	13.82	189.06	175.24
	7/25/2007	15.5	189.06	173.56
	8/16/2007	16.42	189.06	172.64
	9/11/2007	31.1	189.06	157.96
	10/24/2007	18.8	189.06	170.26
	11/27/2007	13.3	189.06	175.76
	12/18/2007	13.45	189.06	175.61
	5/19/2008	11.2	189.06	177.86
	7/30/2008	15.49	189.06	173.57
	11/6/2014	DE		
P-06-04B				
	2/28/2006	16.94	189.17	172.23
	3/1/2006	17.04	189.17	172.13
	4/27/2006	15.55	189.17	173.62
	5/25/2006	15.1	189.17	174.07
	6/13/2006	14.4	189.17	174.77
	7/26/2006	15.1	189.17	174.07
	8/16/2006	15.3	189.17	173.87
	9/13/2006	15.81	189.17	173.36
	10/19/2006	15.7	189.17	173.47
	11/21/2006	14.5	189.17	174.67
	12/7/2006	14.52	189.17	174.65
	1/24/2007	15.5	189.17	173.67
	2/22/2007	15.75	189.17	173.42
	3/21/2007	16.12	189.17	173.05
	4/26/2007	14.5	189.17	174.67
	5/16/2007	15.4	189.17	173.77 W
	6/20/2007	15.73	189.17	173.44
	7/25/2007	D		
	8/16/2007	16.38	189.17	172.79
	9/11/2007	16.6	189.17	172.57
	10/24/2007	D		
	11/27/2007	15.45	189.17	173.72
	12/18/2007	16.23	189.17	172.94
	5/19/2008	15.4	189.17	173.77
	7/30/2008	D		
	11/6/2014	DE		
P-08-03				
	11/6/2014	10.98		
P-08-03A				
	11/6/2014	4.05		166.26
P-08-03B				
	11/6/2014	4.21		166.39
P-08-04				
	7/29/2008	4.6	195.39	190.79
	11/6/2014	3.45	195.39	191.94
P-08-06				
	7/29/2008	6.4	184.89	178.49
	11/6/2014	7.62	184.89	177.27
P-08-07				
	7/29/2008	5.73	214.4	208.67
	11/6/2014	3.61	214.4	210.79
P-08-09A				
	7/31/2008	17.24	200.76	183.52
P-08-09B				
	7/31/2008	17.4	200.8	183.4
P-08-09C				
	7/31/2008	D		
P-08-10A				
	7/31/2008	21.92	204.87	182.95
P-08-10B				
	7/31/2008	22.1	204.98	182.88
P-08-10C				
	7/31/2008	5.18	205.08	199.9
P-08-3A				
	7/30/2008	5.3	171.56	166.26
P-08-3B				
	7/30/2008	5.36	171.75	166.39
P-201A				
	5/19/2008	1.65	149.55	147.9
	7/30/2008	0	149.55	149.55
	10/29/2008	F1		
	10/27/2009	F1		
	10/19/2010	2.46	149.55	147.09
	10/25/2011	1.92	149.55	147.63
	10/23/2012	1.8	149.55	147.75
	10/30/2013	2.65	149.55	146.9
	10/21/2014	2.99	149.55	146.56
	11/6/2014	2.28	149.55	147.27
P-201B				
	5/19/2008	0	152.18	152.18
	7/30/2008	2.8	152.18	149.38
	10/27/2009	F1		
	10/19/2010	F1		
	10/25/2011	0.05	152.18	152.13
	10/23/2012	F1		
	10/30/2013	0	152.18	152.18
	10/21/2014	F1		
	11/6/2014	0.62	152.18	151.56
P-201C				

WELL	DATE	Water Depth	MP Elev	Water Elev
	5/19/2008	0	152.19	152.19
	7/30/2008	1.68	152.19	150.51
	10/27/2009	2.45	152.19	149.74
	10/19/2010	2.29	152.19	149.9
	10/25/2011	2.25	152.19	149.94
	10/23/2012	F1		
	10/30/2013	2.2	152.19	149.99
	10/21/2014	3.76	152.19	148.43
	11/6/2014	F1		
P-201D				
	5/19/2008	0.35	151.33	150.98
	7/30/2008	0.2	151.33	151.13
	10/27/2009	0.05	151.33	151.28
	10/19/2010	0.7	151.33	150.63
	10/25/2011	F1		
	10/23/2012	3.1	151.33	148.23
	10/30/2013	2.57	151.33	148.76
	10/21/2014	3.02	151.33	148.31
	11/6/2014	2.14	151.33	149.19
P-201E				
	5/19/2008	0	152.26	152.26
	7/30/2008	A		
	10/27/2009	2.2	152.26	150.06
	10/19/2010	F1		
	10/25/2011	F1		
	10/23/2012	F1		
	10/30/2013	1.11	152.26	151.15
	10/21/2014	2.04	152.26	150.22
	11/6/2014	F1		
P-202A				
	5/9/2005	1.02	149.38	148.36
	5/19/2008	1	149.38	148.38
	7/30/2008	1.58	149.38	147.8
	10/27/2009	2.55	149.38	146.83
	10/19/2010	3.1	149.38	146.28
	10/26/2011	1.98	149.38	147.4
	10/22/2012	2.1	149.38	147.28
	10/28/2013	2.2	149.38	147.18
	10/20/2014	3.16	149.38	146.22
	11/6/2014	2.2	149.38	147.18
P-202B				
	5/9/2005	0.05	149.37	149.32
	5/19/2008	2	149.37	147.37
	7/30/2008	2.41	149.37	146.96
	10/27/2009	2.2	149.37	147.17
	10/19/2010	2.35	149.37	147.02
	10/26/2011	2.9	149.37	146.47
	10/22/2012	2.25	149.37	147.12
	10/28/2013	2.25	149.37	147.12
	10/20/2014	2.29	149.37	147.08
	11/6/2014	2.75	149.37	146.62
P-203A				
	5/12/2005	4.81	213.16	208.35
	5/19/2008	DE		
	11/6/2014	DE		
P-203B				
	5/12/2005	12.31	213.93	201.62
	5/19/2008	DE		
	11/6/2014	DE		
P-204				
	5/9/2005	A		
	11/6/2014	DE		
P-204A				
	11/6/2014	DE		
P-205A				
	5/12/2005	12.34	207.27	194.93
	5/21/2008	L		
	7/31/2008	9.52	207.27	197.75
	11/6/2014	DE		
P-205B				
	5/12/2005	5.83	207.05	201.22
	5/21/2008	L		
	7/31/2008	8.1	207.05	198.95
	11/6/2014	DE		
P-206A				
	7/31/2013	21.7	204.51	182.81
	10/28/2013	22.9	204.51	181.61
	4/21/2014	19.9	204.51	184.61
	7/28/2014	21.8	204.51	182.71
	10/20/2014	25.7	204.51	178.81
P-209A				
	5/21/2008	L		
	7/30/2008	L		
	10/27/2009	3.85	178.79	174.94
	10/19/2010	6.58	178.79	172.21
	10/25/2011	F1		
	10/23/2012	F1		
	10/29/2013	9.3	178.79	169.49
	10/21/2014	22.21	178.79	156.58
	11/6/2014	3.25	178.79	175.54

WELL	DATE	Water Depth	MP Elev	Water Elev
P-209B				
	5/21/2008	L		
	7/30/2008	L		
	10/27/2009	4.25	178.82	174.57
	10/19/2010	6.85	178.82	171.97
	10/25/2011	0.15	178.82	178.67
	10/23/2012	F1		
	10/29/2013	9.4	178.82	169.42
	10/21/2014	22.35	178.82	156.47
	11/6/2014	4.28	178.82	174.54
P-209C				
	5/21/2008	L		
	7/30/2008	L		
	10/27/2009	D		
	10/19/2010	D		
	10/25/2011	3.15	178.88	175.73
	10/23/2012	3.2	178.88	175.68
	10/29/2013	12.61	178.88	166.27
	10/21/2014	D		
	11/6/2014	D		
P-211A				
	5/12/2005	D		
	5/21/2008	D		
	7/30/2008	5.87	183.57	177.7
	10/27/2009	5.5	183.57	178.07
	10/18/2010	6	183.57	177.57
	10/25/2011	5.4	183.57	178.17
	10/22/2012	3.8	183.57	179.77
	10/29/2013	7.4	183.57	176.17
	10/21/2014	5.5	183.57	178.07
	11/6/2014	4.21	183.57	179.36
P-211B				
	5/12/2005	21.7	183.97	162.27
	5/21/2008	20.81	183.97	163.16
	7/30/2008	6.28	183.97	177.69
	10/27/2009	6.1	183.97	177.87
	10/18/2010	6.4	183.97	177.57
	10/25/2011	6.1	183.97	177.87
	10/22/2012	4.3	183.97	179.67
	10/29/2013	7.8	183.97	176.17
	10/21/2014	5.7	183.97	178.27
	11/6/2014	4.36	183.97	179.61
P-213				
	7/31/2008	1.1	184.34	183.24
	11/6/2014	DE		
P-214A				
	2/21/2005	5.29	192.31	187.02
	5/9/2005	2.83	192.31	189.48
	5/21/2008	2.6	192.31	189.71
	7/31/2008	5.51	192.31	186.8
	10/27/2009	!		
	10/18/2010	!		
	10/25/2011	!		
	11/6/2014	DE		
P-214B				
	2/21/2005	F		
	5/9/2005	F1		
	5/19/2008	2.6	192.44	189.84
	7/31/2008	9.17	192.44	183.27
	10/27/2009	!		
	10/18/2010	!		
	10/25/2011	!		
	11/6/2014	DE		
P-214C				
	2/21/2005	4.2	192.5	188.3
	5/9/2005	5.38	192.5	187.12
	5/19/2008	8.6	192.5	183.9
	7/31/2008	D		
	10/27/2009	!		
	10/18/2010	!		
	10/25/2011	!		
	11/6/2014	DE		
P-215A				
	5/12/2005	4.48	215.12	210.64
	5/19/2008	4.63	215.12	210.49
	7/31/2008	5.14	215.12	209.98
	11/6/2014	DE		
P-215B				
	5/12/2005	H4		
	5/19/2008	7.7	215.23	207.53
	7/31/2008	12.4	215.23	202.83
	11/6/2014	DE		
P-218A				
	5/12/2005	15.62	213.23	197.61
	5/19/2008	DE		
	7/31/2008	DE		
	11/6/2014	DE		
P-218B				
	5/12/2005	15.32	213.24	197.92
	5/19/2008	DE		

WELL	DATE	Water Depth	MP Elev	Water Elev
	7/31/2008	DE		
	11/6/2014	DE		
P-220A				
	1/25/2005	F1		
	5/19/2008	0	147.99	147.99
	7/30/2008	F1		
	10/27/2009	F1		
	10/18/2010	F1		
	10/26/2011	F1		
	10/22/2012	F1		
	10/28/2013	F1	147.99	147.99
	10/20/2014	F1		
	11/6/2014	F1		
P-220B				
	5/19/2008	0	148.05	148.05
	7/30/2008	F1		
	10/27/2009	F1		
	10/18/2010	F1		
	10/26/2011	F1		
	10/22/2012	F1		
	10/28/2013	F1	148.05	148.05
	10/20/2014	F1		
	11/6/2014	F1		
P-222A				
	5/12/2005	3.93	215.92	211.99
P-222B				
	5/12/2005	5.66	216.19	210.53
P-225				
	5/19/2008	L		
	7/30/2008	DE		
	11/6/2014	DE		
P-226A				
	5/12/2005	3.37	217.61	214.24
	5/19/2008	5.4	217.61	212.21
	7/31/2008	5.5	217.61	212.11
	11/6/2014	10.24	217.61	207.37
P-226B				
	5/12/2005	10.8	217.85	207.05
	5/19/2008	11.6	217.85	206.25
	7/31/2008	11.77	217.85	206.08
	11/6/2014	3.44	217.85	214.41
P-228				
	5/12/2005	4.15	217.43	213.28
P-229				
	5/12/2005	3.62	213.79	210.17
	5/19/2008	DE		
	7/30/2008	DE		
	11/6/2014	DE		
P-230				
	5/12/2005	5.12	216.83	211.71
	7/31/2008	D		
P-502A				
	5/12/2005	22.73	210.63	187.9
	7/30/2008	27.7	210.63	182.93
P-502B				
	5/12/2005	8.33	210.74	202.41
	7/30/2008	4.8	210.74	205.94
P-503A				
	5/12/2005	25.5	199.93	174.43
P-503B				
	5/12/2005	D		
P-504A				
	5/12/2005	Q		
	5/19/2008	Q		
	11/6/2014	DE		
P-504B				
	5/12/2005	Q		
	5/19/2008	Q		
	11/6/2014	DE		
P-504C				
	5/12/2005	Q		
	5/19/2008	Q		
	11/6/2014	DE		
PW08-01				
	11/6/2014	12.42		
PW08-02				
	11/6/2014	26.54		
PW08-03				
	11/6/2014	10.98		
PW08-04				
	11/6/2014	8.65		

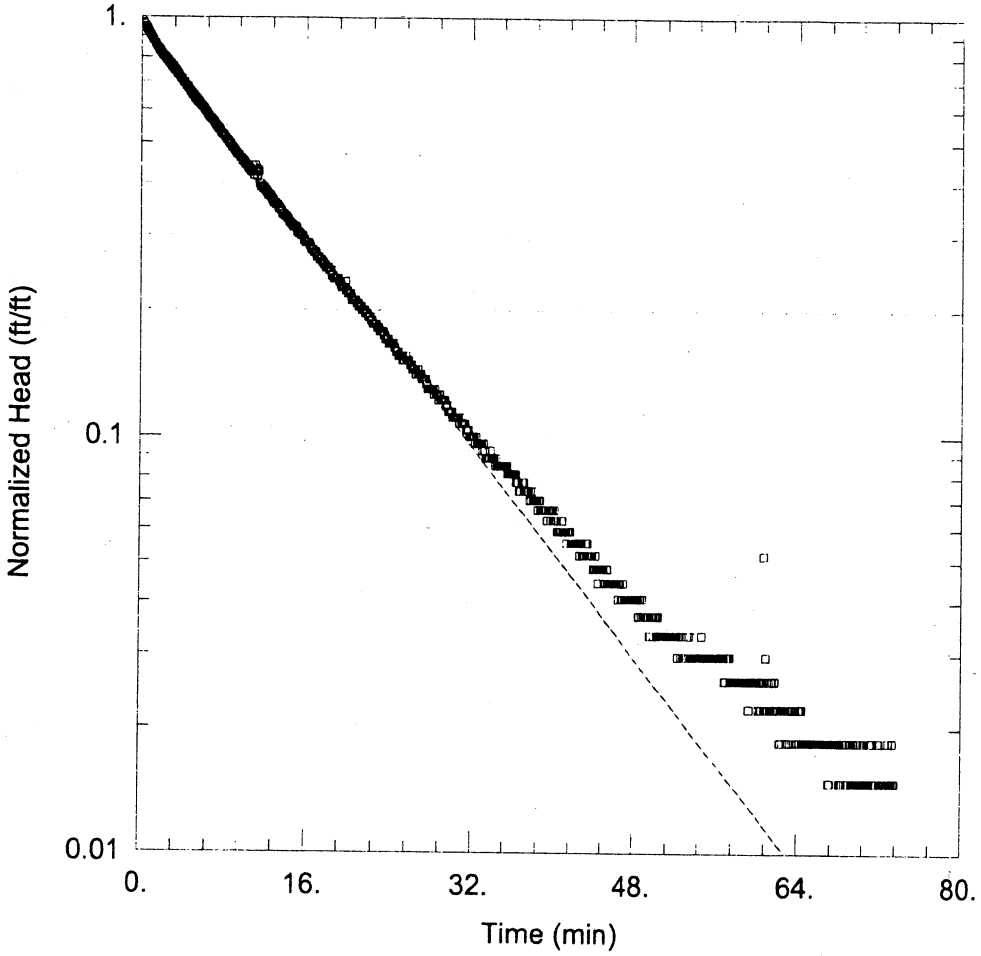
WELL DATE Water Depth MP Elev Water Elev

QUALIFIER DEFINITIONS

!	The sampling location was damaged or destroyed.
^	Artesian condition - the associated value was measured using one of several apparatus.
A	The sampling location was Inaccessible
D	The sampling location was dry.
DE	Decommissioned Location
F	The sampling location was frozen.
F1	Well was flowing
H4	Bentonite Obstruction
I	The sampling location yielded insufficient quantity to collect a sample.
L	Could not locate sampling location.
Q	An obstruction prevented the collection of data.
TOC	Measured from top of casing

APPENDIX E

IN SITU SLUG TEST RESULTS



MW-0602 SLUG TEST

Data Set: \...\MW-0602.aqt
Date: 09/27/06 Time: 14:30:31

PROJECT INFORMATION

Company: SME
Client: CASSELLA
Project: 05055.00
Location: WOTL
Test Well: MW-0602
Test Date: 4/19/06

AQUIFER DATA

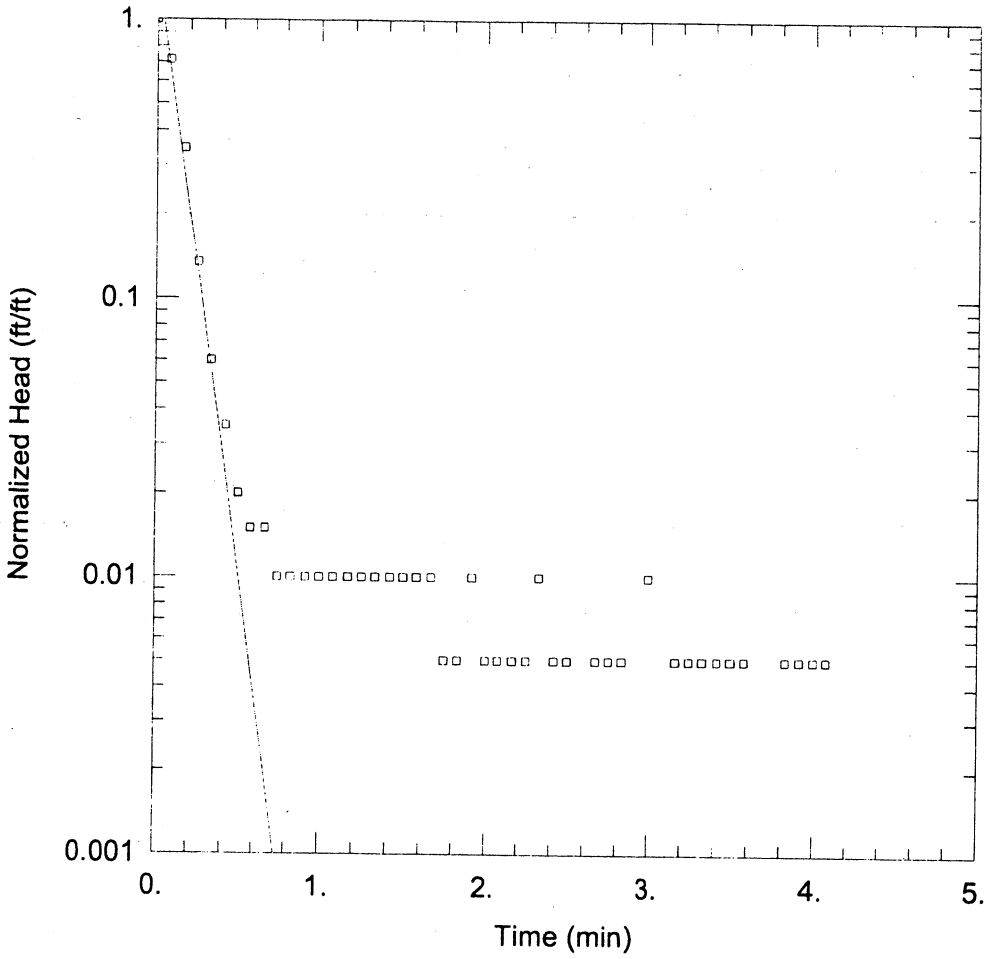
Saturated Thickness: 31.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-0602)

Initial Displacement: 2.7 ft
Total Well Penetration Depth: 31.5 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 31.5 ft
Screen Length: 11.8 ft
Wellbore Radius: 0.158 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 4.266E-5 cm/sec
y0 = 2.607 ft



MW-304A SLUG TEST

Data Set: \...\MW-304A.aqt
Date: 09/27/06 Time: 14:18:54

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: MW-304A
Test Date: 4/19/06

AQUIFER DATA

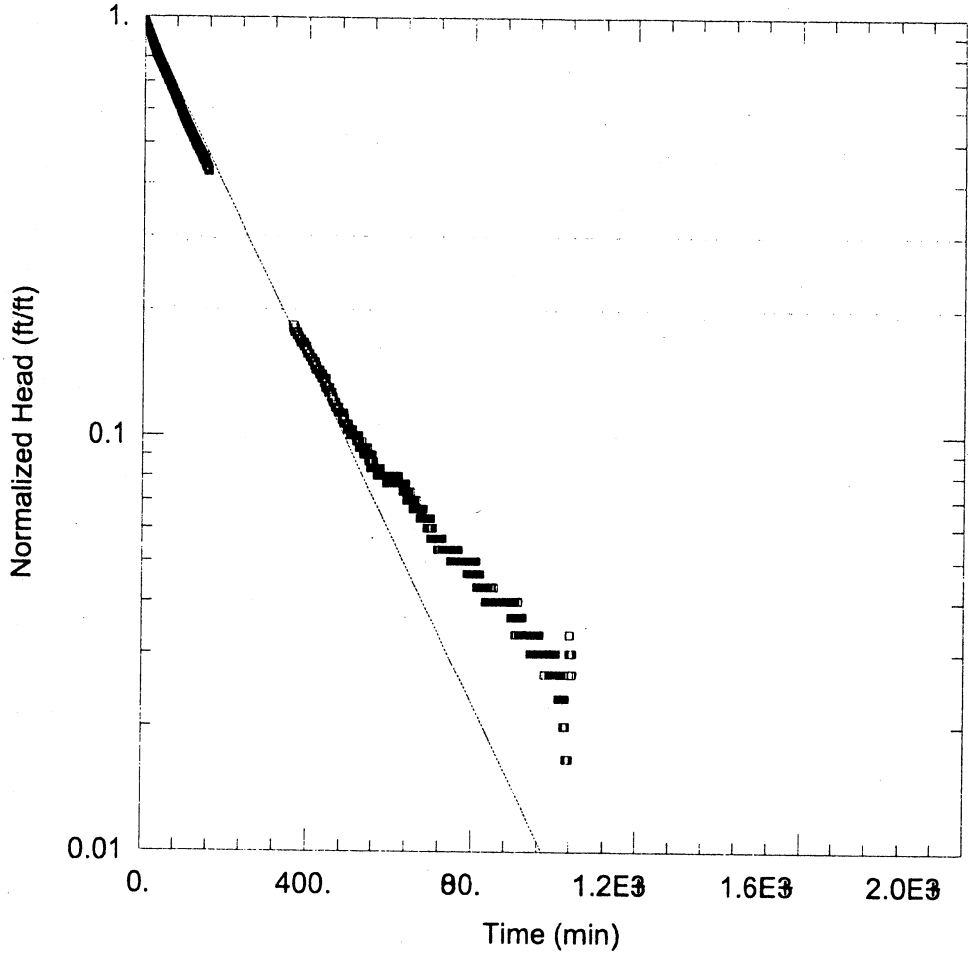
Saturated Thickness: 12.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-304A)

Initial Displacement: 2. ft
Total Well Penetration Depth: 14.6 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 14.6 ft
Screen Length: 12.5 ft
Wellbore Radius: 0.158 ft

SOLUTION

Aquifer Model: Confined
K = 0.004794 cm/sec
Solution Method: Bouwer-Rice
y0 = 2.864 ft



OW-0605 SLUG TEST

Data Set: \...\OW-0605.aqt
Date: 09/27/06 Time: 13:40:18

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: OW-0605
Test Date: 4/19/06

AQUIFER DATA

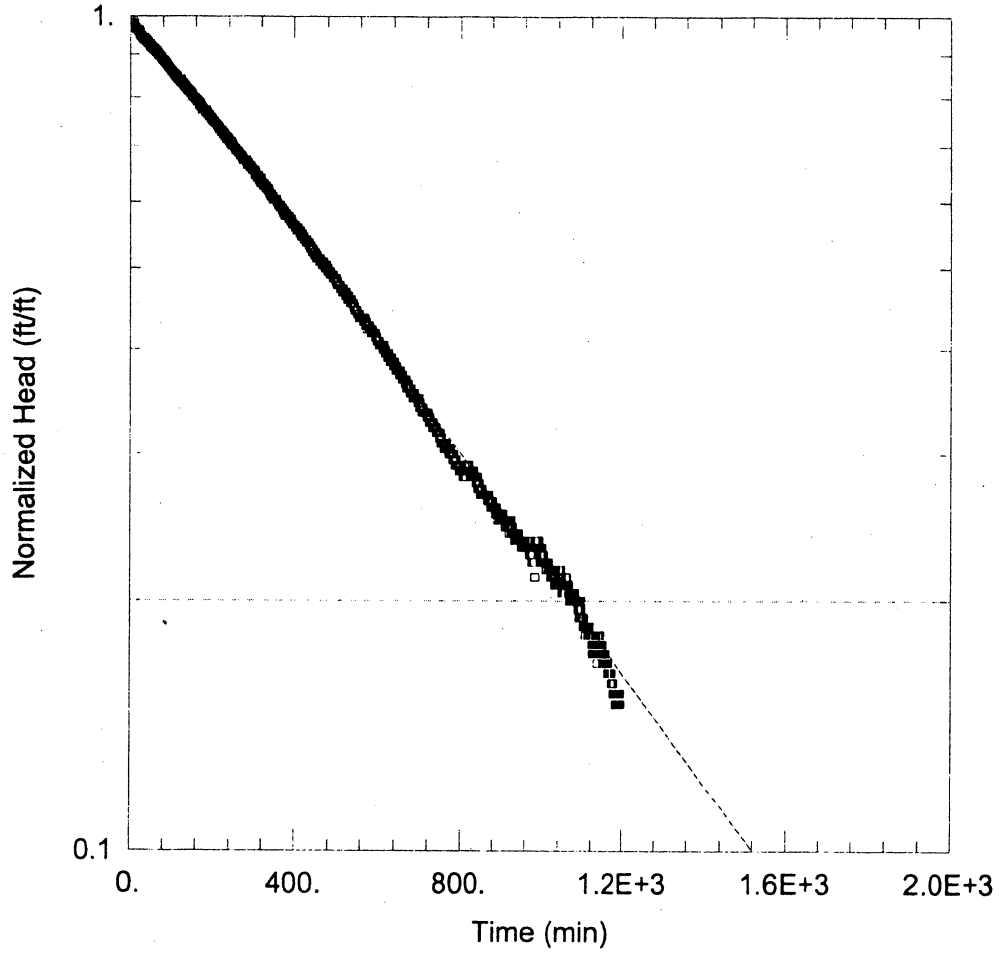
Saturated Thickness: 12.8 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-0605)

Initial Displacement: 3. ft
Total Well Penetration Depth: 32.8 ft
Casing Radius: 0.083 ft
Static Water Column Height: 32.8 ft
Screen Length: 12.8 ft
Wellbore Radius: 0.158 ft

SOLUTION

Aquifer Model: Confined
K = 2.58E-6 cm/sec
Solution Method: Bouwer-Rice
y0 = 2.99 ft



OW-0606 SLUG TEST

Data Set: \...\OW-0606.aqt
Date: 09/27/06 Time: 13:41:43

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: OW-0606
Test Date: 4/19/06

AQUIFER DATA

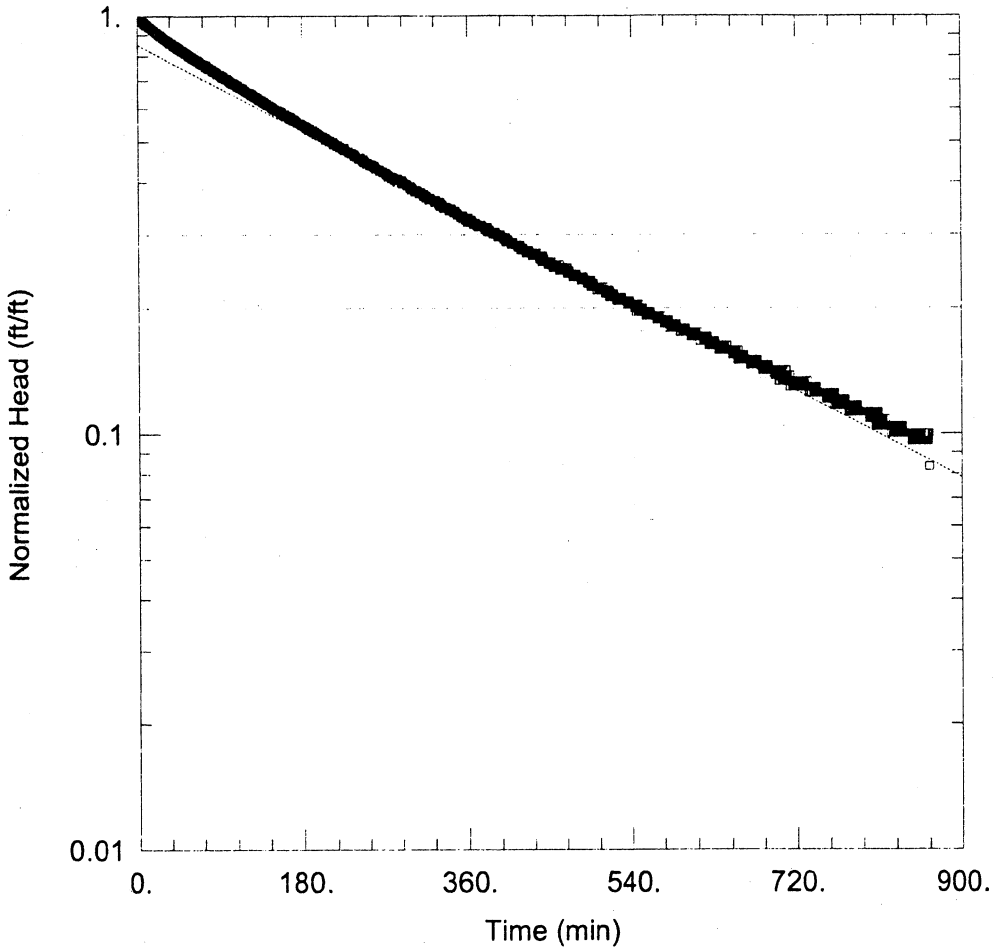
Saturated Thickness: 12.8 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-0606)

Initial Displacement: 2.2 ft
Total Well Penetration Depth: 34.4 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 34.4 ft
Screen Length: 12.8 ft
Wellbore Radius: 0.158 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 8.407E-7 cm/sec
y0 = 2.246 ft



OW-0607 SLUG TEST

Data Set: \...\OW-0607.aqt
Date: 09/27/06 Time: 13:43:49

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: OW-0607
Test Date: 4/19/06

AQUIFER DATA

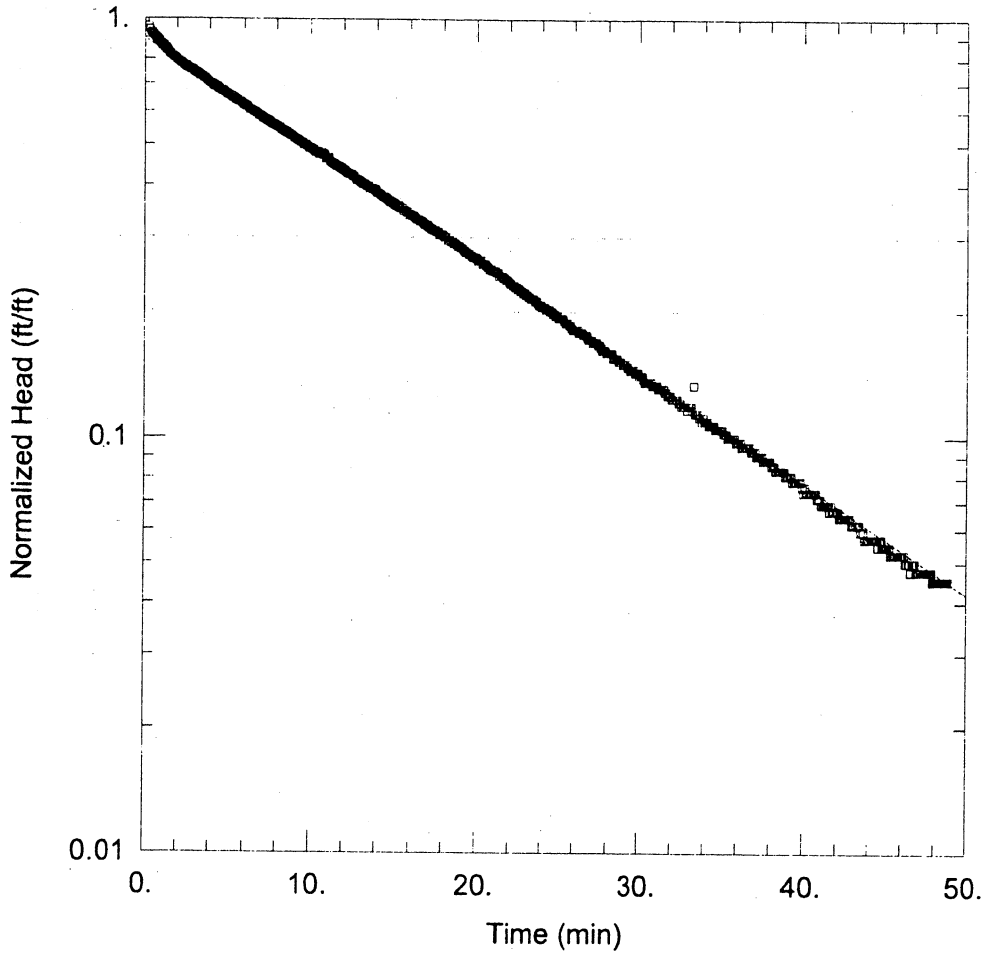
Saturated Thickness: 12.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-0607)

Initial Displacement: 2.4 ft
Total Well Penetration Depth: 30.2 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 30.2 ft
Screen Length: 12.5 ft
Wellbore Radius: 0.158 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 1.463E-6 cm/sec
y0 = 2.047 ft



OW-0608 SLUG TEST

Data Set: \...\OW-0608.aqt
Date: 09/27/06 Time: 13:46:11

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: OW-0608
Test Date: 4/19/06

AQUIFER DATA

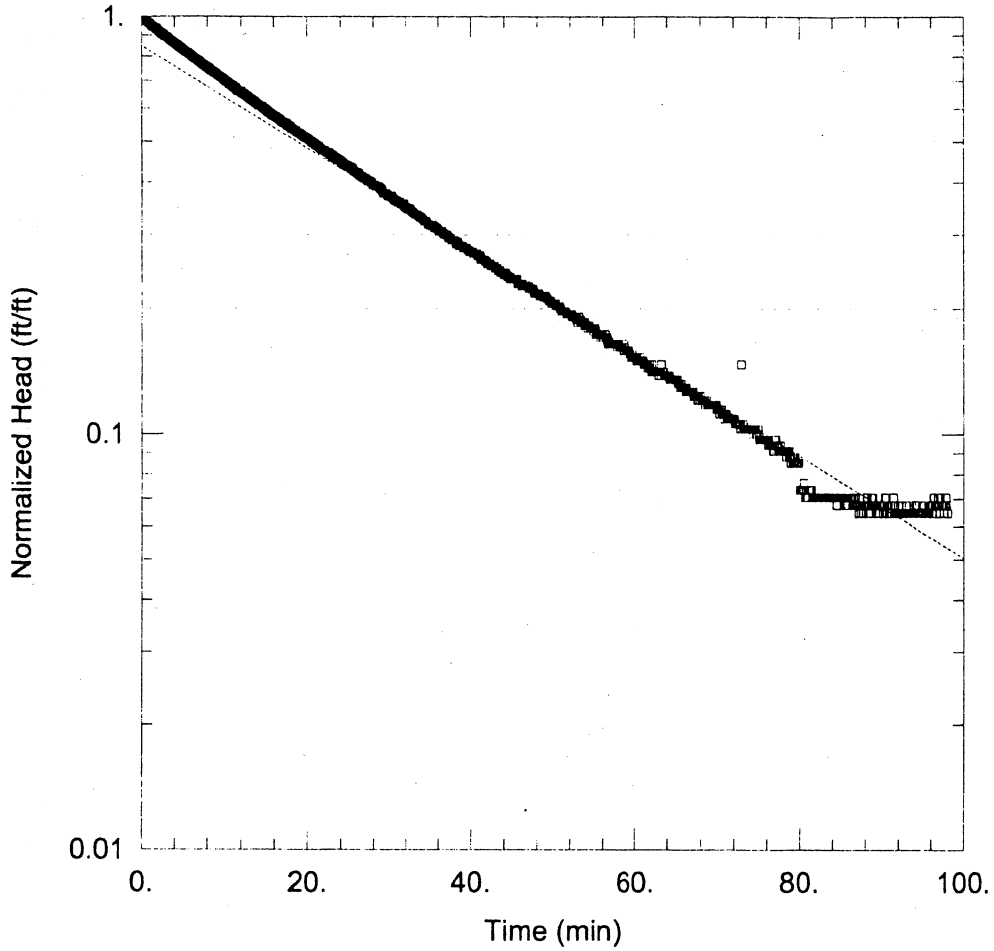
Saturated Thickness: 12.8 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-0608)

Initial Displacement: 4.2 ft
Total Well Penetration Depth: 32.3 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 32.3 ft
Screen Length: 12.8 ft
Wellbore Radius: 0.158 ft

SOLUTION

Aquifer Model: Confined
K = 3.337E-5 cm/sec
Solution Method: Bouwer-Rice
y0 = 3.769 ft



OW-0609 SLUG TEST

Data Set: \...\OW-0609.aqt
Date: 09/27/06 Time: 13:47:23

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: OW-0609
Test Date: 4/19/06

AQUIFER DATA

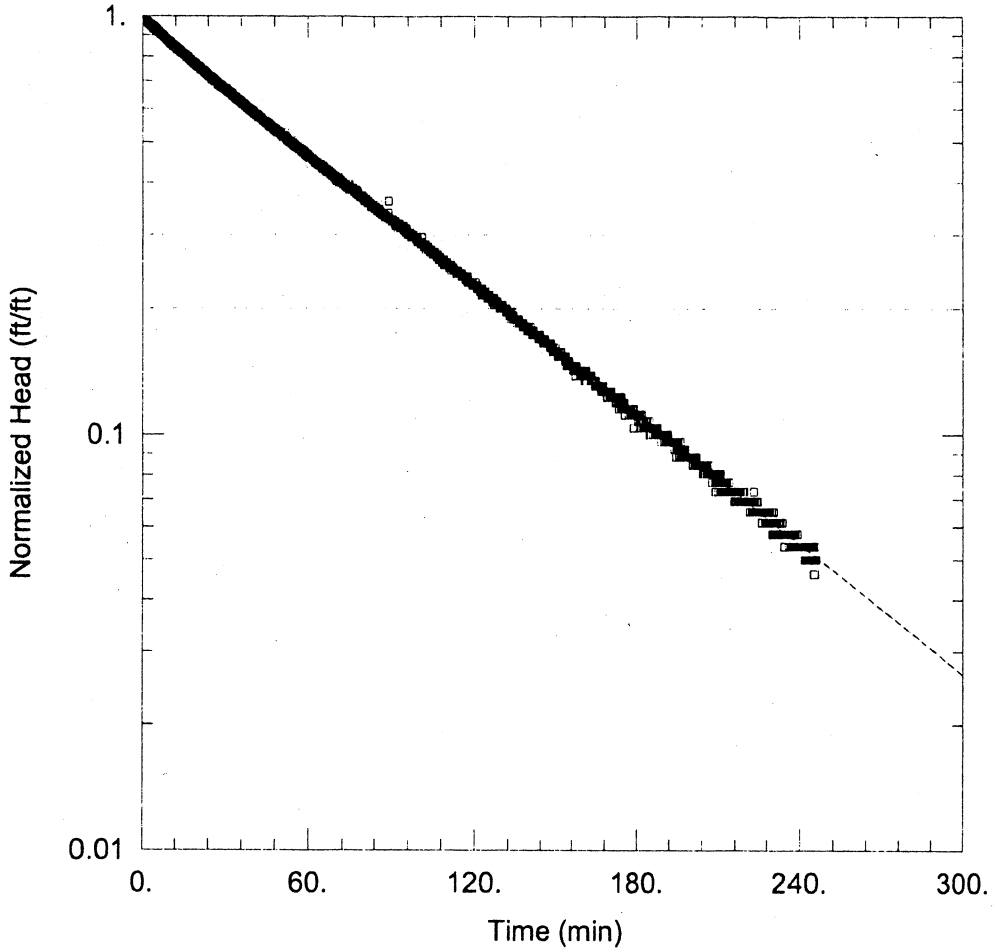
Saturated Thickness: 12.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-0609)

Initial Displacement: 3.4 ft
Total Well Penetration Depth: 35.5 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 35.5 ft
Screen Length: 12.2 ft
Wellbore Radius: 0.158 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 1.634E-5 cm/sec
y0 = 2.886 ft



OW-0610 SLUG TEST

Data Set: \...\OW-0610.aqt
Date: 09/27/06 Time: 13:48:11

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: OW-0610
Test Date: 4/19/06

AQUIFER DATA

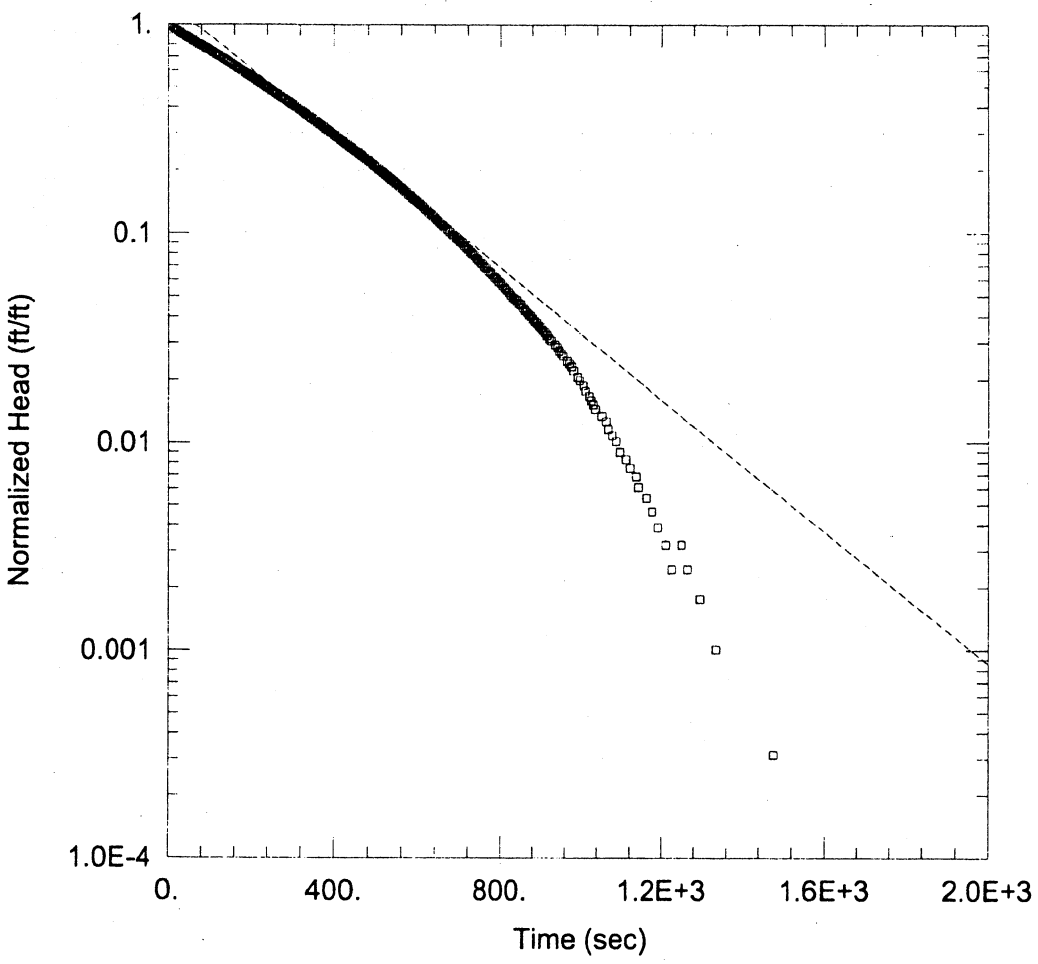
Saturated Thickness: 13.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-0610)

Initial Displacement: 2.6 ft
Total Well Penetration Depth: 40.4 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 40.4 ft
Screen Length: 13.1 ft
Wellbore Radius: 0.158 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 6.666E-6 cm/sec
y0 = 2.577 ft



P-04-06A SLUG TEST

Data Set: \...\P-04-06A.aqt
Date: 09/27/06 Time: 13:51:06

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-06A
Test Date: 10/26/04

AQUIFER DATA

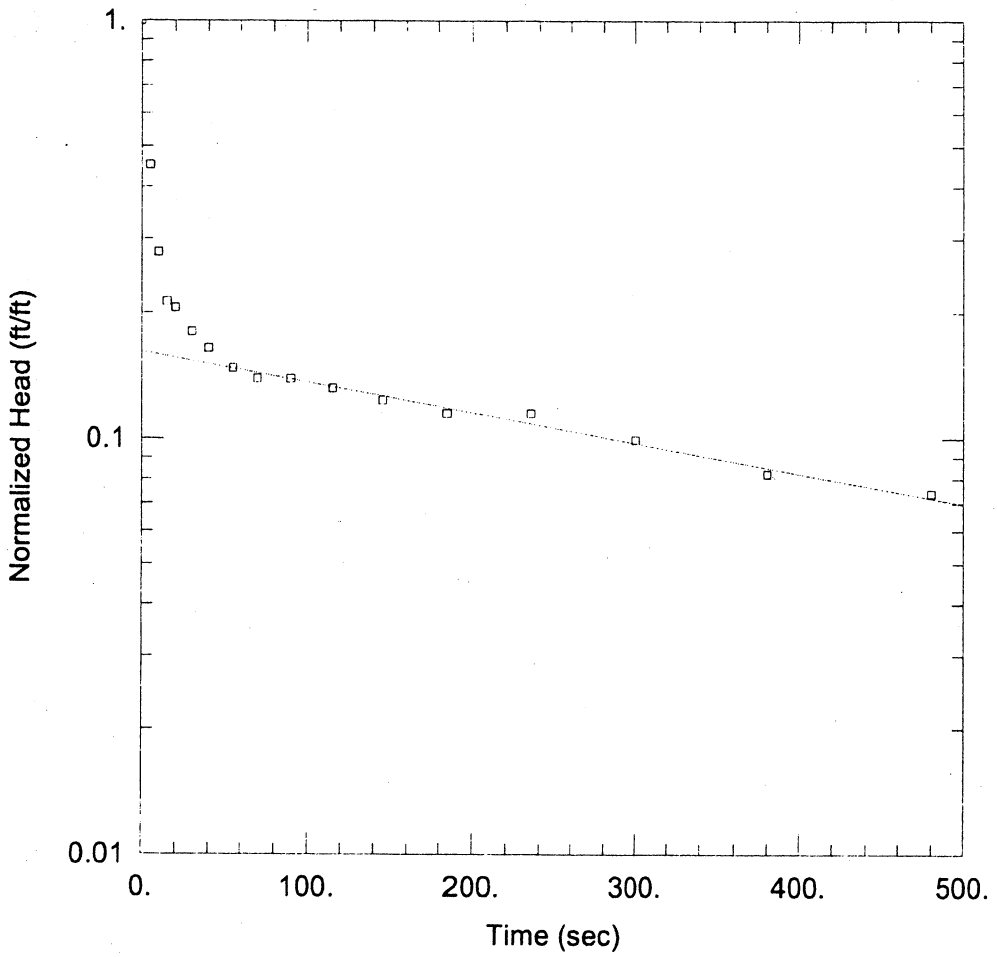
Saturated Thickness: 3.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-06A)

Initial Displacement: 15.88 ft
Total Well Penetration Depth: 15.4 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 25.44 ft
Screen Length: 3.5 ft
Wellbore Radius: 0.158 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 4.893E-5 cm/sec
y0 = 20.21 ft



P-04-07A SLUG TEST

Data Set: \...\P-04-07A.aqt
Date: 09/27/06 Time: 14:37:58

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-07A
Test Date: 10/26/04

AQUIFER DATA

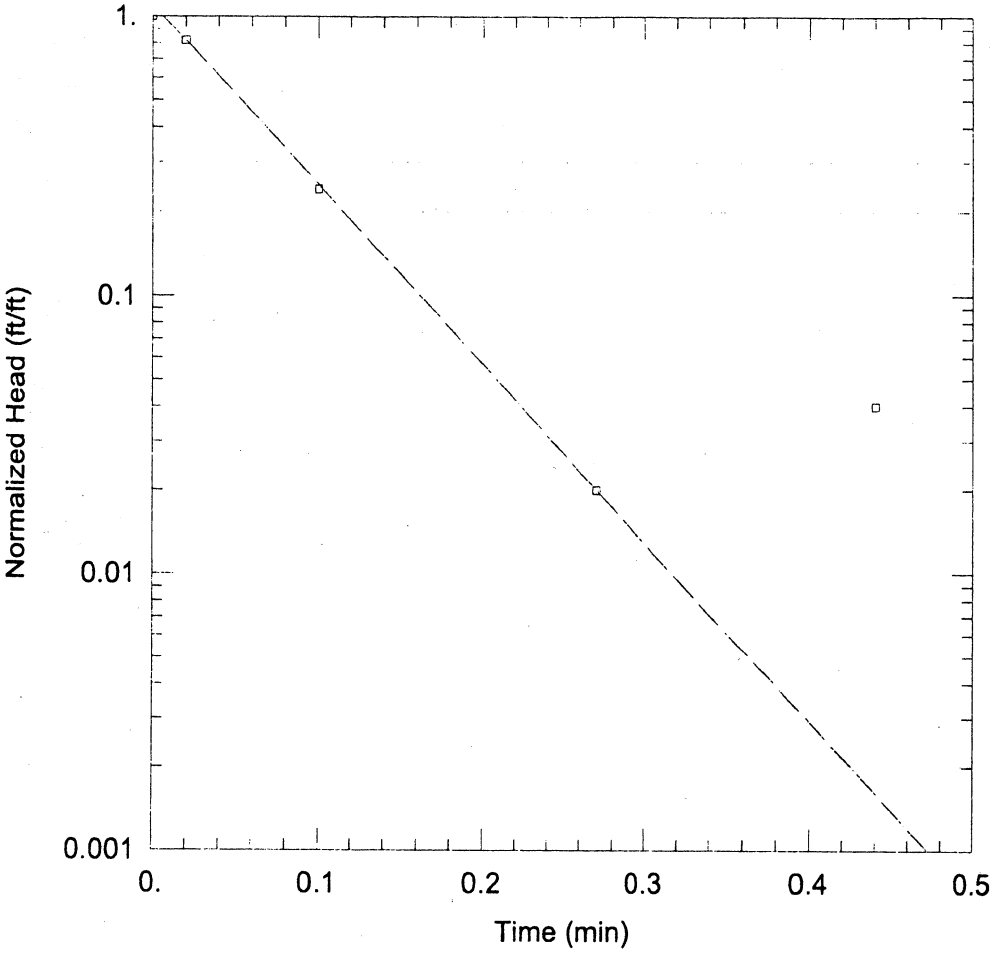
Saturated Thickness: 14. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-07A)

Initial Displacement: 0.705 ft
Total Well Penetration Depth: 80.2 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 85. ft
Screen Length: 14. ft
Wellbore Radius: 0.1242 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 8.478E-6 cm/sec
y0 = 0.1138 ft



P-04-07B SLUG TEST

Data Set: \...\P-04-07B.aqt
Date: 09/27/06 Time: 13:54:32

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: P-04-07B
Test Date: 4/20/06

AQUIFER DATA

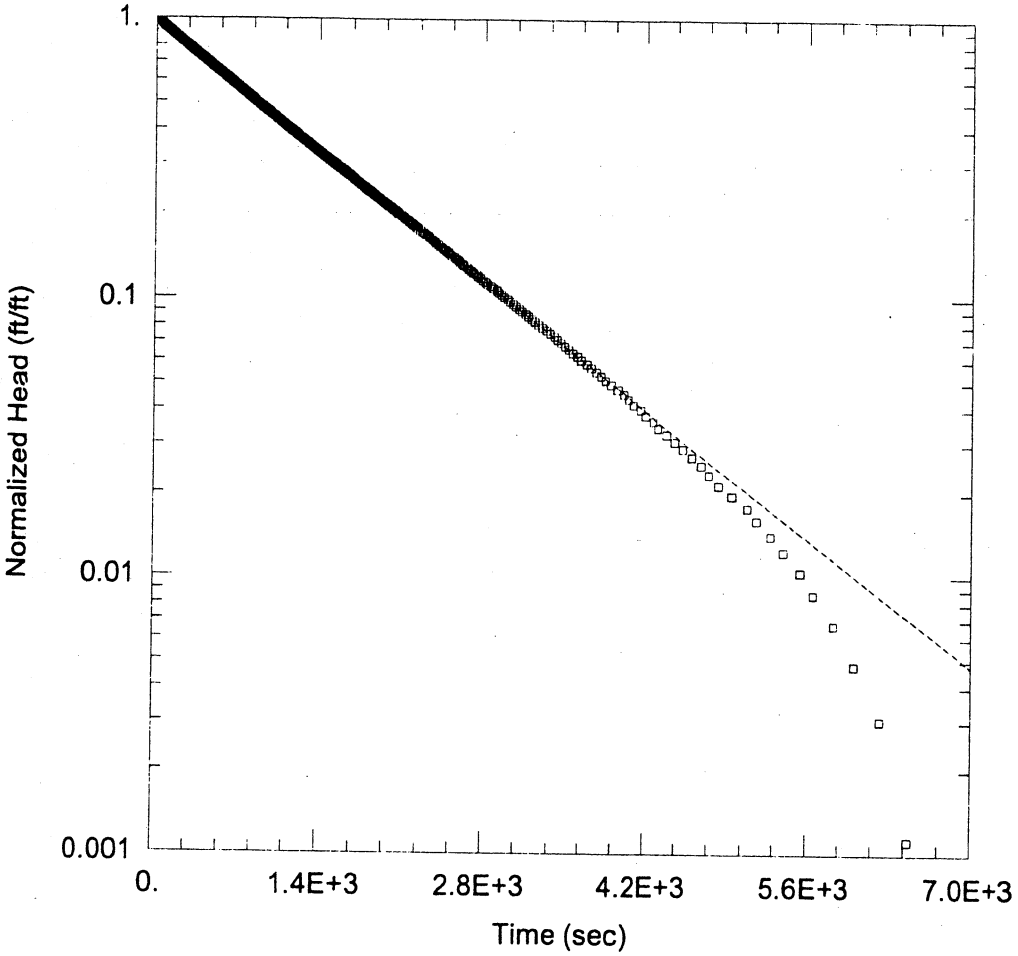
Saturated Thickness: 4.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-07B)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 31.4 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 31.4 ft
Screen Length: 4.5 ft
Wellbore Radius: 0.124 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.003172 cm/sec
y0 = 0.5514 ft



P-04-09A SLUG TEST

Data Set: \...\P-04-09A.aqt
Date: 09/27/06 Time: 14:00:00

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-09A
Test Date: 10/26/04

AQUIFER DATA

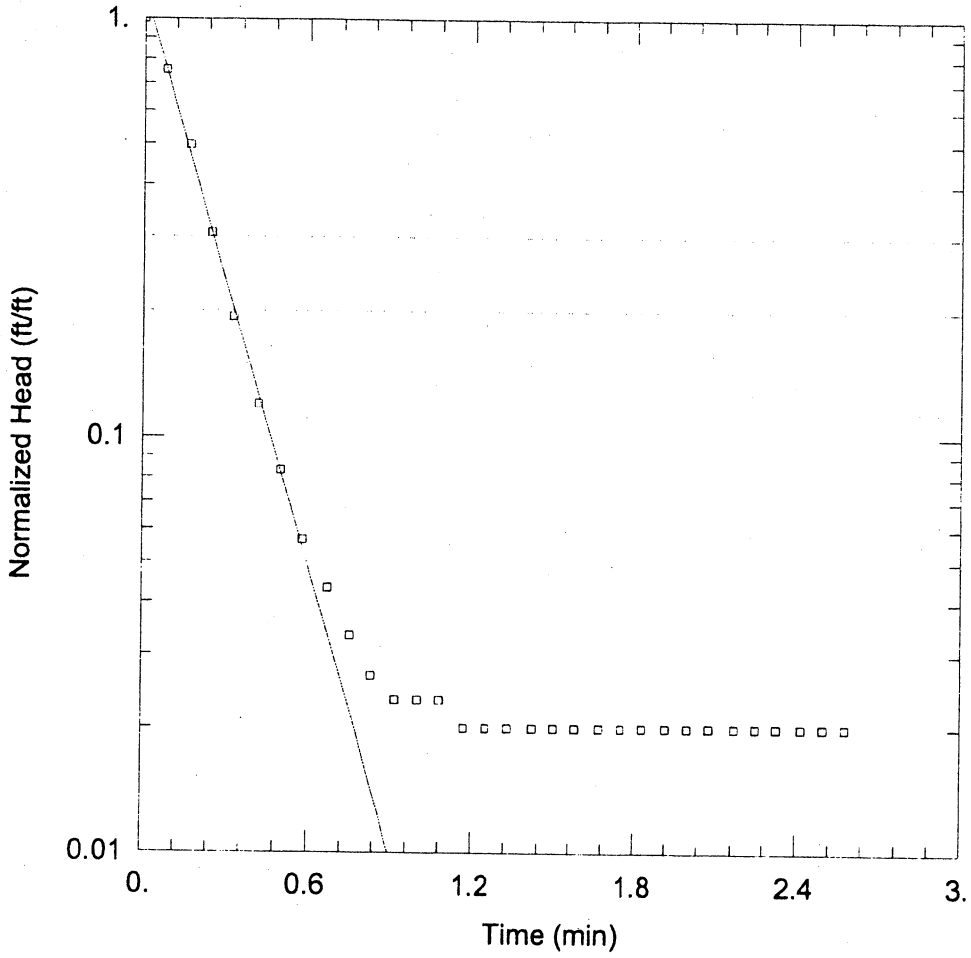
Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-09A)

Initial Displacement: 6.251 ft
Total Well Penetration Depth: 7.9 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 36.13 ft
Screen Length: 3.5 ft
Wellbore Radius: 0.1242 ft

SOLUTION

Aquifer Model: Confined
K = 9.696E-6 cm/sec
Solution Method: Bouwer-Rice
y0 = 5.939 ft



P-04-10A SLUG TEST #1

Data Set: \...\P-04-10A #1.aqt
Date: 09/27/06 Time: 14:01:59

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: P-04-10A
Test Date: 4/19/06

AQUIFER DATA

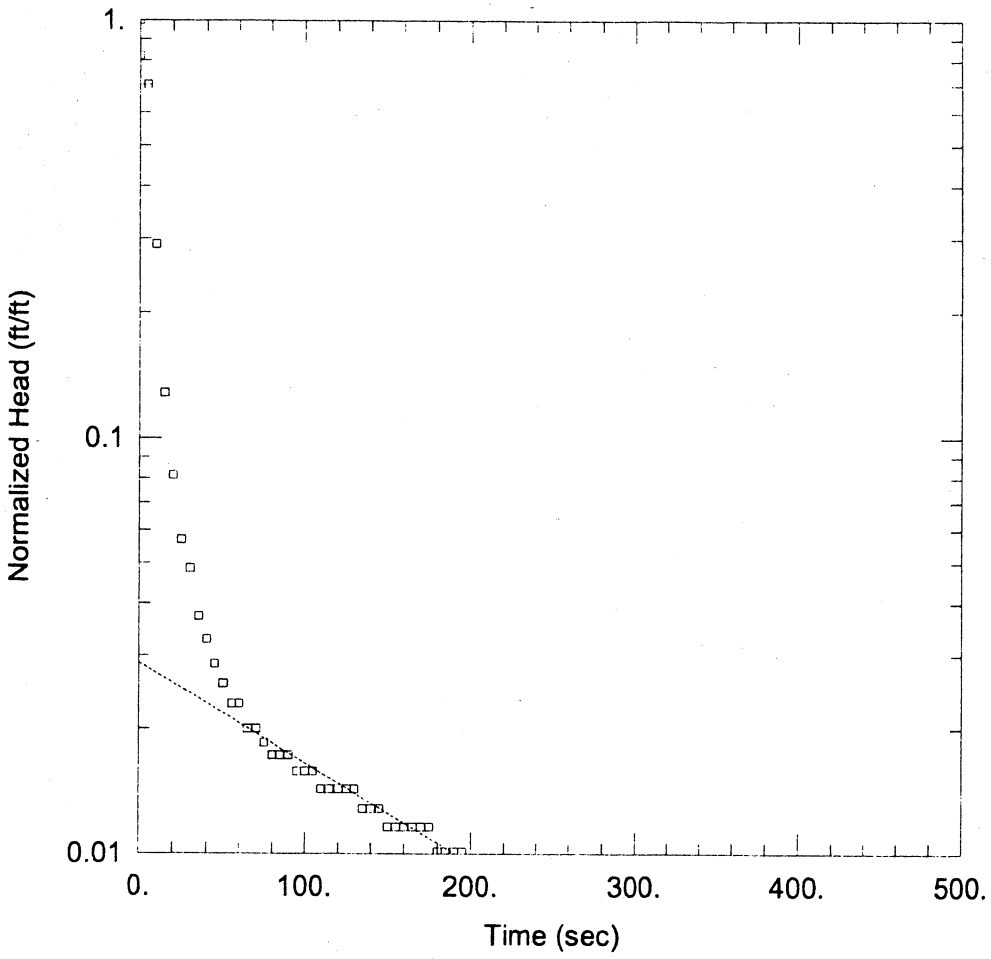
Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-10A)

Initial Displacement: 3. ft
Total Well Penetration Depth: 30.5 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 30.5 ft
Screen Length: 3.5 ft
Wellbore Radius: 0.124 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.001401 cm/sec
y0 = 3.458 ft



P-04-12A SLUG TEST

Data Set: \...\P-04-12A.aqt
Date: 09/27/06 Time: 13:04:56

PROJECT INFORMATION

Company: SEVEE & MAHER
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-12A
Test Date: 10/26/04

AQUIFER DATA

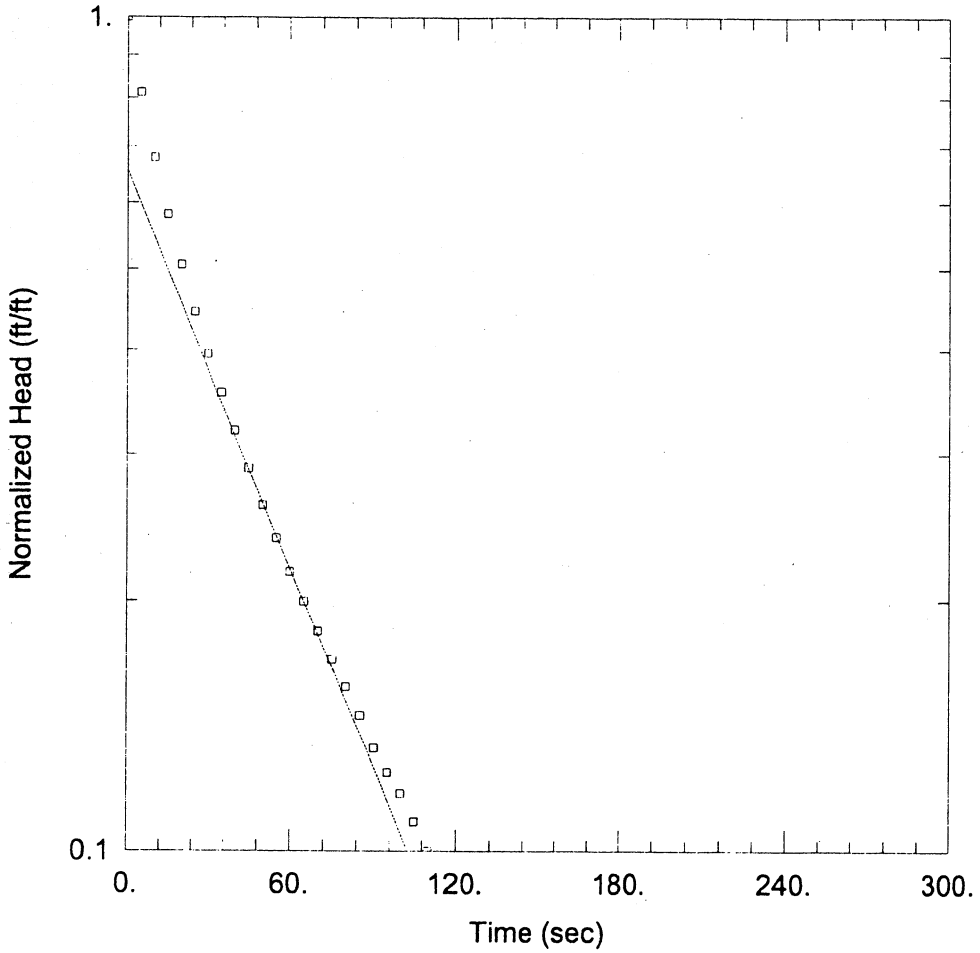
Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-12A)

Initial Displacement: 4.05 ft
Total Well Penetration Depth: 44.3 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 62.75 ft
Screen Length: 8.5 ft
Wellbore Radius: 0.1242 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 4.147E-5 cm/sec
y0 = 0.1166 ft



P-04-12B SLUG TEST

Data Set: \...\P-04-12B.aqt
Date: 09/27/06 Time: 14:09:25

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-12B
Test Date: 10/26/04

AQUIFER DATA

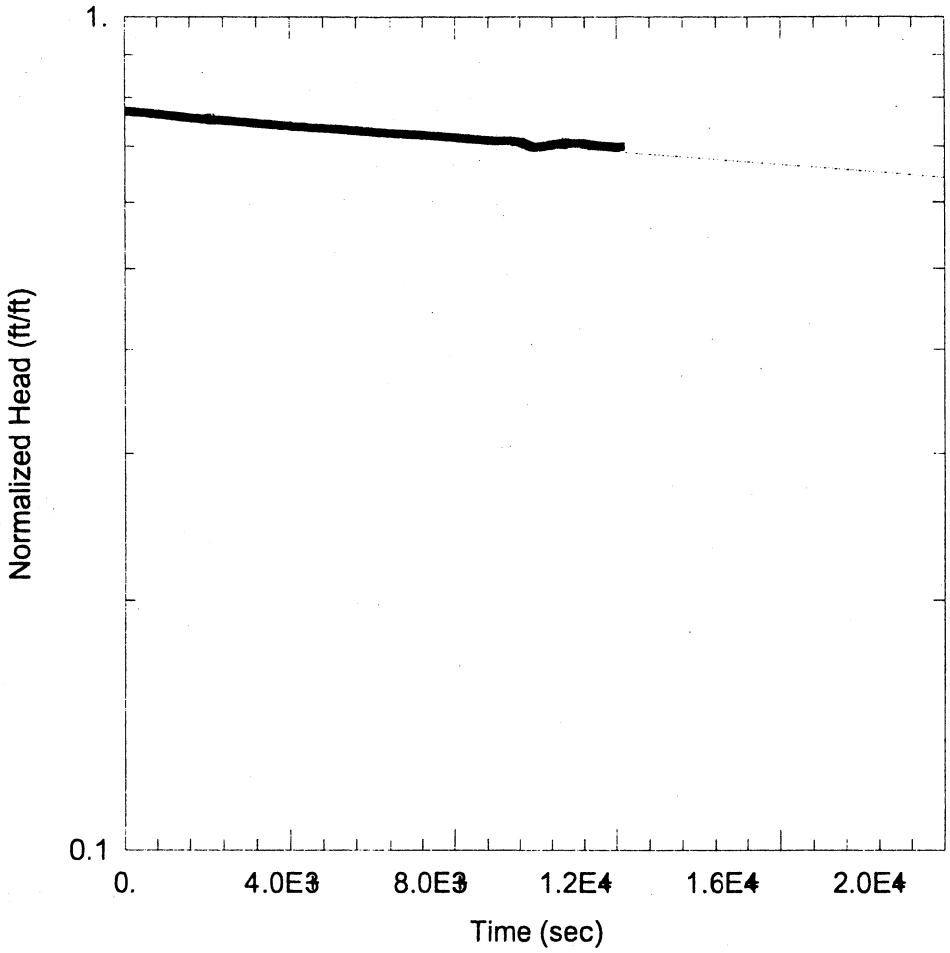
Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-12B)

Initial Displacement: 3.3 ft
Total Well Penetration Depth: 16.36 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 35.45 ft
Screen Length: 3.5 ft
Wellbore Radius: 0.1242 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.0002663 cm/sec
y0 = 2.164 ft



P-04-13A SLUG TEST

Data Set: \...\P-04-13A.aqt
Date: 09/27/06 Time: 14:11:44

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-13A
Test Date: 10/26/04

AQUIFER DATA

Saturated Thickness: 4. ft Anisotropy Ratio (Kz/Kr): 1.

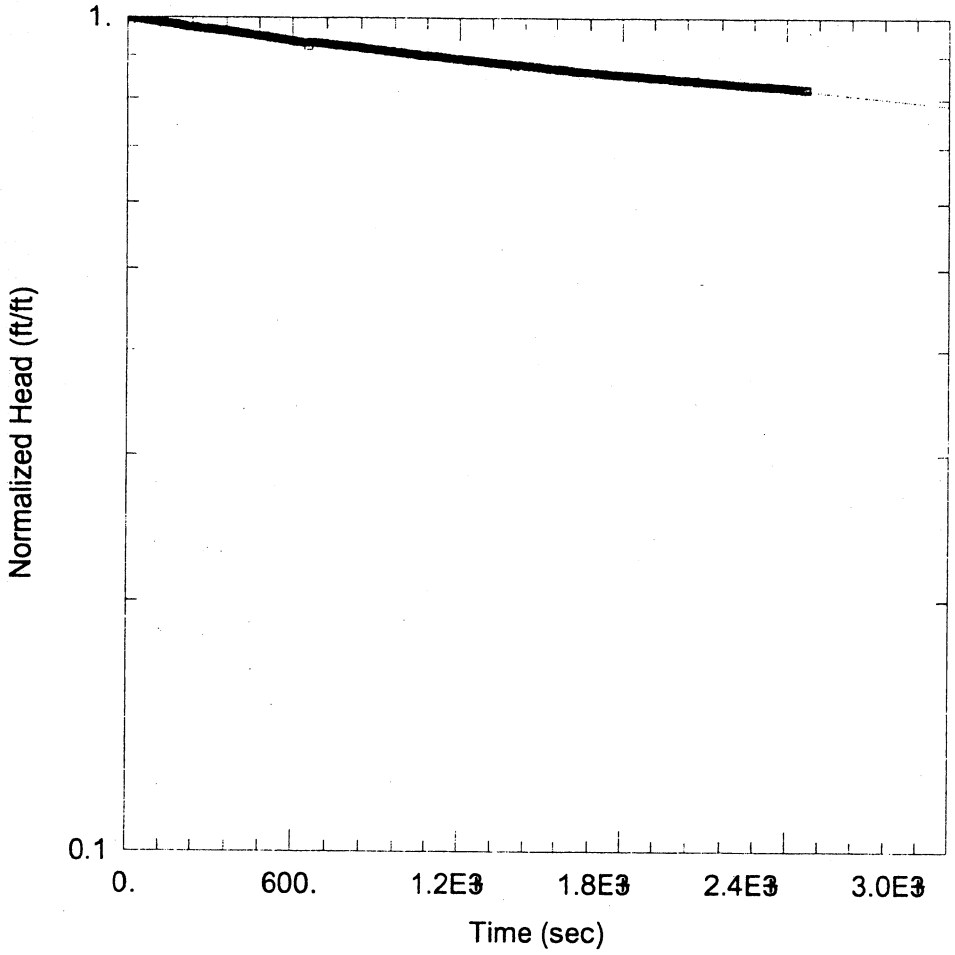
WELL DATA (P-04-13A)

Initial Displacement: 5.29 ft
Total Well Penetration Depth: 101.2 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 115.5 ft
Screen Length: 4. ft
Wellbore Radius: 0.1875 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 1.301E-7 cm/sec y0 = 4.056 ft



P-04-13B SLUG TEST

Data Set: \...\P-04-13B.aqt
Date: 09/27/06 Time: 14:13:11

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-13B
Test Date: 10/26/04

AQUIFER DATA

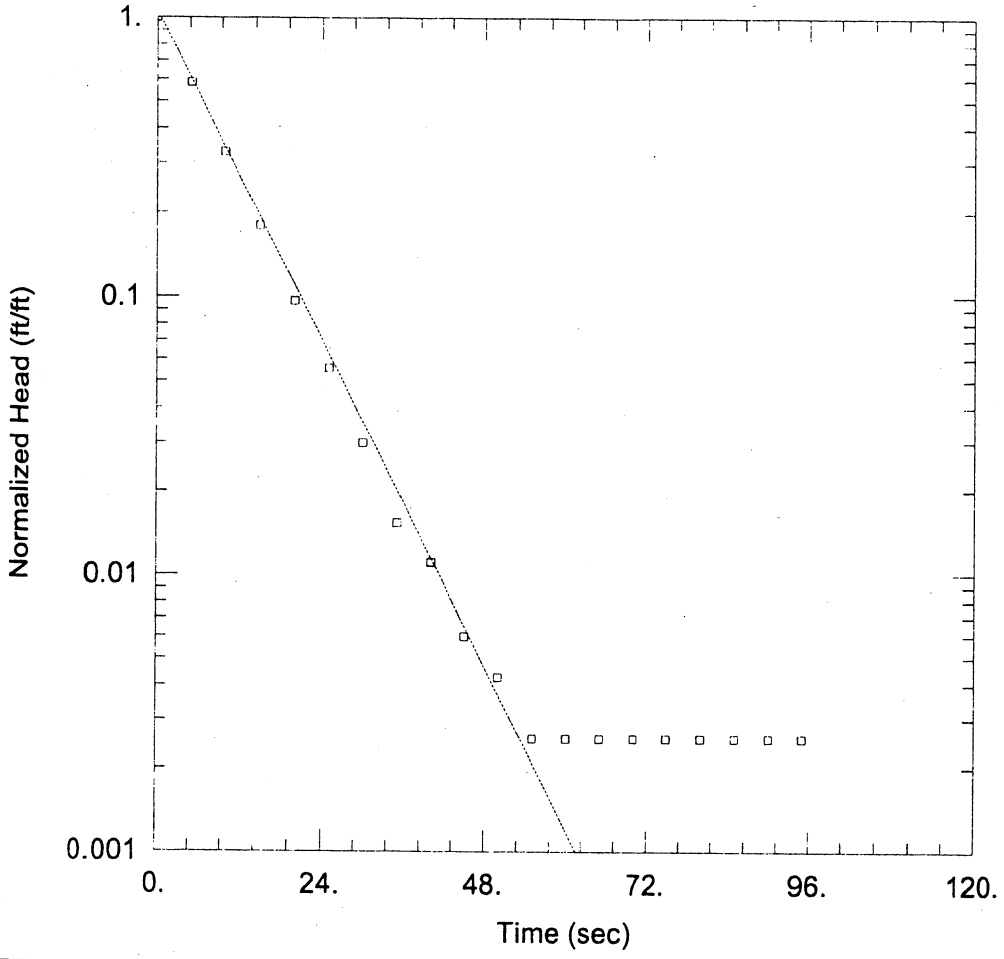
Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-13B)

Initial Displacement: 5.29 ft
Total Well Penetration Depth: 64.17 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 38.9 ft
Screen Length: 3.5 ft
Wellbore Radius: 0.1242 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 1.323E-6 cm/sec
y0 = 5.222 ft



P-04-14B SLUG TEST

Data Set: \...\P-04-14B.aqt
Date: 09/27/06 Time: 14:18:17

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-14B
Test Date: 10/24/04

AQUIFER DATA

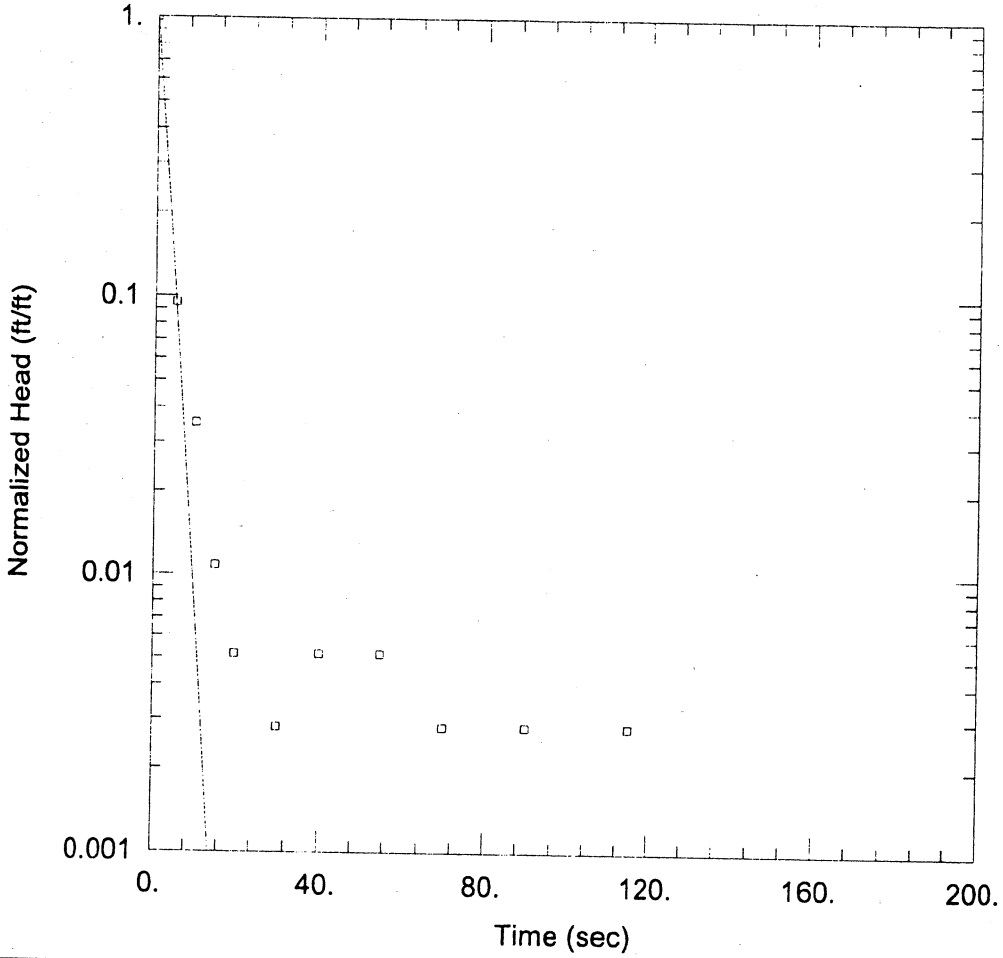
Saturated Thickness: 4.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-14B)

Initial Displacement: 2.71 ft
Total Well Penetration Depth: 17.11 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 15.9 ft
Screen Length: 4.5 ft
Wellbore Radius: 0.1242 ft

SOLUTION

Aquifer Model: Confined
K = 0.001325 cm/sec
Solution Method: Bouwer-Rice
y0 = 2.862 ft



P-04-14A SLUG TEST

Data Set: \...\P-04-14A.aqt
Date: 09/27/06 Time: 14:17:13

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-14A
Test Date: 10/26/04

AQUIFER DATA

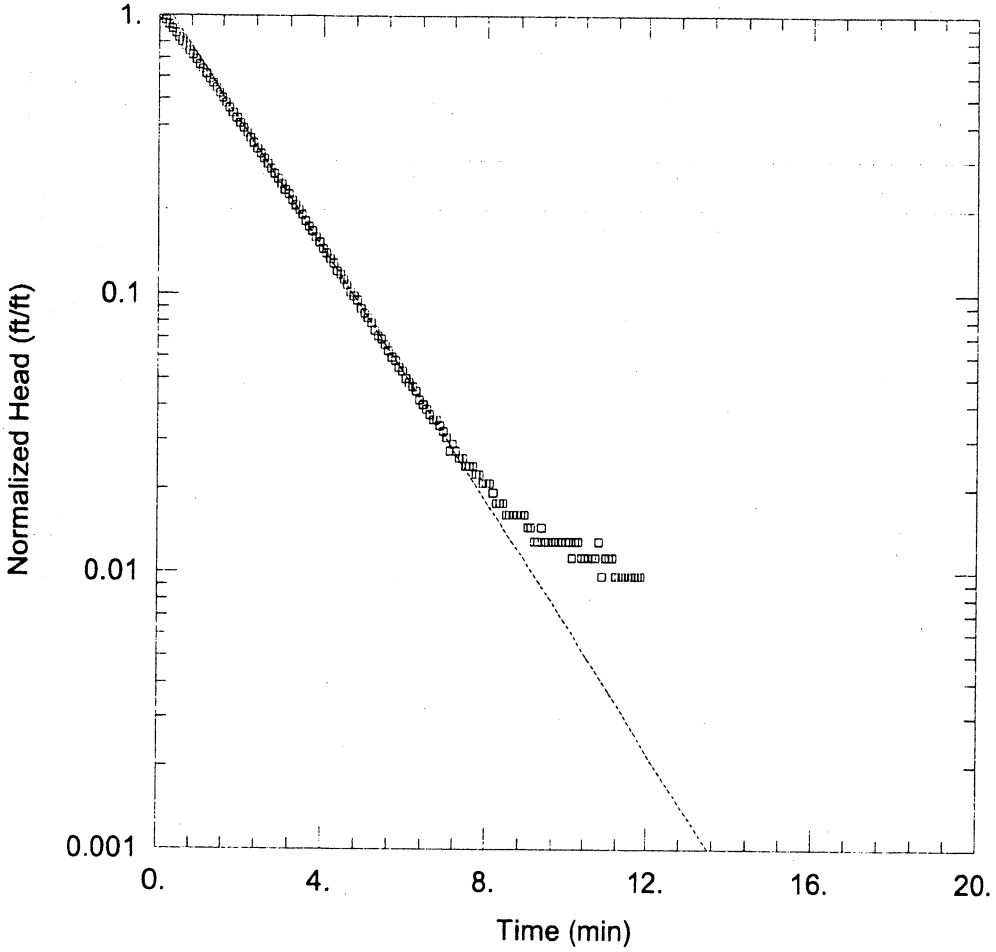
Saturated Thickness: 4.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-14A)

Initial Displacement: 2.13 ft
Total Well Penetration Depth: 59.4 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 63.27 ft
Screen Length: 4.5 ft
Wellbore Radius: 0.1458 ft

SOLUTION

Aquifer Model: Confined
K = 0.006593 cm/sec
Solution Method: Bouwer-Rice
y0 = 2.247 ft



P-06-04A SLUG TEST

Data Set: \...\P-06-04a.aqt
Date: 09/27/06 Time: 13:36:32

PROJECT INFORMATION

Company: SEA E & MAHER ENGINEERS
Client: Casella
Project: Juniper Ridge
Location: Old Town Maine
Test Well: P-06-04A
Test Date: 4/19/2006

AQUIFER DATA

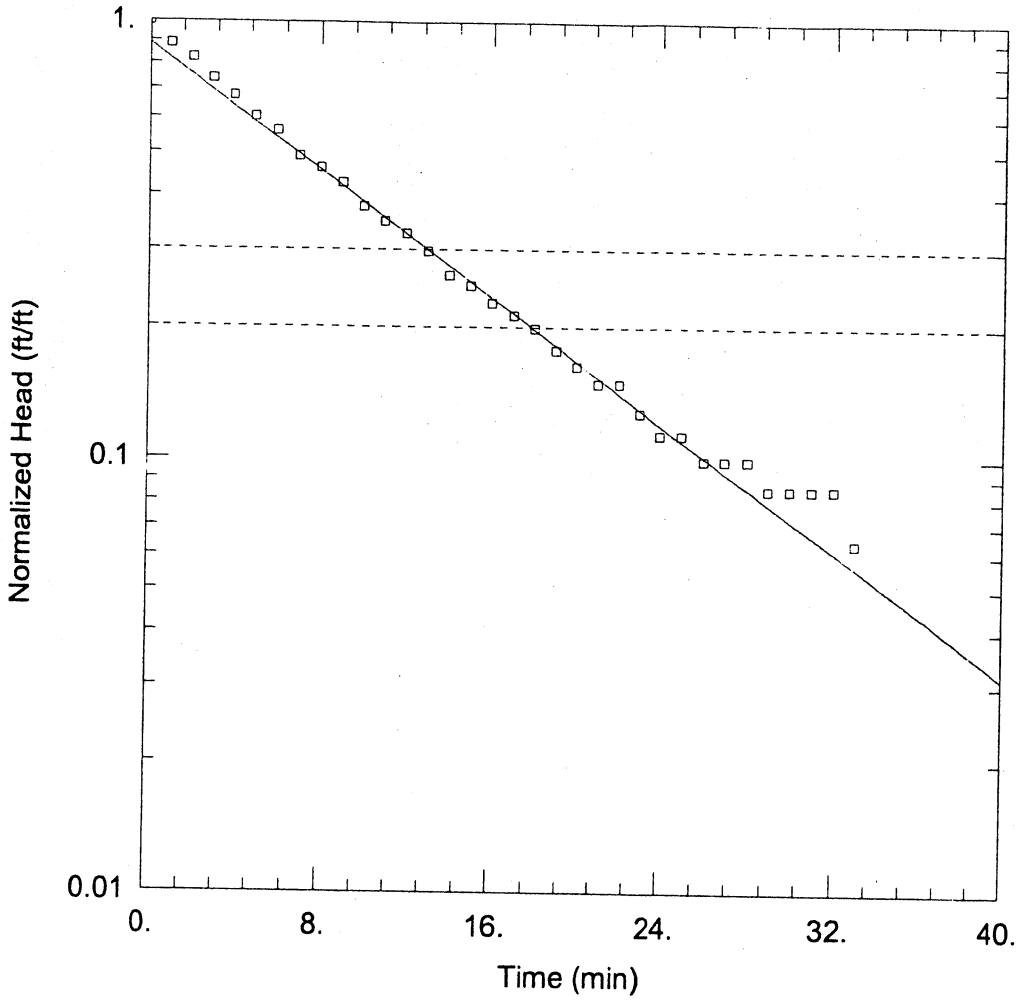
Saturated Thickness: 3.2 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-06-04A)

Initial Displacement: 6.2 ft
Total Well Penetration Depth: 20.1 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 20.1 ft
Screen Length: 3.2 ft
Wellbore Radius: 0.188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0001245 cm/sec
y0 = 7.375 ft



MW-04-111 SLUG TEST #1

Data Set: \\Fserver\cfs\Casella\OldTownLandfill\Expansion\SlugTest\till\MW-04-111.aqt
Date: 09/29/06 Time: 08:00:23

PROJECT INFORMATION

Company: SME
Client: Casella
Project: 06072.00
Location: Juniper Ridge
Test Well: MW-04-111
Test Date: 5/31/06

AQUIFER DATA

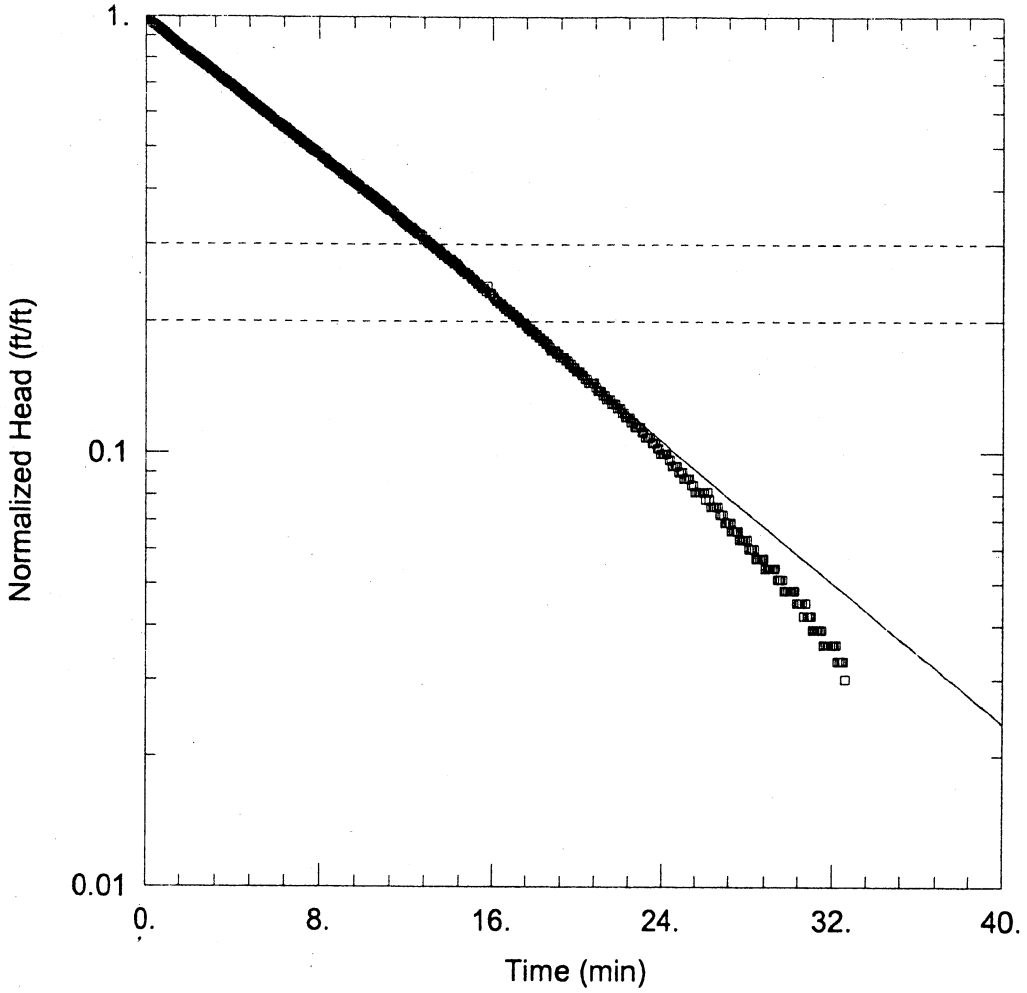
Saturated Thickness: 13.43 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-04-111)

Initial Displacement: 1.41 ft
Total Well Penetration Depth: 13.43 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 13.43 ft
Screen Length: 6. ft
Wellbore Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
K = 7.896E-5 cm/sec
Solution Method: Bouwer-Rice
y0 = 1.253 ft



MW-05-01

Data Set: \\Fserver\cfs\Casella\OldTownLandfill\Expansion\SlugTest\till\MW-05-01.aqt
Date: 09/29/06 Time: 08:00:38

PROJECT INFORMATION

Company: SME
Client: Casella
Project: 06072.00
Location: Juniper Ridge
Test Well: MW-05-01
Test Date: 5/31/06

AQUIFER DATA

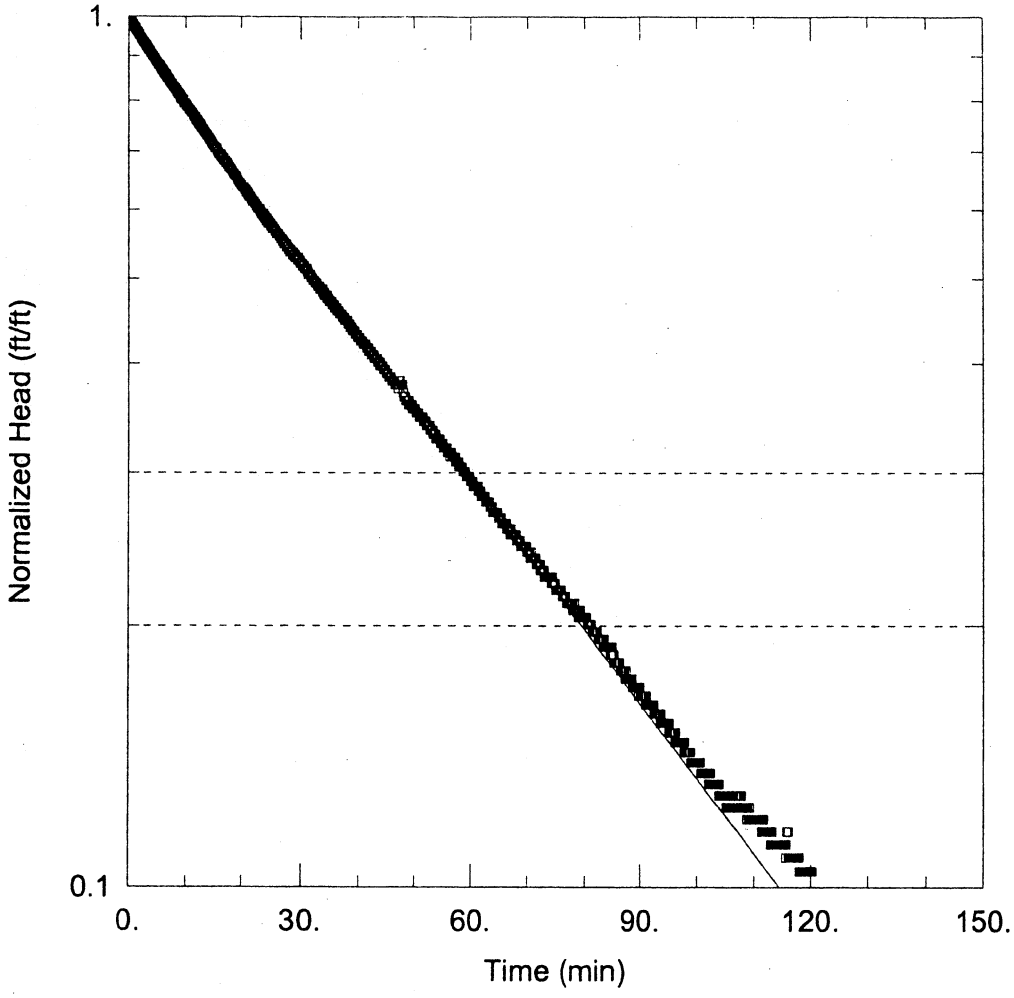
Saturated Thickness: 13.47 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-05-01)

Initial Displacement: 3.32 ft
Total Well Penetration Depth: 13.47 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 13.47 ft
Screen Length: 6. ft
Wellbore Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
K = 8.846E-5 cm/sec
Solution Method: Bouwer-Rice
y0 = 3.329 ft



MW-05-02

Data Set: \\Fserver\cfs\Casella\OldTownLandfill\Expansion\SlugTest\till\MW-05-02.aqt
Date: 09/29/06 Time: 08:00:47

PROJECT INFORMATION

Company: SME
Client: Casella
Project: 06072.00
Location: Juniper Ridge
Test Well: MW-05-02
Test Date: 5/31/06

AQUIFER DATA

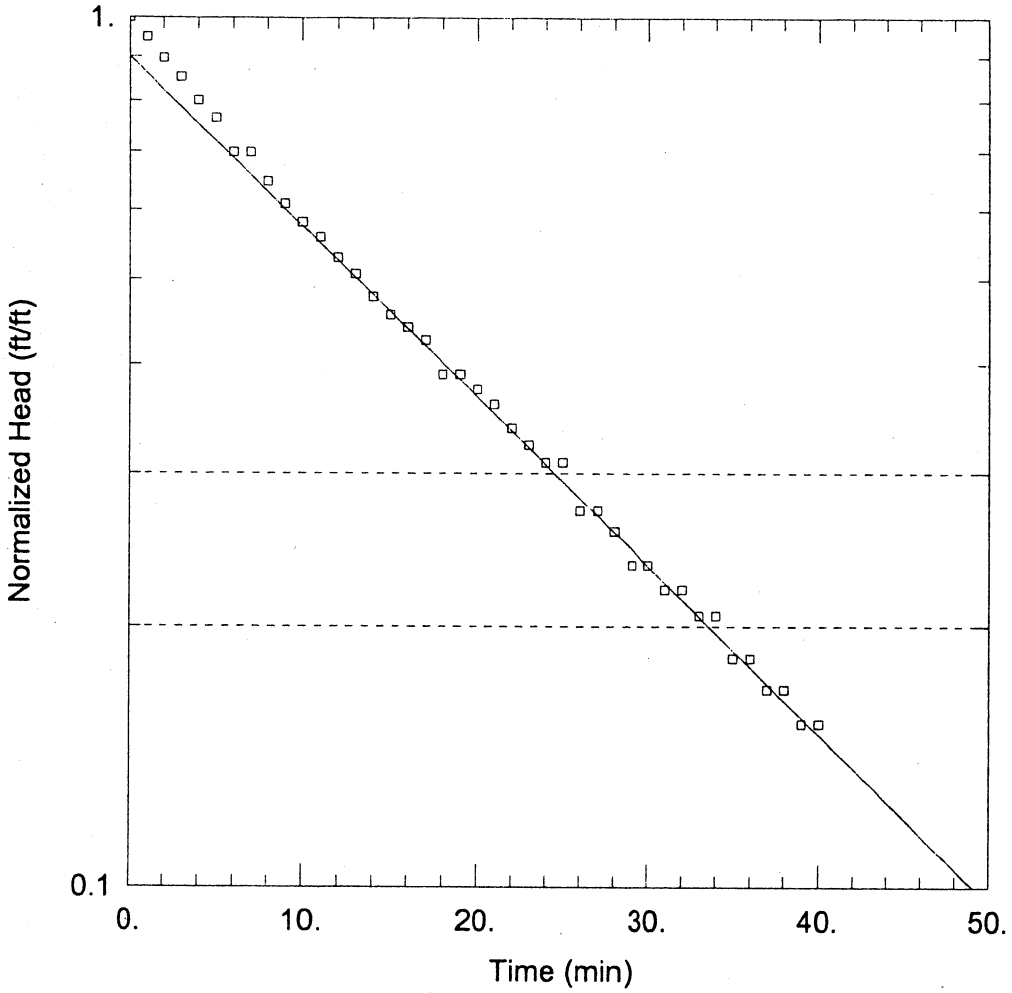
Saturated Thickness: 13.41 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-05-02)

Initial Displacement: 2.59 ft
Total Well Penetration Depth: 13.41 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 13.41 ft
Screen Length: 6. ft
Wellbore Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.871E-5 cm/sec
y0 = 2.502 ft



MW-05-03

Data Set: \\Fserver\cfs\Casella\OldTownLandfill\Expansion\SlugTest\till\MW-05-03.aqt
Date: 09/29/06 Time: 08:00:55

PROJECT INFORMATION

Company: SME
Client: Casella
Project: 06072.00
Location: Juniper Ridge
Test Well: MW-05-03
Test Date: 5/31/06

AQUIFER DATA

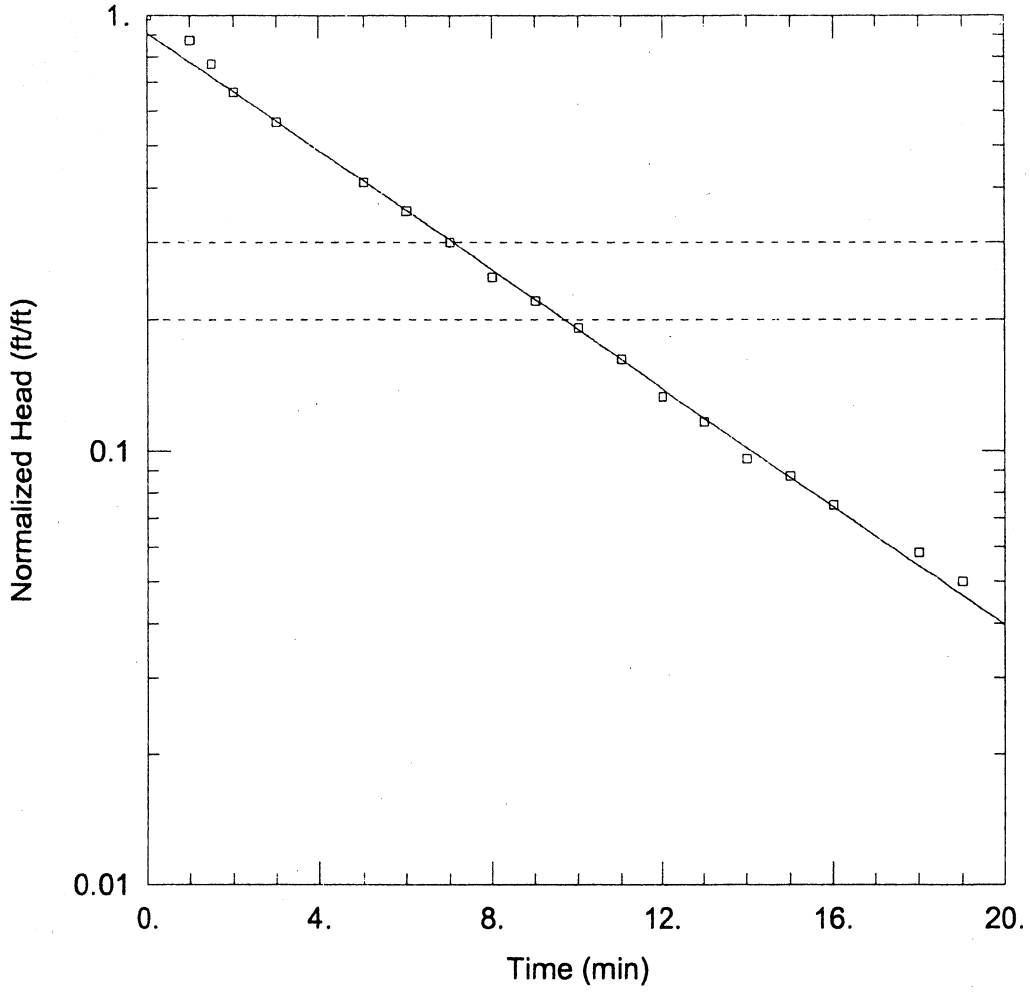
Saturated Thickness: 13.02 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-05-03)

Initial Displacement: 1.36 ft
Total Well Penetration Depth: 13.02 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 13.02 ft
Screen Length: 6. ft
Wellbore Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.21E-5 cm/sec
y0 = 1.224 ft



MW-~~04-111~~ 05-04 SLUG TEST #1

Data Set: \\Fserver\cfs\Casella\OldTownLandfill\Expansion\SlugTest\till\MW-05-04.aqt
Date: 09/29/06 Time: 08:01:02

PROJECT INFORMATION

Company: SME
Client: Casella
Project: 06072.00
Location: Juniper Ridge
Test Well: MW-05-04
Test Date: 5/31/06

AQUIFER DATA

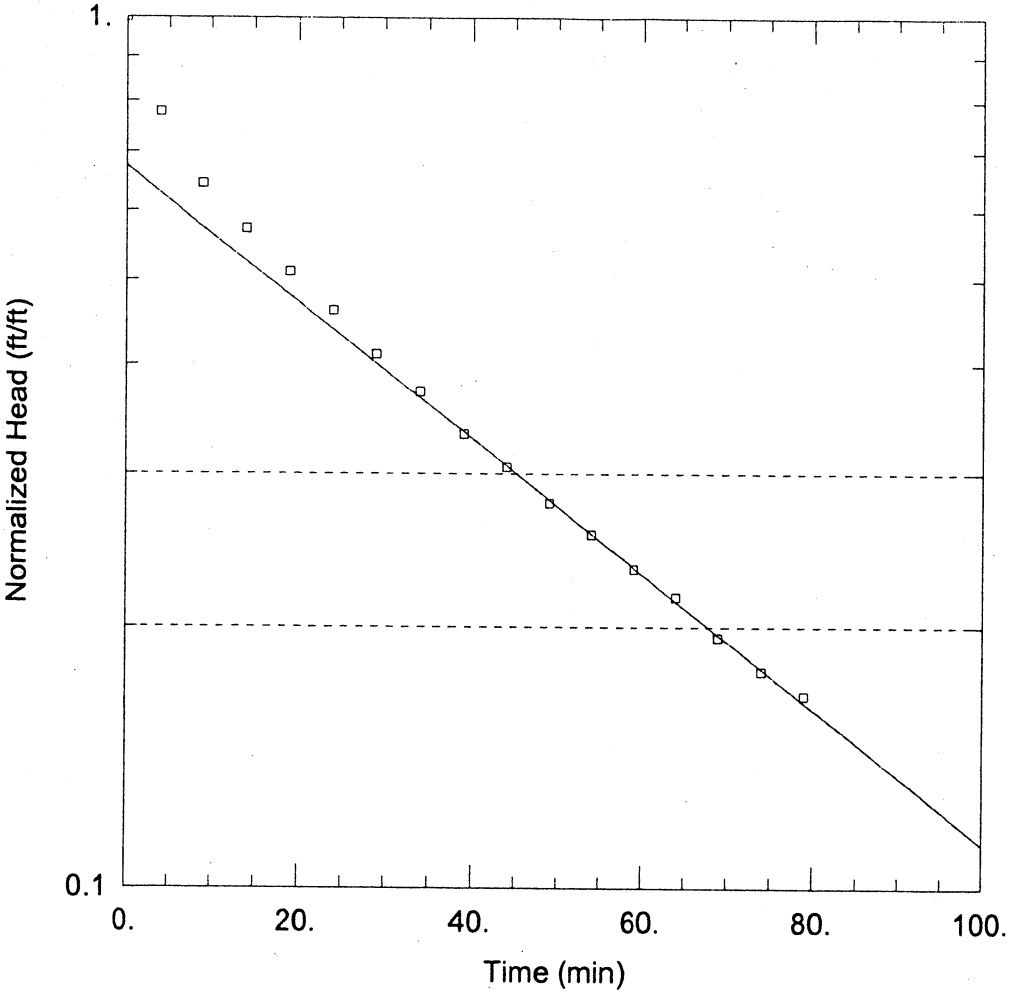
Saturated Thickness: 13.22 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-05-04)

Initial Displacement: 2.4 ft
Total Well Penetration Depth: 13.22 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 13.22 ft
Screen Length: 6. ft
Wellbore Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0001475 cm/sec
y0 = 2.184 ft



MW-05-05

Data Set: \\Fserver\cfs\Casella\OldTownLandfill\Expansion\SlugTest\till\MW-05-05.aqt
Date: 09/29/06 Time: 08:01:11

PROJECT INFORMATION

Company: SME
Client: Casella
Project: 06072.00
Location: Juniper Ridge
Test Well: MW-05-05
Test Date: 5/31/06

AQUIFER DATA

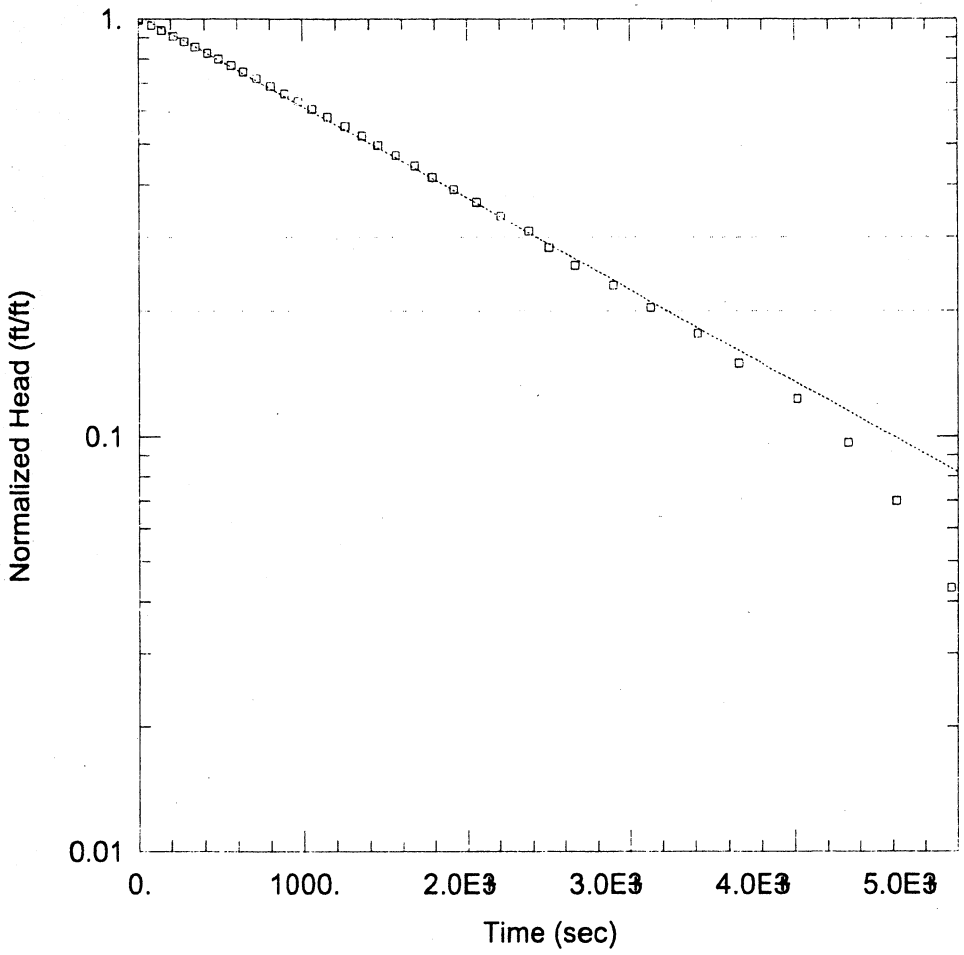
Saturated Thickness: 13.21 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-05-05)

Initial Displacement: 1.8 ft
Total Well Penetration Depth: 13.21 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 13.21 ft
Screen Length: 6. ft
Wellbore Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.69E-5 cm/sec
y0 = 1.215 ft



P-04-05A SLUG TEST

Data Set: \...\P-04-05A.aqt
Date: 09/27/06 Time: 13:49:02

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-05A
Test Date: 10/26/04

AQUIFER DATA

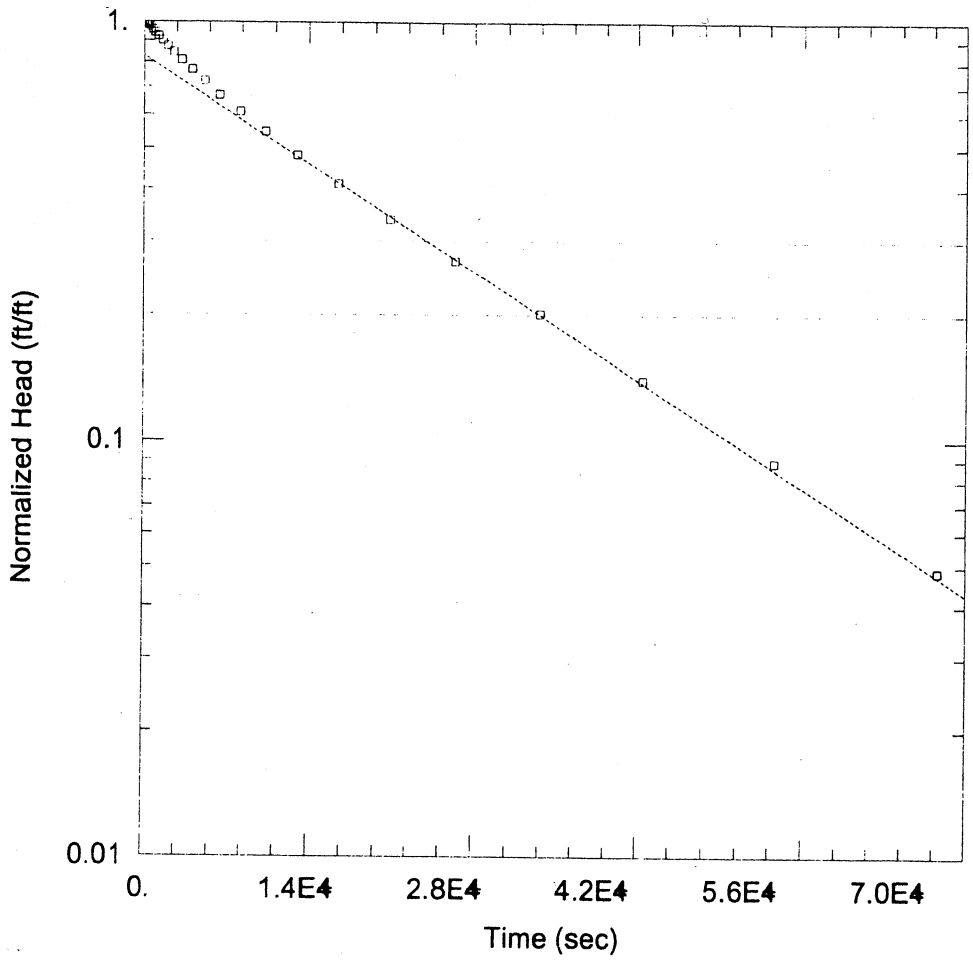
Saturated Thickness: 3.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-05A)

Initial Displacement: 3.892 ft Static Water Column Height: 32.33 ft
Total Well Penetration Depth: 32.33 ft Screen Length: 3.5 ft
Casing Radius: 0.0313 ft Wellbore Radius: 0.1875 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 7.16E-6 cm/sec y0 = 3.965 ft



P-04-05B SLUG TEST

Data Set: \...\P-04-05B.aqt
Date: 09/27/06 Time: 13:49:56

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-05B
Test Date: 10/26/04

AQUIFER DATA

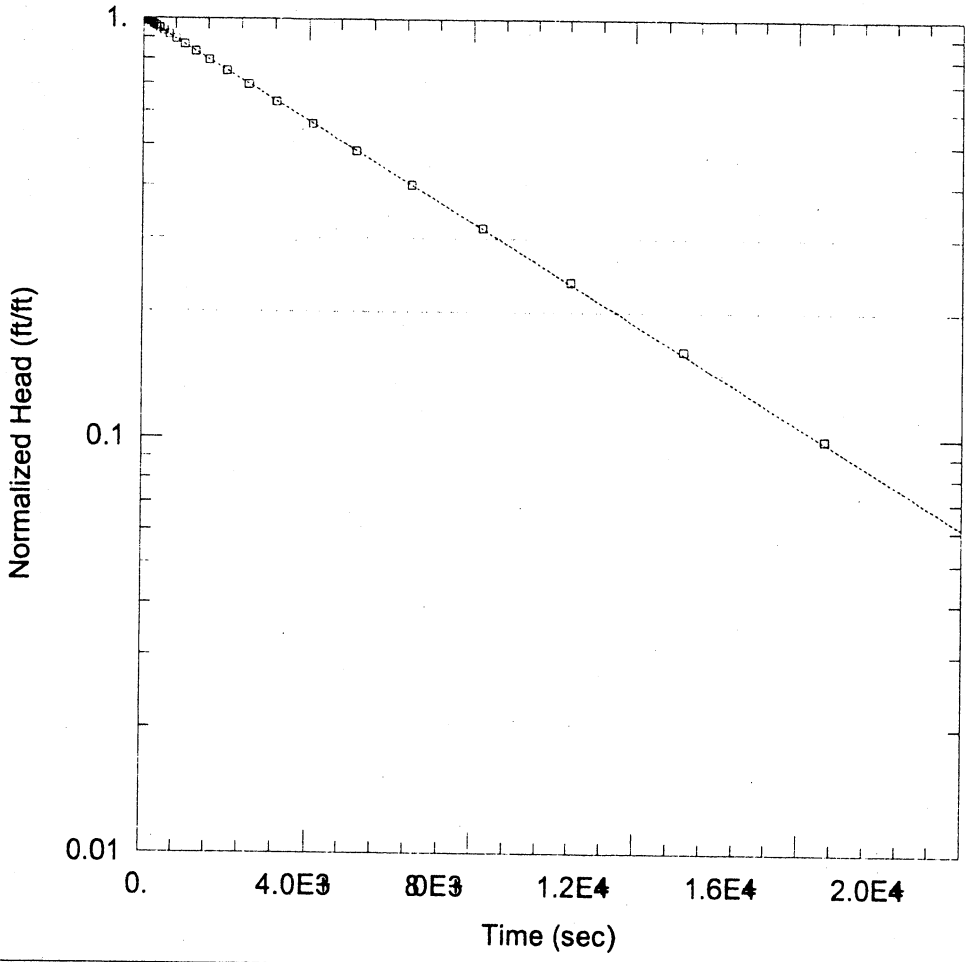
Saturated Thickness: 2.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-05B)

Initial Displacement: 6.162 ft
Total Well Penetration Depth: 12.19 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 12.19 ft
Screen Length: 2.5 ft
Wellbore Radius: 0.1875 ft

SOLUTION

Aquifer Model: Unconfined
K = 6.818E-7 cm/sec
Solution Method: Bouwer-Rice
y0 = 5.113 ft



P-04-06B SLUG TEST

Data Set: \...\P-04-06B.aqt
Date: 09/27/06 Time: 13:52:09

PROJECT INFORMATION

Company: SEA & MAHER ENGINEERS
Client: CASELLA
Project: 04076.09
Location: WEST OLD TOWN
Test Well: P-04-06B
Test Date: 10/26/04

AQUIFER DATA

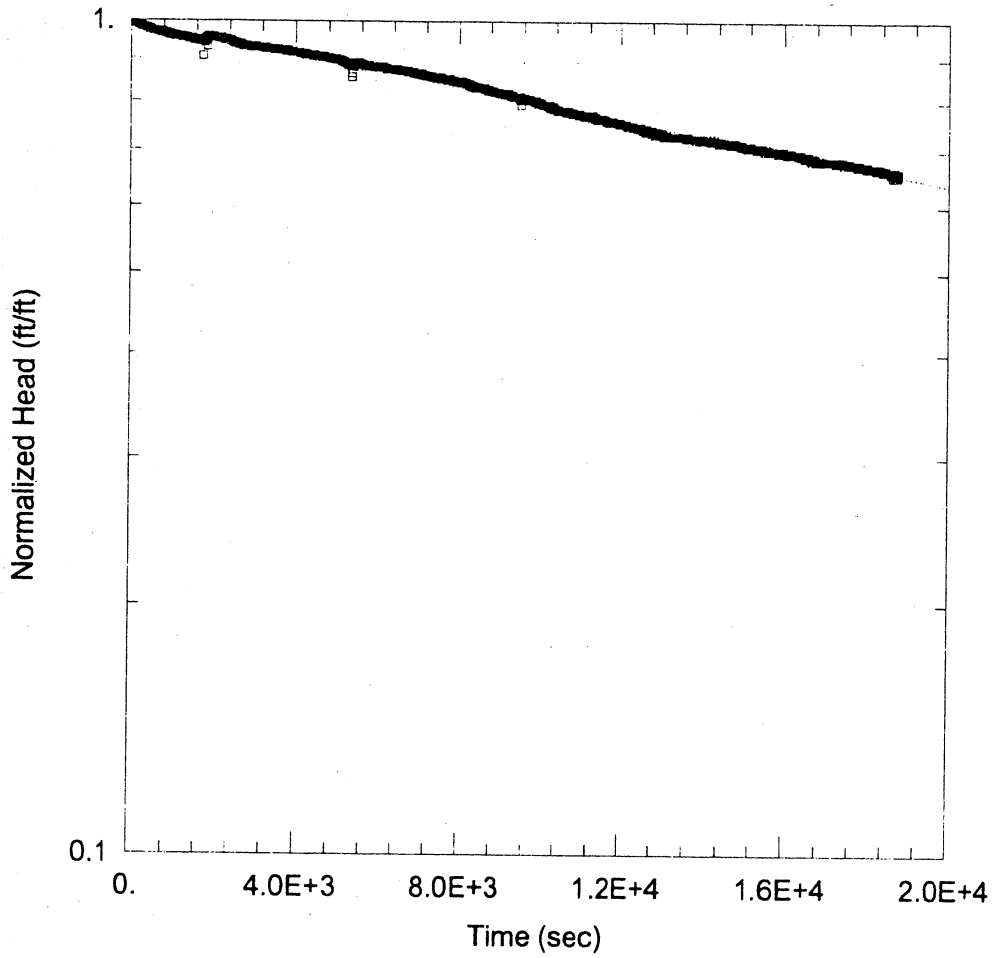
Saturated Thickness: 2.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-06B)

Initial Displacement: 7.77 ft
Total Well Penetration Depth: 5.461 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 5.461 ft
Screen Length: 2.5 ft
Wellbore Radius: 0.1875 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.921E-6 cm/sec
y0 = 7.754 ft



P-04-08A SLUG TEST

Data Set: \...\P-04-08A.aqt
Date: 09/27/06 Time: 13:57:49

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-08A
Test Date: 10/26/04

AQUIFER DATA

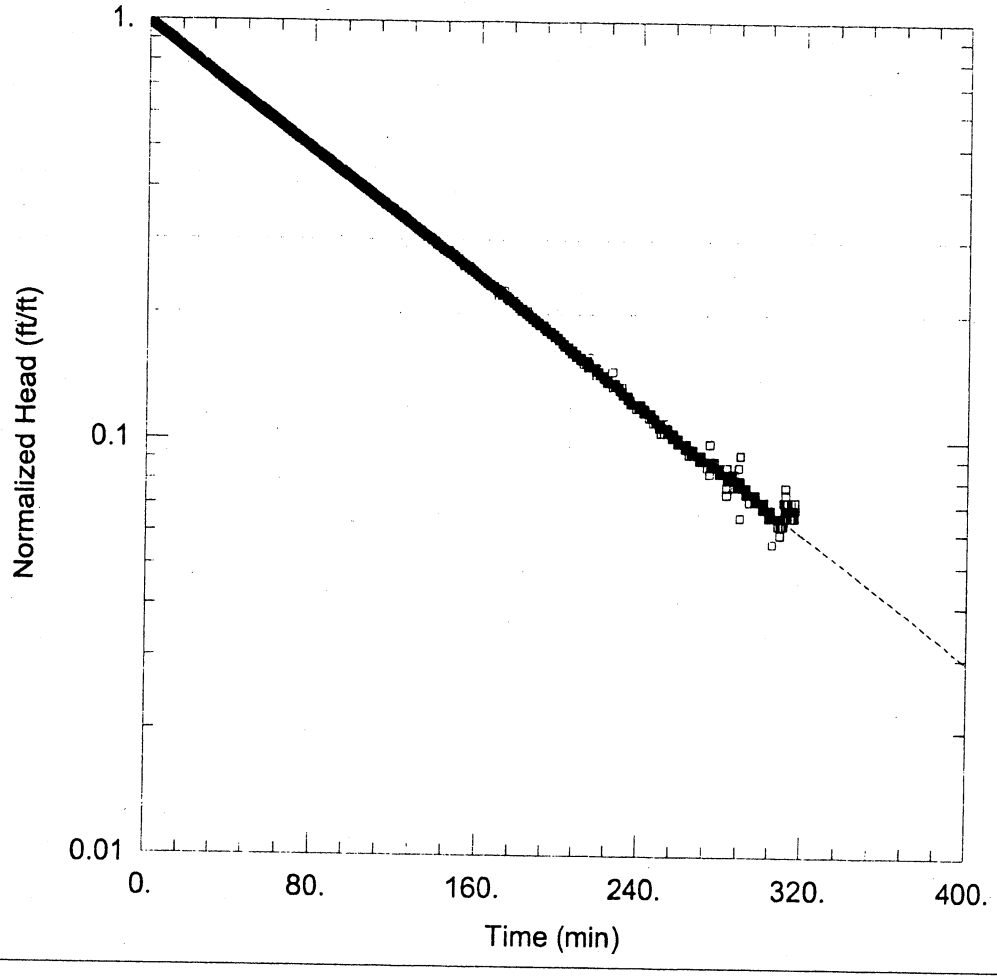
Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-08A)

Initial Displacement: 1.845 ft
Total Well Penetration Depth: 30.28 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 30.28 ft
Screen Length: 3.5 ft
Wellbore Radius: 0.1875 ft

SOLUTION

Aquifer Model: Unconfined
K = 3.151E-7 cm/sec
Solution Method: Bouwer-Rice
y0 = 1.839 ft



P-04-08B

Data Set: \...\P-04-08B.aqt
Date: 09/27/06 Time: 13:59:16

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: P-04-08B
Test Date: 4/19/06

AQUIFER DATA

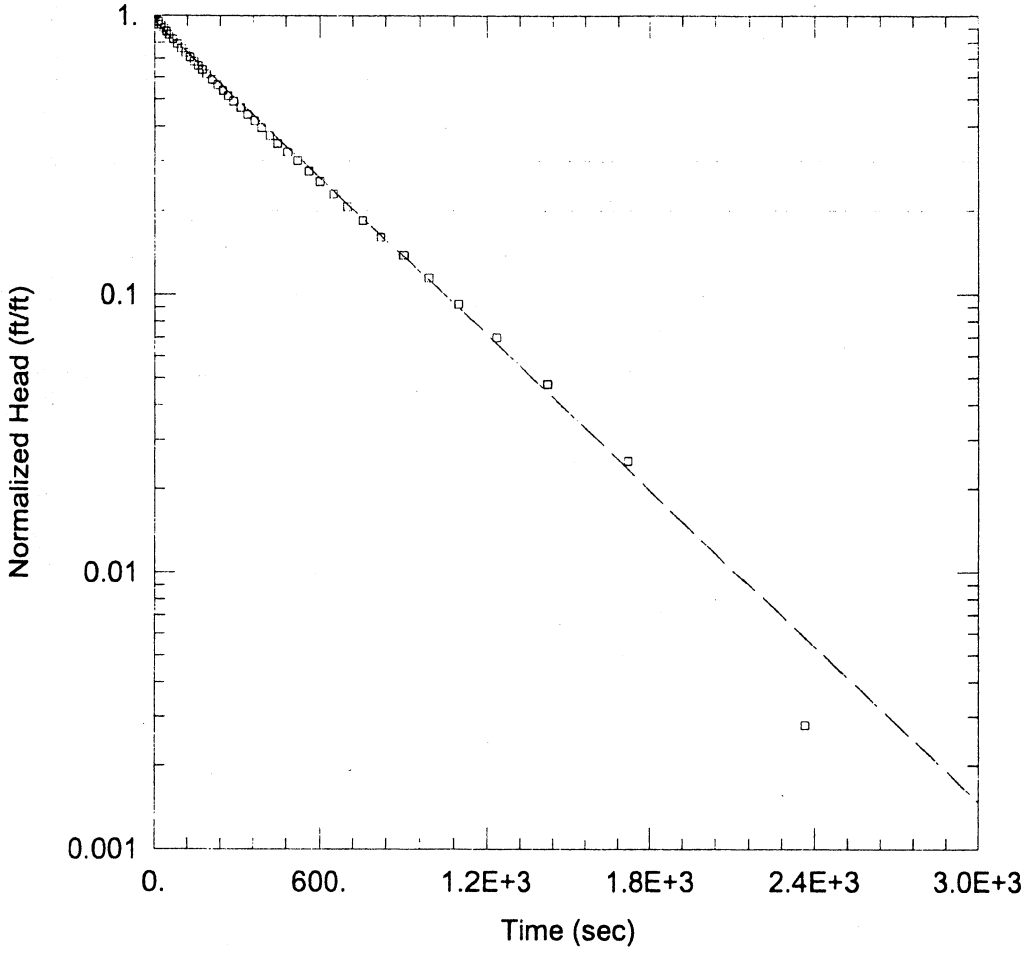
Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-08B)

Initial Displacement: 3.35 ft
Total Well Penetration Depth: 15.3 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 15.3 ft
Screen Length: 3.5 ft
Wellbore Radius: 0.188 ft

SOLUTION

Aquifer Model: Unconfined
K = 1.854E-6 cm/sec
Solution Method: Bouwer-Rice
y0 = 3.313 ft



P-04-09B SLUG TEST

Data Set: \...\P-04-09B.aqt
Date: 09/27/06 Time: 14:00:30

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-09B
Test Date: 10/26/04

AQUIFER DATA

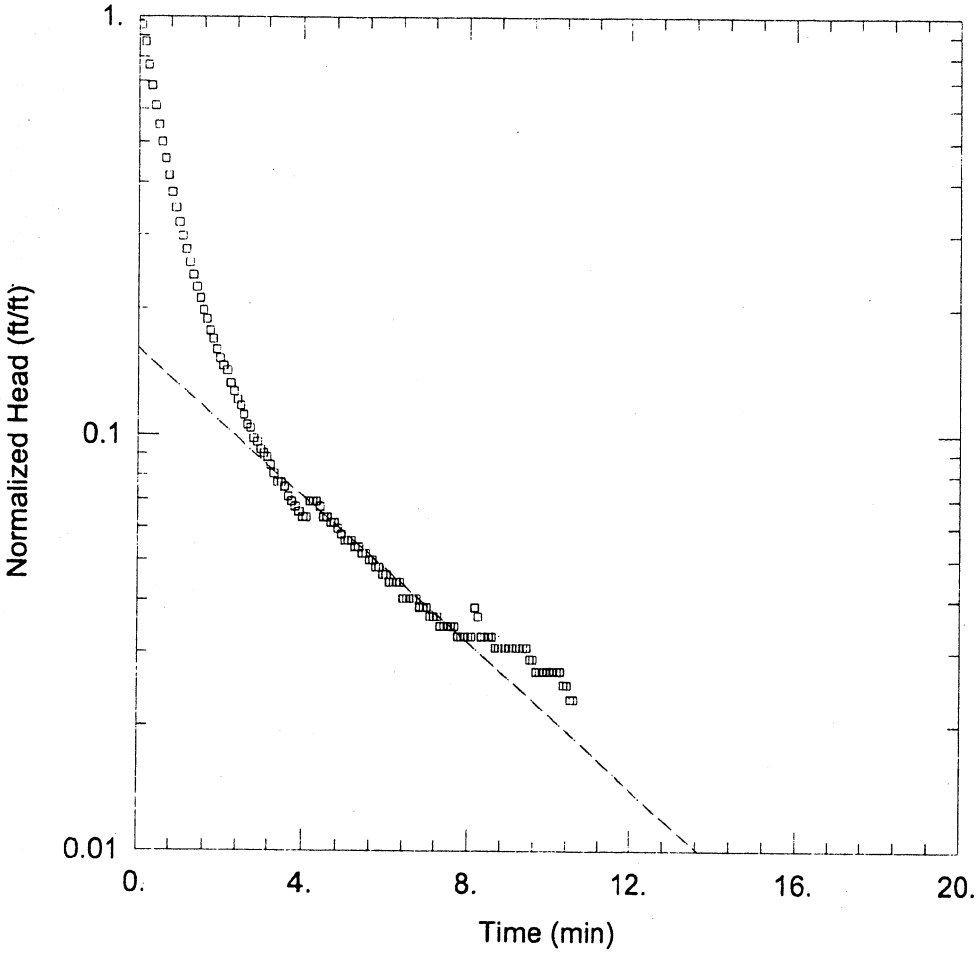
Saturated Thickness: 2.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-09B)

Initial Displacement: 4.649 ft
Total Well Penetration Depth: 12.69 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 12.69 ft
Screen Length: 2.5 ft
Wellbore Radius: 0.1875 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.497E-5 cm/sec
y0 = 4.445 ft



P-04-10B SLUG TEST

Data Set: \...\P-04-10B.aqt
Date: 09/27/06 Time: 13:07:02

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: P-04-10B
Test Date: 4/19/06

AQUIFER DATA

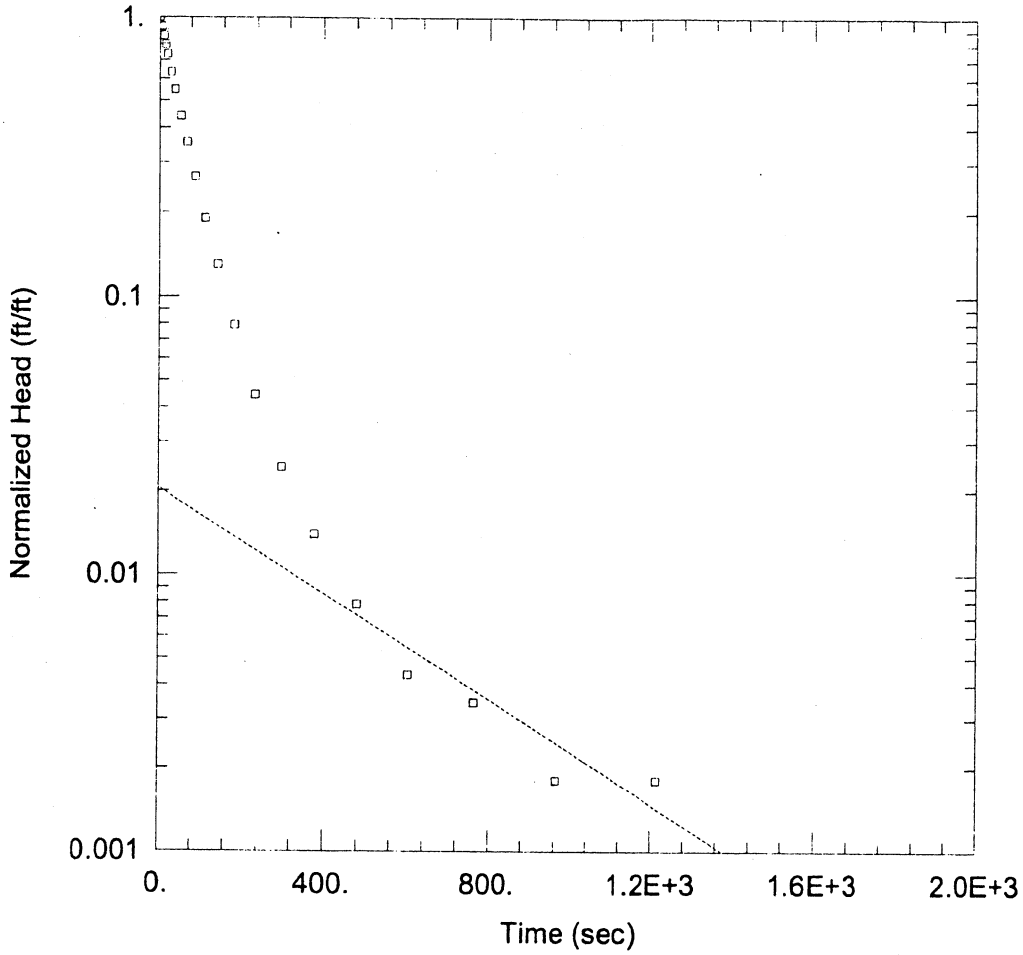
Saturated Thickness: 2.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-10B)

Initial Displacement: 5.2 ft
Total Well Penetration Depth: 8.5 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 8.5 ft
Screen Length: 2.5 ft
Wellbore Radius: 0.188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 5.109E-5 cm/sec
y0 = 0.8383 ft



P-04-11A SLUG TEST

Data Set: \...\P-04-11A.aqt
Date: 09/27/06 Time: 13:04:26

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-11A
Test Date: 10/26/04

AQUIFER DATA

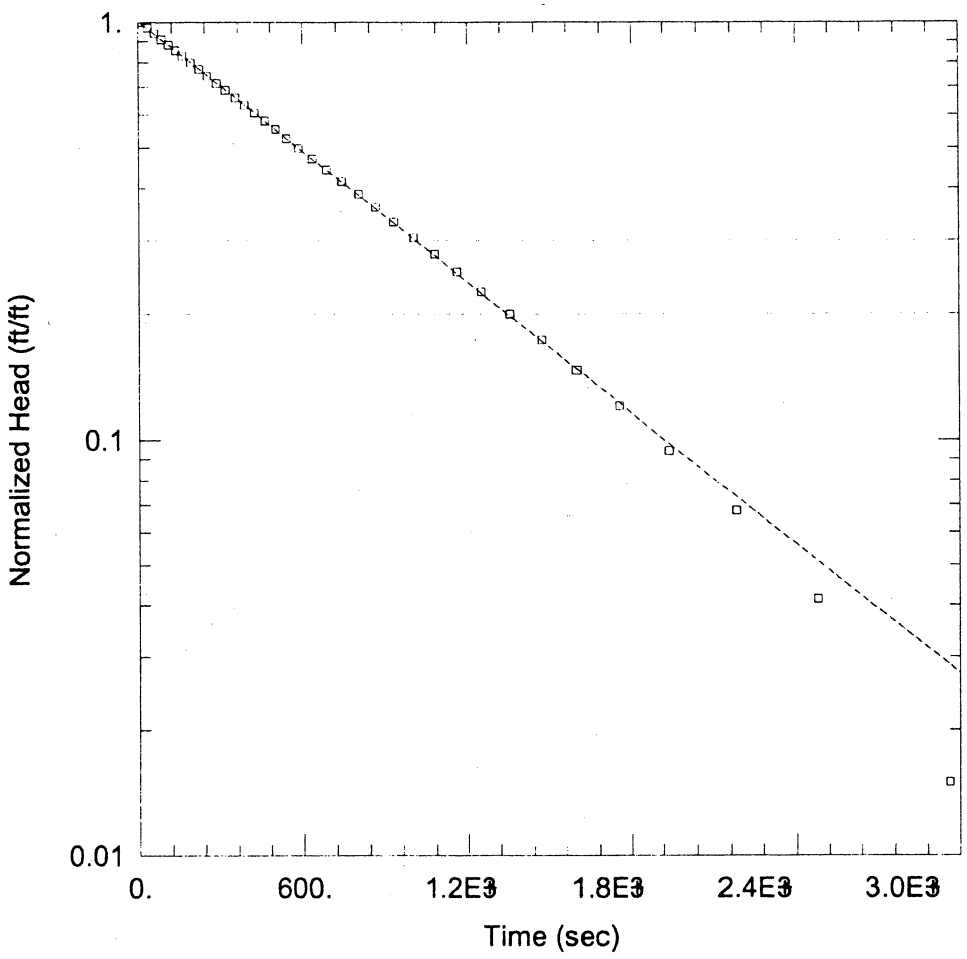
Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-11A)

Initial Displacement: 6.653 ft
Total Well Penetration Depth: 42.83 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 42.83 ft
Screen Length: 3.5 ft
Wellbore Radius: 0.1875 ft

SOLUTION

Aquifer Model: Unconfined
K = 3.24E-5 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.137 ft



P-04-11B SLUG TEST

Data Set: \...\P-04-11B.aqt
Date: 09/27/06 Time: 14:06:16

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-11B
Test Date: 10/26/04

AQUIFER DATA

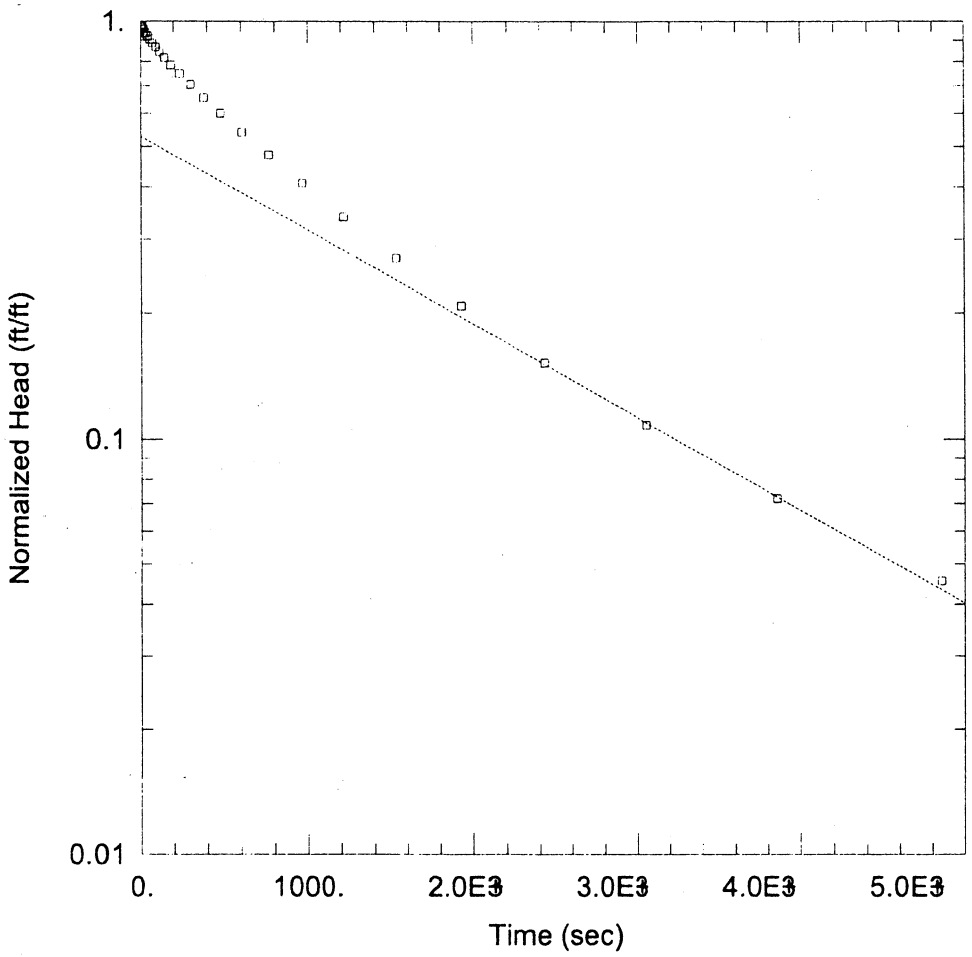
Saturated Thickness: 2.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-11B)

Initial Displacement: 3.94 ft
Total Well Penetration Depth: 9.71 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 9.71 ft
Screen Length: 2.5 ft
Wellbore Radius: 0.1875 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 1.858E-5 cm/sec y0 = 3.969 ft



P-04-12C SLUG TEST

Data Set: \...\P-04-12C.aqt
Date: 09/27/06 Time: 13:03:04

PROJECT INFORMATION

Company: SEVEE & MAHER ENGINEERS
Client: CASELLA
Project: 03076.09
Location: WEST OLD TOWN
Test Well: P-04-12C
Test Date: 10/26/04

AQUIFER DATA

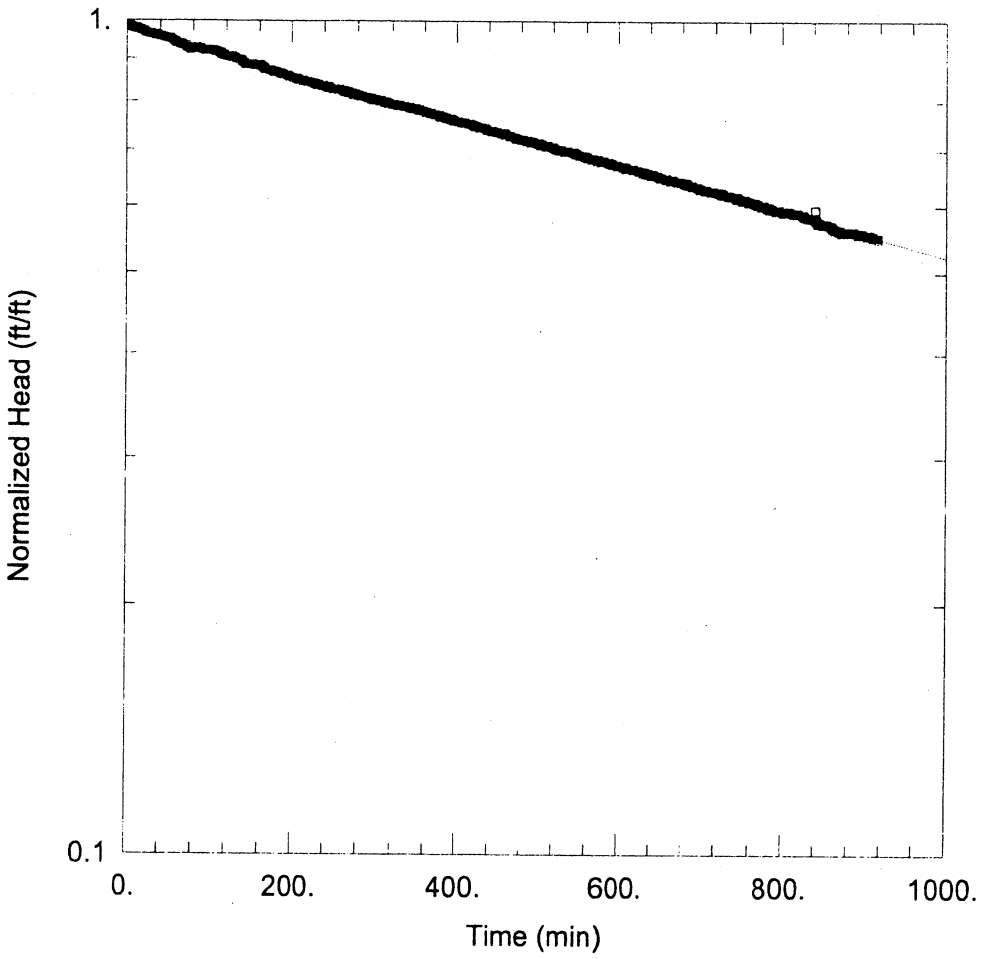
Saturated Thickness: 2.2 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-12C)

Initial Displacement: 3.516 ft Static Water Column Height: 5.033 ft
Total Well Penetration Depth: 5.033 ft Screen Length: 2.2 ft
Casing Radius: 0.0313 ft Wellbore Radius: 0.1875 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 7.749E-6 cm/sec y0 = 1.857 ft



P-04-13C SLUG TEST

Data Set: \...\P-04-13C.aqt
Date: 09/27/06 Time: 14:14:03

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: P-04-13C
Test Date: 4/19/06

AQUIFER DATA

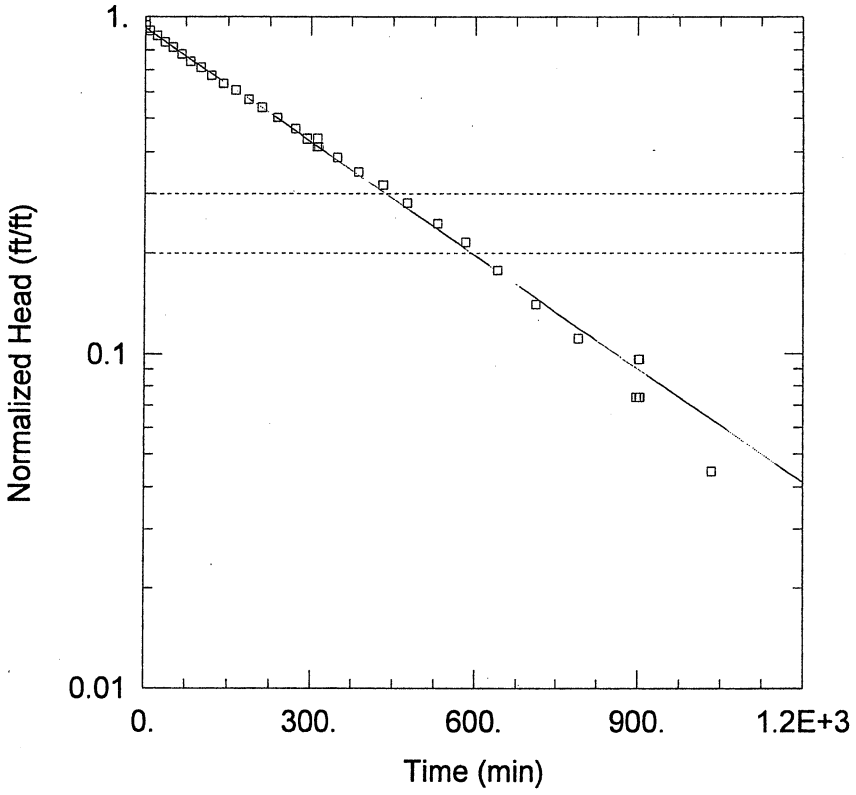
Saturated Thickness: 2.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-13C)

Initial Displacement: 4.1 ft
Total Well Penetration Depth: 8.6 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 8.6 ft
Screen Length: 2.5 ft
Wellbore Radius: 0.188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.568E-7 cm/sec
y0 = 3.997 ft



P-08-03B

Data Set: \\Aserver\cfs\Casella\OldTownLandfill\Hydraulic Conductivity\P08-03B_BR.aqt
Date: 08/05/08 Time: 10:18:41

PROJECT INFORMATION

Client: Casella
Project: 08097.01
Location: JRLF - Old Town, ME
Test Date: 07/30/08

AQUIFER DATA

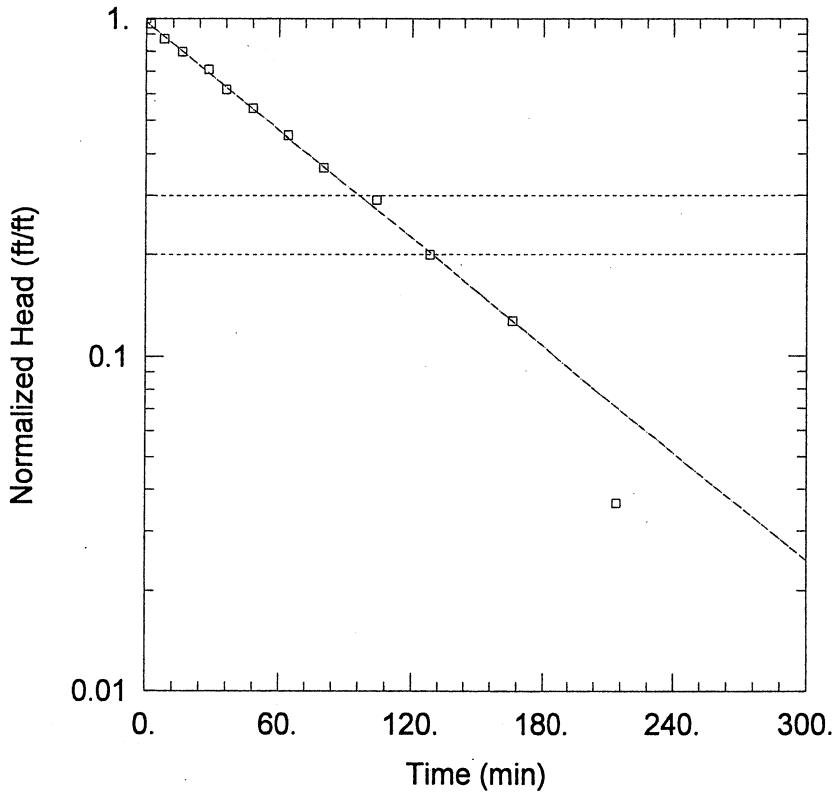
Saturated Thickness: 2.9 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P08-03B)

Initial Displacement: 1.35 ft
Total Well Penetration Depth: 2.9 ft
Casing Radius: 0.042 ft
Static Water Column Height: 2.9 ft
Screen Length: 2. ft
Wellbore Radius: 0.188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.106E-6 cm/sec
y0 = 1.259 ft



P-08-04 A

Data Set: \\Aserver\cfs\Casella\OldTownLandfill\Hydraulic Conductivity\P08-04_BR.aqt
Date: 08/05/08 Time: 10:37:43

PROJECT INFORMATION

Client: Casella
Project: 08097.01
Location: JRLF - Old Town, ME
Test Date: 07/29/08

AQUIFER DATA

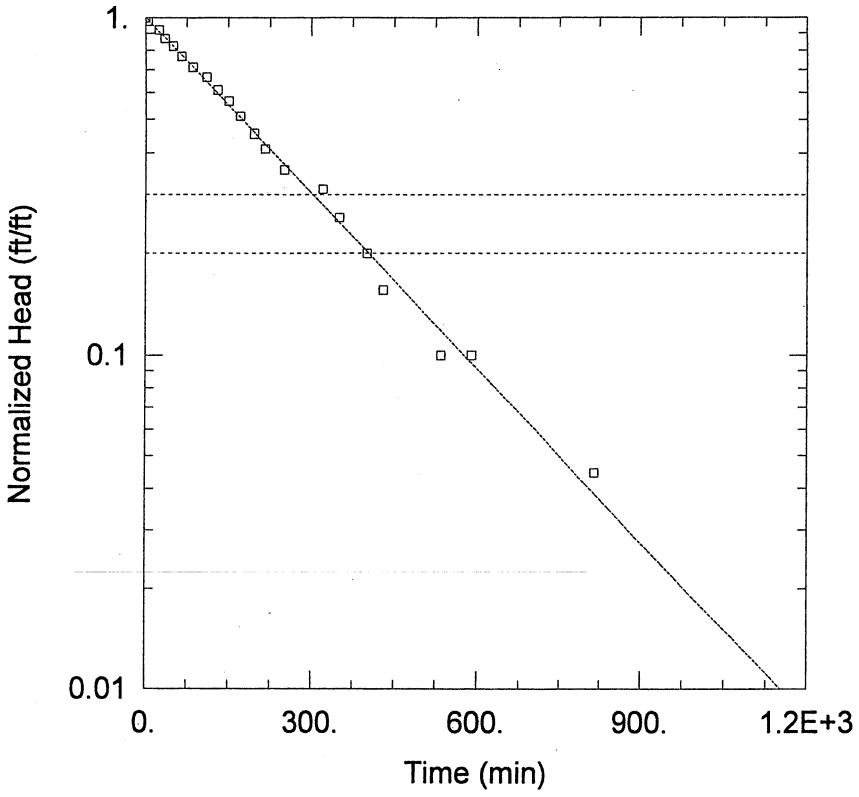
Saturated Thickness: 7.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P08-04)

Initial Displacement: 0.55 ft
Total Well Penetration Depth: 6.7 ft
Casing Radius: 0.042 ft
Static Water Column Height: 6.7 ft
Screen Length: 2. ft
Wellbore Radius: 0.188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 5.368E-6 cm/sec
y0 = 0.5385 ft



P-08-06

Data Set: \\Aserver\cfs\Casella\OldTownLandfill\Hydraulic Conductivity\P08-06_BR.aqt
Date: 08/05/08 Time: 10:34:12

PROJECT INFORMATION

Client: Casella
Project: 08097.01
Location: JRLF - Old Town, ME
Test Date: 07/29/08

AQUIFER DATA

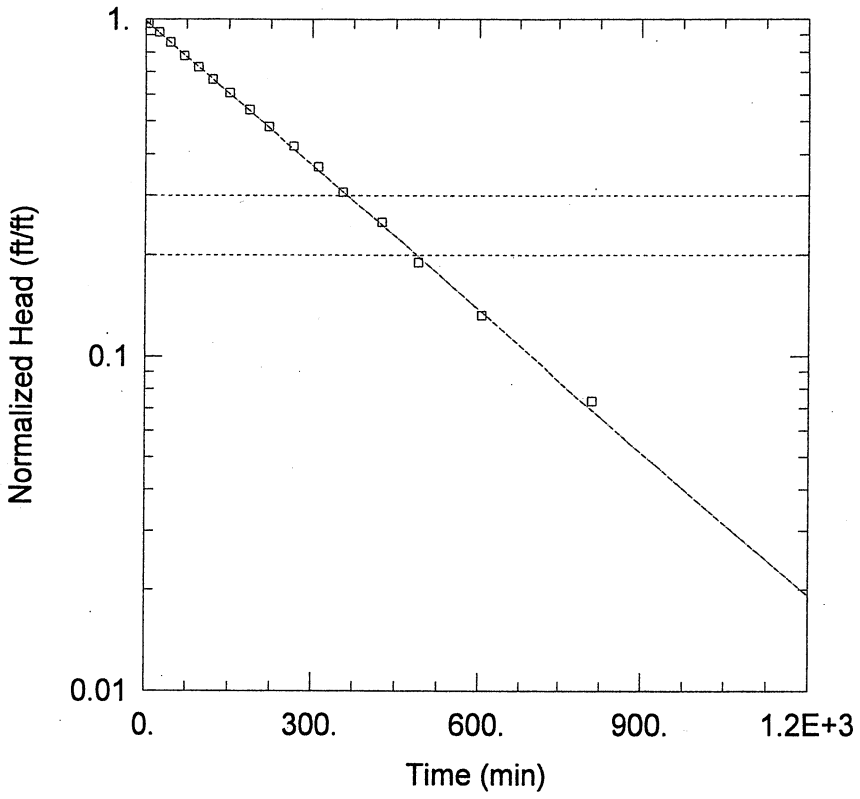
Saturated Thickness: 19.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P08-06)

Initial Displacement: 0.9 ft
Total Well Penetration Depth: 10.4 ft
Casing Radius: 0.042 ft
Static Water Column Height: 10.4 ft
Screen Length: 2. ft
Wellbore Radius: 0.188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.623E-6 cm/sec
y0 = 0.9058 ft



P-08-07

Data Set: \\Aserver\cfs\Casella\OldTownLandfill\Hydraulic Conductivity\P08-07_BR.aqt
Date: 08/05/08 Time: 10:33:10

PROJECT INFORMATION

Client: Casella
Project: 08097.01
Location: JRLF - Old Town, ME
Test Date: 07/29/08

AQUIFER DATA

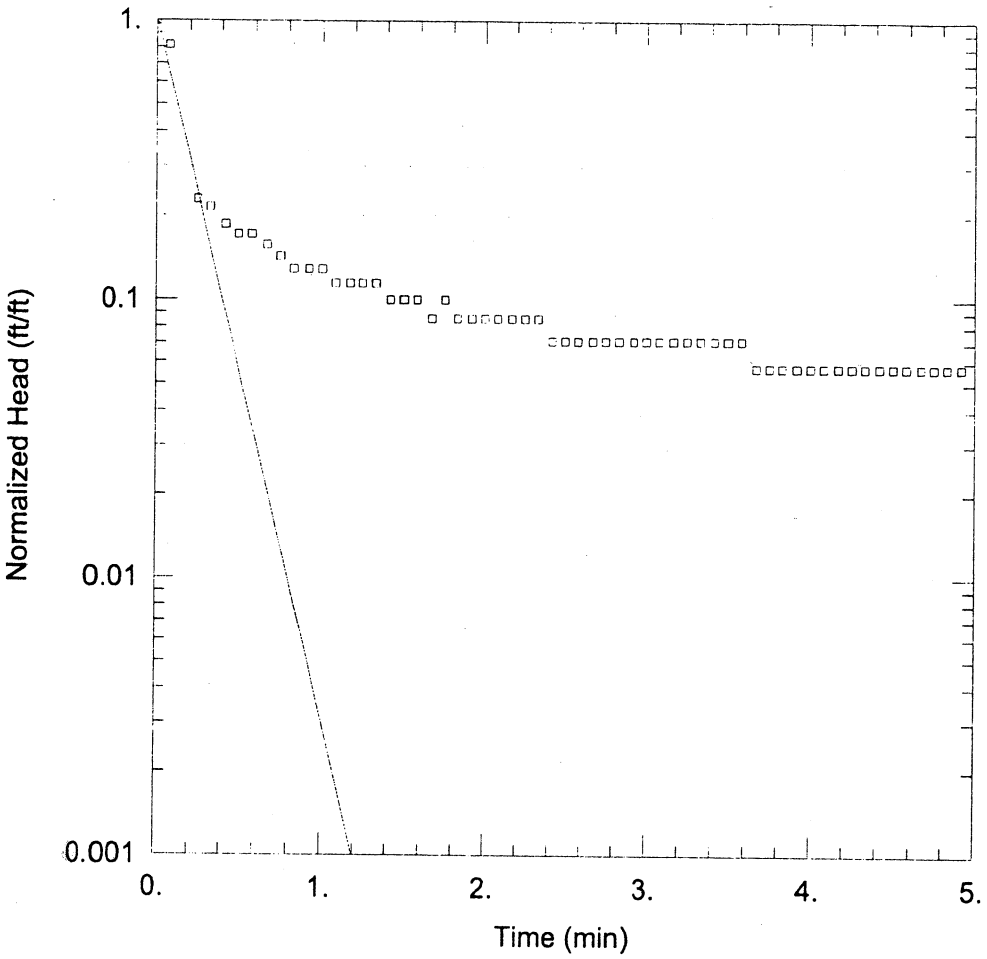
Saturated Thickness: 12.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P08-07)

Initial Displacement: 0.693 ft
Total Well Penetration Depth: 8.94 ft
Casing Radius: 0.042 ft
Static Water Column Height: 8.94 ft
Screen Length: 2. ft
Wellbore Radius: 0.188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.374E-6 cm/sec
y0 = 0.6876 ft



MW-0601 SLUG TEST #1

Data Set: \...\MW-0601 #1.aqt
Date: 09/27/06 Time: 13:31:06

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: MW-0601
Test Date: 4/20/06

AQUIFER DATA

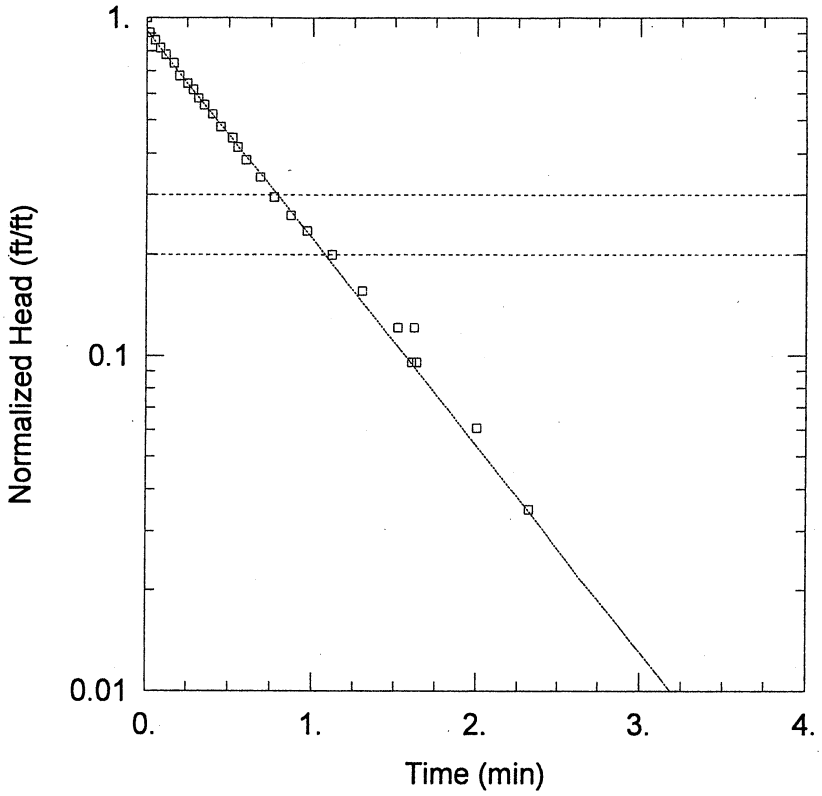
Saturated Thickness: 12.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-0601)

Initial Displacement: 0.7 ft
Total Well Penetration Depth: 23.5 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 23.5 ft
Screen Length: 12.2 ft
Wellbore Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
K = 0.003111 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.7218 ft



P-08-03A

Data Set: \\Aserver\cfs\Casella\OldTownLandfill\Hydraulic Conductivity\P08-03A_BR.aqt
Date: 08/05/08 Time: 10:19:12

PROJECT INFORMATION

Client: Casella
Project: 08097.01
Location: JRLF - Old Town, ME
Test Date: 07/30/08

AQUIFER DATA

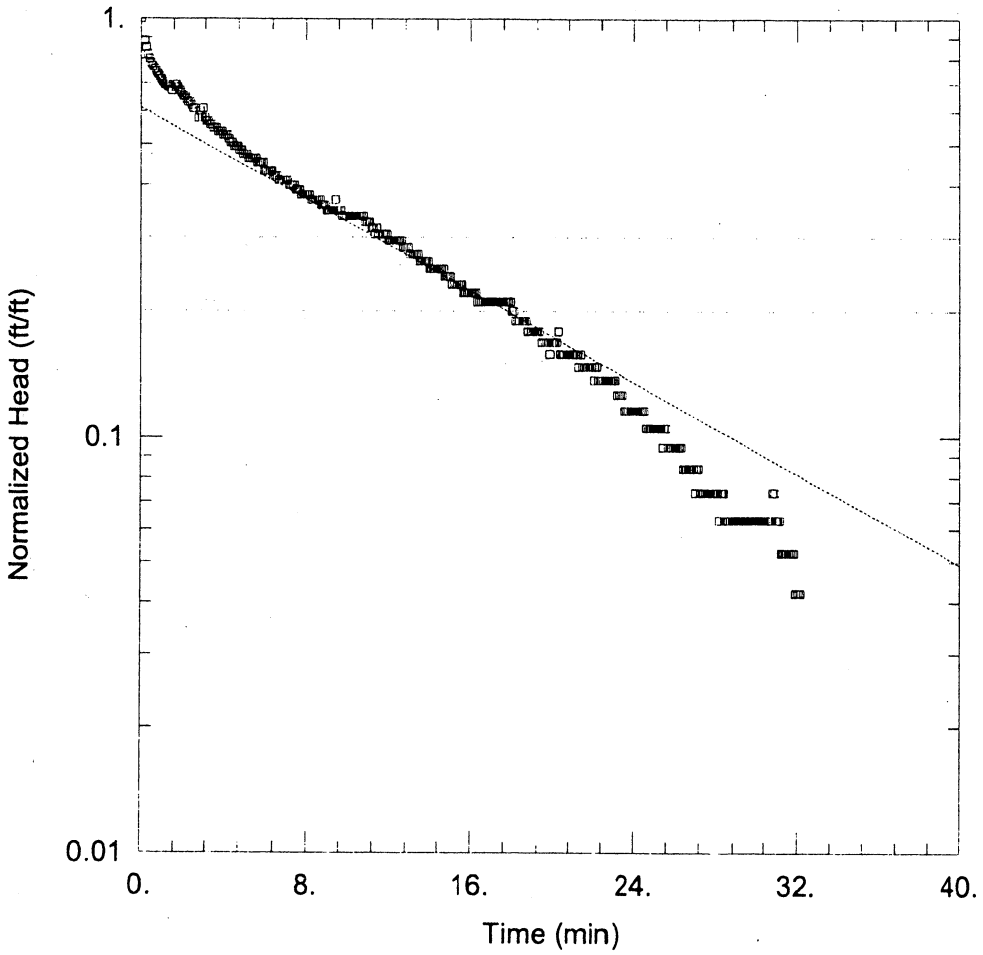
Saturated Thickness: 13. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P08-03A)

Initial Displacement: 1.15 ft
Total Well Penetration Depth: 13. ft
Casing Radius: 0.042 ft
Static Water Column Height: 13. ft
Screen Length: 2. ft
Wellbore Radius: 0.188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0008285 cm/sec
y0 = 1.057 ft



P-04-07C SLUG TEST

Data Set: \...\P-04-07C.aqt
Date: 09/27/06 Time: 13:06:14

PROJECT INFORMATION

Company: SME
Client: CASELLA
Project: 05055.00
Location: WOTL
Test Well: P-04-07C
Test Date: 4/20/06

AQUIFER DATA

Saturated Thickness: 1.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P-04-07C)

Initial Displacement: 0.95 ft
Total Well Penetration Depth: 5.3 ft
Casing Radius: 0.0313 ft
Static Water Column Height: 5.3 ft
Screen Length: 1.7 ft
Wellbore Radius: 0.188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.984E-5 cm/sec
y0 = 0.5822 ft

APPENDIX F

BOREHOLE GEOPHYSICAL LOGGING REPORTS

GEOPHYSICAL LOG RESULTS
OF BOREHOLE MW-06-02
JUNIPER RIDGE PROPERTY
OLD TOWN, MAINE

Northeast Geophysical Services
4 Union Street, Suite 3
Bangor, Maine 04401
March, 2006

GEOPHYSICAL LOG RESULTS
OF BOREHOLE MW-06-02
JUNIPER RIDGE PROPERTY
OLD TOWN, MAINE

Introduction

At the request of Sevee & Maher Engineers, Inc. (SME), a bedrock borehole (MW-06-02) located on the Juniper Ridge Landfill property in Old Town, Maine was geophysically logged. The borehole was logged on March 8, 2006 by Rudy Rawcliffe of Northeast Geophysical Services (NGS) assisted SME personnel. Geophysical logging was used as one of the means to identify the location and orientation of potential water-bearing fractures in the borehole. Caliper, temperature, single point resistance (SPR), spontaneous potential (SP), fluid conductivity, and flowmeter measurements were collected from the borehole. In addition, an acoustic televiewer (ATV) image was also generated for the borehole.

Summary of Results

A composite geophysical log of the borehole is appended. The log shows the results of the caliper, temperature, SPR, SP, fluid conductivity, and ATV logging. Heat pulse flowmeter measurements for ambient and pumping conditions are shown adjacent to the caliper log.

The composite geophysical log shows the possible locations of potential fractures in the borehole. The flowmeter results may provide indications of which of these potential fractures are transmissive.

The ATV log provides the strike and dip of planar features that intersect the borehole. These planar features may be fractures or may represent cleavage or bedding planes. Figure 1 (on the following page) is a rose plot of the strike and dip angle of all the interpreted features for MW-06-02. This plot shows that the predominant strike of about half of the twenty-one interpreted features* is to the northeast at about 35° true and the features generally dip about 45° to the northwest. This probably is the foliation of the rock in this area. However, the strike and dip direction of the fractures that are suspected to be transmissive vary. Figure 3 (page 3) is a polar plot of the dip azimuth and dip direction. This plot shows that several of the suspected transmissive fractures have a dip and dip direction (and strike) that is different from the predominant trend.

MW-06-02 only has about 21 feet of open borehole. The caliper log shows that the upper 8 feet, from 22 to 30 feet, is highly fractured. The temperature and flowmeter measurements indicate that the most transmissive area in the borehole is immediately below the casing from 22 to 25 feet. Other possible transmissive fractures may be at 27-30 feet and at 37 feet.

Methods and Instrumentation

The boreholes were logged with a Mount Sopris MGX II digital logger. The borehole was initially

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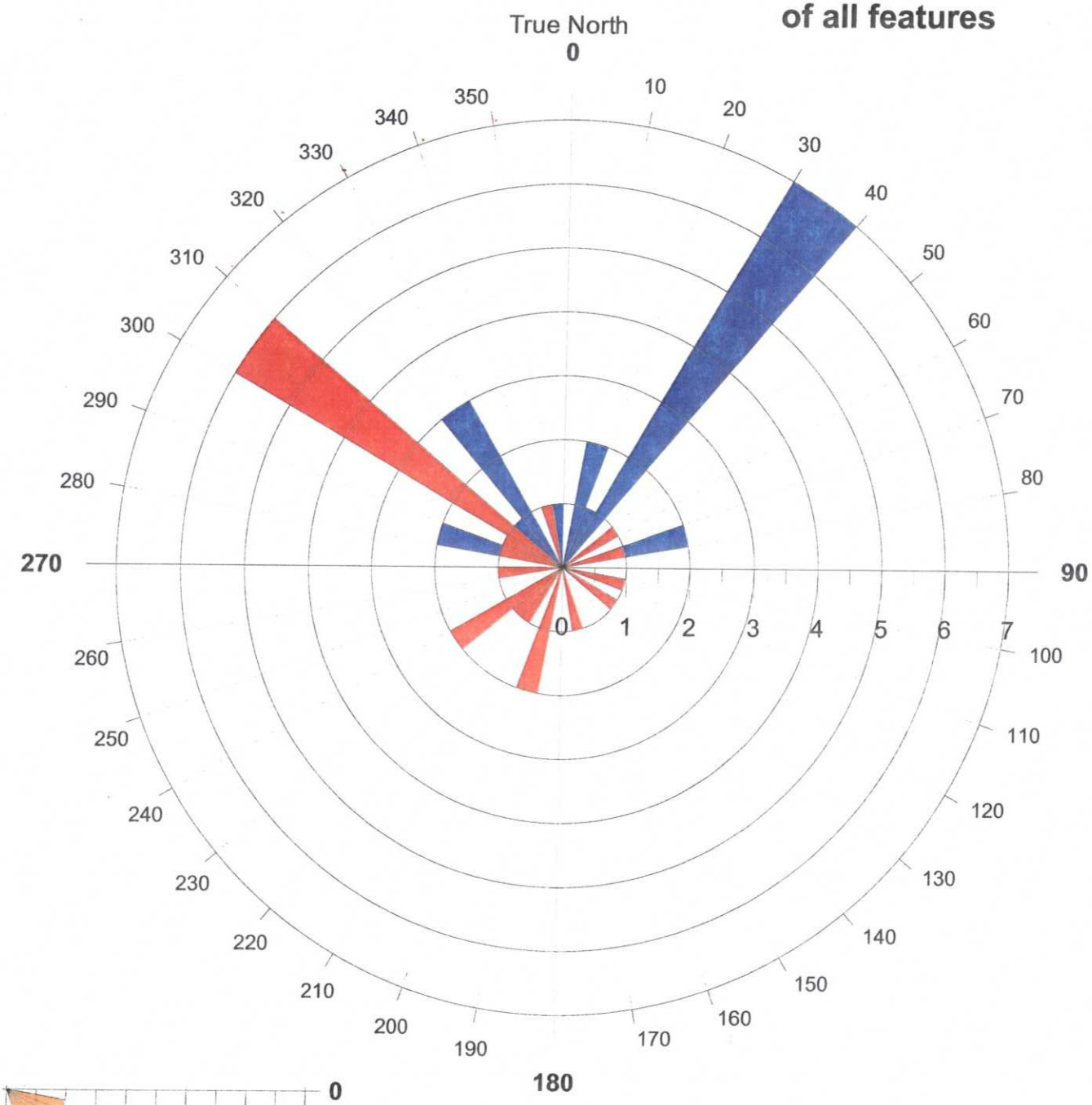
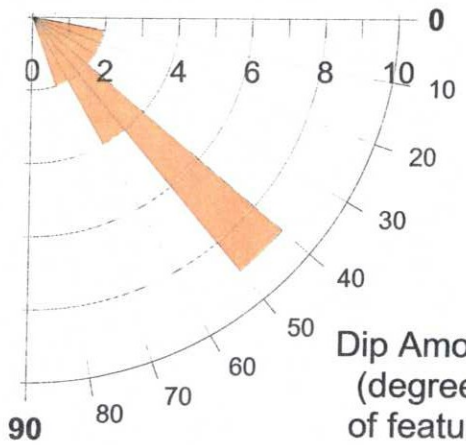
* Only features with dips greater than 10° were used in this plot.

MW-06-02
Old Town, Maine

FIGURE 1
Strike and Dip Direction of all features



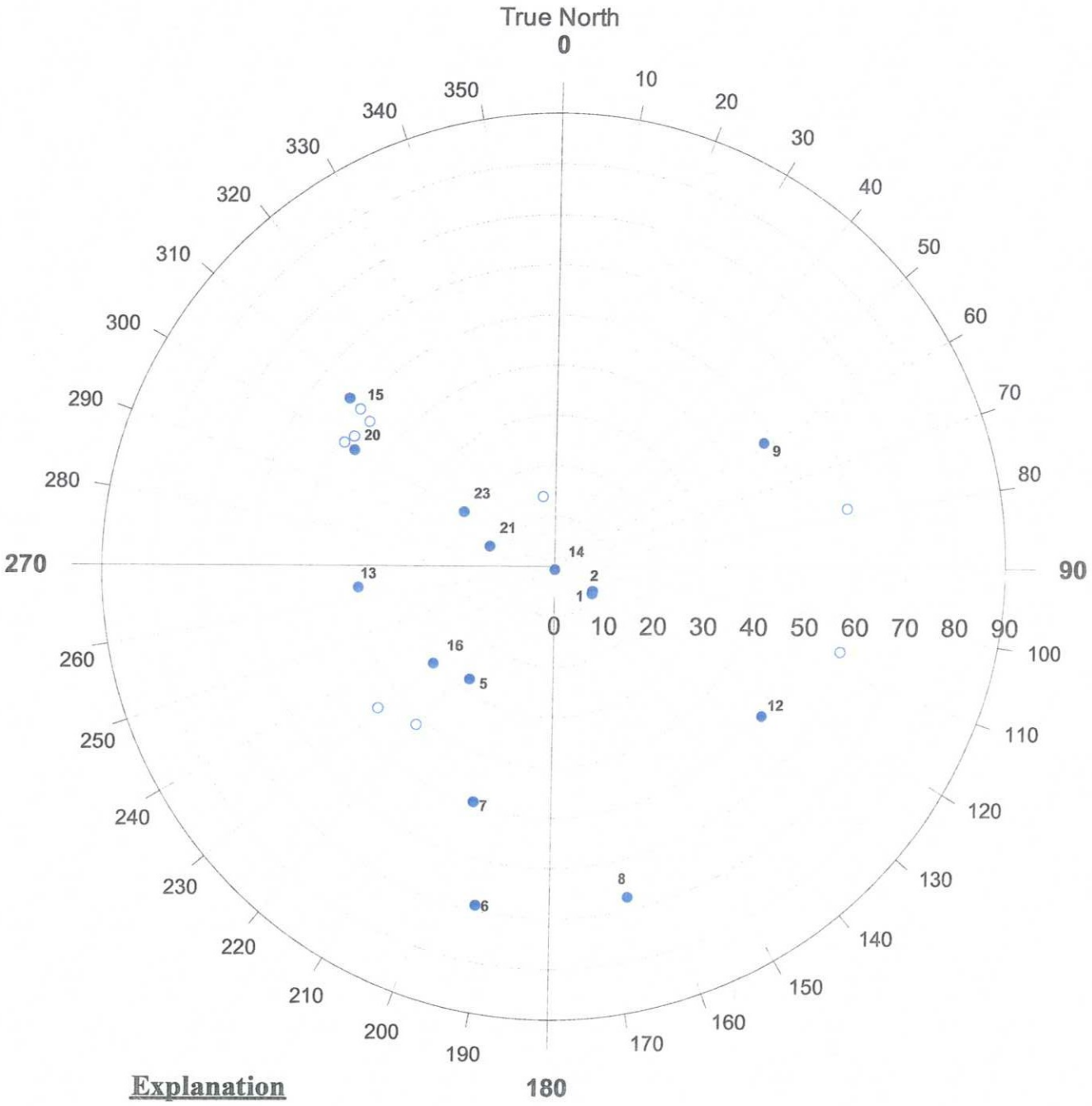


Explanation
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Graph based on 21 measurements in MW 06-02 of features having a dip greater than 10 degrees.

Polar Dip Plot of MW-06-02 Old Town, Maine

FIGURE 2
Dip Amount and Dip Azimuth of planar features



Explanation

- ○ All planar features
- ● possible water bearing features

Graph based on 24 measurements in MW 06-02

logged for temperature and fluid conductivity. Temperature (in degrees Celsius) was measured going down the hole. Areas where water is entering or exiting the borehole (transmissive fractures) are sometimes revealed on the temperature log as abrupt temperature changes or sometimes as temperature gradient changes. Transmissive fractures can also be revealed by changes in the fluid conductivity log.

The borehole was then logged with a caliper tool. Caliper measurements, which measure the borehole diameter, are made coming up the hole. Fractures are often revealed on the caliper log as abrupt widenings of the borehole.

The borehole was then logged with a combination single point resistance, spontaneous potential (SP) and natural gamma tool. Single-point-resistance measures the electrical resistance (in ohms) between the probe and a surface electrode. Water-filled fractures will often appear as abrupt spikes of relatively low resistance on this log. The SP log measures the natural voltages (in milli-volts) that occur in the subsurface. There can be different causes for SP, one is called "streaming potential" and is caused when water flows into or out of the borehole. Water filled bedrock fractures sometimes appear as abrupt spikes to the right on the SP log.

The boreholes were then logged with an acoustic televiewer. The ATV log provides an acoustical image of the borehole walls. The ATV works by scanning the borehole wall with an acoustic beam that is produced by a rapidly rotating piezoelectric source. Planar features such as fractures, bedding surfaces, and joints can be identified with the ATV tool and the strike, dip direction and dip angle of these features can often be determined.

Flowmeter Measurements

Flowmeter measurements of the vertical water flow were made in the borehole using a Mount Sopris Heat Pulse Flowmeter. This instrument is capable of measuring flow direction in a borehole (up or down) and has a calibrated measurement range of 1.0 to 0.03 gallons per minute (gpm).

Vertical flow in a borehole is caused when two or more transmissive fractures in the borehole are at hydraulic disequilibrium with one another. When this occurs there is a hydraulic gradient developed and water will flow toward the fracture with the lower hydraulic head. When no vertical flow is measured it can mean that there are less than two transmissive fractures in the borehole or that all the fractures in the borehole are at equilibrium with each other.

Results

A composite geophysical log of the borehole is appended. One or a combination of anomalous geophysical responses identified physical discontinuities that may represent possible fractures. These included abrupt widenings in the caliper log, spikes of lower resistivity in the SPR log, changes in the fluid resistivity log, and deflections or gradient changes in the temperature log. The heat-pulse flowmeter results are also shown. All of the depths on these logs are referenced from the top of the casing (toc). Following is a descriptive summary of the geophysical logging results:

MW-06-02:

Total Depth (TOC):	43.8 feet
Casing Depth:	22 feet
Water Level:	7.6 feet

The caliper log for MW-06-02 shows a nominal borehole diameter of 6.27 inches. The borehole walls in the upper part of MW-06-02 from immediately beneath the casing at 22 feet until about 30 feet are very rough indicating highly fractured bedrock. Below 30 feet there are some smaller

caliper deflections (possible fractures) at 34.5 feet, 37 feet and 42 feet.

The temperature log for MW-06-02 shows an ambient water temperature below the casing averaging 8.0° C. The temperature log shows deflections in the temperature gradient at 22 feet, 23 feet, and 25 feet. These deflections may indicate a transmissive fracture in this area.

The single point resistance (SPR) log shows that the median resistance for MW-06-02 is 1,125 ohms for the uncased portion of the borehole. There are some abrupt deflections toward lower resistance that may indicate bedrock fractures. In most instances these resistance anomalies are associated with caliper anomalies. The most prominent SPR anomaly is at 24 feet. This depth also has a large SP anomaly associated with it. Much smaller SPR anomalies occur at 27, 29.5, 32 and 37 feet.

The fluid conductivity log shows an average conductivity for the borehole fluid below the casing of about 100 µS/cm. The fluid conductivity is fairly constant over the 21 feet of open borehole with no abrupt changes in fluid conductivity.

The ATV log for MW-06-02 indicates that the planar features (possible fractures, bedding planes, joints or cleavages) predominantly strike to the northeast at about 35° true and have a median dip of 46° to the northwest. The strike and dip of identified planar features (possible fractures) for MW-06-02 are shown on the composite log and tabulated in the appendix. The ATV log was examined in the area of the possible transmissive zones to determine if the strike and dip of these fractures could be determined. In the upper part of the borehole from 22 feet to 31 feet there are numerous fractures oriented at various strikes and dips. Some of these fractures are transmissive, however, they are so closely spaced or even intersecting that the identity of which fracture is transmissive cannot be determined. Similarly, at about 34 feet there appear to be several intersecting fractures. The fracture located at about 36.7 feet (feature #16) strikes 321° and dips 31° southwest. Near the bottom of the borehole at 42 feet there are a couple of possible transmissive fractures: feature #20, which strikes 30° and dips 46° northwest and feature #23, which strikes 31° and dips 21° northwest.

The flowmeter measurements for MW-06-02 under ambient conditions indicate no flow in the borehole at 20 feet or at 26 feet. At 32.5 and 35.5 feet a slight downflow of 0.02 gpm was initially measured but then eventually there was no measurable flow at these locations. At 39 and 42.5 feet no flow was measured. Measurements were then repeated while pumping the borehole at 0.25 gpm. Under pumping conditions, flowmeter measurements indicate no measurable flow at the bottom of the borehole until 35.5 feet and 32.5 feet where slight downflows (0.01 gpm) were measured. However, after about 5 minutes the flowrate at these locations diminished to no measurable flow. At 26.5 feet a slight upflow (0.01 gpm) was measured. At 21 feet, which is in the casing, upflow increased to 0.07 gpm.

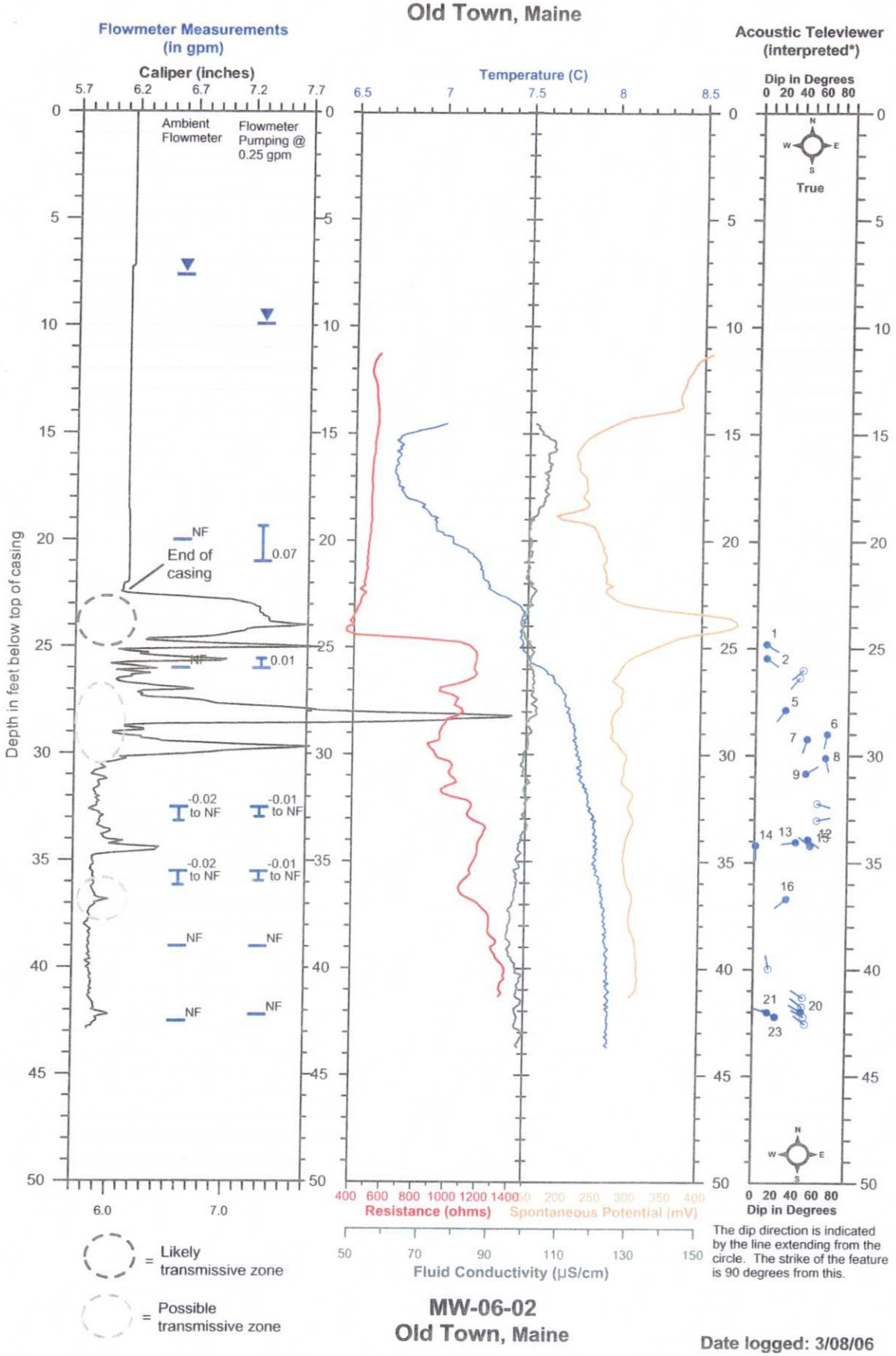
During the 15 minutes of pumping at 0.25 gpm the water level in the borehole dropped 2.3 feet. This indicates that this borehole is not very high yielding. The flowmeter results indicate that the area immediately below the casing from 22 to 25 feet is transmissive. It is also possible that water is entering the borehole at 27 to 30 feet and at about 37 feet.

BOREHOLE GEOPHYSCIAL LOGS

Northeast Geophysical Services

Date logged: 3/08/06

Borehole Geophysical Log
MW-06-02
Old Town, Maine



= Likely transmissive zone

= Possible transmissive zone

The dip direction is indicated by the line extending from the circle. The strike of the feature is 90 degrees from this.

MW-06-02
Old Town, Maine

Date logged: 3/08/06

Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel: 207-942-2700 email: ngsinc@adelphia.net

Log: Acoustical & Caliper Logs

Well: **MW-06-02**

Site: Juniper Ridge Landfill

Location: Old Town, Maine

Date:	3/8/06
Casing Depth:	22 ft
Casing Type:	6 in
Boring Depth:	43.8 ft
Meas. From:	top of casing
Stickup:	2 ft
Water Level:	7.6 ft

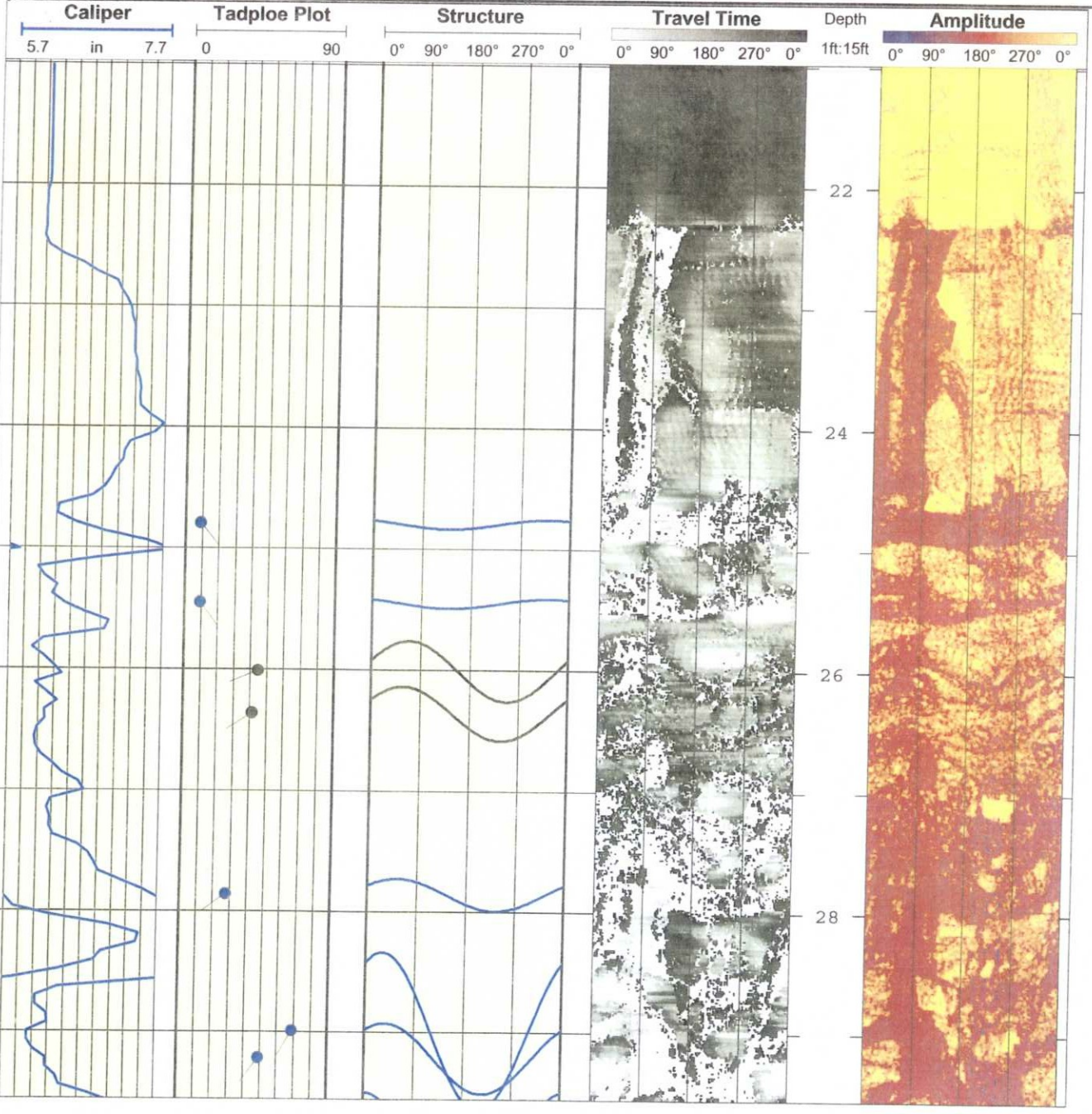
For: Sevee & Maher Engineers

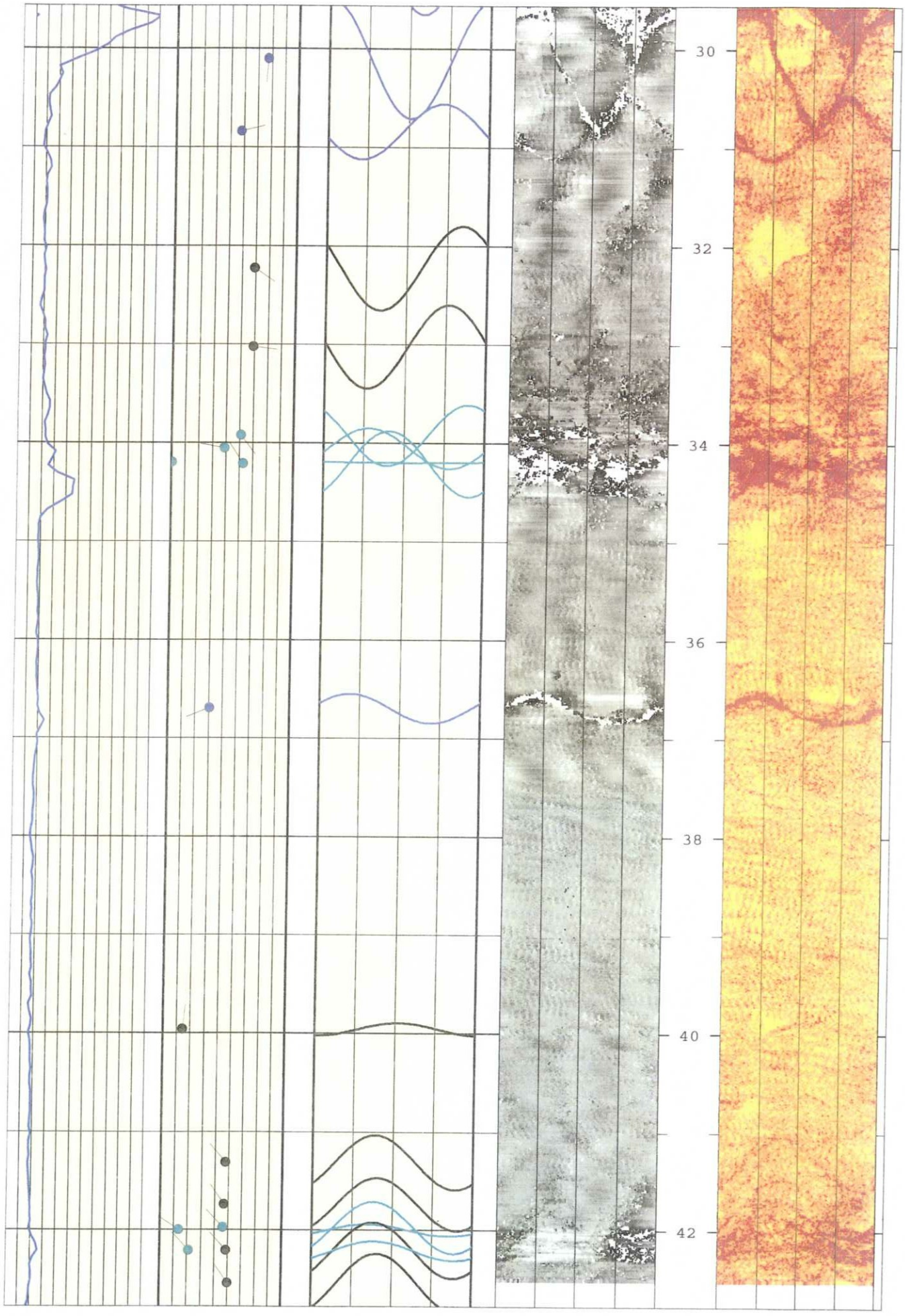
Logged by: R Rawcliffe

Orientation: magnetic

Comments:

Structure & Tadpole Plots:
black = planar features (faults, foliation, joints, etc)
light blue = possibly transmissive fracture
dark blue = likely transmissive fracture




30
32
34
36
38
40
42

Planar Features interpreted from Acoustic Televiewer
MW-06-02 - Old Town, Maine **Logged: 03/08/06**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Category Type
MW-06-02	1	24.8	9	140	50	123	33	107
MW-06-02	2	25.5	9	143	53	125	35	107
MW-06-02	3	26.0	45	248	338	231	321	100
MW-06-02	4	26.4	41	238	328	221	311	100
MW-06-02	5	27.9	28	234	324	217	307	107
MW-06-02	6	29.0	69	210	300	192	282	107
MW-06-02	7	29.2	49	216	306	198	288	107
MW-06-02	8	30.1	67	184	274	167	77	107
MW-06-02	9	30.8	48	76	346	59	329	107
MW-06-02	10	32.2	59	124	34	106	16	100
MW-06-02	11	33.0	59	96	6	79	349	100
MW-06-02	12	33.9	51	143	53	125	35	108
MW-06-02	13	34.1	39	281	11	264	354	108
MW-06-02	14	34.2	1	196	286	179	89	108
MW-06-02	15	34.2	53	326	56	309	39	108
MW-06-02	16	36.7	31	248	338	231	321	107
MW-06-02	17	40.0	14	7	277	350	80	100
MW-06-02	18	41.3	48	320	50	303	33	100
MW-06-02	19	41.7	47	325	55	308	38	100
MW-06-02	20	42.0	46	317	47	300	30	108
MW-06-02	21	42.0	14	304	34	287	17	108
MW-06-02	22	42.2	49	317	47	300	30	100
MW-06-02	23	42.2	21	318	48	301	31	108
MW-06-02	24	42.6	50	326	56	308	38	100

Explanation:

Category 100 = planar feature (possible fracture, joint, foliation, bedding, etc.
Category 107 = Likely water bearing feature
Category 108 = Possible water bearing fracture

GEOPHYSICAL LOG RESULTS
OF BOREHOLES PW-08-01, PW-08-02
PW-08-03 AND PW-08-04
JUNIPER RIDGE PROPERTY
OLD TOWN, MAINE

Northeast Geophysical Services
4 Union Street, Suite 3
Bangor, Maine 04401
February, 2009

GEOPHYSICAL LOG RESULTS
OF BOREHOLES PW-08-01, PW-08-02
PW-08-03 AND PW-08-04
JUNIPER RIDGE PROPERTY
OLD TOWN, MAINE

Introduction

At the request of Sevee & Maher Engineers, Inc. (SME), four bedrock boreholes (PW-08-01, PW-08-02, PW-08-03 and PW-08-04) located on the Juniper Ridge Landfill property in Old Town, Maine were geophysically logged. The boreholes were logged between January 8, and January 14, 2009 by Rudy Rawcliffe of Northeast Geophysical Services (NGS). Geophysical logging was used as one of the means to identify the location and orientation of potential water-bearing fractures in the boreholes. Caliper, temperature, single point resistance (SPR), spontaneous potential (SP), fluid conductivity, and flowmeter measurements were collected from each borehole. In addition, an optical televiewer (OTV) image was also generated for each borehole.

Summary of Results

Composite geophysical logs for each borehole are appended to this report. Each composite log shows the results of the caliper, temperature, SPR, fluid conductivity, and OTV logging. Heat pulse flowmeter measurements for ambient and pumping conditions are shown adjacent to the caliper log.

The composite geophysical log shows the possible locations of potential fractures in each of the boreholes. The flowmeter results and, to a lesser extent, the temperature and fluid conductivity results may provide indications of which of these potential fractures are transmissive.

The OTV logs provide the strike and dip of planar features that intersect the boreholes. These planar features may be fractures, or may represent cleavage or bedding planes. The results have been color-coded on the logs to provide an interpretative range of the likelihood that the associated feature signifies a transmissive fracture as follows:

- Dark blue symbol (Category 107) - multiple distinct borehole geophysical logging responses indicating borehole enlargement (caliper, SPR, optical image), or evident change in the borehole fluid characteristic (temperature, conductivity or quantified vertical flow) that provides the strongest data that the indicated bedrock feature represents a likely transmissive water-bearing fracture.
- Light blue symbol (Category 108) - less amount of corroborating geophysical data to support that the indicated feature will transmit groundwater compared to the dark blue symbol. However, the OTV log shows a fairly distinct feature that perhaps under a higher stress condition (e.g. pumping rate), vertical flow could be induced in the borehole. Less degree of confidence that the feature represents a transmissive feature.

- Light gray symbol (Category 103) – quartz or calcite vein
- Black symbol (Category 100) - bedrock feature not interpreted to transmit water; more likely to represent planes of foliation, bedding planes, healed or filled fractures, or mechanical breaks in the rock matrix due to drilling advancement.

Figure 1 on the following page is a rose plot of the strike and dip angle of all the interpreted features in the four boreholes. This plot shows that the predominant strike direction of all the interpreted features in the four boreholes is to the northeast at about 50° and dipping about 59° to the northwest or to the southeast. This most likely represents the cleavage or bedding plane of the rock. The interpreted results of the OTV logs are summarized on the composite logs for each borehole and in tables that provide the depth and calculated strike and dip of each identified feature. A combined caliper, flowmeter and OTV image log for each borehole is also presented in the appendix.

Figure 2 (page 3) is an upper hemisphere polar plot showing the dip amount and dip direction of all the interpreted planar features in the four boreholes. This graph shows that the Category 100 planar features predominantly dip steeply (median 76°) to the southeast or to the northwest. This probably represents the bedrock foliation. The graph shows that the quartz and/or calcite veins (Category 103) predominantly dip moderately (median 50°) to the northwest. The fractures interpreted to be transmissive (Categories 107 and 108), however, do not have a preferred dip or dip direction but rather have a wide range of dip direction and dip amount with some that are nearly horizontal and others that dip to all four quadrants.

Methods and Instrumentation

The borehole was logged with a Mt Sopris Matrix digital logger. Following is a brief description of each parameter that was measured and how that information is used to locate possible bedrock fractures.

Temperature (in degrees Centigrade [°C]) is measured with the probe going down each hole. Generally, temperature rises smoothly with depth at a rate of about 0.5° to 1.0° C per 100 feet due to the local geothermal gradient. Areas where water may be entering or exiting the borehole are sometimes revealed on the temperature log as abrupt temperature changes or sometimes as temperature gradient changes. Other factors that can affect the temperature log besides transmissive fractures include variations in the thermal resistivity of the rock with depth along the borehole, surface climatic changes, thermal effects of drilling activity, and localized heat sources such as radionuclides in the rock or cement setting outside the casing.

Single-point-resistance (SPR) measures the electrical resistance (in ohms) between the probe and a surface electrode. Water-filled fractures will often appear as abrupt spikes of relatively low resistance on this log.

Fluid conductivity measures the conductivity (in milli-Siemens per meter) of the water in the borehole. Fluid conductivity can be useful in identifying transmissive fractures because water entering the borehole through fractures sometimes has a different conductivity than the water that is already in the borehole.

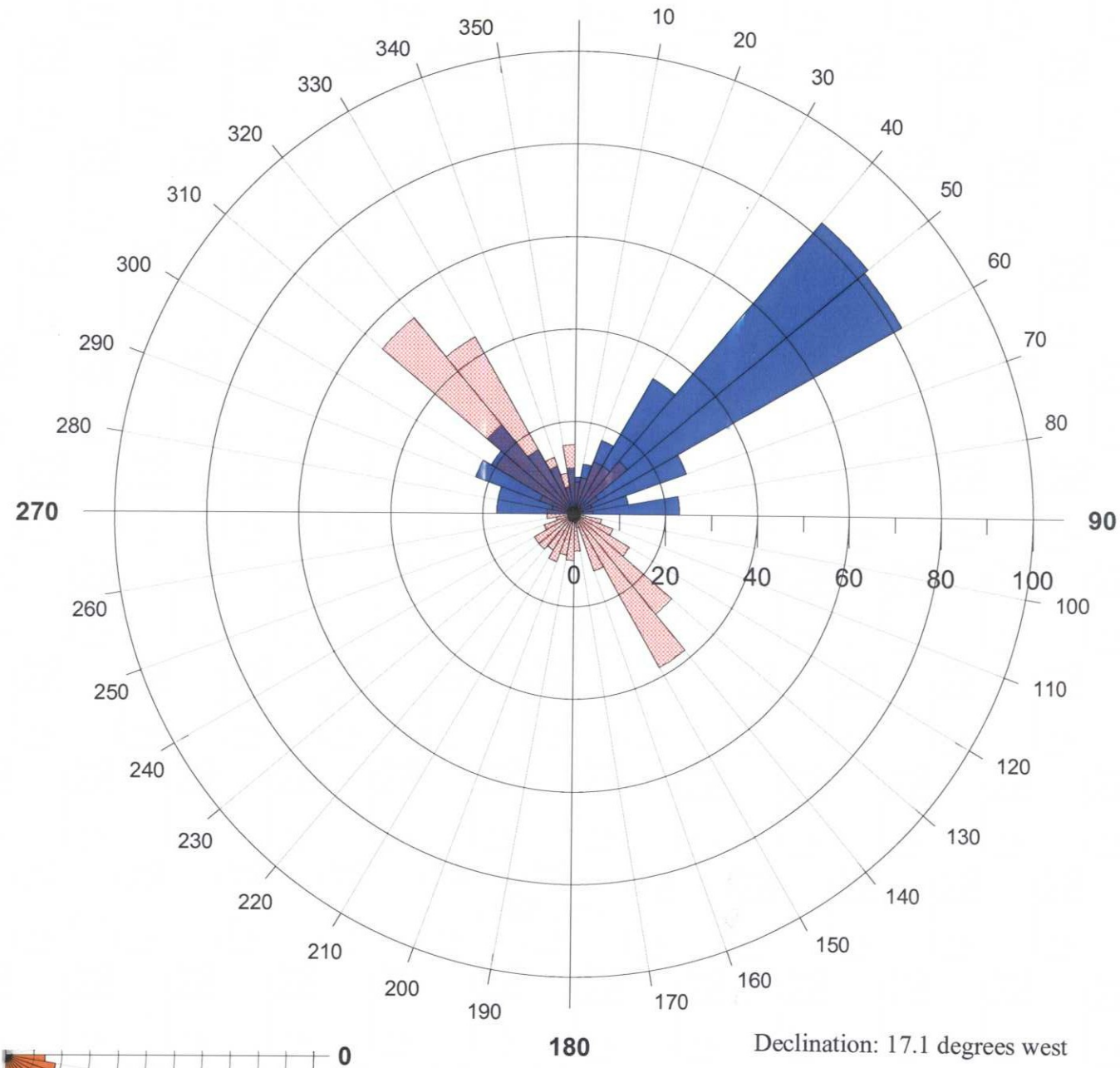
Caliper measures the borehole diameter. Fractures are often revealed on the caliper log as abrupt widenings of the borehole.

The OTV log provides a digital optical image of the borehole walls. The OTV can identify planar features such as fractures, bedding surfaces, and joints and the strike, dip direction and dip angle

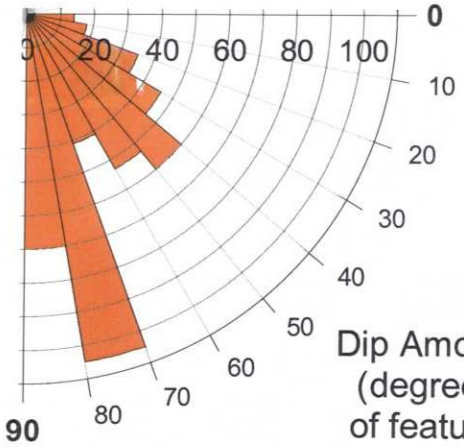
Northeast Geophysical Services

Juniper Ridge Site
Old Town, Maine

FIGURE 1
Strike and Dip Direction
of all features in
PW-08-01, 02, 03, & 04



Declination: 17.1 degrees west

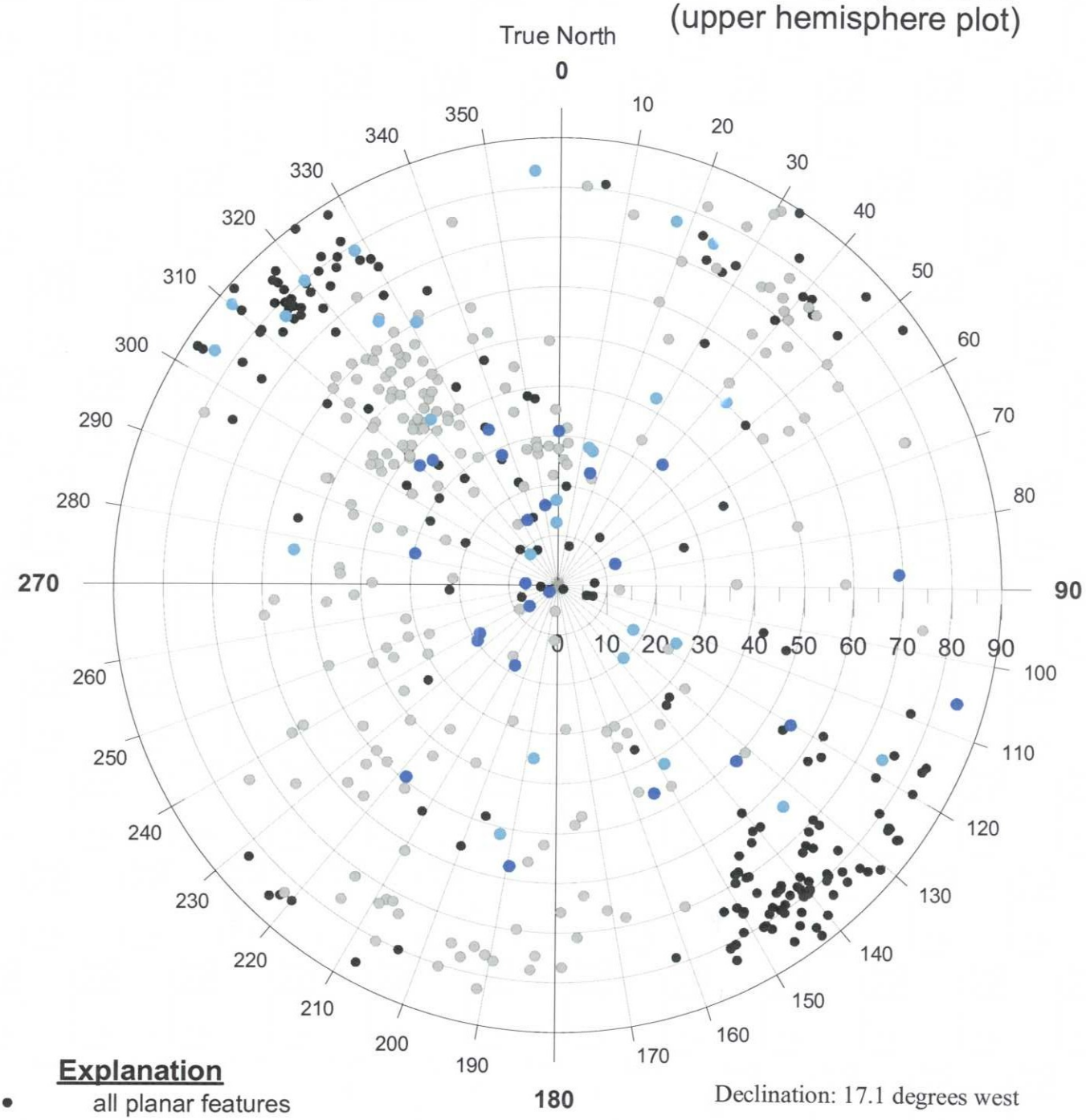


Explanation
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 442 measurements

Juniper Ridge Site
Old Town, Maine

FIGURE 2
Dip Amount and Dip Azimuth of planar features in PW-08-01, 02, 03 & 04
(upper hemisphere plot)



Explanation

- all planar features
- Likely water bearing
- Possibly water bearing
- Qzt/calcite veins

Declination: 17.1 degrees west

Based on 440 measurements

of these features can often be determined.

The temperature, caliper, SPR, fluid conductivity and OTV logs were examined and possible bedrock fractures were identified. This information was used to select measurement locations for the flowmeter instrument. Generally, flowmeter measurements were taken in the zone above and below locations where potential fractures might exist in the boreholes.

Flowmeter Measurements

Flowmeter measurements of the vertical water flow were made in the boreholes using a Mount Sopris Heat Pulse Flowmeter. This instrument is capable of measuring flow direction in a borehole (up or down) and has a calibrated measurement range of 1.0 to 0.03 gallons per minute (gpm).

Vertical flow in a borehole is caused when two or more transmissive fractures in the borehole are at hydraulic disequilibrium with one another. When this occurs there is a hydraulic gradient developed and water will flow toward the fracture with the lower hydraulic head. When no vertical flow is measured it can mean that there are less than two transmissive fractures in the borehole or that all the fractures in the borehole are at equilibrium with each other.

Results

Composite geophysical logs for each of the boreholes are appended to this report (Appendix A). One or a combination of anomalous geophysical responses identified physical discontinuities that may represent possible fractures. These included abrupt widenings in the caliper log, spikes of lower resistivity in the SPR log, changes in the fluid conductivity log, and deflections or gradient changes in the temperature log. The heat-pulse flowmeter results are shown alongside the caliper log. Tadpole plots of the dip and dip direction of the identified planar features (possible fractures, foliations, bedding, etc.) determined from the OTV logs are also shown on this log. All of the depths on these logs are referenced from the top of the casing (toc). Following is a descriptive summary of the geophysical logging results for each of the boreholes:

PW-08-01:

Total Depth (TOC):	261.6 feet
Casing Depth:	67 feet
Water Level:	11.66 feet

The caliper log for PW-08-01 shows a nominal borehole diameter of 6.27 inches. There are several locations in the borehole where the borehole diameter abruptly widens and may represent bedrock fractures. The largest of these caliper anomalies occurs at 124 feet (9.22 inches). Other relatively wide anomalies occur at 196.4 feet (7.14 inches), 222.8 feet (6.81 inches), 226.3 feet (7.28 inches) and 242.6 feet (6.98 inches). In addition to these caliper anomalies there are some smaller caliper deflections that are shown on the log that may also represent bedrock fractures.

The temperature log for PW-08-01 shows an ambient water temperature below the casing averaging 7.96° C. The temperature log is fairly constant over the entire length of the open borehole with no abrupt deflections or gradient changes.

The single point resistance (SPR) log shows that the median resistance for PW-08-01 is 2,831 ohms for the uncased portion of the borehole. There are some abrupt deflections toward lower resistance that may indicate bedrock fractures. In most instances these resistance anomalies are associated with caliper anomalies. The most prominent SPR anomalies are at 124.5, 195.5, 211,

222, 226 and 242 feet. These SPR anomalies also have SP anomalies (deflections to the right) associated with them, which is another indication of a likely bedrock fracture.

The fluid conductivity log shows an average conductivity for the borehole fluid below the casing of about 115 μS/cm. The fluid conductivity is fairly constant over the entire length of the open borehole with no abrupt changes in fluid conductivity.

The optical televiewer log for PW-08-01 indicates that the planar features (possible fractures, bedding planes, joints or cleavages) predominantly strike to the northeast at between 50° to 60° true and have a median dip of 54° to the southeast or to the northwest. The strike and dip of identified planar features including likely and possibly transmissive fractures for PW-08-01 are shown on the composite log and tabulated in the appendix.

The flowmeter measurements for PW-08-01 under ambient conditions are quite interesting. Near the bottom of the borehole at 254 and 246 feet there was no measurable flow. At 235 feet a downflow of 0.04 gpm was measured and from 235 to 200 feet downflow measurements ranged from 0.04 to 0.02 gpm. At 190 feet a strong upflow of 0.18 gpm was measured. From 190 to 129 feet upflow measurements increased from 0.18 to 0.27 gpm. At 120 feet the upflow measurement diminished to 0.05 gpm and at 72.6 feet there was no measurable flow.

These results indicate that, under ambient conditions, water is entering PW-08-01 through fractures located at around 196 feet. Within this vicinity of the borehole there are several fractures that likely or possibly to be transmissive (Features #80 and 82-85(see Table A-1)). From this transmissive zone water moves both upwards and downwards in the borehole. Most of the water that migrates downwards exits the borehole through a fracture (feature #112) located at 242.1 feet. Most of the water that migrates upwards from 196 feet exits the borehole through a fracture (feature #27) located at 123.5 feet. A smaller percentage of the water apparently exits the borehole at 77.8 feet of 74.9 feet (features #6 and 5).

Measurements were then repeated while pumping the borehole at about 0.8 gpm. Under pumping conditions the flowmeter measurements show that water enters the borehole through the fracture located at 242.1(feature #112) and moves upwards at 0.14 gpm. At 224.6 feet upflow measured 0.68 gpm and from here until 65 feet, which is within the casing the upflow rate measured between 0.68 and 0.72 gpm. This indicates that under these pumping conditions most of the water apparently enters the borehole through the fracture at 195.8 feet (features #83).

PW-08-02:

Total Depth (TOC):	235.9 feet
Casing Depth:	40 feet
Water Level:	29.30 feet

The caliper log for PW-08-02 shows a nominal borehole diameter of 6.46 inches. There are several locations in the borehole where the borehole diameter abruptly widens and may represent bedrock fractures. The largest of these caliper anomalies occur in the upper part of the borehole from the bottom of casing at 40 feet until about 98 feet. Within this zone by far the largest caliper anomaly is at about 96 feet, which was over 18 inches wide. Other relatively wide anomalies occur at 85.3 feet (7.92 inches), 55 feet (7.49 inches), 49.6 feet (8.27 inches), 43.7 feet (8.41inches), 41.9 feet (7.41inches) and 40.6 feet, which is just below the casing, (7.32 inches). Below 98 feet the borehole walls are quite smooth with only small caliper deflections.

The temperature log for PW-08-02 shows an ambient water temperature below the casing averaging 8.10° C. The temperature decreases at a steep gradient from the bottom of casing at 40 feet to about 110 feet where the temperature levels off. At about 175 feet the temperature begins increasing with depth. There is a gradient change in the temperature log at about 85 feet that may represent a transmissive fracture.

The fluid conductivity log for PW-08-02 shows a median conductivity for the borehole fluid below the casing of about 376 µS/cm. The fluid conductivity is relatively high in the upper part of the borehole from 40 feet to about 87 feet averaging 918 µS/cm. This was the highest conductivity measured in all of the four boreholes that were logged. From 87 feet to about 180 feet the fluid conductivity decreased leveling to a median of 136 µS/cm near the bottom of the borehole from 180 to 235.9 feet.

The single point resistance (SPR) log shows that the median resistance for PW-08-02 is 1,235 ohms for the uncased portion of the borehole. There are some abrupt deflections toward lower resistance that may indicate bedrock fractures. In most instances these resistance anomalies are associated with caliper anomalies. The most prominent SPR anomaly is associated with the very large caliper anomaly at 96 feet. This SPR anomaly also has an SP anomaly (deflection to the right) associated with it, which is another indication of a likely transmissive bedrock fracture.

The optical televiewer log for PW-08-02 indicates that the planar features (possible fractures, bedding planes, joints or cleavages) have varied strike and dip directions. This is different from the other three boreholes in which the predominant strike direction of the planar features was to the northeast. The two major orientations in PW-08-02 are a northwest strike at roughly 300° true and having a median dip of 72° to the northeast or southwest or a northeast strike at about 50° true and having a median dip of 42° mainly to the northwest. The strike and dip of the planar features including the likely and possible transmissive fractures for borehole PW-08-02 are shown on the composite log and tabulated in the appendix.

The flowmeter measurements for PW-08-02 under ambient conditions indicate no flow in the borehole at 38 feet, which is in the casing and a slight downflow of 0.02 gpm at 48 feet. At 52 feet a strong downflow of 0.18 gpm was measured. Strong downflow was measured at greater depths in the borehole until 103.5 feet where there was no measurable flow. These measurements indicate that under ambient conditions water enters PW-08-02 through fractures just under the casing between 40 and 52 feet and moves downward in the borehole. The water exits the borehole mainly through the large fracture located at 96 feet.

Measurements were then repeated while pumping the borehole at ~0.7 gpm. Under pumping conditions, flowmeter measurements indicate no measurable flow at the bottom of the borehole until 92 feet where an upflow of 0.31 gpm was measured. At 28.5 feet, which is within the casing, an upflow of 0.65 gpm was measured. Similar to the ambient measurements the flowmeter results while pumping PW-08-02 indicate that the large fracture at 96 feet and the fractures between 40 and 52 feet are the most transmissive fractures.

PW-08-03:

Total Depth (TOC):	235.0 feet
Casing Depth:	40 feet
Water Level:	10.0 feet

The caliper log for PW-08-03 shows a nominal borehole diameter of 6.25 inches. There are several locations in the borehole where the borehole diameter abruptly widens and may represent bedrock fractures. The largest of these caliper anomalies occur at 61.7 feet (6.72 inches), 83.3 feet (6.54 inches), 134.5 feet (6.5 inches) and 191 feet (654 inches). In addition to these caliper anomalies there are some smaller caliper deflections that are shown on the log that may also represent bedrock fractures.

The temperature log for PW-08-03 shows an ambient water temperature below the casing averaging 7.84° C. The temperature decreases at a steep gradient from the bottom of casing at 40 feet to about 63 feet where the temperature levels off. From about 70 feet until the bottom of the borehole the temperature rises very gradually. The abrupt gradient change in temperature at about 63 feet may indicate a transmissive fracture in this area.

The fluid conductivity log for PW-08-03 shows an average conductivity for the borehole fluid below the casing of about 135 µS/cm. The fluid conductivity is fairly constant over the entire length of the open borehole with no abrupt changes in fluid conductivity.

The single point resistance (SPR) log shows that the median resistance for PW-08-03 is 2,150 ohms for the uncased portion of the borehole. There are some abrupt deflections toward lower resistance that may indicate bedrock fractures. In most instances these resistance anomalies are associated with caliper anomalies. The most prominent SPR anomalies are at 60-65 feet, 98 feet, and 192 feet. These SPR anomalies also have SP anomalies (deflections to the right) associated with them, which is another indication of a likely bedrock fracture.

The optical televiewer log for PW-08-03 indicates that the planar features (possible fractures, bedding planes, joints or cleavages) predominantly strike to the northeast at about 40° true and have a median dip of 51° to the southeast or to the northwest. The strike and dip of the planar features including the likely and possible transmissive fractures for borehole PW-08-03 are shown on the composite log and tabulated in the appendix.

The flowmeter measurements for PW-08-03 under ambient conditions indicate no flow in bottom of the borehole until 130 feet where a downflow of 0.04 was measured. Downflow of 0.04 gpm was measured in successive depths going upwards in the borehole until 51 feet where there was no measurable flow. These measurements indicate that under ambient conditions water enters PW-08-03 through fractures between 60 and 66 feet and moves downward in the borehole. The water exits the borehole mainly through the fracture located at 134.5 feet.

Measurements were then repeated while pumping the borehole at ~0.8 gpm. Under pumping conditions, flowmeter measurements indicate no measurable flow at the bottom of the borehole until 189 feet where an upflow of 0.02 gpm was measured. At 130 feet upflow increased to 0.60 gpm and at 59 feet upflow increased to 1.68 gpm. The flowmeter results while pumping PW-08-03 indicate that the fracture at 134.5 feet and the fractures between 60 and 65 feet are transmissive fractures, similar to the ambient measurements. The flowmeter results while pumping also indicate the fracture at 191 feet is also transmissive.

PW-08-04:

Total Depth (TOC):	215.0 feet
Casing Depth:	20 feet
Water Level:	9.3 feet

The caliper log for PW-08-04 shows a nominal borehole diameter of 6.26 inches. There are several locations in the borehole where the borehole diameter abruptly widens and may represent bedrock fractures. The largest of these caliper anomalies occur at 64.4 feet (6.59 inches), 145.3 feet (6.80 inches), 150.4 feet (6.65 inches) and 162.4 feet (6.53 inches). In addition to these caliper anomalies there are some smaller caliper deflections that are shown on the log that may also represent bedrock fractures.

The temperature log for PW-08-04 shows an ambient water temperature below the casing averaging 7.75° C. The temperature increases at a steep gradient from the bottom of casing at 20 feet to about 34 feet where the temperature levels off. At about 40 feet the temperature decreases at a steep gradient until about 63 feet where there is a gradient change. At about 95 feet the temperature flattens and from here to the bottom of the borehole the temperature is fairly constant. The areas of gradient changes may be areas of transmissive fractures.

The fluid conductivity log for PW-08-04 shows an average conductivity for the borehole fluid below the casing of about 126 µS/cm. The fluid conductivity is fairly constant over the entire length of the open borehole with no abrupt changes in fluid conductivity. There are some subtle changes in fluid resistivity at about 62 feet and at 168 feet that may indicate transmissive fractures in these areas.

The single point resistance (SPR) log shows that the median resistance for PW-08-04 is 2,247 ohms for the uncased portion of the borehole. There are some abrupt deflections toward lower resistance that may indicate bedrock fractures. In most instances these resistance anomalies are associated with caliper anomalies. The most prominent SPR anomalies are at 49, 62, 96, 145.5 and 162 feet. These SPR anomalies also have SP anomalies (deflections to the right) associated with them, which is another indication of a likely bedrock fracture.

The optical televiewer log for PW-08-04 indicates that the planar features (possible fractures, bedding planes, joints or cleavages) predominantly strike to the northeast at about 50° true and have a median dip of 62° mainly to the northwest. The strike and dip of the planar features including the likely and possible transmissive fractures for borehole PW-08-04 are shown on the composite log and tabulated in the appendix.

The flowmeter measurements for PW-08-04 under ambient conditions indicate no flow at 18.4 feet, which is in the casing. At 25 feet a downflow of 0.04 was measured. At 67 feet downflow increased to 0.07 gpm. Downflow measurements increased in successive depths going downwards in the borehole and by 133 feet downflow measured 0.23 gpm. At 143 feet downflow decreased to 0.13 gpm and at 148.2 feet downflow decreased to 0.06 gpm. At 165 feet there was no measurable flow. These measurements indicate that under ambient conditions water enters PW-08-04 through fractures in the upper part of the borehole just below the casing at 20 feet. Additional water enters the borehole through fractures between 60 and 66 feet, 83.4 feet, and 96-101 feet and moves downward in the borehole. The water exits the borehole mainly through a series of fractures located from 137 to 163 feet.

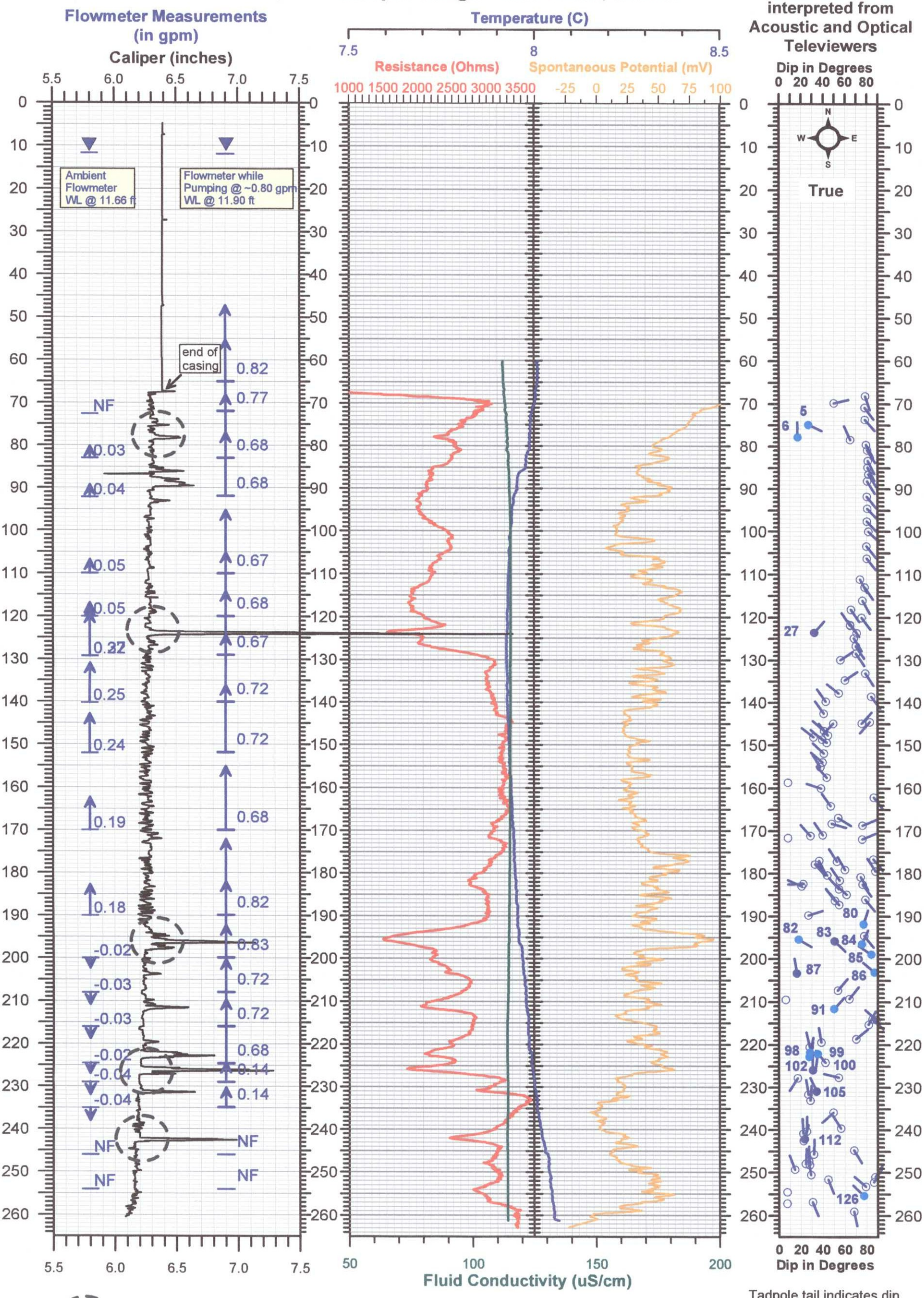
Measurements were then repeated while pumping the borehole at ~0.8 gpm. Under pumping conditions, flowmeter measurements indicate no measurable flow at the bottom of the borehole until 155 feet where a downflow of 0.04 gpm was measured. At 143 feet a strong upflow of 0.23 gpm was measured. At 99 feet upflow increased to 0.60 gpm and at 91 feet upflow increased to 1.07 gpm. Upflow measurements generally increased with successive measurements going upwards in the borehole. The flowmeter measurements from 91 feet to 18.6 feet all exceeded 1 gpm, which is the upper calibrated limit of the flowmeter and so the differences in these measurements may not be significant. The flowmeter results while pumping PW-08-04 indicate that the fracture at 162.2 feet, the fractures at 150.7 and 146 feet and the fractures between 96 and 101 feet are transmissive fractures.

BOREHOLE GEOPHYSCIAL LOGS

Northeast Geophysical Services

FIGURE A-1
Borehole Geophysical Log
PW-08-01
Juniper Ridge - Old Town, Maine

Date logged: 1/08/09



= Likely transmissive zone

= Possible transmissive zone

Tadpole tail indicates dip direction.
The solid tadpoles with a feature number are the ones interpreted to be likely or possibly transmissive.

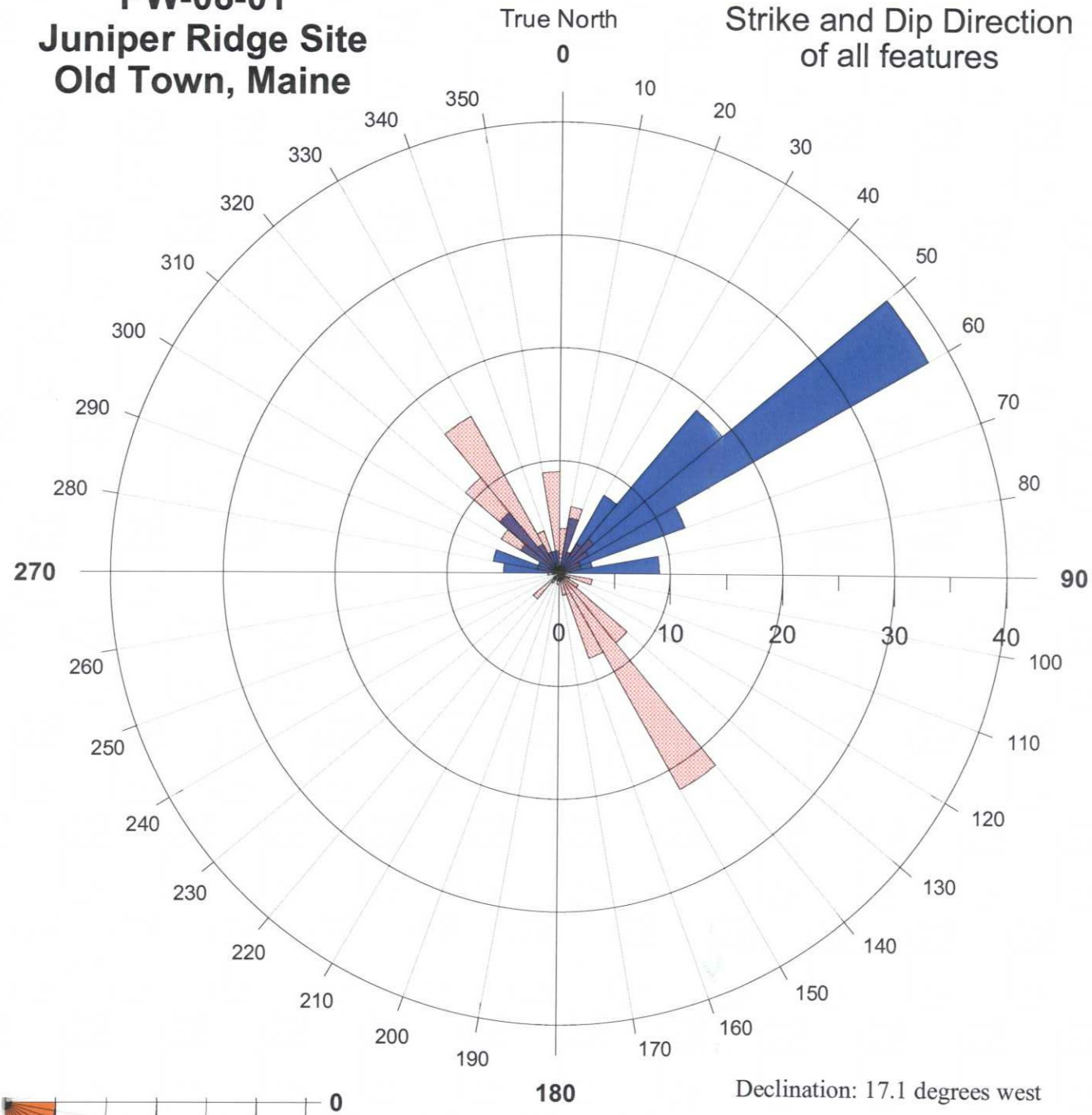
Borehole Geophysical Log
PW-08-01
Juniper Ridge - Old Town, Maine

Northeast Geophysical Services

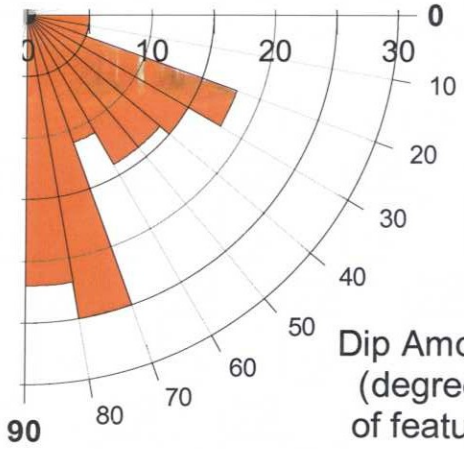
FIGURE A-2

PW-08-01
Juniper Ridge Site
Old Town, Maine

Strike and Dip Direction of all features



Declination: 17.1 degrees west



Explanation

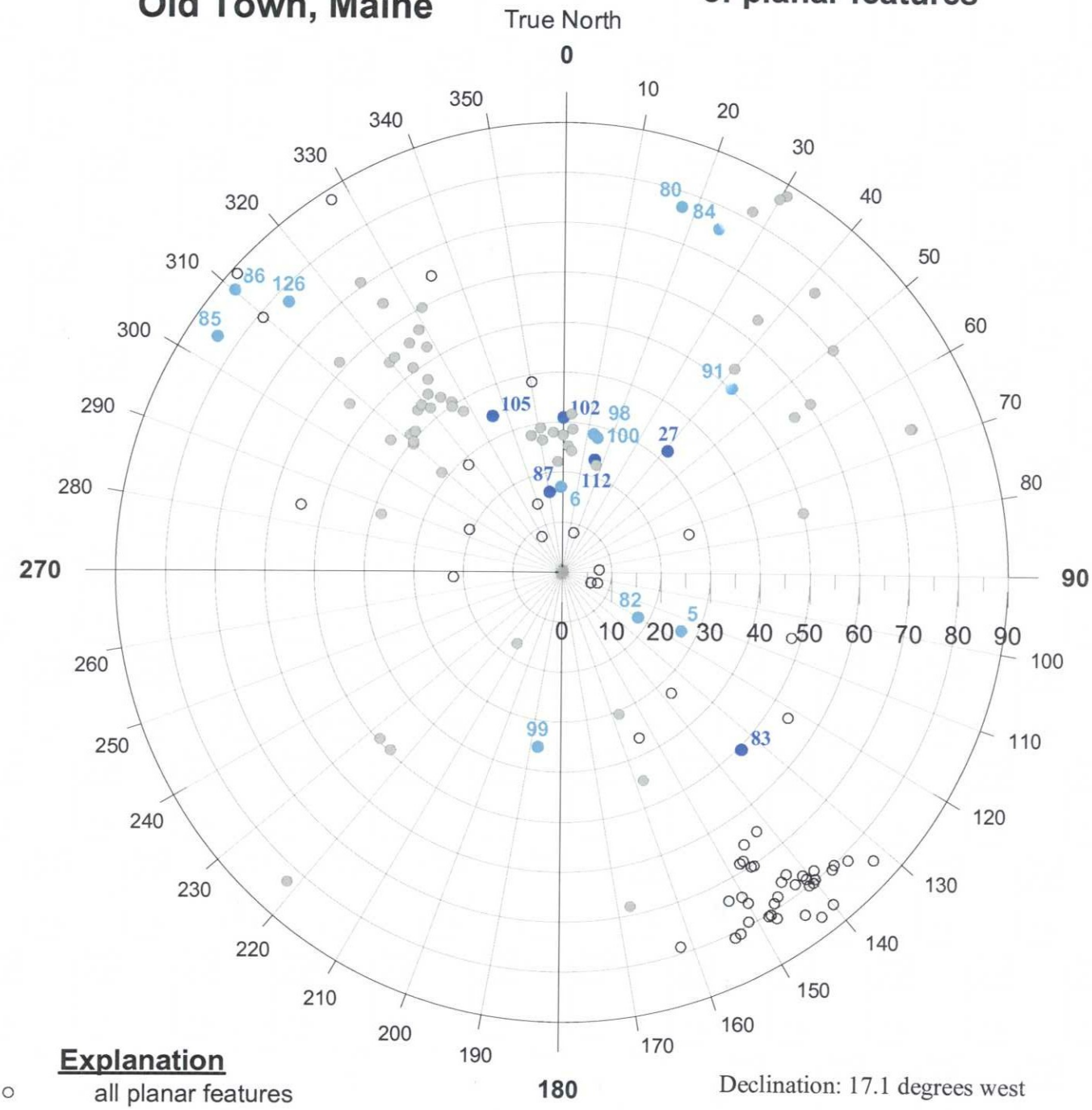
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 129 measurements

FIGURE A-3

PW-08-01
Juniper Ridge Site
Old Town, Maine

Dip Amount and Dip Azimuth of planar features



Explanation

- all planar features
- Likely water bearing
- Possibly water bearing
- Qzt/calcite veins

Declination: 17.1 degrees west

Based on 129 measurements

TABLE A1 - PW-08-01 Interpreted Structure							Declination	17.1
Borehole	Feature #	Feature depth	Dip	Dip Az	Strike	True Dip Az	True Strike	Category
	Number	Feet	Degrees	magnetic	magnetic			Type
PW-08-01	1	68.2	79	179	89	162	72	100
PW-08-01	2	69.8	50	93	3	76	346	103
PW-08-01	3	70.8	78	160	70	143	53	100
PW-08-01	4	73.7	78	156	66	139	49	100
PW-08-01	5	74.9	27	133	43	116	26	108
PW-08-01	6	77.8	17	16	286	359	89	108
PW-08-01	7	78.4	65	353	83	335	65	100
PW-08-01	8	79.6	79	168	78	151	61	100
PW-08-01	9	80.9	80	165	75	148	58	100
PW-08-01	10	83.3	81	171	81	154	64	100
PW-08-01	11	84.9	81	170	80	153	63	100
PW-08-01	12	86.5	82	165	75	147	57	100
PW-08-01	13	88.1	80	165	75	148	58	100
PW-08-01	14	91.8	80	157	67	140	50	100
PW-08-01	15	94.6	81	154	64	137	47	100
PW-08-01	16	97.6	80	153	63	136	46	100
PW-08-01	17	99.9	82	152	62	135	45	100
PW-08-01	18	103.4	80	157	67	140	50	100
PW-08-01	19	106.2	80	158	68	141	51	100
PW-08-01	20	111.1	74	169	79	152	62	100
PW-08-01	21	113.0	78	163	73	146	56	100
PW-08-01	22	116.1	76	167	77	150	60	100
PW-08-01	23	118.2	66	163	73	146	56	100
PW-08-01	24	120.1	75	160	70	143	53	100
PW-08-01	25	121.7	65	159	69	142	52	100
PW-08-01	26	121.8	65	343	73	326	56	103
PW-08-01	27	123.5	32	58	328	41	311	107
PW-08-01	28	123.6	71	342	72	324	54	103
PW-08-01	29	124.8	68	164	74	147	57	100
PW-08-01	30	126.7	70	164	74	147	57	100
PW-08-01	31	128.4	70	163	73	146	56	100
PW-08-01	32	129.9	56	73	343	56	326	103
PW-08-01	33	133.1	79	164	74	147	57	100
PW-08-01	34	134.7	60	73	343	56	326	103
PW-08-01	35	137.8	55	325	55	308	38	103
PW-08-01	36	138.5	84	161	71	144	54	100
PW-08-01	37	139.7	43	341	71	324	54	103
PW-08-01	38	142.5	41	343	73	326	56	103
PW-08-01	39	144.5	83	239	329	222	312	103
PW-08-01	40	144.9	76	59	329	42	312	103
PW-08-01	41	144.9	50	241	331	224	314	103
PW-08-01	42	146.6	41	329	59	311	41	103
PW-08-01	43	147.7	45	339	69	322	52	103
PW-08-01	44	148.1	31	326	56	309	39	103
PW-08-01	45	148.6	40	327	57	310	40	103
PW-08-01	46	149.4	44	324	54	307	37	103
PW-08-01	47	151.9	41	330	60	313	43	103
PW-08-01	48	154.0	40	328	58	310	40	103
PW-08-01	49	155.1	38	345	75	328	58	103
PW-08-01	50	157.5	44	335	65	317	47	103
PW-08-01	51	158.7	8	33	303	16	286	100
PW-08-01	52	160.0	38	304	34	287	17	103
PW-08-01	53	162.1	87	159	69	142	52	100
PW-08-01	54	164.1	47	341	71	324	54	103
PW-08-01	55	166.9	54	139	49	122	32	100
PW-08-01	56	168.2	48	123	33	105	15	100
PW-08-01	57	168.7	76	85	355	67	337	103

TABLE A1 - PW-08-01 Interpreted Structure							Declination	17.1
Borehole	Feature #	Feature depth	Dip	Dip Az	Strike	True Dip Az	True Strike	Category
	Number	Feet	Degrees	magnetic	magnetic			Type
PW-08-01	58	170.9	40	343	73	326	56	103
PW-08-01	59	171.1	29	335	65	318	48	100
PW-08-01	60	171.6	8	346	76	329	59	100
PW-08-01	61	171.9	76	84	354	67	337	103
PW-08-01	62	176.6	86	157	67	140	50	100
PW-08-01	63	176.9	37	171	81	154	64	100
PW-08-01	64	177.1	53	345	75	328	58	103
PW-08-01	65	177.8	33	154	64	137	47	100
PW-08-01	66	179.1	60	348	78	331	61	103
PW-08-01	67	179.4	88	345	75	328	58	100
PW-08-01	68	180.3	44	336	66	319	49	103
PW-08-01	69	180.8	74	167	77	150	60	100
PW-08-01	70	181.6	55	343	73	325	55	103
PW-08-01	71	182.4	22	284	14	267	357	100
PW-08-01	72	182.5	76	161	71	144	54	100
PW-08-01	73	182.9	21	311	41	294	24	100
PW-08-01	74	183.6	55	337	67	320	50	103
PW-08-01	75	184.9	62	330	60	313	43	103
PW-08-01	76	186.1	79	158	68	141	51	100
PW-08-01	77	186.3	51	340	70	323	53	103
PW-08-01	78	187.3	55	338	68	321	51	103
PW-08-01	79	189.7	27	90	0	73	343	100
PW-08-01	80	191.9	77	35	305	18	288	108
PW-08-01	81	194.6	78	158	68	141	51	100
PW-08-01	82	195.4	18	137	47	120	30	108
PW-08-01	83	195.8	51	151	61	134	44	107
PW-08-01	84	196.5	76	41	311	24	294	108
PW-08-01	85	198.9	84	321	51	304	34	108
PW-08-01	86	203.1	87	327	57	310	40	108
PW-08-01	87	203.4	16	7	277	350	80	107
PW-08-01	88	207.3	54	57	327	40	310	103
PW-08-01	89	209.3	64	55	325	38	308	103
PW-08-01	90	209.5	6	127	37	110	20	100
PW-08-01	91	211.6	50	60	330	43	313	108
PW-08-01	92	214.0	85	149	59	132	42	100
PW-08-01	93	214.2	89	329	59	312	42	100
PW-08-01	94	215.3	82	45	315	28	298	103
PW-08-01	95	218.6	70	68	338	50	320	103
PW-08-01	96	219.4	39	7	277	350	80	100
PW-08-01	97	220.5	28	4	274	346	76	103
PW-08-01	98	221.8	28	30	300	13	283	108
PW-08-01	99	222.1	35	205	295	188	278	108
PW-08-01	100	222.8	28	31	301	14	284	108
PW-08-01	101	224.1	42	338	68	320	50	103
PW-08-01	102	225.9	31	17	287	360	90	107
PW-08-01	103	227.6	54	301	31	284	14	100
PW-08-01	104	227.8	17	229	319	212	302	103
PW-08-01	105	230.9	34	352	82	335	65	107
PW-08-01	106	231.6	27	8	278	351	81	103
PW-08-01	107	233.1	29	21	291	4	274	103
PW-08-01	108	235.9	50	245	335	227	317	103
PW-08-01	109	239.6	56	346	76	329	59	103
PW-08-01	110	240.3	25	19	289	2	272	103
PW-08-01	111	240.8	22	14	284	357	87	103
PW-08-01	112	242.1	23	33	303	16	286	107
PW-08-01	113	242.5	22	34	304	17	287	103
PW-08-01	114	244.7	68	165	75	148	58	100

TABLE A1 - PW-08-01 Interpreted Structure							Declination	17.1
Borehole	Feature #	Feature depth	Dip	Dip Az	Strike	True Dip Az	True Strike	Category
	Number	Feet	Degrees	magnetic	magnetic			Type
PW-08-01	115	245.7	32	20	290	3	273	103
PW-08-01	116	247.3	27	17	287	360	90	103
PW-08-01	117	247.9	24	21	291	4	274	103
PW-08-01	118	248.2	28	13	283	356	86	103
PW-08-01	119	249.2	14	356	86	339	69	100
PW-08-01	120	250.5	29	8	278	351	81	103
PW-08-01	121	251.0	88	48	318	31	301	103
PW-08-01	122	251.6	45	175	85	158	68	103
PW-08-01	123	252.2	87	47	317	30	300	103
PW-08-01	124	253.2	79	327	57	310	40	100
PW-08-01	125	254.5	7	103	13	86	356	100
PW-08-01	126	255.3	77	331	61	314	44	108
PW-08-01	127	256.8	31	175	85	158	68	103
PW-08-01	128	257.2	7	124	34	107	17	100
PW-08-01	129	259.0	68	185	275	168	78	103
Explanation of Categories:								
		100	planar feature: bedding, joint, fracture, foliation etc.					
		103	quartz or calcite vein					
		107	likely transmissive fracture					
		108	possible transmissive fracture					

Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel: 207-942-2700 email: negeophysical.com

Log: Optical Televiewer & Caliper logs

Well: **PW-08-01**

Site: Juniper Ridge

Location: West Old Town, Maine

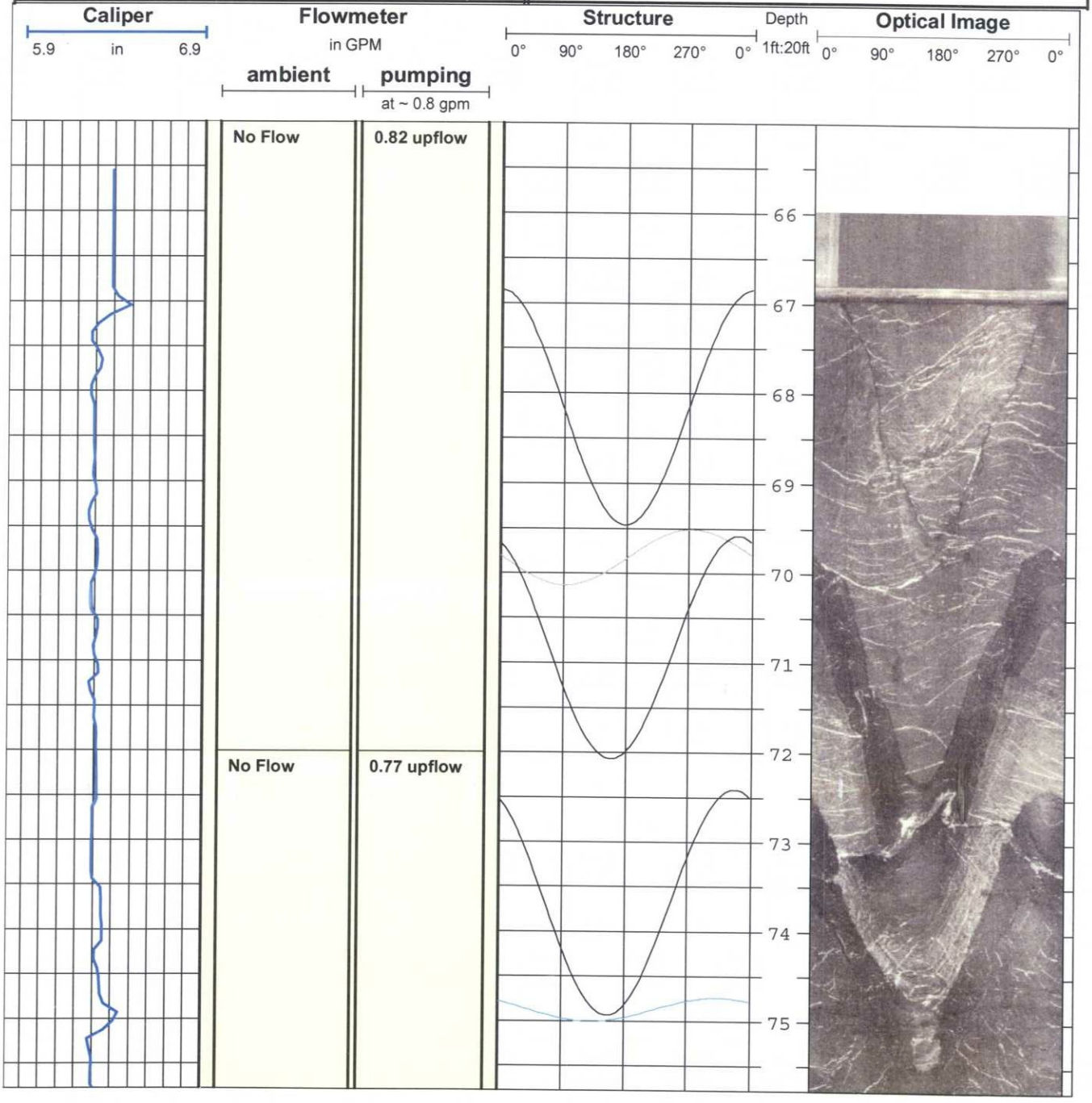
Date:	1/08/09
Casing Depth:	67 ft
Casing Type:	6 in steel
Boring Depth:	261.6 ft
Meas. From:	top of casing
Stickup:	2.6 ft
Water Level:	11.66 ft

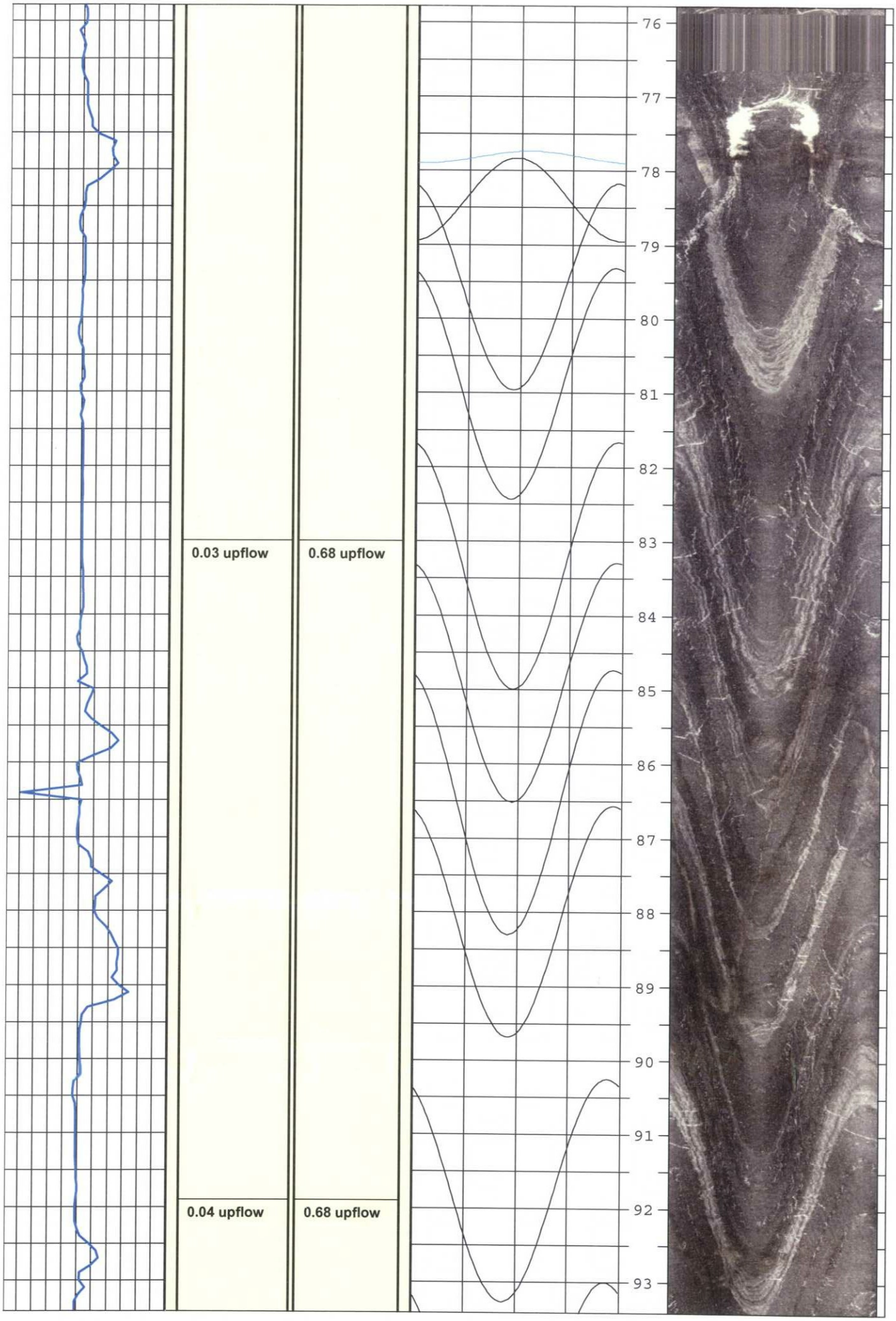
For: Sevee & Maher Engineers

Logged by: R Rawcliffe

Orientation: magnetic

Structure Plots:
black = planar features (joints, fractures, bedding, foliation, etc.)
lt gray = veins of porbably quartz or calcite
lt blue = possibly transmissive fractures
dark blue = likely transmissive fractures

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0.04 upflow
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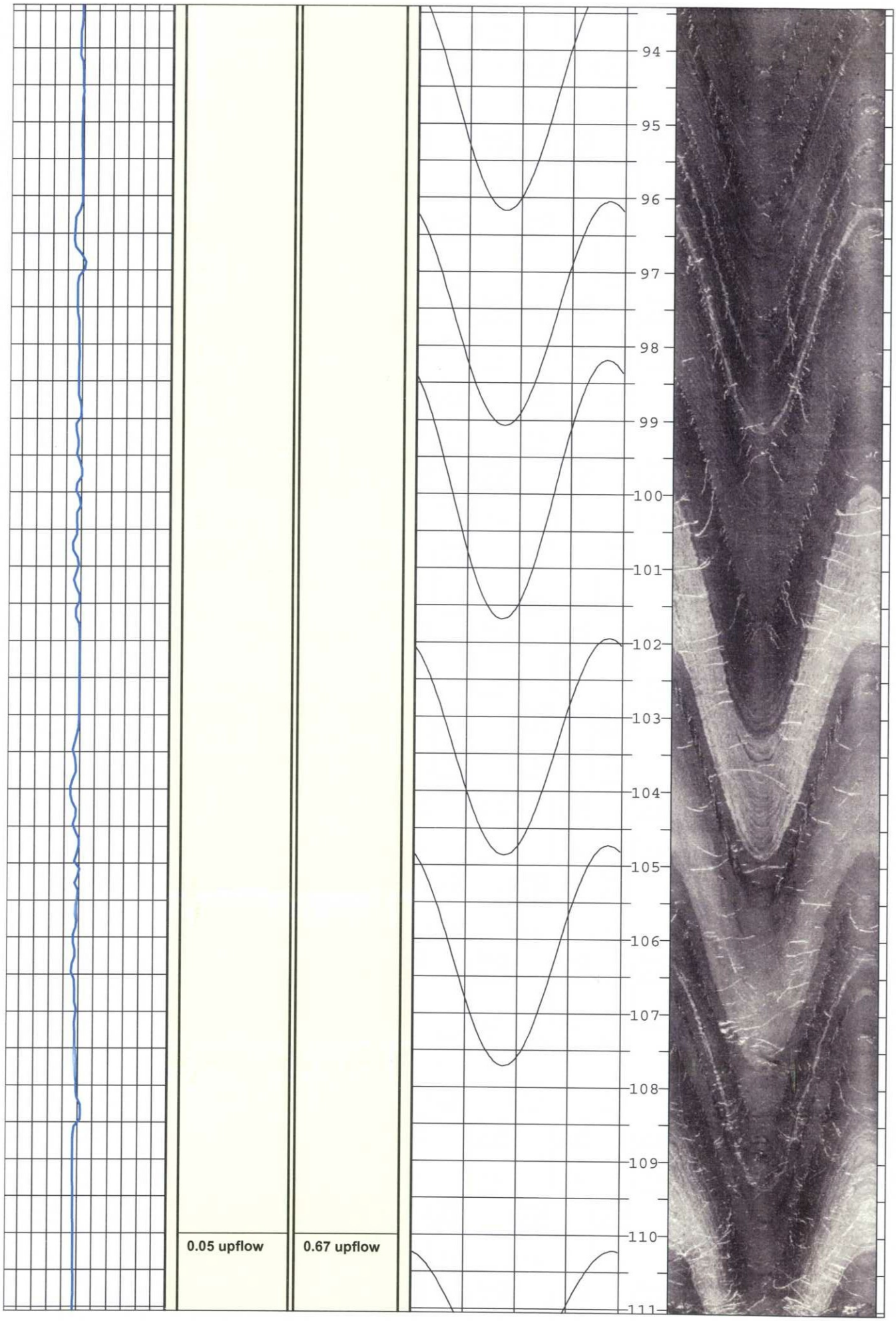
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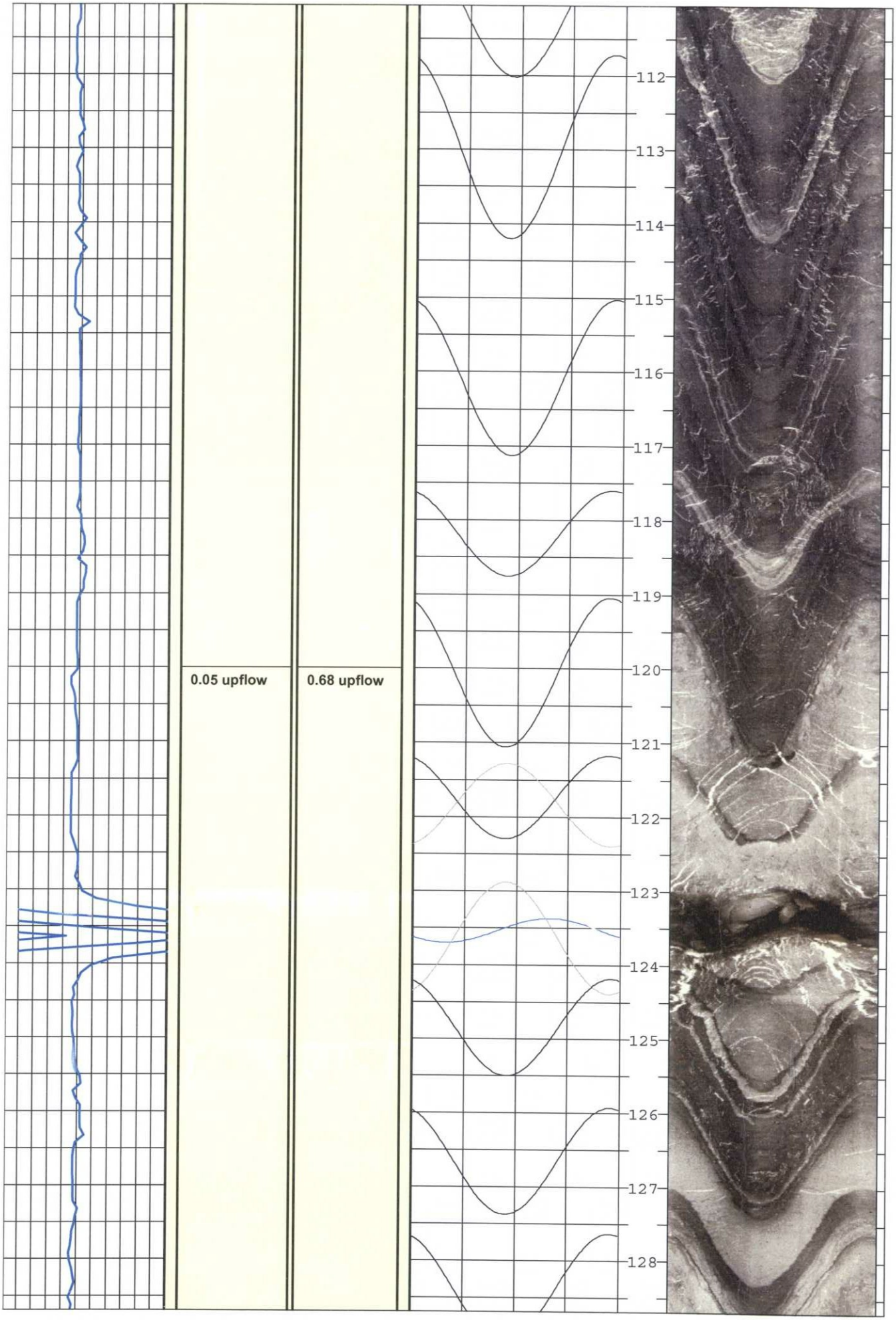
0.67 upflow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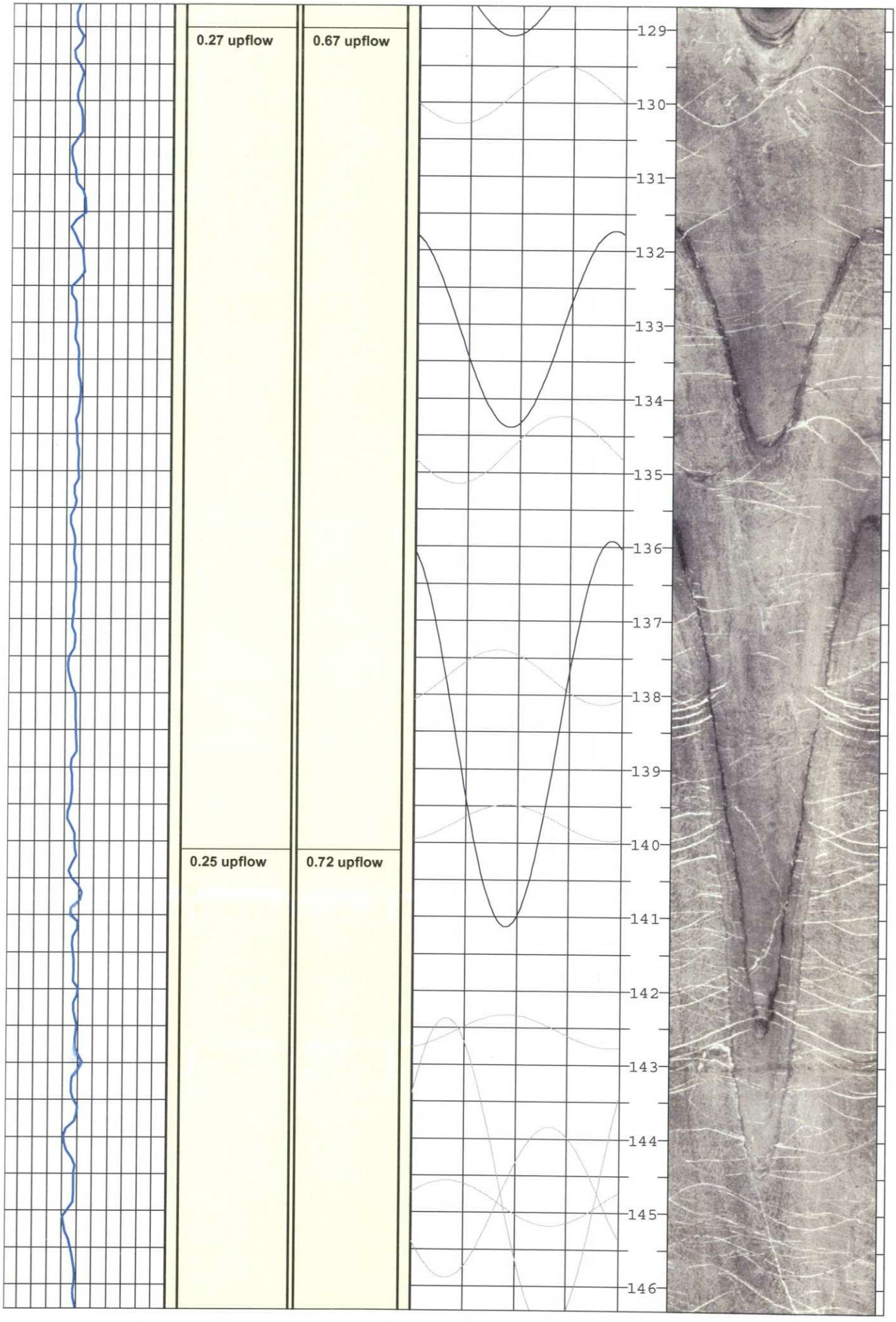
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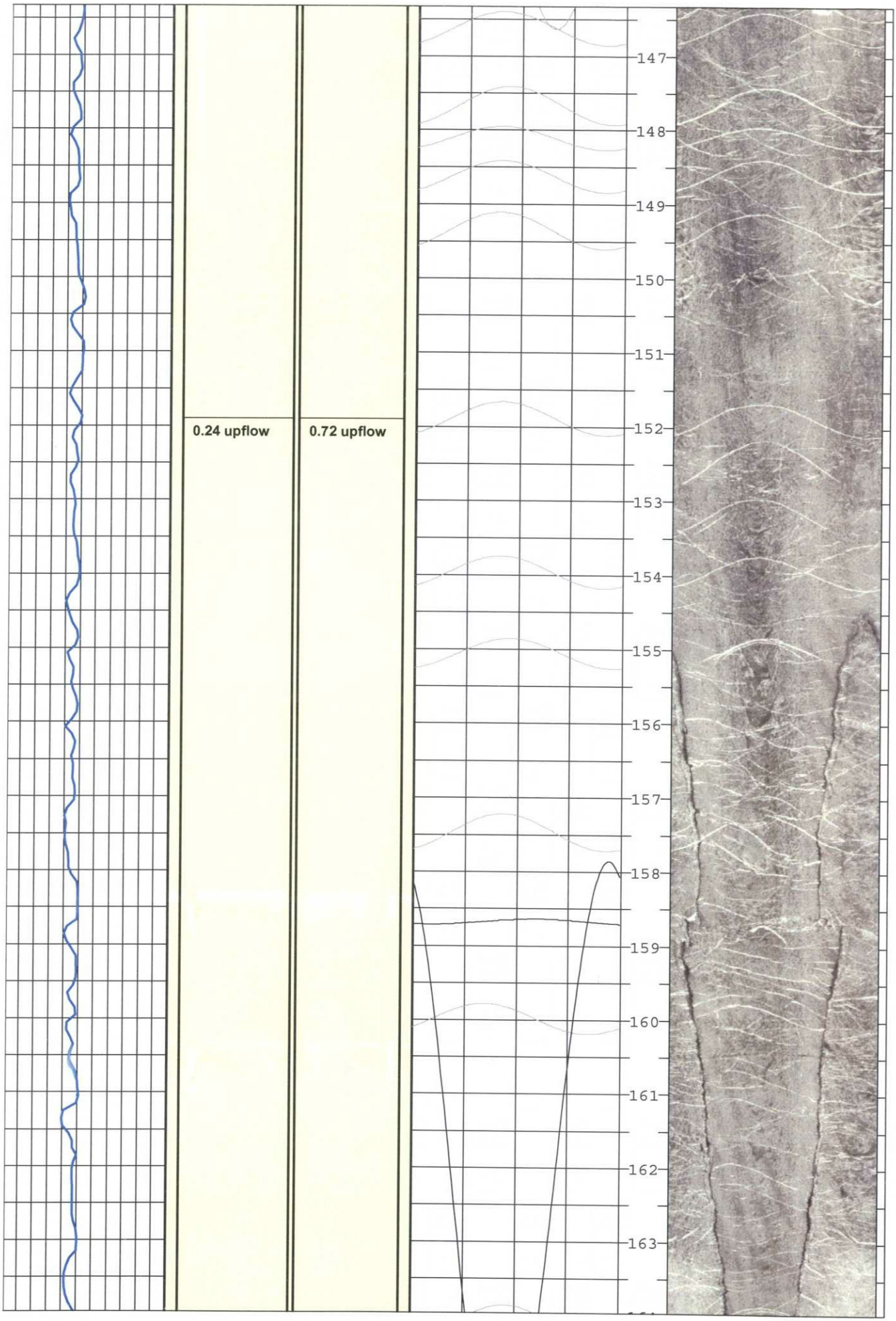
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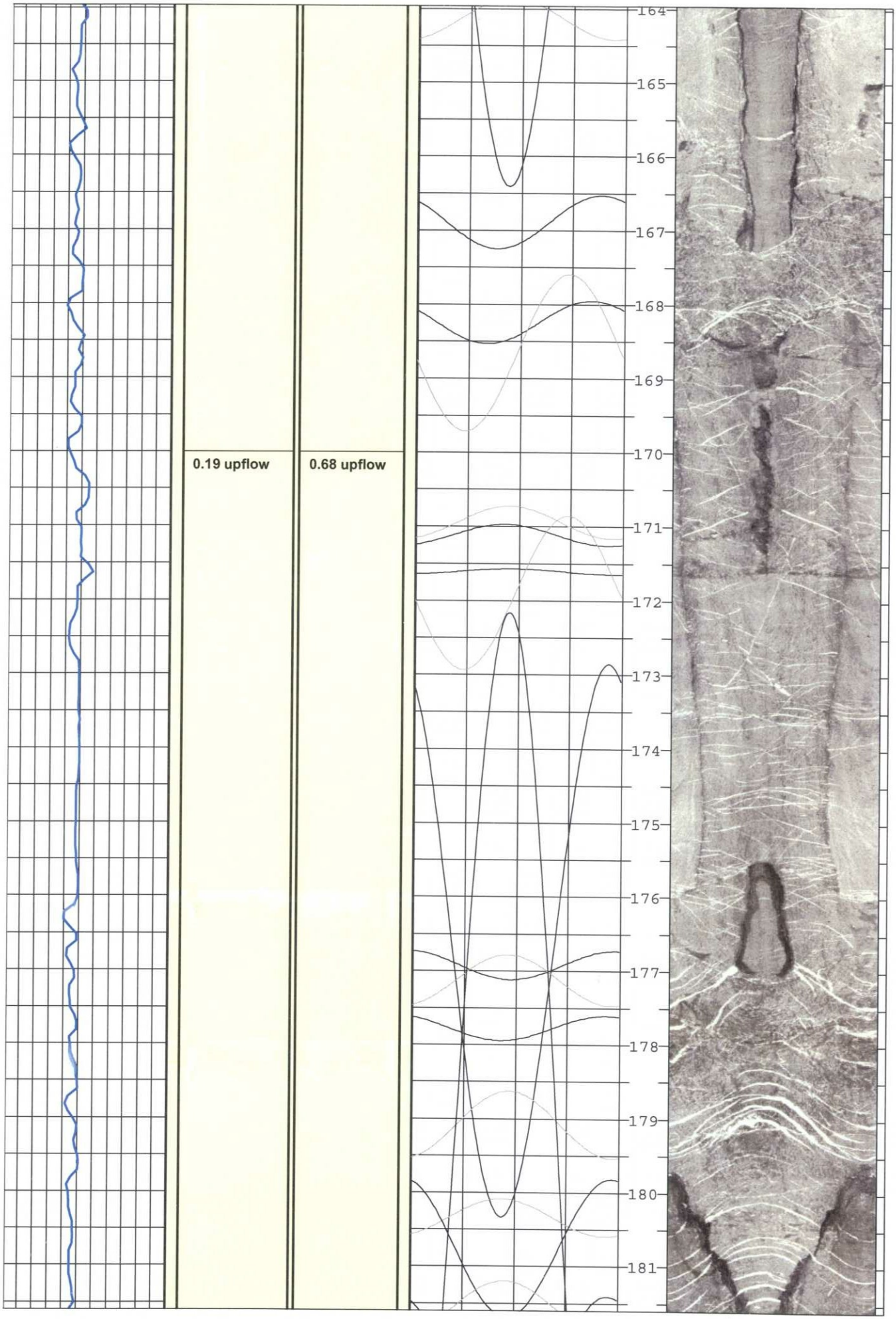
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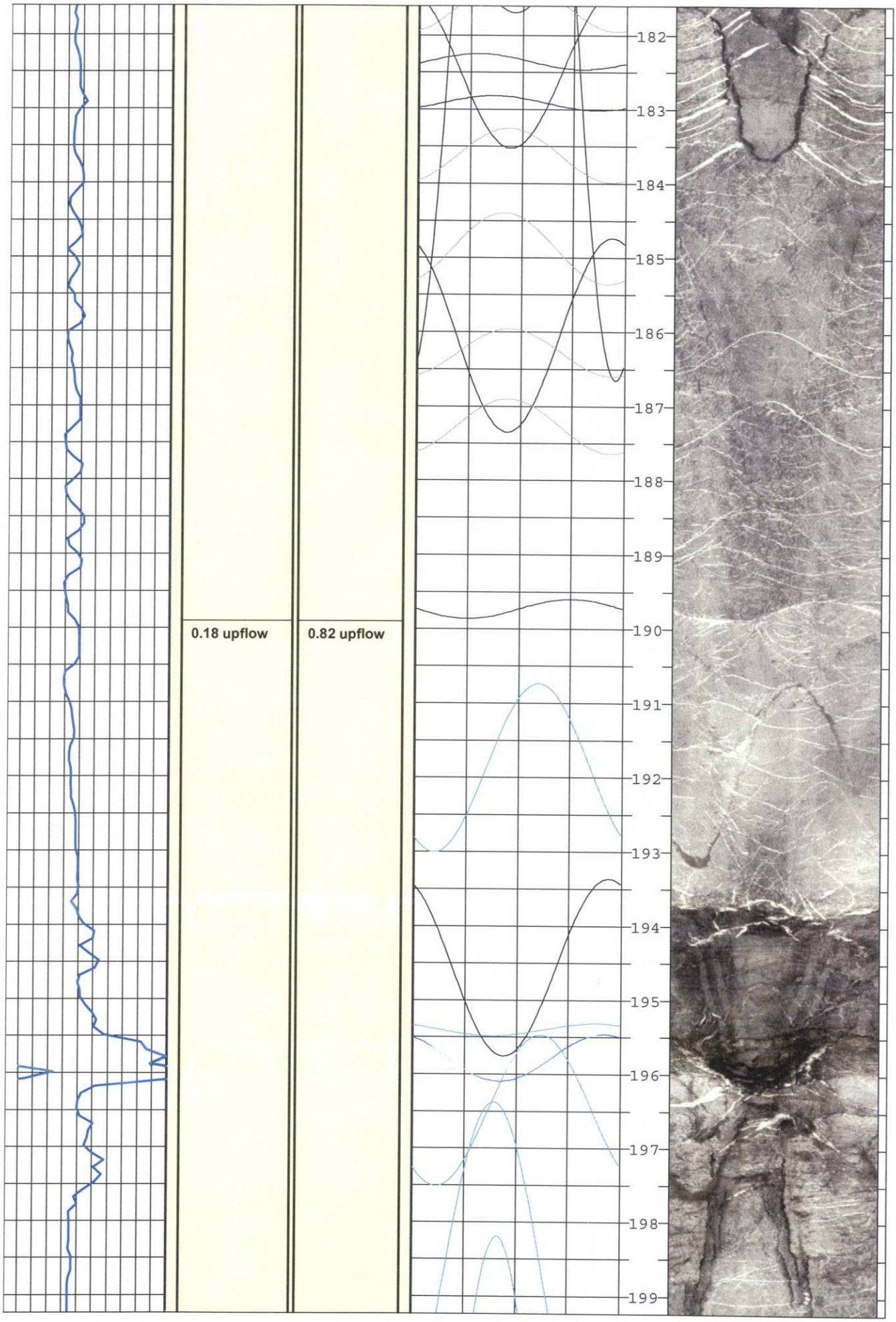
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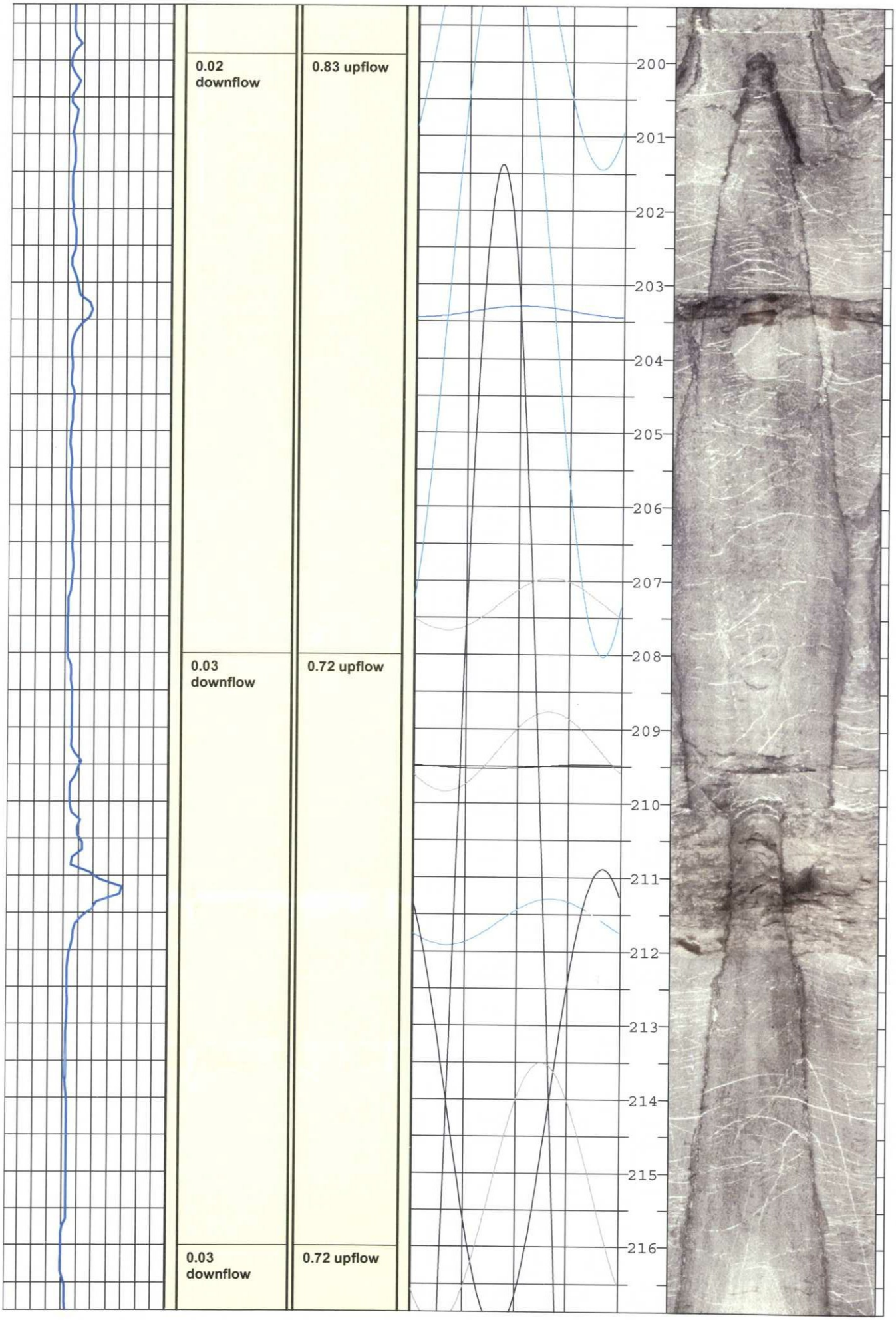
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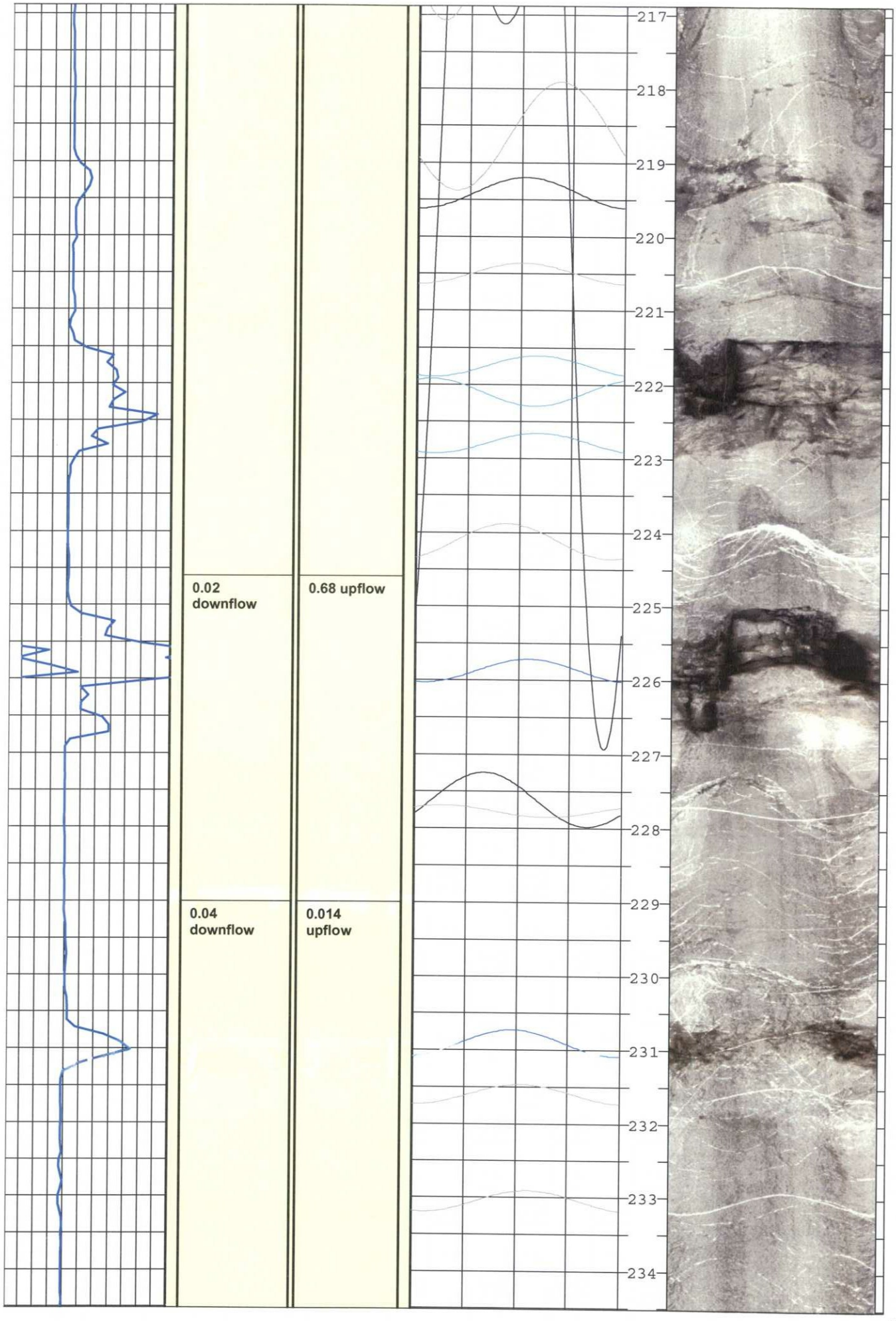
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upflow
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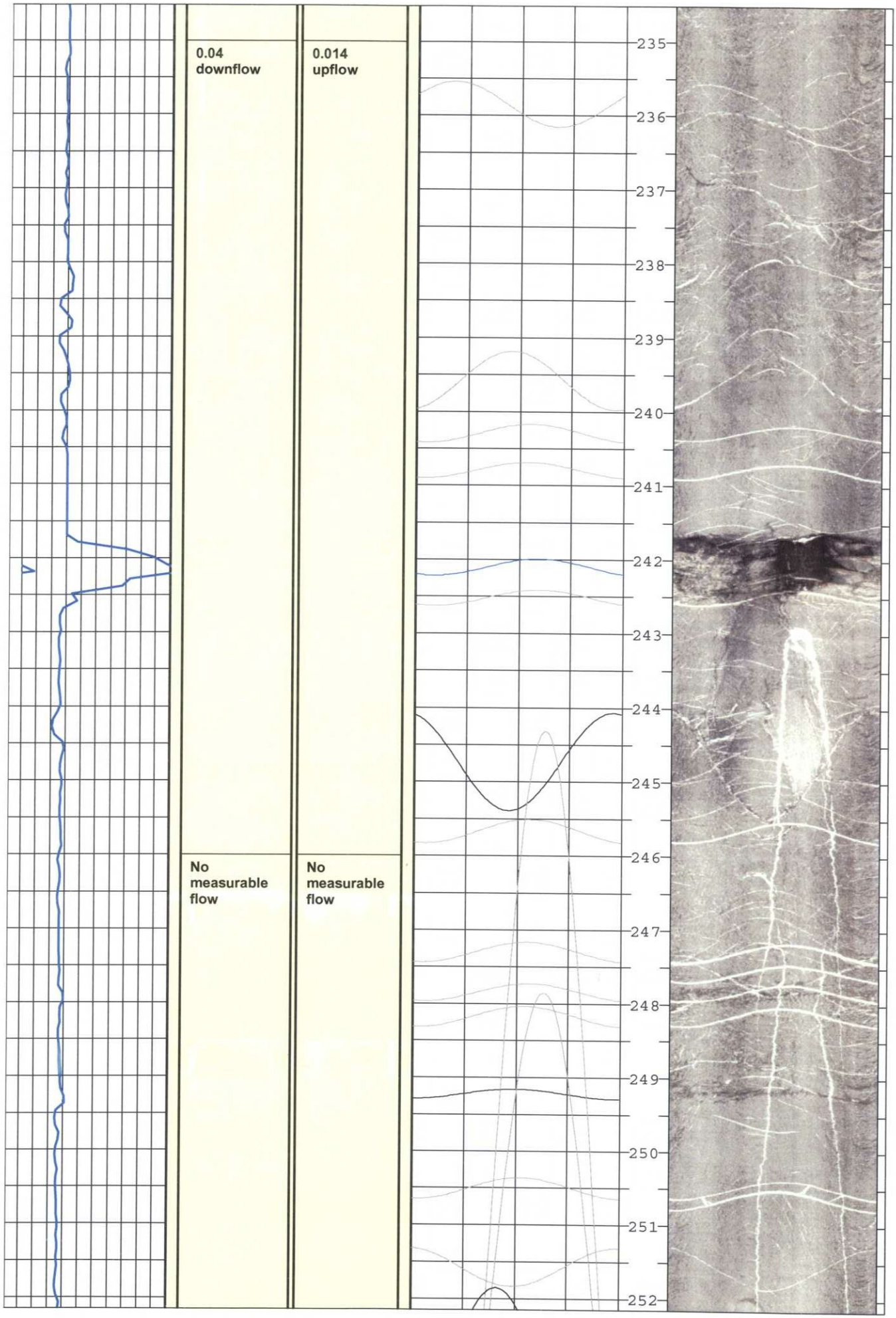
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upflow
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flow
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measurable
flow
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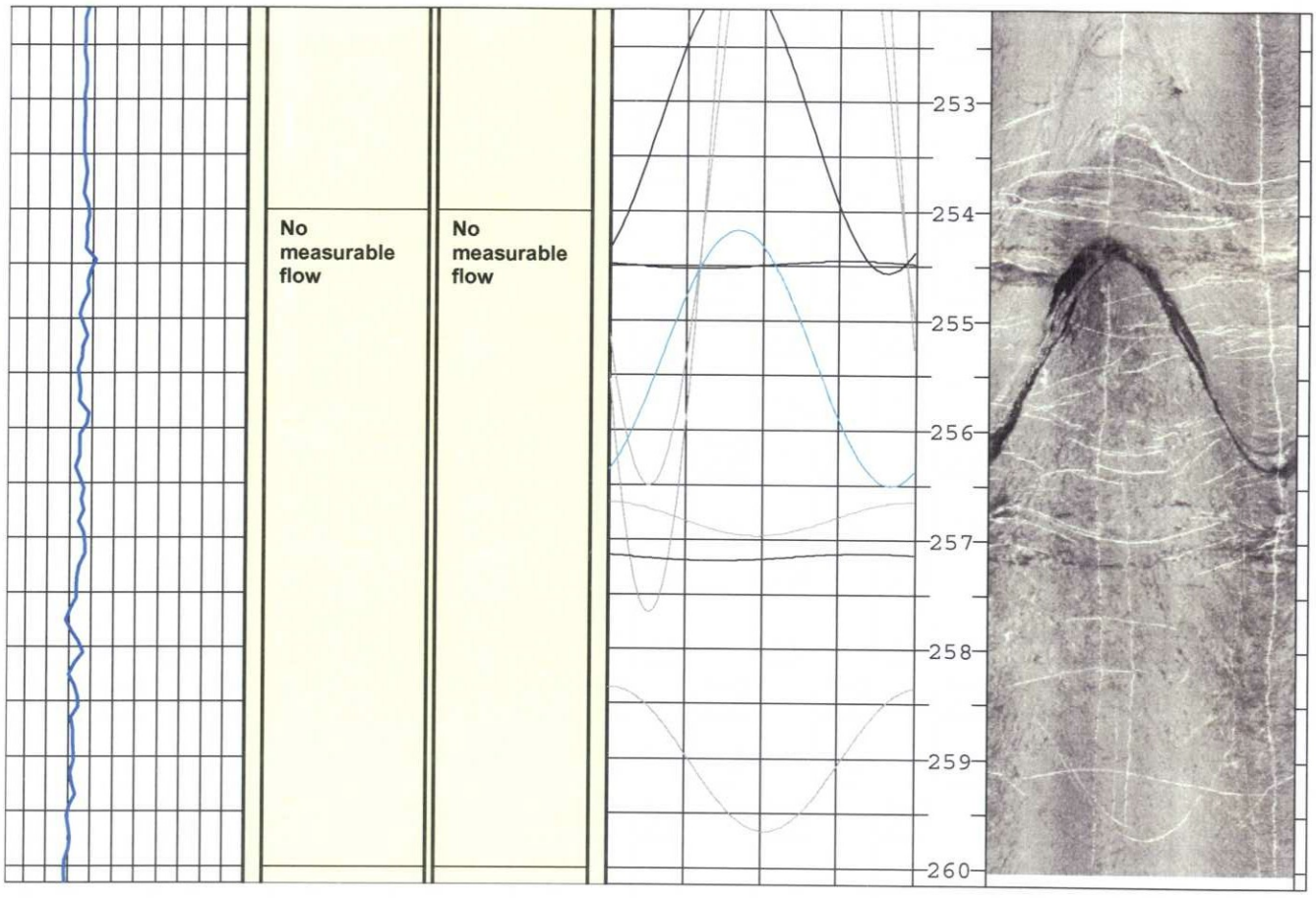
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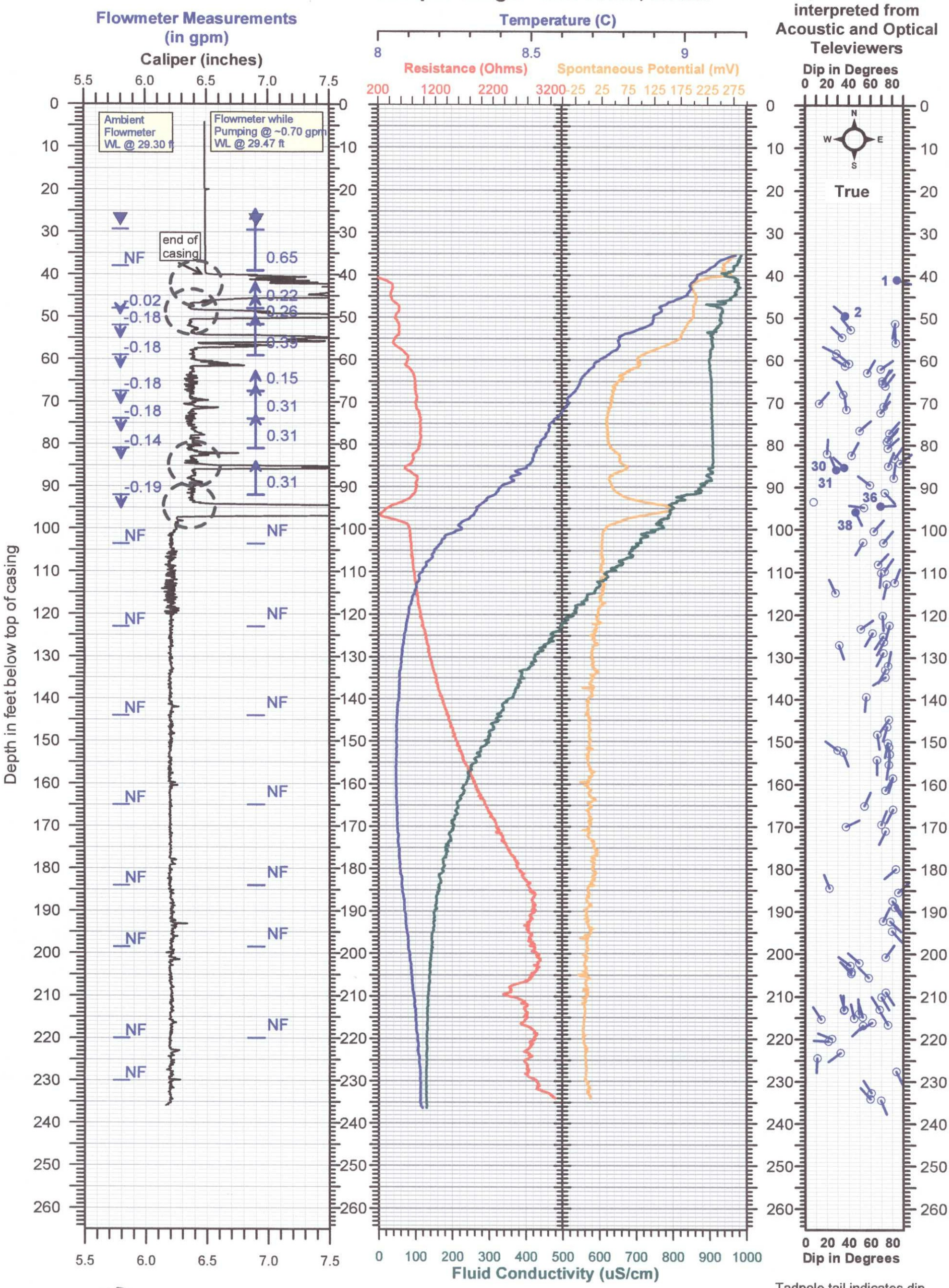
Northeast Geophysical Services

FIGURE B-1
Borehole Geophysical Log
PW-08-02
Juniper Ridge - Old Town, Maine

Date logged: 1/09/09



= Likely transmissive zone

= Possible transmissive zone

Tadpole tail indicates dip direction.
The solid tadpoles with a feature number are the ones interpreted to be likely or possibly transmissive.

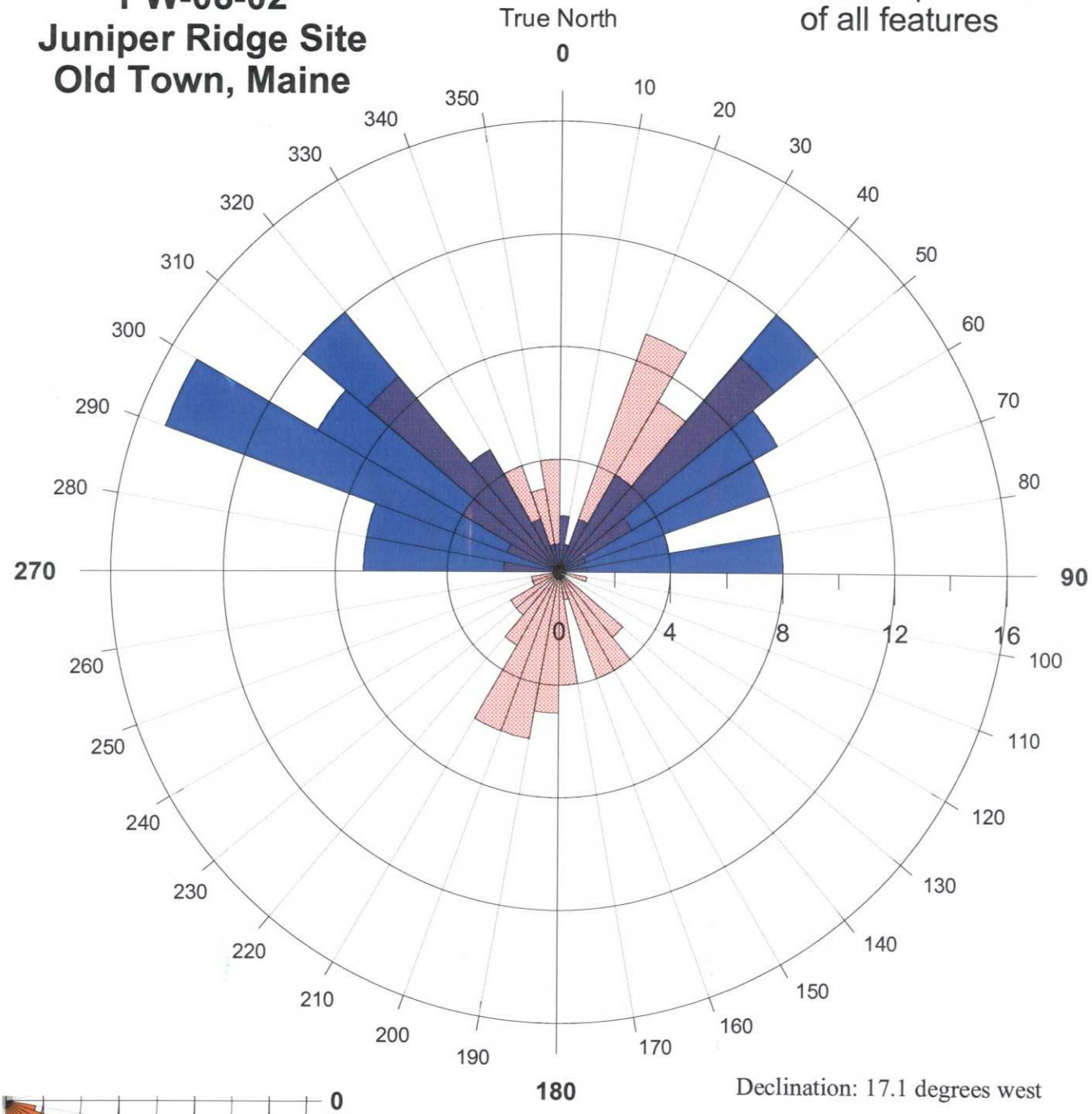
Borehole Geophysical Log
PW-08-02
Juniper Ridge - Old Town, Maine

Northeast Geophysical Services

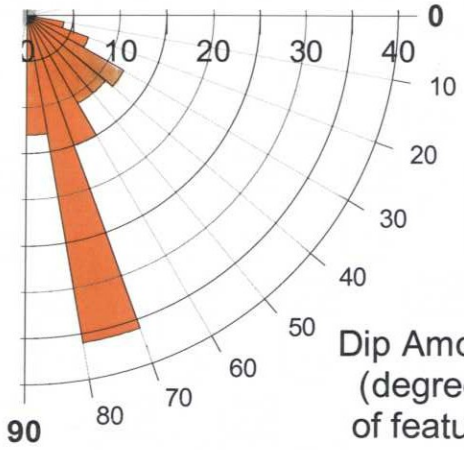
FIGURE B-2

PW-08-02
Juniper Ridge Site
Old Town, Maine

Strike and Dip Direction
of all features



Declination: 17.1 degrees west



Explanation

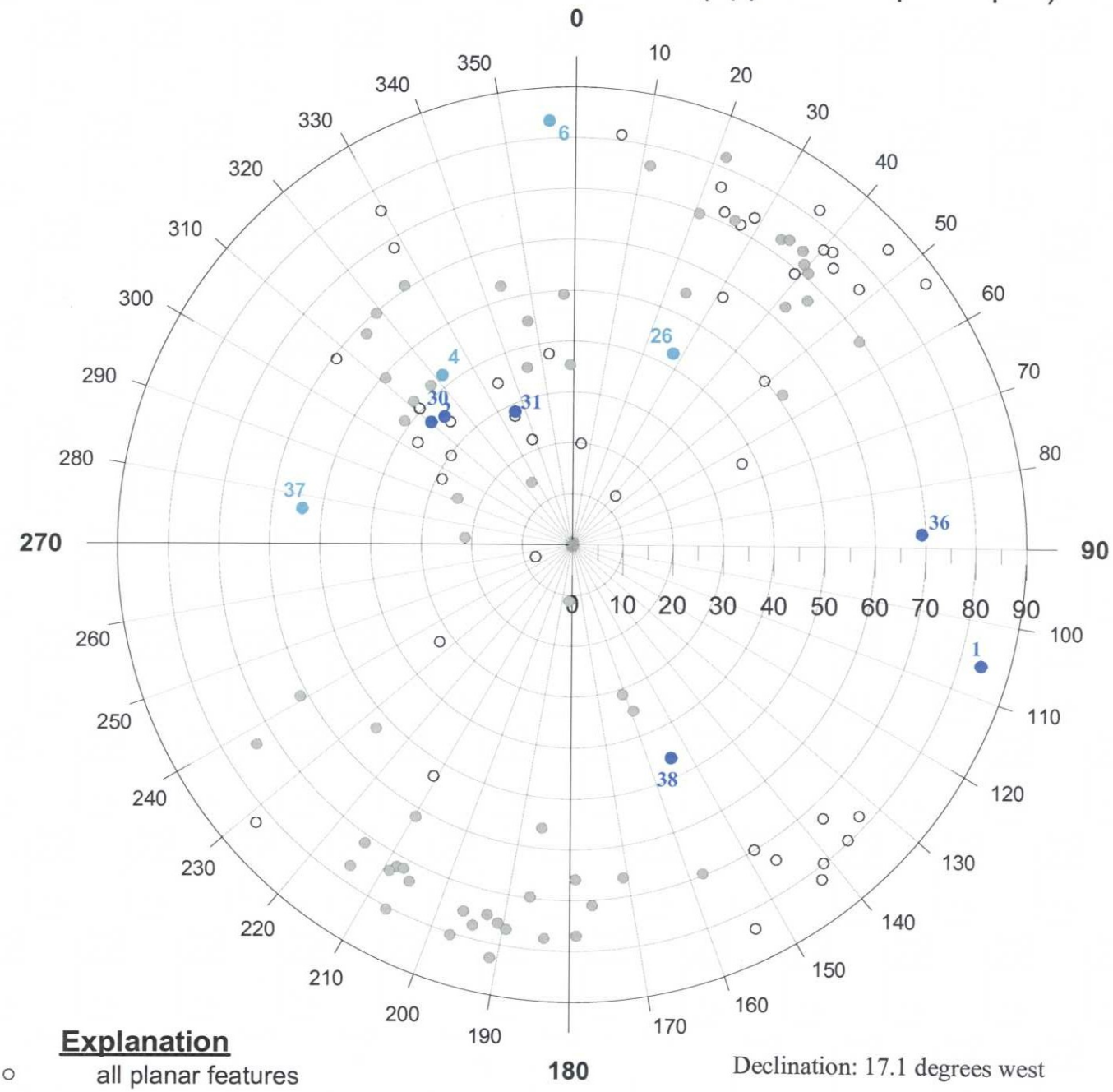
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 110 measurements

FIGURE B-3

PW-08-02
Juniper Ridge Site
Old Town, Maine

Dip Amount and Dip Azimuth of planar features
(upper hemisphere plot)



Explanation

- all planar features
- Likely water bearing
- Possibly water bearing
- Qzt/calcite veins

Declination: 17.1 degrees west

Based on 110 measurements

TABLE B-1 - PW-08-02 Interpreted Structure							Declination	17.1
Borehole	Feature	Feature depth	Dip	Dip Az	Strike	True Dip Az	True Strike	Category
	Number	Feet	Degrees	magnetic	magnetic			Type
PW-08-02	1	41.0	84	123	33	106	16	107
PW-08-02	2	49.5	37	327	57	310	40	107
PW-08-02	3	51.3	83	208	298	191	281	103
PW-08-02	4	52.8	42	339	69	322	52	108
PW-08-02	5	54.6	34	332	62	314	44	100
PW-08-02	6	55.8	83	13	283	356	86	108
PW-08-02	7	58.3	29	313	43	296	26	100
PW-08-02	8	60.7	40	328	58	311	41	100
PW-08-02	9	61.2	37	320	50	303	33	100
PW-08-02	10	62.0	69	72	342	55	325	103
PW-08-02	11	62.9	57	48	318	31	301	100
PW-08-02	12	64.8	71	58	328	41	311	103
PW-08-02	13	65.4	71	45	315	27	297	100
PW-08-02	14	66.0	74	55	325	38	308	103
PW-08-02	15	68.0	35	352	82	334	64	100
PW-08-02	16	70.1	13	58	328	41	311	100
PW-08-02	17	70.8	72	41	311	24	294	100
PW-08-02	18	71.6	38	9	279	352	82	100
PW-08-02	19	72.3	69	56	326	39	309	100
PW-08-02	20	76.6	50	66	336	49	319	100
PW-08-02	21	77.1	77	59	329	41	311	100
PW-08-02	22	78.6	76	57	327	40	310	100
PW-08-02	23	79.2	75	60	330	43	313	100
PW-08-02	24	80.7	76	65	335	48	318	100
PW-08-02	25	82.0	20	22	292	4	274	100
PW-08-02	26	82.4	43	45	315	28	298	108
PW-08-02	27	83.1	82	53	323	36	306	100
PW-08-02	28	84.3	87	70	340	53	323	100
PW-08-02	29	85.0	76	39	309	22	292	100
PW-08-02	30	85.3	36	331	61	314	44	107
PW-08-02	31	85.8	28	353	83	336	66	107
PW-08-02	32	87.8	81	24	294	6	276	100
PW-08-02	33	89.4	59	325	55	308	38	100
PW-08-02	34	91.2	73	154	64	137	47	100
PW-08-02	35	93.5	8	269	359	252	342	100
PW-08-02	36	94.4	69	105	15	88	358	107
PW-08-02	37	94.7	54	294	24	277	7	108
PW-08-02	38	95.8	46	172	82	155	65	107
PW-08-02	39	100.3	63	59	329	42	312	103
PW-08-02	40	102.9	53	228	318	211	301	100
PW-08-02	41	103.0	72	56	326	39	309	103
PW-08-02	42	108.1	67	61	331	44	314	103
PW-08-02	43	109.7	73	51	321	34	304	103
PW-08-02	44	110.1	70	204	294	187	277	103
PW-08-02	45	112.4	82	38	308	21	291	103
PW-08-02	46	112.8	75	210	300	193	283	103
PW-08-02	47	114.8	28	352	82	335	65	100
PW-08-02	48	120.2	71	194	284	176	86	103

TABLE B-1 - PW-08-02 Interpreted Structure							Declination	17.1
Borehole	Feature	Feature depth	Dip	Dip Az	Strike	True Dip Az	True Strike	Category
	Number	Feet	Degrees	magnetic	magnetic			Type
PW-08-02	49	122.4	77	212	302	194	284	103
PW-08-02	50	123.3	51	71	341	54	324	103
PW-08-02	51	124.3	62	227	317	210	300	103
PW-08-02	52	125.1	72	232	322	215	305	103
PW-08-02	53	126.3	72	225	315	208	298	103
PW-08-02	54	127.0	31	178	88	161	71	103
PW-08-02	55	128.9	72	224	314	207	297	103
PW-08-02	56	131.9	76	28	298	11	281	103
PW-08-02	57	133.0	74	226	316	209	299	103
PW-08-02	58	134.7	74	255	345	238	328	103
PW-08-02	59	139.3	56	203	293	186	276	103
PW-08-02	60	144.7	77	232	322	214	304	103
PW-08-02	61	146.4	75	213	303	196	286	103
PW-08-02	62	148.2	66	188	278	171	81	103
PW-08-02	63	150.2	76	208	298	191	281	103
PW-08-02	64	151.1	77	196	286	179	89	103
PW-08-02	65	151.9	30	323	53	306	36	100
PW-08-02	66	152.4	35	176	86	159	69	103
PW-08-02	67	152.8	78	201	291	184	274	103
PW-08-02	68	154.2	66	196	286	179	89	103
PW-08-02	69	155.3	77	207	297	190	280	103
PW-08-02	70	158.5	80	214	304	197	287	103
PW-08-02	71	161.3	74	46	316	29	299	100
PW-08-02	72	165.0	54	41	311	24	294	103
PW-08-02	73	165.8	81	224	314	207	297	103
PW-08-02	74	169.4	70	38	308	21	291	103
PW-08-02	75	169.9	37	81	351	64	334	100
PW-08-02	76	170.9	74	223	313	206	296	103
PW-08-02	77	179.9	83	246	336	229	319	100
PW-08-02	78	184.5	22	355	85	338	68	100
PW-08-02	79	185.5	85	64	334	47	317	100
PW-08-02	80	187.5	80	158	68	141	51	100
PW-08-02	81	188.9	82	160	70	143	53	100
PW-08-02	82	192.2	71	43	313	26	296	103
PW-08-02	83	192.3	78	150	60	133	43	100
PW-08-02	84	194.6	80	153	63	136	46	100
PW-08-02	85	200.7	74	52	322	35	305	103
PW-08-02	86	202.1	49	328	58	311	41	103
PW-08-02	87	202.7	41	323	53	306	36	103
PW-08-02	88	204.2	42	328	58	311	41	103
PW-08-02	89	204.6	42	335	65	318	48	103
PW-08-02	90	205.6	58	332	62	315	45	103
PW-08-02	91	209.0	74	164	74	146	56	100
PW-08-02	92	210.1	70	166	76	149	59	100
PW-08-02	93	213.0	36	2	272	345	75	103
PW-08-02	94	213.0	68	345	75	328	58	100
PW-08-02	95	213.2	35	16	286	359	89	103
PW-08-02	96	214.0	49	15	285	357	87	103

TABLE B-1 - PW-08-02 Interpreted Structure							Declination	17.1
Borehole	Feature	Feature depth	Dip	Dip Az	Strike	True Dip Az	True Strike	Category
	Number	Feet	Degrees	magnetic	magnetic			Type
PW-08-02	97	214.8	53	1	271	344	74	103
PW-08-02	98	215.1	45	5	275	348	78	103
PW-08-02	99	215.4	15	343	73	326	56	103
PW-08-02	100	216.1	62	258	348	241	331	103
PW-08-02	101	216.6	76	347	77	330	60	100
PW-08-02	102	216.8	53	244	334	227	317	103
PW-08-02	103	219.9	25	308	38	291	21	103
PW-08-02	104	220.5	21	290	20	273	3	103
PW-08-02	105	223.2	33	251	341	234	324	100
PW-08-02	106	224.4	11	201	291	183	273	103
PW-08-02	107	227.5	84	171	81	154	64	100
PW-08-02	108	232.6	61	343	73	326	56	103
PW-08-02	109	234.1	60	336	66	319	49	103
PW-08-02	110	234.4	70	175	85	158	68	103
Explanation of Categories:								
		100	planar feature: bedding, joint, fracture, foliation etc.					
		103	quartz or calcite vein					
		107	likely transmissive fracture					
		108	possible transmissive fracture					

Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel: 207-942-2700 email: negeophysical.com

Log: Optical Televiewer & Caliper logs

Well: **PW-08-02**

Site: Juniper Ridge

Location: Old Town, Maine

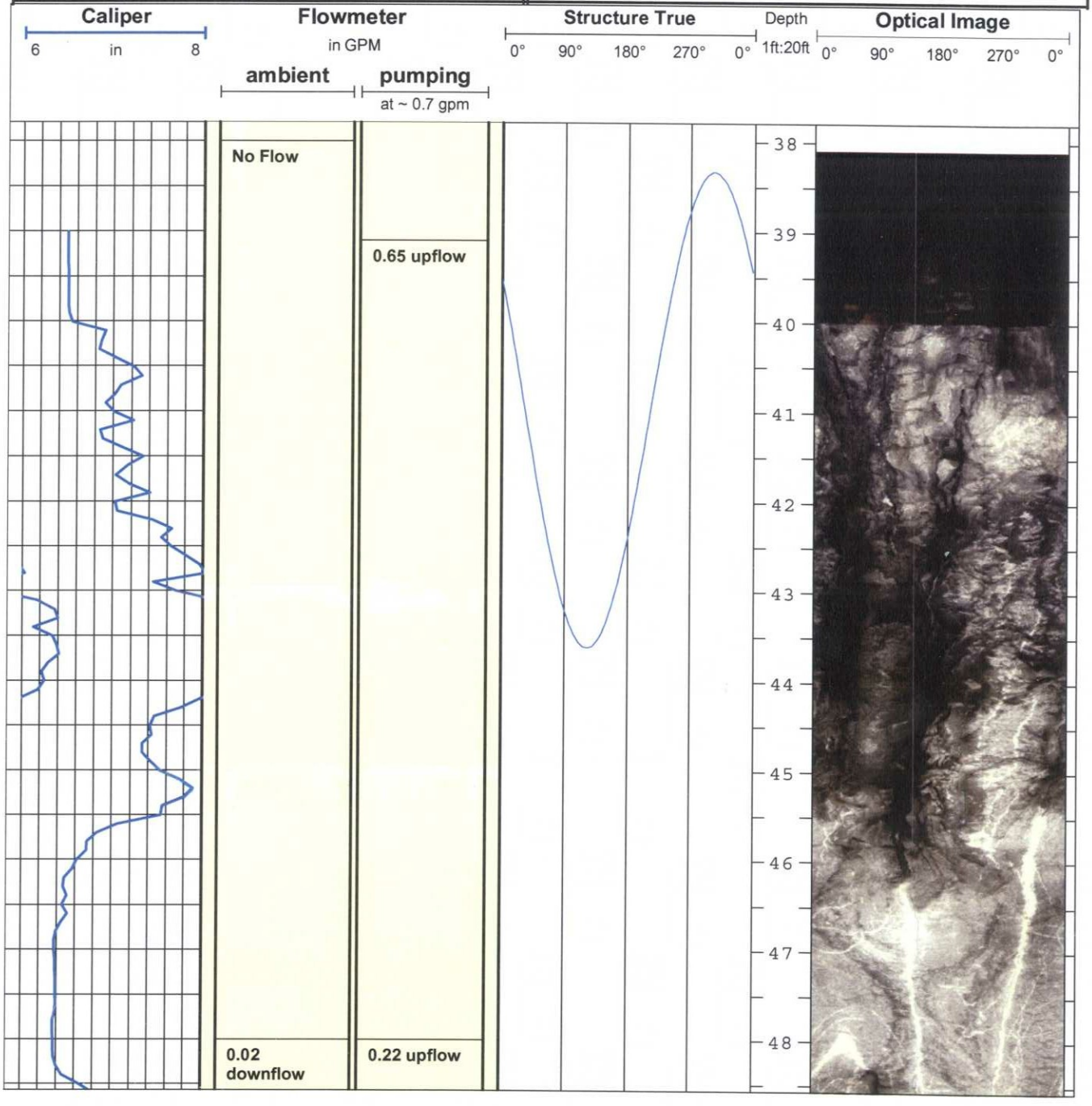
Date:	1/09/09
Casing Depth:	40 ft
Casing Type:	6 in
Boring Depth:	236.9 ft
Meas. From:	top of casing
Stickup:	2.2 ft
Water Level:	29.3 ft

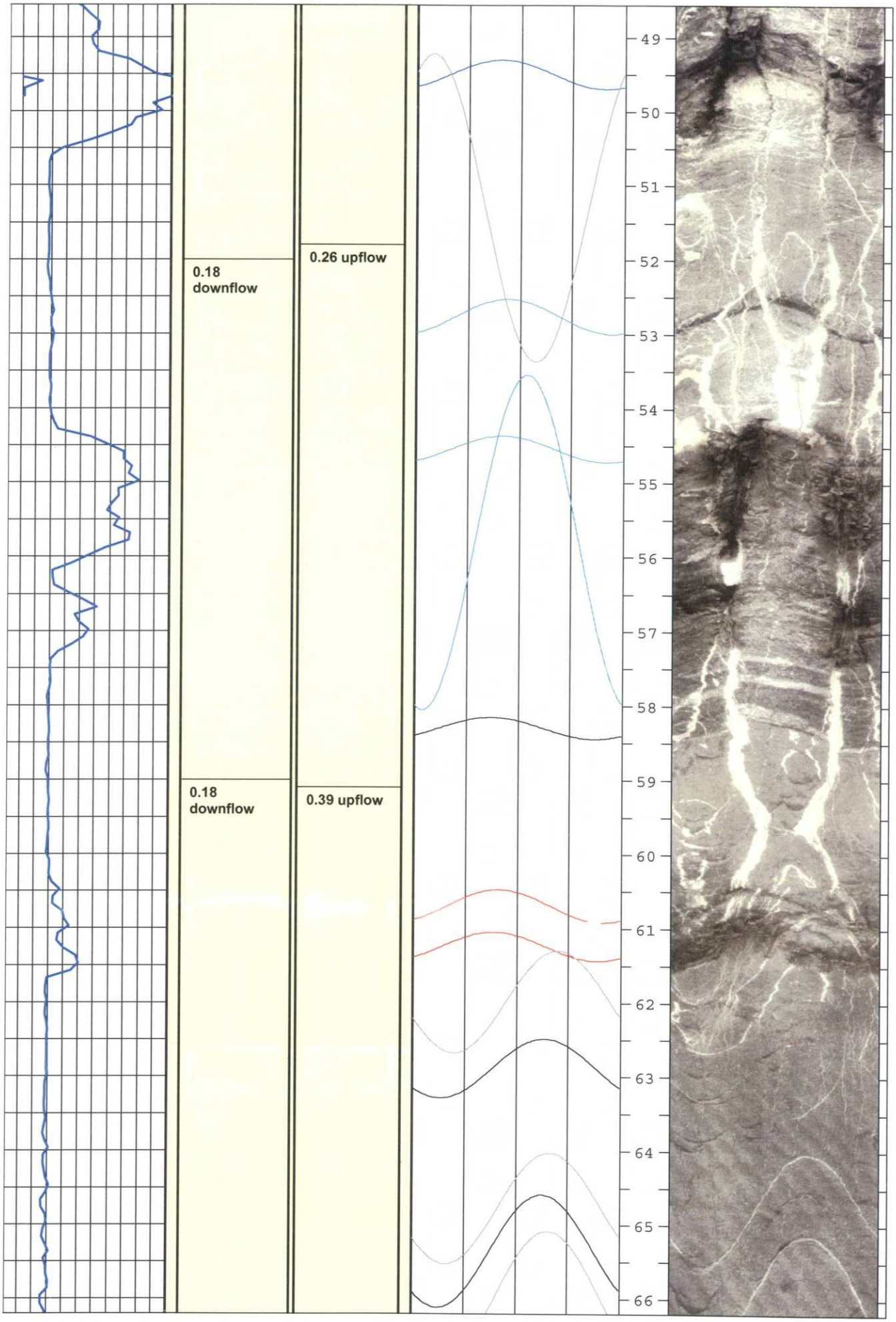
For: SME

Logged by: R. Rawcliffe

Orientation: magnetic

Structure Plots:
black = planar features (joints, fractures, bedding, foliation, etc.)
lt gray = veins of porbably quartz or calcite
lt blue = possibly transmissive fractures
dark blue = likely transmissive fractures

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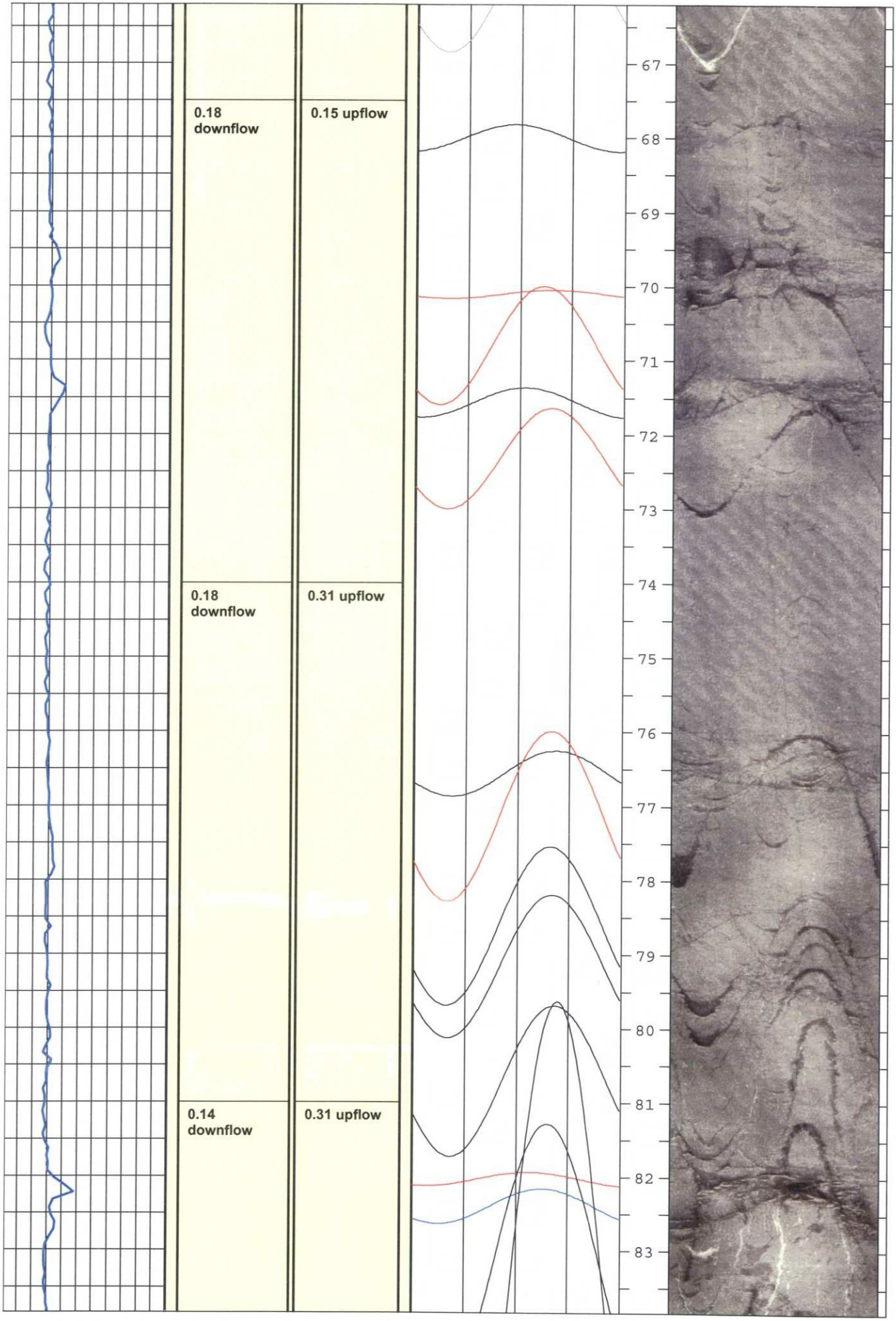
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downflow
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0.14
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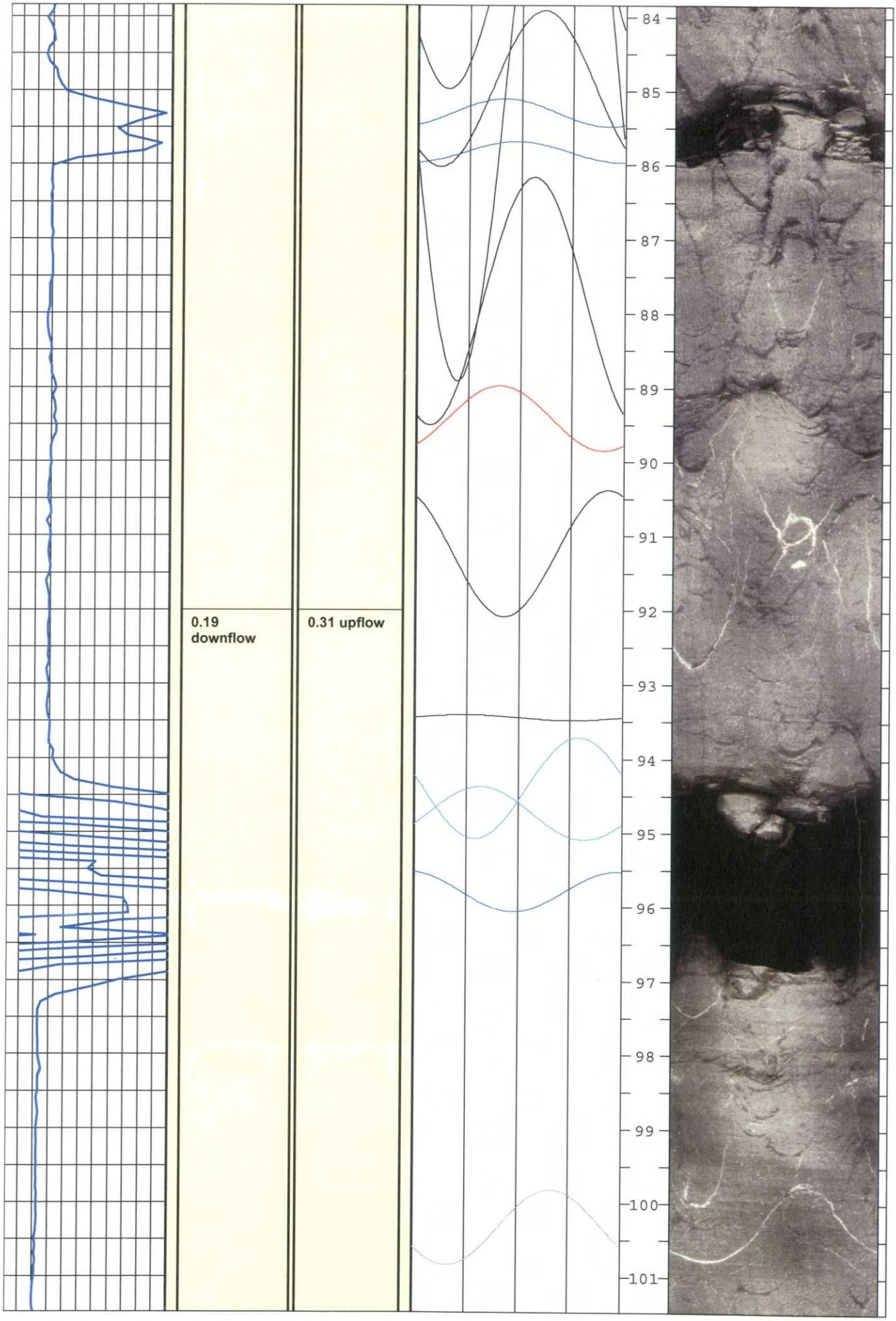
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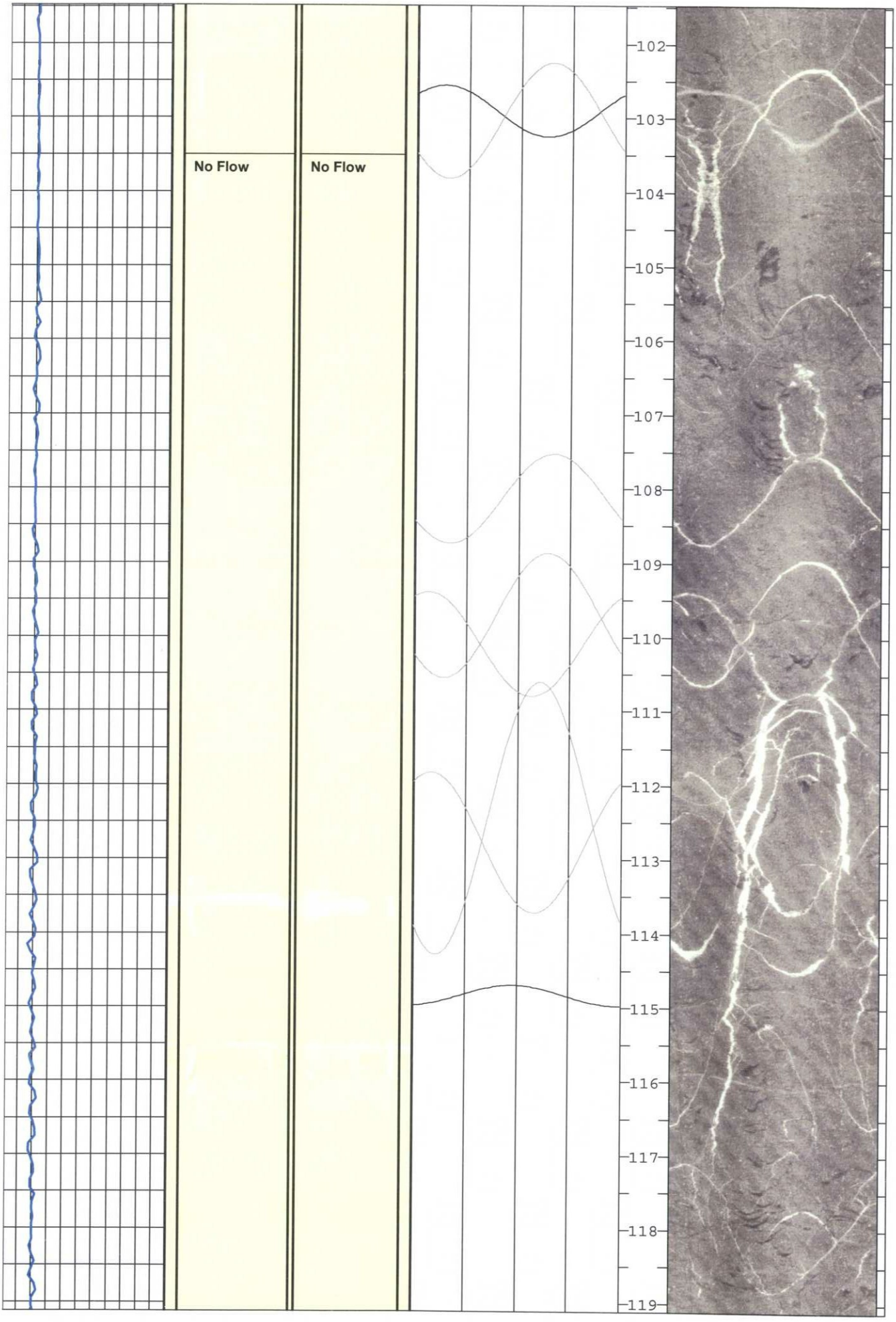
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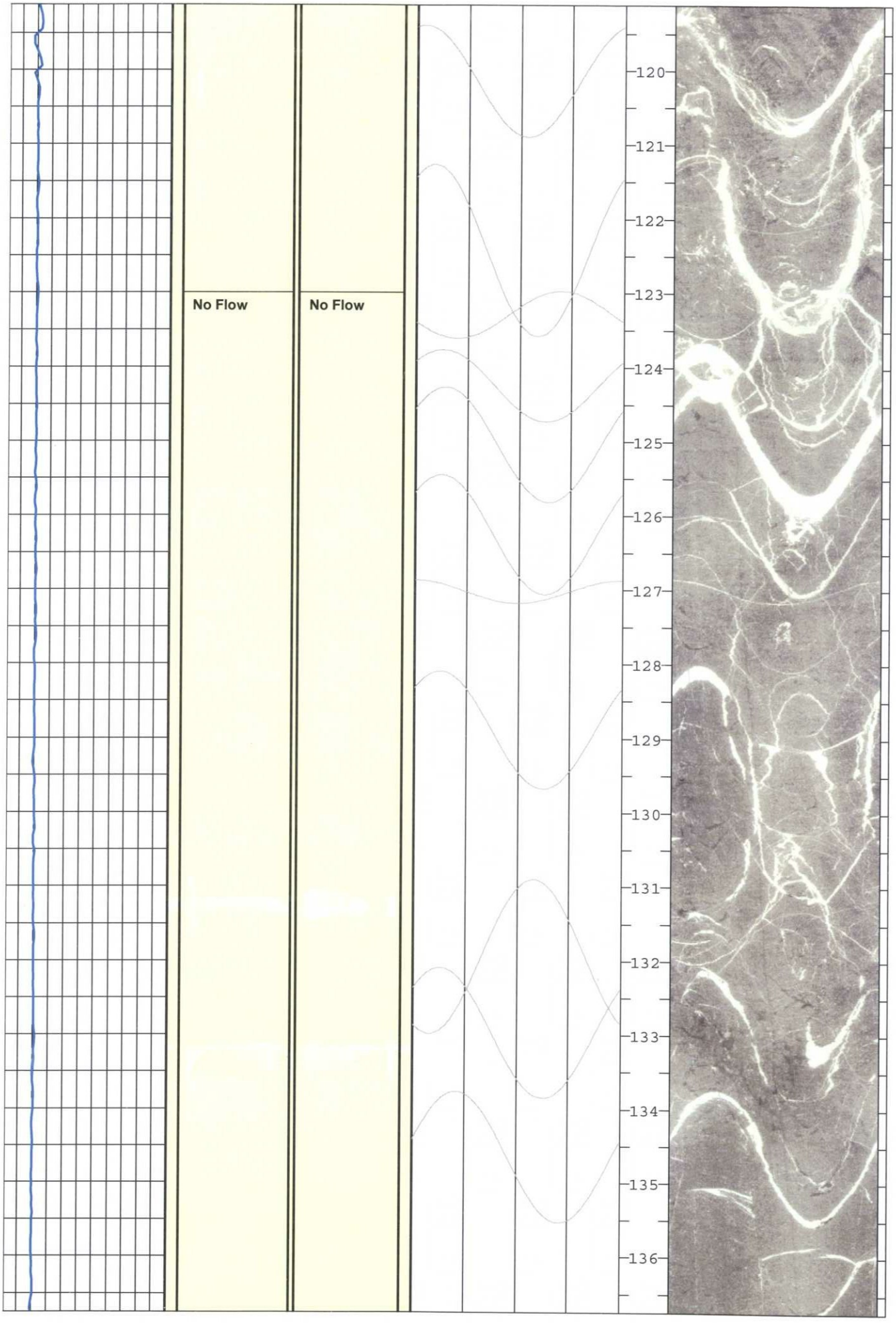
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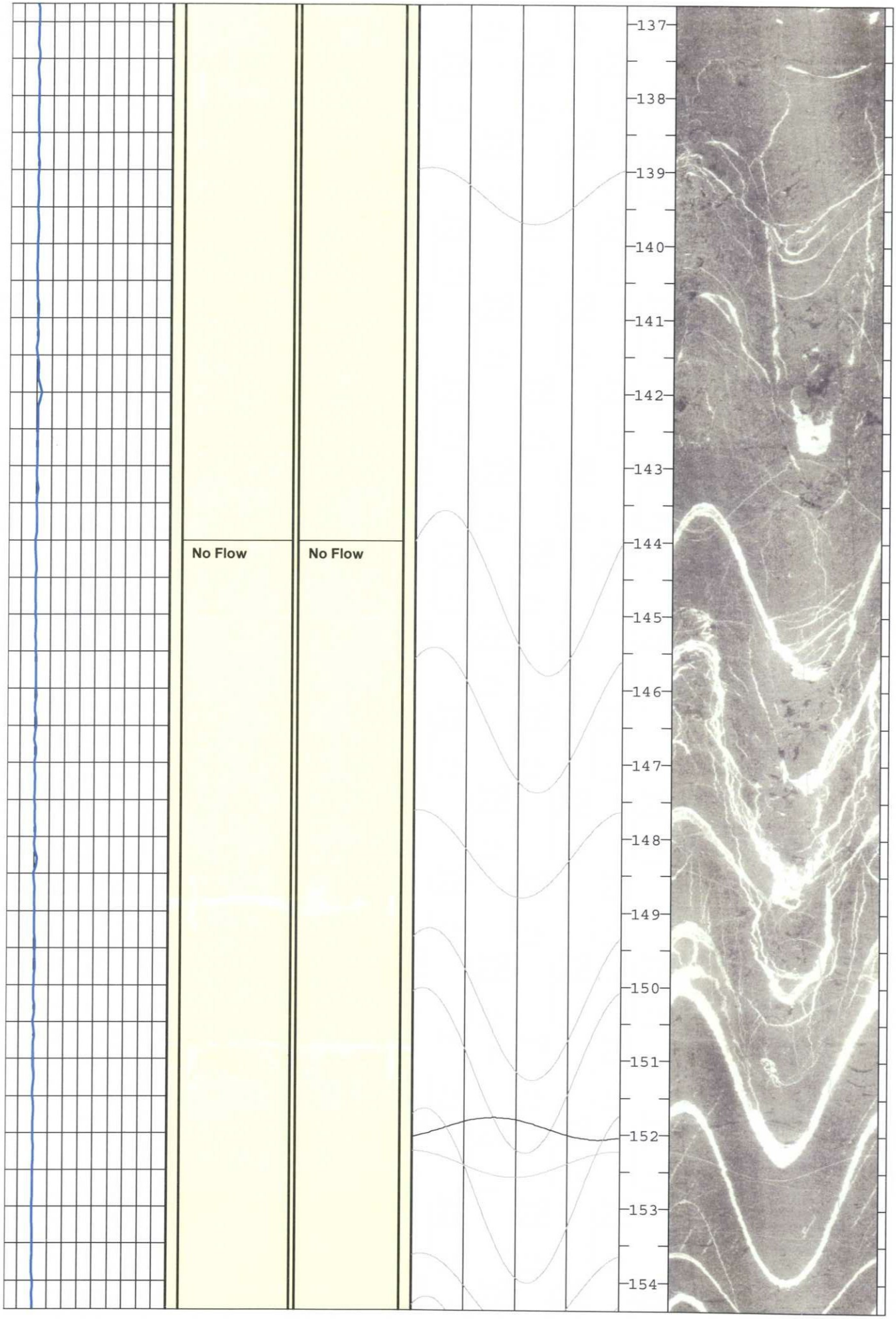
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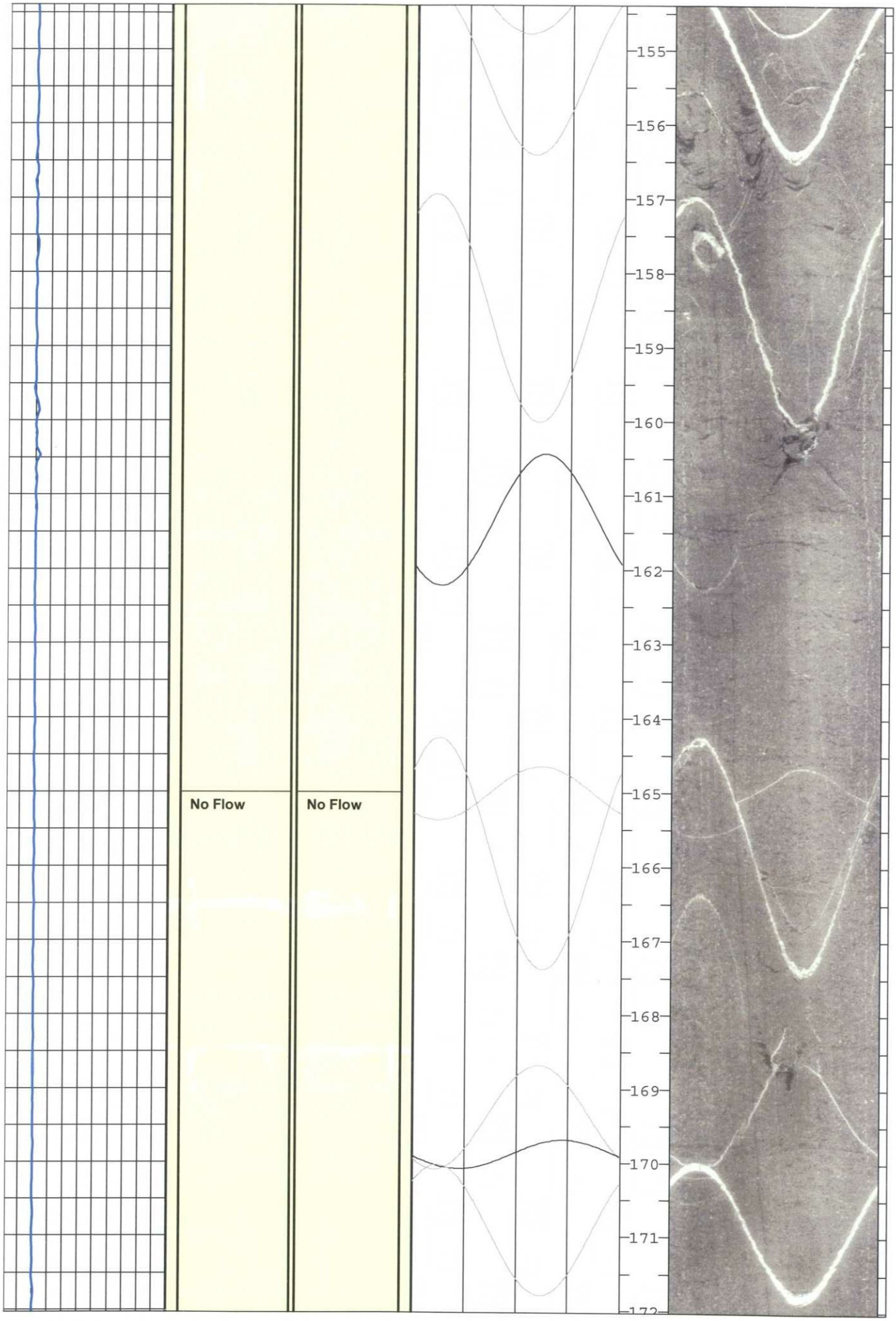
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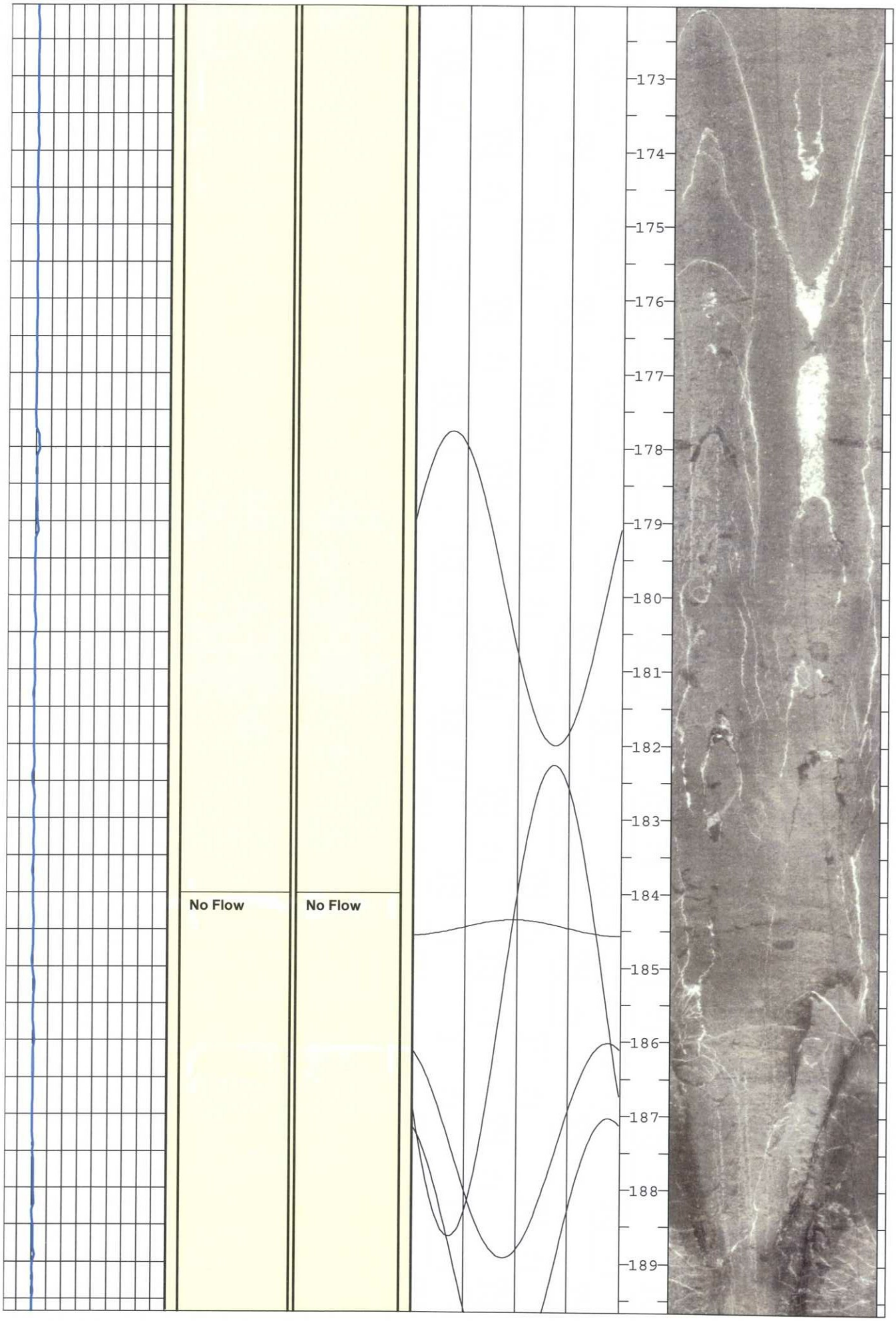
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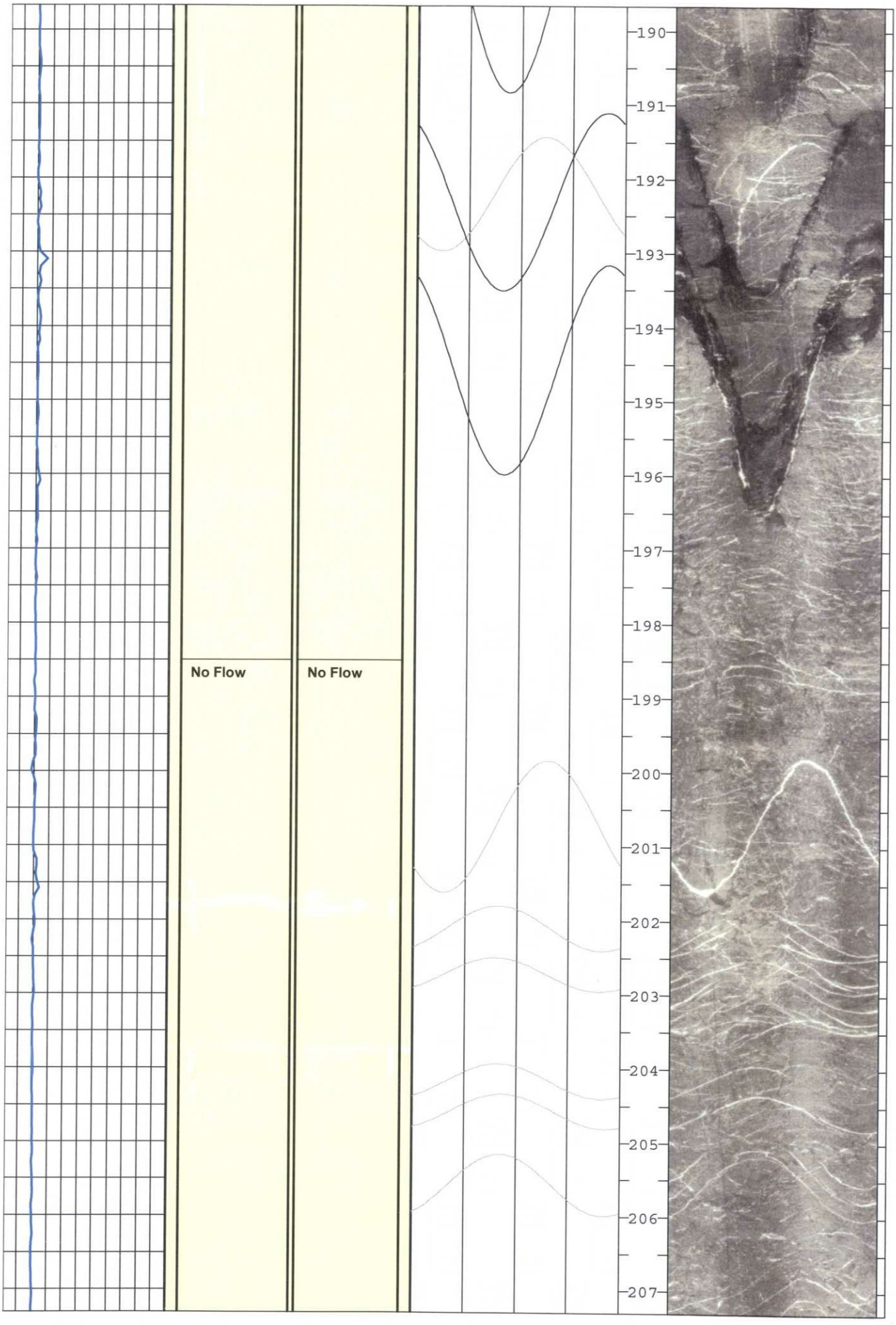
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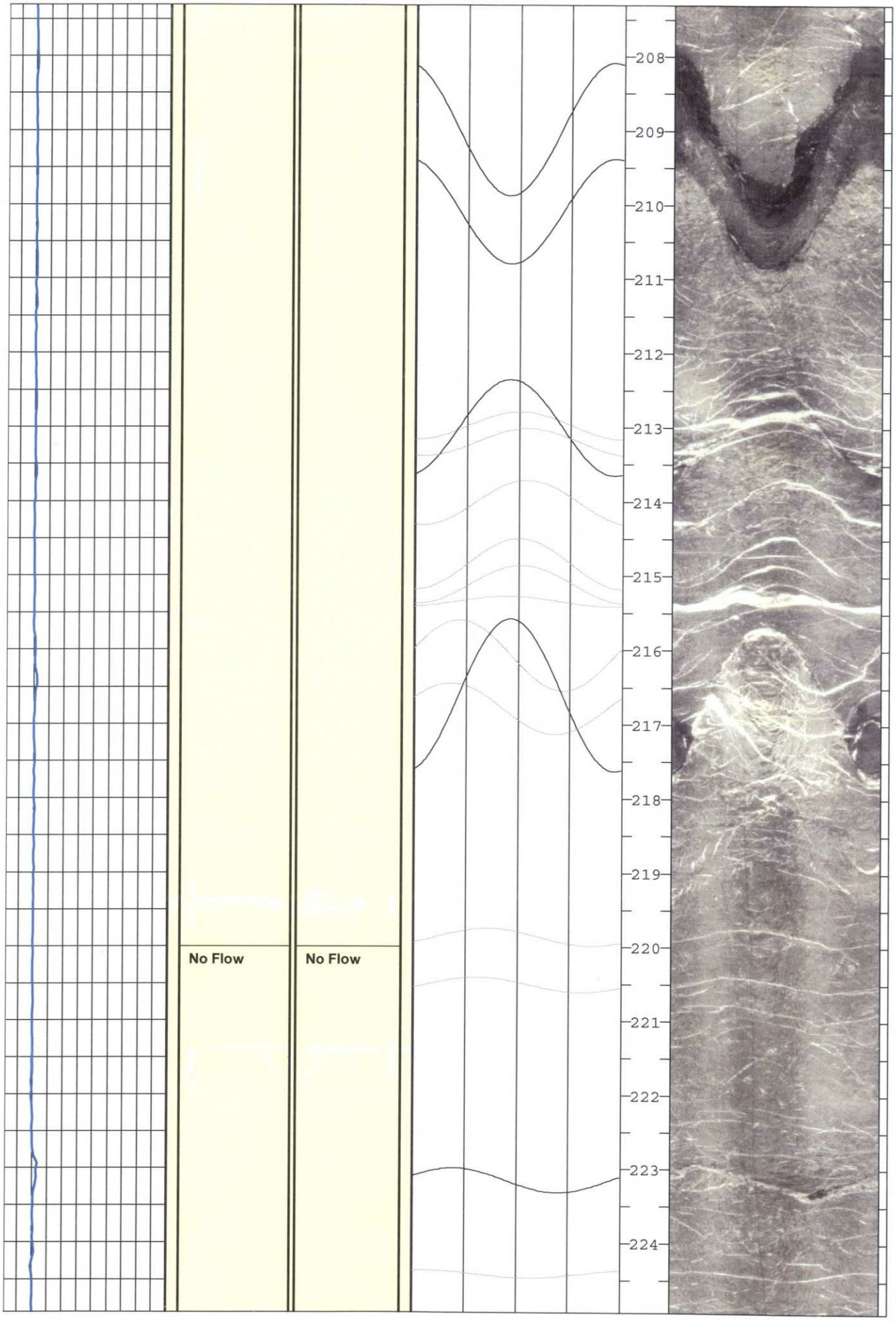
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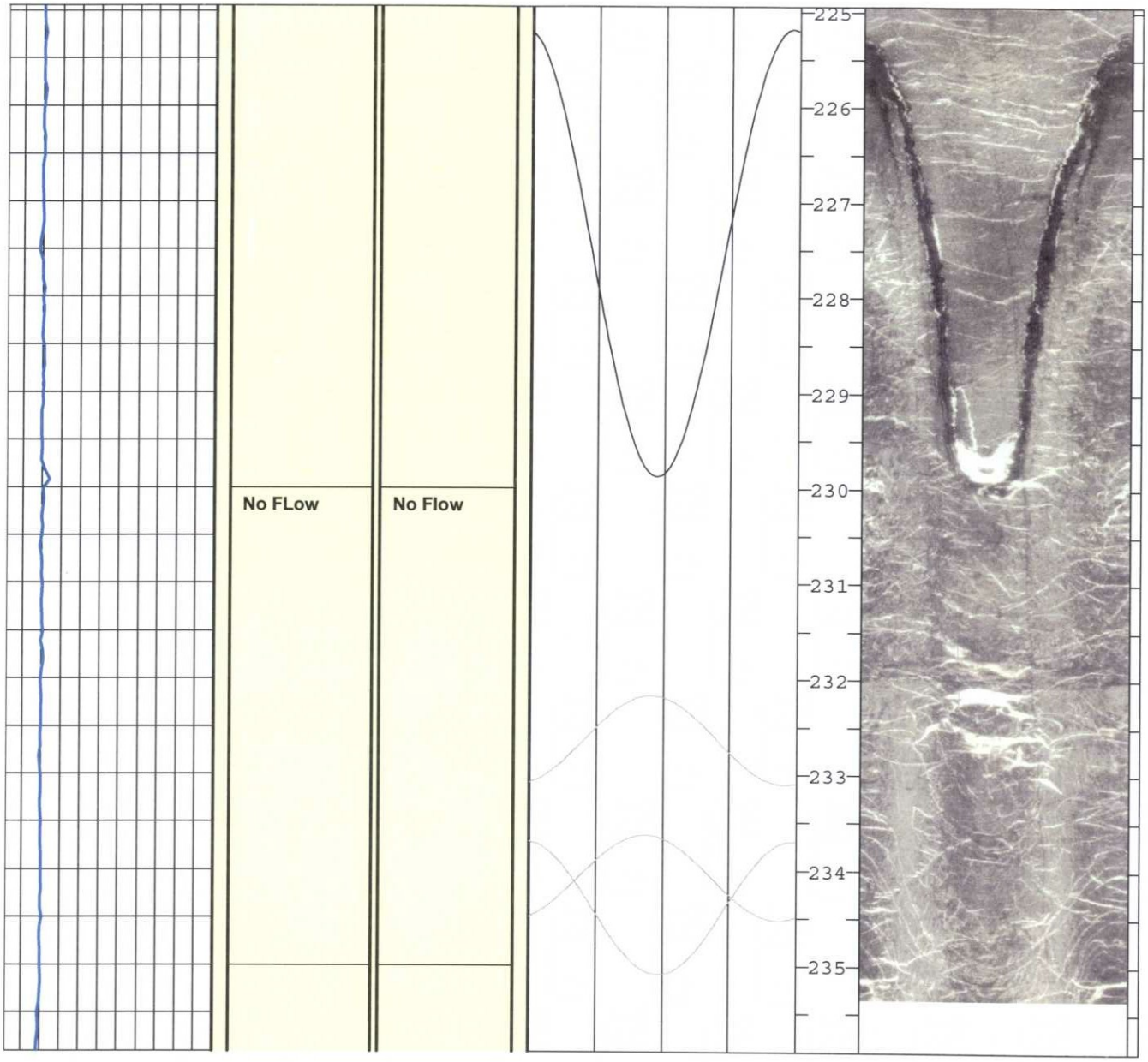
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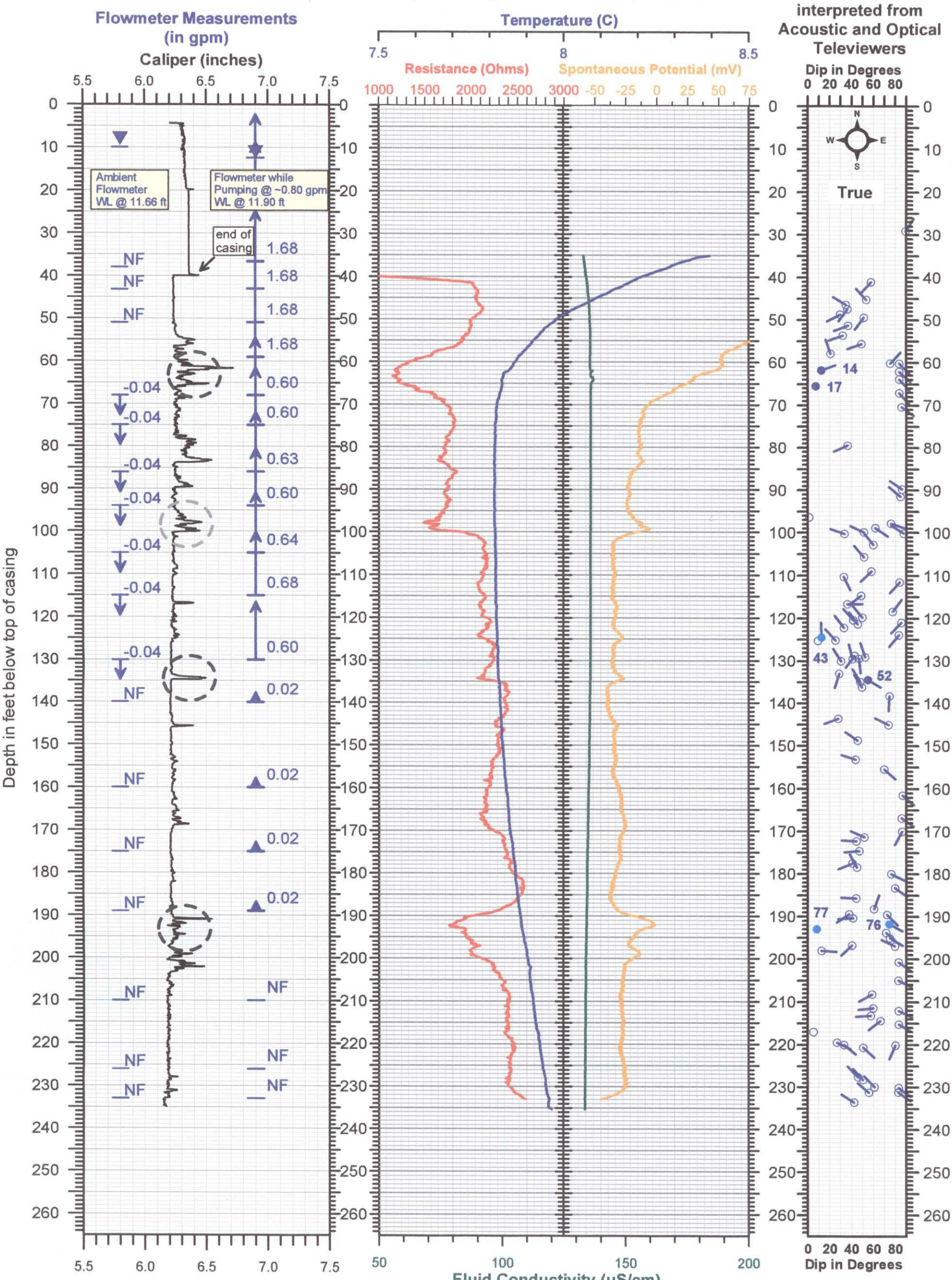
Northeast Geophysical Services

FIGURE C-1
Borehole Geophysical Log
PW-08-03
Juniper Ridge - Old Town, Maine

Date logged: 1/13/09



= Likely transmissive zone

= Possible transmissive zone

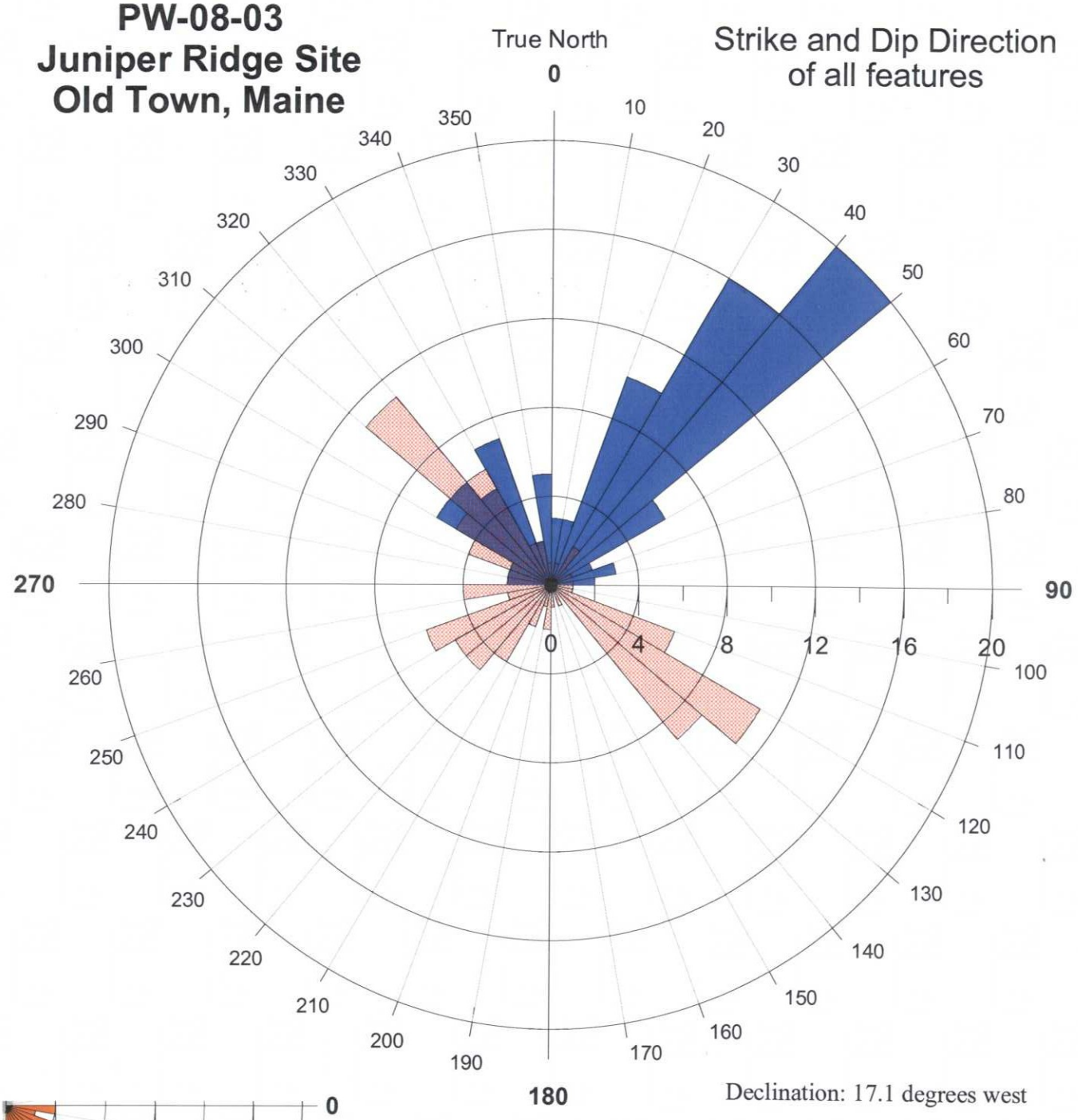
Tadpole tail indicates dip direction.
The solid tadpoles with a feature number are the ones interpreted to be likely or possibly transmissive.

Borehole Geophysical Log
PW-08-03
Juniper Ridge - Old Town, Maine

Northeast Geophysical Services

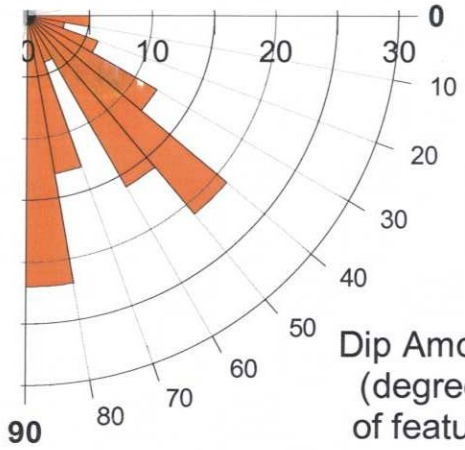
FIGURE C-2

PW-08-03
Juniper Ridge Site
Old Town, Maine



Strike and Dip Direction of all features

Declination: 17.1 degrees west



Explanation

- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

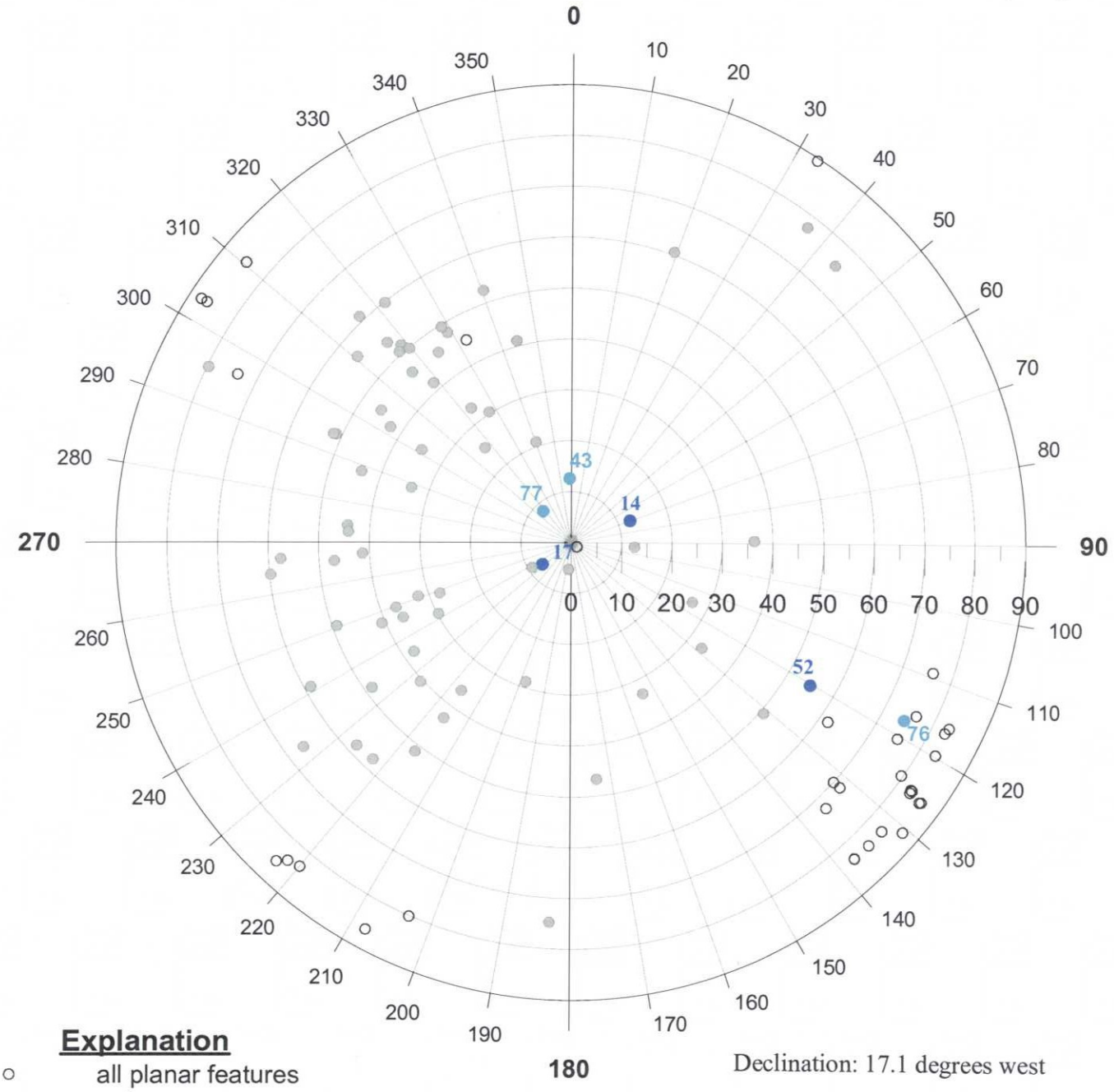
Based on 102 measurements

Northeast Geophysical Services

FIGURE C-3

PW-08-03
Juniper Ridge Site
Old Town, Maine

Dip Amount and Dip Azimuth of planar features
(upper hemisphere plot)



Explanation

- all planar features
- Likely water bearing
- Possibly water bearing
- Qzt/calcite veins

Declination: 17.1 degrees west

Based on 102 measurements

TABLE C-1 - PW-08-03 Interpreted Structure							Declination	17.1
Borehole	Feature	Feature depth	Dip	Dip Az	Strike	True Dip Az	True Strike	Category
	Number	Feet	Degrees	magnetic	magnetic			Type
PW-08-03	1	29.1	89	50	320	33	303	100
PW-08-03	2	41.1	58	240	330	222	312	103
PW-08-03	3	45.2	54	334	64	317	47	103
PW-08-03	4	46.4	35	318	48	301	31	103
PW-08-03	5	47.5	36	234	324	217	307	103
PW-08-03	6	48.7	30	259	349	242	332	103
PW-08-03	7	49.4	51	234	324	217	307	103
PW-08-03	8	51.3	37	267	357	250	340	103
PW-08-03	9	53.6	32	268	358	251	341	103
PW-08-03	10	55.6	49	268	358	250	340	103
PW-08-03	11	57.9	21	357	87	340	70	103
PW-08-03	12	60.1	75	61	331	44	314	103
PW-08-03	13	60.2	84	152	62	135	45	100
PW-08-03	14	61.8	12	87	357	70	340	107
PW-08-03	15	62.1	84	150	60	132	42	100
PW-08-03	16	63.9	84	155	65	138	48	100
PW-08-03	17	65.5	7	250	340	233	323	107
PW-08-03	18	67.1	84	155	65	138	48	100
PW-08-03	19	70.4	86	143	53	126	36	100
PW-08-03	20	79.5	36	263	353	246	336	103
PW-08-03	21	89.8	86	320	50	303	33	100
PW-08-03	22	91.5	85	327	57	310	40	100
PW-08-03	23	96.4	1	145	55	128	38	100
PW-08-03	24	97.8	76	126	36	109	19	100
PW-08-03	25	98.9	62	142	52	124	34	100
PW-08-03	26	99.9	51	312	42	294	24	103
PW-08-03	27	100.2	88	320	50	303	33	100
PW-08-03	28	100.2	33	306	36	289	19	103
PW-08-03	29	102.8	60	339	69	322	52	103
PW-08-03	30	105.7	51	336	66	319	49	103
PW-08-03	31	109.0	58	244	334	227	317	103
PW-08-03	32	110.3	33	171	81	154	64	103
PW-08-03	33	111.5	84	239	329	222	312	100
PW-08-03	34	114.7	49	251	341	234	324	103
PW-08-03	35	116.7	36	106	16	89	359	103
PW-08-03	36	118.4	78	54	324	37	307	103
PW-08-03	37	119.8	50	337	67	320	50	103
PW-08-03	38	120.4	42	336	66	319	49	103
PW-08-03	39	121.0	86	240	330	223	313	100
PW-08-03	40	121.4	46	342	72	325	55	103
PW-08-03	41	122.2	33	340	70	323	53	103
PW-08-03	42	123.9	83	237	327	220	310	100
PW-08-03	43	124.5	13	15	285	358	88	108
PW-08-03	44	125.1	25	334	64	317	47	103
PW-08-03	45	125.3	9	255	345	238	328	103
PW-08-03	46	128.7	43	233	323	216	306	103
PW-08-03	47	129.1	52	357	87	340	70	103
PW-08-03	48	129.4	47	191	281	174	84	103
PW-08-03	49	129.5	41	1	271	344	74	103
PW-08-03	50	130.0	30	344	74	327	57	103
PW-08-03	51	133.0	29	215	305	198	288	103
PW-08-03	52	134.4	55	138	48	120	30	107
PW-08-03	53	134.9	48	346	76	329	59	103
PW-08-03	54	136.2	50	346	76	328	58	103
PW-08-03	55	138.3	75	200	290	183	273	103
PW-08-03	56	143.6	28	266	356	249	339	103

TABLE C-1 - PW-08-03 Interpreted Structure							Declination	17.1
Borehole	Feature	Feature depth	Dip	Dip Az	Strike	True Dip Az	True Strike	Category
	Number	Feet	Degrees	magnetic	magnetic			Type
PW-08-03	57	145.1	74	314	44	296	26	100
PW-08-03	58	148.7	46	321	51	304	34	103
PW-08-03	59	153.2	44	306	36	289	19	103
PW-08-03	60	155.5	70	149	59	132	42	100
PW-08-03	61	161.5	87	148	58	131	41	100
PW-08-03	62	166.9	86	143	53	126	36	100
PW-08-03	63	170.0	86	225	315	208	298	100
PW-08-03	64	171.4	52	311	41	294	24	103
PW-08-03	65	172.3	44	291	21	274	4	103
PW-08-03	66	174.6	47	283	13	265	355	103
PW-08-03	67	177.5	41	264	354	247	337	103
PW-08-03	68	178.4	45	349	79	332	62	100
PW-08-03	69	180.0	76	133	43	116	26	100
PW-08-03	70	183.3	80	142	52	125	35	100
PW-08-03	71	185.7	44	290	20	273	3	103
PW-08-03	72	188.2	61	37	307	19	289	103
PW-08-03	73	189.4	38	252	342	235	325	103
PW-08-03	74	189.6	73	153	63	136	46	100
PW-08-03	75	190.4	41	284	14	267	357	103
PW-08-03	76	191.8	75	135	45	118	28	108
PW-08-03	77	193.0	8	334	64	317	47	108
PW-08-03	78	193.8	72	149	59	132	42	100
PW-08-03	79	195.1	75	138	48	121	31	100
PW-08-03	80	196.8	40	244	334	227	317	103
PW-08-03	81	197.0	80	313	43	296	26	103
PW-08-03	82	198.1	13	111	21	94	4	103
PW-08-03	83	200.7	83	143	53	126	36	100
PW-08-03	84	205.0	83	134	44	117	27	100
PW-08-03	85	208.2	59	258	348	241	331	103
PW-08-03	86	211.5	60	281	11	264	354	103
PW-08-03	87	212.1	83	133	43	116	26	100
PW-08-03	88	213.2	58	284	14	267	357	103
PW-08-03	89	214.5	66	250	340	233	323	103
PW-08-03	90	215.3	83	137	47	120	30	100
PW-08-03	91	217.0	5	203	293	186	276	103
PW-08-03	92	219.5	27	133	43	116	26	103
PW-08-03	93	220.0	33	146	56	128	38	103
PW-08-03	94	220.1	80	221	311	203	293	100
PW-08-03	95	220.7	51	148	58	131	41	103
PW-08-03	96	227.6	46	334	64	316	46	103
PW-08-03	97	228.2	51	335	65	317	47	103
PW-08-03	98	230.0	61	333	63	316	46	103
PW-08-03	99	230.1	83	143	53	126	36	100
PW-08-03	100	231.2	83	143	53	126	36	100
PW-08-03	101	231.2	56	328	58	311	41	103
PW-08-03	102	233.6	42	319	49	302	32	103
Explanation of Categories:								
		100	planar feature: bedding, joint, fracture, foliation etc.					
		103	quartz or calcite vein					
		107	likely transmissive fracture					
		108	possible transmissive fracture					

Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel: 207-942-2700 email: negeophysical.com

Log: Optical Televiewer & Caliper Logs

Well: PW-08-03

Site: Juniper Ridge

Location: Old Town, Maine

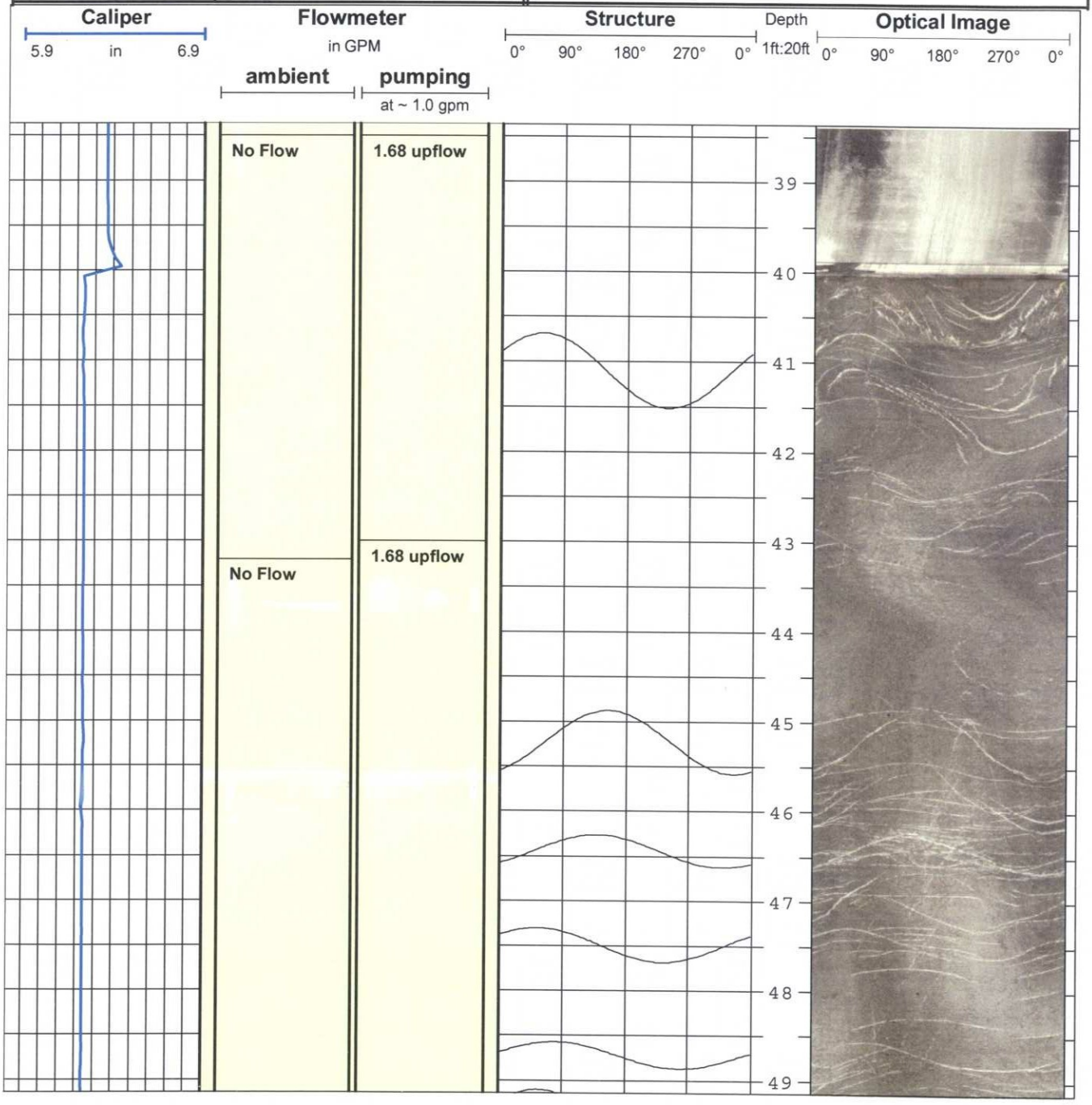
Date:	1/13/09
Casing Depth:	40 ft
Casing Type:	6 in steel
Boring Depth:	236 ft
Meas. From:	top of casing
Stickup:	1.8 ft
Water Level:	9.95 ft

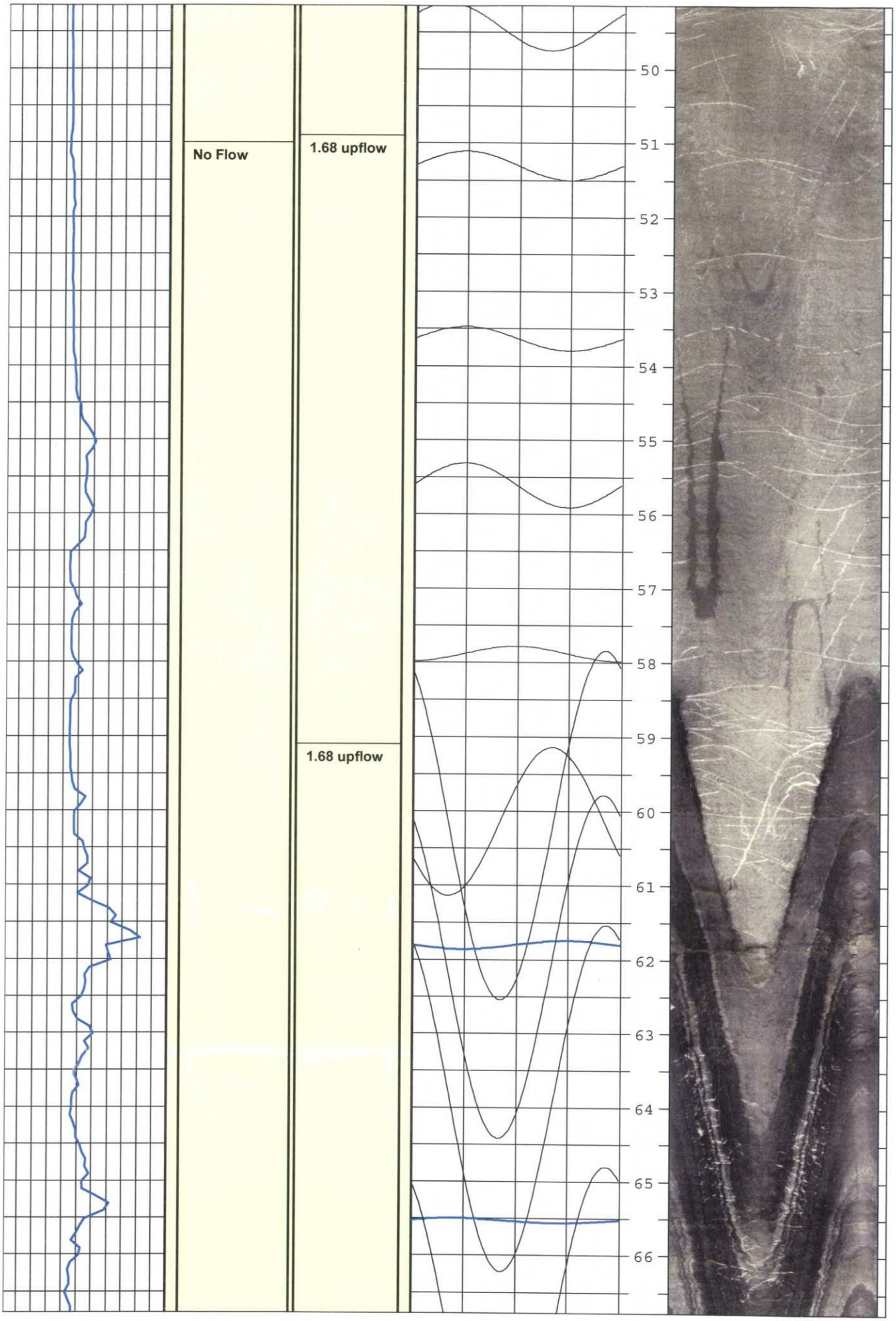
For: Sevee & Maher

Logged by: R Rawcliffe

Orientation: magnetic

Structure Plots:
black = planar features (faults, foliation, bedding, joints, etc)
light gray = veins of likely either quartz or calcite
light blue = possibly transmissive fracture
dark blue = likely transmissive fracture

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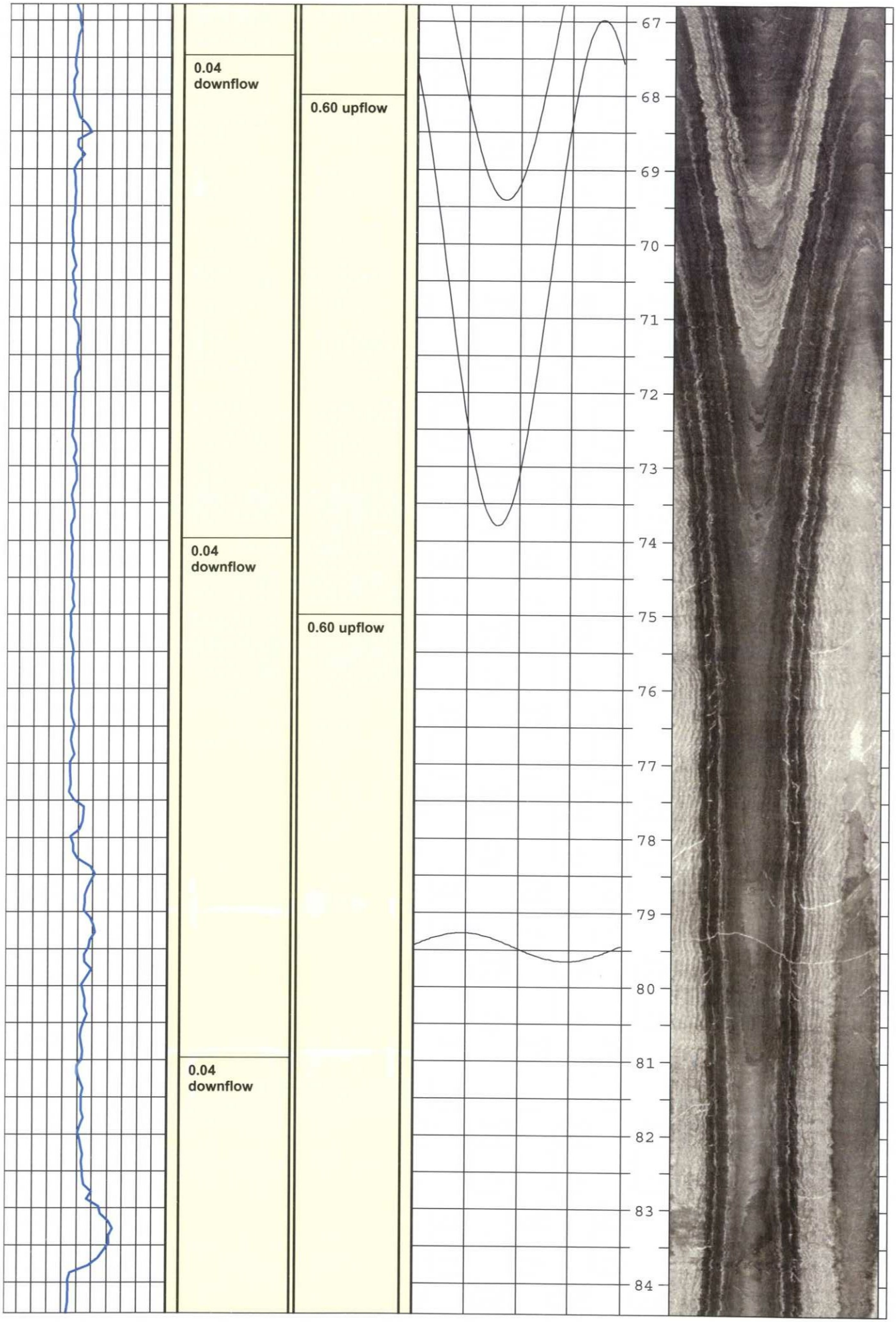
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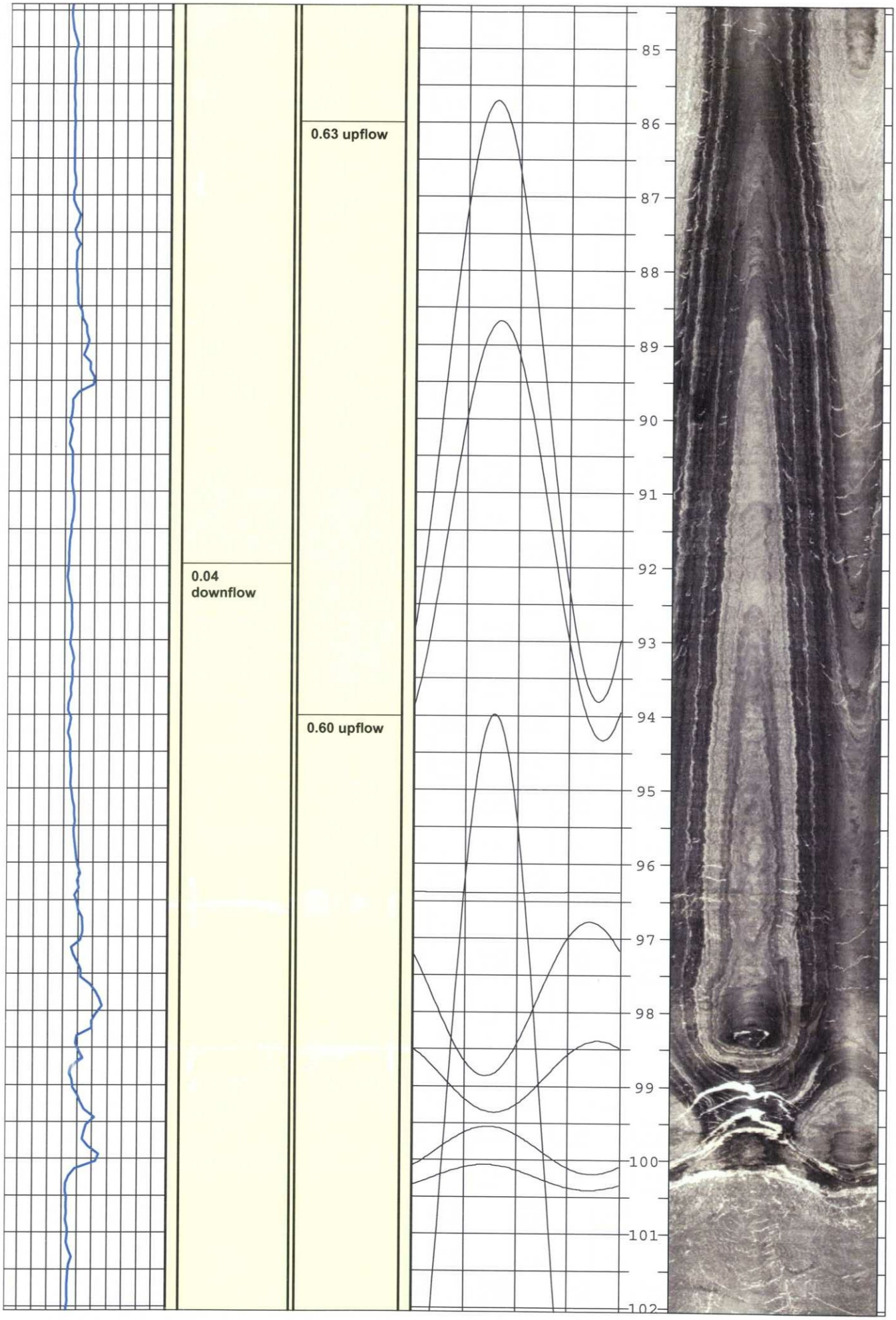
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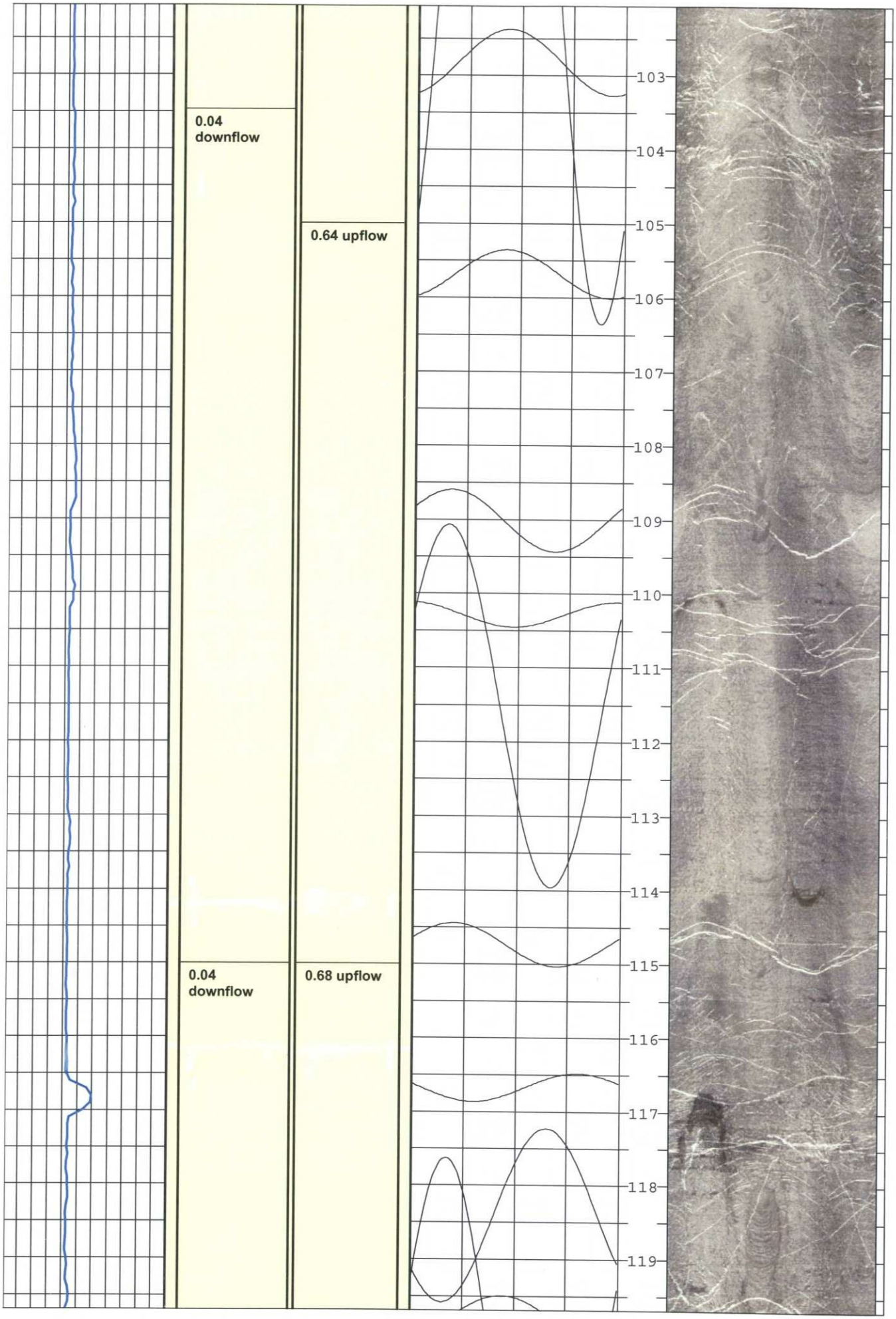
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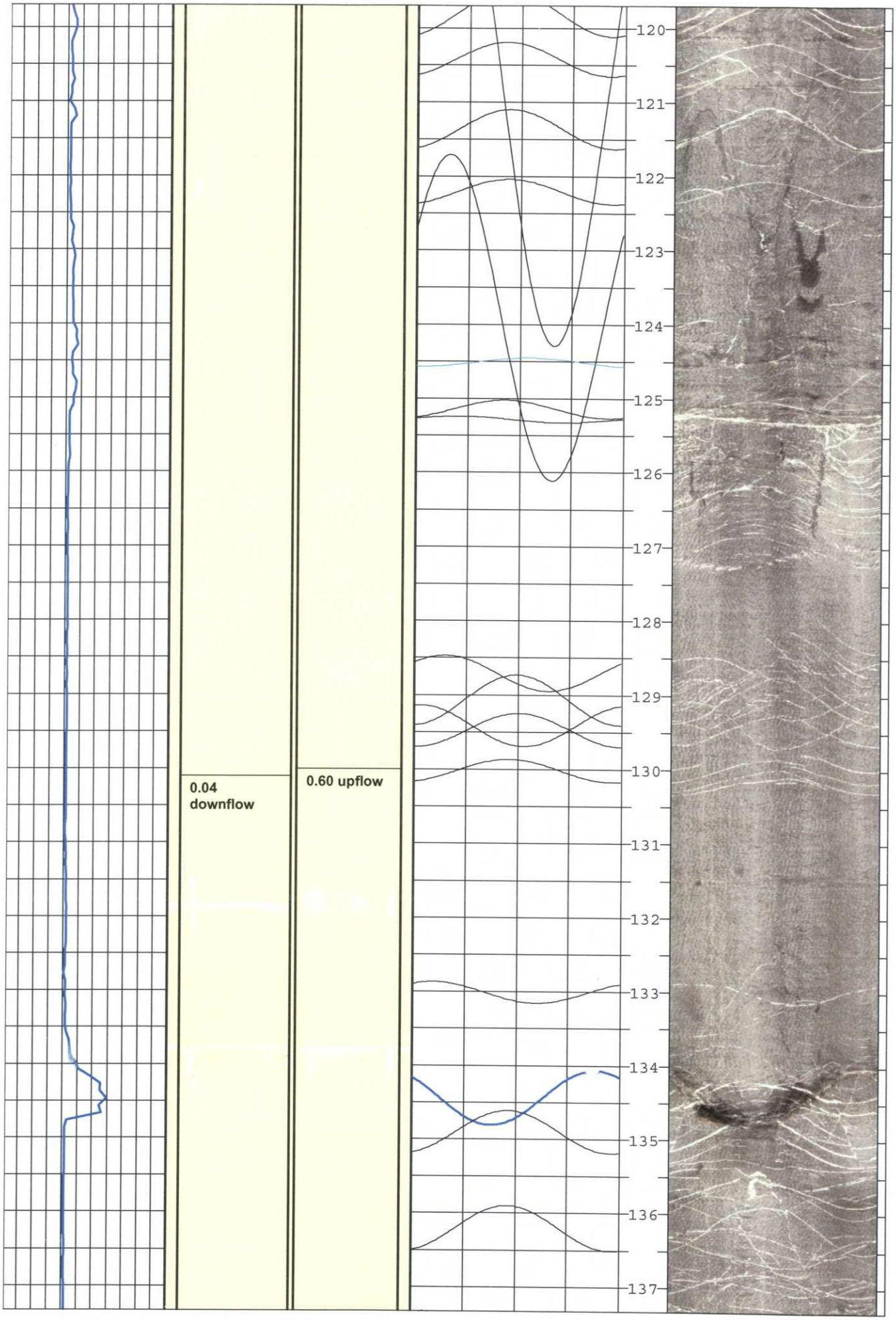
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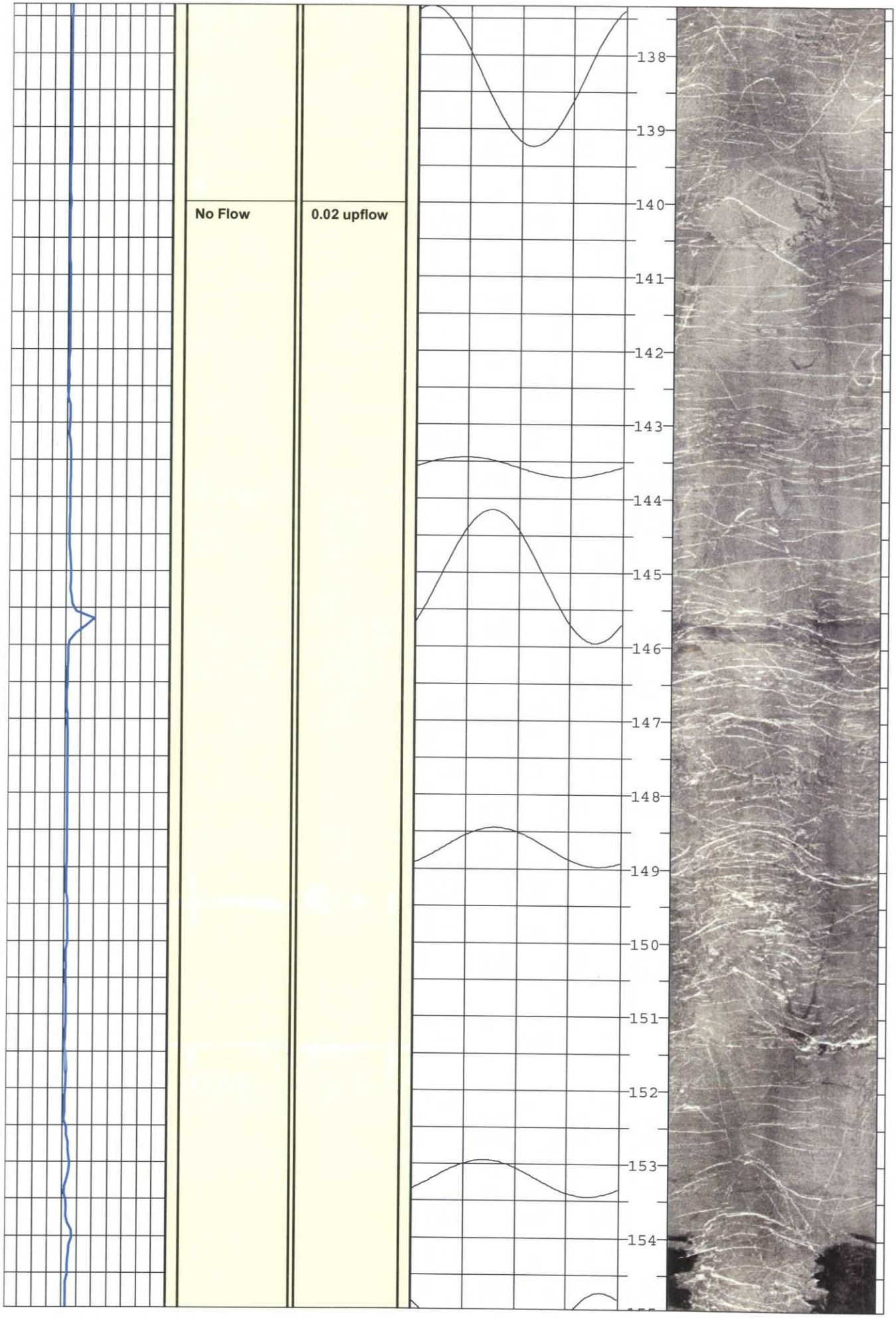
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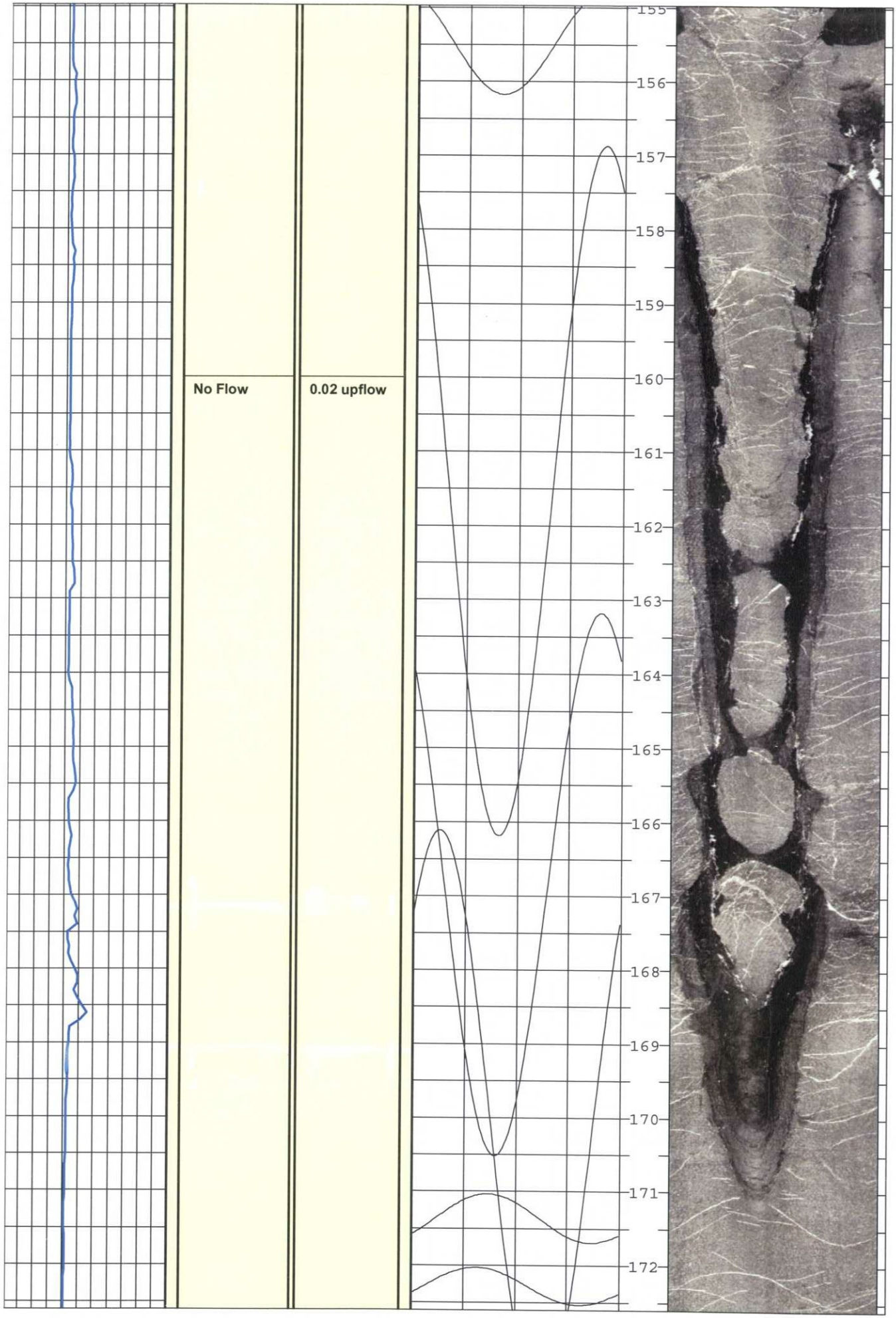
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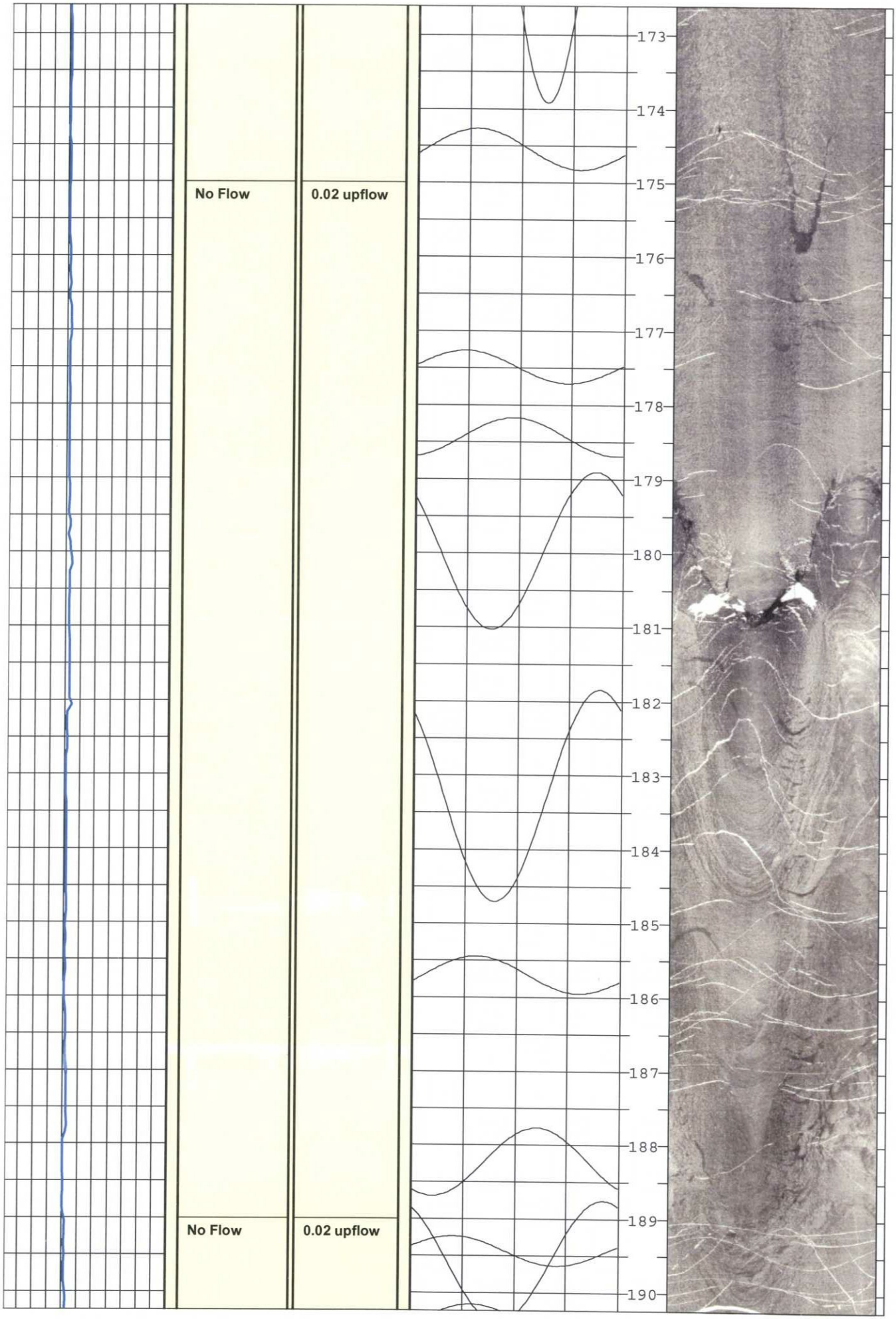
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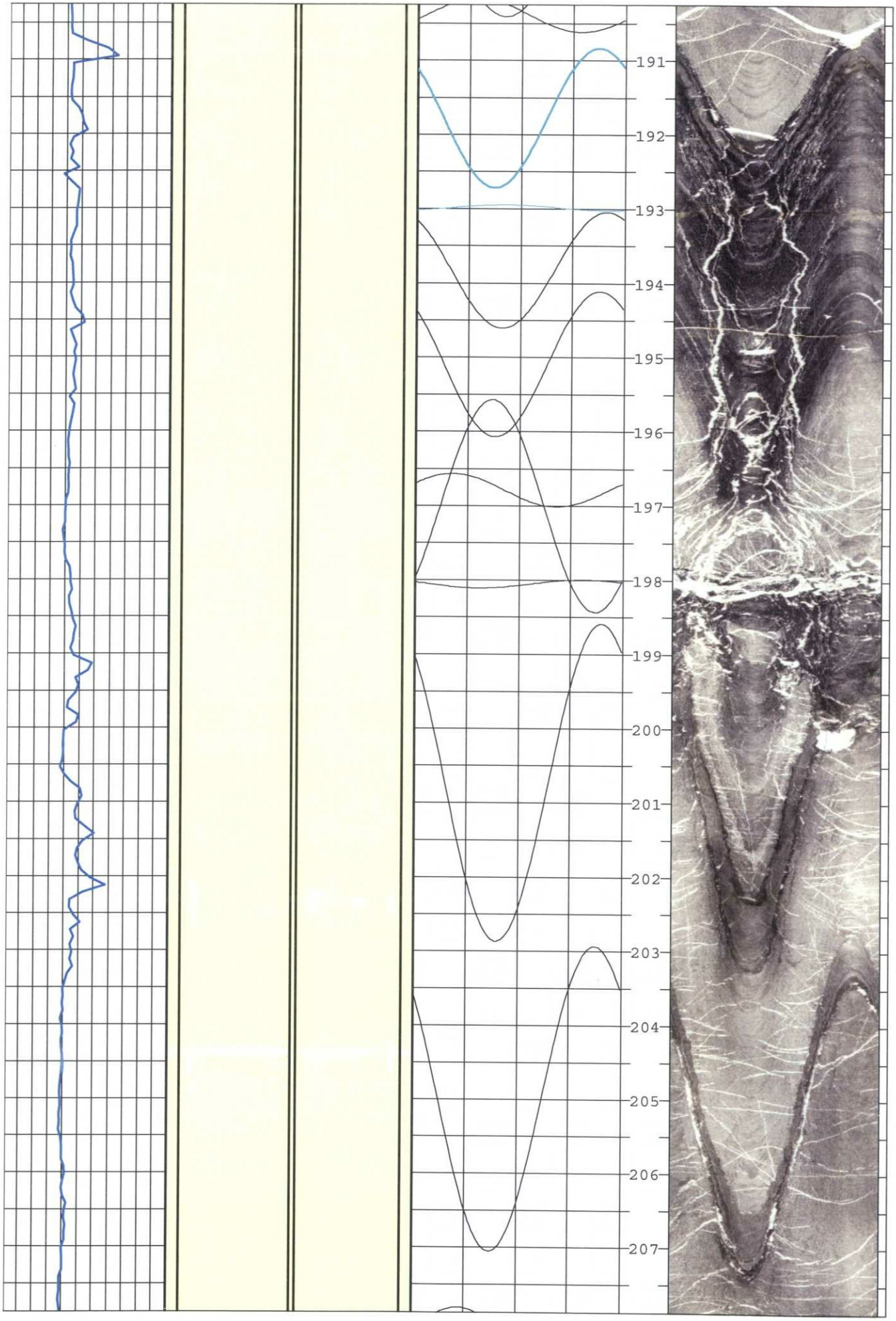
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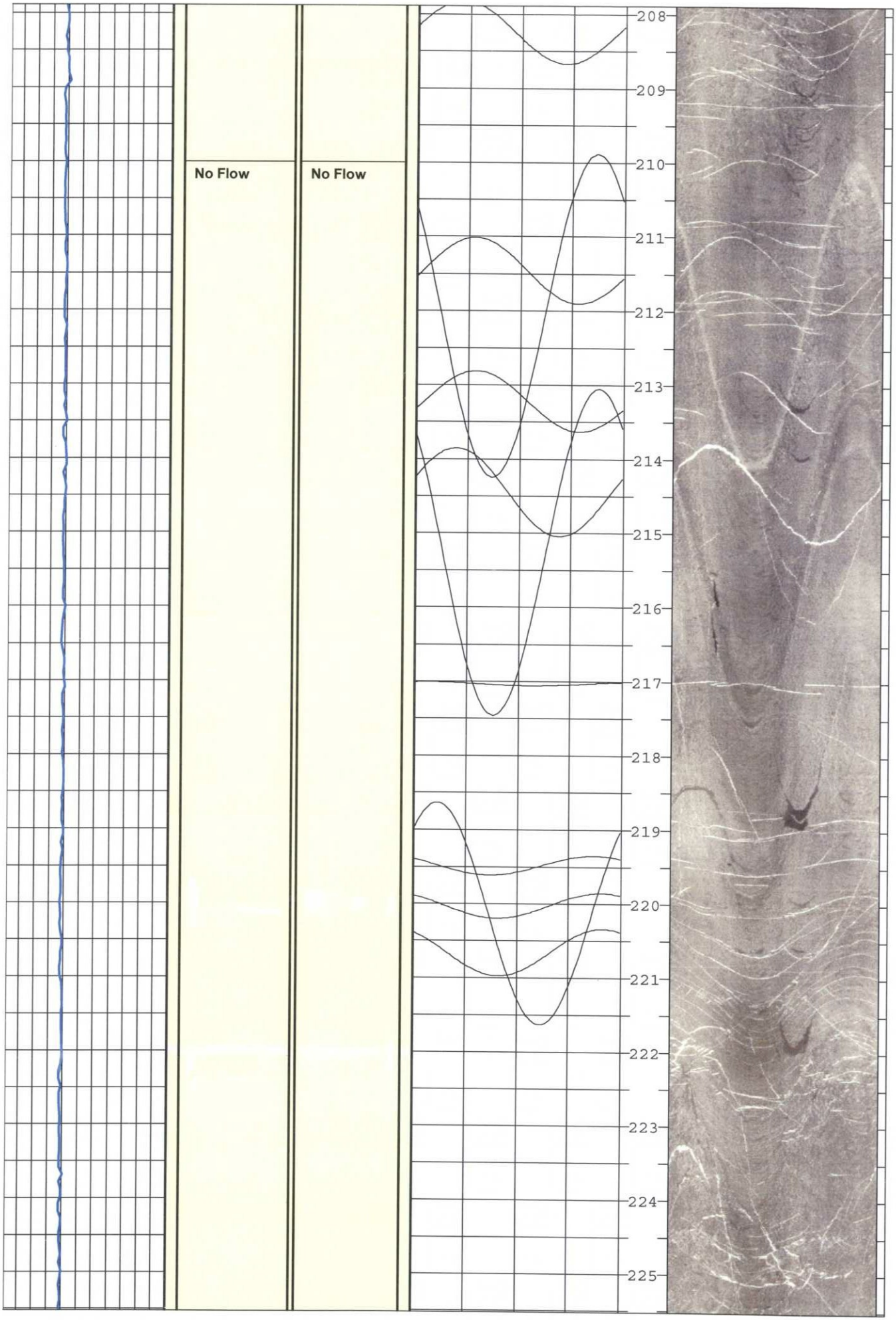
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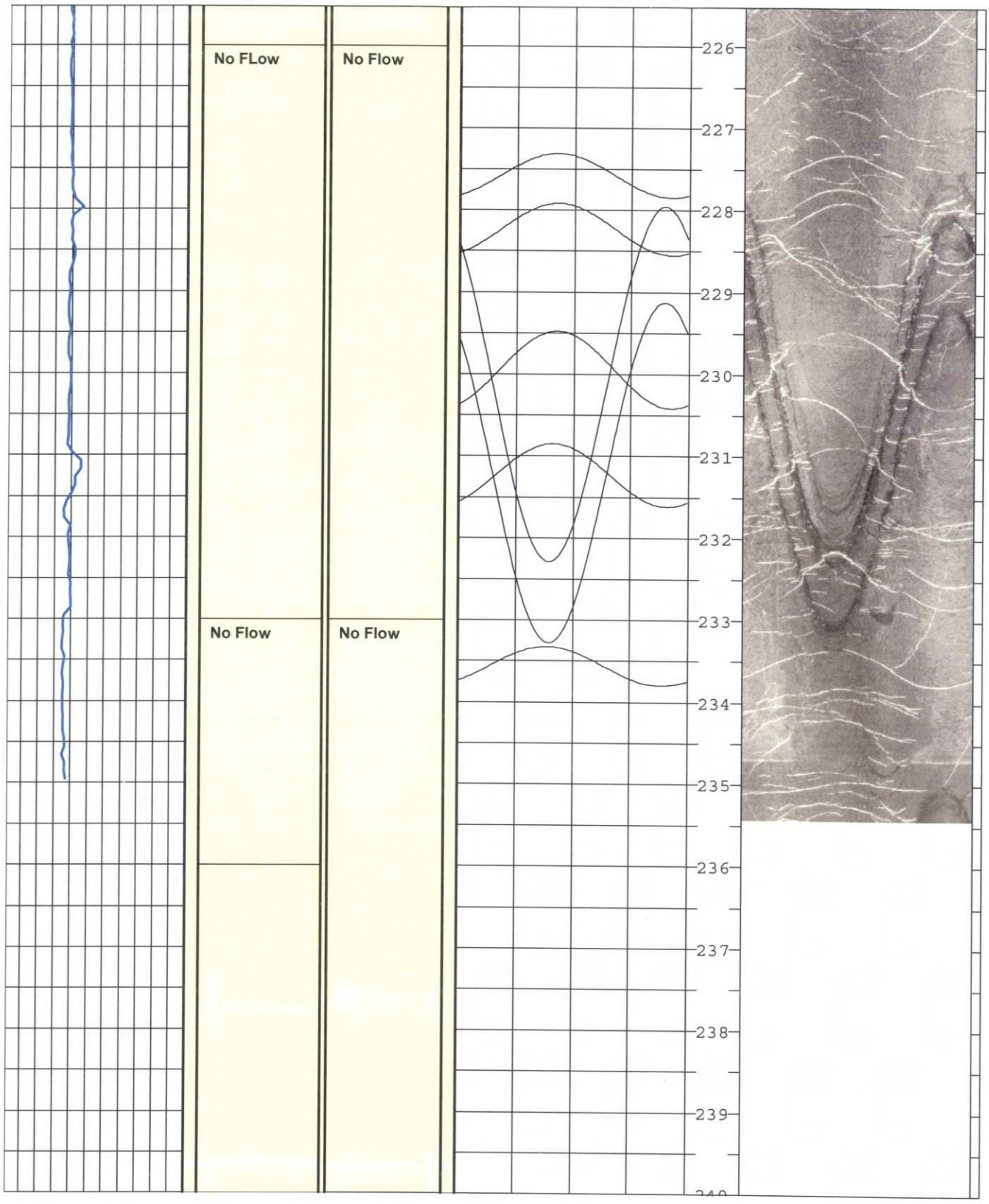
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No Flow
No Flow
No Flow
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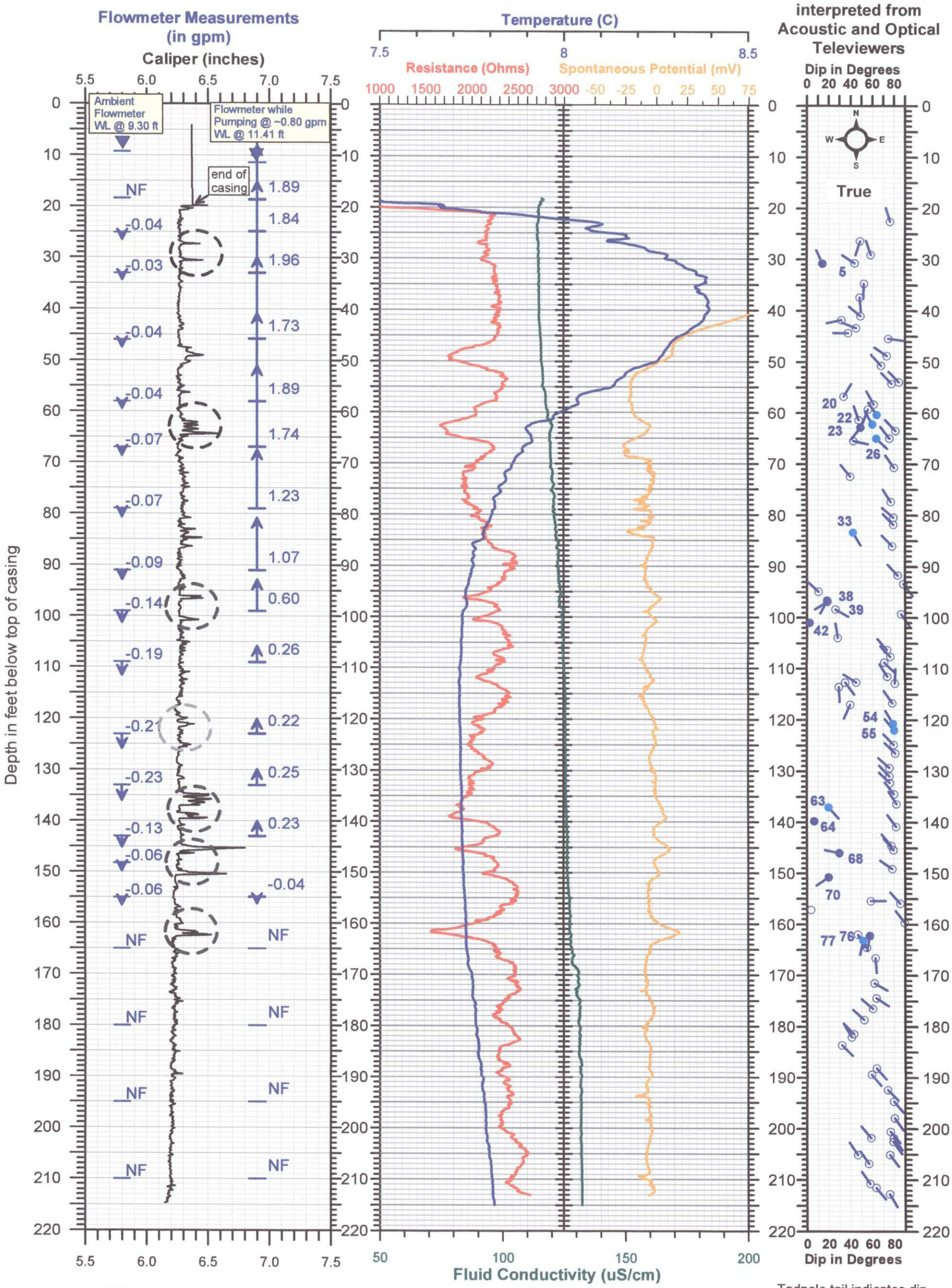
Northeast Geophysical Services

FIGURE D-1
Borehole Geophysical Log
PW-08-04
Juniper Ridge - Old Town, Maine

Date logged: 1/14/09



= Likely transmissive zone

= Possible transmissive zone

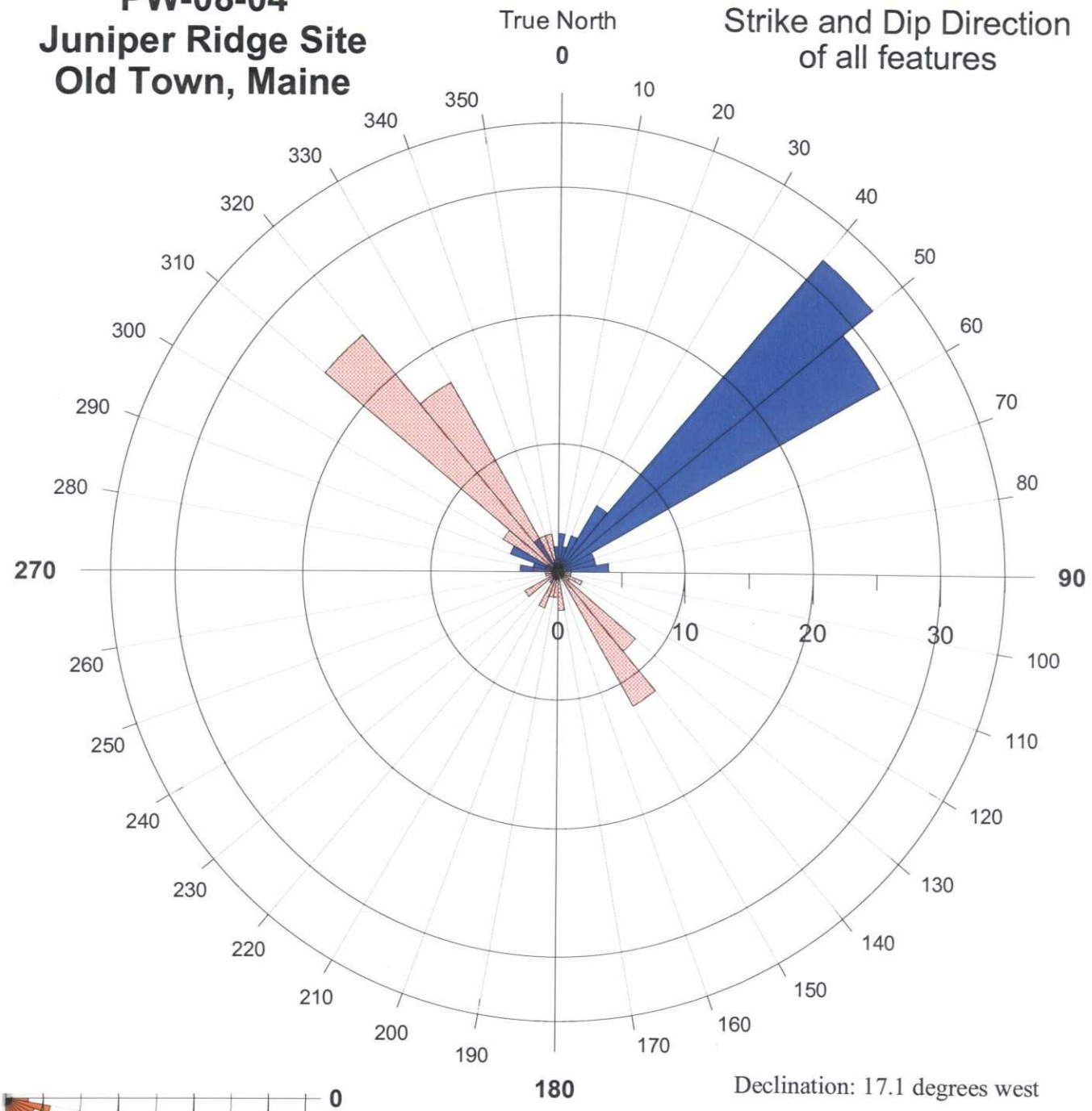
Tadpole tail indicates dip direction.
The solid tadpoles with a feature number are the ones interpreted to be likely or possibly transmissive.

Borehole Geophysical Log
PW-08-04
Juniper Ridge - Old Town, Maine

Northeast Geophysical Services

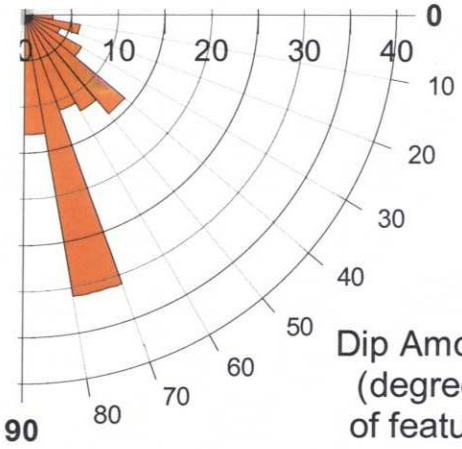
FIGURE D-2

PW-08-04
Juniper Ridge Site
Old Town, Maine



Strike and Dip Direction of all features

Declination: 17.1 degrees west



Explanation

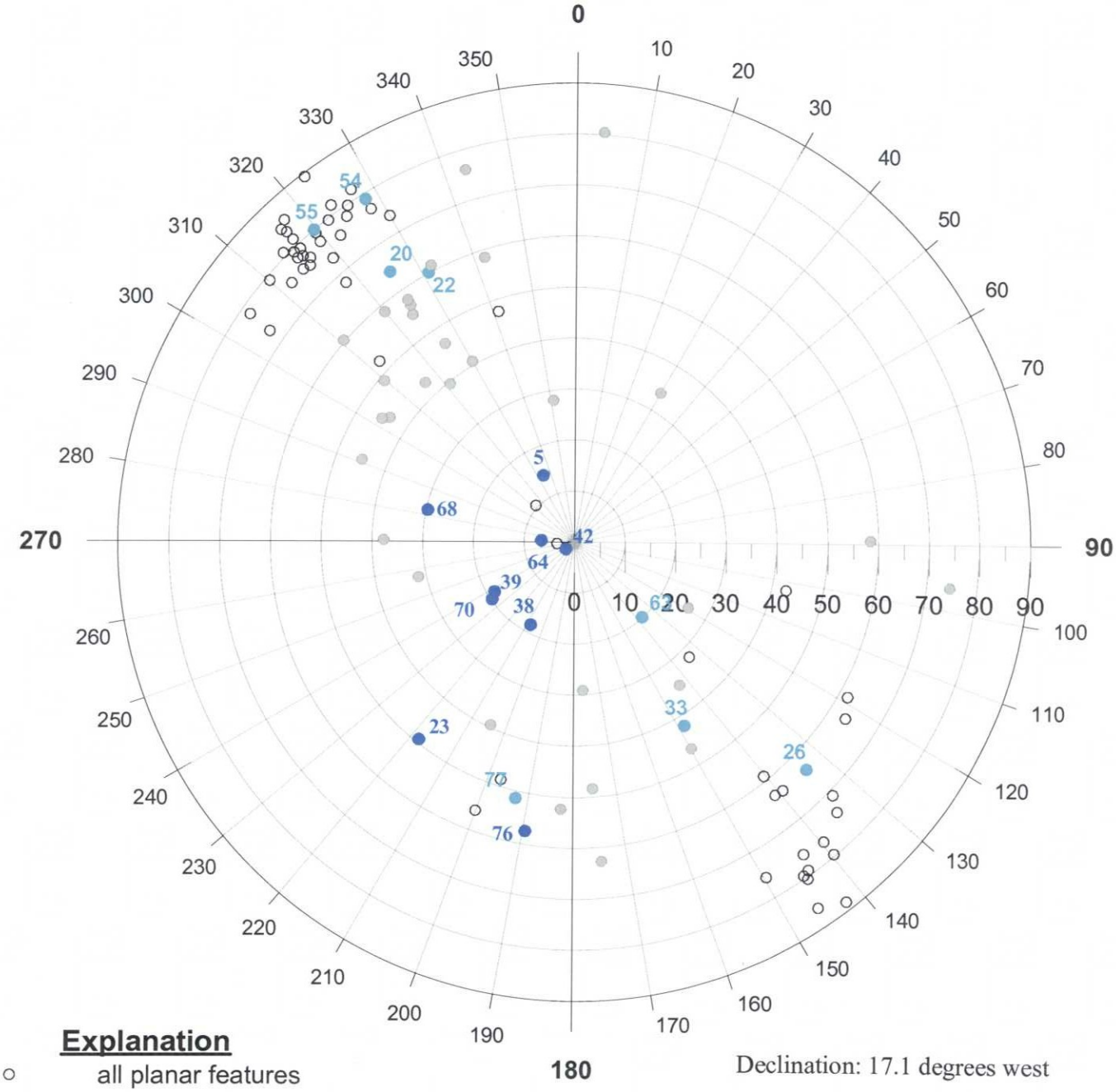
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 101 measurements

FIGURE D-3

PW-08-04
Juniper Ridge Site
Old Town, Maine

Dip Amount and Dip Azimuth of planar features
(upper hemisphere plot)



Explanation

- all planar features
- Likely water bearing
- Possibly water bearing
- Qzt/calcite veins

Declination: 17.1 degrees west

Based on 101 measurements

TABLE D-1 - PW-08-04 Interpreted Structure							Declination	17.1
Borehole	Feature	Feature depth	Dip	Dip Az	Strike	True Dip Az	True Strike	Category
	Number	Feet	Degrees	magnetic	magnetic			Type
PW-08-04	1	22.6	76	0	270	343	73	103
PW-08-04	2	26.4	49	214	304	197	287	100
PW-08-04	3	29.1	59	359	89	342	72	103
PW-08-04	4	30.7	44	321	51	303	33	103
PW-08-04	5	30.8	14	351	81	334	64	107
PW-08-04	6	34.7	52	200	290	183	273	103
PW-08-04	7	37.4	48	193	283	175	85	103
PW-08-04	8	41.0	49	327	57	310	40	103
PW-08-04	9	41.8	32	274	4	257	347	103
PW-08-04	10	43.3	45	308	38	291	21	103
PW-08-04	11	44.3	38	288	18	270	0	103
PW-08-04	12	45.4	75	114	24	97	7	103
PW-08-04	13	48.8	73	321	51	304	34	100
PW-08-04	14	50.7	68	335	65	318	48	100
PW-08-04	15	53.9	84	333	63	316	46	100
PW-08-04	16	54.2	78	333	63	316	46	100
PW-08-04	17	56.7	34	47	317	30	300	103
PW-08-04	18	58.3	61	349	79	332	62	103
PW-08-04	19	59.3	56	217	307	200	290	100
PW-08-04	20	60.3	64	342	72	325	55	108
PW-08-04	21	61.3	48	358	88	341	71	100
PW-08-04	22	62.2	60	348	78	331	61	108
PW-08-04	23	62.8	49	235	325	218	308	107
PW-08-04	24	63.4	81	334	64	317	47	100
PW-08-04	25	64.9	76	339	69	322	52	100
PW-08-04	26	64.9	64	151	61	134	44	108
PW-08-04	27	65.4	43	120	30	102	12	100
PW-08-04	28	70.6	80	343	73	325	55	100
PW-08-04	29	72.4	40	338	68	321	51	103
PW-08-04	30	77.4	77	345	75	328	58	100
PW-08-04	31	80.4	79	327	57	310	40	100
PW-08-04	32	81.8	79	334	64	316	46	100
PW-08-04	33	83.4	42	166	76	149	59	108
PW-08-04	34	86.0	78	332	62	315	45	100
PW-08-04	35	91.7	83	334	64	317	47	100
PW-08-04	36	93.4	88	159	69	142	52	100
PW-08-04	37	94.9	11	329	59	312	42	100
PW-08-04	38	96.6	18	225	315	208	298	107
PW-08-04	39	96.8	19	255	345	238	328	107
PW-08-04	40	98.3	26	137	47	119	29	103
PW-08-04	41	99.3	86	163	73	146	56	100
PW-08-04	42	101.0	2	249	339	231	321	107
PW-08-04	43	103.9	28	8	278	351	81	103
PW-08-04	44	106.3	73	336	66	319	49	100
PW-08-04	45	107.6	76	334	64	317	47	100
PW-08-04	46	108.7	71	151	61	134	44	100
PW-08-04	47	111.6	74	347	77	330	60	100
PW-08-04	48	112.7	45	319	49	302	32	103
PW-08-04	49	112.7	35	160	70	143	53	103
PW-08-04	50	112.9	80	21	291	4	274	103
PW-08-04	51	113.6	29	194	284	177	87	103
PW-08-04	52	116.7	78	342	72	324	54	100
PW-08-04	53	117.0	39	222	312	205	295	103
PW-08-04	54	120.7	79	345	75	328	58	108
PW-08-04	55	122.0	80	337	67	320	50	108
PW-08-04	56	124.8	79	333	63	315	45	100

TABLE D-1 - PW-08-04 Interpreted Structure							Declination	17.1
Borehole	Feature	Feature depth	Dip	Dip Az	Strike	True Dip Az	True Strike	Category
	Number	Feet	Degrees	magnetic	magnetic			Type
PW-08-04	57	126.5	81	331	61	314	44	100
PW-08-04	58	129.3	76	329	59	312	42	100
PW-08-04	59	130.9	75	333	63	316	46	100
PW-08-04	60	132.2	76	332	62	315	45	100
PW-08-04	61	134.5	80	339	69	322	52	100
PW-08-04	62	136.4	82	344	74	327	57	100
PW-08-04	63	137.0	20	155	65	137	47	108
PW-08-04	64	139.8	7	289	19	272	2	107
PW-08-04	65	140.8	82	341	71	324	54	100
PW-08-04	66	144.6	77	336	66	319	49	100
PW-08-04	67	145.4	79	337	67	320	50	100
PW-08-04	68	146.0	30	299	29	282	12	107
PW-08-04	69	149.1	78	322	52	305	35	100
PW-08-04	70	150.7	20	252	342	235	325	107
PW-08-04	71	155.4	58	107	17	89	359	103
PW-08-04	72	155.9	85	335	65	317	47	100
PW-08-04	73	157.1	4	282	12	265	355	100
PW-08-04	74	159.6	89	340	70	323	53	100
PW-08-04	75	162.0	47	167	77	150	60	103
PW-08-04	76	162.2	57	207	297	190	280	107
PW-08-04	77	163.1	52	210	300	193	283	108
PW-08-04	78	164.5	55	341	71	324	54	103
PW-08-04	79	166.6	63	192	282	175	85	103
PW-08-04	80	171.5	62	136	46	119	29	100
PW-08-04	81	174.4	64	140	50	123	33	100
PW-08-04	82	176.5	60	328	58	311	41	103
PW-08-04	83	178.6	52	329	59	312	42	100
PW-08-04	84	181.4	43	333	63	316	46	103
PW-08-04	85	182.0	41	347	77	330	60	103
PW-08-04	86	183.6	32	151	61	134	44	100
PW-08-04	87	188.1	64	156	66	139	49	100
PW-08-04	88	189.4	59	158	68	140	50	100
PW-08-04	89	192.4	74	152	62	135	45	100
PW-08-04	90	194.7	80	157	67	140	50	100
PW-08-04	91	197.9	80	162	72	145	55	100
PW-08-04	92	200.5	76	157	67	140	50	100
PW-08-04	93	201.8	59	337	67	320	50	103
PW-08-04	94	201.8	79	162	72	145	55	100
PW-08-04	95	202.5	79	161	71	144	54	100
PW-08-04	96	205.0	76	160	70	143	53	100
PW-08-04	97	205.1	47	343	73	326	56	103
PW-08-04	98	206.8	57	342	72	325	55	103
PW-08-04	99	210.7	58	342	72	325	55	103
PW-08-04	100	211.5	63	158	68	141	51	100
PW-08-04	101	212.7	76	167	77	150	60	100
Explanation of Categories:								
		100	planar feature: bedding, joint, fracture, foliation etc.					
		103	quartz or calcite vein					
		107	likely transmissive fracture					
		108	possible transmissive fracture					

Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel: 207-942-2700 email: negeophysical.com

Log: Optical Televiewer & Caliper logs

Well: **PW-08-04**

Site: Juniper Ridge

Location: West Old Town, Maine

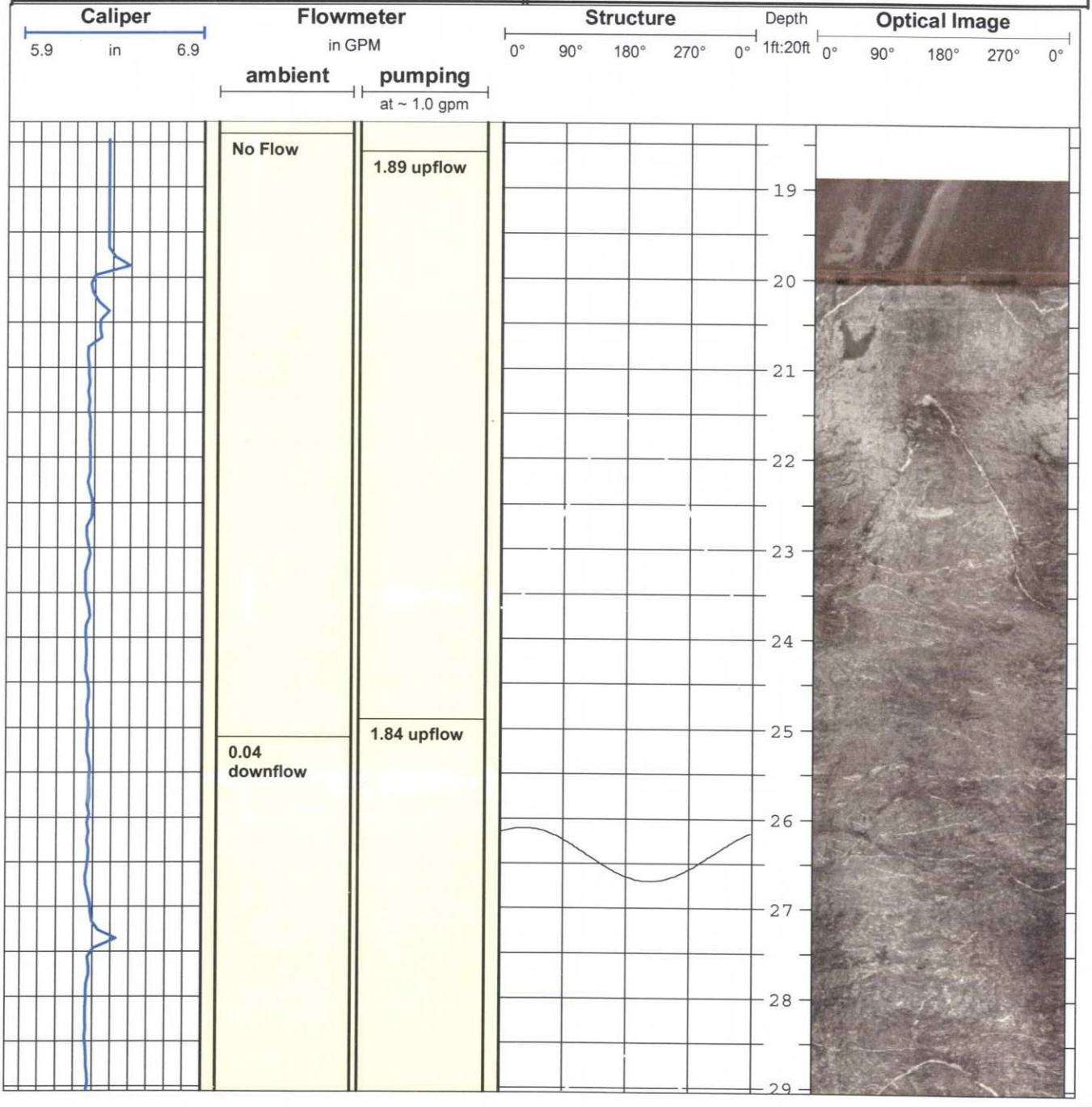
Date:	1/14/09
Casing Depth:	20 ft
Casing Type:	6 in steel
Boring Depth:	216 ft
Meas. From:	top of casing
Stickup:	2.0 ft
Water Level:	9.30 ft

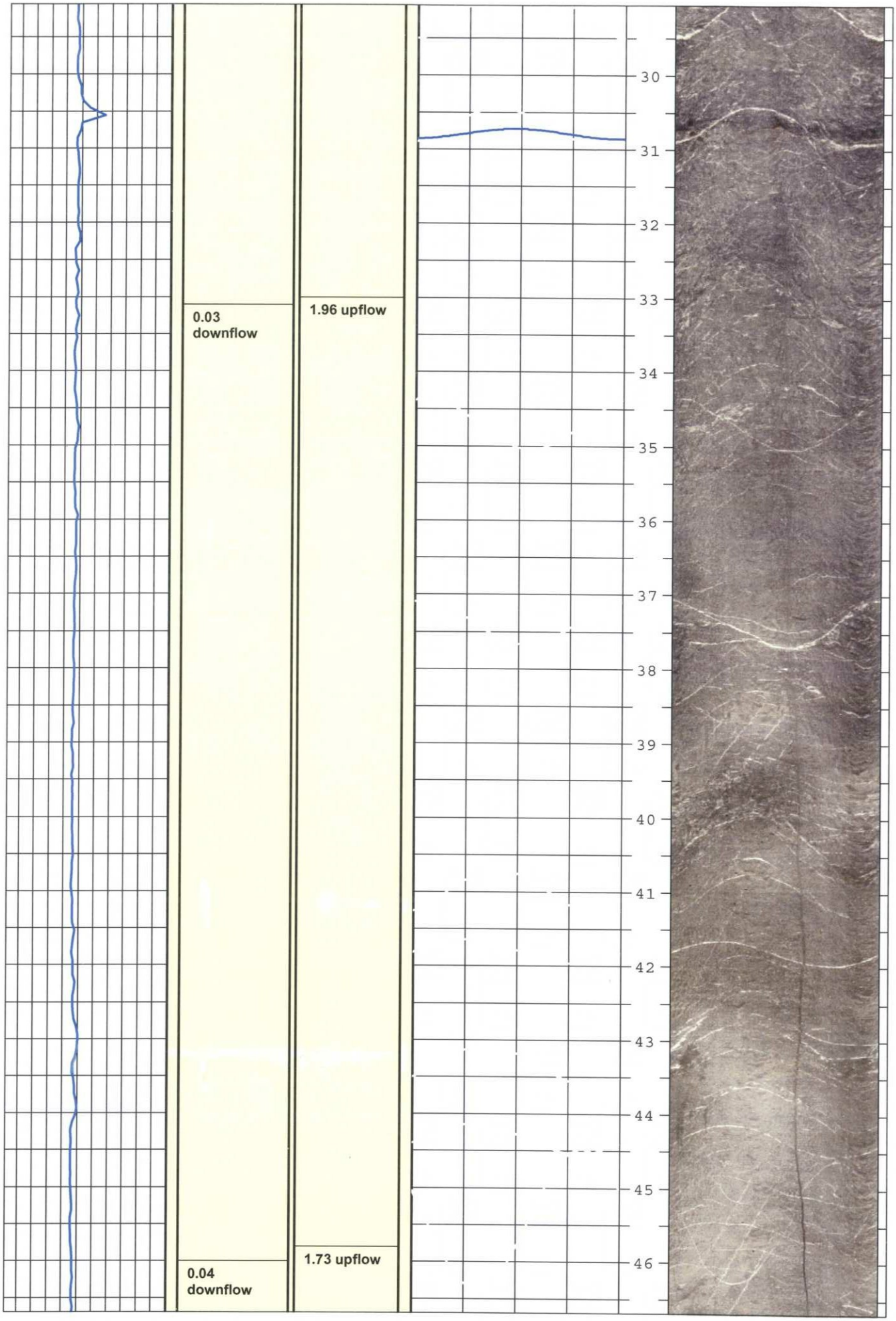
For: Sevee & Maher

Logged by: R Rawcliffe

Orientation: magnetic

Structure Plots:
black = planar features (faults, foliation, bedding, joints, etc)
light gray = veins of likely either quartz or calcite
light blue = possibly transmissive fracture
dark blue = likely transmissive fracture

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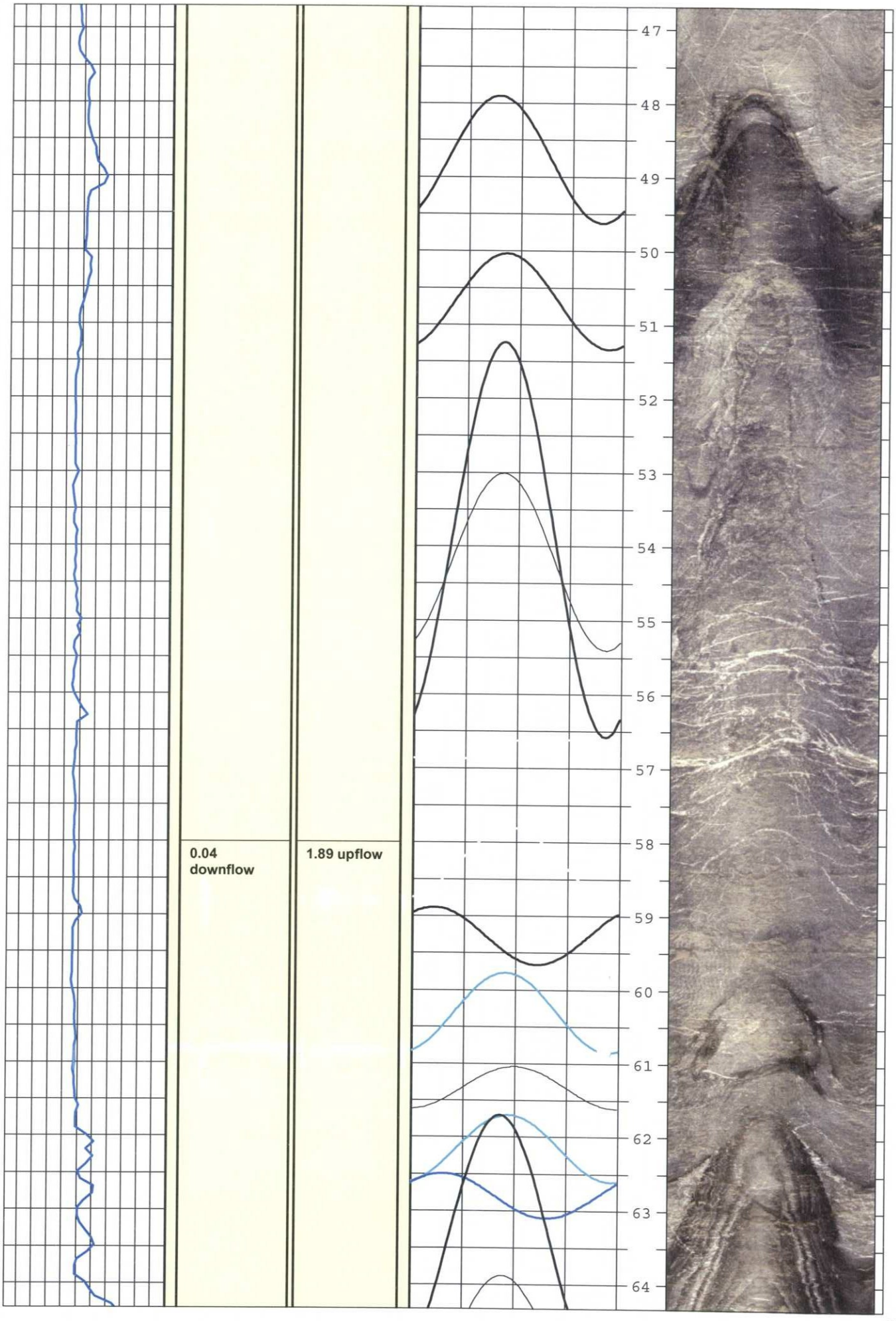
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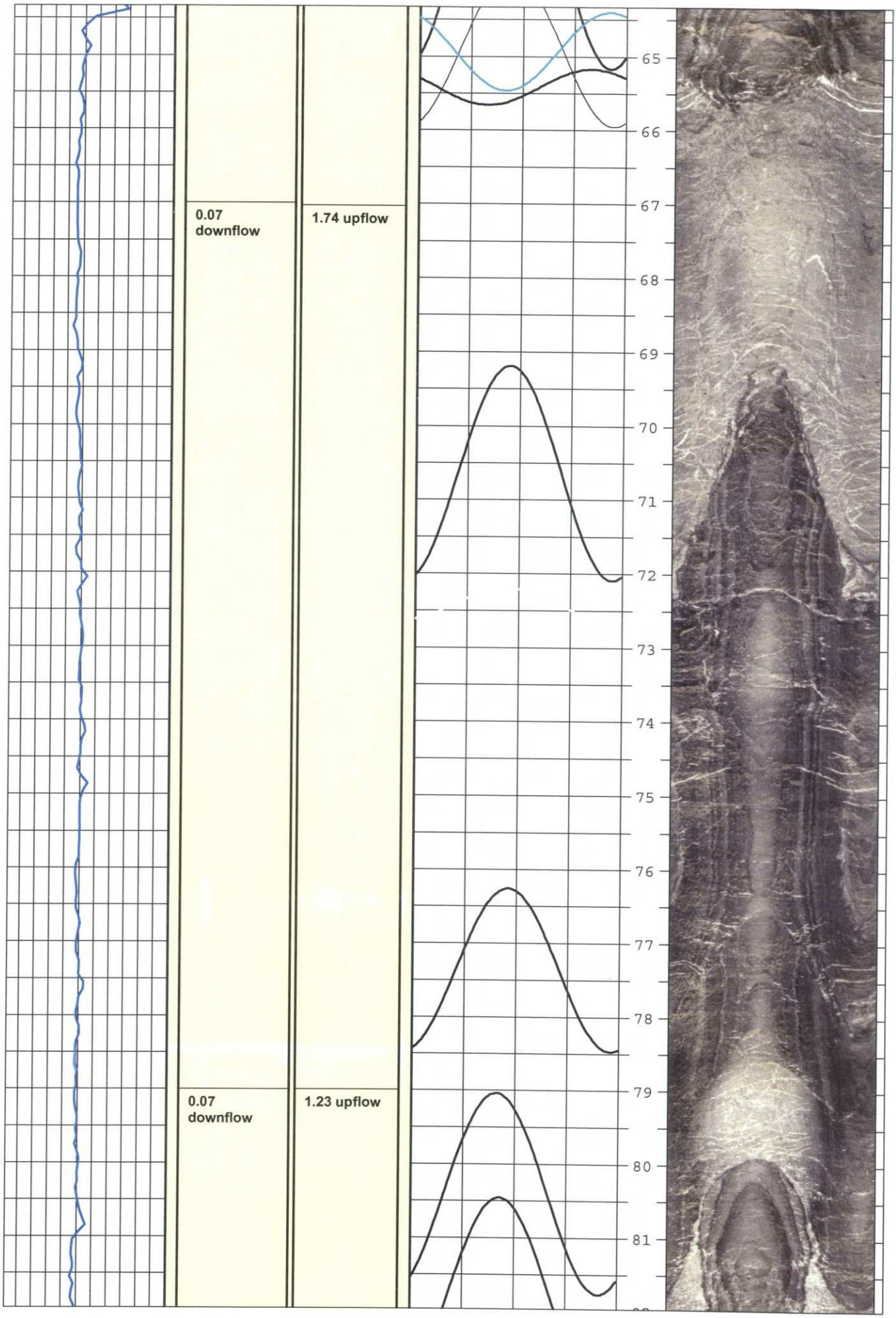
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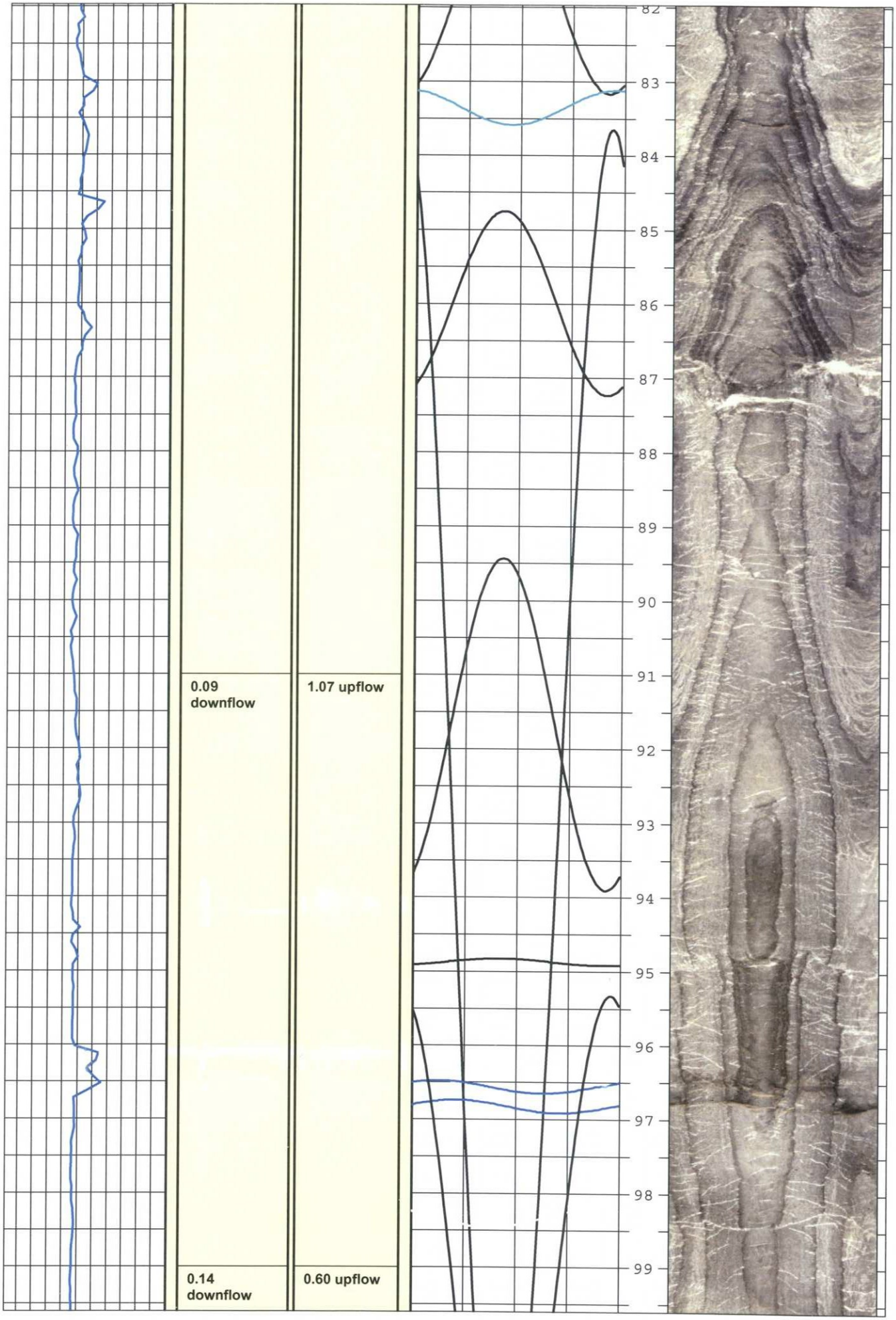
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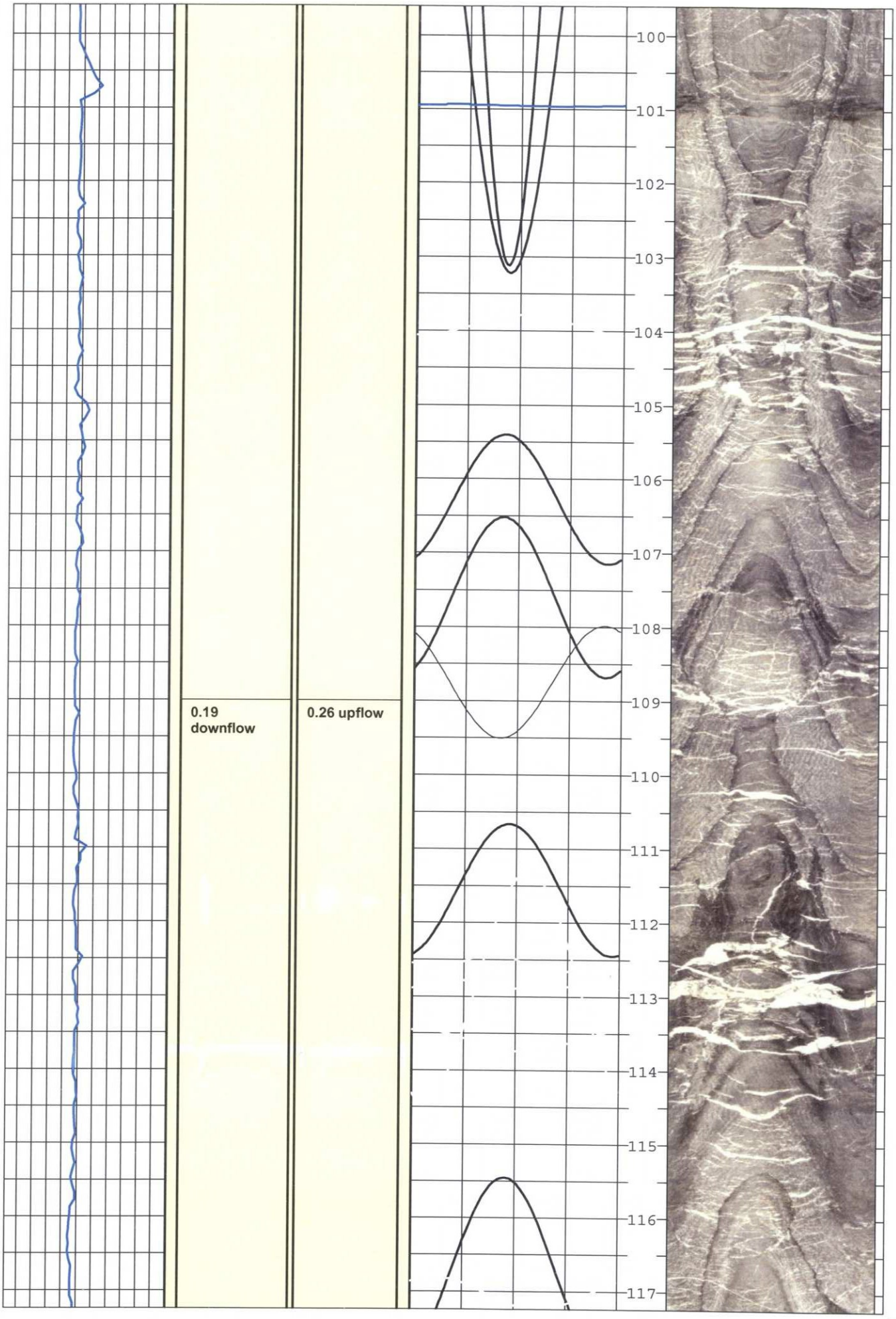
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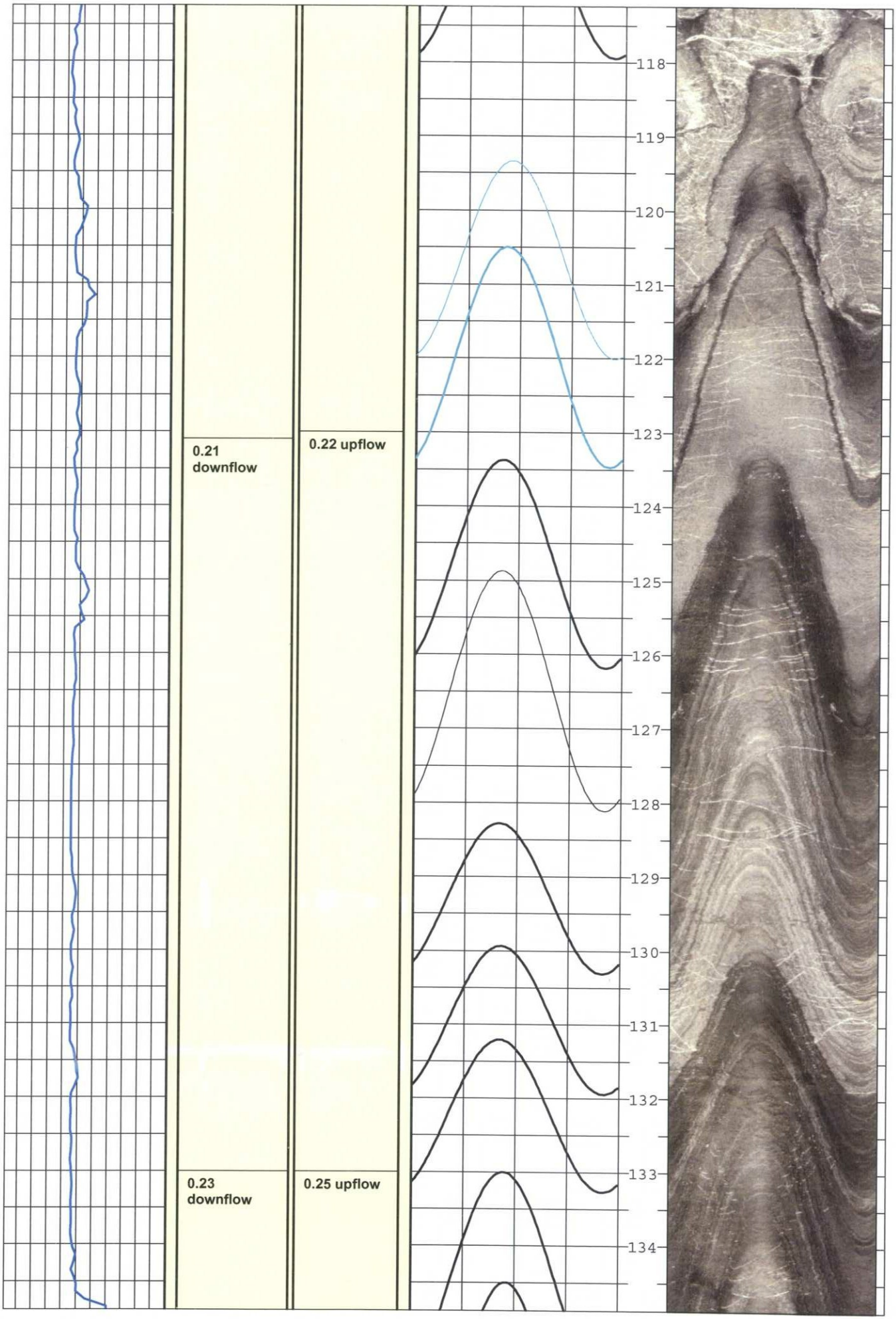
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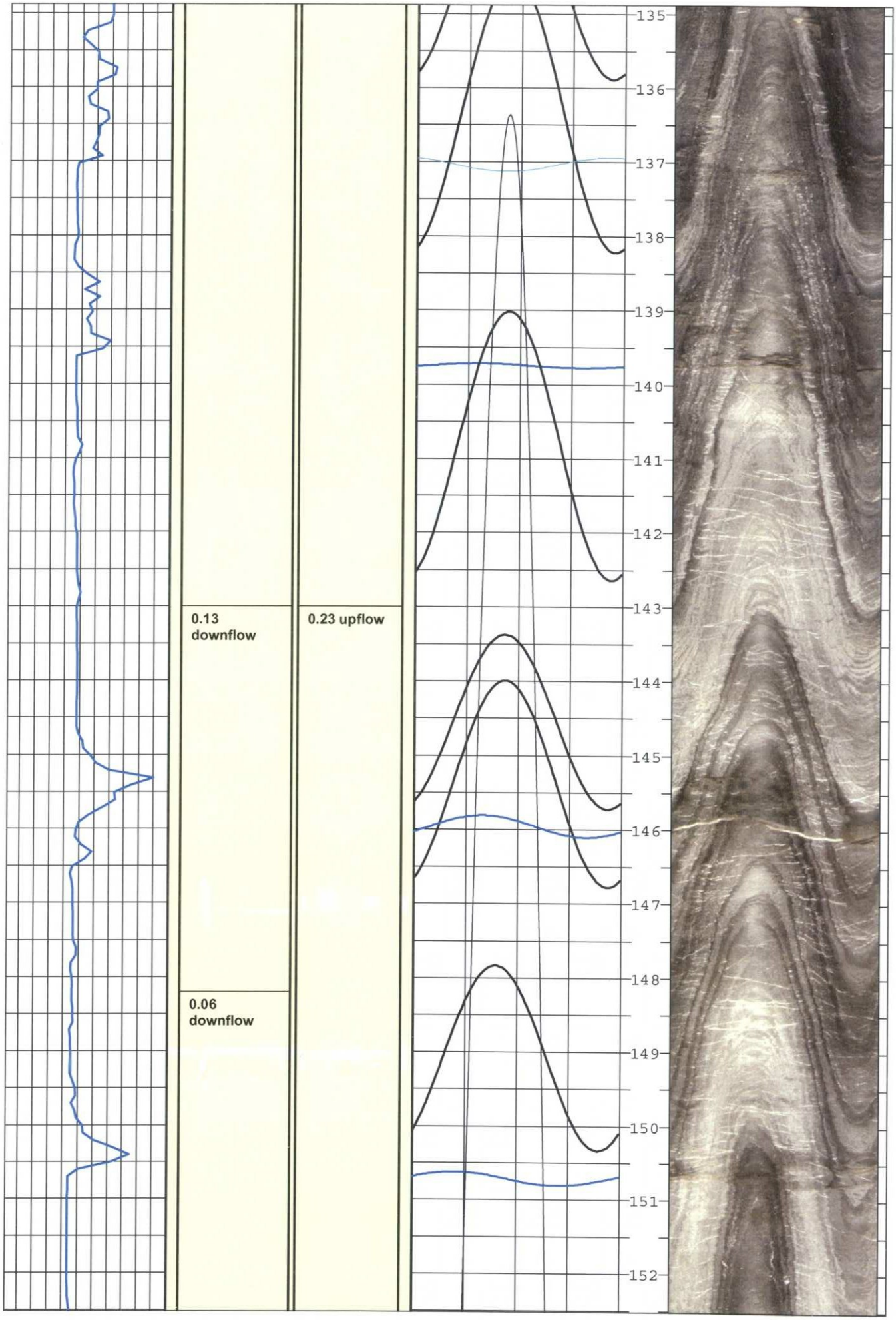
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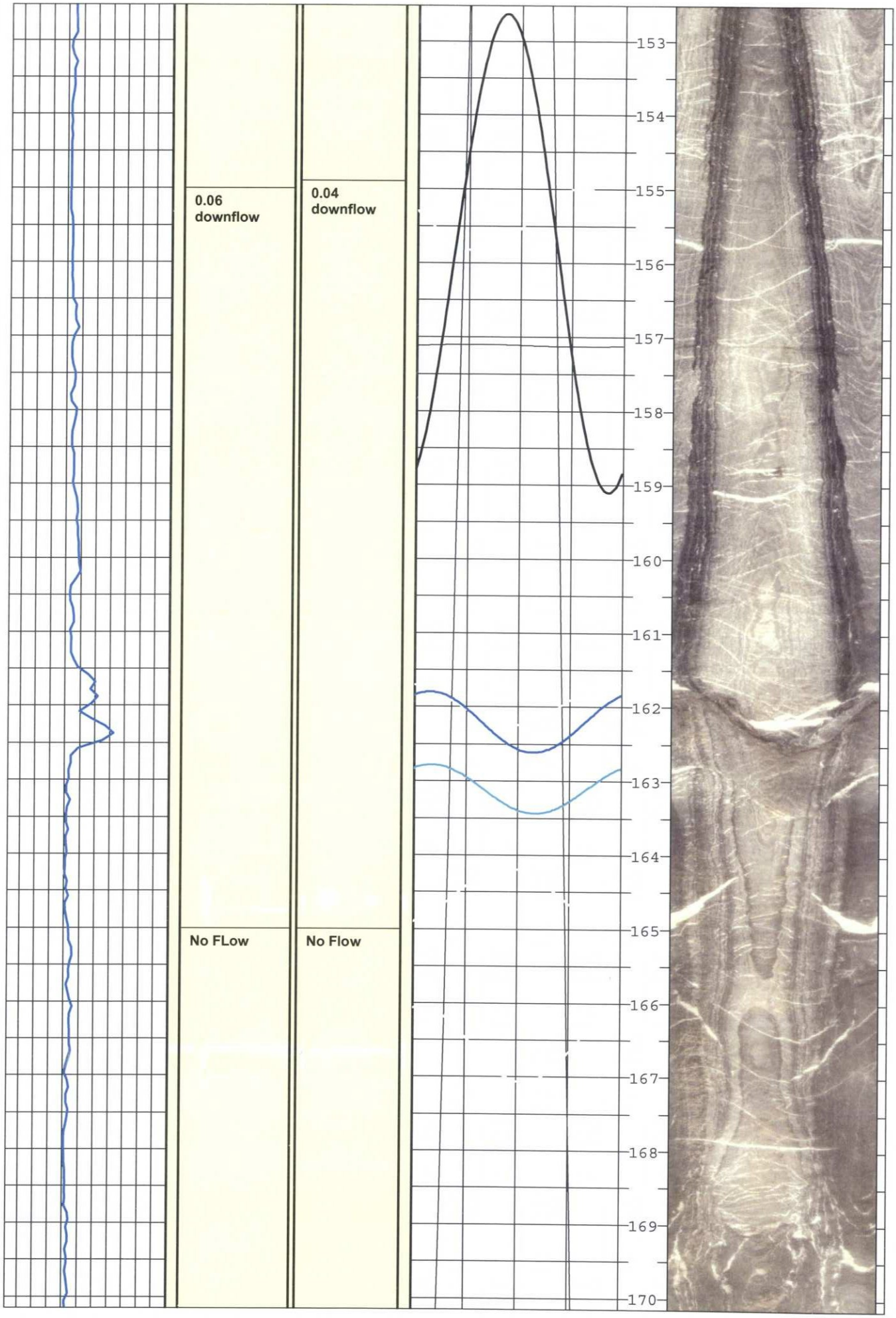
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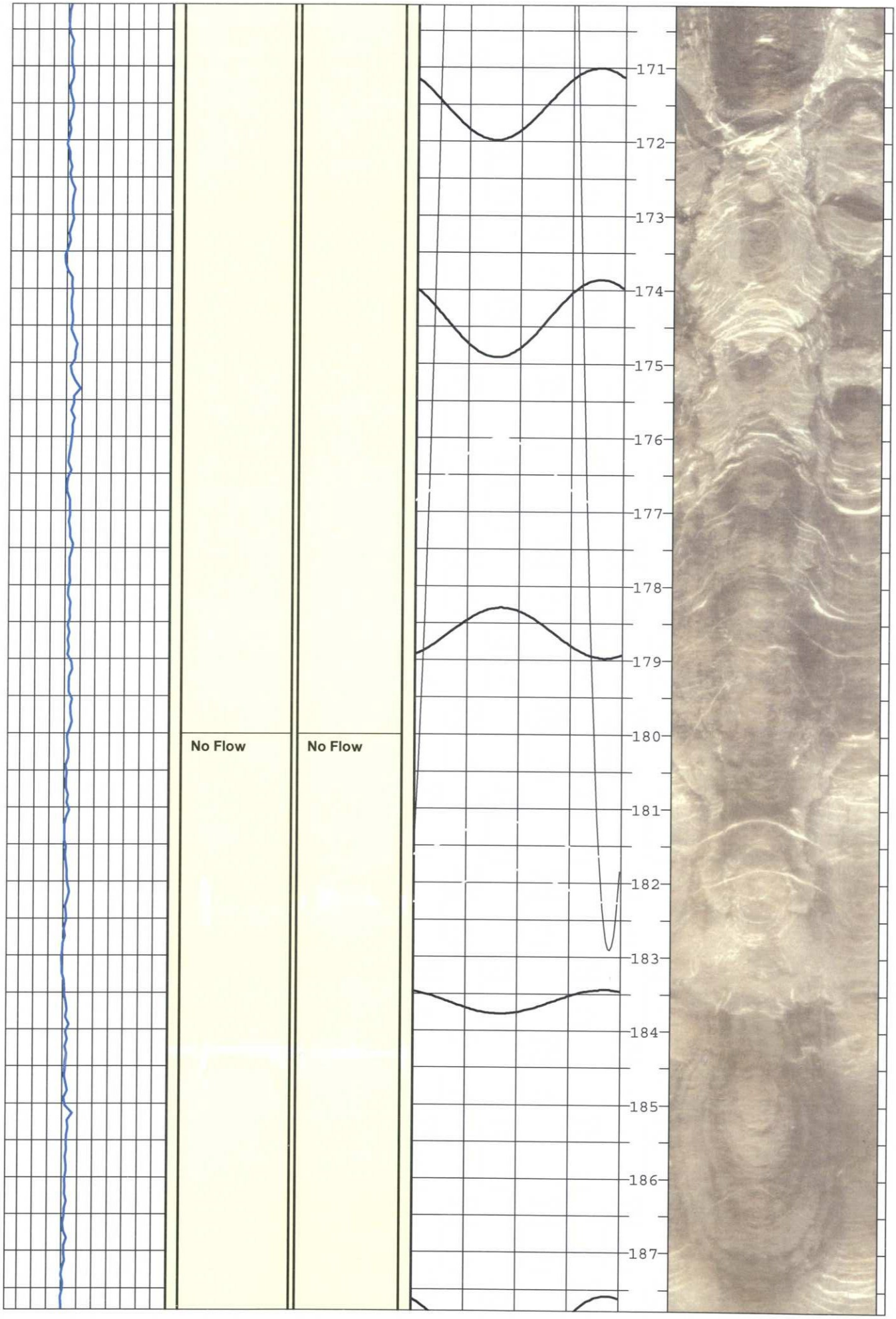
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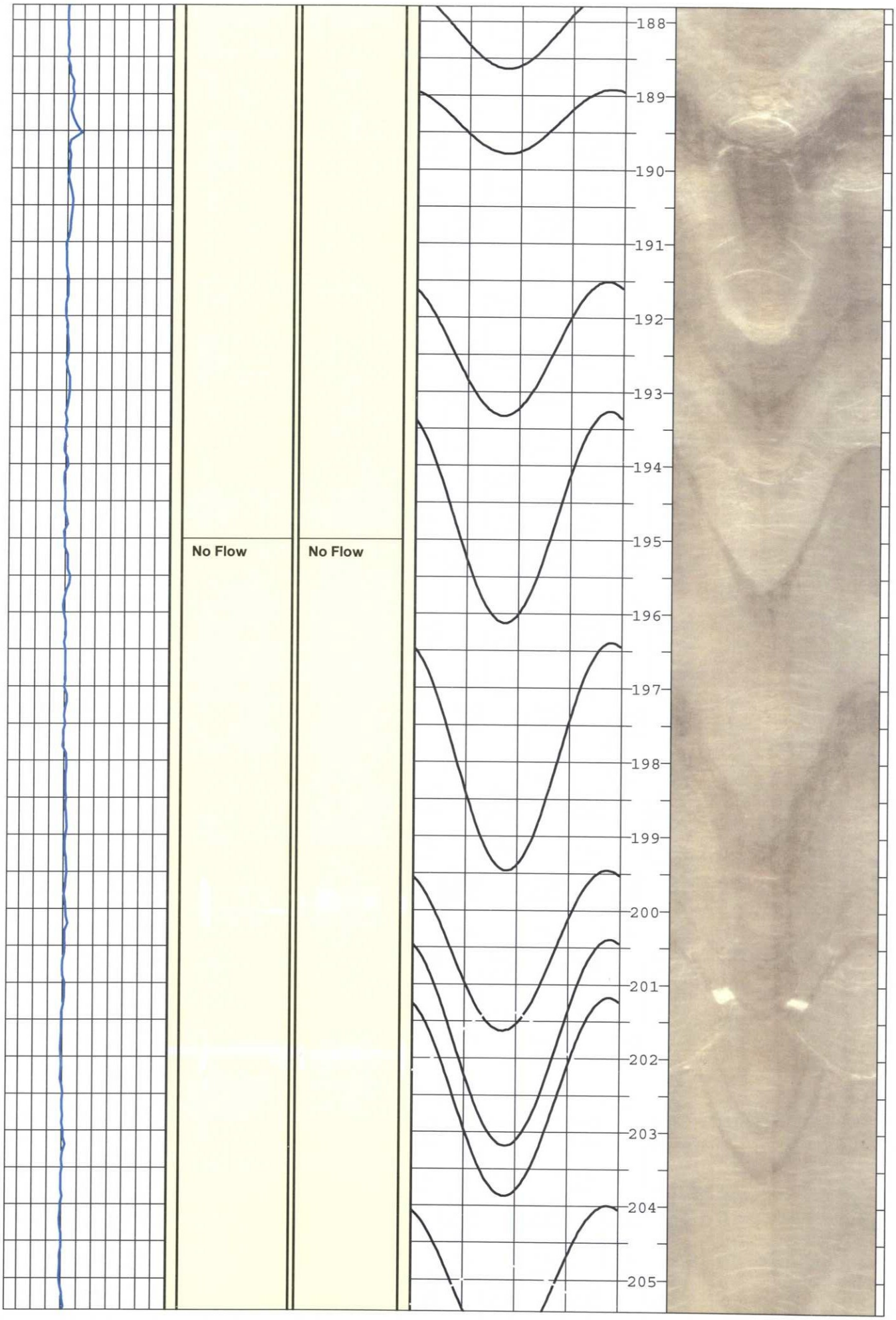
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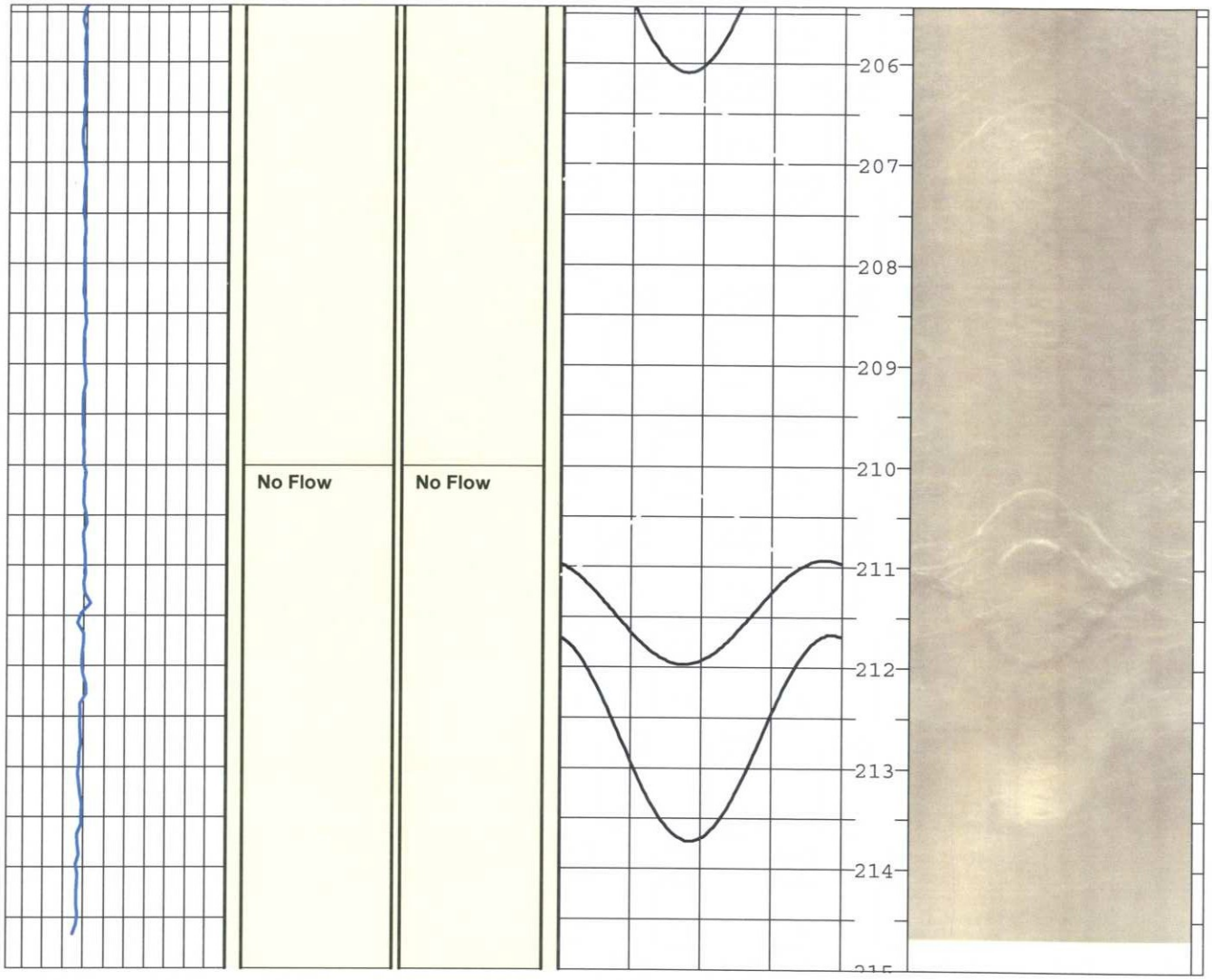
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APPENDIX G

FIELD-SCALE TILL TRACER TEST RESULTS

APPENDIX G

NATURAL GRADIENT TILL TRACER TEST
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

1.0 BACKGROUND AND PURPOSE

A solute tracer test was performed in the glacial till to provide a field-scale measurement of the rate of groundwater movement through the till under natural gradient conditions. The tracer test corroborates other field and laboratory testing results of the till's hydraulic properties. Furthermore, it provides information on the rate of solute spreading (i.e., lateral dispersion) as it moves through the till. The rate of groundwater movement is important to support time-of-travel analyses. That information and the lateral dispersion properties aid in groundwater monitoring system design.

A test location was selected where groundwater flow direction was predominantly horizontal. The fines content of the till at the test location was about 53 percent based on grain size analysis testing. This is slightly sandier than the average till fines content of 56 percent.

An injection well (MW-04-111), screened in the saturated portion of the till, and five monitoring wells (MW-05-01 through MW-05-05) positioned about 10 feet downgradient from the injection well were installed for the tracer test. The monitoring wells formed an arc, each separated from an adjacent well by about 6 feet, and collectively distributed over a total horizontal arc of about 120 degrees. This configuration was utilized to accommodate various possible groundwater flow directions from the injection well. Well installation details are summarized on the logs in Appendix B. Well screens were five feet long in each well installation. The saturated thickness of the till in the tracer test area was at least 12 feet based on the measured groundwater levels. The orientation of the injection and monitoring wells is shown in Figure G-1.

The tracer used in this test consisted of bromide (Br) introduced in the form of sodium bromide (NaBr) solution. Bromide is classified as a conservative tracer since it moves with the same velocity as the groundwater and its concentration is affected only by hydrodynamic dispersion. The Br ion introduced to the aquifer in the form of a sodium salt is considered one of the more satisfactory tracers for hydrogeologic investigations (Olsen and Tenbus, 2004; LeBlanc et al, 1991). Its conservative behavior is well established in field studies and it has been found to be acceptable to environmental regulators for this application (Davis et al, 2001). Furthermore, its presence is relatively easy to analyze for in water and it is not detectable as naturally occurring in the Site groundwater.

2.0 TEST PROCEDURE

The conceptual procedure for the till tracer test was to place a known mass of Br into the injection well and evaluate the tracer's movement by periodically collecting groundwater samples from the downgradient monitoring wells for the analysis of bromide. As mentioned above, the natural background Br concentration in site groundwater is non-detectable with the selected analytical method, so its arrival in any of the monitoring wells was confirmation that the injected tracer had migrated downgradient through the saturated till. The tracer test followed the steps listed below, after the wells were installed and developed to remove fines from drilling and establish hydraulic communication with the surrounding formation:

- The tracer was mixed at a ratio of 25.6 grams NaBr per one liter of deionized water to produce a NaBr solution having a concentration of about 25,600 milligrams per liter. Nine liters of this solution was added to MW-04-111 on February 3, 2005, after 9 liters of well water was removed so as not to alter its static groundwater level. Following the addition of the tracer into MW-04-111, it was allowed to enter and travel through the saturated till under the natural groundwater gradient as dictated by the till's hydraulic properties (i.e., hydraulic conductivity and effective porosity). Three types of data were collected at each monitoring well: (1) groundwater level; (2) specific conductance using a

submersible probe; and (3) mid-screen samples of groundwater from each of the wells.

- The water column in the injection well was routinely mixed to keep the Br concentration relatively constant throughout the well. Prior to groundwater sampling, the water column in each well (injection and downgradient) was mixed. This resulted in obtaining an average Br concentration that minimized the effect of plume stratification due to structural heterogeneities within the till deposit.

- Mid-screen samples of groundwater were collected from each of the six monitoring wells and analyzed for Br content by Maine Environmental Laboratories using Method SW-9056. The samples were collected using dedicated sampling tubes and a peristaltic pump. Purge and sample volumes were kept to a minimum and did not exceed 60 milliliters. The sampling volumes were minimized so that the natural horizontal seepage gradients of the groundwater were not affected in a significant way. In the injection well, specific conductance was also measured to check on uniform mixing of the Br tracer.

3.0 TEST RESULTS

Groundwater Br concentrations in the injection and monitoring wells are summarized in Table G-1. Horizontal hydraulic gradients of the groundwater were also measured between the injection well and each of the monitoring wells. Gradients remained relatively constant between the injection well and the downgradient monitoring wells; although a slight decrease of approximately 0.005 was measured near the end of the test period (in the summer months). However, for the purpose of data evaluation gradients remained reasonably consistent. Gradient values are tabulated in Table G-2.

Only two wells showed the presence of the Br tracer: MW-05-01 and MW-05-02. The Br concentrations in MW-05-02 were greater than MW-05-01 which is consistent with the general direction of groundwater flow based on the water table configuration (see Figure G-1).

Using the travel time to the peak Br concentration (210 days) and the spacing between the injection and monitoring wells (10 feet), an average groundwater flow velocity of 17 feet per year is calculated for the till in the test area. A detailed three-dimensional plume analysis was conducted in order to better estimate the average groundwater seepage velocity. The analytical method of Clary and Vargas, 1978 was selected and was utilized with a varying source (injection) concentration. For tracer source dimensions, the approximate borehole and screen dimensions were utilized. Vertical dispersivity was selected to be significantly less than the longitudinal and lateral dispersivities. The average groundwater velocity, and lateral and longitudinal dispersivities were fitting parameters, selected to get the best fit between the field data and the analytical results. Furthermore, since the Br concentrations in the monitoring wells represented a vertically mixed value, the analytical results were also averaged over the screen length.

The field data suggested the centroid of the Br plume passed between MW-05-02 and MW-05-01, but closer to the latter. Thus, the direction of the centroid was also selected as a fitting parameter.

An analysis of the injection well data, using the method of Drost, 1965 indicated that the Br mass flux from the injection well was nearly consistent with natural groundwater advection of Br from the well. Thus, vertical loss of the Br tracer did not appear to be occurring (see attached calculations). Thus, the tracer moved predominantly horizontally. However, since the test had to be conducted over at least a one year period, precipitation recharge, which contains no measurable bromide, displaced the tracer phase downward. Assuming precipitation recharge of up to six inches per year and a total porosity of 0.25, this would result in a downward phase displacement in the order of a couple of feet over a one year period. Although not critical to the

early data, this becomes more important when attempting to fit the later-time data. Thus, emphasis was placed on fitting the early-time data and less so on the late-time results.

Three wells were analyzed (MW-05-01, MW-05-02, and MW-05-03). Well MW-05-03 did not show the presence of the Br tracer, an observation that was confirmed by the analytical results. The best-fit results are presented in the attached calculations. The calculated average groundwater velocity was 0.03 feet per day or about 11 feet per year. Longitudinal and lateral dispersivities were 1.5 and 0.5 feet, respectively. The longitudinal dispersivity is about 15 percent of the travel distance between the injection well and observation wells. This value is consistent with the "rule-of-thumb" guideline of ten percent of the scale. The lateral to longitudinal dispersivity ratio is about 1:3 in this case.

TABLE G-1

SUMMARY OF TILL TRACER TEST

Date	MW-04-111			MW-05-01		MW-05-02		MW-05-03		MW-05-04		MW-05-05	
	Bromide (mg/L) Unmixed	Mixed	Avg. Spec. Cond.	Bromide (mg/L)	Avg. Spec. Cond. (µs/cm)	Bromide (mg/L)	Avg. Spec. Cond. (µs/cm)	Bromide (mg/L)	Avg. Spec. Cond. (µs/cm)	Bromide (mg/L)	Avg. Spec. Cond. (µs/cm)	Bromide (mg/L)	Avg. Spec. Cond. (µs/cm)
2/3/05			125		145		165		142		123	NS	180
2/3/05	28,600	19,890	19,989	ND		ND		ND		ND		ND	
2/10/05			6,468		102		121		99		84	NS	129
2/17/05	5,500		5,929	ND	139	ND	168	ND	135	ND	114	ND	177
2/17/05	8,300												
2/17/05		4,450											
3/2/05	2,300		1,814	ND	156	ND	196	ND	155	0.03	129	ND	208
3/2/05		2,380	1,919										
3/17/05			663		149		190		149		125		203
3/29/05			271		140		184		145		122		199
4/15/05	87.98		130	ND	127	0.69	173	ND	134	ND	114	ND	188
4/28/05	72.40	29.5	111		121	0.90	163	ND	130	ND	109	ND	183
5/12/05	31.10	21.8	108	0.04	115	1.85	162	ND	130	0.04	107	ND	179
5/25/05	11.65	3.53	99	0.04	107	2.40	156	0.05	125	ND	100	0.11	176
6/22/05	6.33	4.46		ND	106	12.24	159	ND	126	ND	99	ND	172
7/20/05	2.40	1.85	124	ND	116	19.75	167	ND	129	ND	134	ND	121
8/17/05	2.21	1.80	120	0.53	126	23.10	169	ND	133	ND	137	ND	128
9/21/05	0.54	0.47	117	0.63	127	24.04	165	ND	150	ND	133	ND	121
10/21/05	0.19	0.22	109	0.38	119	26.70	161	ND	147	ND	129	ND	118
11/21/05	ND	ND	106	0.23	104	9.05	141	ND	125	ND	116	ND	106
12/27/05	0.07	0.06	103	0.06	105	10.57	144	ND	128	ND	117	ND	107
4/27/06	ND	ND	89	ND	100	4.05	130	ND	129	ND	116	ND	104
5/25/06	ND	ND	95.49	ND	124	2.90	134	ND	134	ND	121	ND	109

Notes:
1. Average specific conductance values are reported after mixing just before sampling.
2. ND is below Method Reporting Limit level of 0.03 mg/L Br. Method capable of detecting to one-half Reporting Limit.

TABLE G-2

HORIZONTAL GROUNDWATER GRADIENTS
TILL TRACER TEST

Location	MW-04-111 194.93[1]		MW-05-01 194.86[1]			MW-05-02 194.62[1]		
Date	Water Depth (ft-btc)	Water Level Elevation (ft)	Water Depth (ft-btc)	Water Level Elevation (ft)	Gradient to MW-04-111	Water Depth (ft-btc)	Water Level Elevation (ft)	Gradient to MW-04-111
2/3/2005	5.24	189.69	5.37	189.49	0.020	5.14	189.48	0.021
2/10/2005	5.18	189.75	5.32	189.54	0.021	5.08	189.54	0.021
2/17/2005	3.99	190.94	4.19	190.67	0.027	3.92	190.70	0.024
3/2/2005	4.69	190.24	4.83	190.03	0.021	4.59	190.03	0.021
3/17/2005	4.24	190.69	4.43	190.43	0.026	4.19	190.43	0.026
3/29/2005	3.29	191.64	3.48	191.38	0.026	3.25	191.37	0.027
4/15/2005	3.98	190.95	4.12	190.74	0.021	3.87	190.75	0.020
4/28/2005	3.44	191.49	3.61	191.32	0.017	3.39	191.23	0.026
5/12/2005	4.00	190.93	4.19	190.74	0.019	3.93	190.69	0.024
5/25/2005	3.92	191.01	4.10	190.83	0.018	3.85	190.77	0.024
6/22/2005	4.43	190.5	4.63	190.30	0.020	4.37	190.25	0.025
7/20/2005	6.48	188.45	6.59	188.34	0.011	6.32	188.30	0.015
8/17/2005	6.79	188.14	6.90	188.03	0.011	6.65	187.97	0.017
9/21/2005	5.90	189.03	5.60	189.33	-0.030	5.67	188.95	0.008
10/21/2005	4.20	190.73	4.35	190.58	0.015	4.10	190.52	0.021

Location	MW-05-03 194.88[1]			MW-05-04 195.41[1]			MW-05-05 194.86[1]		
Date	Water Depth (ft-btc)	Water Level Elevation (ft)		Water Depth (ft-btc)	Water Level Elevation (ft)	Gradient to MW-04-111	Water Depth (ft-btc)	Water Level Elevation (ft)	Gradient to MW-04-111
2/3/2005	5.35	189.53	0.016	5.74	189.67	0.002	5.30	189.56	0.013
2/10/2005	5.30	189.58	0.017	5.68	189.73	0.002	5.26	189.60	0.015
2/17/2005	4.16	190.72	0.022	4.53	190.88	0.006	4.14	190.72	0.022
3/2/2005	4.81	190.07	0.017	5.20	190.21	0.003	4.82	190.04	0.020
3/17/2005	4.40	190.48	0.021	4.78	190.63	0.006	4.16	190.70	-0.001
3/29/2005	3.49	191.39	0.025	3.84	191.57	0.007	3.22	191.64	0.000
4/15/2005	4.09	190.79	0.016	4.46	190.95	0.000	4.06	190.80	0.015
4/28/2005	3.62	191.26	0.023	3.99	191.42	0.007	3.55	191.31	0.018
5/12/2005	4.16	190.72	0.021	4.53	190.88	0.005	4.13	190.73	0.020
5/25/2005	4.07	190.81	0.020	4.47	190.94	0.007	4.05	190.81	0.020
6/22/2005	4.58	190.30	0.020	4.95	190.46	0.004	4.56	190.30	0.020
7/20/2005	6.55	188.33	0.012	6.95	188.46	-0.001	6.50	188.36	0.009
8/17/2005	6.90	187.98	0.016	7.31	188.10	0.004	6.84	188.02	0.012
9/21/2005	6.05	188.83	0.020	6.45	188.96	0.007	5.95	188.91	0.012
10/21/2005	4.35	190.53	0.020	4.69	190.72	0.001	4.30	190.56	0.017

Notes:
1. Elevation at top of PVC casing in feet above NGVD.
2. btc = Below top of PVC casing.
3. Gradients calculated by taking difference in groundwater elevation in the respective monitoring well and injection well and dividing that difference by the horizontal distance between the two wells.

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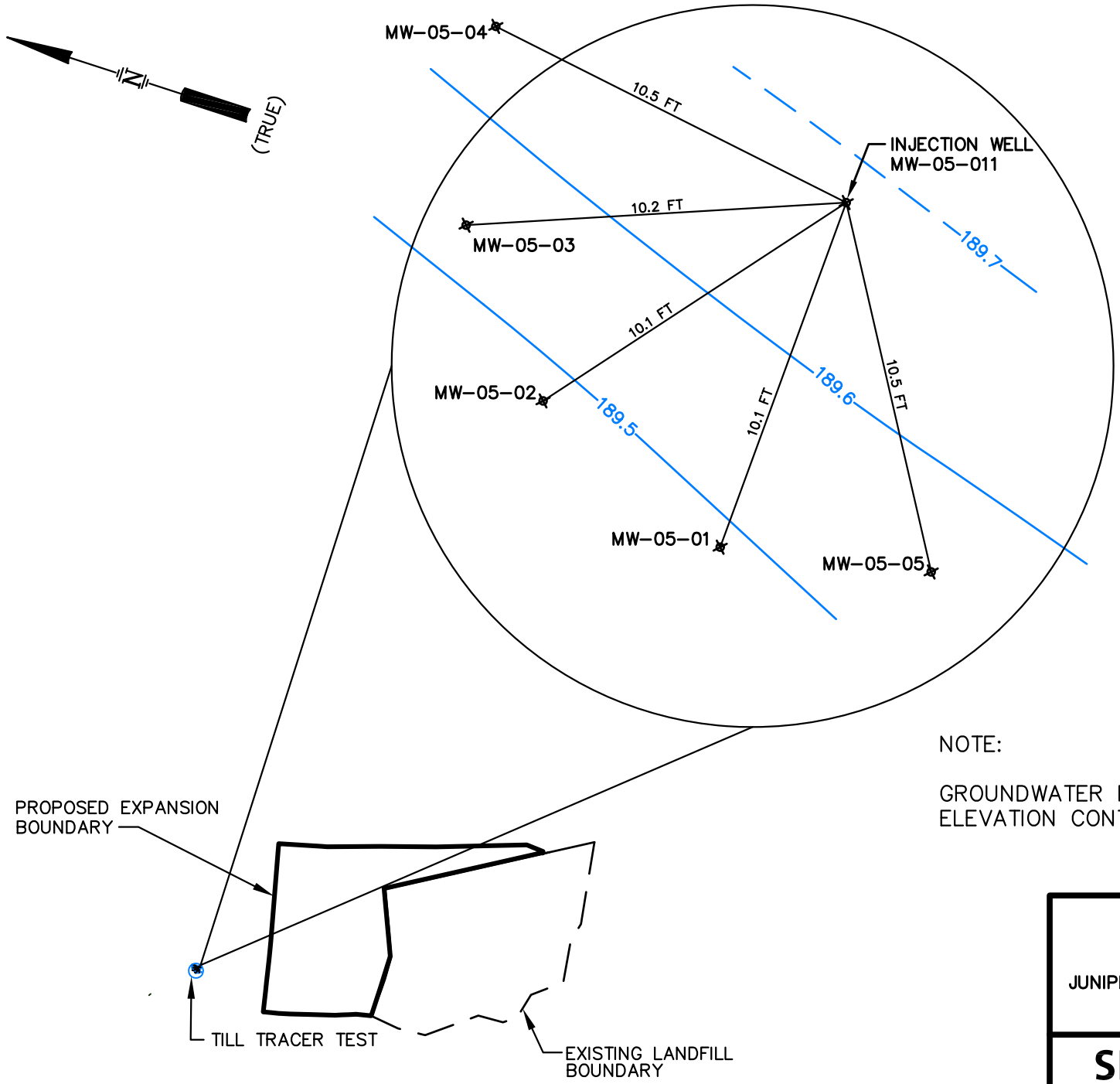

NOTE:

GROUNDWATER PHREATIC SURFACE ELEVATION CONTOURS SHOWN IN BLUE.

FIGURE G-1
WELL LOCATIONS
TILL TRACER TEST
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

DWG: TRACER-TEST LMN: TILL-TRACER CTB: BR-PIR REV: 5/21/15

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jrl till tracer test three dimensional transport analysis with decaying source..check at mw-05-02

(after cleary and ungs, 1978)

source definition:

$N := 16$ number of conc steps

measured Br concentration(mg/l)

$$co := \begin{pmatrix} 19890 \\ 5500 \\ 2380 \\ 87.98 \\ 29.5 \\ 21.8 \\ 3.53 \\ 4.46 \\ 1.85 \\ 1.8 \\ .47 \\ .22 \\ 0 \\ .06 \\ 0 \\ 0 \end{pmatrix}$$

source term(days)

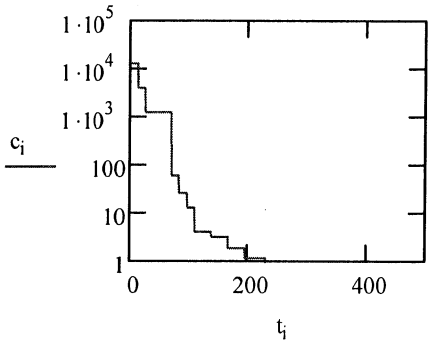
$$ti := \begin{pmatrix} 0 \\ 14 \\ 27 \\ 71 \\ 84 \\ 98 \\ 111 \\ 139 \\ 167 \\ 195 \\ 230 \\ 260 \\ 291 \\ 328 \\ 449 \\ 477 \end{pmatrix}$$

$i := 1, 2 .. 500$

$t_i := i - 1$

$$c_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left(\Phi\left(t_i - ti_{n-1}\right) - \Phi\left(t_i \cdot \right. \right. \right.$$

plot of source concentration with time



Assumed parameters:

half-width of source in z direction in ft $a := 2.5$

half-width of source in y direction in ft $b := .19$

pore fluid velocity in ft/day $vx := .03$

x(downgradient) dispersivity in ft $\alpha x := 1.5$

y(lateral) dispersivity in ft $\alpha y := .1$

z(vertical) dispersivity in ft $\alpha z := .1$

Calculated breakthru curve:

$x := 9.5$ distance of interest in feet

$y := 2$ y coordinate of intrest in ft

$z := 0$ z coordinate of intrest in ft

$Dx := \alpha x \cdot vx$ longitudinal dispersion coefficient in ft^2/day

$Dy := \alpha y \cdot vx$ lateral dispersion coefficient in ft^2/day

$Dz := \alpha z \cdot vx$ vetical dispersion coefficient in ft^2/day

actual Br concentrations at MW-05-02

$$actC := \begin{pmatrix} 0 & 0.01 \\ 14 & 0.01 \\ 27 & 0.01 \\ 71 & .69 \\ 84 & .9 \\ 98 & 1.85 \\ 111 & 2.4 \\ 139 & 12.24 \\ 167 & 19.75 \\ 195 & 23.1 \\ 230 & 24.04 \\ 260 & 26.7 \\ 291 & 9.05 \\ 328 & 10.57 \\ 449 & 4.05 \\ 477 & 2.9 \end{pmatrix}$$

note that precipitation recharge lowers the actual values to less than the theoretical values as the recharges pushes the plume deeper and adds so upper fringe dilution.

$$A(x) := \frac{x}{8 \cdot \sqrt{Dx \cdot \pi}} \cdot \exp\left(\frac{vx \cdot x}{2 \cdot Dx}\right)$$

$$B(x,t) := \exp\left(-\frac{vx^2}{4\cdot Dx}\cdot t - \frac{x^2}{4\cdot Dx\cdot t}\right)$$

$$E(x,y,t) := \operatorname{erf}\left(\frac{b-y}{2\cdot\sqrt{Dy\cdot t}}\right) + \operatorname{erf}\left(\frac{b+y}{2\cdot\sqrt{Dy\cdot t}}\right)$$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{0.01}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

$i := 1,2..500$

$\tau_i := i$ time increments in days

$$cs1_i := \sum_{n=1}^{N-1}\left[\left(\frac{co_n + co_{n-1}}{2}\right)\cdot\left[\Phi\left(\tau_i - ti_{n-1}\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

$z := 2.5$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{0.01}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

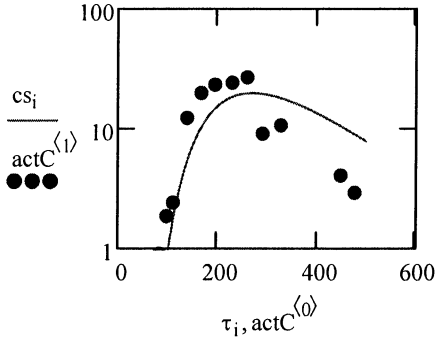
$i := 1,2..500$

$\tau_i := i$ time increments in days

$$cs2_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left[\Phi\left(\tau_i - ti_{n-1}\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

average in the vertical direction along well screen:

$$cs_i := \frac{cs1_i + cs2_i}{2}$$



$$- ti_n))\Big]$$

jrl till tracer test three dimensional transport analysis with decaying source..check at mw-05-03

(after cleary and ungs, 1978)

source definition:

$N := 16$ number of conc steps

measured Br concentration(mg/l)

$$co := \begin{pmatrix} 19890 \\ 5500 \\ 2380 \\ 87.98 \\ 29.5 \\ 21.8 \\ 3.53 \\ 4.46 \\ 1.85 \\ 1.8 \\ .47 \\ .22 \\ 0 \\ .06 \\ 0 \\ 0 \end{pmatrix}$$

source term(days)

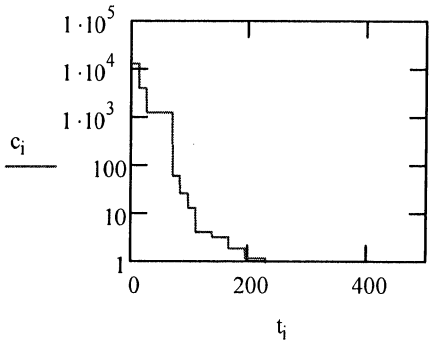
$$ti := \begin{pmatrix} 0 \\ 14 \\ 27 \\ 71 \\ 84 \\ 98 \\ 111 \\ 139 \\ 167 \\ 195 \\ 230 \\ 260 \\ 291 \\ 328 \\ 449 \\ 477 \end{pmatrix}$$

$i := 1, 2 .. 500$

$t_i := i - 1$

$$c_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left(\Phi\left(t_i - ti_{n-1}\right) - \Phi\left(t_i \cdot \right. \right. \right.$$

plot of source concentration with time



Assumed parameters:

half-width of source in z direction in ft $a := 2.5$

half-width of source in y direction in ft $b := .19$

pore fluid velocity in ft/day $vx := .03$

x(downgradient) dispersivity in ft $\alpha x := 1.5$

y(lateral) dispersivity in ft $\alpha y := .1$

z(vertical) dispersivity in ft $\alpha z := .1$

Calculated breakthru curve:

$x := 7.5$ distance of interest in feet

$y := 7$ y coordinate of intrest in ft

$z := 0$ z coordinate of intrest in ft

$Dx := \alpha x \cdot vx$ longitudinal dispersion coefficient in ft^2/day

$Dy := \alpha y \cdot vx$ lateral dispersion coefficient in ft^2/day

$Dz := \alpha z \cdot vx$ vetical dispersion coefficient in ft^2/day

no Br concentrations at MW-05-03

$$A(x) := \frac{x}{8 \cdot \sqrt{Dx \cdot \pi}} \cdot \exp\left(\frac{vx \cdot x}{2 \cdot Dx}\right)$$

$$B(x,t) := \exp\left(-\frac{vx^2}{4 \cdot Dx} \cdot t - \frac{x^2}{4 \cdot Dx \cdot t}\right)$$

$$E(x,y,t) := \operatorname{erf}\left(\frac{b - y}{2 \cdot \sqrt{Dy \cdot t}}\right) + \operatorname{erf}\left(\frac{b + y}{2 \cdot \sqrt{Dy \cdot t}}\right)$$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a - z}{2 \cdot \sqrt{Dz \cdot t}}\right) + \operatorname{erf}\left(\frac{a + z}{2 \cdot \sqrt{Dz \cdot t}}\right)$$

$$C(x,y,\eta) := A(x) \cdot \int_{0.01}^{\eta} B(x,t) \cdot t^{-1.5} \cdot E(x,y,t) \cdot F(x,z,t)\, dt$$

$i := 1, 2 .. 500$

$\tau_i := i$ time increments in days

$$cs1_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left[\Phi\left(\tau_i - ti_{n-1}\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

$z := 2.5$

$$F(x, z, t) := \operatorname{erf}\left(\frac{a - z}{2 \cdot \sqrt{Dz \cdot t}} \right) + \operatorname{erf}\left(\frac{a + z}{2 \cdot \sqrt{Dz \cdot t}} \right)$$

$$C(x, y, \eta) := A(x) \cdot \int_{0.01}^{\eta} B(x, t) \cdot t^{-1.5} \cdot E(x, y, t) \cdot F(x, z, t)\, dt$$

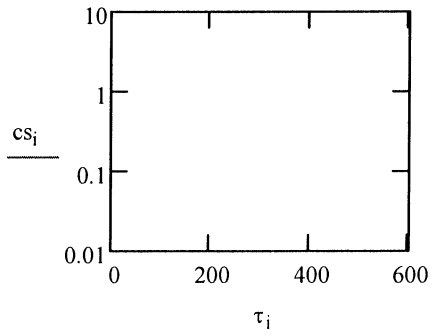
$i := 1, 2 .. 500$

$\tau_i := i$ time increments in days

$$cs2_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left[\Phi\left(\tau_i - ti_{n-1}\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

average in the vertical direction along well screen:

$$cs_i := \frac{cs1_i + cs2_i}{2}$$


10
1
0.1
0.01
cs_i
0
200
400
600
τ_i

$$- ti_n))\Big]$$

jrl till tracer test three dimensional transport analysis with decaying source..check at mw-05-01

(after cleary and ungs, 1978)

source definition:

$N := 16$ number of conc steps

measured Br concentration(mg/l)

$$co := \begin{pmatrix} 19890 \\ 5500 \\ 2380 \\ 87.98 \\ 29.5 \\ 21.8 \\ 3.53 \\ 4.46 \\ 1.85 \\ 1.8 \\ .47 \\ .22 \\ 0 \\ .06 \\ 0 \\ 0 \end{pmatrix}$$

source term(days)

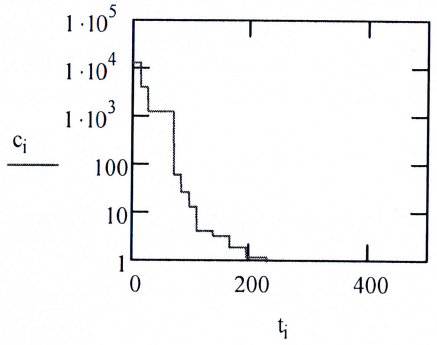
$$ti := \begin{pmatrix} 0 \\ 14 \\ 27 \\ 71 \\ 84 \\ 98 \\ 111 \\ 139 \\ 167 \\ 195 \\ 230 \\ 260 \\ 291 \\ 328 \\ 449 \\ 477 \end{pmatrix}$$

$i := 1, 2 .. 500$

$t_i := i - 1$

$$c_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left(\Phi\left(t_i - ti_{n-1}\right) - \Phi\left(t_i - \right. \right. \right.$$

plot of source concentration with time



Assumed parameters:

half-width of source in z direction in ft $a := 2.5$

half-width of source in y direction in ft $b := .19$

pore fluid velocity in ft/day $vx := .03$

x(downgradient) dispersivity in ft $\alpha x := 1.5$

APPENDIX H

FIELD-SCALE BEDROCK TRACER TEST RESULTS

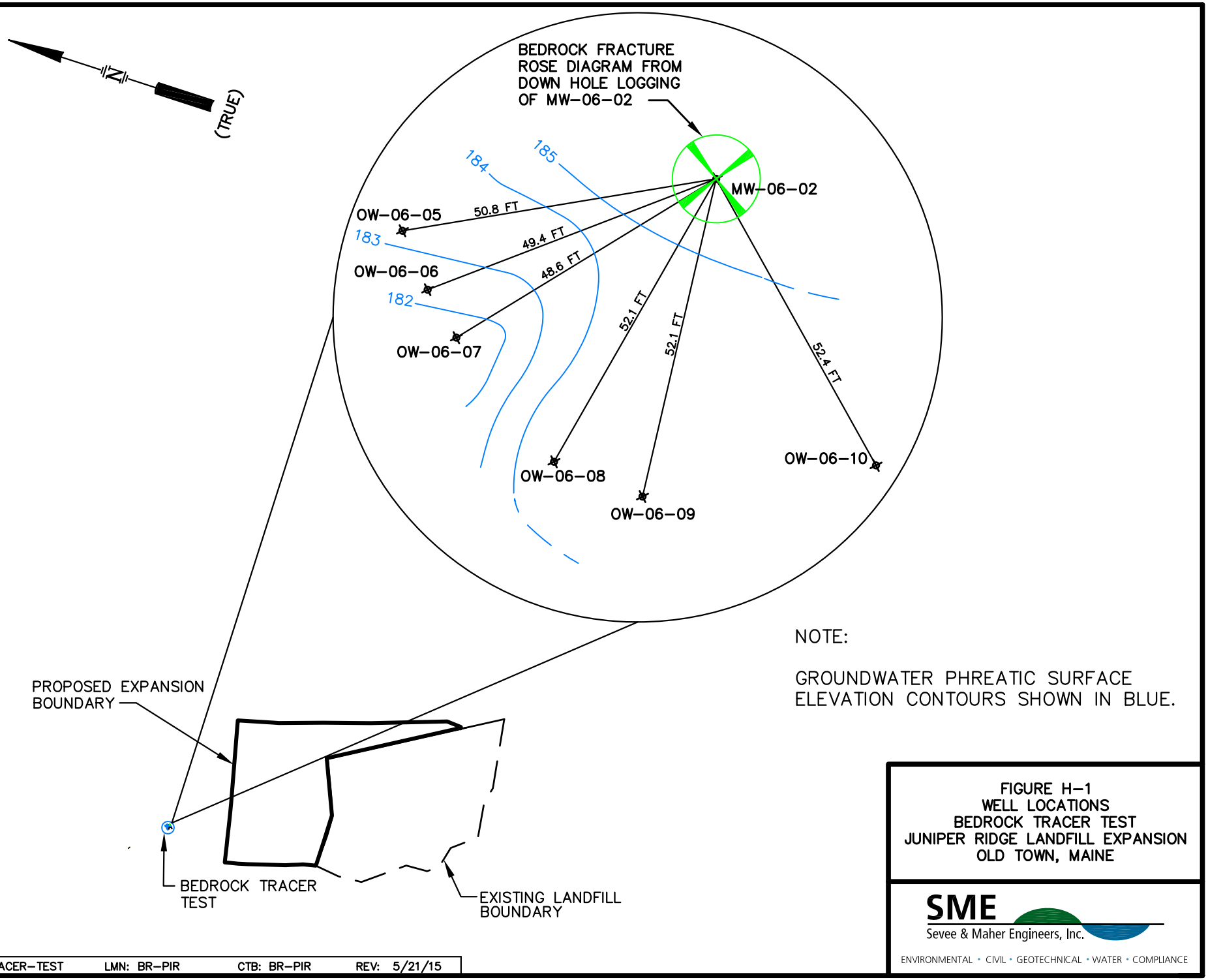
APPENDIX H

NATURAL GRADIENT BEDROCK TRACER TEST RESULTS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

1.0 BACKGROUND AND PURPOSE

A natural gradient bedrock tracer test was performed to provide a field-scale measurement of the hydraulic properties of the fractured bedrock. This test was performed to corroborate other field testing of the bedrock in terms of estimating groundwater velocities through the bedrock fractures and fracture interconnectedness within the bedrock. The tracer test included the installation of a network of six downgradient observation wells and one tracer injection well. The six observation wells were distributed within the immediate downgradient area of the injection well to provide coverage for a variety of possible groundwater flow directions within the bedrock fractures. Although the tracer test represents groundwater flow within the upper portion of the bedrock, it is considered to be generally applicable to depths of interest relative to monitoring the performance of the landfill.

The bedrock consists of interbedded phyllite, metaquartzite, metagraywacke, and metasiltstone. Field testing of the rock indicated that there are two principal orientations of fractures: (1) the prominent set of fractures strikes in a northeastern-southwestern direction (N25E to N67E) and are relatively steeply dipping based on the bedrock outcrop field measurements (see Figure H-1); and (2) a secondary set of fractures strike northwest to southeast. Site-specific studies also indicate that other random fractures are also present in the bedrock. Downhole geophysical logging of the bedrock at the injection hole, MW-06-02, confirmed the fractured nature of the bedrock. The predominant fracture strike orientation at MW-06-02 was about N30E to N40E (relative to Truth North). A secondary set of fractures, striking N50W to N60W, was also observed in the geophysical logging. The bedrock core in the tracer test wells consisted of fractured but competent gray metamorphosed siltstone.



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The tracer injection well (MW-06-02) was located approximately 50 feet upgradient from the observation wells. Since the groundwater flow in the bedrock is controlled by the fracture orientations and the degree of fracture interconnection, the downgradient observation wells were spaced over a horizontal arc of approximately 110 degrees to intercept potential flow paths of the tracer. This also allowed for determining the predominant horizontal flow direction in the bedrock as well as the degree of interconnection of the fractures. The fracture interconnectiveness, along with the fracture patterns, will control the lateral and longitudinal solute dispersivities in the rock.

The injection well and each of the observation wells were similarly constructed with 10-foot-long screen sections positioned in the upper portion of the bedrock. The well screens were positioned to cover at least one common elevation region, but also needed to be positioned on fracture zones observed in the bedrock cores from each borehole. Thus, the screen elevations vary over about 8 feet vertically, but screen fracture zones that transport groundwater. A pump test performed prior to the tracer test showed that all wells were hydraulically connected to the injection well (see Appendix J). The logs for the observation wells and the injection well are included in Appendix B.

The tracer used in this test consisted of bromide in the form of sodium bromide. Bromide (Br) is classified as a conservative tracer since it moves with the same velocity as the groundwater and its concentration is affected only by hydrodynamic dispersion. The bromide ion introduced to the aquifer in the form of a sodium salt is considered one of the more satisfactory tracers for hydrogeologic investigations (Olsen and Tenbus, 2004; LeBlanc, et al, 1991). Its conservative behavior is well established in field studies and it has been found to be acceptable to environmental regulators for this application (Davis, et al, 2001). Furthermore, it is relatively easy to analyze for and is not detected as naturally occurring in the Site groundwater.

2.0 TEST PROCEDURE

The procedure for the bedrock tracer test included placement of a known mass of bromide into the injection well and observing the tracer's movement by collecting periodic groundwater

samples from the observation wells over a twenty-four-day period. The water samples were analyzed for bromide at Maine Environmental Laboratory (MEL) in Yarmouth, Maine. As mentioned above, natural background bromide concentrations are non-detectable so the presence of bromide in any of the observation wells was confirmation that the tracer had flowed through groundwater from the injection well. After the wells were installed and developed, the tracer test followed the steps listed below. The tracer test lay-out is presented in Figure H-1.

1. The tracer was mixed at a ratio of 250 grams of sodium bromide per liter of deionized water to produce a bromide concentration of 194,000 mg/L. Two liters of this solution were added to injection well MW-06-02 in a single pulse on June 9, 2008. Since this was intended to be a natural gradient tracer test, fresh groundwater was removed from the well prior to tracer injection to mitigate any effects that may be caused by hydraulic mounding of the tracer during injection. The volume of solution injected was limited to minimize the disturbance to groundwater levels. The initial bromide concentration in the well bore after mixing was 20,200 mg/L.

2. Following injection, the tracer was allowed to enter the bedrock fractures at a rate controlled by the natural hydraulic properties of the bedrock (i.e., hydraulic conductivity and effective porosity) and local conditions (hydraulic gradient and precipitation infiltration). The water column in the injection well was routinely mixed to keep the bromide concentration in the injection well relatively constant.

3. During the test period two types of data were periodically collected from each of the wells: (1) groundwater levels; and (2) water samples for bromide analyses. Groundwater samples were collected periodically from the mid-screen of the injection well and each observation well and analyzed for bromide at MEL using Method SW-9056. The observation well water was vertically mixed prior to sampling and the samples were collected using dedicated sampling tubing and a peristaltic pump. Purge and sample volumes did not exceed 60 milliliters to minimize the disturbance to the natural horizontal seepage gradients of the

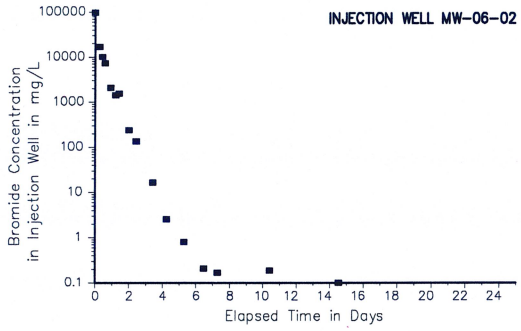
groundwater. At the injection well, specific conductance was also measured to check on uniform mixing of the bromide tracer.

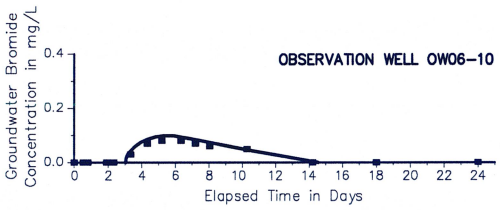
4. The test continued until bromide concentrations in the injection well and observation wells had returned to non-detectable levels.

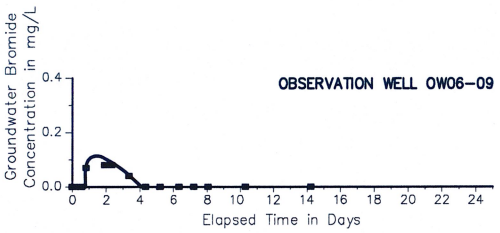
3.0 TEST DATA

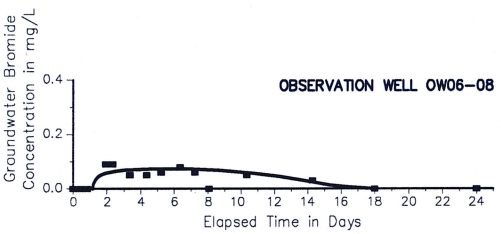
Groundwater bromide concentrations in the injection and observation wells over the test period are summarized in Table H-1. The laboratory test results are at the offices of Sevee & Maher Engineers, Inc., Cumberland, Maine and are available upon request. As expected, bromide concentrations decreased in the injection well and at the end of the test were approximately at the analytical method detection level. Bromide concentrations were detected in at least five of the observation wells with OW-06-05 showing a few random bromide detections. The sporadic concentrations detected at OW-06-05 may be associated with analytical imprecision. Furthermore, the orientation of the groundwater contours allows for groundwater to enter the vicinity of OW-06-05 that may not be from the injection well direction. Interpretations of the OW-06-05 data as real-values or artifacts of the sampling and testing procedure do not alter the conclusions of the test in any significant way. Breakthrough peaks of bromide were detected in the other five observation wells, as shown in Figure H-2.

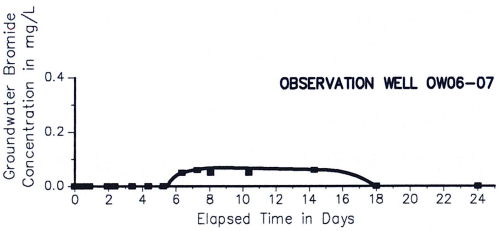
Horizontal hydraulic gradients of the groundwater were measured between the injection well and each of the observation wells. The groundwater level measurements are shown in Table H-1 and the average horizontal hydraulic gradients up to bromide breakthrough are shown in Table H-2. Hydraulic gradients were measured to range from 0.008 to 0.123, and were relatively consistent throughout the tracer test. Horizontal seepage gradients in the bedrock for the landfill Site range from 0.02 to 0.05, which is within the range of gradients measured during the tracer test. The hydraulic gradients were greatest in the direction of OW-06-07 and were least in the direction of OW-06-08. A relatively small rainfall event occurred during the tracer test on the third day (June 12, 2008), which likely had only a minor impact, if any, on the tracer plume concentrations.

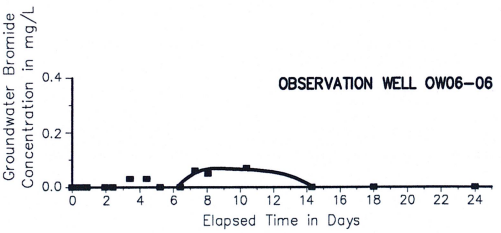


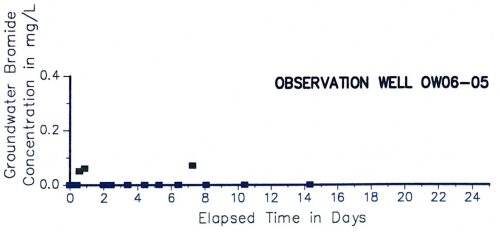












DWG: TRACER-TEST LMN: BR-PIR CTB: BR-PIR REV: 1/28/09

FIGURE H-2
TRACER BREAKTHROUGH CURVES
BEDROCK TRACER TEST
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.

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TABLE H-1

SUMMARY OF BROMIDE DATA
BEDROCK TRACER TEST DATA

MW-06-02 (Injection Well)			OW-06-05			OW-06-06			OW06-07			OW-06-08			OW-06-09			OW06-10		
Elapsed Time (days)	Bromide (mg/L)	Groundwater Level (ft-btc)	Elapsed Time (days)	Bromide (mg/L)	Groundwater Level (ft-btc)	Elapsed Time (days)	Bromide (mg/L)	Groundwater Level (ft-btc)	Elapsed Time (days)	Bromide (mg/L)	Groundwater Level (ft-btc)	Elapsed Time (days)	Bromide (mg/L)	Groun dwater Level (ft-btc)	Elapsed Time (days)	Bromide (mg/L)	Groundwater Level (ft-btc)	Elapsed Time (days)	Bromide (mg/L)	Groundwater Level (ft-btc)
0^-	ND	6.95	0	ND	6.40	0	ND	6.40	0	ND	9.00	0	ND	4.42	0	ND	5.30	0	ND	5.75
0^+	20,200	7.48	0.221	ND	6.75	0.213	ND	6.65	0.205	ND	9.32	0.198	ND	4.73	0.134	ND	5.45	0.091	ND	6.10
0.260	17,000	7.30	0.421	ND	6.98	0.413	ND	7.08	0.408	ND	9.60	0.402	ND	4.78	0.368	ND	5.60	0.359	ND	6.20
0.429	10,100	7.27	0.566	0.05	7.39	0.563	ND	7.80	0.556	ND	10.10	0.551	ND	4.80	0.546	ND	5.68	0.540	ND	6.30
0.575	7,350	7.30	0.874	0.06	6.90	0.872	ND	7.48	0.866	ND	9.85	0.853	ND	4.85	0.811	0.075	5.70	0.802	ND	6.37
0.917	2,080	7.25	1.197	-	7.05	1.193	-	7.85	1.189	-	9.85	1.156	-	4.90	1.149	-	5.75	1.141	-	6.40
1.210	1,410	7.25	1.419	-	7.20	1.412	-	8.10	1.405	-	9.97	1.401	-	4.90	1.367	-	5.75	1.359	-	6.40
1.426	1,550	7.25	1.990	ND	6.95	1.951	ND	7.70	1.942	ND	9.65	1.940	0.095	4.55	1.931	0.08	5.45	1.920	ND	6.40
2.000	239	7.00	2.418	ND	7.06	2.408	ND	7.83	2.369	ND	9.76	2.356	0.095	4.56	2.344	0.08	5.45	2.334	ND	6.16
2.430	136	6.96	3.421	ND	7.20	3.421	0.03	7.58	3.401	ND	9.72	3.365	0.05	4.81	3.357	0.04	5.65	3.349	0.03	6.35
3.430	16.55	7.20	4.414	ND	7.28	4.403	0.03	7.65	4.363	ND	9.84	4.353	0.05	4.99	4.344	ND	5.83	4.335	0.07	6.52
4.240	2.55	7.33	5.280	ND	7.44	5.212	ND	7.74	5.262	ND	10.02	5.221	0.06	5.09	5.213	ND	5.94	5.205	0.08	6.68
5.289	0.81	7.49	8.088	ND	7.40	6.413	0.05	7.70	6.463	0.05	10.00	6.356	0.08	5.27	6.347	ND	6.15	6.338	0.08	6.85
6.468	0.21	7.65	10.400	ND	7.49	7.270	0.07	7.43	7.267	0.05	9.80	7.216	0.06	5.31	7.206	ND	6.20	7.195	0.07	6.92
7.280	0.17	7.75	6.423	ND	7.65	8.055	ND	7.84	8.075	0.06	10.12	8.068	ND	5.10	8.061	ND	5.90	8.054	0.06	6.70
8.124	ND	7.60	7.273	0.07	7.71	10.362	0.06	7.73	10.353	0.05	10.18	10.338	0.05	4.91	10.300	ND	5.70	10.296	0.05	6.59
10.410	0.19	7.42	14.328	ND	7.90	14.293	ND	7.58	14.285	0.05	10.24	14.273	0.03	5.43	14.228	ND	6.25	14.219	ND	7.03
14.340	ND	7.96	-	-	-	18.000	ND	-	18.000	ND	-	18.000	ND	-	-	-	-	18.000	ND	-
-	-	-	-	-	-	24.000	ND	-	24.000	ND	-	24.000	ND	-	-	-	-	24.000	ND	-

Notes.
btc – below top of PVC casing
ND is less than method Reporting Limit of 0.03 mg/L. Method is capable of detecting to one-half of the Reporting Limit.

TABLE H-2

CALCULATED GROUNDWATER VELOCITIES
BEDROCK TRACER TEST

Observation Well Location	Elevation (ft-btc)	Average Horizontal Groundwater Seepage Gradient	Estimated Groundwater Velocity (ft/day)	Measured In situ Hydraulic Conductivity (cm/sec)
OW-06-05	190.53	0.039	-	2.6×10^{-6}
OW-06-06	190.12	0.057	7	8.4×10^{-7}
OW-06-07	189.16	0.123	8	1.5×10^{-6}
OW-06-08	189.72	0.008	26	3.3×10^{-5}
OW-06-09	190.10	0.016	65	1.6×10^{-5}
OW-06-10	191.07	0.011	15	6.7×10^{-6}
MW-06-02	192.71	-	-	4.3×10^{-5}

4.0 ANALYSIS OF RESULTS

The breakthrough curves of the tracer at each of the observation wells are shown in Figure H-2. Relative locations of the observation wells and injection well are shown in Figure H-1. Figure H-1 also shows the location of the tracer test relative to the proposed landfill expansion area.

A comparison of arrival times of the tracer revealed that it reached observation wells OW-06-08, OW-06-09 and OW-06-10 sooner than being detected in OW-06-06 and OW-06-07. Observation well OW-06-10 is best aligned with the direction of the predominant northeast/southwest striking bedrock fractures relative to the injection well location, as shown on the bedrock fracture rose diagram in Figure H-1. In contrast, the horizontal groundwater seepage gradients are greatest towards OW-06-06 and OW-06-07. OW-06-07 is best aligned with the secondary northwest/southeast striking fracture set. Based on the arrival times of the tracer, the bedrock's predominant fractures appeared to have had more influence on the tracer travel

velocity than the steeper groundwater seepage gradients. The secondary fracture set aligns with the steeper gradients which suggests this secondary fracture set is less permeable than the northeast/southwest set.

The tracer arrived at OW-06-09 earlier than the other wells. Thus, the axial or centroidal direction of the plume travel appeared to move toward OW-06-09. This would be consistent with an interplay between the principal hydraulic conductivity orientation (i.e., aligning with the predominant fracture sets) and the hydraulic gradient direction (as defined by the groundwater levels). From a theoretical perspective, this is what would be expected to occur (Bear, 1972).

The tracer test indicates that flow pathways other than the prominent fracture orientation also transmit groundwater. In fact, the tracer appeared to spread over an angle of at least 100 degrees downgradient of the injection well, suggesting that the bedrock fractures are integrated, at least in the shallow portion of the bedrock, which should widen the spacing needed for monitoring well locations in the bedrock at this Site.

The Br concentration in the injection wells was first analyzed using the point-dilution method of Drost, et al, 1968. This suggested the Br was exiting the well at a quicker rate than could be explained by horizontal tracer advection from the well screen only. Given the near-vertical fracture dips and a tracer slug density about that of seawater, it appears likely that a portion of the tracer migrated vertically downward due to its density into the fresh groundwater. In the case of the till tracer test, the initial solute density was less and vertical migration was attenuated over the test period due to the relatively low vertical hydraulic conductivity of the till (e.g., 1.5×10^{-7} cm/sec on average) which prevents it from occurring. The bedrock tracer test setting, therefore, lent itself to a denser-than-water solute plume migrating downward under gravity (Schincariol and Schwartz, 1990; Oostrom, et al, 1992).

However, the density migration of some of the solute does not alter the usefulness of the tracer test. As long as a part of the bromide enters the horizontally moving groundwater and the solute can be detected in observation wells, then the test provides evidence of a horizontal component of groundwater flow. Subsequent to conducting the tracer test, downward, as well as horizontal

seepage gradients were examined at the tracer test location through development of vertical equipotential profiles for the Expansion Site. The relative vertical and horizontal hydraulic conductivities are not defined for the bedrock so the actual tracer plume flow direction cannot be accurately defined by a single set of wells at about the same elevation. However, the horizontal and vertical seepage gradients in the bedrock can be estimated from vertical equipotential diagrams. The presence and magnitude of the horizontal seepage component in the bedrock is confirmed by the measured horizontal seepage gradients as shown in Table H-2. Based on the equipotential diagrams (Section 5.0 herein), an approximate vertical gradient in the order of 0.08 to 0.20 can be interpreted. The vertical and horizontal gradients can be resolved to a resultant gradient of 0.08 to 0.20 that dips at an angle of 80 to 85 degrees below horizontal. However, even though a majority of the solute may have been lost vertically, enough solute entered the horizontally moving groundwater to be detectable in the monitoring wells about 50 feet away from the injection wells. Ignoring hydrodynamic dispersion of the tracer, the first peak bromide concentrations were utilized to estimate groundwater seepage velocities. The calculated average groundwater travel velocities at each of the observation wells are shown in Table H-2 and ranged from 7 to 65 ft/day. No groundwater velocity was calculated for OW-06-05 for the reasons stated above.

A more detailed analysis of the bedrock tracer plume using a three-dimensional analytical equation of Cleary and Ungs, 1978 was performed. The analytical equations allowed for tracing a plume movement that has both vertical and horizontal components. It also allowed for the condition of finite screen lengths that only cover a portion of the plume. One of the interesting features of the measured bromide plume was the similar maximum bromide concentrations at the downgradient wells. This suggested a significant lateral dispersivity. That is, a dispersivity that spreads the plume out to a nearly-uniform concentration, at least, along the edges of the plume. The variables in fitting the measured data to the analytical results included: average groundwater velocity, downward flow direction, plume axis or centroid flow azimuth, and dispersivities (longitudinal, lateral, and vertical). These parameters are constrained by the Br data and equipotential diagrams.

The results are given in the attached calculations and provide favorable comparisons to the collected Br data using one set of parameters for all observation wells. The lateral dispersivities were found to be larger than the longitudinal dispersivities. This has been documented before where the plume is migrating in fractured bedrock. Furthermore, the average velocity (5 ft/day) along the plume axis is slightly less than the values estimated based on the individual observation well breakthrough curves. This may also, in part, be is due to the longitudinal dispersivity which is also significant (about 20 percent of the scale length). The plume appears to have dropped vertically about 20 feet over the approximately 50-foot distance along the plume centroid axis toward well OW-06-09. This represents a dip angle of about 20 degrees which is significantly less than the estimate based on the equipotential profiles only. However, as previously stated, this is possibly consistent if the bedrock directional hydraulic conductivities were precisely known. The actual plume dip will be a resolution of the hydraulic gradient along the flow path with the varying hydraulic conductivities. The 20-degree plume dip would be consistent with a bedrock that has greater horizontal hydraulic conductivity than vertical hydraulic conductivity. The simulated breakthrough curves compare well with the observed bromide data for one consistent set of values for the model fitting variables or parameters. This provides a significant degree of confidence that a general understanding of the plume behavior is understood and describable. The local variations in Br arrival at each observation well from the analytical model could easily be due to localized variations in fracture hydraulic conductivity, fracture porosity, and fracture orientation. Furthermore, the down-dipping plume axis velocity estimate of 5 ft/day is similar to the seepage velocity value previously calculated for the bedrock (see Subsection 5.2.4 herein) and the approximations given in Table H-2 for each observation well.

As indicated above, the lateral dispersivity caused the plume to spread over an arc of at least 100 degrees. Thus, the fracture pattern in the bedrock, with its two nearly orthogonal and vertical fracture sets, caused the plume to spread rapidly.

Such large lateral plume dispersion is not uncommon in fractured bedrock where the plume is migrating perpendicular to the more permeable fracture or fault orientation (Kelkar, et al, 2006). The plume readily migrates along the more permeable fracture set spreading even under small

gradients, then spreading the plume laterally. Lateral or transverse dispersivities of up to 910 meters have been observed in basalt formations (Gelhar, et al, 1992). Some plumes are reported to have a "circular" shape rather than the classical "cigar" shape due to this effect (Lavenue and Domenico, 1986).

For tracer flow parallel to the predominant fracture set, less lateral plume dispersion should be anticipated. This has important implications in bedrock monitoring well placement.

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jrl bedrock tracer test three dimensional transport analysis with decaying source..check at ow-06-05

(after cleary and ungs, 1978)

source definition:

$N := 17$ number of conc steps

measured Br concentration(mg/l)

$$co := \begin{pmatrix} 20200 \\ 17000 \\ 10100 \\ 7350 \\ 2080 \\ 1410 \\ 1550 \\ 239 \\ 136 \\ 16.55 \\ 2.55 \\ .81 \\ .21 \\ .17 \\ 0.01 \\ .19 \\ 0.01 \end{pmatrix}$$

source term(days)

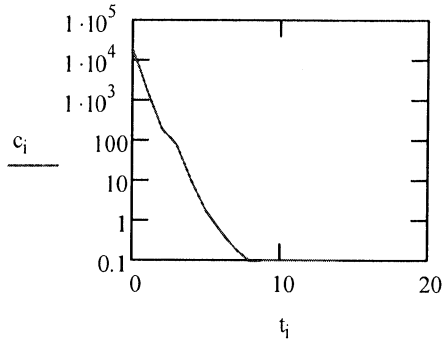
$$ti := \begin{pmatrix} 0 \\ .26 \\ .429 \\ .575 \\ .917 \\ 1.21 \\ 1.426 \\ 2 \\ 2.43 \\ 3.43 \\ 4.24 \\ 5.289 \\ 6.568 \\ 7.28 \\ 8.124 \\ 10.41 \\ 14.34 \end{pmatrix}$$

$i := 1, 2 .. 500$

$t_i := i - 1$

$$c_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left(\Phi\left(t_i - ti_{n-1}\right) - \Phi\left(t_i - \right. \right. \right.$$

plot of source concentration with time



Assumed parameters:

half-width of source in z direction in ft $a := 5$

half-width of source in y direction in ft $b := .19$

pore fluid velocity in ft/day $vx := 5$

x(downgradient) dispersivity in ft $\alpha x := 20$

y(lateral) dispersivity in ft $\alpha y := 60$

z(vertical) dispersivity in ft $\alpha z := 1$

Calculated breakthru curve:

$x := 19$ distance of interest in feet

$y := 47$ y coordinate of intrest in ft

$z := 15$ z coordinate of intrest in ft

$Dx := \alpha x \cdot vx$ longitudinal dispersion coefficient in ft^2/day

$Dy := \alpha y \cdot vx$ lateral dispersion coefficient in ft^2/day

$Dz := \alpha z \cdot vx$ vetical dispersion coefficient in ft^2/day

actual Br concentrations at 0W-06-05

$$actCC := \begin{pmatrix} 0 & 0.01 \\ .213 & 0.01 \\ .421 & 0.01 \\ .566 & 0.05 \\ .874 & .06 \\ 1.99 & .01 \\ 3.421 & .01 \\ 5.28 & .01 \\ 6.423 & .01 \\ 7.273 & 0.07 \\ 8.088 & .01 \\ 10.4 & .01 \\ 14.293 & .01 \end{pmatrix}$$

$$A(x) := \frac{x}{8 \cdot \sqrt{Dx \cdot \pi}} \cdot \exp\left(\frac{vx \cdot x}{2 \cdot Dx}\right)$$

$$B(x,t) := \exp\left(-\frac{vx^2}{4\cdot Dx}\cdot t - \frac{x^2}{4\cdot Dx\cdot t}\right)$$

$$E(x,y,t) := \operatorname{erf}\left(\frac{b-y}{2\cdot\sqrt{Dy\cdot t}}\right) + \operatorname{erf}\left(\frac{b+y}{2\cdot\sqrt{Dy\cdot t}}\right)$$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{.001}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$cs1_i := \sum_{n=1}^{N-1}\left[\left(\frac{co_n + co_{n-1}}{2}\right)\cdot\left[\Phi\left(\tau_i - ti_{n-1}\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

$z := 25$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{0.01}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

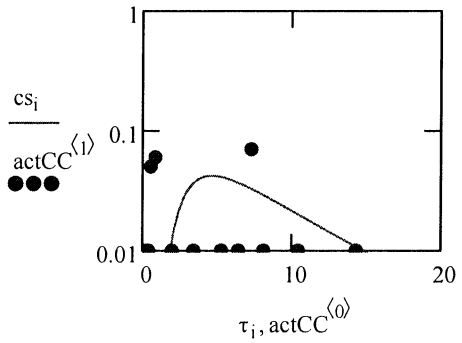
$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$cs2_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left[\Phi\left(\tau_i - ti_{n-1}\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

average in the vertical direction along well screen:

$$cs_i := \frac{cs1_i + cs2_i}{2}$$



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$- ti_n))]$

jrl bedrock tracer test three dimensional transport analysis with decaying source..check at ow-06-06

(after cleary and ungs, 1978)

source definition:

$N := 17$ number of conc steps

measured Br concentration(mg/l)

$$co := \begin{pmatrix} 20200 \\ 17000 \\ 10100 \\ 7350 \\ 2080 \\ 1410 \\ 1550 \\ 239 \\ 136 \\ 16.55 \\ 2.55 \\ .81 \\ .21 \\ .17 \\ 0.01 \\ .19 \\ 0.01 \end{pmatrix}$$

source term(days)

$$ti := \begin{pmatrix} 0 \\ .26 \\ .429 \\ .575 \\ .917 \\ 1.21 \\ 1.426 \\ 2 \\ 2.43 \\ 3.43 \\ 4.24 \\ 5.289 \\ 6.568 \\ 7.28 \\ 8.124 \\ 10.41 \\ 14.34 \end{pmatrix}$$

$i := 1, 2 .. 500$

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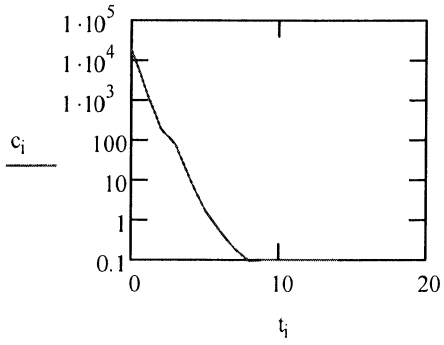
plot of source concentration with time



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pore fluid velocity in ft/day $vx := 5$

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y(lateral) dispersivity in ft $\alpha y := 60$

z(vertical) dispersivity in ft $\alpha z := 1$

Calculated breakthru curve:

$x := 28$ distance of interest in feet

$y := 41$ y coordinate of intrest in ft

$z := 15$ z coordinate of intrest in ft

$Dx := \alpha x \cdot vx$ longitudinal dispersion coefficient in ft^2/day

$Dy := \alpha y \cdot vx$ lateral dispersion coefficient in ft^2/day

$Dz := \alpha z \cdot vx$ vetical dispersion coefficient in ft^2/day

actual Br concentrations at 0W-06-06

$$actCC := \begin{pmatrix} 0 & 0.01 \\ .213 & 0.01 \\ .563 & 0.01 \\ 1.951 & 0.01 \\ 2.408 & .01 \\ 3.421 & .03 \\ 4.403 & .03 \\ 5.212 & .01 \\ 6.413 & 0.05 \\ 7.27 & 0.07 \\ 8.055 & .01 \\ 10.362 & .06 \\ 14.293 & .01 \\ 18 & .01 \\ 24 & .01 \end{pmatrix}$$

$$A(x) := \frac{x}{8\cdot\sqrt{Dx\cdot\pi}}\cdot\exp\left(\frac{vx\cdot x}{2\cdot Dx}\right)$$

$$B(x,t) := \exp\left(-\frac{vx^2}{4\cdot Dx}\cdot t - \frac{x^2}{4\cdot Dx\cdot t}\right)$$

$$E(x,y,t) := \operatorname{erf}\left(\frac{b-y}{2\cdot\sqrt{Dy\cdot t}}\right) + \operatorname{erf}\left(\frac{b+y}{2\cdot\sqrt{Dy\cdot t}}\right)$$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{.001}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$cs1_i := \sum_{n=1}^{N-1}\left[\left(\frac{co_n + co_{n-1}}{2}\right)\cdot\left[\Phi\left(\tau_i - ti_{n-1}\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

$z := 25$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{0.01}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

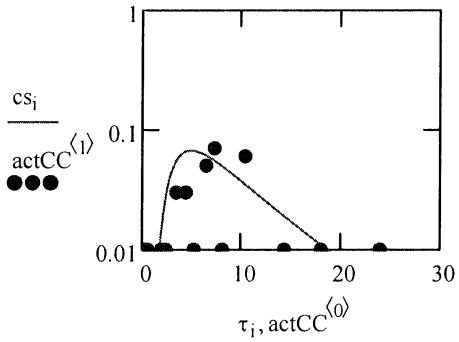
$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$cs2_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left[\Phi\left(\tau_i - ti_{n-1}\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

average in the vertical direction along well screen:

$$cs_i := \frac{cs1_i + cs2_i}{2}$$



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jrl bedrock tracer test three dimensional transport analysis with decaying source..check at ow-06-07

(after cleary and ungs, 1978)

source definition:

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measured Br concentration(mg/l)

$$co := \begin{pmatrix} 20200 \\ 17000 \\ 10100 \\ 7350 \\ 2080 \\ 1410 \\ 1550 \\ 239 \\ 136 \\ 16.55 \\ 2.55 \\ .81 \\ .21 \\ .17 \\ 0.01 \\ .19 \\ 0.01 \end{pmatrix}$$

source term(days)

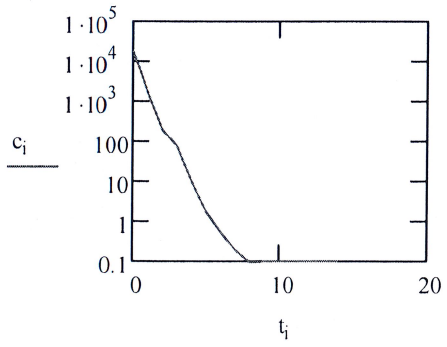
$$ti := \begin{pmatrix} 0 \\ .26 \\ .429 \\ .575 \\ .917 \\ 1.21 \\ 1.426 \\ 2 \\ 2.43 \\ 3.43 \\ 4.24 \\ 5.289 \\ 6.568 \\ 7.28 \\ 8.124 \\ 10.41 \\ 14.34 \end{pmatrix}$$

$i := 1, 2 .. 500$

$t_i := i - 1$

$$c_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left(\Phi\left(t_i - ti_{n-1}\right) - \Phi\left(t_i \right. \right. \right.$$

plot of source concentration with time



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x(downgradient) dispersivity in ft $\alpha x := 20$

y(lateral) dispersivity in ft $\alpha y := 60$

z(vertical) dispersivity in ft $\alpha z := 1$

Calculated breakthru curve:

$x := 34$ distance of interest in feet

$y := 34$ y coordinate of intrest in ft

$z := 15$ z coordinate of intrest in ft

$Dx := \alpha x \cdot vx$ longitudinal dispersion coefficient in ft^2/day

$Dy := \alpha y \cdot vx$ lateral dispersion coefficient in ft^2/day

$Dz := \alpha z \cdot vx$ vetical dispersion coefficient in ft^2/day

actual Br concentrations at 0W-06-07

$$actCC := \begin{pmatrix} 0 & 0.01 \\ .205 & 0.01 \\ .556 & 0.01 \\ 1.942 & 0.01 \\ 3.401 & .01 \\ 4.363 & .01 \\ 5.262 & .01 \\ 6.463 & 0.05 \\ 7.267 & 0.05 \\ 8.075 & 0.06 \\ 10.353 & .05 \\ 14.285 & .05 \\ 18 & .01 \\ 24 & .01 \end{pmatrix}$$

$$A(x) := \frac{x}{8 \cdot \sqrt{Dx \cdot \pi}} \cdot \exp\left(\frac{vx \cdot x}{2 \cdot Dx}\right)$$

$$B(x,t) := \exp\left(-\frac{vx^2}{4\cdot Dx}\cdot t - \frac{x^2}{4\cdot Dx\cdot t}\right)$$

$$E(x,y,t) := \operatorname{erf}\left(\frac{b-y}{2\cdot\sqrt{Dy\cdot t}}\right) + \operatorname{erf}\left(\frac{b+y}{2\cdot\sqrt{Dy\cdot t}}\right)$$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{.001}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$csl_i := \sum_{n=1}^{N-1}\left[\left(\frac{co_n + co_{n-1}}{2}\right)\cdot\left[\Phi\left(\tau_i - ti_{n-1}\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

$z := 25$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{0.01}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

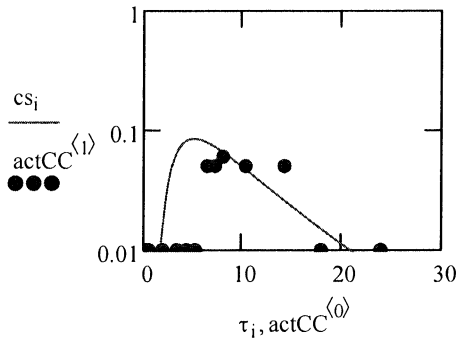
$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$cs2_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left[\Phi\left(\tau_i - ti_{n-1}\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

average in the vertical direction along well screen:

$$cs_i := \frac{cs1_i + cs2_i}{2}$$



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$$- ti_n))\Big]$$

jrl bedrock tracer test three dimensional transport analysis with decaying source..check at ow-06-08

(after cleary and ungs, 1978)

source definition:

$N := 17$ number of conc steps

measured Br concentration(mg/l)

$$co := \begin{pmatrix} 20200 \\ 17000 \\ 10100 \\ 7350 \\ 2080 \\ 1410 \\ 1550 \\ 239 \\ 136 \\ 16.55 \\ 2.55 \\ .81 \\ .21 \\ .17 \\ 0.01 \\ .19 \\ 0.01 \end{pmatrix}$$

source term(days)

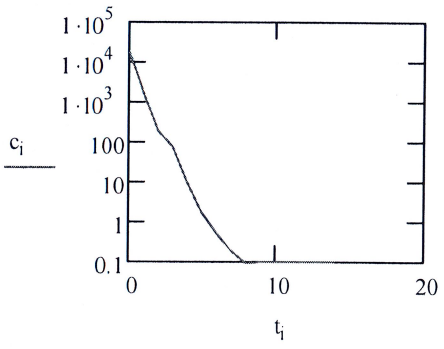
$$ti := \begin{pmatrix} 0 \\ .26 \\ .429 \\ .575 \\ .917 \\ 1.21 \\ 1.426 \\ 2 \\ 2.43 \\ 3.43 \\ 4.24 \\ 5.289 \\ 6.568 \\ 7.28 \\ 8.124 \\ 10.41 \\ 14.34 \end{pmatrix}$$

$i := 1, 2 .. 500$

$t_i := i - 1$

$$c_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left(\Phi\left(t_i - ti_{n-1}\right) - \Phi\left(t_i - \right. \right. \right.$$

plot of source concentration with time



Assumed parameters:

half-width of source in z direction in ft $a := 5$

half-width of source in y direction in ft $b := .19$

pore fluid velocity in ft/day $vx := 5$

x(downgradient) dispersivity in ft $\alpha x := 20$

y(lateral) dispersivity in ft $\alpha y := 60$

z(vertical) dispersivity in ft $\alpha z := 1$

Calculated breakthru curve:

$x := 50$ distance of interest in feet

$y := 15$ y coordinate of intrest in ft

$z := 15$ z coordinate of intrest in ft

$Dx := \alpha x \cdot vx$ longitudinal dispersion coefficient in ft^2/day

$Dy := \alpha y \cdot vx$ lateral dispersion coefficient in ft^2/day

$Dz := \alpha z \cdot vx$ vetical dispersion coefficient in ft^2/day

actual Br concentrations at 0W-06-08

$$actCC := \begin{pmatrix} 0 & 0.01 \\ .198 & 0.01 \\ .402 & 0.01 \\ .551 & 0.01 \\ .853 & .01 \\ 1.94 & .095 \\ 2.356 & 0.095 \\ 3.365 & 0.05 \\ 4.353 & 0.05 \\ 5.221 & 0.06 \\ 6.356 & 0.08 \\ 7.216 & .06 \\ 8.068 & .01 \\ 10.338 & .05 \\ 14.273 & .03 \\ 18 & .01 \\ 24 & .01 \end{pmatrix}$$

$$A(x) := \frac{x}{8 \cdot \sqrt{Dx \cdot \pi}} \cdot \exp\left(\frac{vx \cdot x}{2 \cdot Dx}\right)$$

$$B(x,t) := \exp\left(-\frac{vx^2}{4\cdot Dx}\cdot t - \frac{x^2}{4\cdot Dx\cdot t}\right)$$

$$E(x,y,t) := \operatorname{erf}\left(\frac{b-y}{2\cdot\sqrt{Dy\cdot t}}\right) + \operatorname{erf}\left(\frac{b+y}{2\cdot\sqrt{Dy\cdot t}}\right)$$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{.001}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$cs1_i := \sum_{n=1}^{N-1}\left[\left(\frac{co_n + co_{n-1}}{2}\right)\cdot\left[\Phi\left(\tau_i - ti_{n-1}\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

$z := 25$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{0.01}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

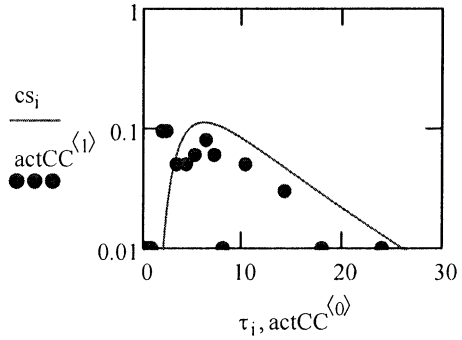
$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$cs2_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left[\Phi\left(\tau_i - ti_{n-1}\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

average in the vertical direction along well screen:

$$cs_i := \frac{cs1_i + cs2_i}{2}$$



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$- ti_n))\Big]$

jrl bedrock tracer test three dimensional transport analysis with decaying source..check at ow-06-09

(after cleary and ungs, 1978)

source definition:

$N := 17$ number of conc steps

measured Br concentration(mg/l)

$$co := \begin{pmatrix} 20200 \\ 17000 \\ 10100 \\ 7350 \\ 2080 \\ 1410 \\ 1550 \\ 239 \\ 136 \\ 16.55 \\ 2.55 \\ .81 \\ .21 \\ .17 \\ 0.01 \\ .19 \\ 0.01 \end{pmatrix}$$

source term(days)

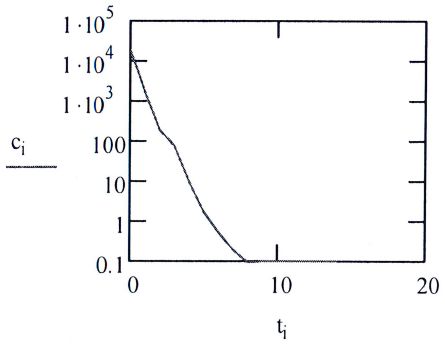
$$ti := \begin{pmatrix} 0 \\ .26 \\ .429 \\ .575 \\ .917 \\ 1.21 \\ 1.426 \\ 2 \\ 2.43 \\ 3.43 \\ 4.24 \\ 5.289 \\ 6.568 \\ 7.28 \\ 8.124 \\ 10.41 \\ 14.34 \end{pmatrix}$$

$i := 1, 2 .. 500$

$t_i := i - 1$

$$c_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left(\Phi\left(t_i - ti_{n-1}\right) - \Phi\left(t_i \cdot \right. \right. \right.$$

plot of source concentration with time



Assumed parameters:

half-width of source in z direction in ft $a := 5$

half-width of source in y direction in ft $b := .19$

pore fluid velocity in ft/day $vx := 5$

x(downgradient) dispersivity in ft $\alpha x := 20$

y(lateral) dispersivity in ft $\alpha y := 60$

z(vertical) dispersivity in ft $\alpha z := 1$

Calculated breakthru curve:

$x := 50.8$ distance of interest in feet

$y := 0$ y coordinate of intrest in ft

$z := 15$ z coordinate of intrest in ft

$Dx := \alpha x \cdot vx$ longitudinal dispersion coefficient in ft^2/day

$Dy := \alpha y \cdot vx$ lateral dispersion coefficient in ft^2/day

$Dz := \alpha z \cdot vx$ vetical dispersion coefficient in ft^2/day

actual Br concentrations at 0W-06-09

$$actCC := \begin{pmatrix} 0 & 0.01 \\ .134 & 0.01 \\ .368 & 0.01 \\ .546 & 0.01 \\ .811 & .075 \\ 1.931 & .08 \\ 2.344 & 0.08 \\ 3.357 & 0.04 \\ 4.344 & 0.01 \\ 5.213 & 0.01 \\ 6.347 & 0.01 \end{pmatrix}$$

$$A(x) := \frac{x}{8 \cdot \sqrt{Dx \cdot \pi}} \cdot \exp\left(\frac{vx \cdot x}{2 \cdot Dx}\right)$$

$$B(x,t) := \exp\left(-\frac{vx^2}{4\cdot Dx}\cdot t - \frac{x^2}{4\cdot Dx\cdot t}\right)$$

$$E(x,y,t) := \operatorname{erf}\left(\frac{b-y}{2\cdot\sqrt{Dy\cdot t}}\right) + \operatorname{erf}\left(\frac{b+y}{2\cdot\sqrt{Dy\cdot t}}\right)$$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{.001}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$cs1_i := \sum_{n=1}^{N-1}\left[\left(\frac{co_n + co_{n-1}}{2}\right)\cdot\left[\Phi\left(\tau_i - ti_{n-1}\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

$z := 25$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{0.01}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

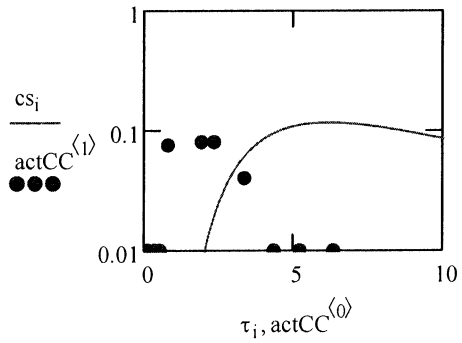
$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$cs2_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left[\Phi\left(\tau_i - ti_{n-1}\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

average in the vertical direction along well screen:

$$cs_i := \frac{cs1_i + cs2_i}{2}$$



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$- ti_n))]$

jrl bedrock tracer test three dimensional transport analysis with decaying source..check at ow-06-10

(after cleary and ungs, 1978)

source definition:

$N := 17$ number of conc steps

measured Br concentration(mg/l)

$$co := \begin{pmatrix} 20200 \\ 17000 \\ 10100 \\ 7350 \\ 2080 \\ 1410 \\ 1550 \\ 239 \\ 136 \\ 16.55 \\ 2.55 \\ .81 \\ .21 \\ .17 \\ 0.01 \\ .19 \\ 0.01 \end{pmatrix}$$

source term(days)

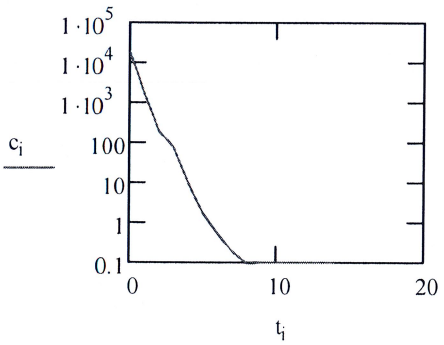
$$ti := \begin{pmatrix} 0 \\ .26 \\ .429 \\ .575 \\ .917 \\ 1.21 \\ 1.426 \\ 2 \\ 2.43 \\ 3.43 \\ 4.24 \\ 5.289 \\ 6.568 \\ 7.28 \\ 8.124 \\ 10.41 \\ 14.34 \end{pmatrix}$$

$i := 1, 2 .. 500$

$t_i := i - 1$

$$c_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left(\Phi\left(t_i - ti_{n-1}\right) - \Phi\left(t_i \cdot \right. \right. \right.$$

plot of source concentration with time



Assumed parameters:

half-width of source in z direction in ft $a := 5$

half-width of source in y direction in ft $b := .19$

pore fluid velocity in ft/day $vx := 5$

x(downgradient) dispersivity in ft $\alpha x := 20$

y(lateral) dispersivity in ft $\alpha y := 60$

z(vertical) dispersivity in ft $\alpha z := 1$

Calculated breakthru curve:

$x := 39$ distance of interest in feet

$y := 35$ y coordinate of intrest in ft

$z := 15$ z coordinate of intrest in ft

$Dx := \alpha x \cdot vx$ longitudinal dispersion coefficient in ft^2/day

$Dy := \alpha y \cdot vx$ lateral dispersion coefficient in ft^2/day

$Dz := \alpha z \cdot vx$ vetical dispersion coefficient in ft^2/day

actual Br concentrations at 0W-06-10

$$actCC := \begin{pmatrix} 0 & 0.01 \\ .091 & 0.01 \\ .359 & 0.01 \\ .54 & 0.01 \\ .802 & .01 \\ 1.92 & .01 \\ 2.334 & 0.01 \\ 3.349 & 0.03 \\ 4.335 & .07 \\ 5.205 & .08 \\ 6.338 & .08 \\ 7.195 & .07 \\ 8.054 & .06 \\ 10.296 & 0.05 \\ 14.219 & 0.01 \\ 10 & .01 \\ 24 & .01 \end{pmatrix}$$

$$A(x) := \frac{x}{8 \cdot \sqrt{Dx \cdot \pi}} \cdot \exp\left(\frac{vx \cdot x}{2 \cdot Dx}\right)$$

$$B(x,t) := \exp\left(-\frac{vx^2}{4\cdot Dx}\cdot t - \frac{x^2}{4\cdot Dx\cdot t}\right)$$

$$E(x,y,t) := \operatorname{erf}\left(\frac{b-y}{2\cdot\sqrt{Dy\cdot t}}\right) + \operatorname{erf}\left(\frac{b+y}{2\cdot\sqrt{Dy\cdot t}}\right)$$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{.001}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$cs1_i := \sum_{n=1}^{N-1}\left[\left(\frac{co_n + co_{n-1}}{2}\right)\cdot\left[\Phi\left(\tau_i - ti_{n-1}\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right)\cdot\left(C\left(x,y,\left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

$z := 25$

$$F(x,z,t) := \operatorname{erf}\left(\frac{a-z}{2\cdot\sqrt{Dz\cdot t}}\right) + \operatorname{erf}\left(\frac{a+z}{2\cdot\sqrt{Dz\cdot t}}\right)$$

$$C(x,y,\eta) := A(x)\cdot\int_{0.01}^{\eta} B(x,t)\cdot t^{-1.5}\cdot E(x,y,t)\cdot F(x,z,t)\,dt$$

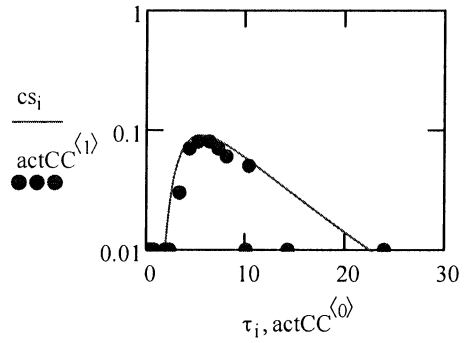
$i := 1,2..300$

$\tau_i := \frac{i}{10}$ time increments in days

$$cs2_i := \sum_{n=1}^{N-1} \left[\left(\frac{co_n + co_{n-1}}{2} \right) \cdot \left[\Phi\left(\tau_i - ti_{n-1}\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_{n-1}\right|\right)\right) - \Phi\left(\tau_i - ti_n\right) \cdot \left(C\left(x, y, \left|\tau_i - ti_n\right|\right)\right)\right]\right]$$

average in the vertical direction along well screen:

$$cs_i := \frac{cs1_i + cs2_i}{2}$$



Analysis of density driven plume:

mass of bromide into well.

$M := 388$ gm

well cross-sectional flow area contributing to groundwater: $A := 10 \cdot \frac{2.5}{12}$ ft²

well volume contining solute: $W := 31 \cdot \pi \cdot \frac{1}{144}$ ft³

$W \cdot 7.48 \cdot 3.8 = 19.224$ L

initial solute concentration: $Co := \frac{M}{W} \cdot \frac{1000}{7.48 \cdot 3.8}$

$Co = 2.018 \times 10^4$ mg/l

$n := .00033$ from OW-06-06 and OW-06-07 core

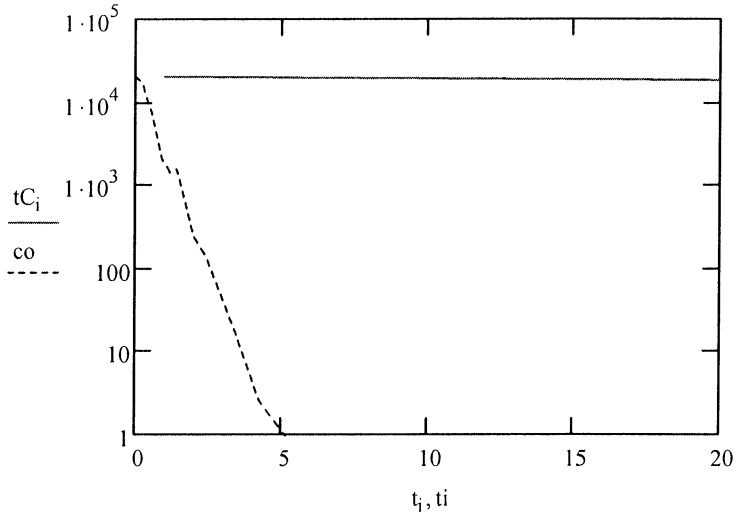
$\psi := 1.$

$vstar := n \cdot vx \cdot \psi$ ft/day

$j := 1, 2 .. 20$

$t_j := j$

$$tC_j := Co \cdot \exp\left(\frac{-vstar \cdot A \cdot t_j}{W}\right)$$



$$- ti_n))\Big]$$

APPENDIX I

HELIUM/TRITIUM GROUNDWATER AGE-DATING RESULTS

Noble Gas Laboratory
Dept. ofEarth and Environmental Sciences
University of Rochester

Sender: **Sevee and Maher** Organization: **Casella Landfill**

Sample ID: **GW-X06-A-112** P-04-06A

Date: 1/26/2005 Temp(°C) Salinity Altitude (m)

Analysis # 9631 Degas Date **2/10/2005** Measurement Date **3/29/2005**

Tritium (TU) ***7.02*** ***+/-*** ***0.21*** *(1 σ)*

He bulb blank	*3.00*	ncc (STP)
He-3 by tritium decay	*73.5*	fcc (STP)
% tritiogenic He-3	*95.3%*	

Comments:
average Tritium
consistent with precipitation

Helium Analysis # 9616 Extraction Date 1/26/2005 Measurement Date **3/29/2005**

Measured
Sample Weight: 22.03 grams

δ^3**He** *(%)=* -53.76 +/- 0.22

Solubility He (assumed)
^{3}**He** *(TU) =* -14.52 +/- 0.06

"Solubility Age" -uncorrected
Age (yr) =

Dissolved Gas Concentrations

					Deviation from solubility (%)
^{3}**He:**	109.9	+/-	*1.10*	pcc STP/kg	*82*
^{4}**He:**	177	+/-	*1.77*	µcc STP/kg	*307*
Ne:	247	+/-	*2.47*	µcc STP/kg	*36*
Ar:	0.34	+/-	*0.01*	cc STP/kg	*11*
N_2	14.49	+/-	*0.29*	cc STP/kg	*22*
CH_4	0.09	+/-	*0.003*	cc STP/kg	

Comments
small gas bubble during sampling

Helium concentrations and age corrected for "excess air"
Estimated Solubility Temperature *18.7 °C*

Tritiogenic ^{3}He:	*8*	TU
Solubility ^{4}He:	*158*	µcc STP/kg
Ne:	*247*	µcc STP/kg
Terrigenic ^{4}He:	*114*	µcc STP/kg

"Corrected" Age (years)
14.15

Comments
Correction is too large to provide valid age.
large amount of terrigenic helium -may be mixed water

Comments:
may be mixed water - based on modern tritium with large amount of terrigenic helium

corrected age - very dependent on method of correction

Noble Gas Laboratory
Dept. ofEarth and Environmental Sciences
University of Rochester

Sender	**Sevee and Maher**	Organization	**Casella Landfill**				
Sample ID:	**GW-X07-B-114** P-04-07A						
Date:	1/25/2005	Temp(°C)		Salinity		Altitude (m)	

Analysis #	9632	Degas Date	**2/9/2005**	Measurement Date	**3/29/2005**

Tritium (TU)	***7.94***	***+/-***	***0.24***	*(1 σ)*	
He bulb blank	*2.55*	ncc (STP)			
He-3 by tritium decay	*76.5*	fcc (STP)			
% tritiogenic He-3	*96.2%*				

Comments:
average Tritium
at precipitation levels

Helium Analysis #	9611	Extraction Date	1/26/2005	Measurement Date	**3/29/2005**

Measured Sample Weight: 22.72 grams

δ^3 ***He*** *(%)=* 44.80 +/- 0.72

Solubility He (assumed)
^{3} ***He*** *(TU)* = 12.10 +/- 0.19

"Solubility Age" -uncorrected
Age (yr) = ***16.614***

Dissolved Gas Concentrations

					Deviation from solubility (%)	*Comments*
^{3} ***He:***	162.0	+/-	*1.62*	pcc STP/kg	*168*	
^{4} ***He:***	81	+/-	*0.81*	µcc STP/kg	*87*	small bubble or excess air
Ne:	328	+/-	*3.28*	µcc STP/kg	*81*	
Ar:	0.41	+/-	*0.01*	cc STP/kg	*31*	correction to age
N_2	15.82	+/-	*0.32*	cc STP/kg	*34*	should be valid
CH_4	0.00	+/-	*0.000*	cc STP/kg		

Helium concentrations and age corrected for "excess air"

Estimated Solubility Temperature *15.1* °C

			"Corrected"	*Comments*
Tritiogenic ^{3} ***He:***	*18.05*	TU		small correction to age
Solubility ^{4} ***He:***	*40*	µcc STP/kg	*Age (years)*	no terrigenic helium
Ne:	*328*	µcc STP/kg		
Terrigenic ^{4} *He:*	*-3.47*	µcc STP/kg	*21.56* years	

Comments:

APPENDIX J

MW-06-02 GROUNDWATER PUMPING TEST RESULTS

APPENDIX J

GROUNDWATER PUMP TEST AT MW-06-02
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

1.0 PURPOSE

On July 10, 2006, a groundwater pump test was conducted by Sevee & Maher Engineers, Inc. at monitoring well MW-06-02 at Juniper Ridge Landfill in Old Town, Maine. MW-06-02 is a shallow bedrock groundwater monitoring well installed by Maine Test Borings, Inc. on April 3, 2006. The purpose of the pump test was to determine to what extent the bedrock fractures are integrated or hydraulically interconnected. This was done by monitoring the groundwater elevations in six nearby groundwater observation wells. This test was done preceding the bedrock tracer test, which was performed in the same grouping of wells.

2.0 PUMP TEST PROCEDURE

The pumping well was constructed by boring through about 20.7 feet of unconsolidated soil consisting predominantly of olive-colored gravelly sandy silt till with traces of clay and cobbles. Bedrock was encountered at about 20.7 feet below existing grade and a 6-inch diameter borehole was drilled into the bedrock to a depth of about 40.5 feet below existing grade. Bedrock consisted of a gray metasiltstone with quartz seams based on rock core observations. A 2-inch diameter PVC screen (0.010-inch slot) was installed from about 25 feet to 35 feet below existing grade and surrounded by a sand pack.

Groundwater level drawdowns were measured in six wells: OW-06-05, OW-06-06, OW-06-07, OW-06-08, OW-06-09, and OW-06-10. The observation wells consist of 4-inch diameter boreholes with 2-inch diameter PVC risers and screens. Every well was constructed with a 10-foot long screen positioned in bedrock with bottom of screen depth ranging from 34 feet below existing grade at OW-06-08 to 42 feet below existing grade at OW-06-10. Above the screen, the borehole annulus between the well and bedrock or soil was sealed with bentonite chips. Well

construction logs for the monitoring and observation wells are located in Appendix B. Each observation well is located approximately 50 feet from MW-06-02 on the downgradient side of the pumping well. The well configuration was based on performing the tracer test. The well locations are given in Figure J-1.

Groundwater elevations were also monitored in the pump well, MW-06-02. Groundwater elevations were measured every 5 minutes using pressure transducers for the duration of the pump test and the post-pumping groundwater level recovery period. Supplemental manual groundwater elevation measurements were taken intermittently.

Groundwater was pumped from MW-06-02 using a submersible pump and control box powered by a generator. Pumping began at about noon on July 10, 2006 and lasted about eight hours. The initial pump rate was set at 3.5 gallons per minute (gpm). However, due to an unsustainable yield at that pump rate, the pump was shut off at 1 minute and 20 seconds into the pump test and restarted at a pump rate of 0.60 gpm at 7 minutes. The pumping rate was further decreased and was continuously adjusted to maintain a drawdown in the pump well. The average pump rate for the duration of the pump test was about 0.19 gpm. Final groundwater readings were taken the day after the test (i.e., July 11, 2006).

3.0 TEST DATA

The results of the pump test are attached herein. Manual groundwater elevation measurements and recorded pump rates are tabulated in Attachment A. The groundwater pump rate for the duration of the pump test is displayed graphically on a semi-log graph in Attachment B. The drawdown versus time data are displayed graphically on a semi-log graph in Attachment C for the pump well and for the six observation wells. The manual observations and the pressure transducer measurements are shown together on the same graphs in Attachment C. The graphs show the pump test results from one minute into the pump test to the completion of the pump test at 470 minutes and approximately one-half day of groundwater level recovery readings.

It should be noted that at approximately 200 to 300 minutes into the pump test, a significant thunder shower passed over the pump test site. According to archived precipitation data from the Bangor, Maine airport, up to 0.5 inches of rain may have accumulated from that storm. Effects from this rain event appear to be evident in the groundwater elevations in some wells and not others during the pump test. The effects are particularly evident at OW-06-08, OW-06-09, and OW-06-10. Effects from the rain event are less prominent or absent in observation wells OW-06-05 and OW-06-07. Whether these effects of the groundwater levels are the result of local precipitation recharge or barometric pressure fluctuations as the storm passed was not critical to the interpretations and was not explored. Weather data from the date of the pump test at the Bangor airport are presented in Attachment D. This low-pressure storm event resulted in some wells recovering to a slightly higher groundwater elevation than at the start of the pump test (e.g., OW-06-08, OW-06-09, and OW-06-10).

4.0 ANALYSIS OF RESULTS

Groundwater drawdown in the pump well varied due to inconsistent pump rates. The maximum drawdown of about 20 feet occurred at about 1.33 minutes into the test and was the result of an initial 3.5-gpm pumping rate. However, for the majority of the pump test, the drawdown fluctuated in a range from approximately 11 to 13 feet after pump rates were lowered. Data from the six observation wells were analyzed to better understand the connectivity of shallow bedrock fractures through which the groundwater flows. A bedrock tracer test conducted in the same well network (conducted subsequent to this pump test) confirmed that all six monitoring wells are to some degree interconnected.

Measurements at observation well OW-06-05 resulted in a maximum drawdown reading of 0.54 feet at about 505 minutes. Observation well OW-06-05 is about 50 feet from the pump well. The Cooper-Jacob (Cooper and Jacob, 1946) time-drawdown method was used to estimate the transmissivity and storativity of the bedrock in the vicinity of this observation well. This method assumes (among other things) nonequilibrium uniform, radial flow under confined conditions. The transmissivity and storativity calculated from the drawdown results at OW-06-05 are 0.12 cm^2/sec and 0.0004, respectively.

Data from measurements at observation well OW-06-06 were difficult to interpret. Observation well OW-06-06 is about 49.4 feet from the pump well. The maximum drawdown reading during the pump test was approximately 0.16 feet. This may merely be natural fluctuation in the groundwater elevation as there is no apparent recovery from the pump test. It is unclear whether the lack of drawdown at this well is due to poor fracture connectivity with the pump well or to a higher transmissivity. Except for the pumping well, drawdowns continued to increase for about an hour after the pumping ceased, suggesting limited recharge from the till. No further analysis was done on the data from this well.

Measurements at observation well OW-06-07 resulted in a maximum drawdown reading of 0.77 feet at about 525 minutes. Observation well OW-06-07 is about 48.6 feet from the pump well. Drawdowns continued to increase for about an hour after the test ceased. The Cooper Jacob time-drawdown method was used to estimate transmissivity and storativity values at OW-06-07 of 0.08 cm^2/sec and 0.0004, respectively.

Measurements at observation well OW-06-08 resulted in a maximum drawdown reading of 0.13 feet at about 205 minutes. Observation well OW-06-08 is about 52.1 feet from the pump well. Drawdowns began decreasing about an hour before the pumping ceased suggesting an effect related to the passing rainfall event. The Cooper-Jacob time-drawdown method was used to estimate transmissivity and storativity values at OW-06-08 of 0.36 cm^2/sec and 0.0008, respectively.

Measurements at observation well OW-06-09 resulted in a maximum drawdown reading of 0.66 feet at about 205 minutes. Observation well OW-06-09 is about 50.8 feet from the pump well. Like OW-06-08, this well also showed decreasing drawdowns prior to the end of pumping. The Cooper-Jacob time-drawdown method was used to estimate transmissivity and storativity values at OW-06-09 of 0.15 cm^2/sec and 0.0001, respectively.

Measurements at observation well OW-06-10 resulted in a maximum drawdown reading of 0.42 feet at about 265 minutes. Observation well OW-06-10 is about 52.4 feet from the pump well.

Like OW-06-08 and OW-06-09, this well also showed decreasing drawdown prior to the end of pumping. The Cooper-Jacob time-drawdown method was used to estimate transmissivity and storativity values at OW-06-10 of 0.17 cm^2/sec and 0.0002, respectively.

The geometric mean of the transmissivity and storativity estimates completed for observation wells OW-06-05, OW-06-07, OW-06-08, OW-06-09, and OW-06-10 were 0.15 cm^2/sec and 0.0003, respectively.

The accuracy of the method used to analyze the data from this pump test is limited by its assumptions. Particularly, while radial flow is assumed, this may not be the case in fractured bedrock. Furthermore, depending on the degree of fracture interconnectedness and the scale of influence, the assumptions of isotropic hydraulic conductivity and storativity may not apply. Additionally, while the analytical method used assumes that the tested aquifer is confined, three wells exhibited hydraulic connectivity to the overlying tills; in these wells, transmissivities may be overestimated. Not withstanding these limitations, the Cooper-Jacob method was useful for analyzing short-term pump test data and yielded results, which are reasonable for the material tested. The results are summarized in Table J-1.

TABLE J-1

Observation Well	Azimuth from the Predominant Fracture Strike (degrees)	Maximum Drawdown (ft)	Transmissivity (cm^2/sec)	Storativity	Estimated Average Hydraulic Conductivity between Observation Well and Pumping Well (cm/s)
OW-06-05	N28W	0.54	0.12	0.0004	$4x10^{-4}$
OW-06-06	N40W	0.16	-	-	-
OW-06-07	N50W	0.77	0.08	0.0004	$3x10^{-4}$
OW-06-08	N79W	0.13	0.36	0.0008	$1x10^{-3}$
OW-06-09	N84E	0.66	0.15	0.0001	$5x10^{-4}$
OW-06-10	N42E	0.42	0.17	0.0002	$6x10^{-4}$
Geometric Mean		-	0.15	0.0003	$5x10^{-4}$

Fractures in observation wells OW-06-09 and OW-06-10 appear to be more directly connected to the pumping well than at OW-06-05, OW-06-06, OW-06-07, and OW-06-08. This is shown in the drawdown versus time data where the response to the pump test is seen in the first hour in the former wells and is seen after an hour in the latter wells. In addition, this trend correlates well with the bedrock tracer test where the injected bromide tracer was detected earlier at OW-06-09

and OW-06-10. These have been shown to be more aligned with the predominant fracture set strike from the pumping well. Table J-1 lists the approximate radial azimuth for the various observation wells relative to the two predominant fracture set strike orientations (northeast/southwest and northwest/southeast).

Because of the suggested anisotropy in drawdown responses described in the previous paragraph, the method of Papadopoulos, 1965 was also utilized to see if there was a consistent direction for the maximum and minimum principal transmissivities. This method utilized groups of three observation wells to solve for the two principal transmissivities and their orientations. Five groups of wells provided meaningful results. Wells in a group must be spread out radially so that two wells are not close to the same radial direction; this limits the number of group combinations. Furthermore, the variability of the data at OW-06-06 limited its usefulness.

The results are given in Table J-2 for the different well groupings. This analysis (calculations are provided in Attachment E) showed that the direction of maximum transmissivity was to the northeast with an average direction of about N61E relative to True North. This aligns favorably with the strike of one of the two primary fracture sets to the northeast/southwest. The minimum principal transmissvity is orthogonal to N61E or about N29W. The most frequent fracture strike direction from the MW-06-02 downhole geophysical logging was about N35E, again agreeing favorably with the calculated maximum transmissivity direction. The average maximum principal transmissivity is 0.70 $cm^{2/}$sec and the minimum is 0.040 cm^2/sec with a geometric mean value of 0.17 cm^2/sec. The mean value agrees well with the mean value from the Cooper-Jacob analyses. The geometric mean storativity of 0.0002 agrees with the 0.0003 mean value from the Cooper-Jacob method.

TABLE J-2

Well Combination	Storativity	Maximum Transmissivity (cm^2/sec)	Minimum Transmissivity (cm^2/sec)	Azimuth of Maximum Transmissivity (relative to True North)
OW-06-05, 08, 10	0.00025	0.21	0.070	N63E
OW-06-05, 07, 10	0.00024	0.29	0.042	N23E
OW-06-05, 09, 10	0.00018	0.43	0.048	N78E
OW-06-07, 08, 10	0.00019	0.67	0.029	N70E
OW-06-07, 09, 10	0.000050	1.86	0.070	N71E

Thus, a rigorous analysis of the pump test data in the bedrock demonstrates anisotropy relative to the hydraulic conductivity. The northeast/southwest fracture set imparts a greater relative hydraulic conductivity than the northwest/southeast set. This is believed to be in part due to the foliation associated with the phyllite, possibly the bedding of the different lithologic units, and the slightly more frequent northeast/southwest fractures. The anisotropy ratio for this test was about 17 to 1. This value likely varies some spatially but has been observed in similar rock types in Maine.

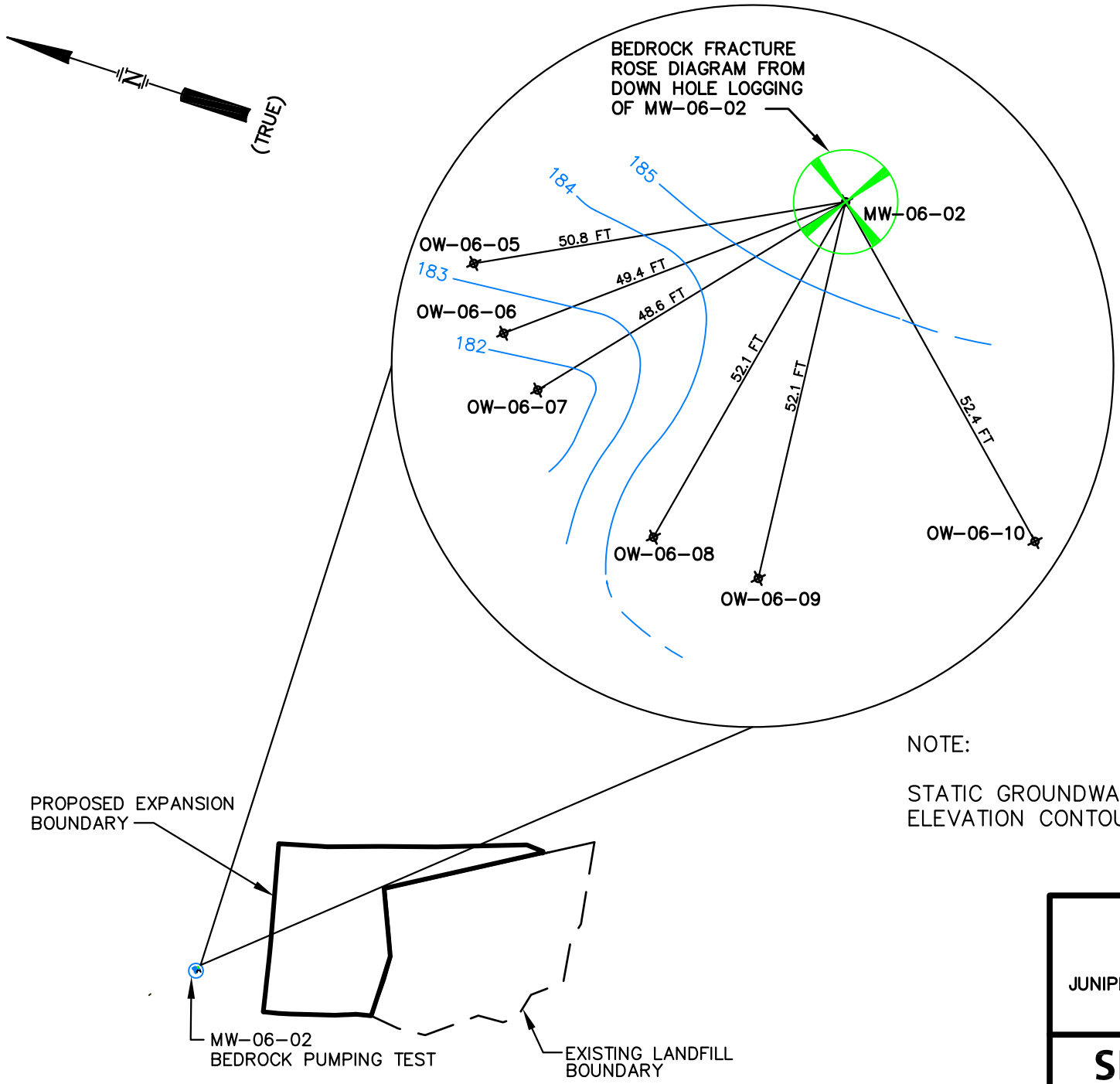
Table J-1 also lists an approximation of the hydraulic conductivity estimated from the respective transmissivities by dividing the transmissivity by the well screen length. These values are greater than measured at the observation wells but, in fact, represent an overall average hydraulic conductivity between the pumping well and the observation wells. The distance allows for hydraulic connections to average out many fracture effects. The higher values may also be due, in part, to partial penetration of the wells in the bedrock formation. Barker and Black, 1983 note that transimissivity values are always overestimated when applying standard type-curve analyses to fracture bedrock. In any case, the pumping test is of value in that it demonstrates the interconnection of fractures and a possible preferential flow path striking to the northeast/southwest.

References

Cooper, H.H. and C.E. Jacob, 1946. A generalized graphical method for evaluating formation constants and summarizing well field history, American Geophysical Union Transactions, Vol. 27, pp. 526-534.

Freeze, R.A. and J.A. Cherry, 1979. Groundwater. Prentice-Hall, Englewood Cliffs, N.J.

Papadopoulos, I. S., 1965. Nonsteady Flow to a Well in an Infinite Anisotropic Aquifer, Symposium of the International Association of Scientific Hydrology, Dubrovnik, Volume 1, No. 73.



NOTE:

STATIC GROUNDWATER PHREATIC SURFACE ELEVATION CONTOURS SHOWN IN BLUE.

FIGURE J-1
WELL LOCATIONS
BEDROCK PUMPING TEST
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

DWG: TRACER-TEST LMN: BR-PIR CTB: BR-PIR REV: 5/22/15

\\Nserver\cfs\Casella\OldTownLandfill\Expansion\9.35MCY-Expansion\Acad\Figures\Tracer-Test.dwg, 5/22/2015 8:13:54 AM, paf

ATTACHMENT A

TABULATED PUMP TEST DATA

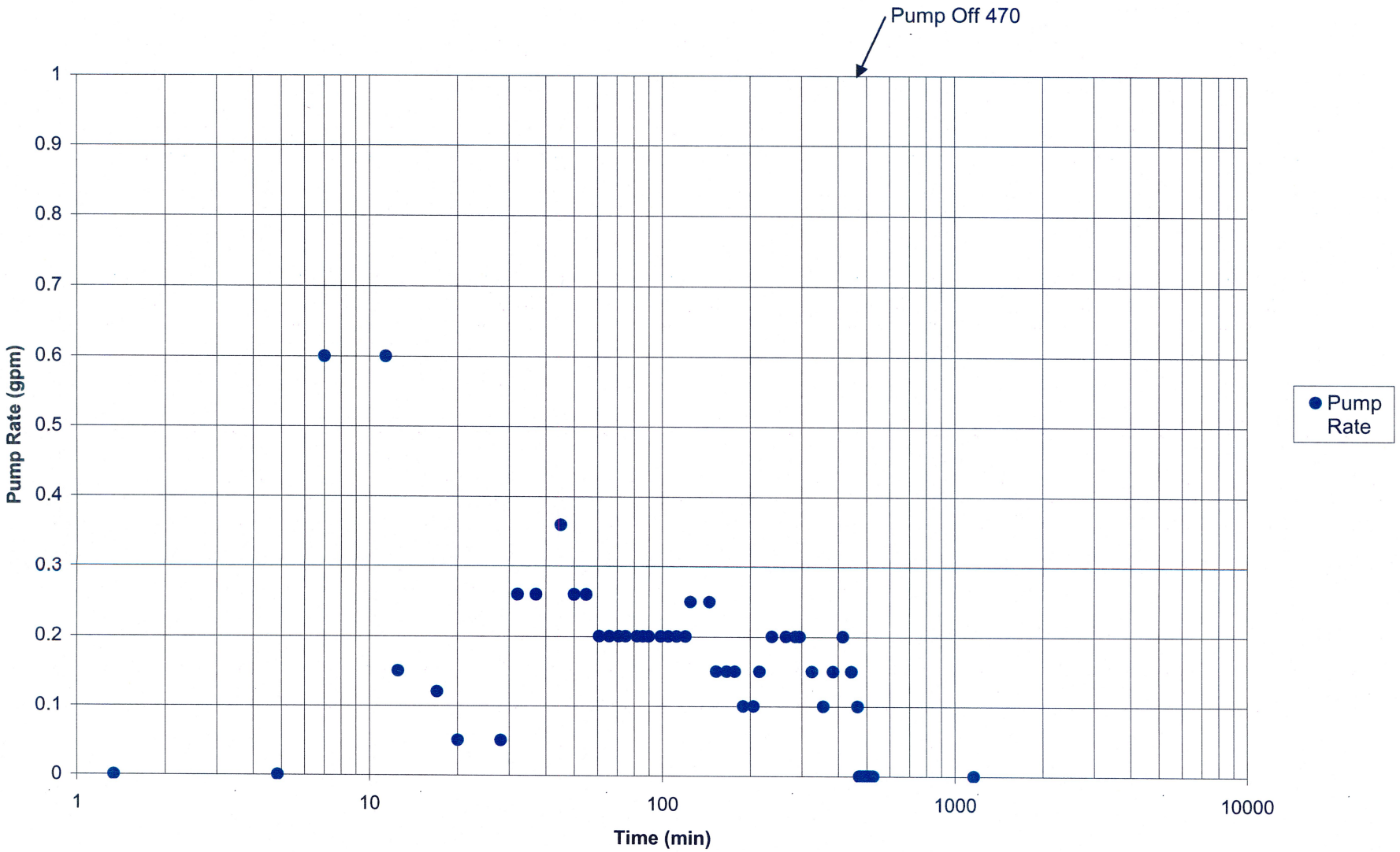
July 10 & 11, 2006 Pumping Test at MW 06 02
Juniper Ridge Landfill, Old Town, Maine

Date	Time	Elapsed Time (min)	Pump Rate (gpm)	MW 06 02 Drawdown (ft)	Drawdown (ft)						Notes
					OW 06 05	OW 06 06	OW 06 07	OW 06 08	OW 06 09	OW 06 10	
7/10/2006	Static WL	0.00	0.00	7.69<TOC	7.52<TOC	7.18<TOC	10.00<TOC	5.54<TOC	6.15<TOC	6.97<TOC	
7/10/2006	11:45:00	0.00	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7/10/2006	11:46:20	1.33	0.00	19.81							Pump Stopped Due to Excessive Drawdown
7/10/2006	11:49:50	4.83	0.00	15.06							
7/10/2006	11:52:00	7.00	0.60								
7/10/2006	11:56:21	11.35	0.60								
7/10/2006	11:57:50	12.50	0.15	16.82							
7/10/2006	12:02	17.00	0.12	18.66							
7/10/2006	12:05	20.00	0.05	17.44							
7/10/2006	12:13	28.00	0.05	17.58	0.03	-0.04		0.02	0.21	0.03	
7/10/2006	12:17	32.00	0.26	11.76							
7/10/2006	12:22	37.00	0.26	11.82							
7/10/2006	12:30	45.00	0.36	12.00							Pump at 93.50 Hz
7/10/2006	12:35	50.00	0.26	12.04							
7/10/2006	12:40	55.00	0.26	11.86	0.07	-0.05	0.02	0.02	0.40	0.13	
7/10/2006	12:46	61.00	0.20	11.68							
7/10/2006	12:51	66.00	0.20	11.62							Adjusted Pump to 94.00 Hz
7/10/2006	12:56	71.00	0.20	8.41							
7/10/2006	13:00	75.00	0.20	13.11							
7/10/2006	13:07	82.00	0.20	12.69							
7/10/2006	13:11	86.00	0.20	13.51							
7/10/2006	13:15	90.00	0.20	13.57	0.12	-0.03	0.09	0.05	0.47	0.22	
7/10/2006	13:24	99.00	0.20	13.59							
7/10/2006	13:30	105.00	0.20	13.50							
7/10/2006	13:37	112.00	0.20	13.41							
7/10/2006	13:45	120.00	0.20	13.33	0.18	-0.02	0.15	0.08	0.56	0.27	
7/10/2006	13:50	125.00	0.25	13.36							
7/10/2006	14:10	145.00	0.25	13.00	0.23	0.00	0.24	0.09	0.63	0.34	
7/10/2006	14:18	153.00	0.15	12.68							
7/10/2006	14:31	166.00	0.15	12.71							
7/10/2006	14:42	177.00	0.15	12.66	0.30	0.03	0.32	0.13	0.64	0.38	
7/10/2006	14:54	189.00	0.10	12.67							
7/10/2006	15:10	205.00	0.10	12.39	0.33	0.04	0.36	0.13	0.66	0.41	
7/10/2006	15:20	215.00	0.15	12.13							Adjusted Pump to 106.40 Hz
7/10/2006	15:42	237.00	0.20	12.02	0.38	0.04	0.43	0.10	0.65	0.41	
7/10/2006	16:10	265.00	0.20	11.73	0.41	0.07	0.48		0.62	0.42	
7/10/2006	16:30	285.00	0.20	11.69							
7/10/2006	16:40	295.00	0.20	12.04	0.42	0.02	0.53	0.05	0.60	0.35	
7/10/2006	17:10	325.00	0.15	12.63	0.46	0.02	0.57	0.03	0.59	0.35	
7/10/2006	17:40	355.00	0.10	12.22	0.48	0.05	0.61	-0.04	0.58	0.38	
7/10/2006	18:08	383.00	0.15	11.96	0.49	0.06	0.65	0.02	0.58	0.38	
7/10/2006	18:39	414.00	0.20	11.86	0.52	0.08	0.68	0.01	0.57	0.38	
7/10/2006	19:08	443.00	0.15	11.29	0.52	0.09	0.70	0.03	0.55	0.38	
7/10/2006	19:30	465.00	0.10	10.84	0.53	0.09	0.73	0.00	0.53	0.38	
7/10/2006	19:35	470.00	0.00								PULLED PUMP
7/10/2006	19:41	476.00	0.00	6.36	0.53	0.11	0.74	0.01	0.52	0.38	
7/10/2006	19:50	485.00	0.00	2.78	0.53	0.11	0.75	-0.03	0.50	0.36	
7/10/2006	20:00	495.00	0.00	1.52	0.53	0.12	0.75	-0.02	0.43	0.33	
7/10/2006	20:10	505.00	0.00	0.97	0.54	0.11	0.75	-0.01	0.35	0.32	
7/10/2006	20:20	515.00	0.00	0.64	0.53	0.12	0.76	-0.05	0.27	0.29	
7/10/2006	20:30	525.00	0.00	0.51	0.53	0.13	0.77	-0.06	0.26	0.28	
7/11/2006	7:05	1160.00	0.00	0.18	0.05	0.16	0.13	-0.09	-0.06	-0.06	

ATTACHMENT B

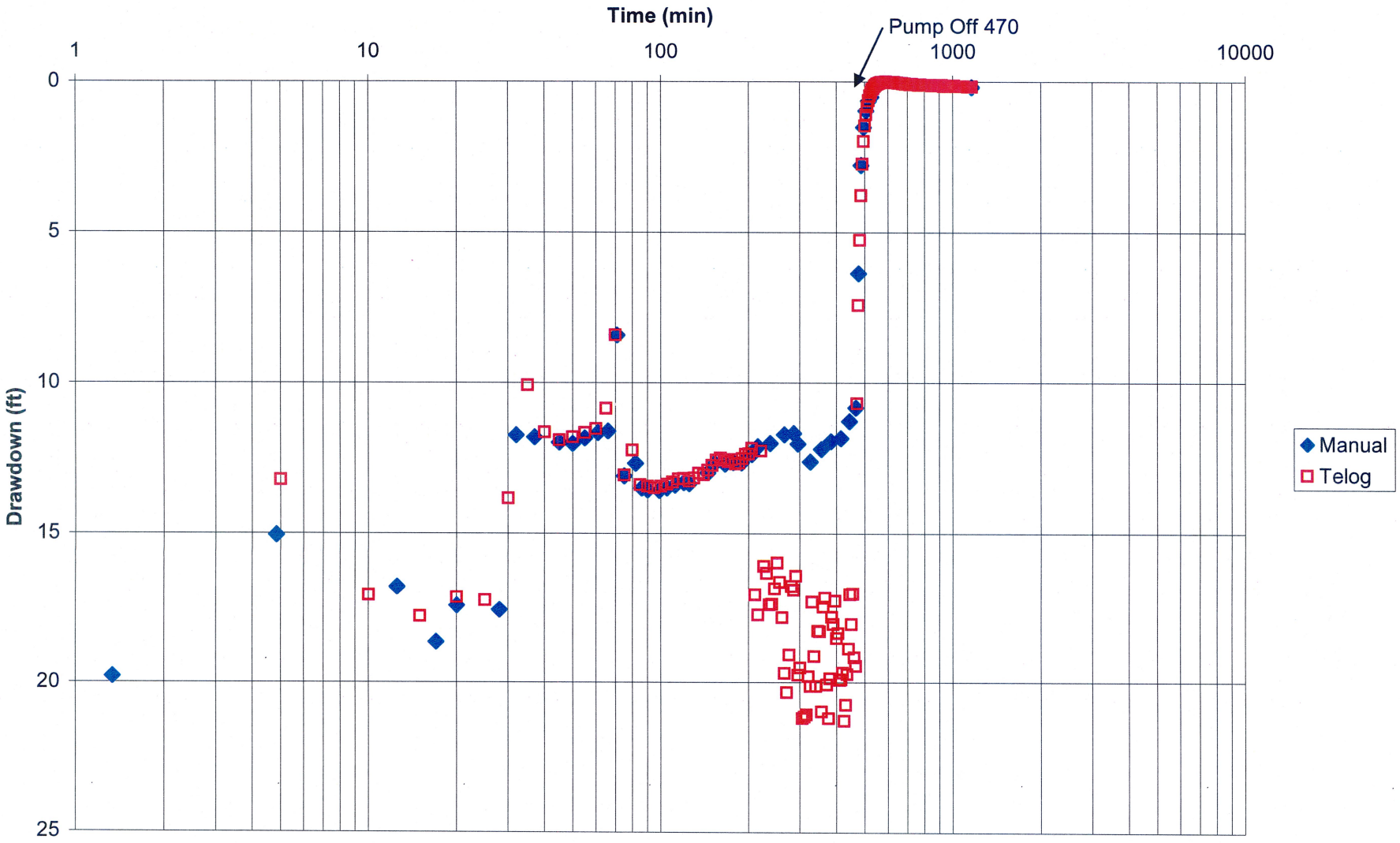
SEMI-LOG TIME vs. PUMP RATE

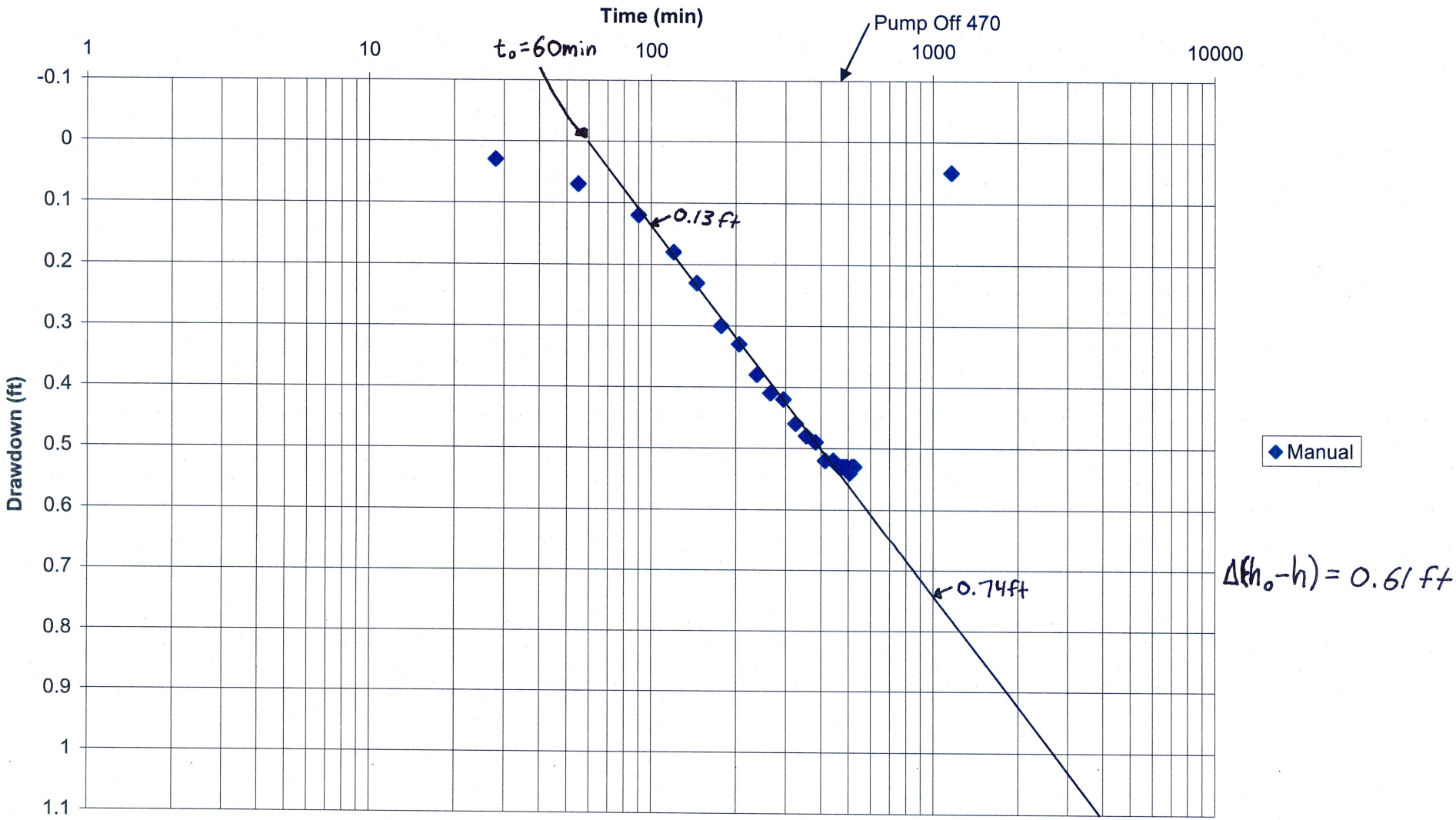
Juniper Ridge Landfill - Pump Rate (First 1.3 minutes pumped at 3.5 gpm)



ATTACHMENT C

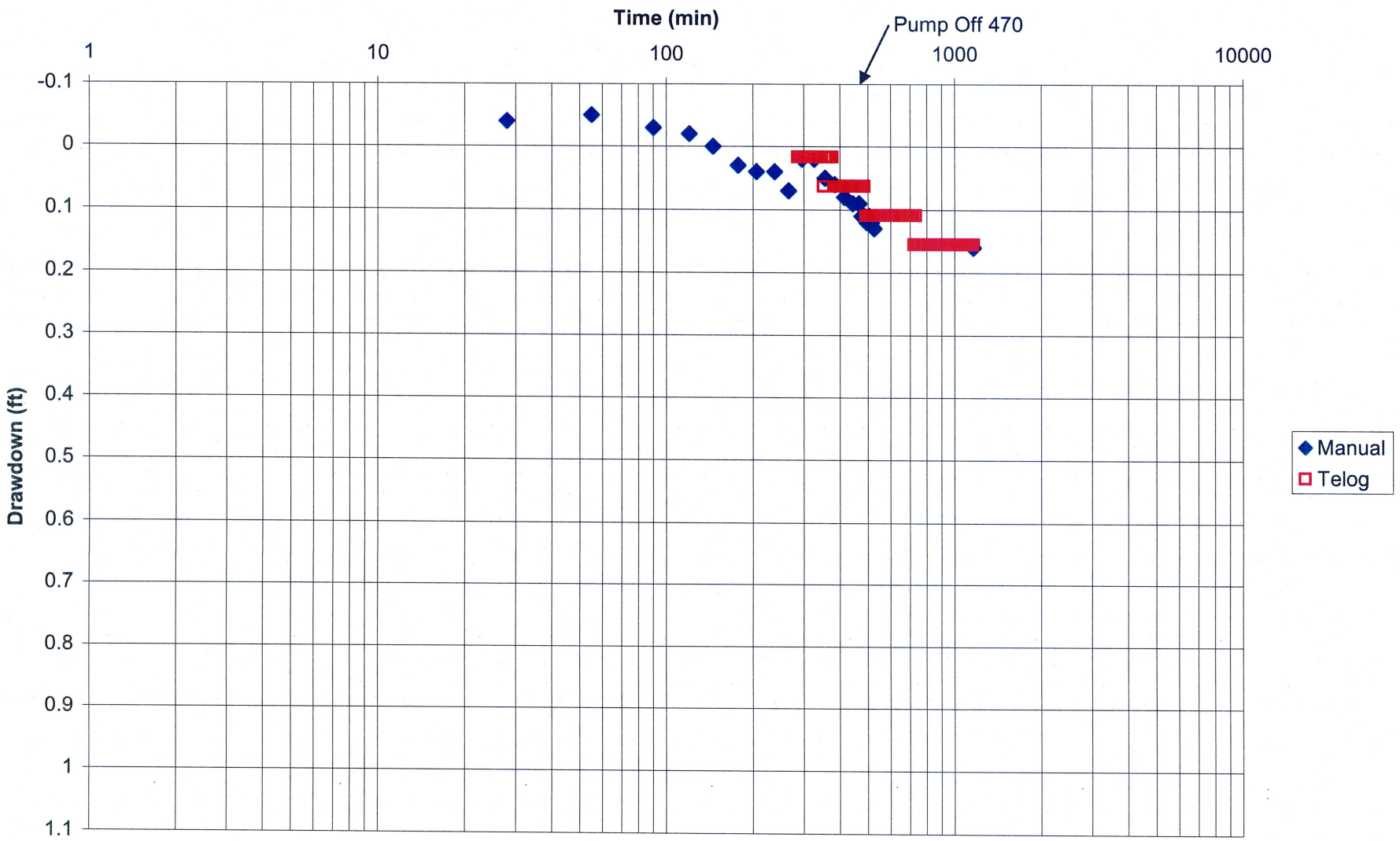
SEMI-LOG TIME vs. DRAWDOWNS

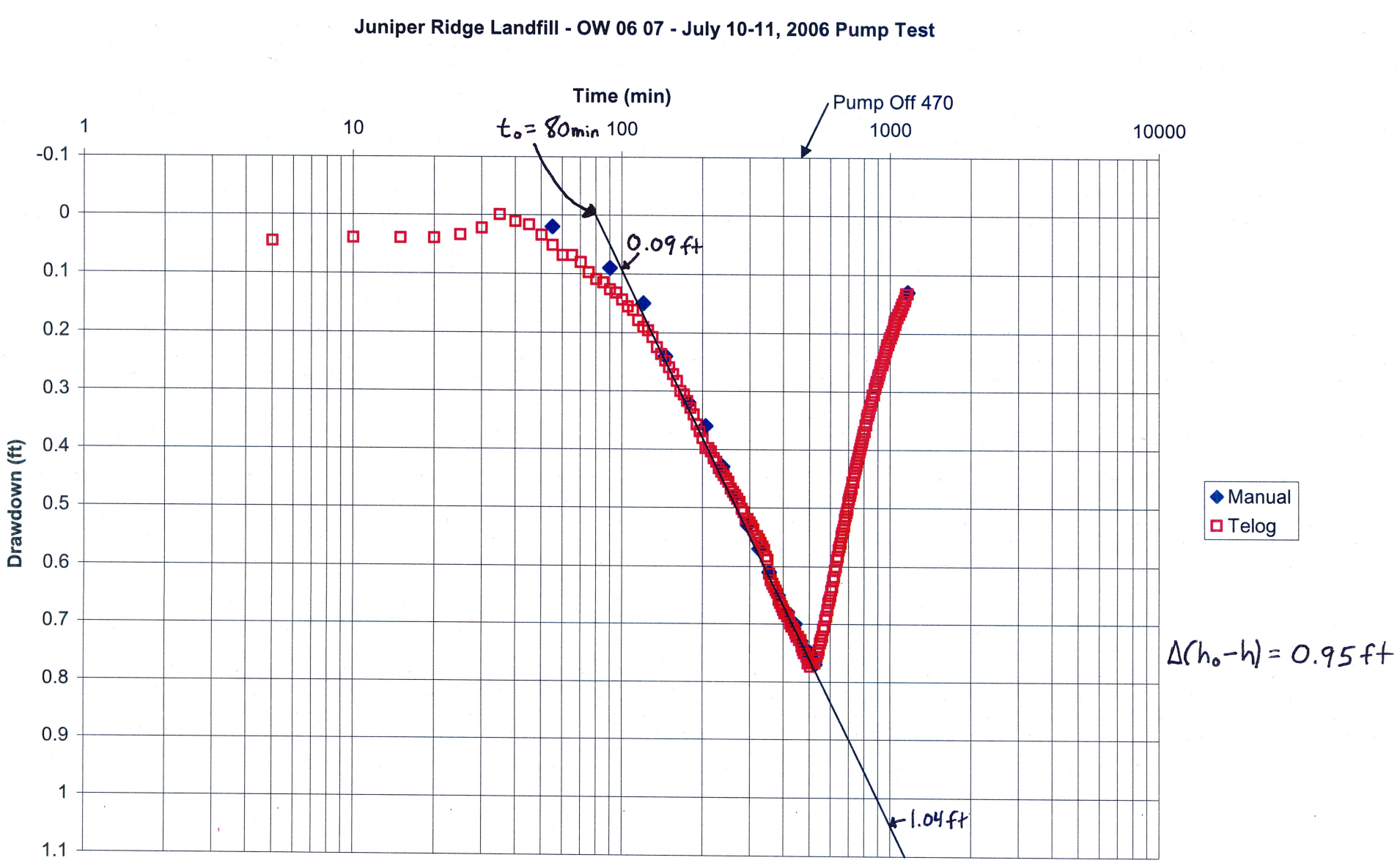

Juniper Ridge Landfill - MW 06 02 - July 10-11, 2006 Pump Test
Time (min)
1
10
100
1000
10000
Pump Off 470
Drawdown (ft)
0
5
10
15
20
25
Manual
Telog



$$T = \frac{2.3Q}{4\pi\Delta(h_o-h)} = \frac{2.3 * 36.58\ ft^3/d}{4\pi * 0.61\ ft} = 10.98\ ft^2/d = 0.12\ cm^2/s$$

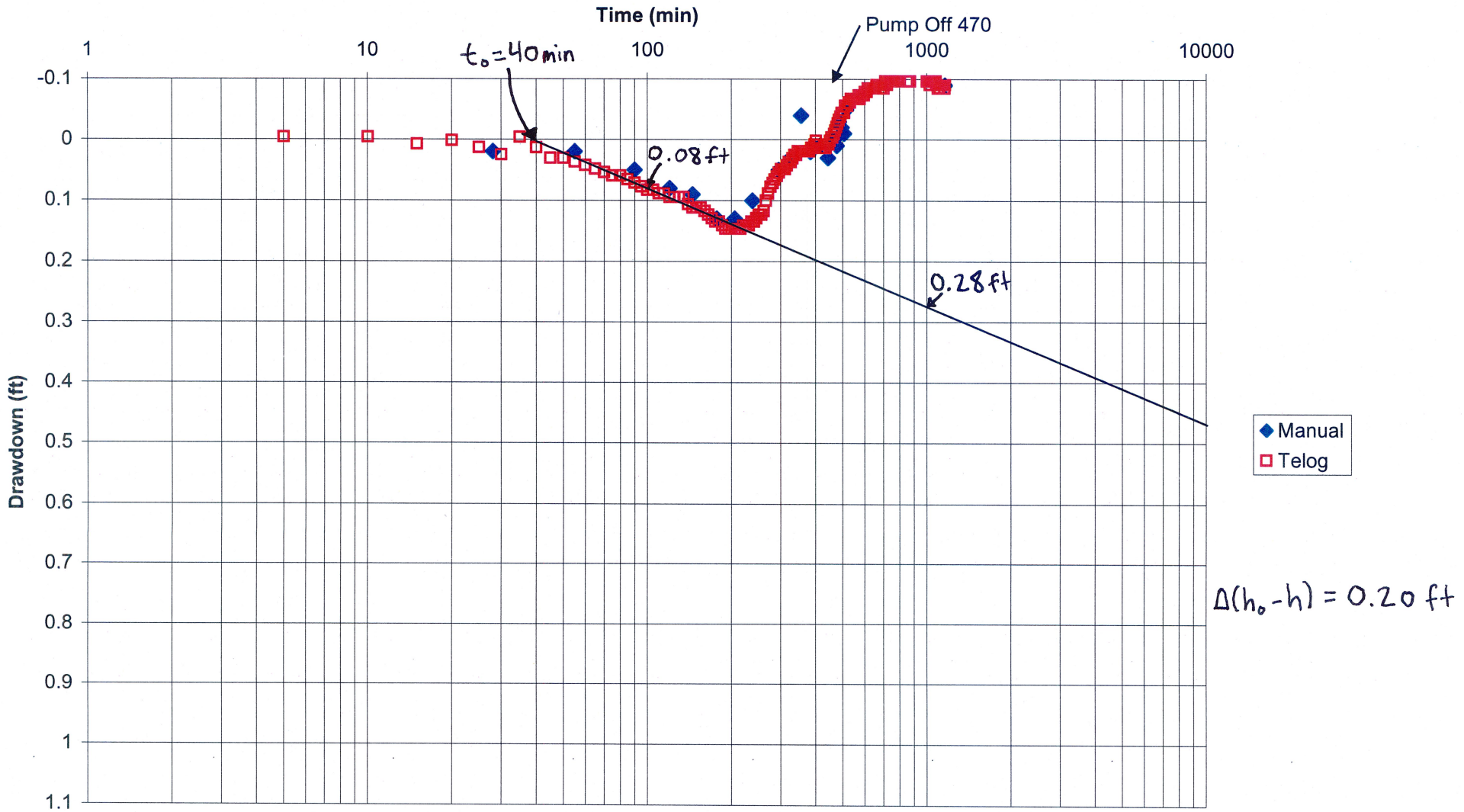
$$S = \frac{2.25Tt_o}{r^2} = \frac{2.25 * 10.98\ ft^2/d * 0.042\ d}{(50.79\ ft)^2} = 0.0004$$


Juniper Ridge Landfill - OW 06 06 - July 10-11, 2006 Pump Test
Time (min)
Pump Off 470
1
10
100
1000
10000
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
Drawdown (ft)
Manual
Telog



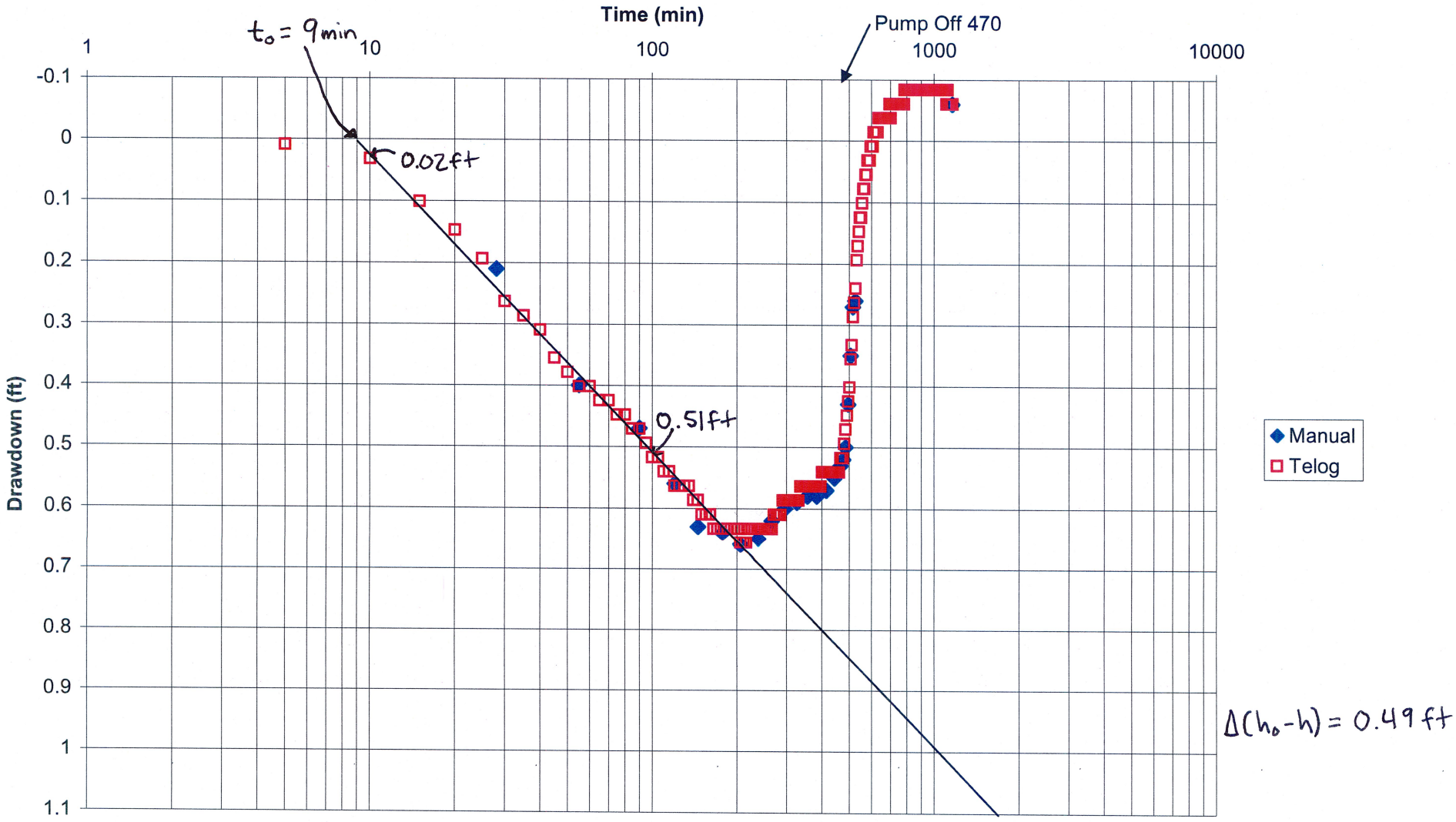
$$T = \frac{2.3Q}{4\pi\Delta(h_o - h)} = \frac{2.3 * 36.58\ ft^3/d}{4\pi * 0.95\ ft} = 7.05\ ft^2/d = 0.08\ cm^2/s$$

$$S = \frac{2.25\,T t_o}{r^2} = \frac{2.25 * 7.05\ ft^2/d * 0.056\ d}{(48.62\ ft)^2} = 0.0004$$



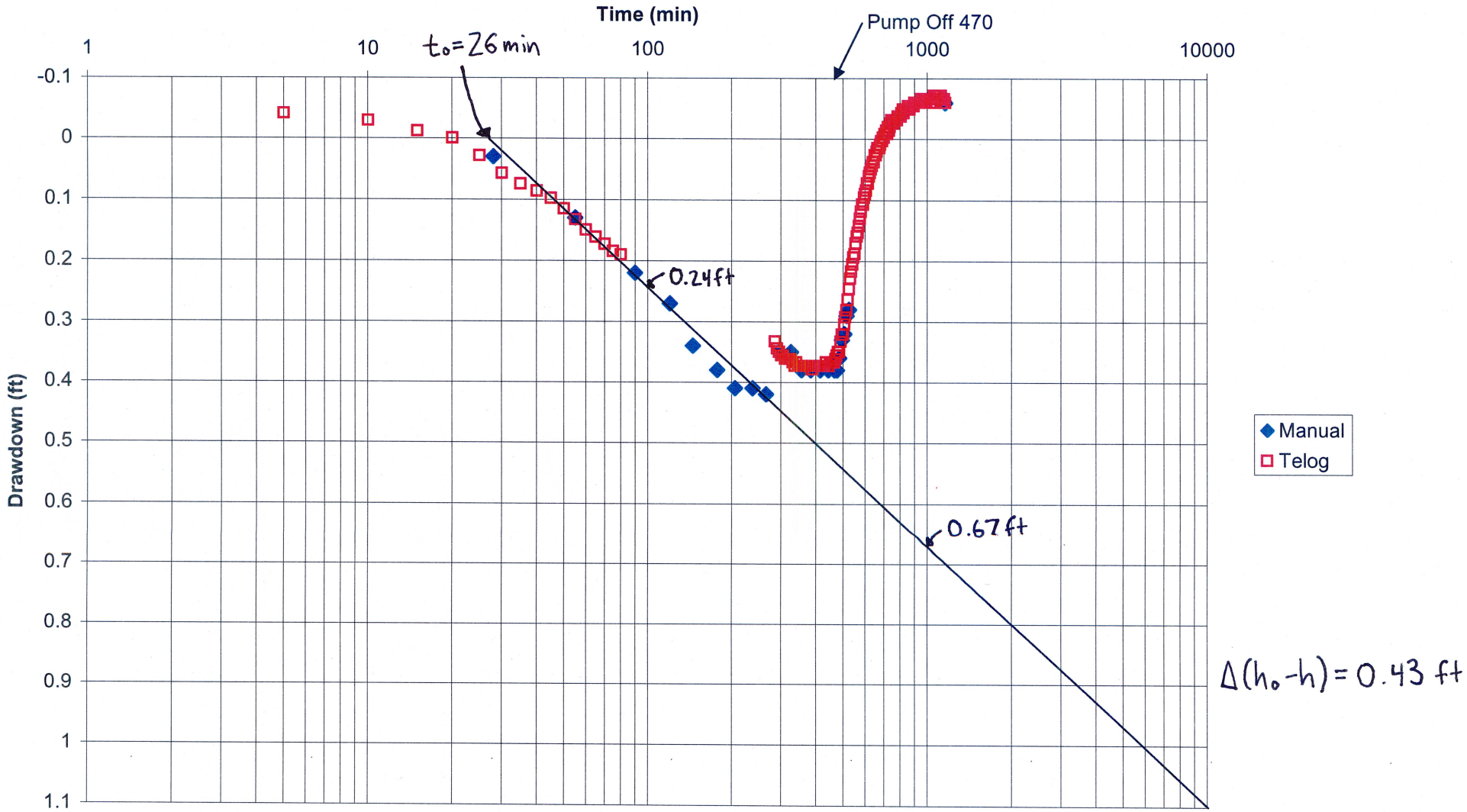
$$T = \frac{2.3Q}{4\pi\Delta(h_o-h)} = \frac{2.3 * 36.58\ ft^3/d}{4\pi * 0.20\ ft} = 33.48\ ft^2/d = 0.36\ cm^2/s$$

$$S = \frac{2.25\,T t_o}{r^2} = \frac{2.25 * 33.48\ ft^2/d * 0.028\ d}{(52.06\ ft)^2} = 0.0008$$



$$T = \frac{2.3Q}{4\pi\Delta(h_o-h)} = \frac{2.3 * 36.58\ ft^3/d}{4\pi(0.49\ ft)} = 13.66\ ft^2/d = 0.15\ cm^2/s$$

$$S = \frac{2.25Tt_o}{r^2} = \frac{2.25 * 13.66\ ft^2/d * 0.006\ d}{(50.79\ ft)^2} = 0.0001$$



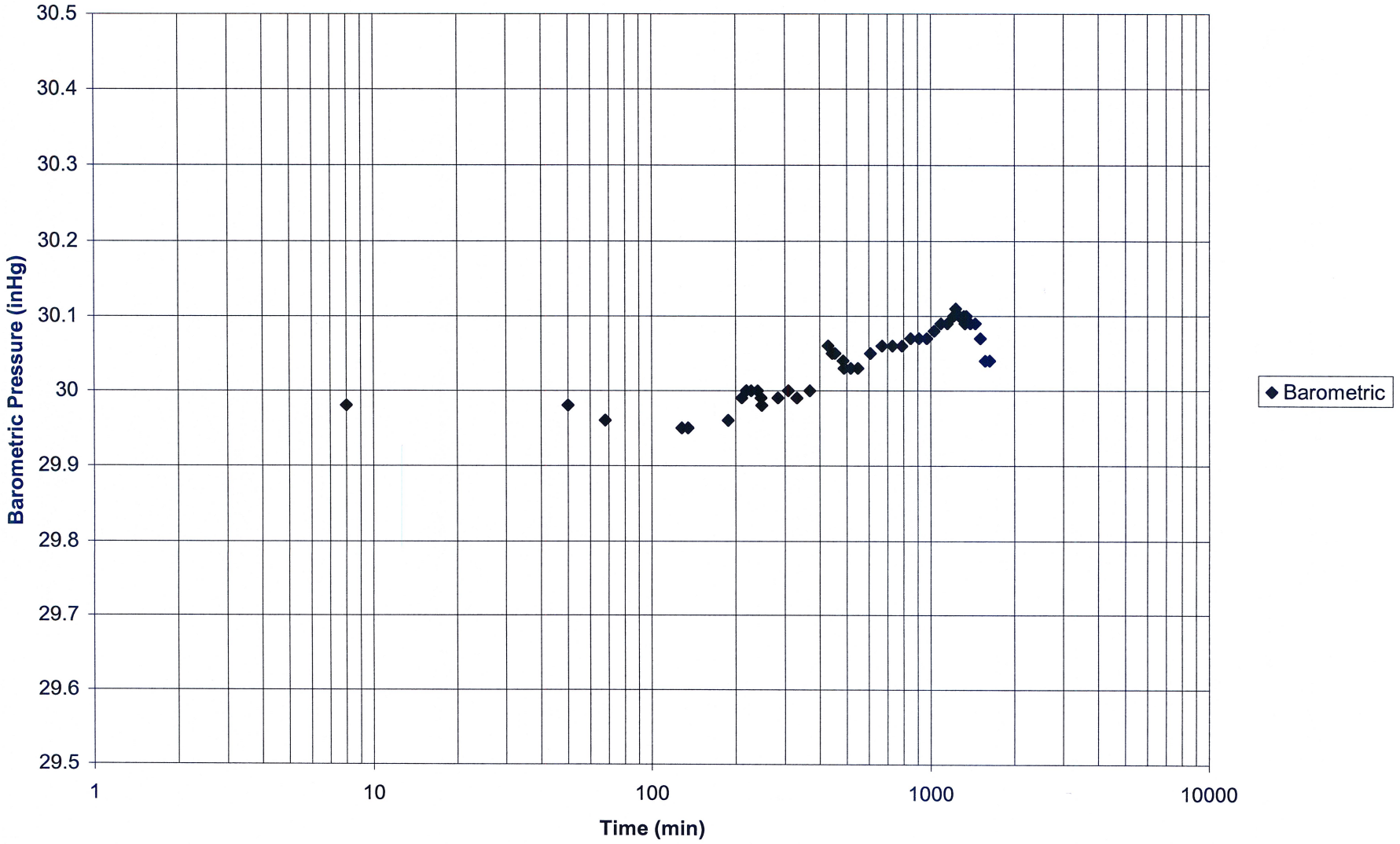
$$T = \frac{2.3Q}{4\pi\Delta(h_o-h)} = \frac{2.3 * 36.58\ ft^3/d}{4\pi * 0.43\ ft} = 15.57\ ft^2/d = 0.17\ cm/s$$

$$S = \frac{2.25Tt_o}{r^2} = \frac{2.25 * 15.57\ ft^2/d * 0.018d}{(52.37\ ft)^2} = 0.0002$$

ATTACHMENT D

WEATHER DATA

Juniper Ridge Landfill - Barometric Pressure - July 10-11, 2006 Pump Test





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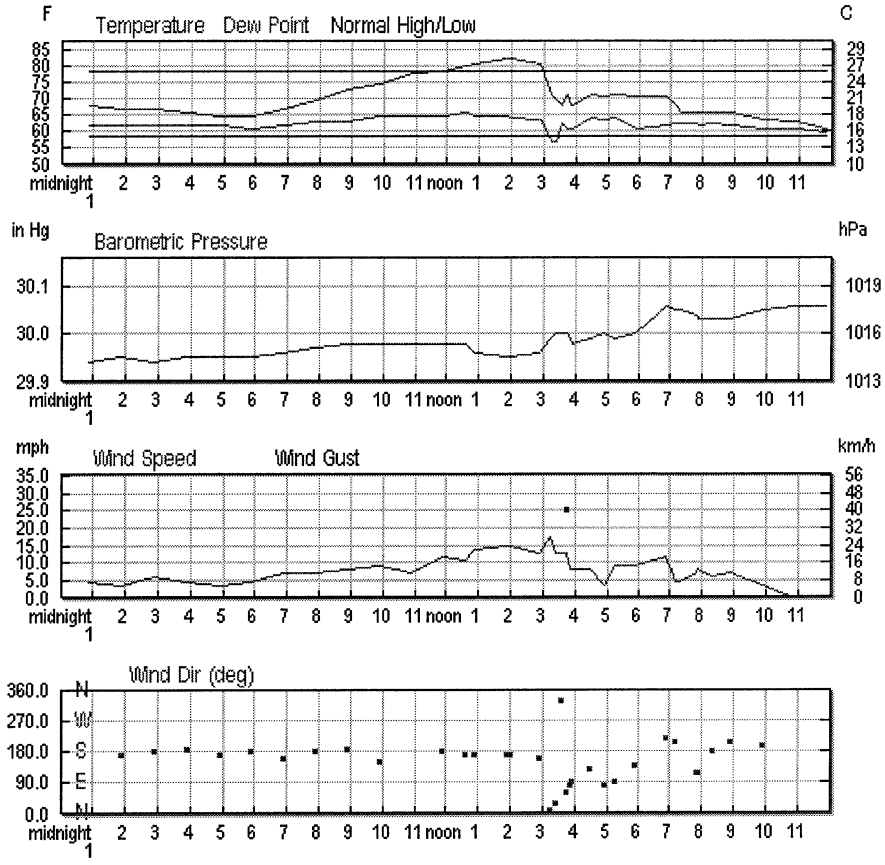
History for Bangor, ME

Monday, July 10, 2006

Daily Summary

	Actual:	Average :	Record :
Temperature:			
Mean Temperature	**72** °F / **22** °C	**69** °F / **20** °C	
Max Temperature	**83** °F / **28** °C	**79** °F / **26** °C	**96** °F / **35** °C (1937)
Min Temperature	**61** °F / **16** °C	**59** °F / **15** °C	**44** °F / **6** °C (1942)
Degree Days:			
Heating Degree Days	0	1	
Month to date heating degree days	0	10	
Since 1 July heating degree days	0	10	
Cooling Degree Days	7	5	
Month to date cooling degree days	53	40	
Year to date cooling degree days	136	89	
Growing Degree Days	22 (Base 50)		
Moisture:			
Dew Point	**62** °F / **16** °C		
Average Humidity	78		
Maximum Humidity	100		
Minimum Humidity	55		
Precipitation:			
Precipitation	**0.51** in / **1.30** cm	**0.11** in / **0.28** cm	**0.98** in / **2.49** cm (1972)
Month to date precipitation	0.90	1.10	
Year to date precipitation	23.64	20.55	
Snow:			
Snow	**0.00** in / **0.00** cm	**0.00** in / **0.00** cm	**0.00** in / **0.00** cm (2002)
Month to date snowfall	0.0	0.0	
Since 1 July snowfall	0.0	0.0	
Snow Depth	**0.00** in / **0.00** cm		
Sea Level Pressure:			
Sea Level Pressure	**29.95** in / **1014** hPa		
Wind:			
Wind Speed	**7** mph / **11** km/h (SSE)		
Max Wind Speed	**20** mph / **32** km/h		
Max Gust Speed	**25** mph / **40** km/h		
Visibility	**7** miles / **11** kilometers		
Events	Rain , Hail , Thunderstorm		

T = Trace of Precipitation, **MM** = Missing Value **Source:** NWS Daily Summary



Hourly Observations

Time (EDT):	Temp.:	Dew Point:	Humidity:	Sea Level Pressure:	Visibility:	Wind Dir:	Wind Speed:	Gust Speed:	Precip:	Events:	Conditions:
12:53 AM	68.0 °F / 20.0 °C	62.1 °F / 16.7 °C	81%	29.94 in / 1013.8 hPa	10.0 miles / 16.1 kilometers	South	4.6 mph / 7.4 km/h / 2.1 m/s	-	N/A		Scattered Clouds
1:53 AM	66.9 °F / 19.4 °C	62.1 °F / 16.7 °C	84%	29.95 in / 1014.0 hPa	10.0 miles / 16.1 kilometers	South	3.5 mph / 5.6 km/h / 1.5 m/s	-	N/A		Scattered Clouds
2:53 AM	66.9 °F / 19.4 °C	62.1 °F / 16.7 °C	84%	29.94 in / 1013.9 hPa	10.0 miles / 16.1 kilometers	South	5.8 mph / 9.3 km/h / 2.6 m/s	-	N/A		Scattered Clouds
3:53 AM	66.0 °F / 18.9 °C	62.1 °F / 16.7 °C	87%	29.95 in / 1014.0 hPa	10.0 miles / 16.1 kilometers	South	4.6 mph / 7.4 km/h / 2.1 m/s	-	N/A		Scattered Clouds
4:53 AM	64.9 °F / 18.3 °C	62.1 °F / 16.7 °C	90%	29.95 in / 1014.0 hPa	8.0 miles / 12.9 kilometers	South	3.5 mph / 5.6 km/h / 1.5 m/s	-	N/A		Scattered Clouds
5:53 AM	64.9 °F / 18.3 °C	61.0 °F / 16.1 °C	87%	29.95 in / 1014.2 hPa	6.0 miles / 9.7 kilometers	South	4.6 mph / 7.4 km/h / 2.1 m/s	-	N/A		Mostly Cloudy
6:53 AM	66.9 °F / 19.4 °C	62.1 °F / 16.7 °C	84%	29.96 in / 1014.4 hPa	7.0 miles / 11.3 kilometers	SSE	6.9 mph / 11.1 km/h / 3.1 m/s	-	N/A		Mostly Cloudy
7:53 AM	70.0 °F / 21.1 °C	63.0 °F / 17.2 °C	78%	29.97 in / 1014.8 hPa	8.0 miles / 12.9 kilometers	South	6.9 mph / 11.1 km/h / 3.1 m/s	-	N/A		Mostly Cloudy
8:53 AM	73.0 °F / 22.8 °C	63.0 °F / 17.2 °C	71%	29.98 in / 1015.2 hPa	9.0 miles / 14.5 kilometers	South	8.1 mph / 13.0 km/h / 3.6 m/s	-	N/A		Scattered Clouds
9:53 AM	75.0 °F / 23.9 °C	64.9 °F / 18.3 °C	71%	29.98 in / 1015.0 hPa	9.0 miles / 14.5 kilometers	SSE	9.2 mph / 14.8 km/h / 4.1 m/s	-	N/A		Scattered Clouds
10:53 AM	78.1 °F / 25.6 °C	64.9 °F / 18.3 °C	64%	29.98 in / 1015.1 hPa	10.0 miles / 16.1 kilometers	Variable	6.9 mph / 11.1 km/h / 3.1 m/s	-	N/A		Mostly Cloudy
11:53 AM	79.0 °F / 26.1 °C	64.9 °F / 18.3 °C	62%	29.98 in / 1015.0 hPa	10.0 miles / 16.1 kilometers	South	11.5 mph / 18.5 km/h /	-	N/A		Scattered Clouds

							5.1 m/s				
12:35 PM	80.6 °F / 27.0 °C	66.2 °F / 19.0 °C	61%	29.98 in / 1015.1 hPa	10.0 miles / 16.1 kilometers	South	10.4 mph / 16.7 km/h / 4.6 m/s	-	N/A	Thunderstorm	Thunderstorm
12:53 PM	81.0 °F / 27.2 °C	64.9 °F / 18.3 °C	58%	29.96 in / 1014.3 hPa	10.0 miles / 16.1 kilometers	South	13.8 mph / 22.2 km/h / 6.2 m/s	-	N/A	Thunderstorm	Thunderstorm
1:53 PM	82.9 °F / 28.3 °C	64.9 °F / 18.3 °C	54%	29.95 in / 1014.0 hPa	10.0 miles / 16.1 kilometers	South	15.0 mph / 24.1 km/h / 6.7 m/s	-	N/A	Thunderstorm	Thunderstorm
2:00 PM	82.4 °F / 28.0 °C	64.4 °F / 18.0 °C	54%	29.95 in / 1014.1 hPa	10.0 miles / 16.1 kilometers	South	15.0 mph / 24.1 km/h / 6.7 m/s	-	N/A		Mostly Cloudy
2:53 PM	81.0 °F / 27.2 °C	64.0 °F / 17.8 °C	56%	29.96 in / 1014.5 hPa	10.0 miles / 16.1 kilometers	SSE	12.7 mph / 20.4 km/h / 5.7 m/s	-	N/A		Mostly Cloudy
3:15 PM	71.6 °F / 22.0 °C	57.2 °F / 14.0 °C	60%	29.99 in / 1015.5 hPa	10.0 miles / 16.1 kilometers	North	17.3 mph / 27.8 km/h / 7.7 m/s	23.0 mph / 37.0 km/h / 10.3 m/s	N/A	Thunderstorm	Thunderstorm
3:23 PM	69.8 °F / 21.0 °C	57.2 °F / 14.0 °C	64%	30.00 in / 1015.8 hPa	8.0 miles / 12.9 kilometers	NNE	12.7 mph / 20.4 km/h / 5.7 m/s	-	N/A	Rain , Thunderstorm	Thunderstorms with Small Hail
3:32 PM	68.0 °F / 20.0 °C	62.6 °F / 17.0 °C	83%	30.00 in / 1015.8 hPa	1.8 miles / 2.8 kilometers	NNW	12.7 mph / 20.4 km/h / 5.7 m/s	23.0 mph / 37.0 km/h / 10.3 m/s	0.17 in / 0.4 cm	Rain , Hail , Thunderstorm	Thunderstorms with Hail
3:44 PM	71.6 °F / 22.0 °C	60.8 °F / 16.0 °C	69%	30.00 in / 1015.8 hPa	0.8 miles / 1.2 kilometers	ENE	12.7 mph / 20.4 km/h / 5.7 m/s	25.3 mph / 40.7 km/h / 11.3 m/s	0.39 in / 1.0 cm	Rain , Thunderstorm	Heavy Thunderstorms and Rain
3:51 PM	68.0 °F / 20.0 °C	60.8 °F / 16.0 °C	78%	29.99 in / 1015.5 hPa	2.0 miles / 3.2 kilometers	East	8.1 mph / 13.0 km/h / 3.6 m/s	-	0.40 in / 1.0 cm	Rain , Thunderstorm	Light Thunderstorms and Rain
3:53 PM	68.0 °F / 20.0 °C	61.0 °F / 16.1 °C	78%	29.98 in / 1015.1 hPa	3.0 miles / 4.8 kilometers	East	8.1 mph / 13.0 km/h / 3.6 m/s	-	0.40 in / 1.0 cm	Thunderstorm	Unknown
4:28 PM	71.6 °F / 22.0 °C	64.4 °F / 18.0 °C	78%	29.99 in / 1015.5 hPa	8.0 miles / 12.9 kilometers	SE	8.1 mph / 13.0 km/h / 3.6 m/s	-	N/A		Overcast
4:53 PM	71.1 °F / 21.7 °C	64.0 °F / 17.8 °C	78%	30.00 in / 1015.7 hPa	9.0 miles / 14.5 kilometers	East	3.5 mph / 5.6 km/h / 1.5 m/s	-	N/A		Overcast
5:16 PM	71.6 °F / 22.0 °C	64.4 °F / 18.0 °C	78%	29.99 in / 1015.5 hPa	9.0 miles / 14.5 kilometers	East	9.2 mph / 14.8 km/h / 4.1 m/s	-	N/A	Thunderstorm	Thunderstorm
5:53 PM	71.1 °F / 21.7 °C	61.0 °F / 16.1 °C	70%	30.00 in / 1015.8 hPa	9.0 miles / 14.5 kilometers	SE	9.2 mph / 14.8 km/h / 4.1 m/s	-	N/A	Thunderstorm	Thunderstorm
6:53 PM	71.1 °F / 21.7 °C	62.1 °F / 16.7 °C	73%	30.06 in / 1017.9 hPa	8.0 miles / 12.9 kilometers	SW	11.5 mph / 18.5 km/h / 5.1 m/s	-	N/A	Thunderstorm	Thunderstorm
7:08 PM	68.0 °F / 20.0 °C	62.6 °F / 17.0 °C	83%	30.05 in / 1017.5 hPa	1.8 miles / 2.8 kilometers	SSW	4.6 mph / 7.4 km/h / 2.1 m/s	-	0.05 in / 0.1 cm	Rain , Thunderstorm	Heavy Thunderstorms and Rain
7:18 PM	66.2 °F / 19.0 °C	62.6 °F / 17.0 °C	88%	30.05 in / 1017.5 hPa	3.0 miles / 4.8 kilometers	Variable	4.6 mph / 7.4 km/h / 2.1 m/s	-	0.06 in / 0.2 cm	Rain , Thunderstorm	Light Thunderstorms and Rain
7:49 PM	66.2 °F / 19.0 °C	62.6 °F / 17.0 °C	88%	30.04 in / 1017.2 hPa	5.0 miles / 8.0 kilometers	ESE	6.9 mph / 11.1 km/h / 3.1 m/s	-	0.11 in / 0.3 cm	Rain , Thunderstorm	Light Thunderstorms and Rain
7:53 PM	66.0 °F / 18.9 °C	62.1 °F / 16.7 °C	87%	30.03 in / 1016.8 hPa	6.0 miles / 9.7 kilometers	ESE	8.1 mph / 13.0 km/h / 3.6 m/s	-	0.11 in / 0.3 cm	Rain , Thunderstorm	Light Thunderstorms and Rain
8:20 PM	66.2 °F / 19.0 °C	62.6 °F / 17.0 °C	88%	30.03 in / 1016.8 hPa	7.0 miles / 11.3 kilometers	South	5.8 mph / 9.3 km/h / 2.6 m/s	-	0.00 in / 0.0 cm		Overcast
8:53 PM	66.0 °F / 18.9 °C	62.1 °F / 16.7 °C	87%	30.03 in / 1016.9 hPa	8.0 miles / 12.9 kilometers	SSW	6.9 mph / 11.1 km/h / 3.1 m/s	-	0.00 in / 0.0 cm		Overcast
9:53 PM	64.0 °F / 17.8 °C	61.0 °F / 16.1 °C	90%	30.05 in / 1017.5 hPa	6.0 miles / 9.7 kilometers	SSW	3.5 mph / 5.6 km/h / 1.5 m/s	-	N/A		Mostly Cloudy
10:53 PM	63.0 °F / 17.2 °C	61.0 °F / 16.1 °C	93%	30.06 in / 1017.8 hPa	4.0 miles / 6.4 kilometers	Calm	Calm	-	N/A		Mostly Cloudy
11:53 PM	61.0 °F / 16.1 °C	60.1 °F / 15.6 °C	97%	30.06 in / 1018.0 hPa	2.0 miles / 3.2 kilometers	Calm	Calm	-	N/A		Scattered Clouds

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History for Bangor, ME

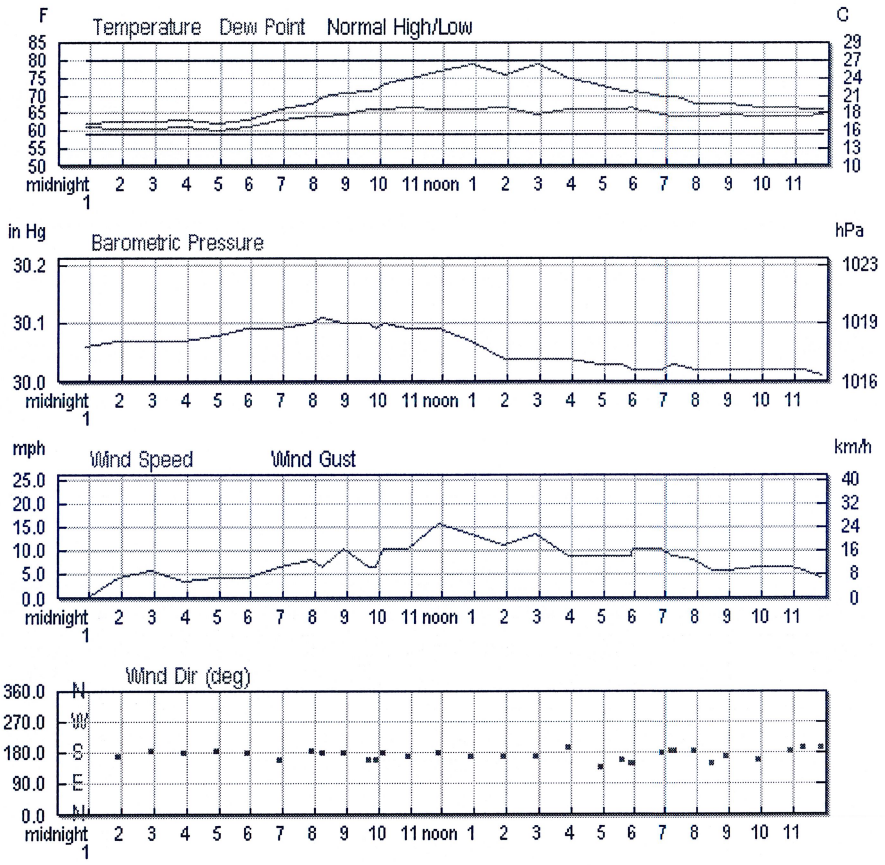
Tuesday, July 11, 2006

Daily Summary

	Actual:	Average :	Record :
Temperature:			
Mean Temperature	**71** °F / **21** °C	**69** °F / **20** °C	
Max Temperature	**79** °F / **26** °C	**80** °F / **26** °C	**94** °F / **34** °C (1935)
Min Temperature	**62** °F / **16** °C	**59** °F / **15** °C	**47** °F / **8** °C (2002)
Degree Days:			
Heating Degree Days	0	1	
Month to date heating degree days	0	11	
Since 1 July heating degree days	0	11	
Cooling Degree Days	6	5	
Month to date cooling degree days	59	45	
Year to date cooling degree days	142	94	
Growing Degree Days	20 (Base 50)		
Moisture:			
Dew Point	**61** °F / **16** °C		
Average Humidity	80		
Maximum Humidity	93		
Minimum Humidity	67		
Precipitation:			
Precipitation	**0.01** in / **0.03** cm	**0.11** in / **0.28** cm	**2.66** in / **6.76** cm (1959)
Month to date precipitation	0.91	1.21	
Year to date precipitation	23.65	20.66	
Snow:			
Snow	**0.00** in / **0.00** cm	**0.00** in / **0.00** cm	**0.00** in / **0.00** cm (2002)
Month to date snowfall	0.0	0.0	
Since 1 July snowfall	0.0	0.0	
Snow Depth	**0.00** in / **0.00** cm		
Sea Level Pressure:			
Sea Level Pressure	**30.07** in / **1018** hPa		
Wind:			
Wind Speed	**8** mph / **13** km/h (South)		
Max Wind Speed	**18** mph / **29** km/h		
Max Gust Speed	**23** mph / **37** km/h		
Visibility	**6** miles / **9** kilometers		
Events	Rain , Thunderstorm		

T = Trace of Precipitation, **MM** = Missing Value

Source: NWS Daily Summary



Hourly Observations

Time (EDT):	Temp.:	Dew Point:	Humidity:	Sea Level Pressure:	Visibility:	Wind Dir:	Wind Speed:	Gust Speed:	Precip:	Events:	Conditions:
12:53 AM	62.1 °F / 16.7 °C	61.0 °F / 16.1 °C	96%	30.06 in / 1018.0 hPa	4.0 miles / 6.4 kilometers	Calm	Calm	-	N/A		Clear
1:53 AM	62.6 °F / 17.0 °C	60.8 °F / 16.0 °C	94%	30.07 in / 1018.2 hPa	3.0 miles / 4.8 kilometers	South	4.6 mph / 7.4 km/h / 2.1 m/s	-	N/A		Clear
2:53 AM	62.6 °F / 17.0 °C	60.8 °F / 16.0 °C	94%	30.07 in / 1018.2 hPa	3.0 miles / 4.8 kilometers	South	5.8 mph / 9.3 km/h / 2.6 m/s	-	N/A		Clear
3:53 AM	63.0 °F / 17.2 °C	61.0 °F / 16.1 °C	93%	30.07 in / 1018.1 hPa	2.5 miles / 4.0 kilometers	South	3.5 mph / 5.6 km/h / 1.5 m/s	-	N/A		Partly Cloudy
4:53 AM	62.1 °F / 16.7 °C	60.1 °F / 15.6 °C	93%	30.08 in / 1018.4 hPa	2.5 miles / 4.0 kilometers	South	4.6 mph / 7.4 km/h / 2.1 m/s	-	0.01 in / 0.0 cm		Scattered Clouds
5:53 AM	63.0 °F / 17.2 °C	61.0 °F / 16.1 °C	93%	30.09 in / 1018.8 hPa	1.8 miles / 2.8 kilometers	South	4.6 mph / 7.4 km/h / 2.1 m/s	-	N/A		Scattered Clouds
6:53 AM	66.0 °F / 18.9 °C	63.0 °F / 17.2 °C	90%	30.09 in / 1018.9 hPa	2.0 miles / 3.2 kilometers	SSE	6.9 mph / 11.1 km/h / 3.1 m/s	-	N/A		Scattered Clouds
7:53 AM	68.0 °F / 20.0 °C	64.0 °F / 17.8 °C	87%	30.10 in / 1019.2 hPa	2.5 miles / 4.0 kilometers	South	8.1 mph / 13.0 km/h / 3.6 m/s	-	N/A		Scattered Clouds
8:14 AM	69.8 °F / 21.0 °C	64.4 °F / 18.0 °C	83%	30.11 in / 1019.5 hPa	3.0 miles / 4.8 kilometers	South	6.9 mph / 11.1 km/h / 3.1 m/s	-	N/A		Haze
8:53 AM	71.1 °F / 21.7 °C	64.9 °F / 18.3 °C	81%	30.10 in / 1019.2 hPa	4.0 miles / 6.4 kilometers	South	10.4 mph / 16.7 km/h / 4.6 m/s	-	N/A		Haze
9:40 AM	71.6 °F / 22.0 °C	66.2 °F / 19.0 °C	83%	30.10 in / 1019.2 hPa	4.0 miles / 6.4 kilometers	SSE	6.9 mph / 11.1 km/h / 3.1 m/s	-	N/A		Haze
9:53 AM	72.0 °F / 22.2 °C	66.0 °F / 18.9 °C	81%	30.09 in / 1018.9 hPa	4.0 miles / 6.4 kilometers	SSE	6.9 mph / 11.1 km/h / 3.1 m/s	-	N/A		Haze

10:07 AM	73.4 °F / 23.0 °C	66.2 °F / 19.0 °C	78%	30.10 in / 1019.2 hPa	4.0 miles / 6.4 kilometers	South	10.4 mph / 16.7 km/h / 4.6 m/s	-	N/A	Haze
10:53 AM	75.0 °F / 23.9 °C	66.9 °F / 19.4 °C	76%	30.09 in / 1019.0 hPa	5.0 miles / 8.0 kilometers	South	10.4 mph / 16.7 km/h / 4.6 m/s	-	N/A	Haze
11:53 AM	77.0 °F / 25.0 °C	66.0 °F / 18.9 °C	69%	30.09 in / 1019.0 hPa	6.0 miles / 9.7 kilometers	South	16.1 mph / 25.9 km/h / 7.2 m/s	-	N/A	Haze
12:53 PM	79.0 °F / 26.1 °C	66.0 °F / 18.9 °C	64%	30.07 in / 1018.2 hPa	7.0 miles / 11.3 kilometers	South	13.8 mph / 22.2 km/h / 6.2 m/s	-	N/A	Haze
1:53 PM	75.9 °F / 24.4 °C	66.9 °F / 19.4 °C	74%	30.04 in / 1017.2 hPa	6.0 miles / 9.7 kilometers	South	11.5 mph / 18.5 km/h / 5.1 m/s	-	0.00 in / 0.0 cm	Rain	Light Rain
2:53 PM	79.0 °F / 26.1 °C	64.9 °F / 18.3 °C	62%	30.04 in / 1017.3 hPa	10.0 miles / 16.1 kilometers	South	13.8 mph / 22.2 km/h / 6.2 m/s	-	0.00 in / 0.0 cm		Mostly Cloudy
3:53 PM	75.0 °F / 23.9 °C	66.0 °F / 18.9 °C	73%	30.04 in / 1017.3 hPa	8.0 miles / 12.9 kilometers	SSW	9.2 mph / 14.8 km/h / 4.1 m/s	-	N/A		Mostly Cloudy
4:53 PM	73.0 °F / 22.8 °C	66.0 °F / 18.9 °C	79%	30.03 in / 1016.8 hPa	7.0 miles / 11.3 kilometers	SE	9.2 mph / 14.8 km/h / 4.1 m/s	-	0.00 in / 0.0 cm		Mostly Cloudy
5:35 PM	71.6 °F / 22.0 °C	66.2 °F / 19.0 °C	83%	30.03 in / 1016.8 hPa	5.0 miles / 8.0 kilometers	SSE	9.2 mph / 14.8 km/h / 4.1 m/s	-	0.00 in / 0.0 cm	Rain , Thunderstorm	Light Thunderstorms and Rain
5:53 PM	71.1 °F / 21.7 °C	66.9 °F / 19.4 °C	87%	30.02 in / 1016.4 hPa	5.0 miles / 8.0 kilometers	SSE	9.2 mph / 14.8 km/h / 4.1 m/s	-	0.00 in / 0.0 cm	Thunderstorm	Mostly Cloudy
5:56 PM	71.6 °F / 22.0 °C	66.2 °F / 19.0 °C	83%	30.02 in / 1016.5 hPa	5.0 miles / 8.0 kilometers	SSE	10.4 mph / 16.7 km/h / 4.6 m/s	-	N/A		Mostly Cloudy
6:53 PM	70.0 °F / 21.1 °C	64.9 °F / 18.3 °C	84%	30.02 in / 1016.6 hPa	9.0 miles / 14.5 kilometers	South	10.4 mph / 16.7 km/h / 4.6 m/s	-	N/A		Mostly Cloudy
7:10 PM	69.8 °F / 21.0 °C	64.4 °F / 18.0 °C	83%	30.03 in / 1016.8 hPa	8.0 miles / 12.9 kilometers	South	9.2 mph / 14.8 km/h / 4.1 m/s	-	N/A		Mostly Cloudy
7:17 PM	69.8 °F / 21.0 °C	64.4 °F / 18.0 °C	83%	30.03 in / 1016.8 hPa	7.0 miles / 11.3 kilometers	South	9.2 mph / 14.8 km/h / 4.1 m/s	-	N/A		Overcast
7:53 PM	68.0 °F / 20.0 °C	64.0 °F / 17.8 °C	87%	30.02 in / 1016.5 hPa	10.0 miles / 16.1 kilometers	South	8.1 mph / 13.0 km/h / 3.6 m/s	-	N/A		Overcast
8:25 PM	68.0 °F / 20.0 °C	64.4 °F / 18.0 °C	88%	30.02 in / 1016.5 hPa	10.0 miles / 16.1 kilometers	SSE	5.8 mph / 9.3 km/h / 2.6 m/s	-	N/A		Overcast
8:53 PM	68.0 °F / 20.0 °C	64.9 °F / 18.3 °C	90%	30.02 in / 1016.6 hPa	10.0 miles / 16.1 kilometers	South	5.8 mph / 9.3 km/h / 2.6 m/s	-	N/A		Overcast
9:53 PM	66.9 °F / 19.4 °C	64.0 °F / 17.8 °C	90%	30.02 in / 1016.6 hPa	10.0 miles / 16.1 kilometers	SSE	6.9 mph / 11.1 km/h / 3.1 m/s	-	N/A		Overcast
10:53 PM	66.9 °F / 19.4 °C	64.0 °F / 17.8 °C	90%	30.02 in / 1016.5 hPa	9.0 miles / 14.5 kilometers	South	6.9 mph / 11.1 km/h / 3.1 m/s	-	N/A		Overcast
11:19 PM	66.2 °F / 19.0 °C	64.4 °F / 18.0 °C	94%	30.02 in / 1016.5 hPa	8.0 miles / 12.9 kilometers	SSW	5.8 mph / 9.3 km/h / 2.6 m/s	-	N/A		Overcast
11:53 PM	66.0 °F / 18.9 °C	64.9 °F / 18.3 °C	96%	30.01 in / 1016.0 hPa	2.0 miles / 3.2 kilometers	SSW	4.6 mph / 7.4 km/h / 2.1 m/s	-	N/A		Overcast

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ATTACHMENT E

ANISOTROPIC TRANSMISSIVITY ANALYSES

ANISOTROPIC TRANSMISSIVITY ESTIMATION

(after Papadopoulos, 1965)

WEST OLD TOWN LANDFILL DATA FROM PUMP TEST ON MW-06-02

COMBINING WELLS OW-06-05,08,10

average pumping rate:

$x_0 := 45$ ft $\quad y_0 := 22$ ft $\quad Q := 38.4$ ft^3/day

$x_1 := 12 \quad y_1 := 50$

$x_2 := -37 \quad y_2 := 36$

$to_0 := \frac{60}{1440}$ day $\quad \Delta s := .61$ ft/ $\log_{10}$ cycle

$to_1 := \frac{39}{1440}$ day

$to_2 := \frac{26}{1440}$ day

$a := \frac{2.303 \cdot Q}{4\pi \cdot \Delta s}$ ft^2/day

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} \left(y_0\right)^2 & \left(x_0\right)^2 & -2 \cdot \left(x_0 \cdot y_0\right) \\ \left(y_1\right)^2 & \left(x_1\right)^2 & -2 \cdot \left(x_1 \cdot y_1\right) \\ \left(y_2\right)^2 & \left(x_2\right)^2 & -2 \cdot \left(x_2 \cdot y_2\right) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$S := \frac{1}{a} \cdot \sqrt{A \cdot B - C^2}$ $S = 2.506 \times 10^{-4}$

$Txx := \frac{A}{S}$ $Txx = 9.402$

$Tyy := \frac{B}{S}$ $Tyy = 17.134$

$Txy := \frac{C}{S}$ $Txy = -5.291$

$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right]$ $T\xi = 19.821$ ft²/day

$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right]$ $T\eta = 6.715$ ft²/day

$T\xi \cdot \frac{900}{1440 \cdot 60} = 0.206$ cm²/sec

$T\eta \cdot \frac{900}{1440 \cdot 60} = 0.07$ cm²/sec

$\theta prime := \operatorname{atan}\left(\frac{T\xi - Txx}{Txy}\right)$ $\frac{\theta prime \cdot 180}{\pi} = -63.079$ degrees

Note: negative clockwise from True North

COMBINING WELLS OW-06-05,07,10

$x_0 := 45$ ft $y_0 := 22$ ft

$x_1 := 32$ $y_1 := 36$

$x_2 := -37$ $y_2 := 36$

$to_0 := \frac{60}{1440}$ day $\Delta s := .66$ ft/ $\log_{10}$ cycle

$to_1 := \frac{80}{1440}$ day

$to_2 := \frac{26}{1440}$ day

$$a := \frac{2.303 \cdot Q}{4\pi \cdot \Delta s} \quad ft^2/day$$

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} \left(y_0\right)^2 & \left(x_0\right)^2 & -2 \cdot \left(x_0 \cdot y_0\right) \\ \left(y_1\right)^2 & \left(x_1\right)^2 & -2 \cdot \left(x_1 \cdot y_1\right) \\ \left(y_2\right)^2 & \left(x_2\right)^2 & -2 \cdot \left(x_2 \cdot y_2\right) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$$S := \frac{1}{a} \cdot \sqrt{A \cdot B - C^2} \qquad S = 2.403 \times 10^{-4}$$

$$Txx := \frac{A}{S} \qquad Txx = 24.266$$

$$Tyy := \frac{B}{S} \qquad Tyy = 7.705$$

$$Txy := \frac{C}{S} \qquad Txy = -8.559$$

$$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\xi = 27.894 \ ft^2/day$$

$$T\xi \cdot \frac{900}{1440 \cdot 60} = 0.291 \quad cm^2/sec$$

$$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\eta = 4.076 \ ft^2/day$$

$$T\eta \cdot \frac{900}{1440 \cdot 60} = 0.042 \quad cm^2/sec$$

$$\theta prime := atan\left(\frac{T\xi - Txx}{Txy}\right) \qquad \frac{\theta prime \cdot 180}{\pi} = -22.974 \quad degrees$$

COMBINING WELLS OW-06-05,09,10

$x_0 := 45$ ft $\quad y_0 := 22$ ft

$x_1 := -3 \quad y_1 := 52$

$x_2 := -37 \quad y_2 := 36$

$to_0 := \frac{60}{1440}$ day $\quad \Delta s := .51$ ft/ $\log_{10}$ cycle

$to_1 := \frac{9}{1440}$ day

$to_2 := \frac{26}{1440}$ day

$a := \frac{2.303 \cdot Q}{4\pi \cdot \Delta s}$ ft^2/day

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} \left(y_0\right)^2 & \left(x_0\right)^2 & -2 \cdot \left(x_0 \cdot y_0\right) \\ \left(y_1\right)^2 & \left(x_1\right)^2 & -2 \cdot \left(x_1 \cdot y_1\right) \\ \left(y_2\right)^2 & \left(x_2\right)^2 & -2 \cdot \left(x_2 \cdot y_2\right) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$S := \frac{1}{a} \cdot \sqrt{A \cdot B - C^2}$ $\quad S = 1.813 \times 10^{-4}$

$Txx := \frac{A}{S}$ $\quad Txx = 6.184$

$Tyy := \frac{B}{S}$ $\quad Tyy = 39.792$

$Txy := \frac{C}{S}$ $\quad Txy = -7.46$

$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right]$ $\quad T\xi = 41.374$ ft²/day

$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right]$ $\quad T\xi \cdot \frac{900}{1440 \cdot 60} = 0.431$ cm²/sec

$T\eta = 4.602$ ft²/day

$\theta prime := \operatorname{atan}\left(\frac{T\xi - Txx}{Txy}\right)$ $\quad \frac{\theta prime \cdot 180}{\pi} = -78.03$ degrees $\quad T\eta \cdot \frac{900}{1440 \cdot 60} = 0.048$ cm²/sec

---

COMBINING WELLS OW-06-07,08,10

$x_0 := -37$ ft $\quad y_0 := 36$ ft

$x_1 := 12 \quad y_1 := 50$

$x_2 := 32 \quad y_2 := 36$

$to_0 := \frac{26}{1440}$ day $\quad \Delta s := .53$ ft/ $\log_{10}$ cycle

$to_1 := \frac{39}{1440}$ day

$to_2 := \frac{80}{1440}$ day

$a := \frac{2.303 \cdot Q}{4\pi \cdot \Delta s}$ ft²/day

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} (y_0)^2 & (x_0)^2 & -2 \cdot (x_0 \cdot y_0) \\ (y_1)^2 & (x_1)^2 & -2 \cdot (x_1 \cdot y_1) \\ (y_2)^2 & (x_2)^2 & -2 \cdot (x_2 \cdot y_2) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$$S := \frac{1}{a} \cdot \sqrt{A \cdot B - C^2} \qquad S = 1.878 \times 10^{-4}$$

$$Txx := \frac{A}{S} \qquad Txx = 10.025$$

$$Tyy := \frac{B}{S} \qquad Tyy = 57.027$$

$$Txy := \frac{C}{S} \qquad Txy = -19.884$$

$$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\xi = 64.31 \quad ft^2/day$$

$$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\xi \cdot \frac{900}{1440 \cdot 60} = 0.67 \quad cm^2/sec$$

$$T\eta = 2.742 \quad ft^2/day$$

$$\theta prime := atan\left(\frac{T\xi - Txx}{Txy}\right) \qquad \frac{\theta prime \cdot 180}{\pi} = -69.883 \quad degrees \qquad T\eta \cdot \frac{900}{1440 \cdot 60} = 0.029 \quad cm^2/sec$$

COMBINING WELLS OW-06-07,09,10

$x_0 := -37\ ft \qquad y_0 := 36\ ft$

$x_1 := -3 \qquad y_1 := 52$

$x_2 := 32 \qquad y_2 := 36$

$$to_0 := \frac{26}{1440} \quad day \qquad \Delta s := .63 \quad ft/\log_{10} cycle$$

$$to_1 := \frac{9}{1440} \quad day$$

$$to_2 := \frac{80}{1440} \quad day$$

$$a := \frac{2.303 \cdot Q}{4\pi \cdot \Delta s} \quad ft^2/day$$

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} \left(y_0\right)^2 & \left(x_0\right)^2 & -2 \cdot \left(x_0 \cdot y_0\right) \\ \left(y_1\right)^2 & \left(x_1\right)^2 & -2 \cdot \left(x_1 \cdot y_1\right) \\ \left(y_2\right)^2 & \left(x_2\right)^2 & -2 \cdot \left(x_2 \cdot y_2\right) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$$S := \frac{1}{a} \cdot \sqrt{A \cdot B - C^2} \qquad S = 4.988 \times 10^{-5}$$

$$Txx := \frac{A}{S} \qquad Txx = 18.643$$

$$Tyy := \frac{B}{S} \qquad Tyy = 160.793$$

$$Txy := \frac{C}{S} \qquad Txy = -53.599$$

$$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\xi = 178.737 \quad ft^2/day$$

$$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\xi \cdot \frac{900}{1440 \cdot 60} = 1.862 \quad cm^2/sec$$

$$T\eta = 0.698 \quad ft^2/day$$

$$\theta prime := atan\left(\frac{T\xi - Txx}{Txy}\right) \qquad T\eta \cdot \frac{900}{1440 \cdot 60} = 7.272 \times 10^{-3} \quad cm^2/sec$$

$$\frac{\theta prime \cdot 180}{\pi} = -71.49 \quad degrees$$

APPENDIX K

BEDROCK OUTCROP MAPPING DATA

TABLE K-1

BEDROCK OUTCROP OC-AG FRACTURE SURVEY
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

Fracture ID	Number of Intersecting Fractures	Azimuth (1)(2)	Dip (1)
1	2	72°	12°E
2	2	134°	75°W
3	1	-	-
4	3	-	-
5	1	-	-
6	2	-	-
7	2	-	-
8	10	108°	28°E
9	1	-	-
10	5	-	-
11	1	-	-
12	3	-	-
13	3	142°	62°W
14	2	-	-
15	3	-	-
16	4	-	-
17	4	-	-
18	6	-	-
19	3	-	-
20	1	-	-
21	5	108°	25°E
22	4	-	-
23	1	-	-
24	6	-	-
25	6	-	-
26	2	-	-
27	5	-	-
28	7	23°	30°W
29	3	-	-
30	16	118°	79°E
31	17	116°	79°E
32	12	-	-
33	6	-	-
34	7	-	-
35	4	94°	34°E
36	3	-	-
37	4	-	-
38	2	-	-
39	3	-	-
40	2	-	-
41	2	-	-
42	4	-	-
43	5	142°	23°W
44	4	-	-
45	3	-	-
46	4	-	-
47	5	162°	50°E
48	1	-	-
49	4	-	-
50	2	-	-
51	5	95°	73°E
52	2	120°	82°E
53	15	116°	84°E
54	8	112°	72°E
55	4	-	-
56	4	-	-
57	3	-	-
58	3	-	-
59	5	-	-
60	4	154°	70°W
61	3	160°	83°W
62	3	-	-
63	4	150°	7°W
64	2	-	-
65	2	-	-
66	5	-	-
67	2	101°	75°E
68	Outcrop Face	106°	79°W

Notes:
1. Fractures without azimuths and dips displayed were linear features not accessible for planar measurements.
2. Azimuth relative to True North.
3. See Figure 3-3 for fracture location.

TABLE K-2

SUPPLEMENTAL AZIMUTH AND DIP MEASUREMENTS
ON OUTCROP OC-AG
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

Fracture ID	Azimuth	Dip
1A	116°	62°E
2A	68°	8°W
3A	98°	7°E
4A	76°	82°E
5A	53°	76°E
6A	58°	79°W
7A	60°	79°W
8A	54°	79°W
9A	6°	18°W
10A	162°	65°E
11A	136°	52°E
12A	124°	68°E
13A	159°	50°W
14A	179°	83°E
15A	118°	62°E
16A	168°	63°E
17A	61°	78°W
18A	44°	65°W
19A	26°	22°E
20A	82°	43°W
21A	70°	69°E
22A	155°	85°E
23A	160°	64°W
24A	62°	72°W
25A	63°	71°W
26A	161°	63°E
27A	60°	75°W
28A	161°	61°W
29A	128°	81°E
30A	42°	41°W

Fracture ID	Azimuth	Dip
31A	118°	72°E
32A	165°	62°W
33A	128°	76°E
34A	41°	27°W
35A	107°	73°E
36A	38°	73°E
37A	34°	41°E
38A	40°	67°W
39A	116°	79°E
40A	32°	33°W
41A	133°	48°E
42A	39°	76°E
43A	114°	79°E
44A	59°	72°E
45A	37°	80°E
46A	165°	73°W
47A	125°	53°E
48A	30°	20°E
49A	173°	52°W
50A	47°	7°W
51A	116°	81°E
52A	43°	81°E
53A	133°	51°E
54A	67°	30°W
55A	15°	60°W
56A	132°	49°E
57A	50°	70°E
58A	40°	81°E
59A	134°	82°E
60A	11°	8°E

Note
Azimuth relative True North.

APPENDIX L

ELECTRICAL EARTH RESISTIVITY AND VLF-EM GEOPHYSICAL SURVEY REPORTS

ELECTRICAL RESISTIVITY AND VLF EM SURVEYS AT THE WEST OLD LANDFILL SITE, OLD TOWN, MAINE

For:

SEVEE & MAHER ENGINEERS

Northeast Geophysical Services
4 Union Street, Suite 3
Bangor, Maine 04401
December, 2004

ELECTRICAL RESISTIVITY AND VLF EM SURVEYS AT THE WEST OLD LANDFILL SITE, OLD TOWN, MAINE

INTRODUCTION

At the request of Sevee & Maher Engineers, Inc. electrical resistivity and VLF EM surveys were completed by Northeast Geophysical Services (NGS) at the West Old Town Landfill site in Old Town, Maine. Three survey lines totaling 6,628 linear feet (2,020 meters) were surveyed using both geophysical methods. Fieldwork was done on October 8th, 19th, 25th-28th and November 10th, 2004 by Rudy Rawcliffe, Mike Scully and John Breedlove of NGS. The results of the surveys will be used to assist in the selection of well drilling locations. This report describes the equipment and methods used and the results of the survey. Vertical profiles that show the modeled 2-D resistivity for each survey line are included with the report.

LOCATION AND SITE CONDITIONS

The three survey lines are located in the wooded area to the north of the West Old Town Landfill in Old Town, Maine and trend generally east to west. Line cutting was done on each line and pin flags were placed at 20-meter intervals. Sevee & Maher engineers later did an elevation survey at selected points on each line.

Line 1 is located roughly 200 to 300 feet north of the northern fence that surrounds the landfill. Line 2 is located about 1,100 feet north of Line 1 and Line 3 is located about 900 feet north of Line 2. Lines 1 and 2 both cross the paved access road. Buried and overhead utility lines located by the access road affected the resistivity and VLF measurements in this immediate area. At the time of the survey the soil was generally moist this benefited the survey because the electrodes made good electrical contact with the ground.

SUMMARY OF RESULTS

The interpreted resistivity data are presented in the appendix as colorized vertical profiles of the modeled resistivity for each of the three survey lines. The lowest resistivities, which are shown in blue, are interpreted to represent saturated clay/silt soils. The highest resistivities, shown in dark red-brown, are interpreted to represent dry soil or bedrock. Intermediate colors (yellows) are interpreted to represent intermediate conditions, i.e. - moist sandy or gravel soils or saturated fractured bedrock.

The VLF survey detected a few generally weak to moderate anomalies along the survey lines. The locations of detected anomalous VLF responses are indicated on the profiles as Vs.

METHODS AND INSTRUMENTATION

Electrical Resistivity

The resistivity data were collected using an ABEM Terrameter SAS 1000 resistivity meter with an ABEM LUND ES464 electrode selector. This is an automated multi-electrode resistivity system. The survey was conducted using the dipole-dipole array. The dipole-dipole

configuration consists of a pair of current electrodes (C1-C2) followed in line by a pair of potential electrodes (P1-P2). Depth of investigation is determined by the spacing width between the electrode pairs with the wider electrode spacing penetrating more deeply into the earth.

VLF EM:

A Geonics EM-16 VLF instrument was used for the survey. This instrument measures the inphase and quadrature components of the electromagnetic field that is produced by VLF transmitters. Readings were taken at 20-meter intervals along the survey lines.

At the West Old Town landfill site the Cutler VLF transmitter station was used for all three VLF survey lines. Cutler is located east of the site at approximately 130^0 from magnetic north. So, in order to receive at least 50% of the Cutler VLF signal a conductor would need to have a strike of between 70^0 and 190^0 from magnetic north. North-northeasterly trending conductors would probably not be detected by this VLF survey

ELECTRICAL RESISTIVITY SURVEY RESULTS

The data were interpreted using the RES2DINV interpretation software written by M.H. Loke. This program creates a 2-dimensional model of the subsurface resistivity based on the apparent resistivities measured at the surface. The effectiveness of the model to match the surface measurements is calculated as a percentage of the root-mean-square (% RMS) difference between the modeled and actual measurements. In general, a RMS value of 10% or less is considered a close match between the model and field measurements. At the West Old Town site the RMS values for the models was generally good, averaging under 6%. The exception was Line 1 East, which had an RMS value of 9.9%.

The interpreted data was then contoured using the Surfer contouring program by Golden Software and presented as colorized vertical sections of apparent resistivity for each line. The colors in these sections depict the modeled resistivity with light orange-red to dark red-brown representing areas of high resistivity (2,000 to >10,000 ohmmeters) and low resistivities (below 200 ohmmeters) shown in blue shades. Resistivities from 200 to 2,000 ohmmeters are represented by white to yellow tones.

The areas of high resistivity (greater than 2,000 ohmmeters) are interpreted to represent dry or gravel soil or massive bedrock. Low resistivities of below 200 ohmmeters are interpreted to represent saturated clayey soils. Areas of intermediate resistivity (200 to 2,000 ohmmeters) are interpreted to represent saturated sandy or gravel soil or saturated fractured bedrock.

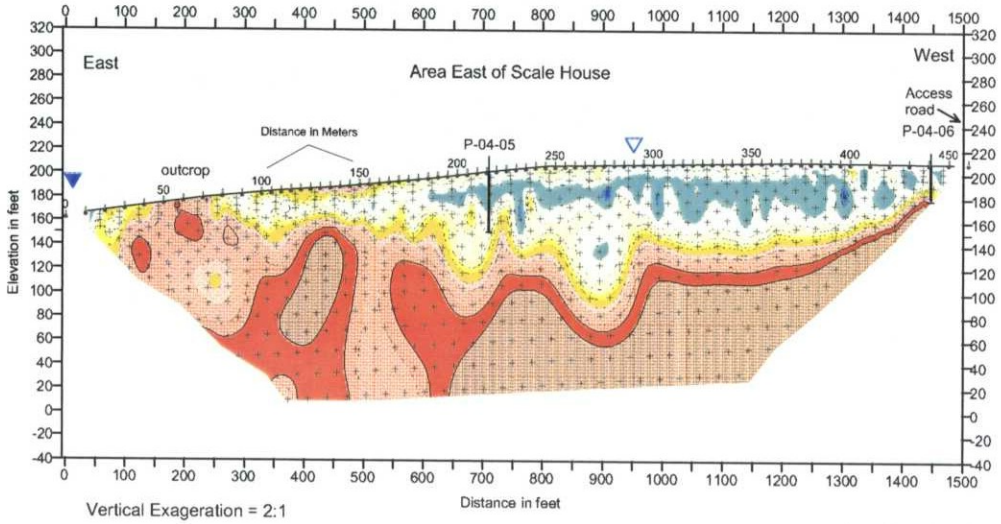
The modeled resistivity profiles generally show a surficial layer of relatively low resistivity (50 to 800 ohmmeters) that is underlain by higher resistivity (1,000 to 10,000 ohmmeters). The boundary between these two layers is characterized by a steep increase in resistivity gradient. This boundary generally occurs at about the 1,000 to 1,500 ohmmeter contour line. The surficial layer is interpreted to represent saturated soil and the deeper layer is interpreted to represent bedrock. Within the higher resistivity layer there are some areas of lower resistivity. These areas may represent bedrock fracture zones.

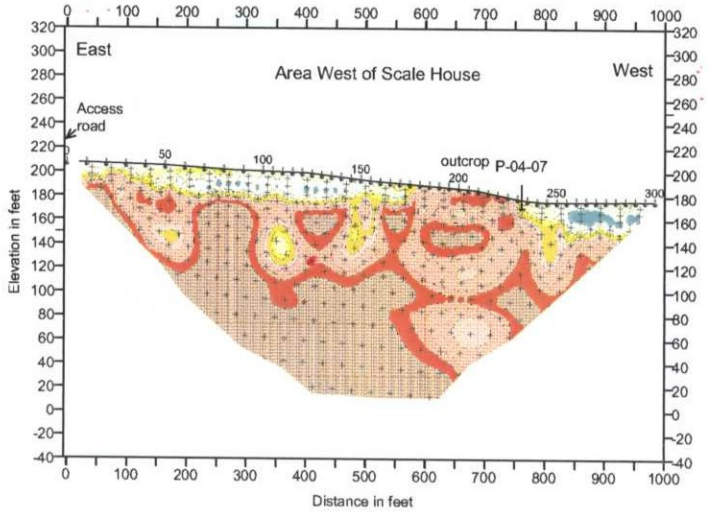
The interpreted resistivity data are presented in the appendix as colorized vertical profiles of the modeled resistivity for each of the three survey lines.

MODELED RESISTIVITY PROFILES

WEST OLD TOWN LANDFILL SITE

RESISTIVITY LINE 1





Looking South

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF-EM Conductors

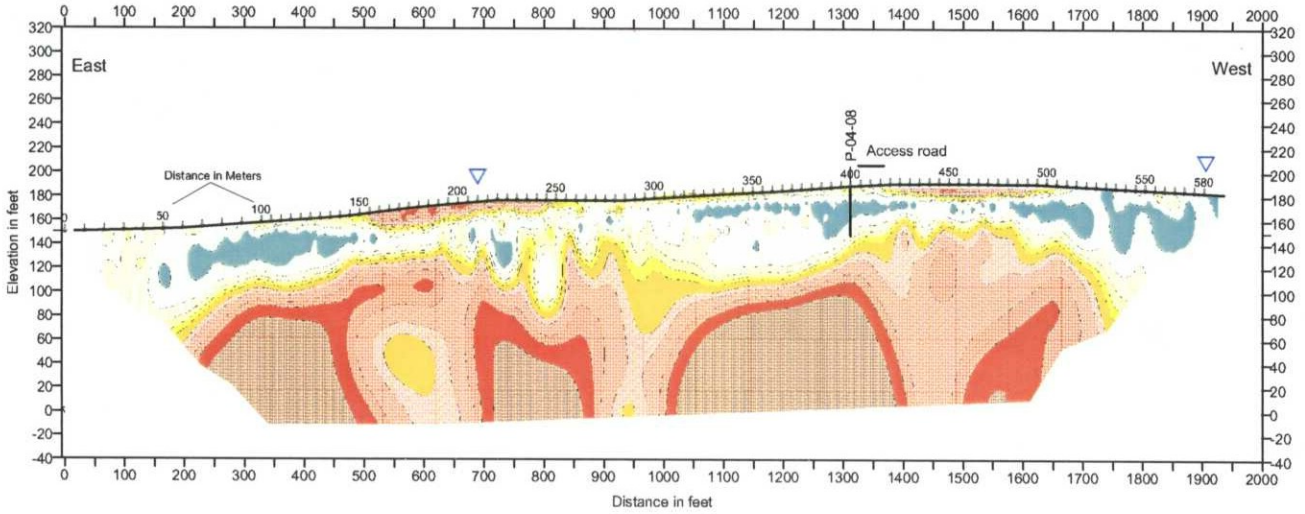
- ▼ **Strong (Fraser >30)**
- ▽ **Moderate (Fraser 20-30)**
- ▽ **Weak (Fraser 10-20)**

Surveyed 10/27/04 by:

Northeast Geophysical Services

WEST OLD TOWN LANDFILL SITE

RESISTIVITY LINE 2



Vertical Exageration = 2:1

Looking South

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF-EM Conductors

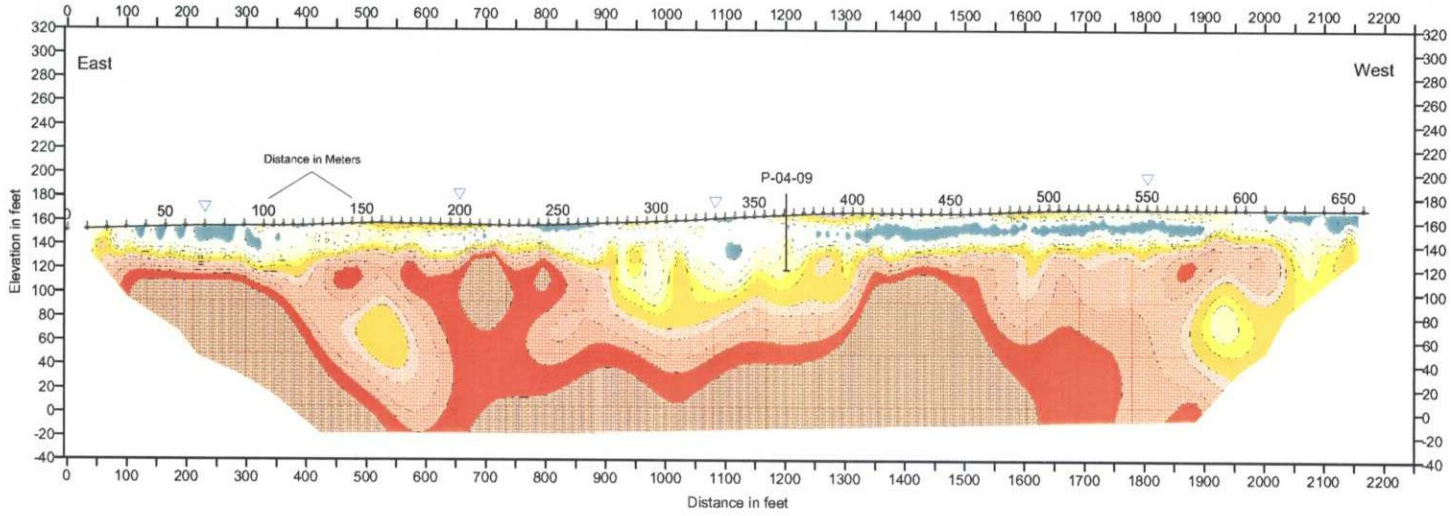
- **Strong (Fraser >30)**
- **Moderate (Fraser 20-30)**
- **Weak (Fraser 10-20)**

Surveyed 10/25/04 by:

Northeast Geophysical Services

WEST OLD TOWN LANDFILL SITE

RESISTIVITY LINE 3



Vertical Exageration = 2:1

Looking South

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF-EM Conductors

- **Strong (Fraser >30)**
- **Moderate (Fraser 20-30)**
- **Weak (Fraser 10-20)**

Surveyed 10/28/04 by:

Northeast Geophysical Services

SECOND ROUND OF ELECTRICAL RESISTIVITY AND VLF EM SURVEYS AT THE JUNIPER RIDGE LANDFILL SITE, OLD TOWN, MAINE

For:

SEVEE & MAHER ENGINEERS

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April, 2009

SECOND ROUND OF ELECTRICAL RESISTIVITY AND VLF EM SURVEYS AT THE JUNIPER RIDGE LANDFILL SITE, OLD TOWN, MAINE

INTRODUCTION

At the request of Sevee & Maher Engineers, Inc. (SME) a second round of electrical resistivity and VLF EM surveys were completed by Northeast Geophysical Services (NGS) at the Juniper Ridge Landfill site in Old Town, Maine. In 2004 three survey lines having a total length of 2,020 meters (6,628 feet) were surveyed using both geophysical methods. The new fieldwork consisted of 8 new survey lines having a total length of 7,900 meters (25,920 feet) as well as 600 meters (1,969 feet) on extensions of two of the 2004 survey lines. The new work was completed during the period from November 23, 2008 to January 23, 2009 by Rudy Rawcliffe, Mike Scully, Chris Dorion and Joshua Rhoades of NGS with the help of Andrew Gobeil of SME. The results of the surveys are being used to assist in the selection of monitoring well drilling locations. This report describes the equipment and methods used and the results of the surveys. A line location map and vertical profiles showing the modeled 2-D resistivity as well as VLF EM anomalies for each survey line are included with the report.

LOCATION AND SITE CONDITIONS

The eight new survey lines are located in wooded areas to the north and east of the existing Juniper Ridge Landfill in Old Town, Maine as shown on Figure 3-1 of SME's report. Two of the lines (Lines 5 and 11) trend generally east - west while six of the lines (Lines 4, 6, 7, 8, 9, & 10) trend generally north - south. Line 4 was originally surveyed November 25, 2008. It began at a dirt access road and went northerly, eventually crossing the paved main site access road. In mid January the line was extended 800 meters to the south at roughly the same bearing. The two line segments (Line 4 and Line 4SE) are shown on separate profiles here so that the plot scales could be kept the same for all of the line profiles. Line clearing was done by NGS on all of the lines and the lines were marked with pin flags at 20-meter intervals. SME personnel later surveyed selected points on most of the lines.

During the field surveys soil conditions were generally moist. This is beneficial to the survey since it helps the electrodes make good electrical contact with the ground. Lines 4, 6, 7, 8, 9 and the extensions of Lines 1 and 2 were completed in November and December before severe winter conditions set in. For these survey days the snow cover was minimal or non-existent and the mean daily temperature averaged 31^0 F. Lines 4SE, 5, 10 and 11 were done in mid to late January when weather conditions had become more severe. For these survey days the snow cover was on the order of two feet deep and the mean daily temperature averaged 10.5^0 F. Despite the snow cover, frost had penetrated up to about 3 inches into the soil. For these later lines the freezing ground conditions may have negatively affected the quality of the resistivity surveys to some extent. This issue is discussed in more detail below.

SUMMARY OF RESULTS

The survey data are presented in the appendix as color-contoured vertical profiles of the modeled resistivity for each of the survey lines. The lowest resistivities, which are shown in blue, are interpreted to represent saturated clayey to silty soils. The highest resistivities, shown in orange to dark red-brown, are interpreted to represent dry soil or massive bedrock. Intermediate colors (white and yellows) are interpreted to represent intermediate conditions, i.e. - moist sandy or gravel soils or saturated fractured bedrock.

The VLF survey detected several anomalies along the survey lines that range in intensity from very weak to strong. The locations and relative strengths of the VLF anomalies are indicated on the profiles as blue inverted triangles as shown in the explanations of the figures.

METHODS AND INSTRUMENTATION

Electrical Resistivity: The resistivity data were collected using an ABEM Terrameter SAS 1000 resistivity meter with an ABEM LUND ES464 electrode selector. This is an automated multi-electrode resistivity system. The surveys were conducted using the dipole-dipole array. The dipole-dipole configuration consists of a pair of current electrodes (C1-C2) followed in line by a pair of potential electrodes (P1-P2). Depth of investigation is determined by the spacing width between the electrode pairs with the wider electrode spacing penetrating more deeply into the earth.

VLF EM: A Geonics EM-16 VLF instrument was used for this survey. This instrument measures the inphase and quadrature components of the electromagnetic field that is produced by VLF transmitters. Readings were taken at 20-meter intervals along the survey lines. At the Juniper Ridge landfill site the Cutler VLF transmitter station was used for all of the VLF survey lines. The strength of VLF response from a geologic conductor such as a bedrock fracture zone is directly related to the angle between the strike of the conductor and the direction to the VLF transmitter. The best case is where the conductor is pointing directly toward the transmitter. Cutler is located east of the site at a bearing of approximately 130^0 from magnetic north. In order to receive at least 50% of the Cutler VLF signal a conductor would need to have a strike of between 70^0 and 190^0 from magnetic north. North-northeasterly (10^0 to 70^0) trending conductors would probably not be detected by this VLF survey.

DISCUSSION OF ELECTRICAL RESISTIVITY SURVEY RESULTS

The data were interpreted using the RES2DINV interpretation software written by M.H. Loke. This program creates a 2-dimensional model of the subsurface resistivity based on the apparent resistivities measured at the surface. The effectiveness of the model to match the surface measurements is calculated as a percentage of the root-mean-square (% RMS) difference between the modeled and actual measurements. In general, a RMS value of 10% or less is considered a close match between the model and field measurements.

At the Juniper Ridge site the RMS values for the models were generally good, averaging approximately 8.5%. Lines 4SE, 5, 10, and 11 had the highest RMS errors at 15.4%, 11.3%, 12.1% and 15.1% respectively. These lines were all conducted in very cold weather conditions with at least some frost in the ground. The extreme weather conditions may have negatively impacted the data quality somewhat on these lines. One way this can happen is, although the electrodes are driven through the frost, they will conduct the cold and eventually freeze the soil around the bottom of the electrodes. This condition will impede the transfer of current from the electrodes to the soil which will result in lower data quality. These RMS values should not be considered unacceptable, but they do tend to reflect that the data was somewhat noisy, likely due to the extreme conditions. It is possible that false anomalies could be created by the modeling software in this situation. In particular the strong low resistivity anomaly that occurs on Line 4SE at about 1,325 feet (-300M) is suspect. This line was conducted on a day when the mean daily temperature was -5^0 F and the model has the highest RMS error of all (15.4%). This portion of the line also occurs close to a metal chain link fence. Also, Line 10, which was done approximately 200 feet to the east of Line 4SE does not show an anomaly in a similar position.

The interpreted data was then contoured using the Surfer contouring program by Golden Software and presented as color-contoured vertical sections of apparent resistivity for each line. The colors on these sections depict the modeled resistivity with light orange-red to dark red-brown representing areas of high resistivity (2,000 to >10,000 ohmmeters) and low resistivities (below 200 ohmmeters) shown in blue shades. Resistivities from 200 to 2,000 ohmmeters are represented by white to yellow tones.

The areas of high resistivity (greater than 2,000 ohmmeters) are interpreted to represent dry sand or gravel soil or massive bedrock. Low resistivities of below 200 ohmmeters are interpreted to represent saturated clayey soils. Areas of intermediate resistivity (200 to 2,000 ohmmeters) are interpreted to represent saturated sandy or gravel soil or saturated fractured bedrock.

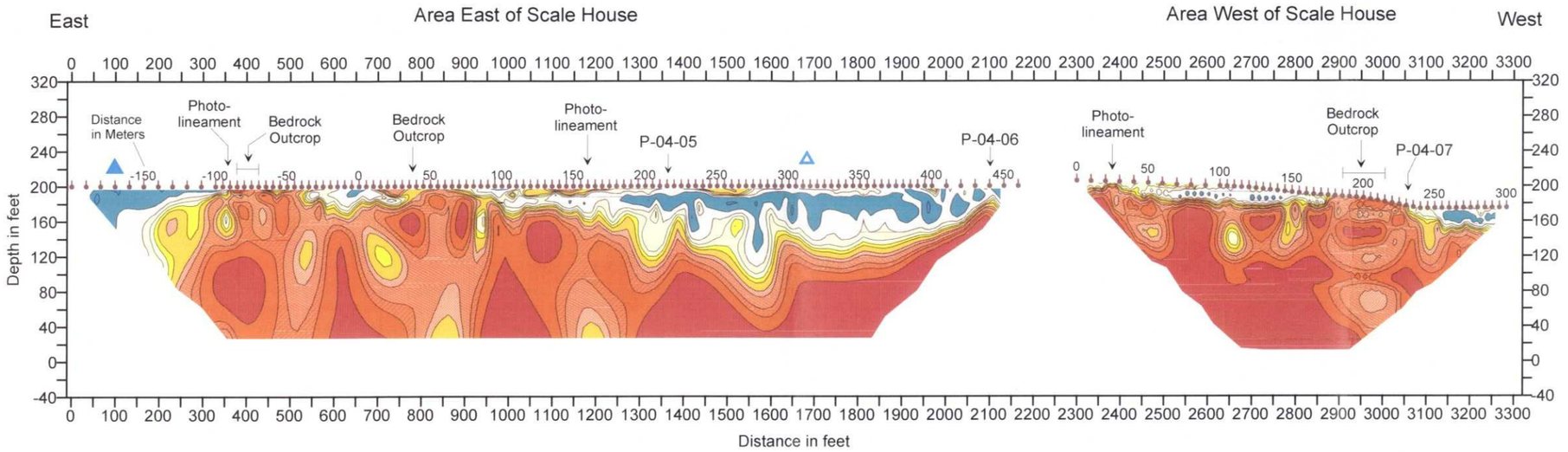
The modeled resistivity profiles generally show a surficial layer of relatively low resistivity (50 to 800 ohmmeters) that is underlain by higher resistivity (1,000 to 10,000 ohmmeters). The boundary between these two layers is characterized by a steep increase in resistivity gradient. This boundary generally occurs at about the 1,000 to 1,500 ohmmeter contour line. The surficial layer is interpreted to represent saturated soil and the deeper layer is interpreted to represent bedrock. Within the higher resistivity layer there are some areas of lower resistivity. These areas may represent saturated bedrock fracture zones or more conductive bedrock types such as graphitic shale. Many of the lines also show a very thin surface veneer of high resistivity which is interpreted to represent dry soil.

The resistivity data are presented in the appendix as color-contoured vertical profiles of the modeled resistivity for each of the survey lines.

MODELED RESISTIVITY PROFILES

JUNIPER RIDGE LANDFILL SITE

RESISTIVITY LINE 1



Vertical Exageration = 2:1

Looking South

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF ANOMALIES

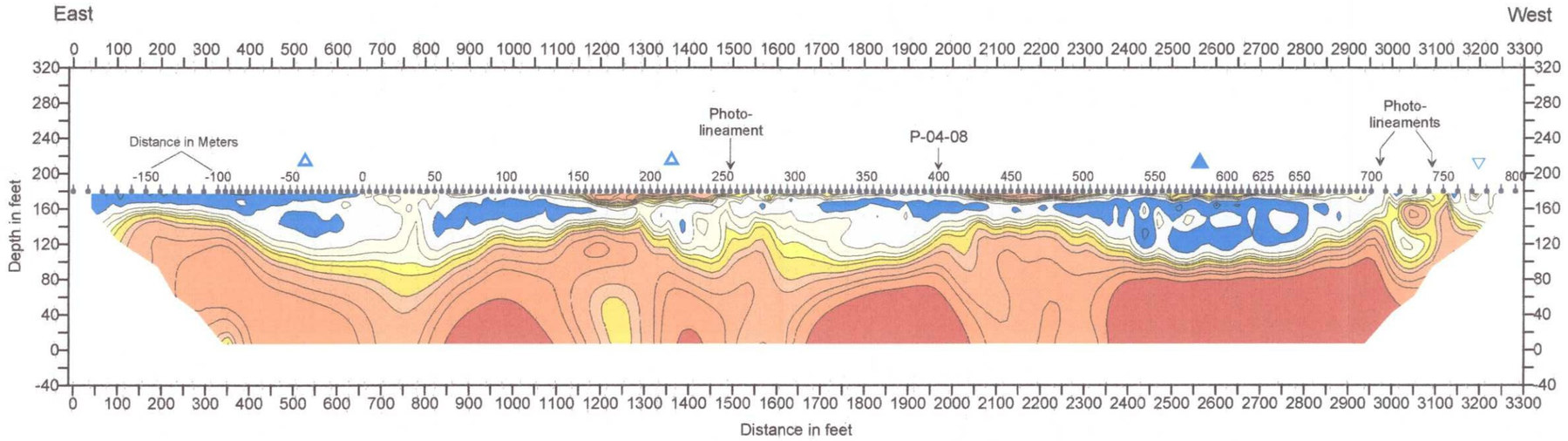
- Weak VLF Conductor
- Moderate VLF Conductor
- Strong VLF Conductor

Surveyed 10/27/04 & 12/04/08 by:

Northeast Geophysical Services

JUNIPER RIDGE LANDFILL SITE

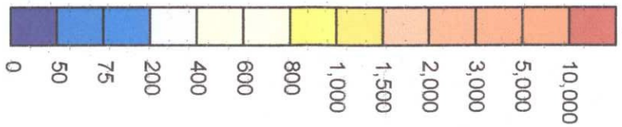
RESISTIVITY LINE 2



Vertical Exageration = 2:1

Looking South

Resistivity in Ohm-Meters



VLF ANOMALIES

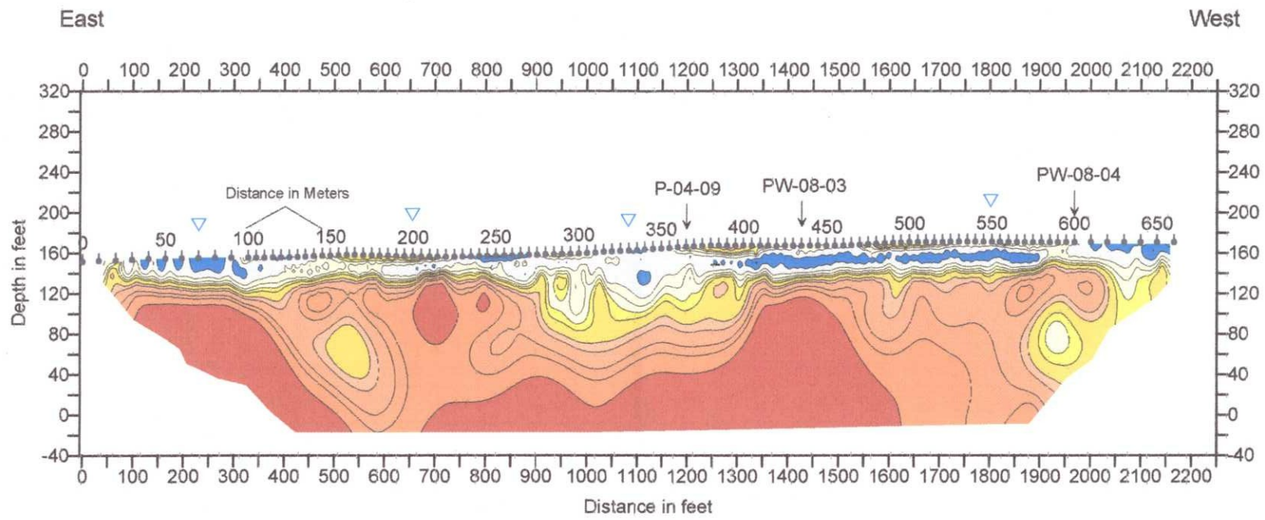
- ▽ Weak VLF Conductor
- △ Moderate VLF Conductor
- ▲ Strong VLF Conductor

Surveyed 10/25/04 & 12/05/08 by:

Northeast Geophysical Services

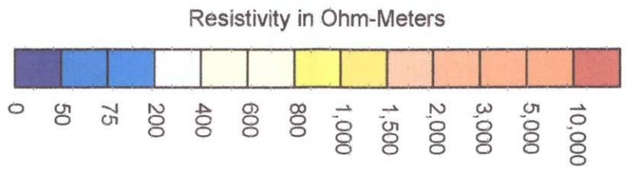
JUNIPER RIDGE LANDFILL SITE

RESISTIVITY LINE 3



Vertical Exageration = 2:1

Looking South



VLF ANOMALIES

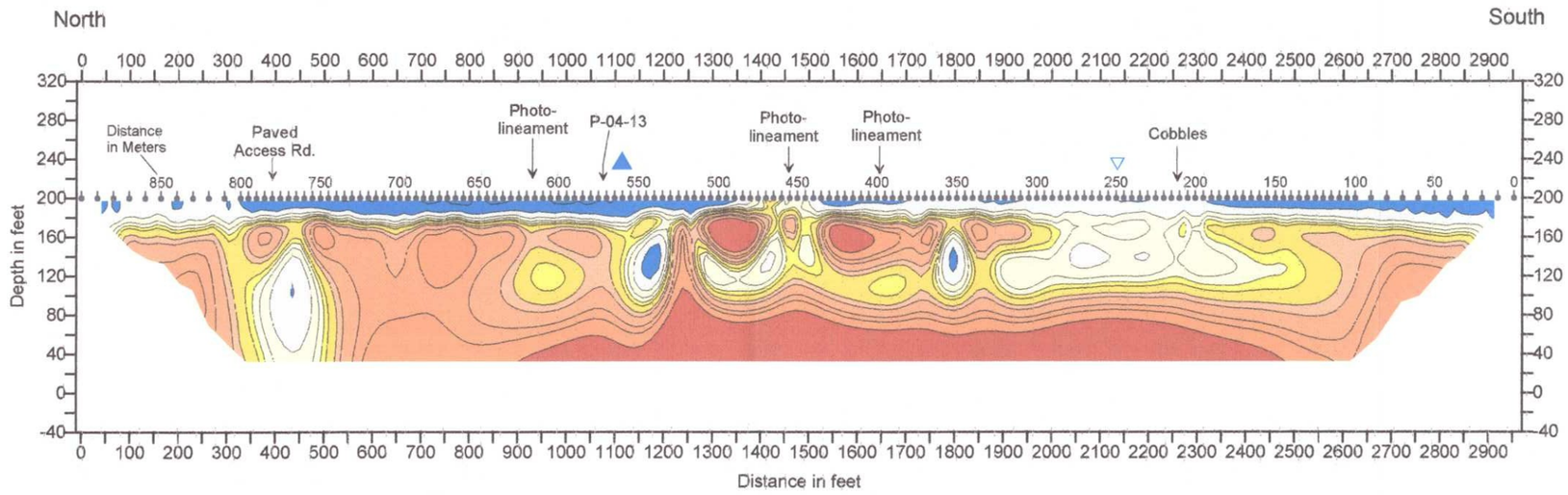
- ▽ Weak VLF Conductor
- △ Moderate VLF Conductor
- ▲ Strong VLF Conductor

Surveyed 10/28/04 by:

Northeast Geophysical Services

JUNIPER RIDGE LANDFILL SITE

RESISTIVITY LINE 4



Vertical Exageration = 2:1

Looking East

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF ANOMALIES

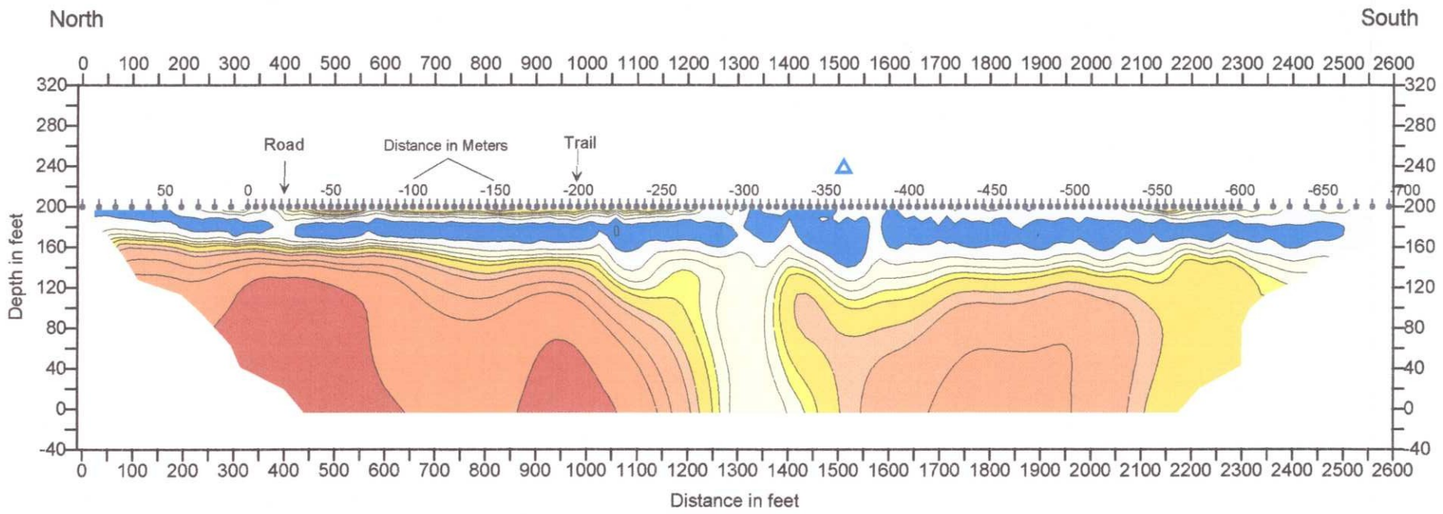
- ▽ Weak VLF Conductor
- △ Moderate VLF Conductor
- ▲ Strong VLF Conductor

Surveyed 11/24/08 by:

Northeast Geophysical Services

JUNIPER RIDGE LANDFILL SITE

RESISTIVITY LINE 4 - SOUTH EXTENSION



Vertical Exageration = 2:1

Looking East

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF ANOMALIES

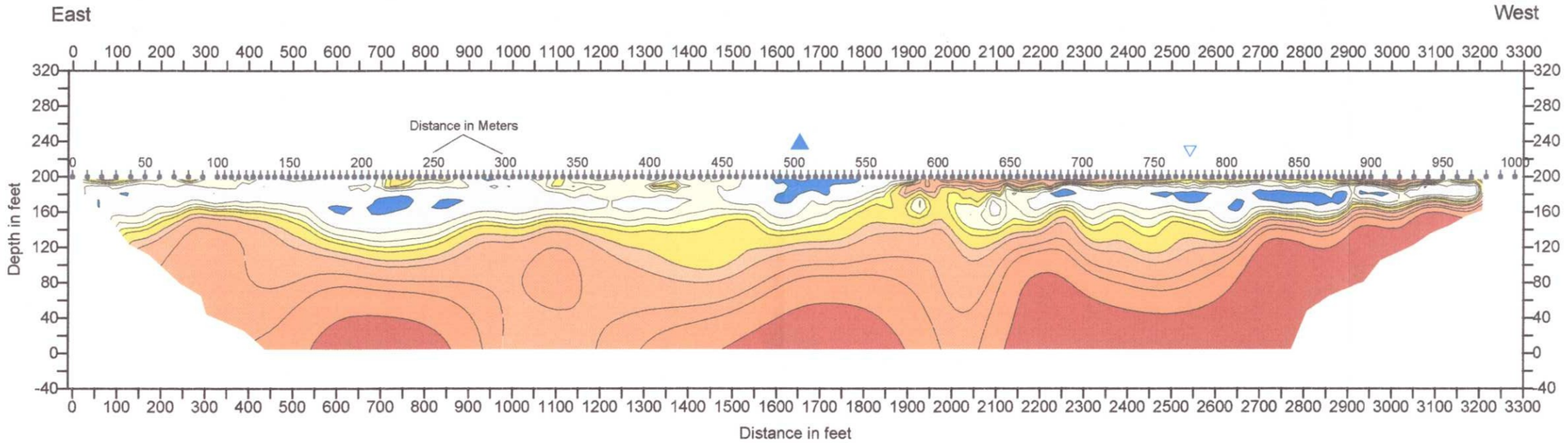
- ▽ Weak VLF Conductor
- △ Moderate VLF Conductor
- ▲ Strong VLF Conductor

Surveyed 1/14/09 by:

Northeast Geophysical Services

JUNIPER RIDGE LANDFILL SITE

RESISTIVITY LINE 5



Vertical Exageration = 2:1

Looking South

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF ANOMALIES

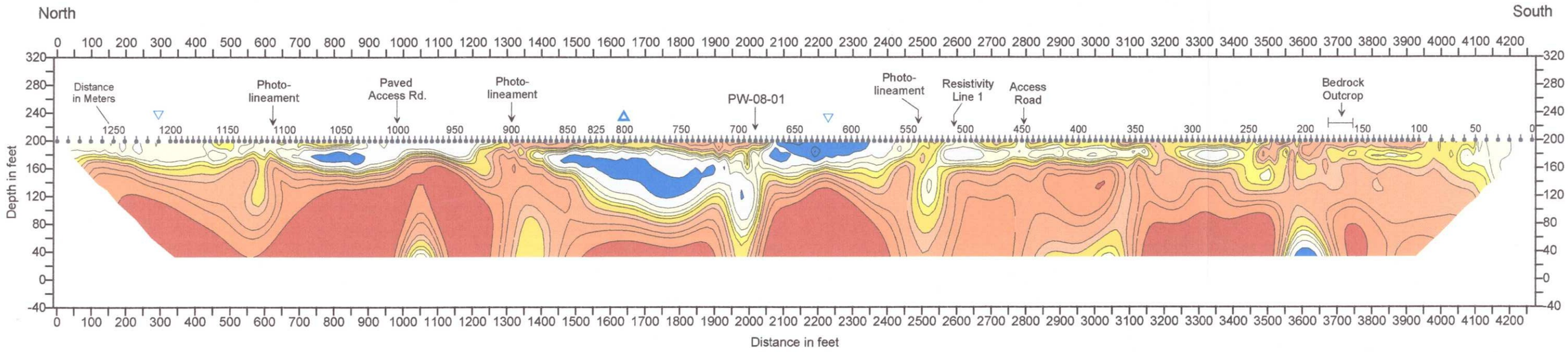
- Weak VLF Conductor
- Moderate VLF Conductor
- Strong VLF Conductor

Surveyed 1/12/09 by:

Northeast Geophysical Services

JUNIPER RIDGE LANDFILL SITE

RESISTIVITY LINE 6



Vertical Exageration = 2:1

Looking East

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF ANOMALIES

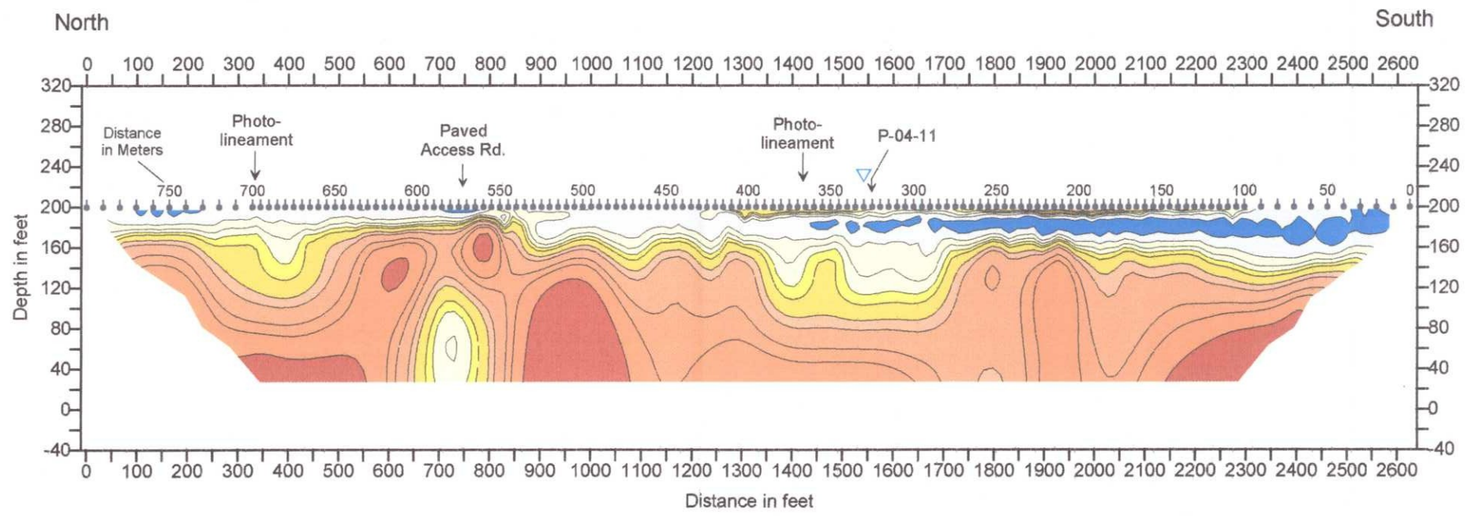
- ▽ Weak VLF Conductor
- △ Moderate VLF Conductor
- ▲ Strong VLF Conductor

Surveyed 11/26/08 by:

Northeast Geophysical Services

JUNIPER RIDGE LANDFILL SITE

RESISTIVITY LINE 7



Vertical Exageration = 2:1

Looking East

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF ANOMALIES

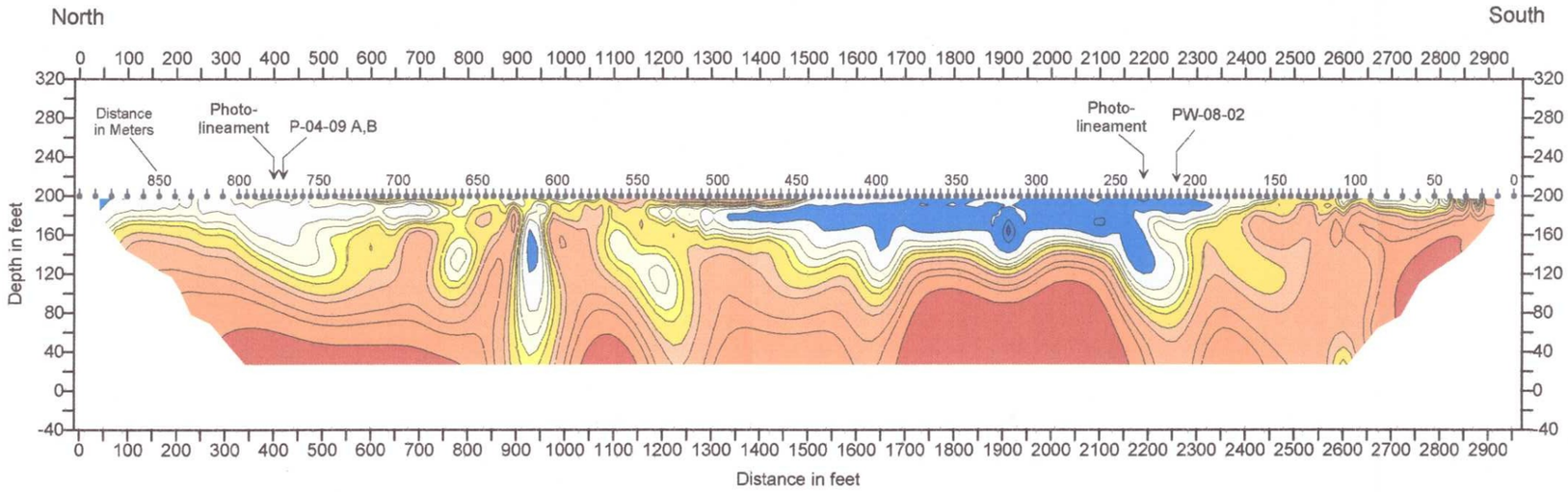
- ▽ Weak VLF Conductor
- △ Moderate VLF Conductor
- ▲ Strong VLF Conductor

Surveyed 12/3/08 by:

Northeast Geophysical Services

JUNIPER RIDGE LANDFILL SITE

RESISTIVITY LINE 8



Vertical Exageration = 2:1

Looking East

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF ANOMALIES

* No VLF done on this line due to proximity to power line.

▽ Weak VLF Conductor

△ Moderate VLF Conductor

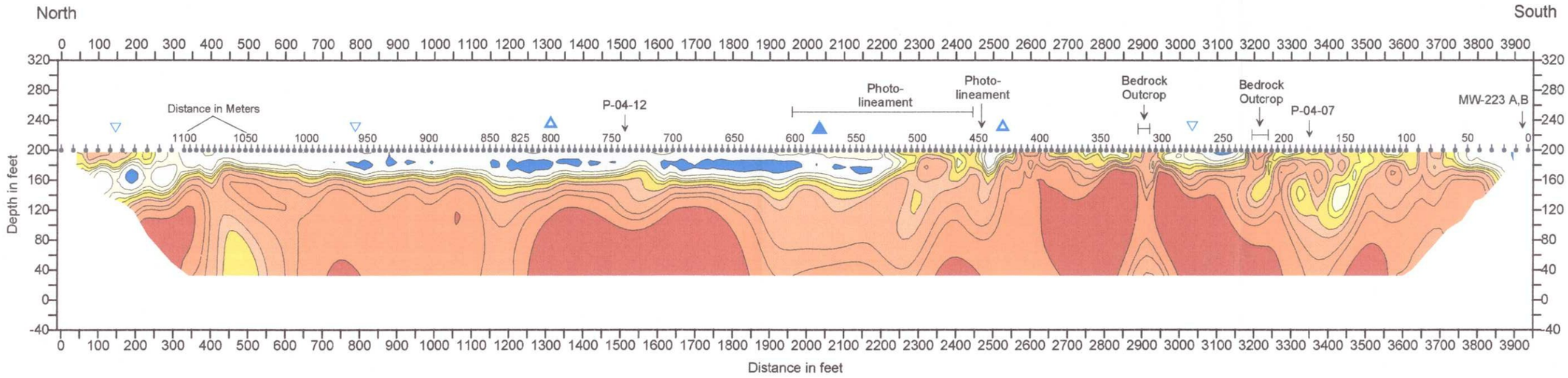
▲ Strong VLF Conductor

Surveyed 12/4/08 by:

Northeast Geophysical Services

JUNIPER RIDGE LANDFILL SITE

RESISTIVITY LINE 9



Vertical Exageration = 2:1

Looking East

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF ANOMALIES

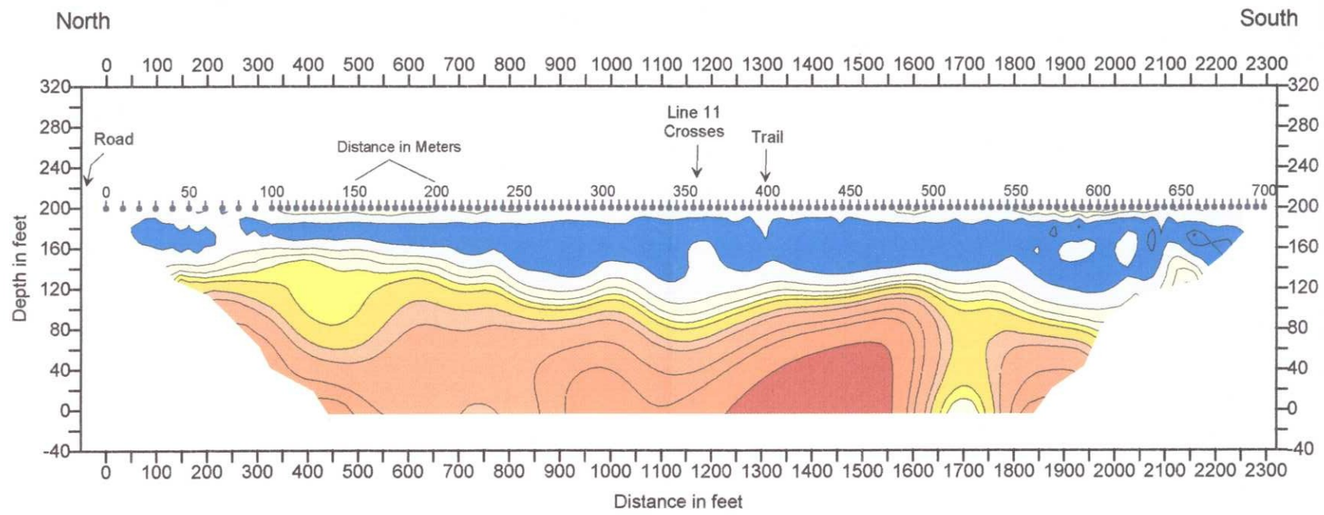
- ▽ Weak VLF Conductor
- △ Moderate VLF Conductor
- ▲ Strong VLF Conductor

Surveyed 11/21/08 by:

Northeast Geophysical Services

JUNIPER RIDGE LANDFILL SITE

RESISTIVITY LINE 10



Vertical Exageration = 2:1

Looking East

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

VLF ANOMALIES

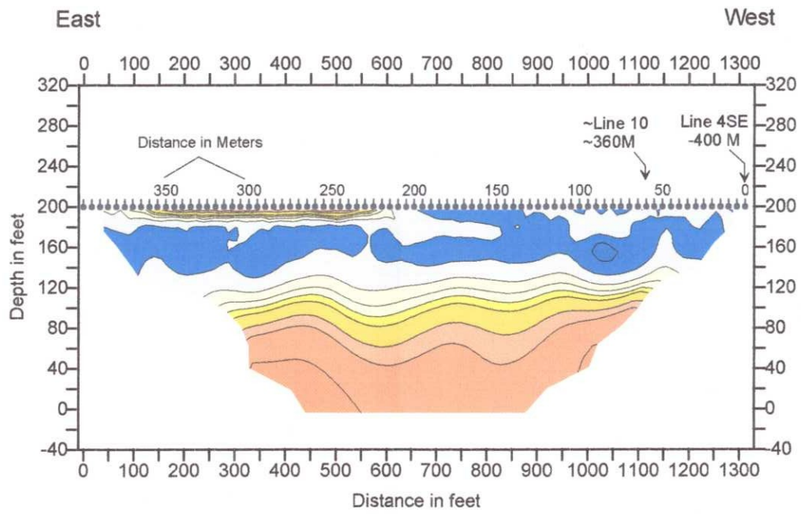
- ▽ Weak VLF Conductor
- △ Moderate VLF Conductor
- ▲ Strong VLF Conductor

Surveyed 1/14/09 by:

Northeast Geophysical Services

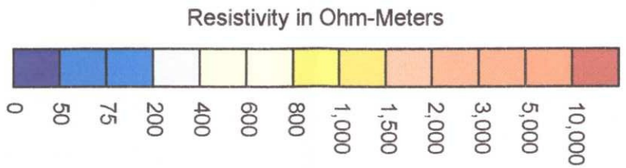
JUNIPER RIDGE LANDFILL SITE

RESISTIVITY LINE 11



Vertical Exageration = 2:1

Looking South



VLF ANOMALIES

- ▽ Weak VLF Conductor
- △ Moderate VLF Conductor
- ▲ Strong VLF Conductor

Surveyed 1/23/09 by:

Northeast Geophysical Services

APPENDIX M

HYDRAULIC ANALYSIS OF DATA FROM LONG-TERM BEDROCK PUMP TEST AT PW-08-01

APPENDIX M

HYDRAULIC ANALYSIS OF DATA FROM LONG-TERM BEDROCK PUMP TEST AT PW-08-01

1.0 PURPOSE

Five bedrock groundwater pump tests were conducted at the proposed Expansion between January 29, 2009 and April 6, 2009 to evaluate fracture interconnectivity. One of the tests consisted of a long-term fourteen-day pump test during which PW-08-01 was pumped for the first seven days and both PW-08-01 and PW-08-02 were pumped for the last seven days. The drawdown data was analyzed for aquifer parameters from the first seven days of this test during which only PW-08-01 was pumped. This test was selected since it was a long-term test and affected a broad area of the bedrock. Thus, bulk aquifer parameters could be checked against the slug test data and the MW-06-02 short-term pump test results.

2.0 PUMP TEST DESCRIPTION OF SEVEN-DAY PUMP TEST OF PW-08-01

The pump test started with pumping PW-08-01 beginning at 12:30 PM on March 23, 2009. The pump test period relevant to this discussion ended on March 30, 2009 at 2:15 PM, at which time groundwater was also pumped from PW-08-02. Daily average temperatures during the pump test ranged between 22 and 41 degrees Fahrenheit. The amount of precipitation during the one-week period totaled approximately 0.6 inches. Recharge to groundwater during this pumping test likely occurred due to snowmelt and precipitation.

The pump in PW-08-01 was set at a depth of approximately 186 feet bgs in an open-borehole diameter of about six inches. Groundwater was pumped from PW-08-01 through a 6-inch diameter pipe with a 3-inch orifice plate, and discharged approximately 700 feet away in a downslope and hydraulically downgradient direction. The pumped groundwater discharge from PW-08-01 was directed away from PW-08-02, and the pumped groundwater discharge from

PW-08-02 was directed away from PW-08-01. The pumping rates for PW-08-01 were set to the highest capacity of the pump by leaving the flow valve open. The pumping rate at the beginning of the test was about 200 gpm, but dropped to about 155 gpm on the afternoon of March 30, 2009, due to the increased head as the water level dropped in the borehole. The static depth to groundwater before the pumping test in PW-08-01 was 7.42 feet bgs. The maximum drawdown in PW-08-01 during the first seven days of this pumping test was 120.22 feet.

Groundwater levels were monitored in wells and piezometers using pressure transducers and a manual water level meter. The data is attached to this Appendix in graphical (transducer) and tabular (manual) forms. It should be noted that earth tide variations are seen in some of the time drawdown data. They generally caused a head change of about one-tenth of one foot when the effects were strongest, which occurred during a new moon on March 26, 2009. However, local precipitation records, barometric pressure records, earth tides, barometric efficiencies of the monitoring wells, and onsite pre-pump test groundwater level trends were not used to correct measured drawdowns. Estimates of aquifer parameters were not sought in wells with limited drawdown (i.e., 0.5 foot or less).

3.0 PUMP TEST ANALYSIS

Hydrogeologic parameters were estimated by use of the time versus drawdown data from the bedrock monitoring wells and piezometers during the first seven days of the long-term pump test at pump well PW-08-01. This analysis was done for a representative number of observation wells which included PW-08-02, PW-08-03, PW-08-04, the office supply well (OSW), the scale house supply well (SHSW), P-04-06A, P-04-07B, and MW-223A (well construction specifications for OSW and SHSW are estimated based on available well drilling information). The selection of these monitoring locations was based on the following criteria: (1) the data was collected by a pressure transducer with adequate water level measurement frequencies, (2) the monitoring well or piezometer was screened in bedrock or entirely open to the bedrock, and (3) there was adequate drawdown to stress the bedrock formation.

The bedrock aquifer in the pump test area is generally overlain by relatively low-permeability glacial till. Each of the above-mentioned monitoring locations for which hydrogeologic parameters were analyzed is overlain by the till. Previous field and laboratory testing has shown that the saturated till generally has a lower hydraulic conductivity than the bedrock. Thus, the saturated till acts as a leaky semi-confining layer overlying the bedrock. This results in a delayed source of recharge to the bedrock from the till after a sufficient period of pumping groundwater from the bedrock.

The till groundwater monitoring locations with substantial drawdown were generally in monitoring wells and piezometers that are screened just above the bedrock surface. The presence of groundwater level drawdowns in the till is evidence of groundwater draining from the till into the bedrock during the pump tests. Little or no groundwater level influence in the till near the groundwater table surface was observed. This was due in part to the limited amount of till recharge due to its relatively low hydraulic conductivity, as well as precipitation events and melting of the snow pack during the pump test, maintaining the water table. The till drainage is temporary unless recharged by precipitation.

The method used for analysis of transmissivity and storativity of the bedrock was that of Hantush and Jacob, 1955 for confined aquifers with leaky aquitards (semi-confining layers) with no storage from the aquitard. This method has the further benefit of estimating both the hydrogeologic parameters of the bedrock, as well as the till leakage. The estimated bedrock aquifer transmissivity values calculated at the specified locations range from 0.49 to 6.0 cm^2/sec, with a geometric mean of 3.0 cm^2/sec. The estimated bedrock aquifer storativity values range from 0.000052 to 0.00022, with a geometric mean of 0.0001. The fact that these values are generally consistent on a site-wide scale supports the concept of treating bedrock fractures as well interconnected. The analyses are attached to this Appendix.

The transmissivities estimated from the MW-06-02 test ranged from 0.08 to 0.36 cm^2/sec. However, the MW-06-02 well only penetrated the upper 20 feet of bedrock, whereas PW-08-01 penetrated about 200 feet of bedrock. Thus, the bedrock contribution was about ten times greater for the deeper wells due to the penetration depth, which suggests transmissivities should be about ten times greater, assuming the same average hydraulic conductivity. Also, PW-08-01 was positioned in permeable rock based on the earth resistivity survey which may also be part of the reason the transmissivities are greater. The storativity for the MW-06-02 pump test ranged from 0.0001 to 0.0008, again generally consistent with the PW-08-01 long-term test estimate.

Based on the delayed recharge response from the overlying till, the distance of each monitoring location from the pumping well, and the estimated saturated till thickness near the end of the pump test, the hydraulic conductivity of the till confining layer was calculated for each of the specified locations (Hantush and Jacob, 1955). The calculated hydraulic conductivities of the till through this analysis ranged from $1.0x10^{-7}$ to $3.0x10^{-6}$ cm/sec, with a geometric mean of $7.3x10^{-7}$ cm/sec. The geometric mean vertical hydraulic conductivity from the laboratory undisturbed test samples was $1.5x10^{-7}$ cm/sec, with a range from $2.4x10^{-8}$ to $1.8x10^{-6}$ cm/sec (see Section 3.3.4). Although the values are different, the order of magnitude is similar. Furthermore, the assumptions of the Hantush and Jacob analytical method (such as full penetration and no aquitard storage) are not met, which can lead to greater transmissivity estimate.

As a supplemental check on bedrock transmissivity anisotropy, the method of Papadopoulos (1965) was used to analyze a random selection of nine wells for the first seven days of PW-08-01 pumping during the long-term pump test (the data used was collected before PW-08-02 started pumping). This analysis showed anisotropic effects that favored a greater transmissivity to the northeast/southwest direction. However, two of the seven various well combinations showed anisotropic effects favoring a greater transmissivity to the northwest/southeast. This is due to the bedrock heterogeneity and its discrete fractured nature. However, when all seven sets of analyses were averaged, the maximum principal hydraulic conductivity was oriented on an azimuth of N36E relative to True North. The average maximum principal transmissivity was

calculated at 54 cm^2/sec to the northeast/southwest. The minimum principal transmissivity was calculated at 16 cm^2/sec and is oriented perpendicular to the maximum value. Thus, the anisotropy ratio for the PW-08-01 long-term pump test was about 3.4 to 1. The calculations are attached to this Appendix. Care should be exercised in directly applying these transmissivity values since they are over-estimated due to the recharge from the till and deeper bedrock that was occurring during the test. The conditions violate basic assumptions of the Papadopoulos method. Alternately, the calculated transmissivities may be greater than the average bedrock transmissivity since PW-08-01 was positioned in lower resistivity rock, suggesting a greater local fracture density. Since the early-time data was used for calculations, the transmissivities may represent conditions very local to the borehole. Local conditions to the well may be more permeable than the average bedrock condition. Certainly this is supported by the resistivity data and comparison of the PW-08-03 test results with the other three deep borehole tests. In any case, the analysis is useful in that it supplements the MW-06-02 analysis and confirms the hydraulic conductivity anisotropy in the bedrock over a Site-wide scale. We believe that even though this method over-estimates the transmissivity, the ratio of the two principal transmissivities is useful in supplementing the MW-06-02 ratio value. The lower calculated anisotropy ratio from the long-term PW-08-01 pump test may suggest that the localized MW-06-02 anisotropy ratio calculated may be too high for the overall Site.

REFERENCES

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Papadopulos, I.S., 1965. Nonsteady flow to a well in an infinite anisotropic aquifer. Intern. Assoc. Sci. Hydrol., Volume 1, No. 73.

Walton, W.C., 1962. Selected analytical methods for well and aquifer evaluation. Illinois State Water Survey Bull., No. 49; 81 pp.

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PUMP TEST WORK PLAN

DATA COMPILATION AND UPDATED WORK PLAN FOR INVESTIGATION OF THE BEDROCK UNDERLYING THE PROPOSED EXPANSION OF THEJUNIPER RIDGE LANDFILL SITE OLD TOWN, MAINE

1.0 BACKGROUND

The Work Plan submitted to MEDEP November 2008 outlined an investigatory program to address the questions raised in MEDEP's October 15, 2008 memorandum. The work plan included proposed surface geophysics, drilling and borehole geophysics tasks that have now been completed and are reported/ compiled in this document. The purpose of this document is to transmit the data from that bedrock characterization and to refine the pump testing to evaluate bedrock fracture interconnectedness. Figures 1 and 2 show the location of the nine geophysical survey lines, four deep bedrock wells and bedrock strikes from borehole geophysics. The following sections summarize the approach of the various investigations, methodologies, and a schedule for completing the pump testing phase of work.

2.0 GEOPHYSICAL INVESTIGATION

Figure 1 and 2 illustrate the earth electrical resistivity transect results completed throughout the proposed landfill expansion. Figure 1 shows the resistivity profiles in a general north – south orientation. Figure 2 shows the resistivity profiles oriented in a general east-west orientation. Collectively, the geophysical transects are approximately perpendicular to one another, a pattern that should help compensate if some of the transects are parallel to bedrock features or other extraneous conductive interferences.

The geophysical resistivity lines were supplemented with VLF-EM to aid in picking up electromagnetic anomalies as was done during the 2004 geophysical survey. The geophysical surveys were performed by Northeast Geophysical Services of Bangor, Maine. The data from the surficial geophysical survey is presented as a two-dimensional vertical profile of the modeled

resistivities along each transect. As a result of the resistivity and from discussions with MEDEP, SME selected four bedrock drilling sites, two in low resistance zones within the proposed expansion footprint, and one zone north of the proposed expansion in the direction of potential receptors. The fourth location drilled was also in the north area of the expansion, but was selected from a high resistance location to further confirm the resistivity profile interpretations. The resistivity profiles are in Attachment A.

3.0 DRILLING AND BOREHOLE GEOPHYSICAL LOGGING

Four boreholes PW-08-01 through PW-08-04 were drilled from December 30, 2008 to January 9, 2009. The drilling was performed by Goodwin Well and Water of Turner, Maine and overseen by a SME Maine Certified Geologist (CG). The open borehole wells were advanced into stable bedrock using mud rotary (8-$^3/_4$ –inch diameter roller bit). Six-inch OD steel casing was set into bedrock and the boring was advanced an additional 200 feet into the bedrock using the six-inch air hammer technique. The steel casing was set a minimal amount into the bedrock so as to isolate and stabilize the overburden from erosion, but without isolating upper bedrock fractures from the open borehole so that shallow structures could be logged by the downhole geophysical methods. SME drilling logs and Goodwin Well and Water drilling logs are included in Attachment B

Borehole geophysical logging was done by the same methods found to be successful at MW-06-02. Again, the geophysics was performed by NEG using a suite of borehole geophysical methods including, calipers, fluid conductivity (resistivity), single-point resistance, spontaneous potential, fluid temperature, optical televiewer, and flowmeter. The optical televiewer logs were utilized to calculate fracture and structural strikes and dips of features observed along the borehole. Rose diagrams of the bedrock strikes were measured from the borehole geophysics. The cumulative fracture strikes for each borehole are shown on Figures 1 and 2 to assist in evaluating the common fracture orientations.

Borehole geophysical logs are included in Attachment C including:

- Composite logs of calipers, flow meter, fluid conductivity (resistivity), single-point resistance, spontaneous potential, fluid temperature and strike and dip results,
- Optical Televiewer Logs including calipers, flow meter, structure interpretation, and optical image results.
- Strike and Dip Rose Diagrams of all features, and
- Dip Amount and Dip Azimuth of planar features.

4.0 PROPOSED BOREHOLE PUMPING TESTS

A water pump will be placed just above the deepest fracture in each well. Each well will be pumped to induce the maximum drawdown without dewatering the well for a minimum of 24 hours. During the pump test, existing bedrock wells and piezometers that are located within 1,500 feet of the pumping well will be monitored for drawdowns (see 1,500 foot diameter circles in Figure 3). Proposed pumping and monitoring locations in bedrock and overburden wells and piezometers are shown on Figure 3. Water level drawdown data from the pumping well and the existing bedrock wells and piezometers will be measured utilizing downhole pressure transducers. Periodic manual water level measurements will be made to confirm the electronic transducers set in bedrock wells. At the end of the 24-hour pumping period, the water levels will be allowed to recover for a period equal to the period of pumping. The groundwater level recovery period will also be recorded by the transducers. Since the pump test is only over a period of about one day, background data in terms of ambient groundwater level trends is not considered necessary. However, atmospheric barometric pressure will be measured during the pump test(s). Pump flow rates will be measured by an orifice weir discharging a minimum of 300 feet from the well in a downgradient direction.

The pump testing will be performed with assistance from Goodwin Well Drilling, Inc. The groundwater level drawdowns will be presented on drawdown versus time graphs for all

monitored well locations. The purpose of these pump tests are to examine hydraulic fracture interconnectedness; therefore, transmissivities and storage coefficients will not be calculated. Fracture interconnectedness will be based on the presence of measurable groundwater level drawdowns.

5.0 SCHEDULE

This pumping test work will begin is currently planned to begin January 26, 2009. Once the pump testing is complete, the information will be supplied to MEDEP.

FIGURES

LINE 1
LINE 2
LINE 3
LINE 4
LINE 5
LINE 6
LINE 7
LINE 8
LINE 9
LINE 10
LINE 11
Paved Access Rd.
Distance in Meters
OC-AG
OC-1
OC-2
OC-3
OC-4
P-04-13
P-04-12A
P-04-12B
P-04-14A
P-04-14B
P-06-04A
P-08-09A
P-06-03
P-08-01
P-08-06
P-04-10A
P-04-10B
P-04-11A
P-04-11B
P-08-02
P-04-09A
P-04-09B
P-08-03
P-04-08A
P-04-08B
P-04-06A
P-04-06B
P-08-02
P-08-04A
P-08-04B
P-08-04
P-08-05
P-08-07
P-08-08
P-04-05A
P-04-05B
P-225
P-228
P-230
P-229
P-222A
P-222B
P-223A
P-223B
P-215A
P-215B
P-205B
P-205A
P-226B
P-226A
P-504A
P-504B
P-504C
P-503A
P-503B
P-502A
P-502B
P-501A
P-501B
P-501C
P-211A
P-211B
P-210
P-214A
P-214B
P-214C
P-218A
P-218B
P-203A
P-203B
P-201A
P-201B
P-201C
P-202A
P-202B
P-209A
P-209B
P-209C
P-220A
P-220B
MW-206A
MW-303
MW-207
MW-304A
MW-302
MW-302R
MW-04-106
MW-04-103B
MW-04-104
MW-04-105
MW-04-101
MW-04-102
MW-04-110
MW-216B
MW-216R
MW-04-109R
MW-401A
MW-401B
MW-204
MW-301
MW-227
MW-402B
MW-402A
OW-06-05
OW-06-09
OW-06-08
OW-06-10
MW-04-111
MW-05-05
MW-06-02
MW-05-04
MW-05-03
MW-05-02
MW-05-01
B-08-01
XXXXX
XXXXXX
XXXXXXX
XXXX
XXX
XX
X

ROSE DIAGRAM FROM BORE HOLE GEOPHYSICS SHOW STRIKE OF ALL FEATURES (TYP)

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

150 0 300 600 FEET

LEGEND

- PROPERTY LINE
- BEDDING AND FOLIATE (———) AND FRACTURE (– – –) ORIENTATIONS MEASURED AT OUTCROPS; DIPS SHOWN IN PARENTHESIS (LOCATION APPROXIMATE)
- BEDROCK OUTCROPS
- STRONG VLF CONDUCTOR
- MODERATE VLF CONDUCTOR
- WEAK VLF CONDUCTOR
- GEOPHYSICAL SURVEY LINE
- —E— UNDERGROUND ELECTRIC AND COMMUNICATIONS (OUT OF SERVICE)
- STRIKE OF ALL FEATURES. ORIENTATION MEASURE BY OPTICAL LOGGER DURING BOREHOLE GEOPHYSIC LOGGING
- PHOTO LINEAR LINE

DWG: FIGURES LMN: FIG 2-1-NS CTB: RESISTIVITY REV: 5/21/15

FIGURE 1
RESULTS OF RESISTIVITY AND VLF SURVEY
NORTH-SOUTH
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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LINE 4
LINE 5
LINE 6
LINE 7
LINE 8
LINE 9
LINE 10
LINE 11
LINE 1
LINE 2
LINE 3
OC-AG
OC-1
OC-2
OC-3
PW-08-01
PW-08-02
PW-08-03
PW-08-04
MW-06-01
MW-213
MW-206A
MW-303
MW-304A
MW-212
MW-207
MW-302R
MW-302
MW-04-106
MW-04-110
MW-216B
MW-216BR
MW-04-109R
MW-04-103B
MW-04-104
MW-04-105
MW-223A
MW-223B
MW-227
MW-204
MW-301
MW-401A
MW-401B
MW-402B
MW-402A
P-04-13A
P-04-13B
P-04-13C
P-04-14A
P-04-14B
P-04-10A
P-04-10B
P-04-11A
P-04-11B
P-04-09A
P-04-09B
P-04-06A
P-04-06B
P-04-12A
P-04-12B
P-04-12C
P-08-10A
P-08-09A
P-06-04A
P-06-03
P-08-06
P-08-07
P-08-04A
P-08-04B
P-04-01
P-04-02
P-04-04
P-04-07
P-226B
P-226A
P-504A
P-504B
P-504C
P-503A
P-503B
P-501A
P-501B
P-501C
P-228
P-230
P-215A
P-215B
P-205B
P-205A
P-229
P-222A
P-222B
P-203B
P-203A
P-218A
P-218B
P-211A
P-211B
P-210
P-214A
P-214B
P-214C
P-201A
P-201B
P-201C
P-209A
P-209B
P-209C
P-202A
P-202B
P-220A
P-220B
B-08-08
B-08-02
B-08-01
B-04-05
B-05-05
OW-06-07
OW-06-08
MW-04-111
MW-05-05
MW-04-102
MW-04-103
MW-04-107
MW-04-108
MW-04-101
XXXXXX
XXXXX
XXXX
XXX

Resistivity in Ohm-Meters

0 50 75 200 400 600 800 1,000 1,500 2,000 3,000 5,000 10,000

150 0 300 600 FEET

LEGEND

- PROPERTY LINE
- BEDDING AND FOLIATE (———) AND FRACTURE (— — —) ORIENTATIONS MEASURED AT OUTCROPS; DIPS SHOWN IN PARENTHESIS (LOCATION APPROXIMATE)
- BEDROCK OUTCROPS
- STRONG VLF CONDUCTOR
- MODERATE VLF CONDUCTOR
- WEAK VLF CONDUCTOR
- GEOPHYSICAL SURVEY LINE
- UE — UNDERGROUND ELECTRIC AND COMMUNICATIONS (OUT OF SERVICE)
- STRIKE OF ALL FEATURES. ORIENTATION MEASURE BY OPTICAL LOGGER DURING BOREHOLE GEOPHYSIC LOGGING
- PHOTO LINEAR LINE

DWG: FIGURES LMN: FIG 2-2 EW CTB: RESISTIVITY REV: 5/21/15

FIGURE 2
RESULTS OF RESITIVITY AND VLF SURVEY
EAST-WEST
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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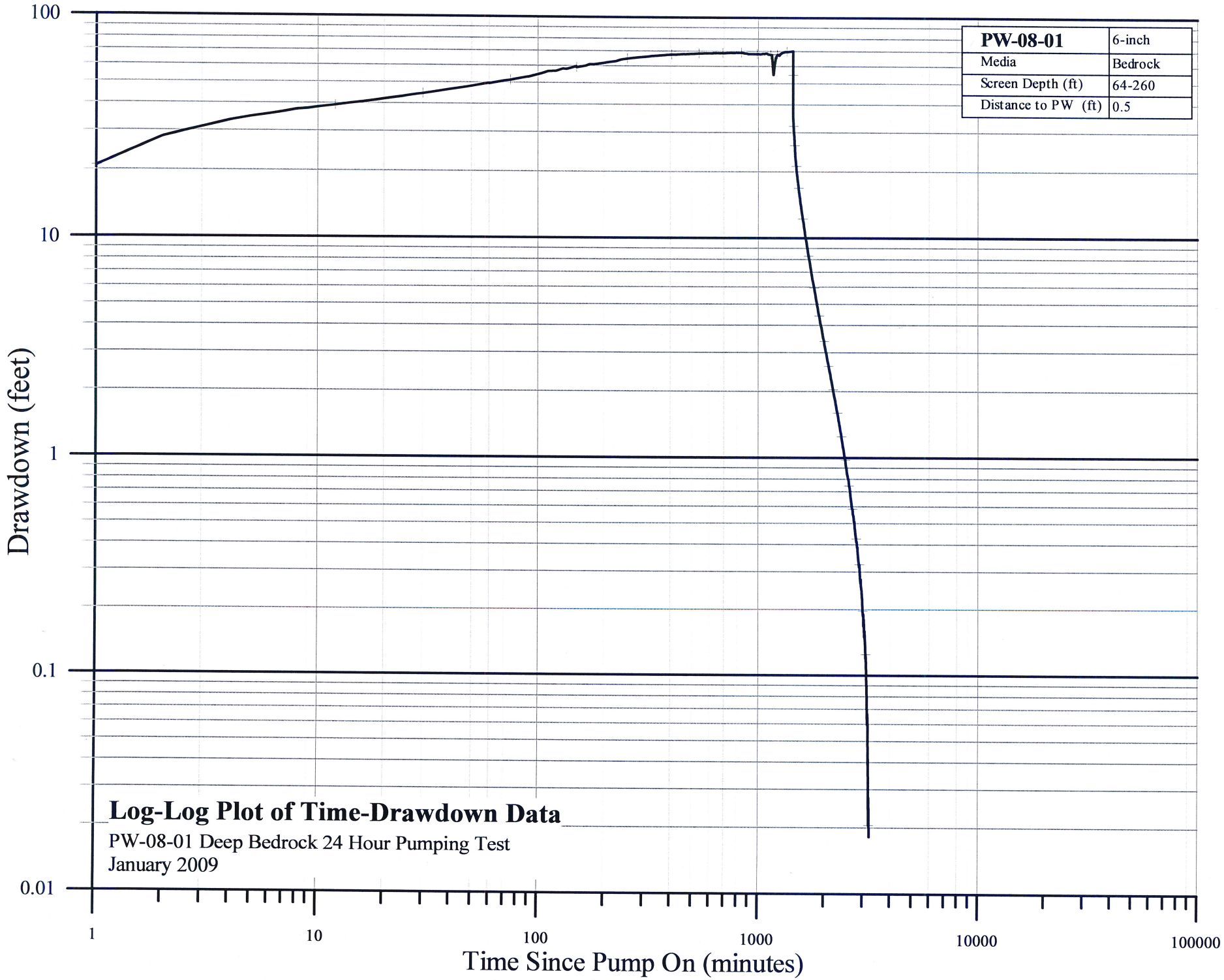
1500 FOOT RADIUS AROUND PUMPING WELLS FOR WATER LEVEL MONITORING

LANDFILL EXPANSION BOUNDARY

P-04-13A P-04-13B P-04-13C
P-04-14A P-04-14B
P-04-10A P-04-10B
P-04-11A P-04-11B
P-04-09B P-04-09A
P-04-08A P-04-08B
P-04-06A P-04-06B
P-04-12A P-04-12B P-04-12C
P-04-07A P-04-07B P-04-07C
P-08-03A P-08-03B
P-08-01 P-08-06
P-08-02
P-08-07
P-08-04
P-04-05A P-04-05B
P-06-04A P-06-04B
P-08-09A
P-08-10A
P-04-01 P-04-02 P-04-03 P-04-04
P-04-101 P-04-102
P-04-103B P-04-104 P-04-105
P-04-110 P-04-109R
P-04-106
P-04-02
P-04-03
P-04-04
P-04-01
P-04-101
P-04-102
P-04-103B
P-04-104
P-04-105
P-04-110

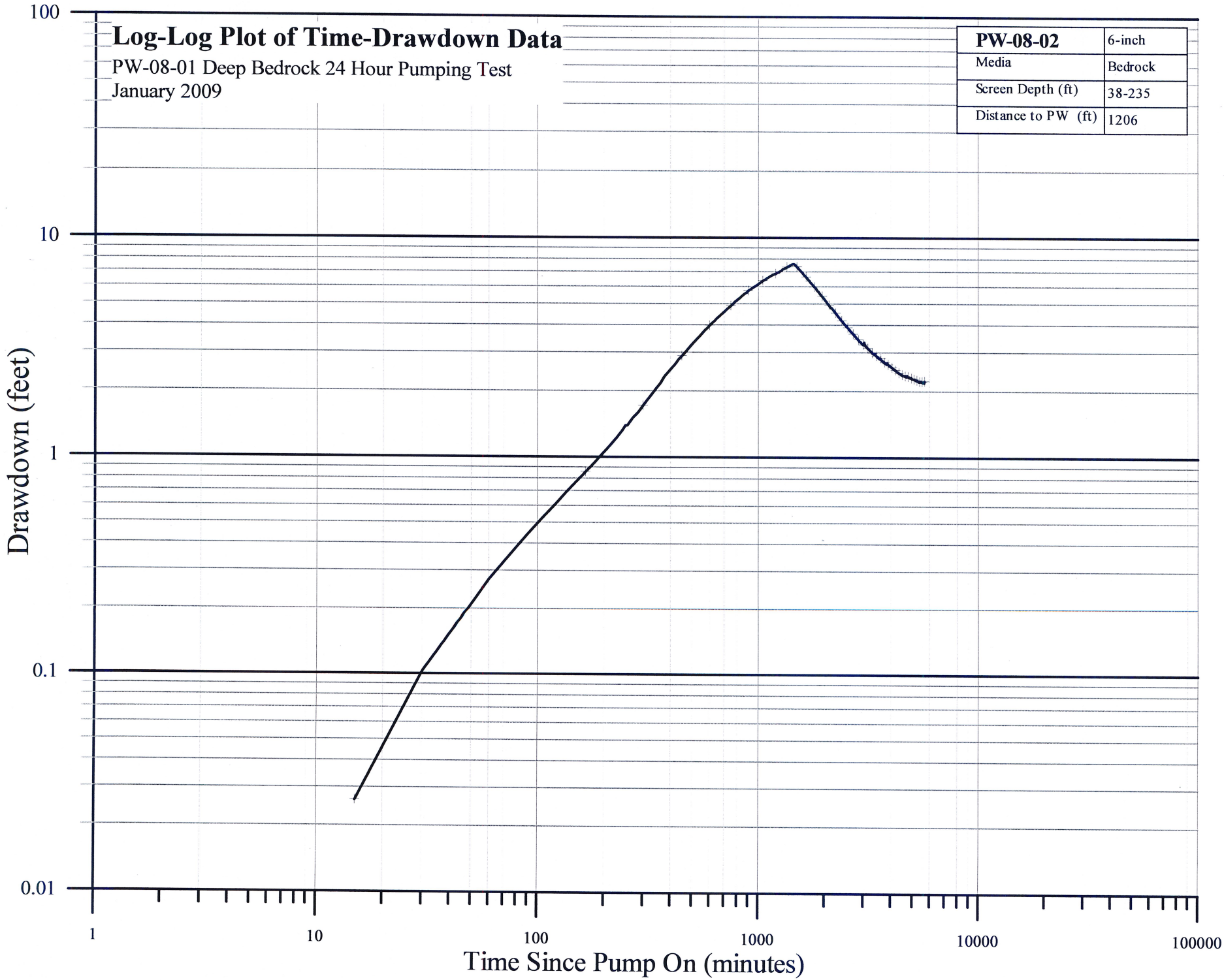
TRANSDUCER DRAWDOWN PLOTS

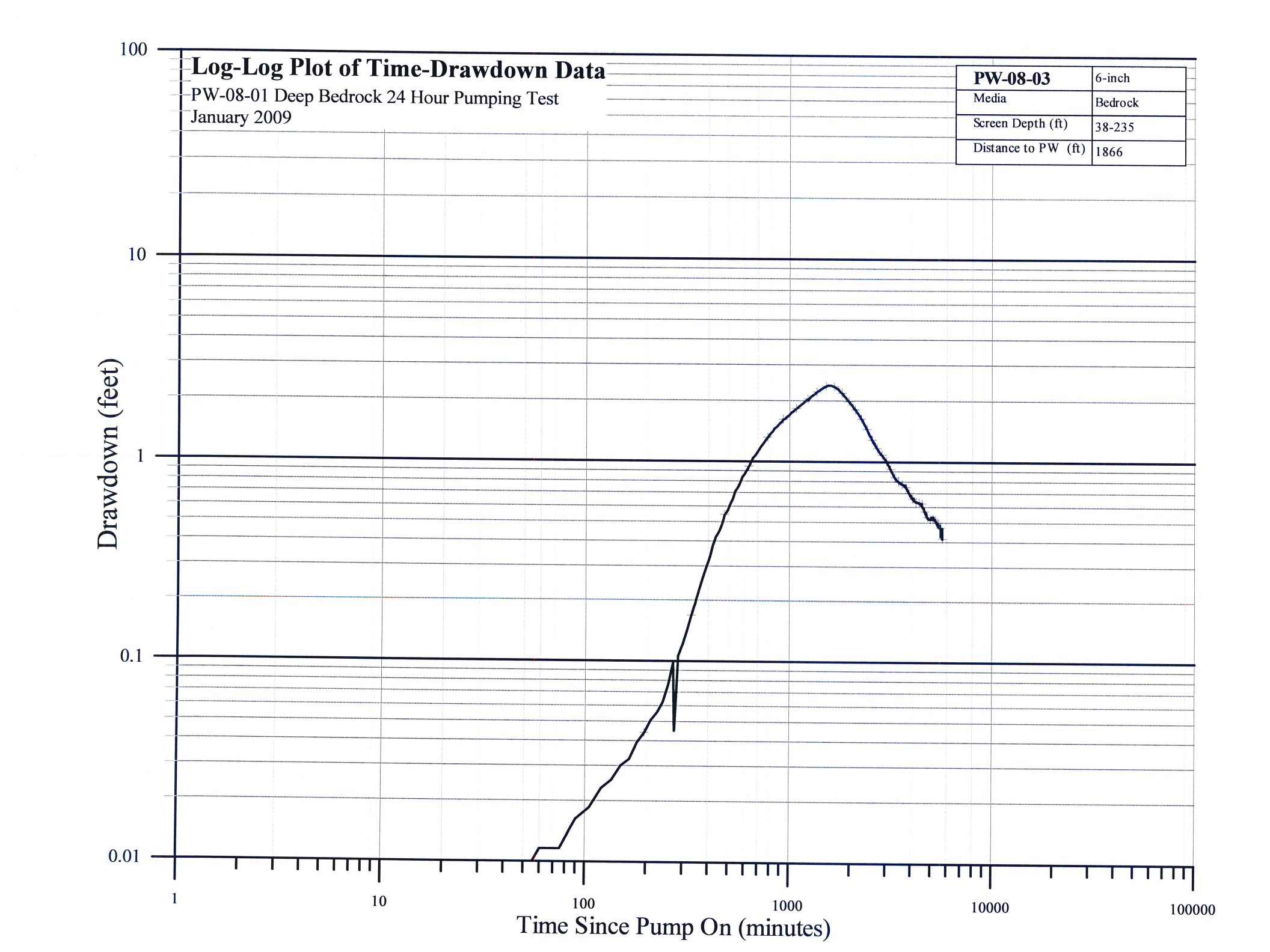

PW-08-01 | 6-inch
Media | Bedrock
Screen Depth (ft) | 64-260
Distance to PW (ft) | 0.5
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)
Log-Log Plot of Time-Drawdown Data
PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009

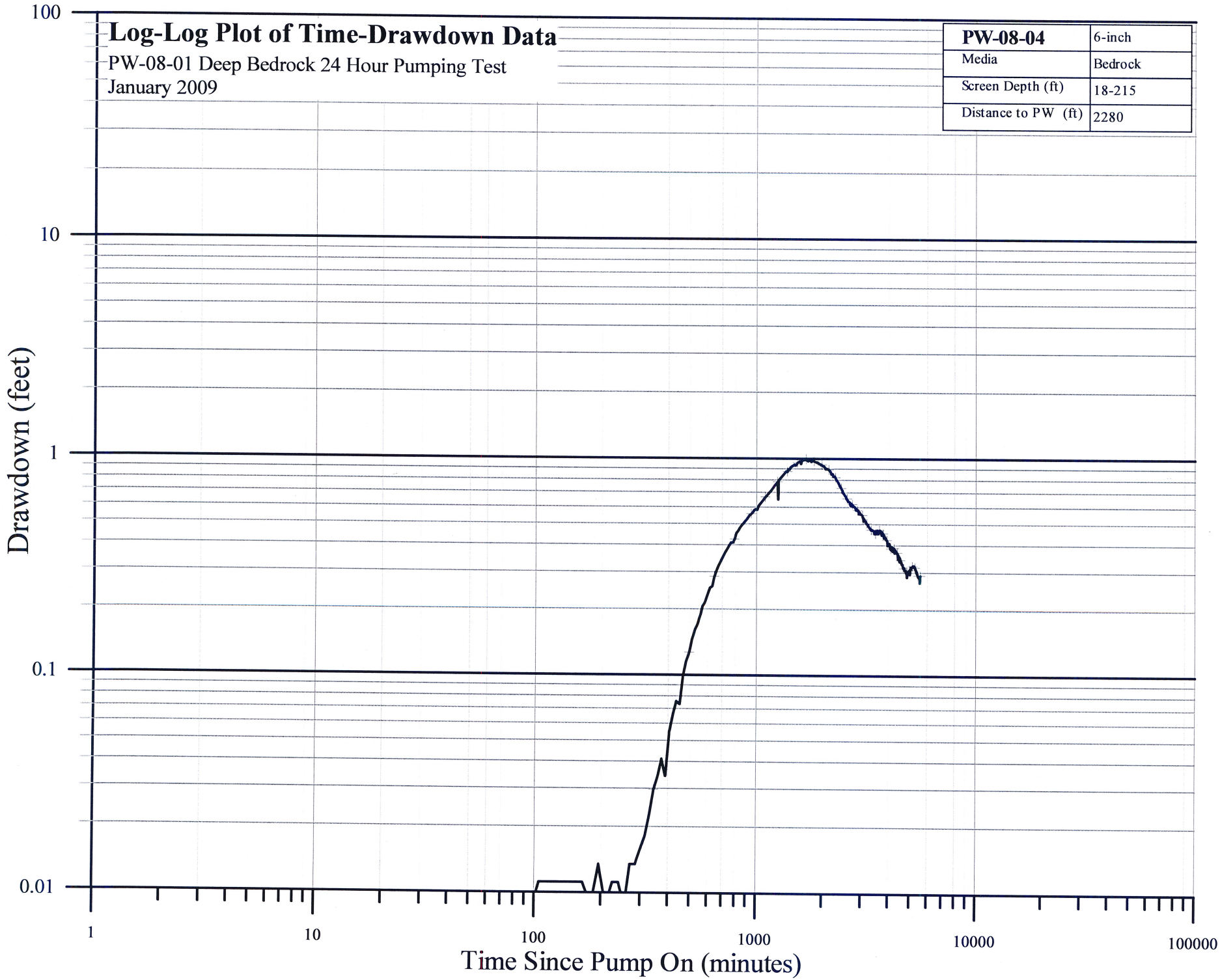
Log-Log Plot of Time-Drawdown Data

PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009

PW-08-02	6-inch
Media	Bedrock
Screen Depth (ft)	38-235
Distance to PW (ft)	1206



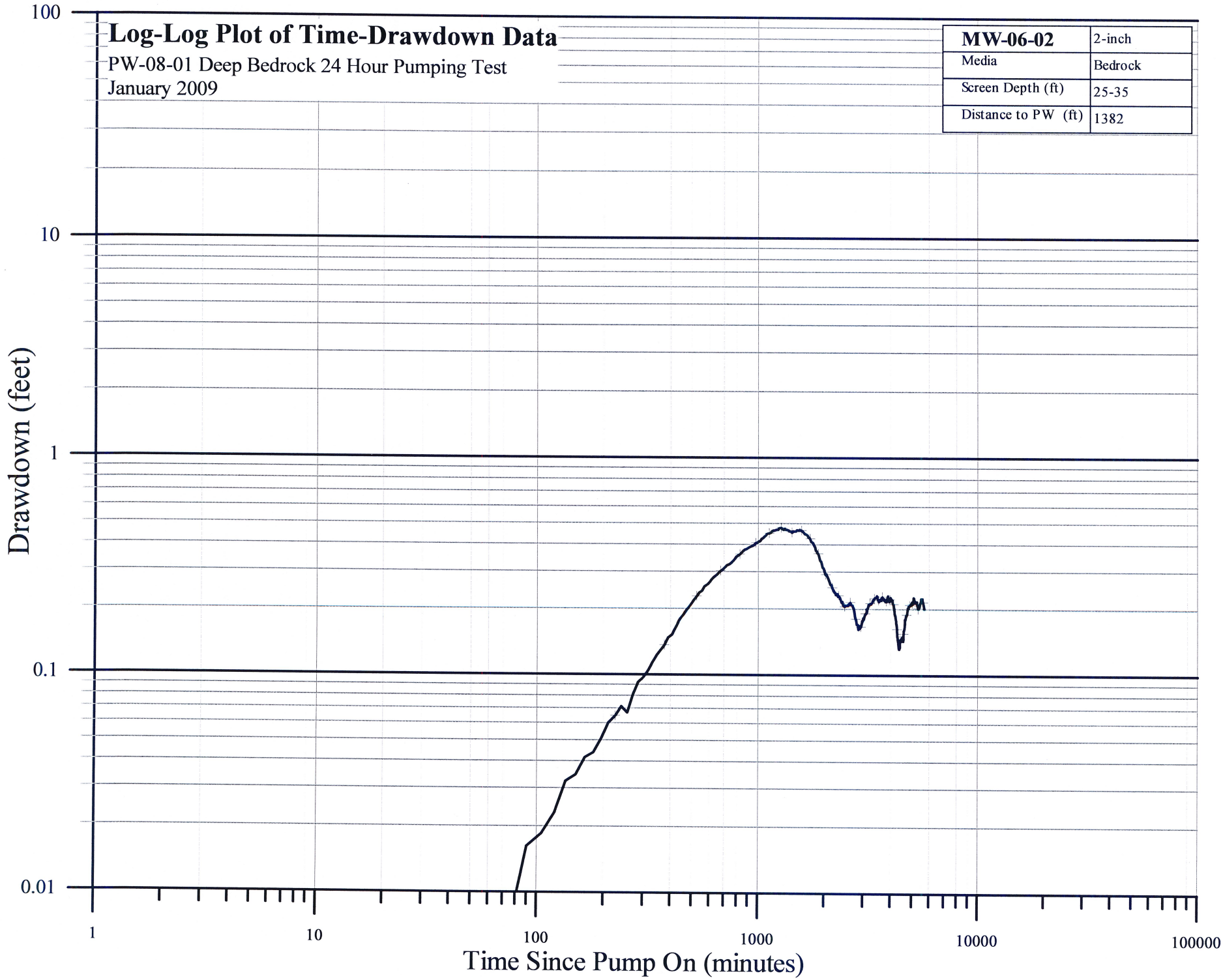

Log-Log Plot of Time-Drawdown Data
PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009
PW-08-03 | 6-inch
Media | Bedrock
Screen Depth (ft) | 38-235
Distance to PW (ft) | 1866
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

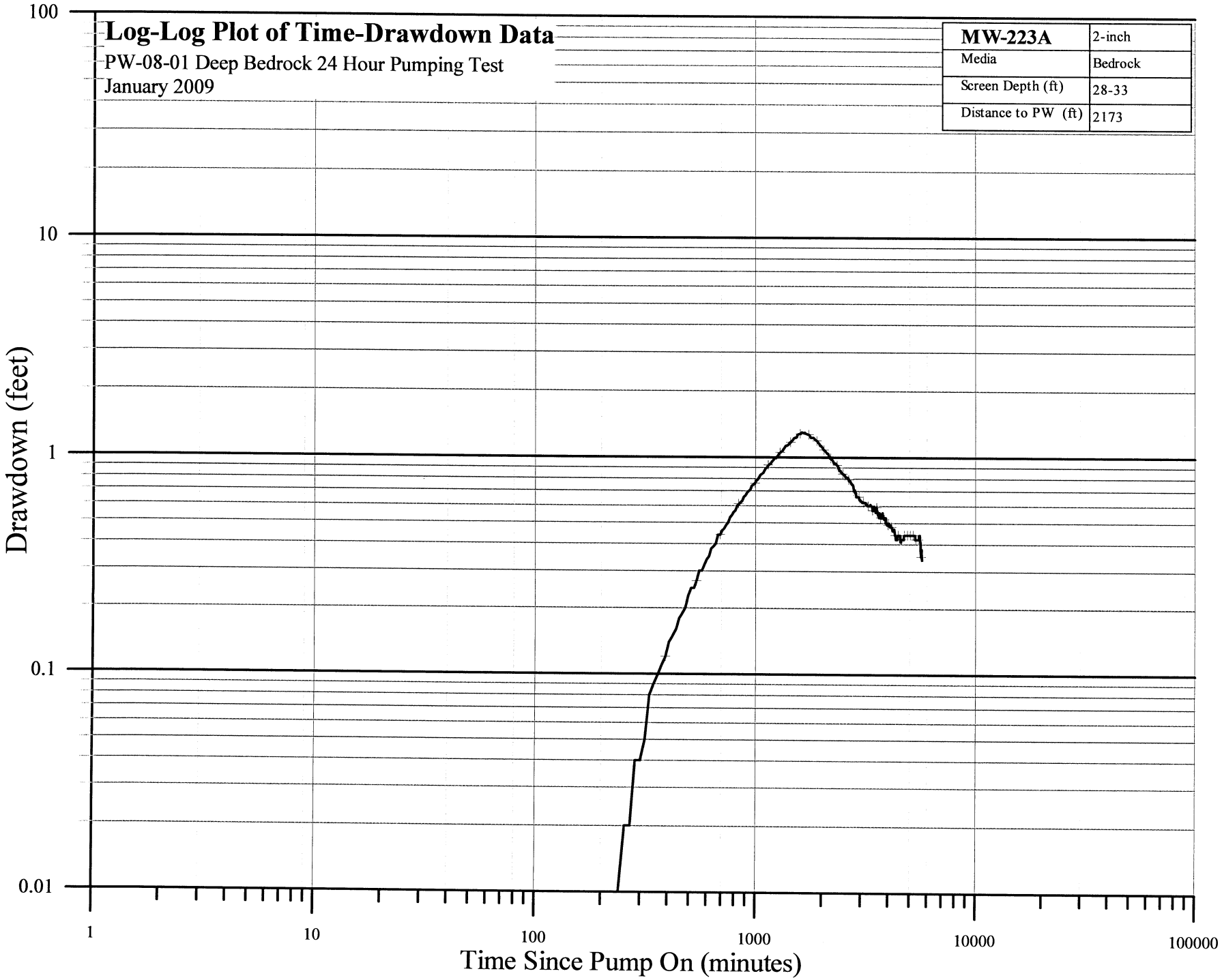

Log-Log Plot of Time-Drawdown Data
PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009
PW-08-04 | 6-inch
Media | Bedrock
Screen Depth (ft) | 18-215
Distance to PW (ft) | 2280
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

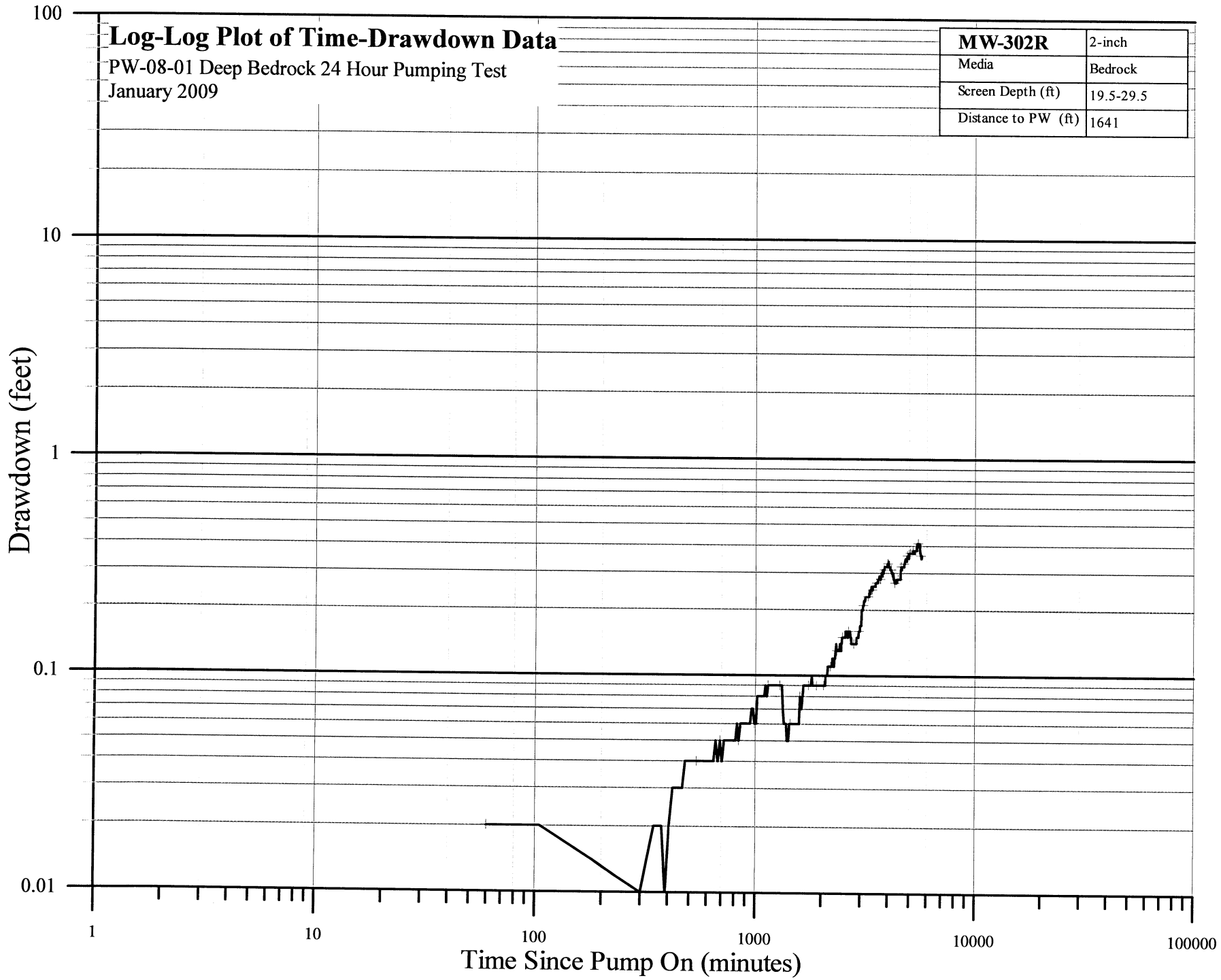
Log-Log Plot of Time-Drawdown Data

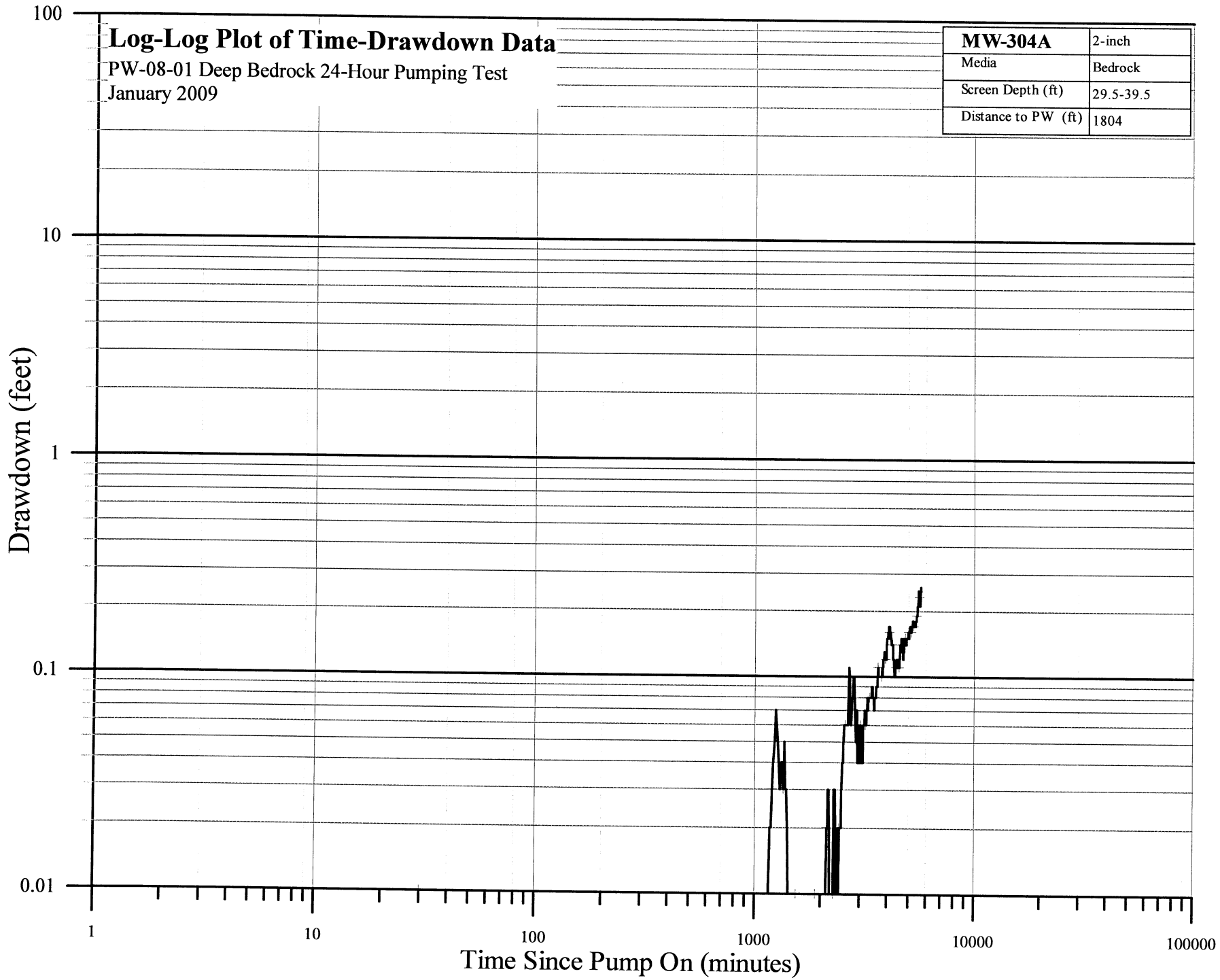
PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009

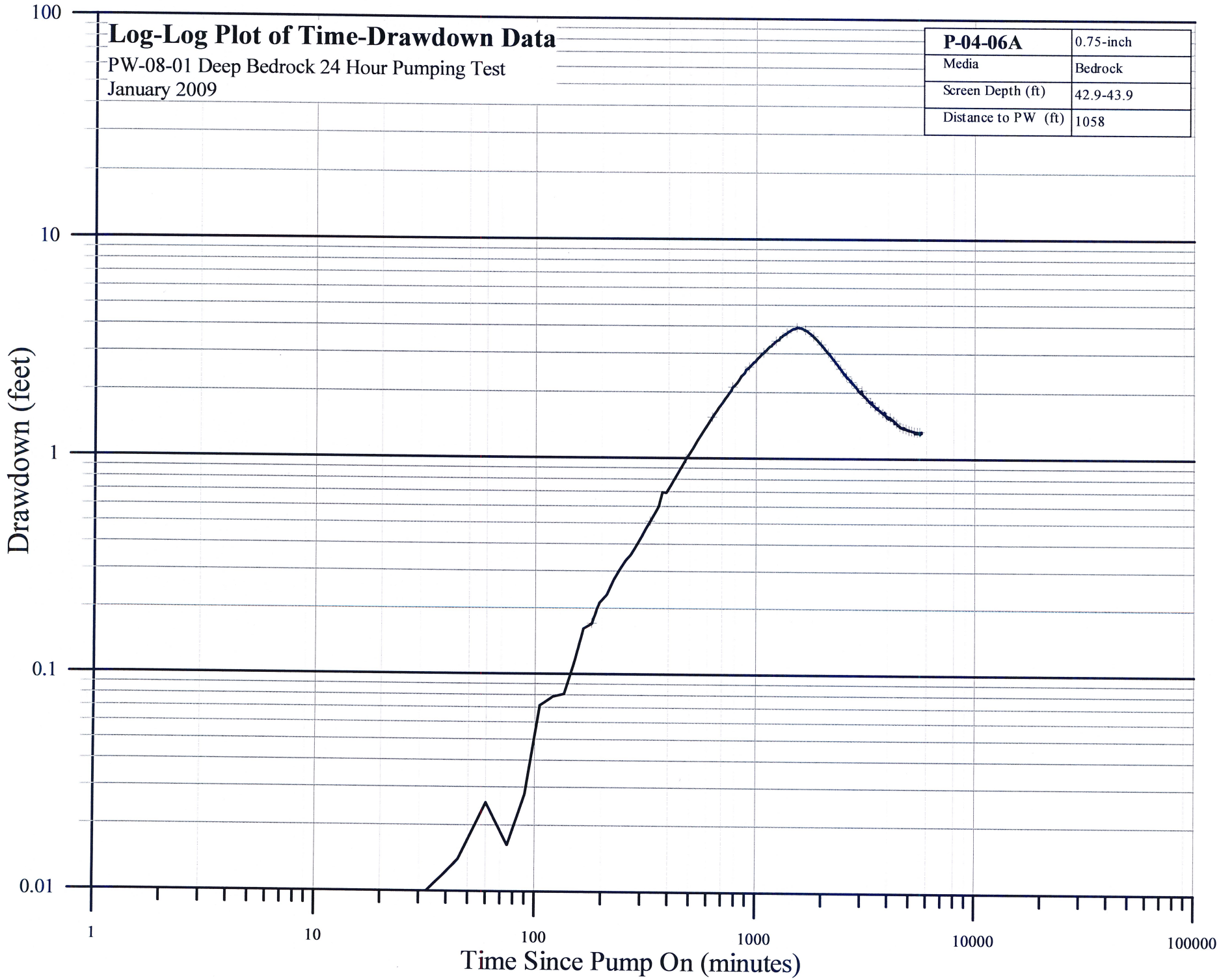
MW-06-02	2-inch
Media	Bedrock
Screen Depth (ft)	25-35
Distance to PW (ft)	1382

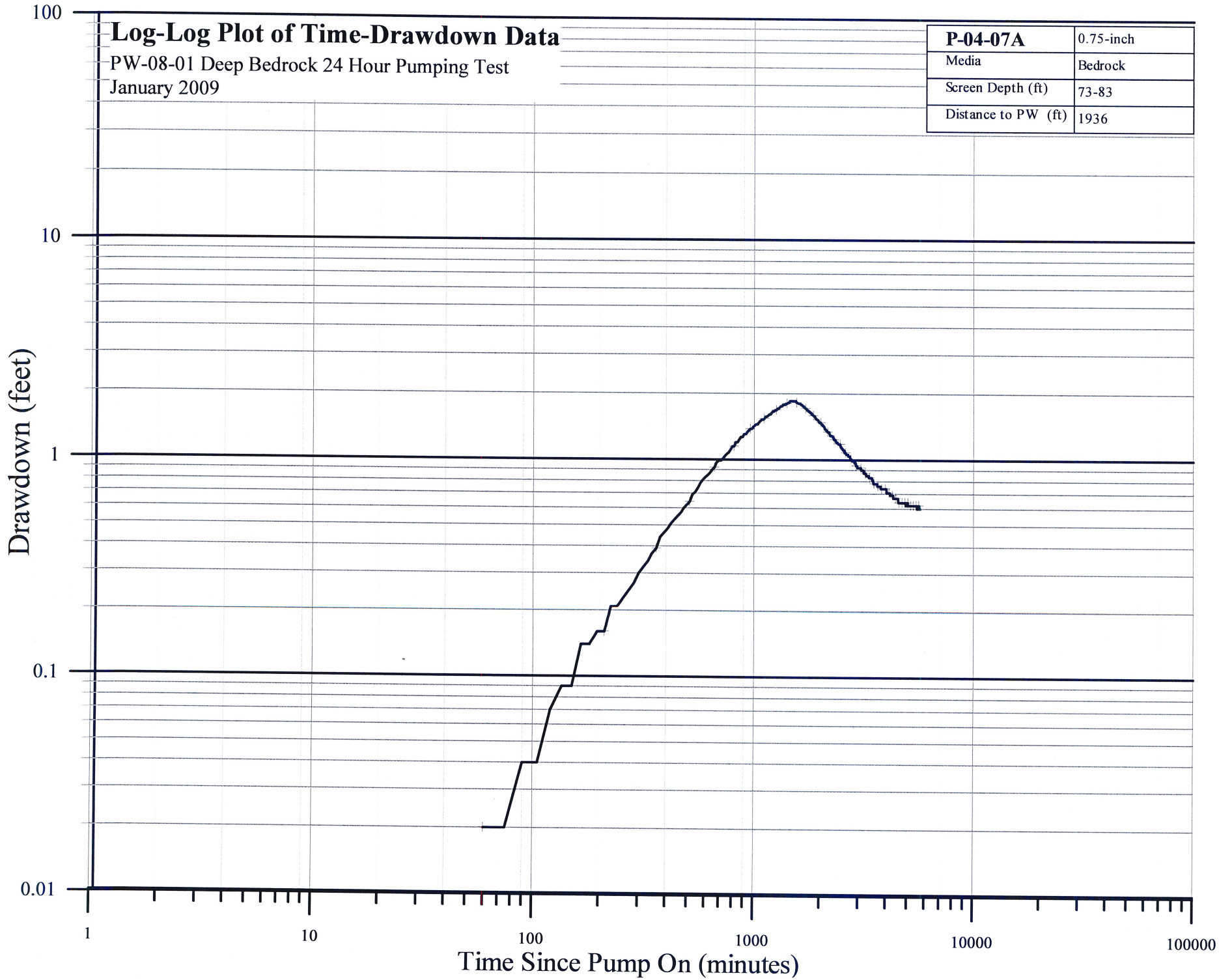



Log-Log Plot of Time-Drawdown Data
PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009
MW-223A
2-inch
Media
Bedrock
Screen Depth (ft)
28-33
Distance to PW (ft)
2173
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009
MW-302R
2-inch
Media
Bedrock
Screen Depth (ft)
19.5-29.5
Distance to PW (ft)
1641
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-01 Deep Bedrock 24-Hour Pumping Test
January 2009
MW-304A
2-inch
Media
Bedrock
Screen Depth (ft)
29.5-39.5
Distance to PW (ft)
1804
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

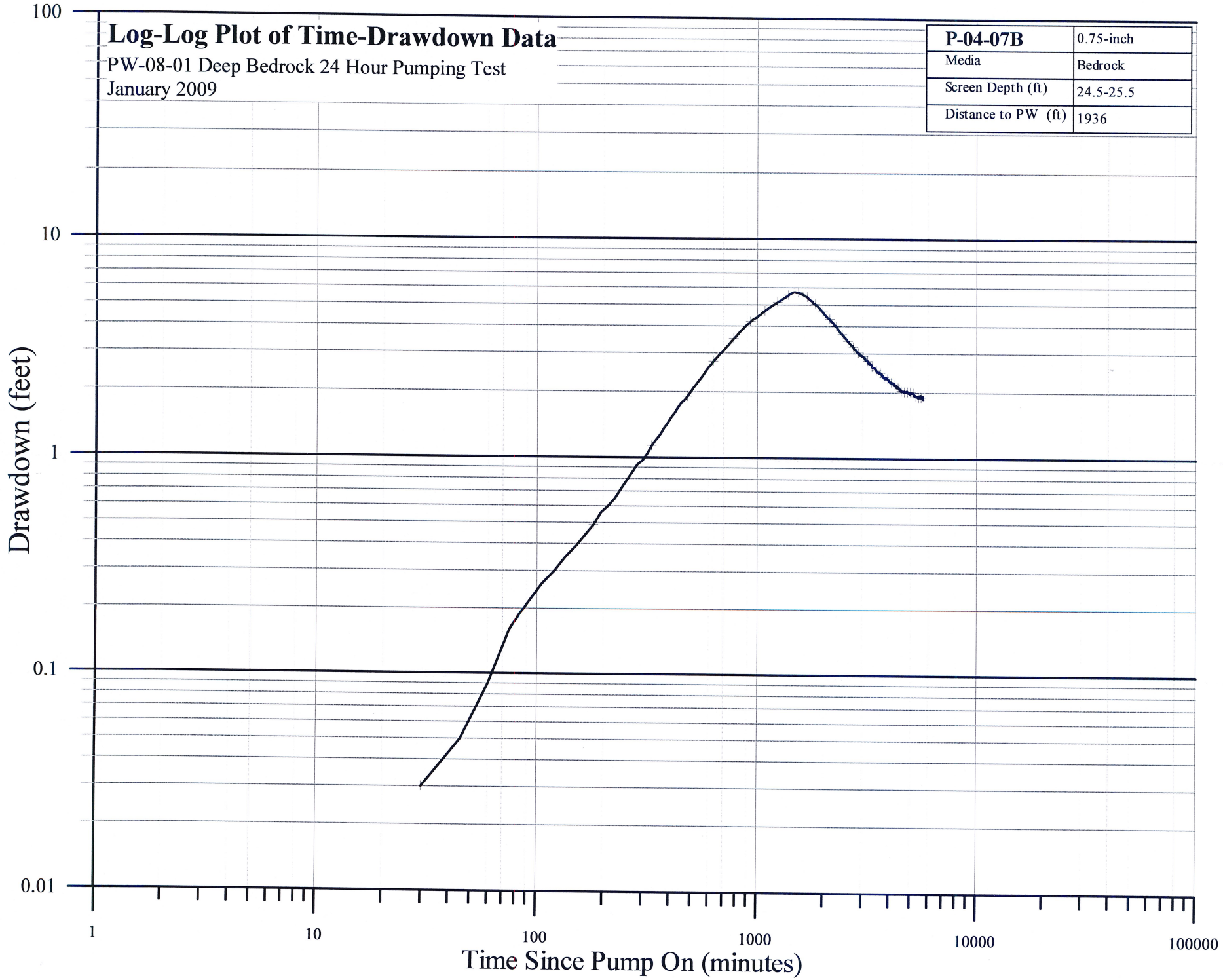

Log-Log Plot of Time-Drawdown Data
PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009
P-04-06A
0.75-inch
Media
Bedrock
Screen Depth (ft)
42.9-43.9
Distance to PW (ft)
1058
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009
P-04-07A
0.75-inch
Media
Bedrock
Screen Depth (ft)
73-83
Distance to PW (ft)
1936
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

Log-Log Plot of Time-Drawdown Data

PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009

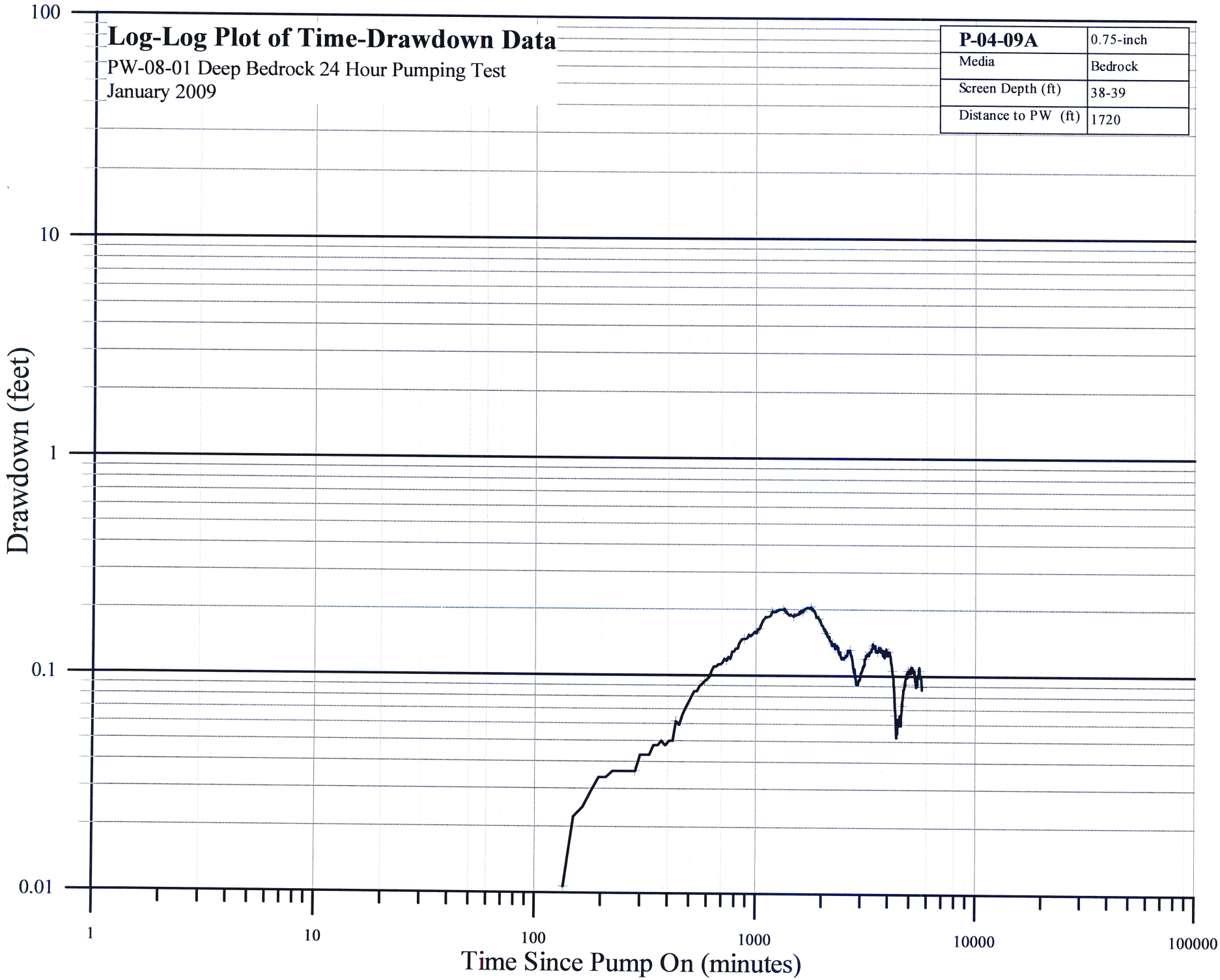
P-04-07B	0.75-inch
Media	Bedrock
Screen Depth (ft)	24.5-25.5
Distance to PW (ft)	1936



Log-Log Plot of Time-Drawdown Data

PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009

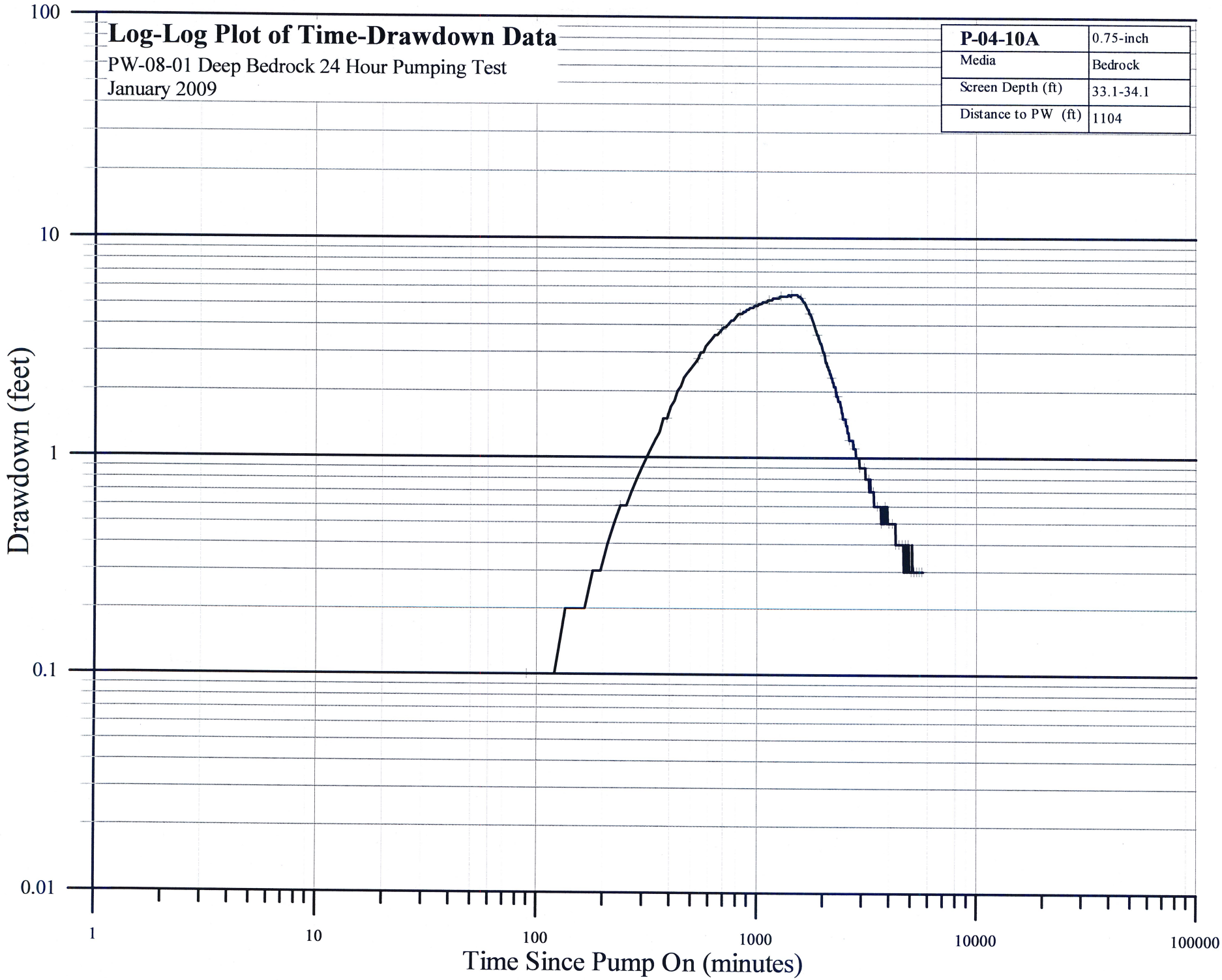
P-04-09A	0.75-inch
Media	Bedrock
Screen Depth (ft)	38-39
Distance to PW (ft)	1720



Log-Log Plot of Time-Drawdown Data

PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009

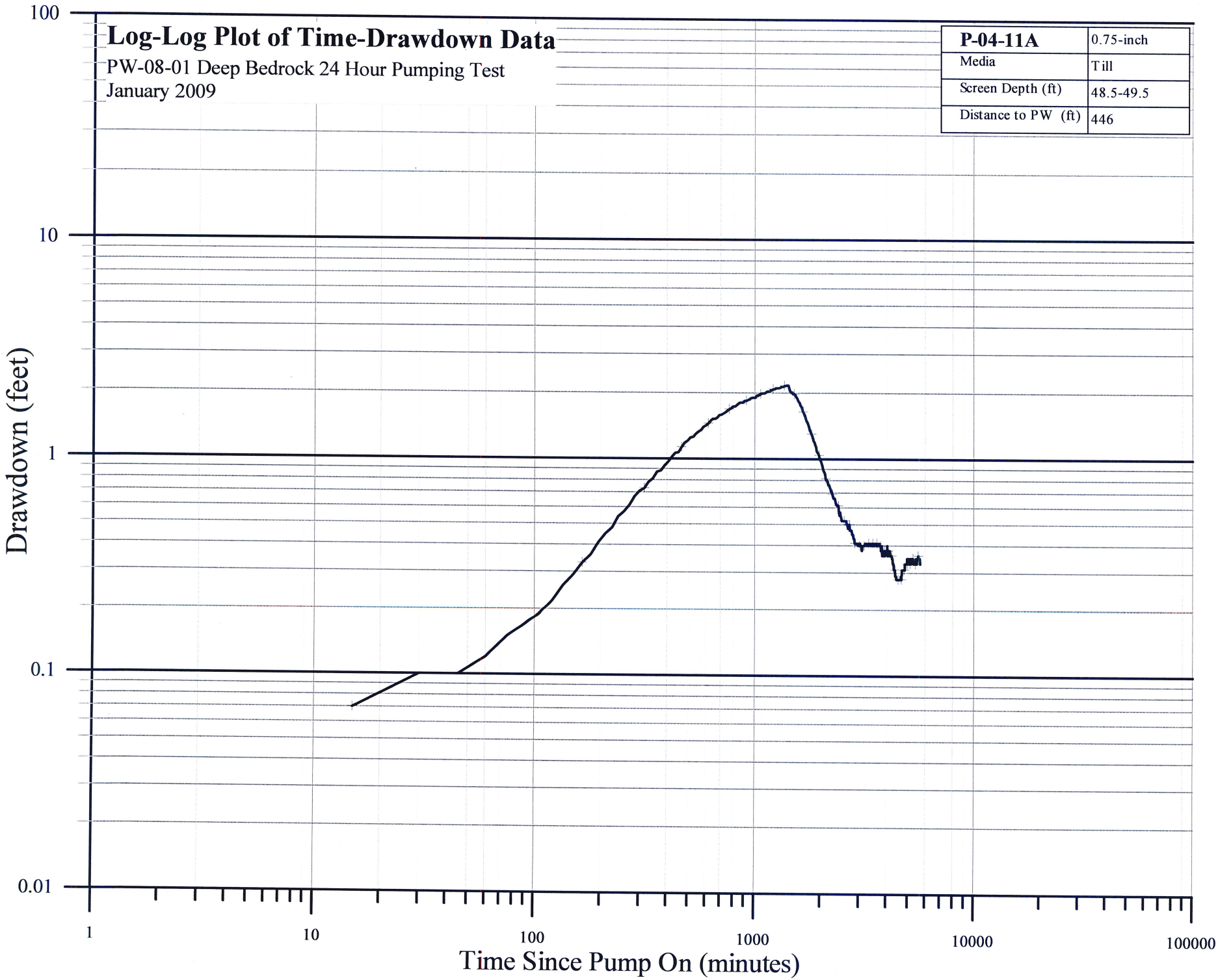
P-04-10A	0.75-inch
Media	Bedrock
Screen Depth (ft)	33.1-34.1
Distance to PW (ft)	1104

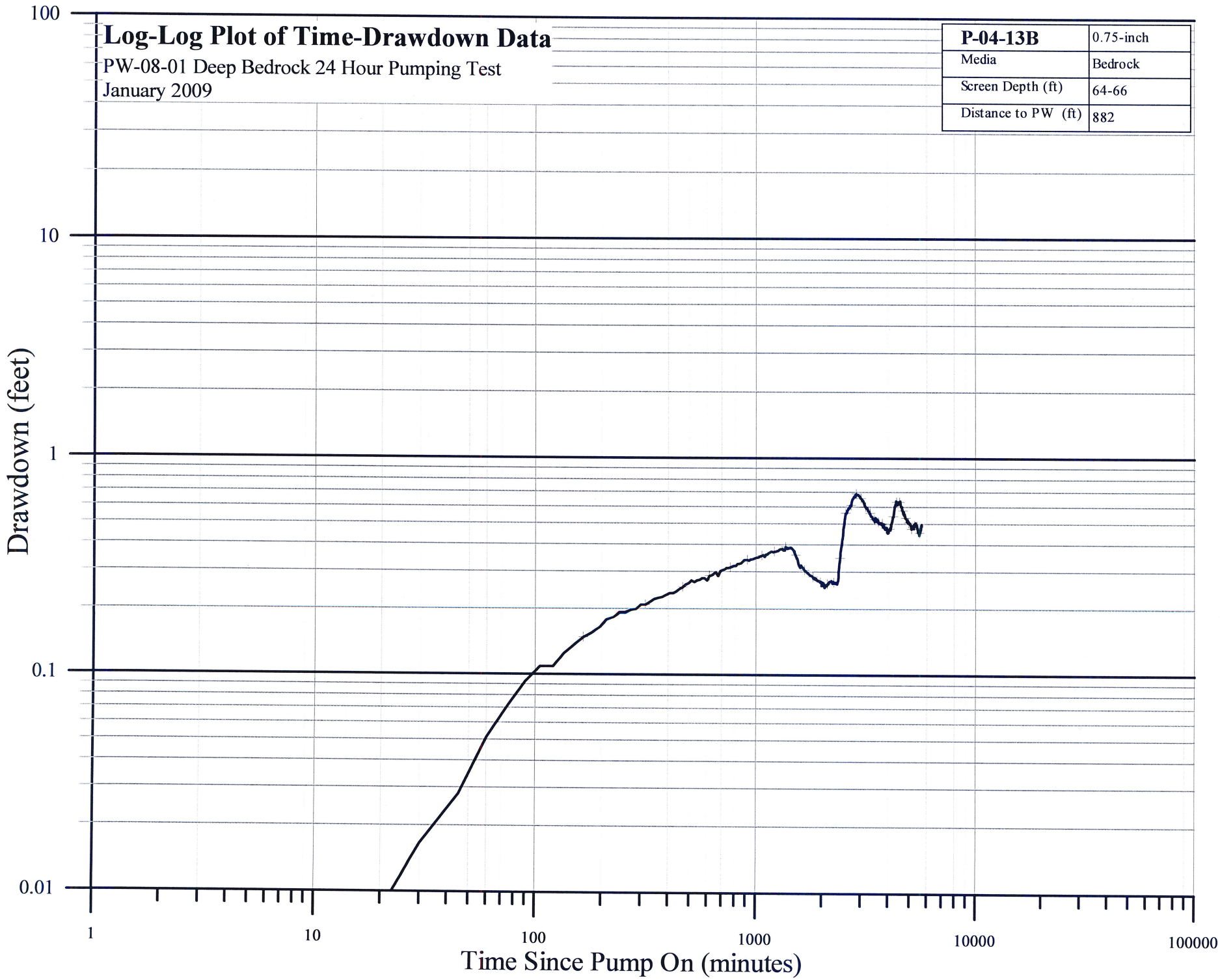


Log-Log Plot of Time-Drawdown Data

PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009

P-04-11A	0.75-inch
Media	Till
Screen Depth (ft)	48.5-49.5
Distance to PW (ft)	446

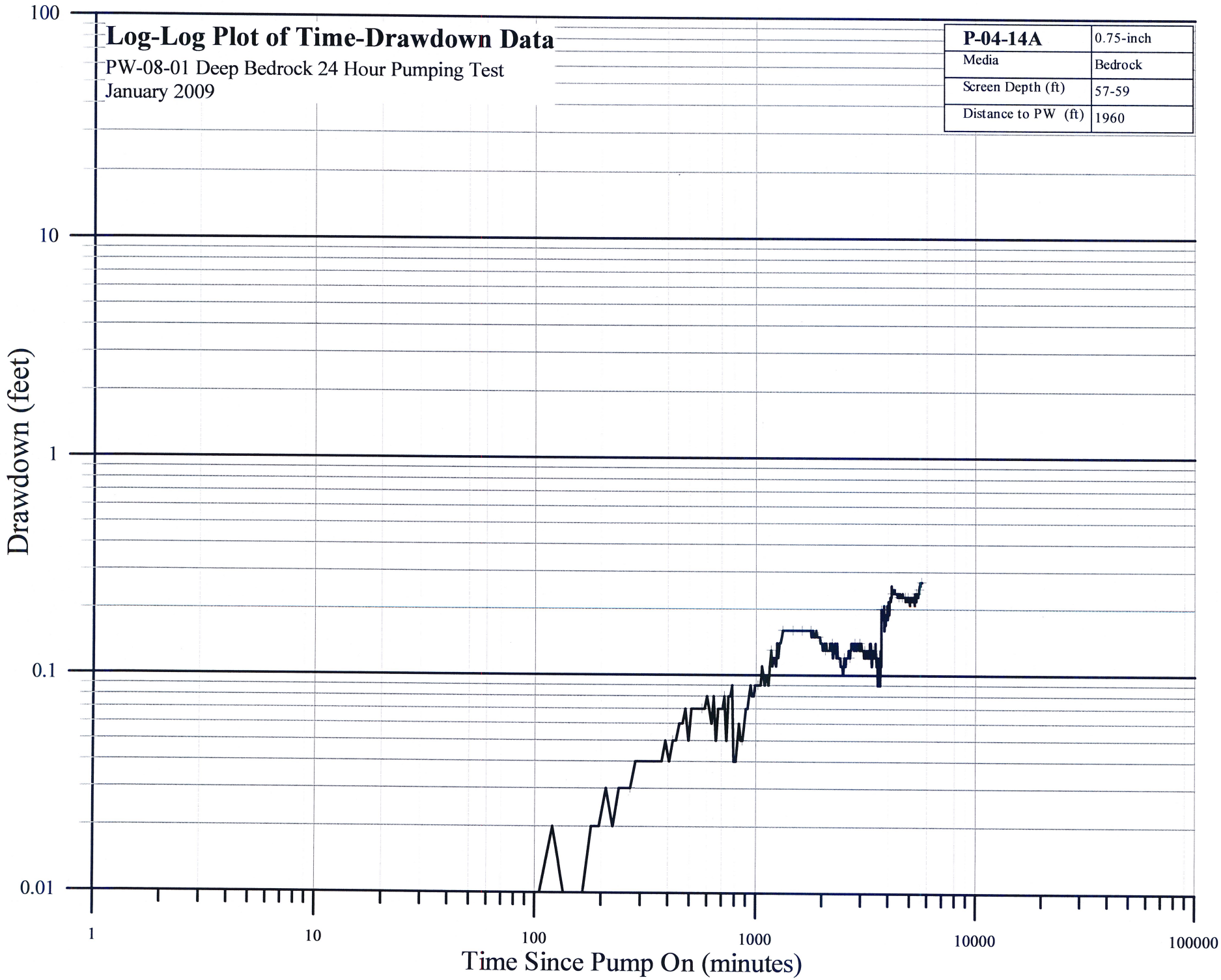


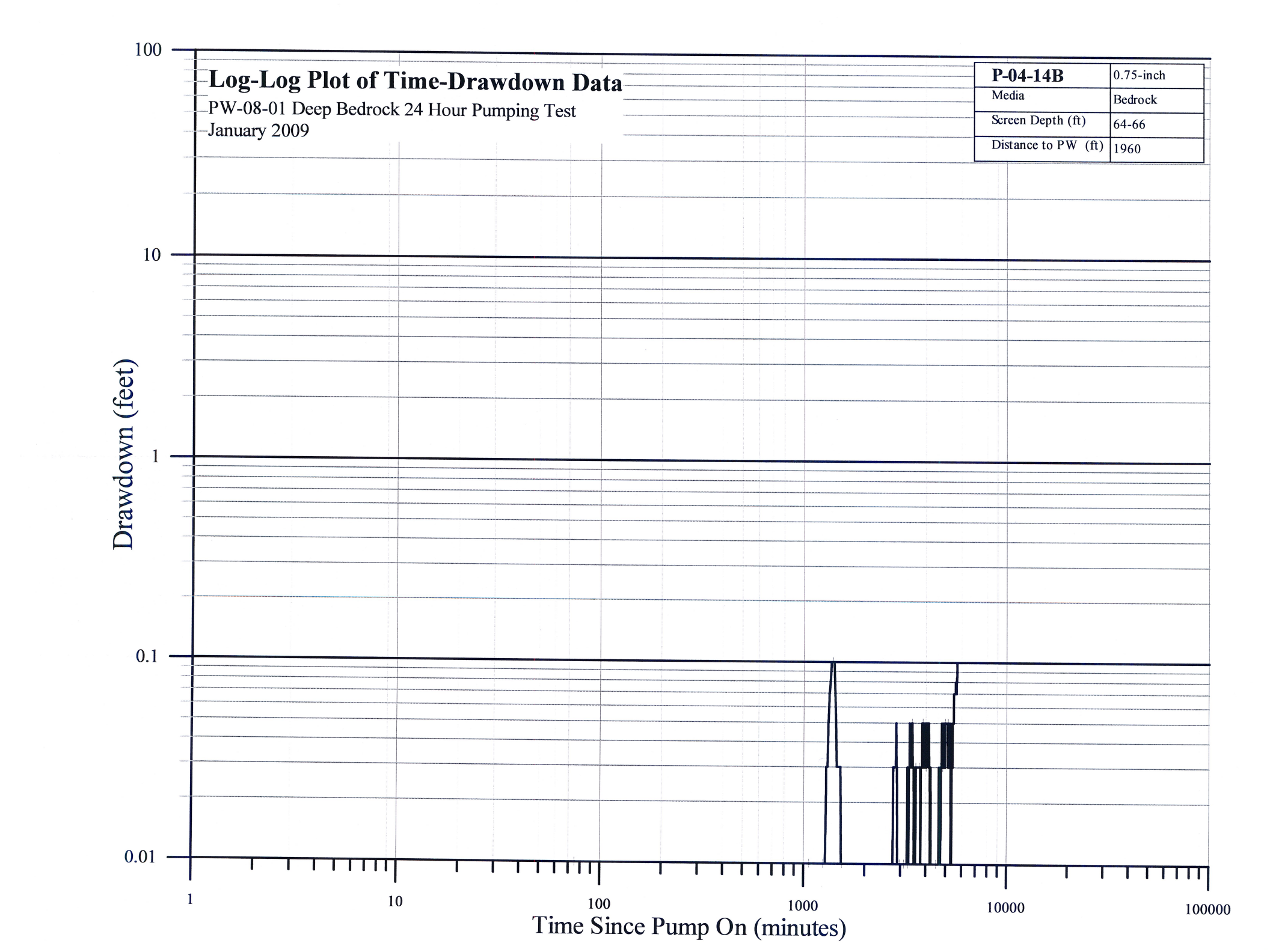

Log-Log Plot of Time-Drawdown Data
PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009
P-04-13B
0.75-inch
Media
Bedrock
Screen Depth (ft)
64-66
Distance to PW (ft)
882
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

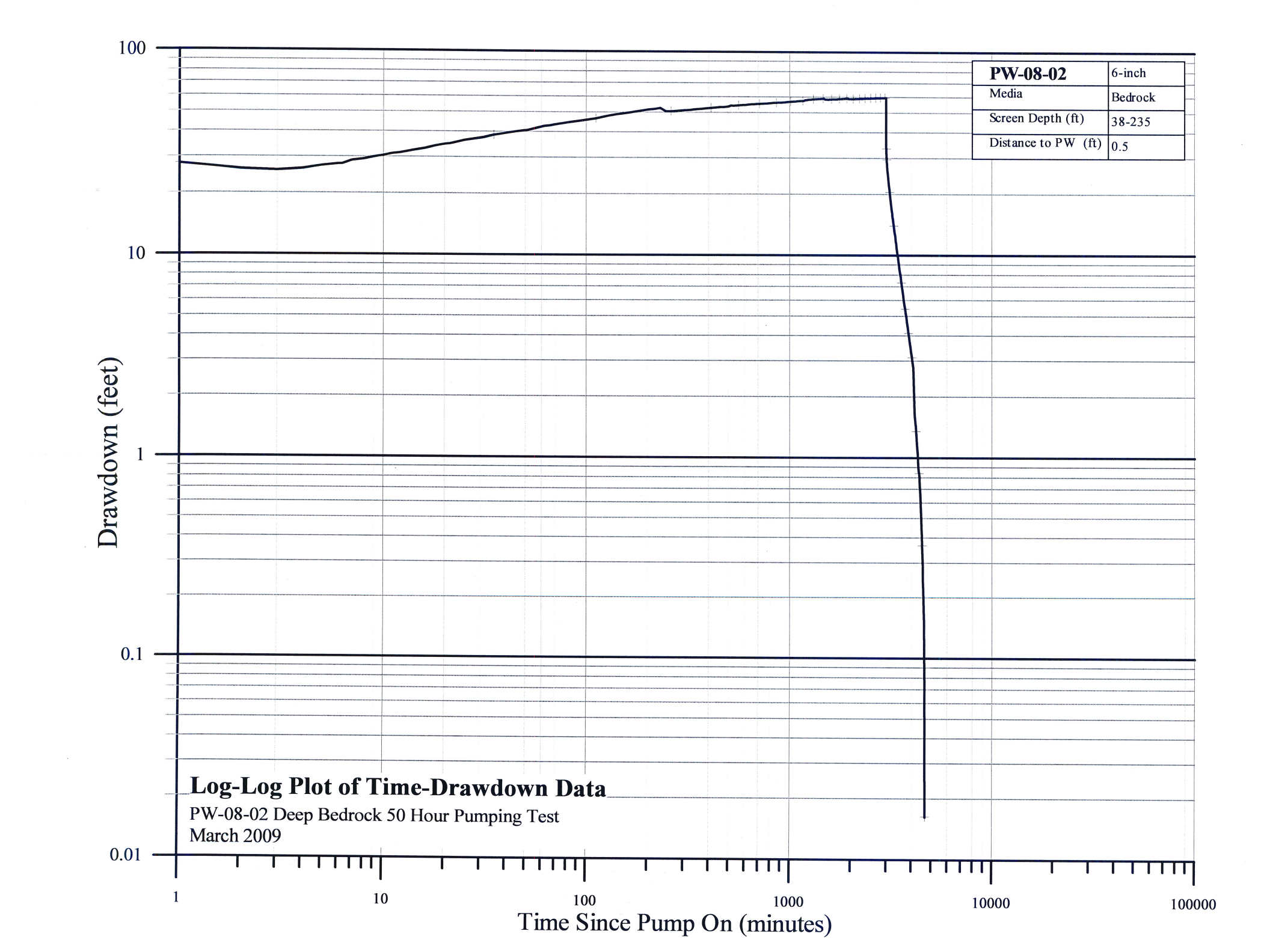
Log-Log Plot of Time-Drawdown Data

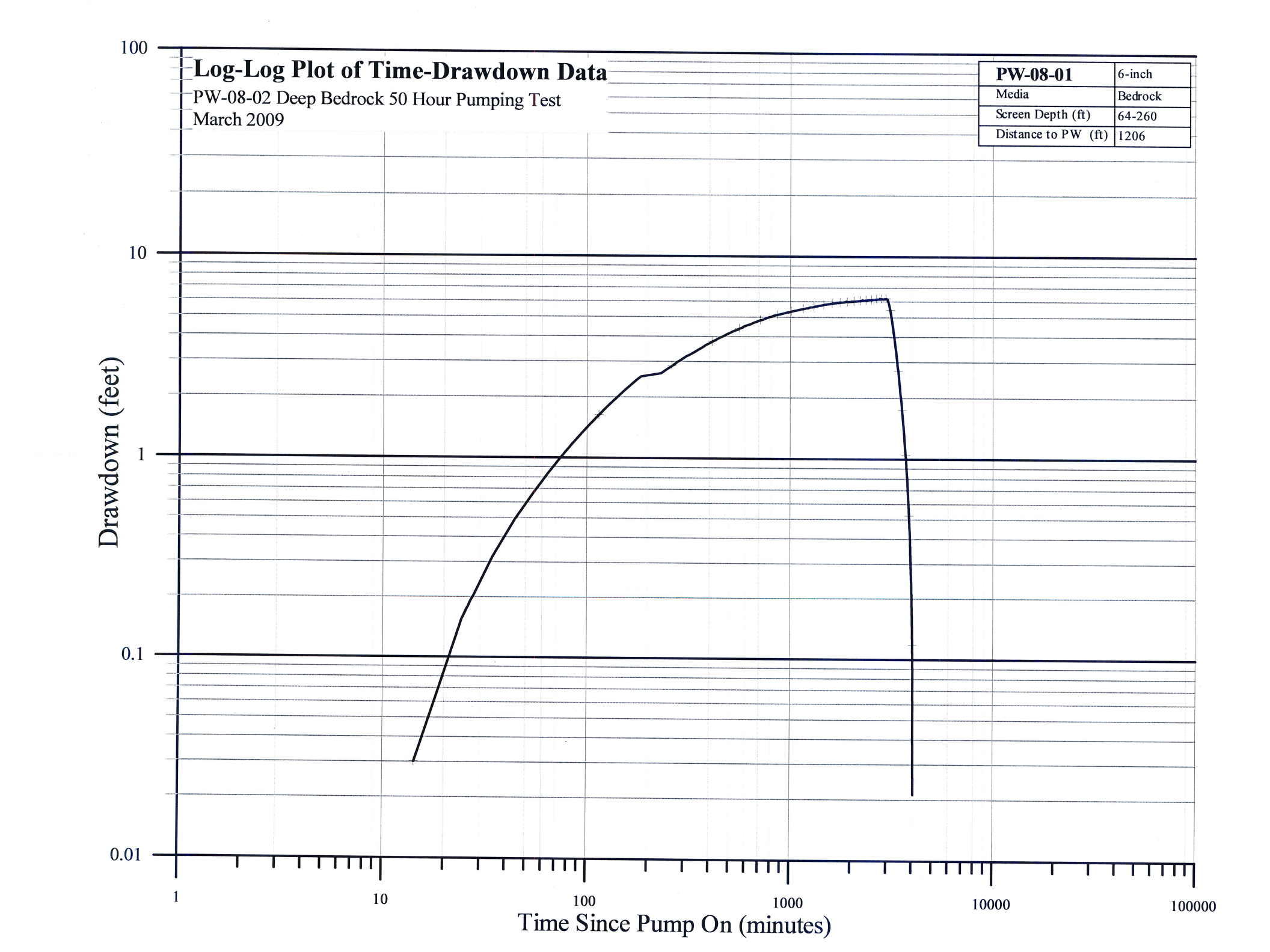
PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009

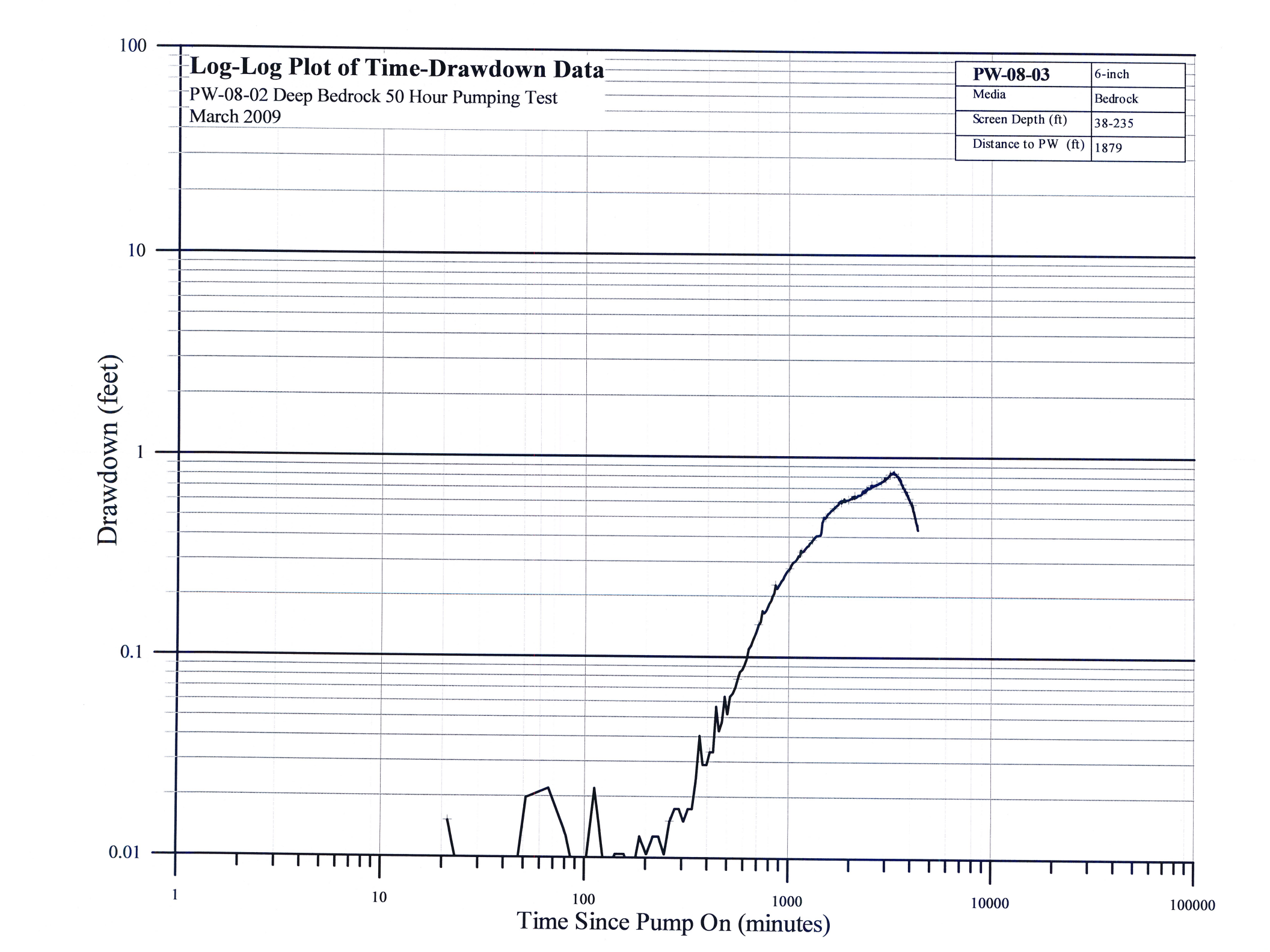
P-04-14A	0.75-inch
Media	Bedrock
Screen Depth (ft)	57-59
Distance to PW (ft)	1960

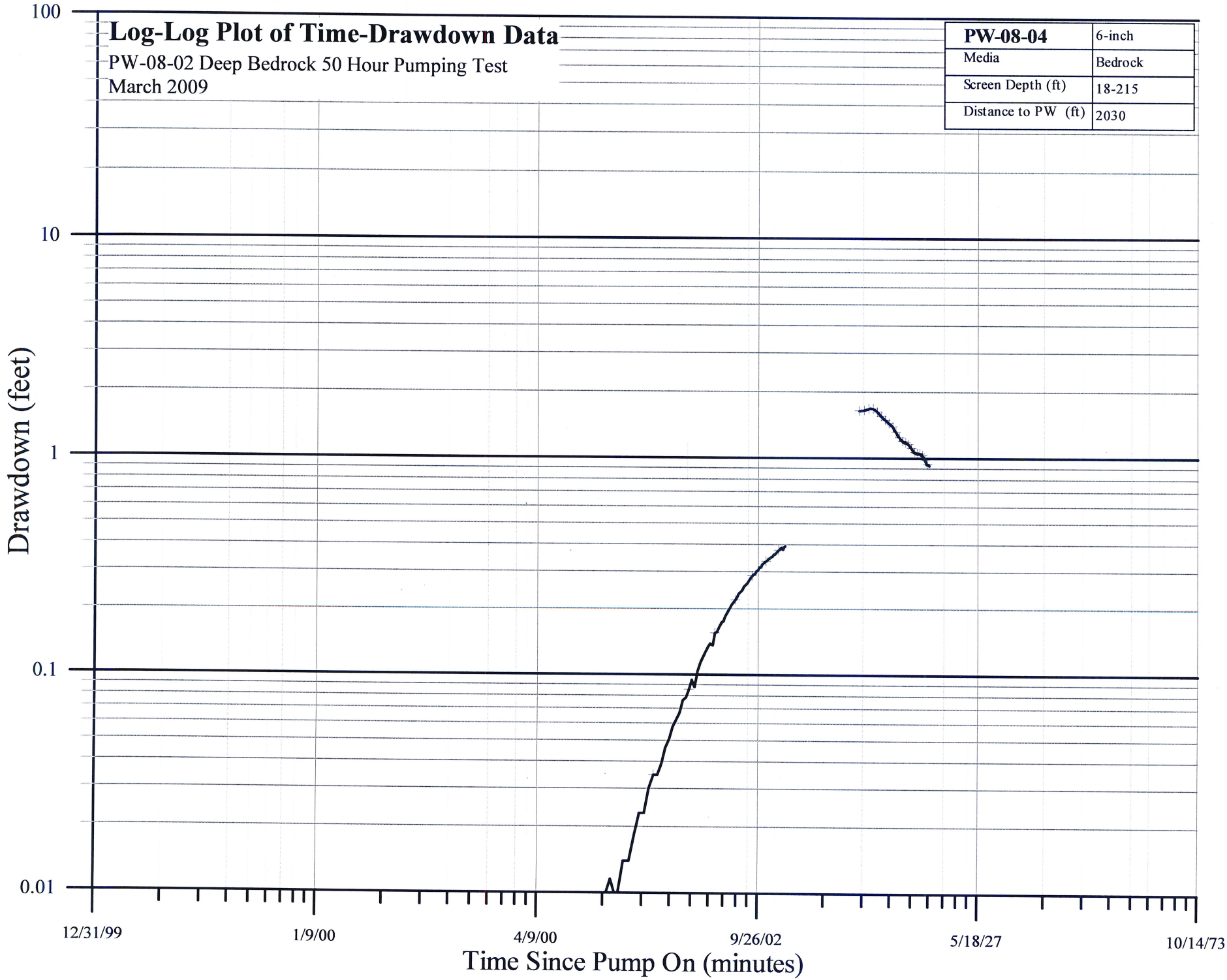


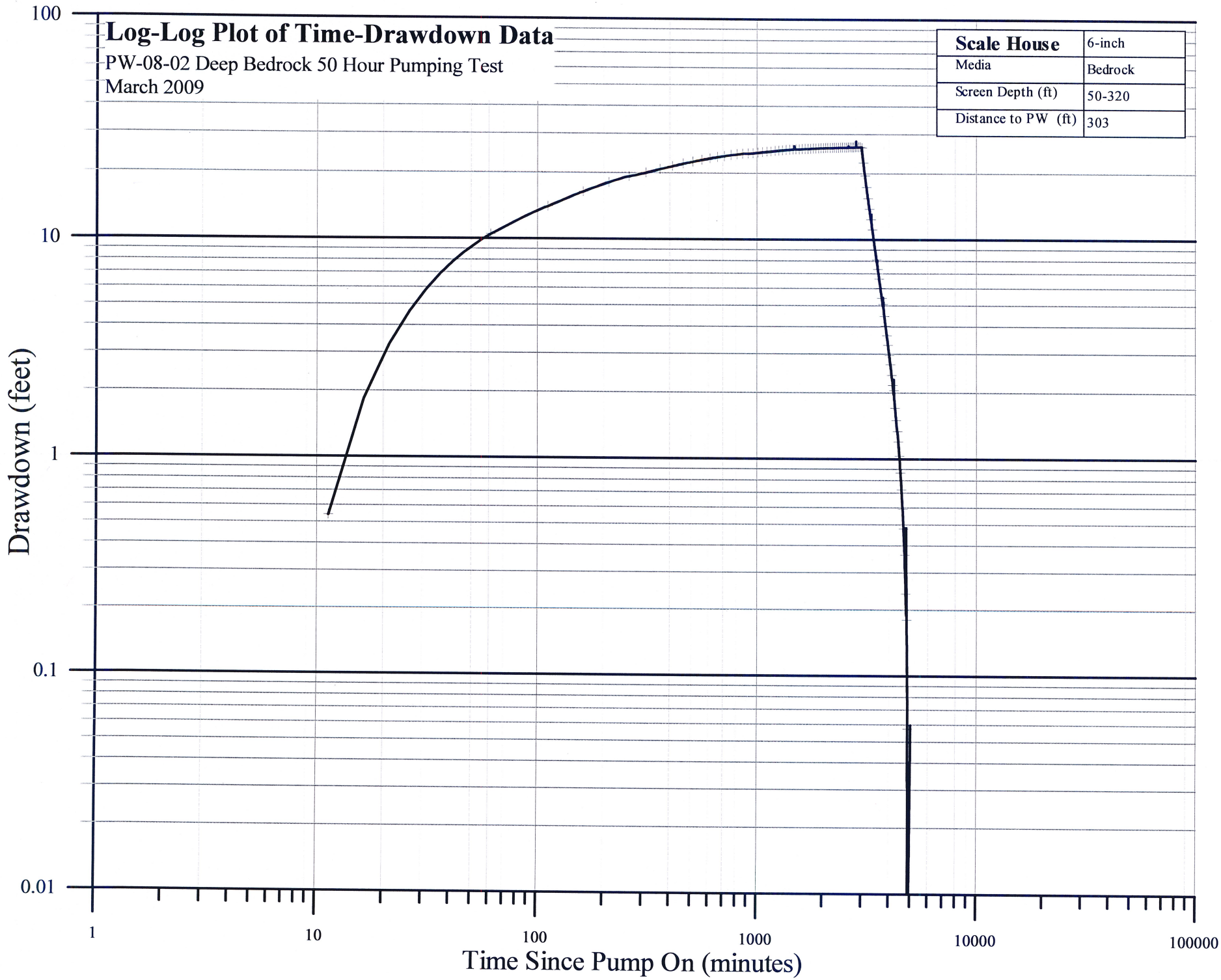

Log-Log Plot of Time-Drawdown Data
PW-08-01 Deep Bedrock 24 Hour Pumping Test
January 2009
P-04-14B
0.75-inch
Media
Bedrock
Screen Depth (ft)
64-66
Distance to PW (ft)
1960
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

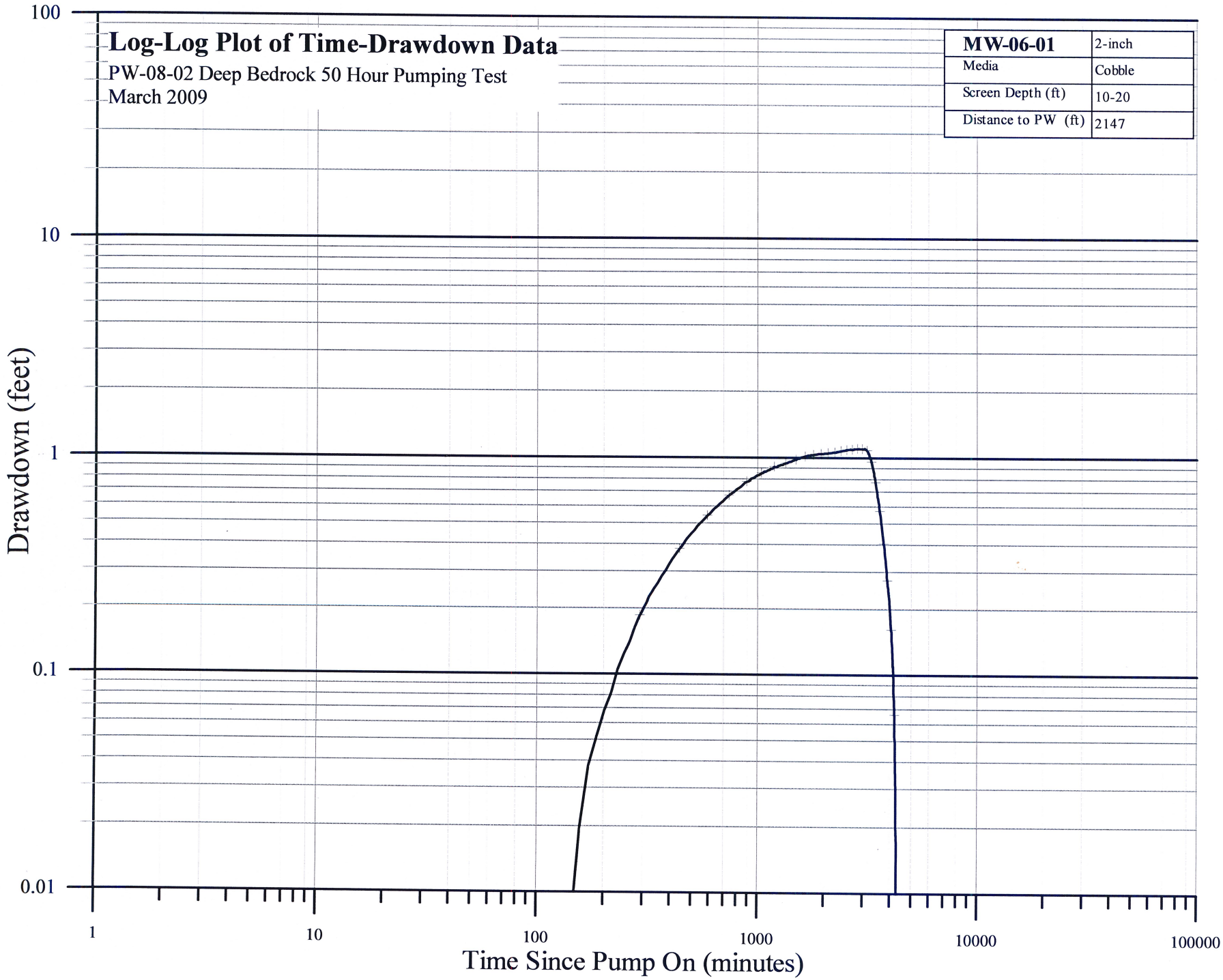

PW-08-02
6-inch
Media
Bedrock
Screen Depth (ft)
38-235
Distance to PW (ft)
0.5
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)
Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009

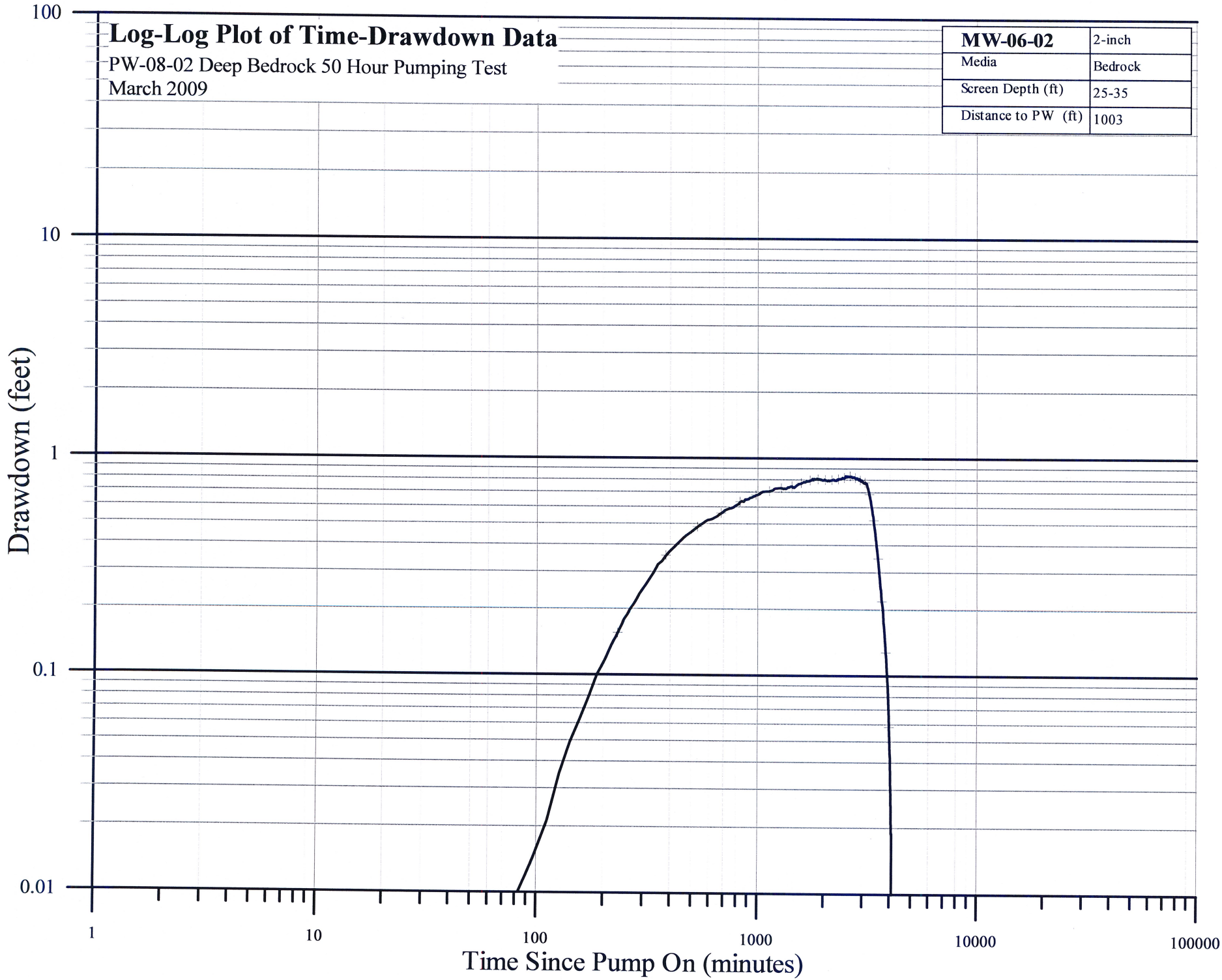

Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
PW-08-01 | 6-inch
Media | Bedrock
Screen Depth (ft) | 64-260
Distance to PW (ft) | 1206
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
PW-08-03 | 6-inch
Media | Bedrock
Screen Depth (ft) | 38-235
Distance to PW (ft) | 1879
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

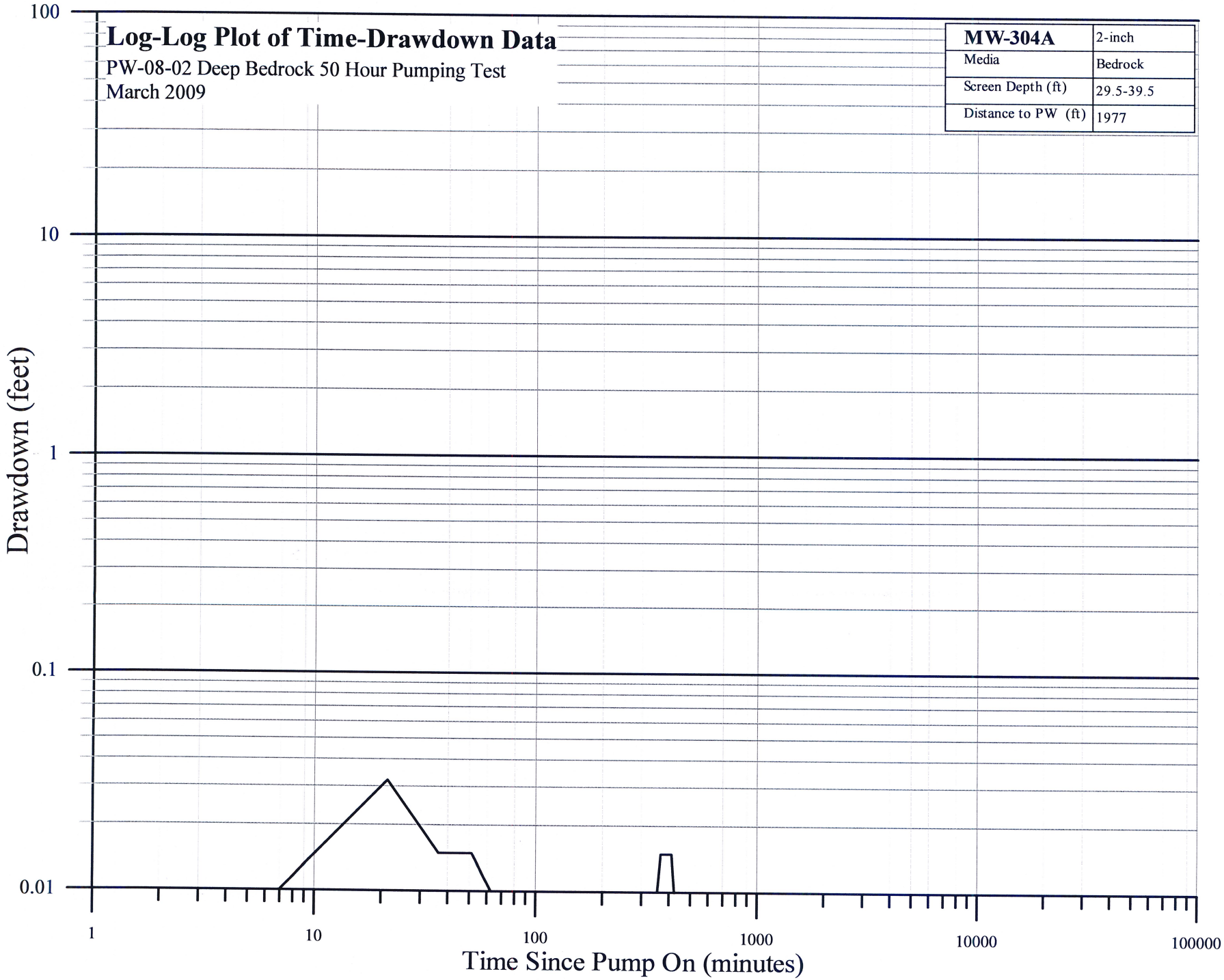

Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
PW-08-04 | 6-inch
Media | Bedrock
Screen Depth (ft) | 18-215
Distance to PW (ft) | 2030
100
10
1
0.1
0.01
Drawdown (feet)
12/31/99
1/9/00
4/9/00
9/26/02
5/18/27
10/14/73
Time Since Pump On (minutes)

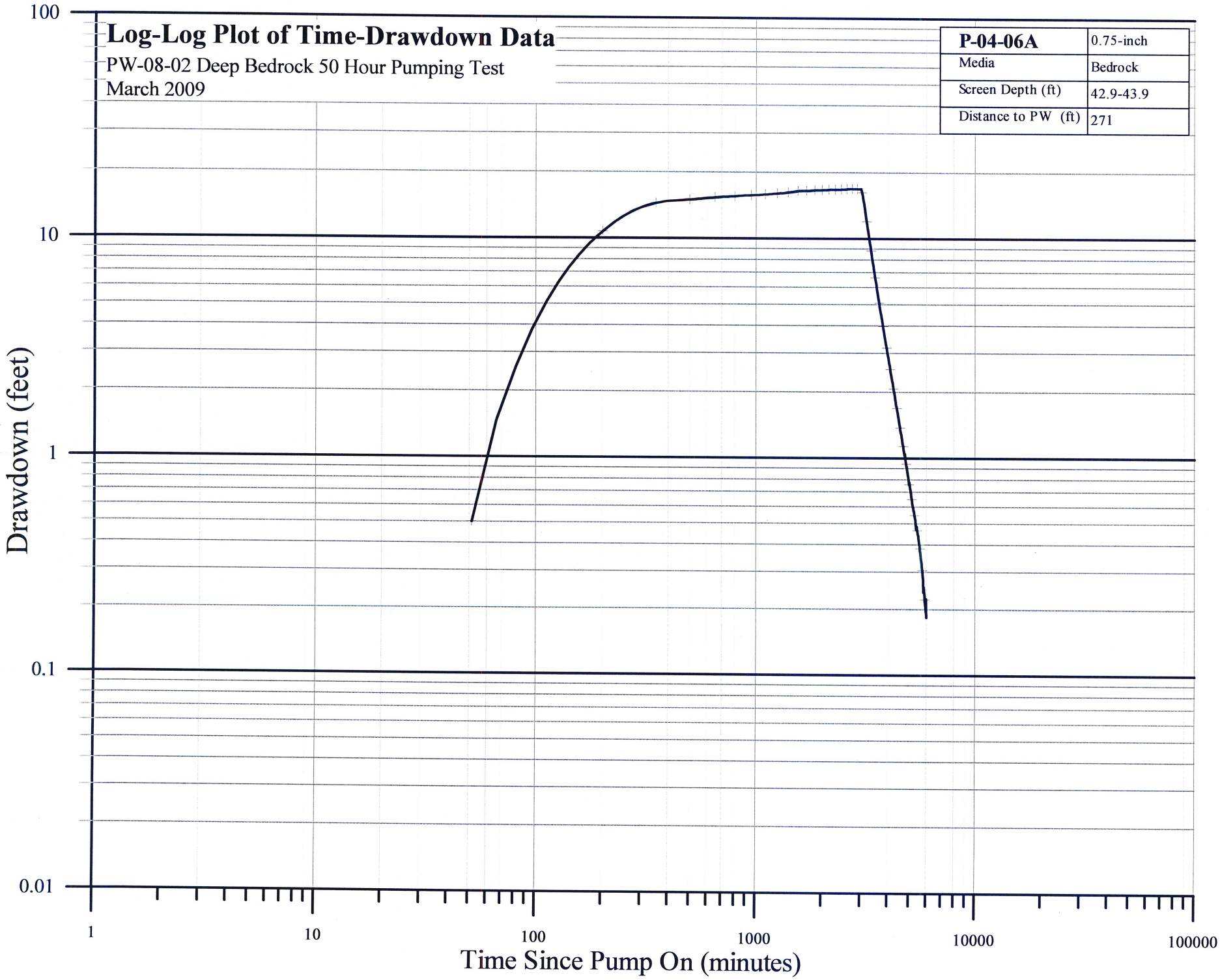

Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
Scale House 6-inch
Media Bedrock
Screen Depth (ft) 50-320
Distance to PW (ft) 303
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

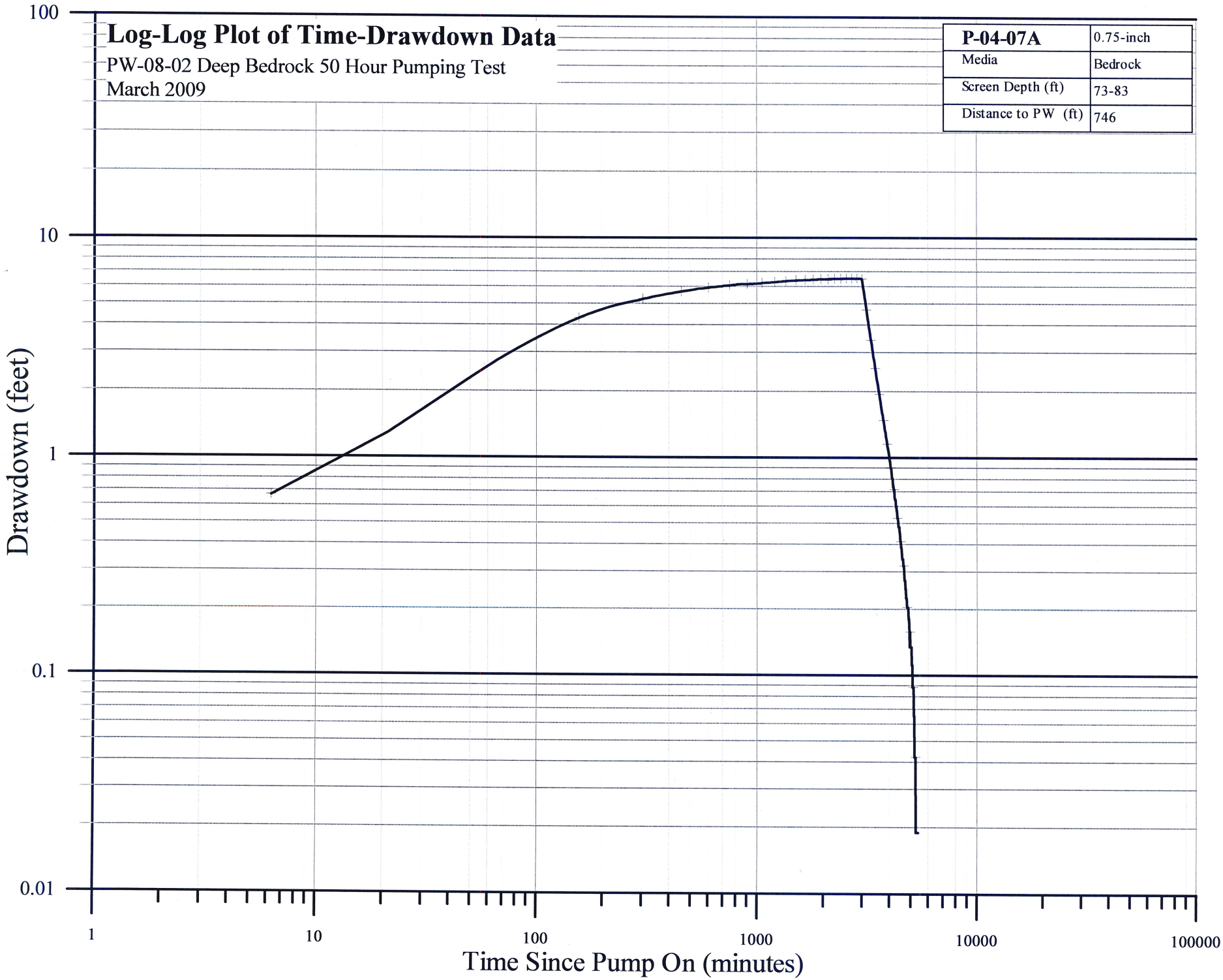

Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
MW-06-01 | 2-inch
Media | Cobble
Screen Depth (ft) | 10-20
Distance to PW (ft) | 2147
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

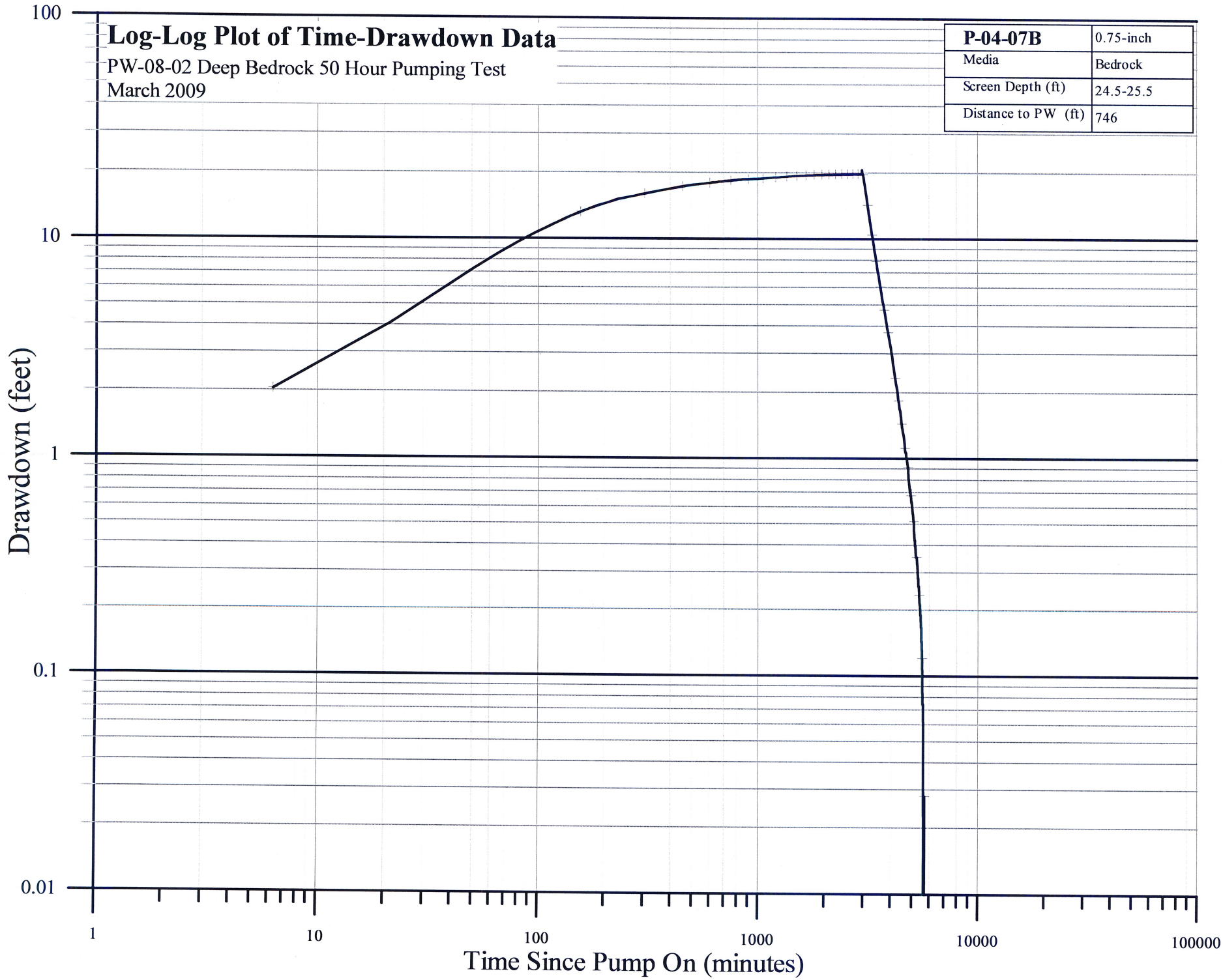

Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
MW-06-02
2-inch
Media
Bedrock
Screen Depth (ft)
25-35
Distance to PW (ft)
1003
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

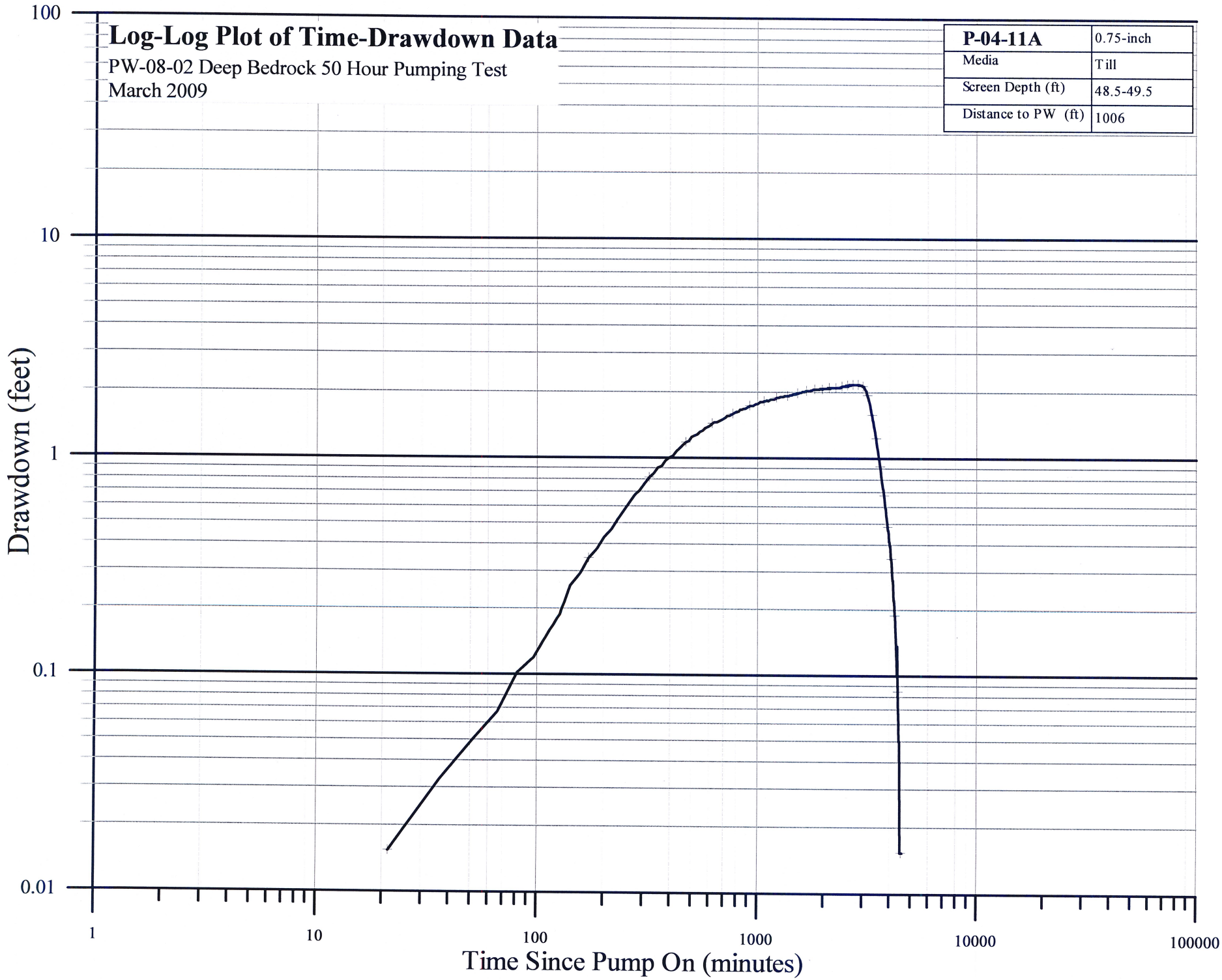

Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
MW-223A
2-inch
Media
Bedrock
Screen Depth (ft)
28-33
Distance to PW (ft)
1122
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

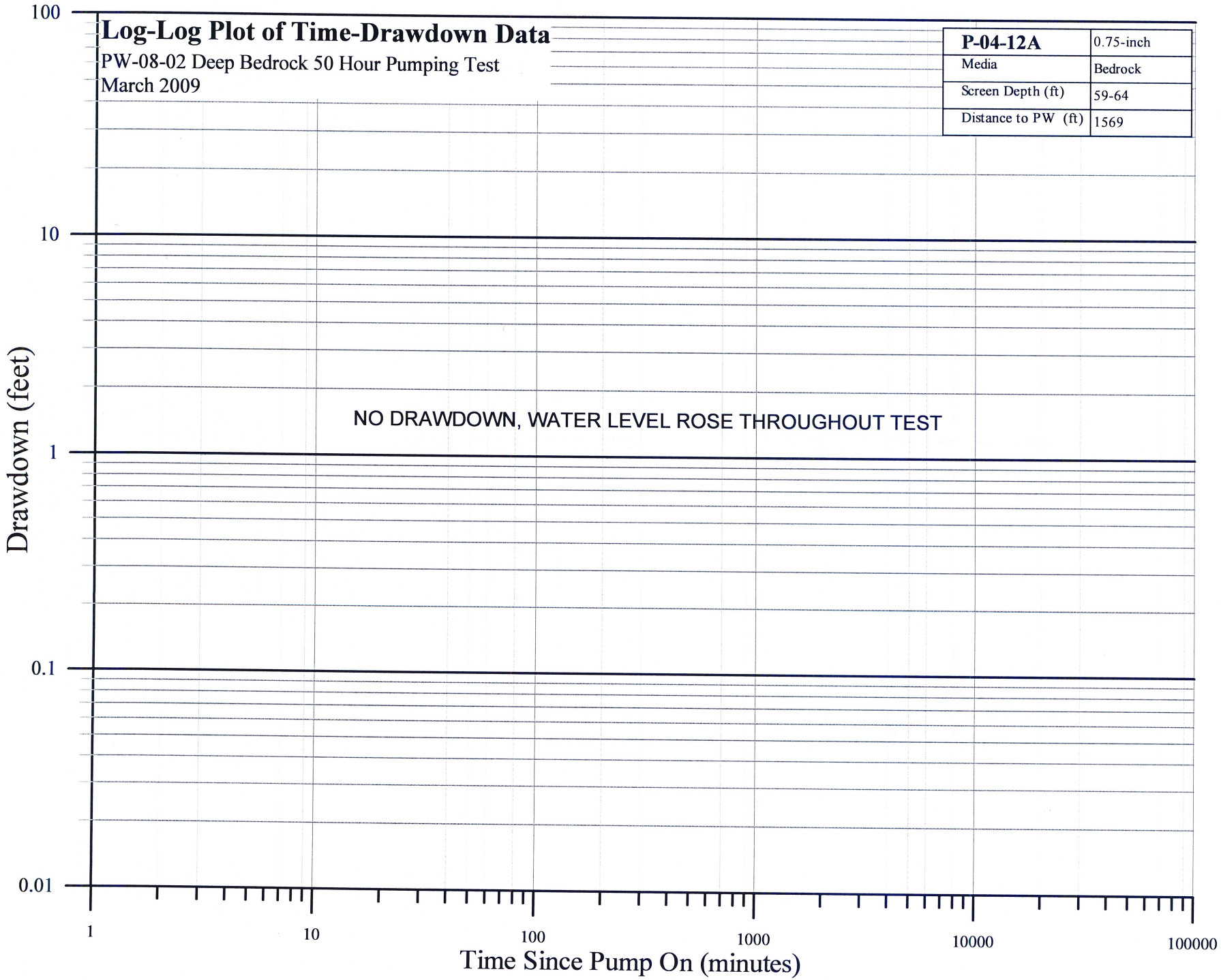

Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
MW-304A
2-inch
Media
Bedrock
Screen Depth (ft)
29.5-39.5
Distance to PW (ft)
1977
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

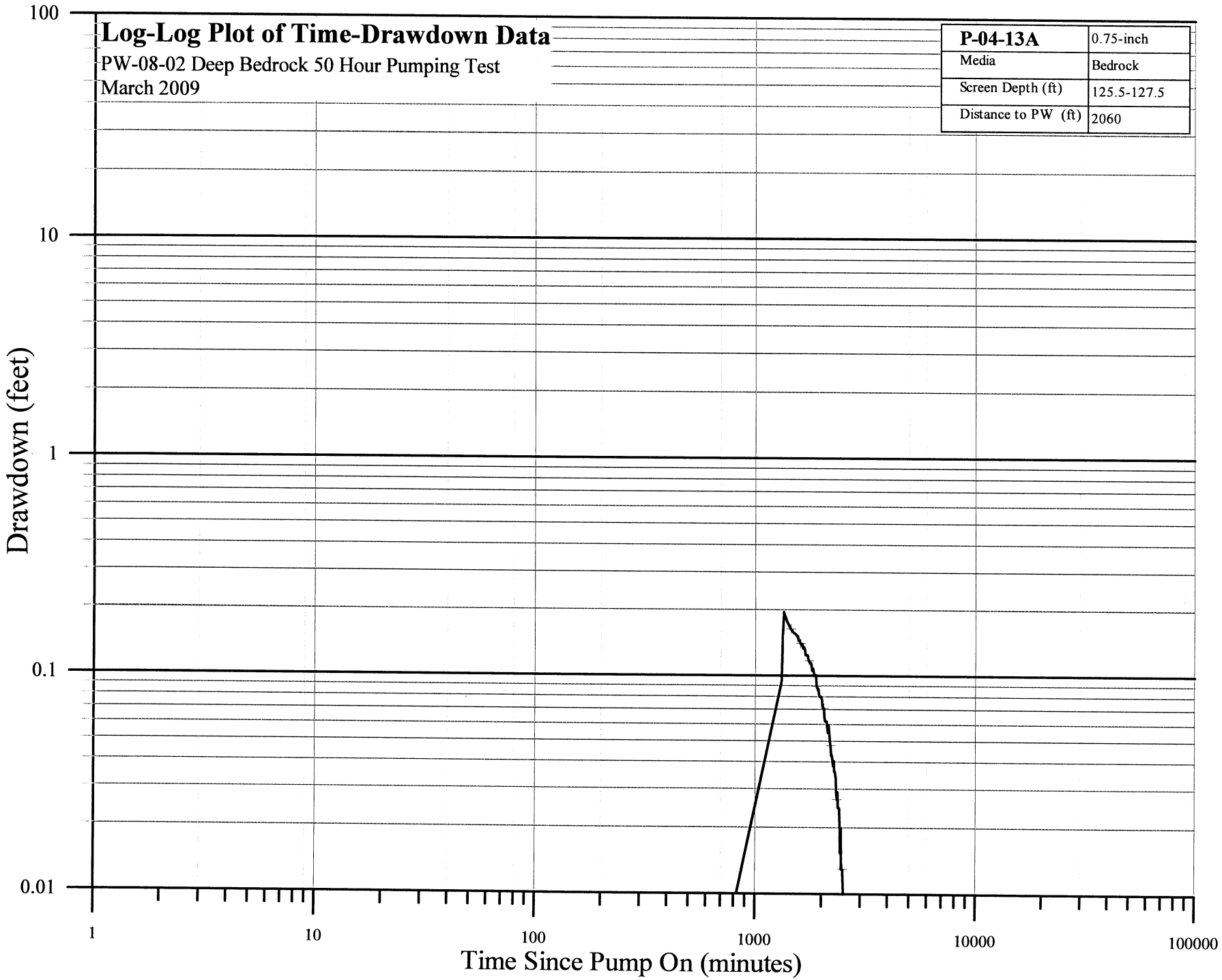

Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
P-04-06A
0.75-inch
Media
Bedrock
Screen Depth (ft)
42.9-43.9
Distance to PW (ft)
271
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
P-04-07A
0.75-inch
Media
Bedrock
Screen Depth (ft)
73-83
Distance to PW (ft)
746
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
P-04-07B
0.75-inch
Media
Bedrock
Screen Depth (ft)
24.5-25.5
Distance to PW (ft)
746
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
P-04-11A
0.75-inch
Media
Till
Screen Depth (ft)
48.5-49.5
Distance to PW (ft)
1006
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

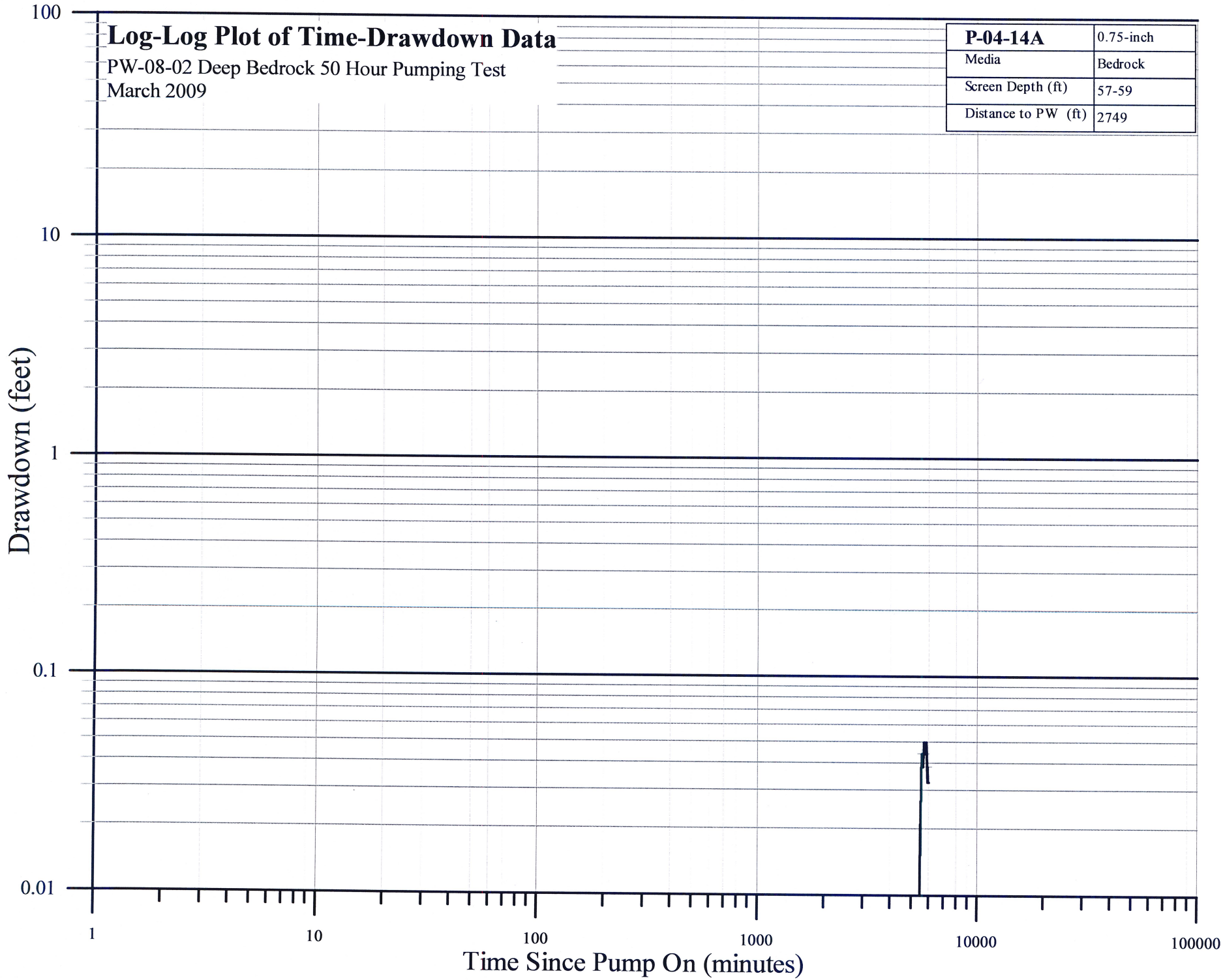

Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
P-04-12A
0.75-inch
Media
Bedrock
Screen Depth (ft)
59-64
Distance to PW (ft)
1569
NO DRAWDOWN, WATER LEVEL ROSE THROUGHOUT TEST
Drawdown (feet)
100
10
1
0.1
0.01
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

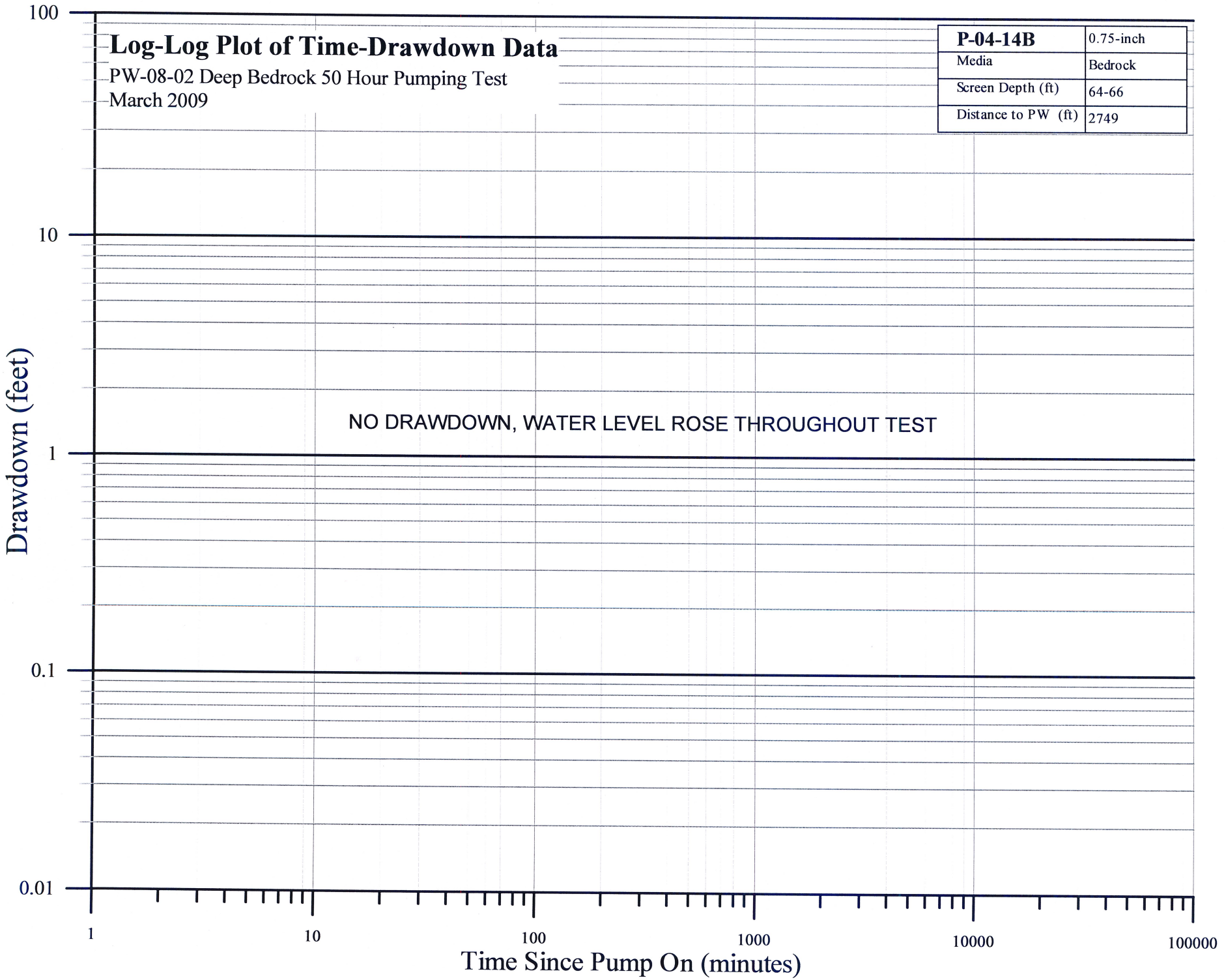

Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
P-04-13A
0.75-inch
Media
Bedrock
Screen Depth (ft)
125.5-127.5
Distance to PW (ft)
2060
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

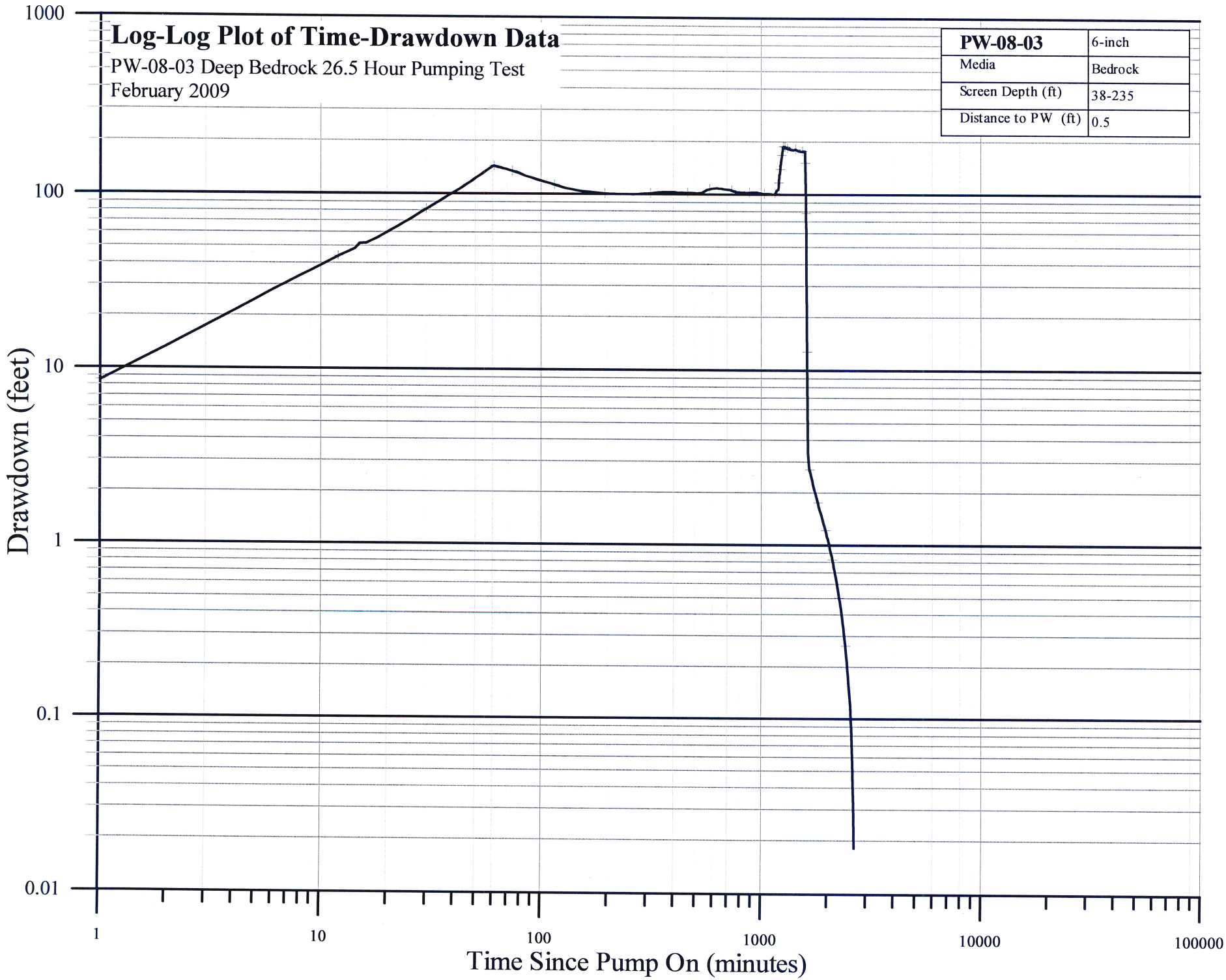
Log-Log Plot of Time-Drawdown Data

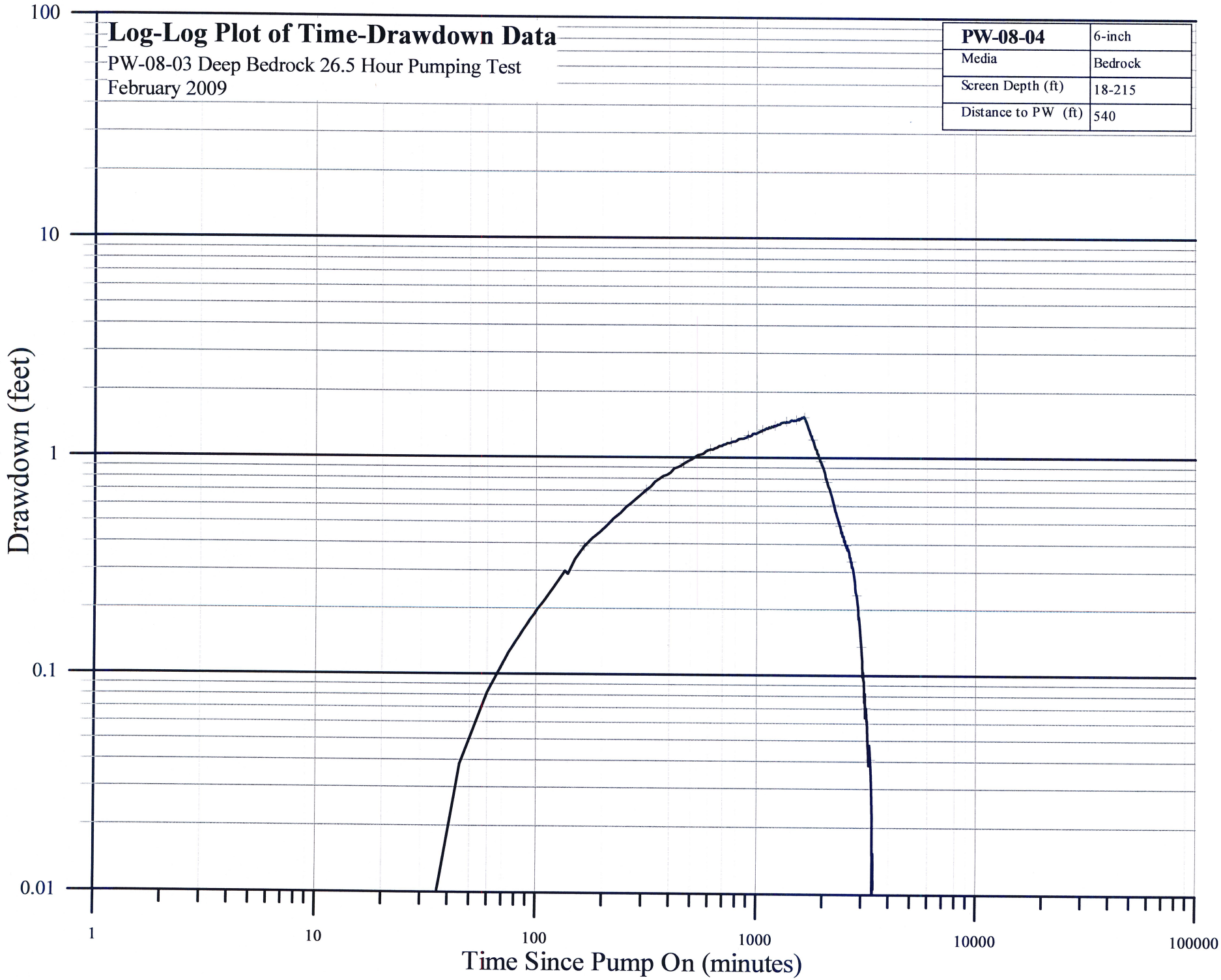
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009

P-04-14A	0.75-inch
Media	Bedrock
Screen Depth (ft)	57-59
Distance to PW (ft)	2749




Log-Log Plot of Time-Drawdown Data
PW-08-02 Deep Bedrock 50 Hour Pumping Test
March 2009
P-04-14B
0.75-inch
Media
Bedrock
Screen Depth (ft)
64-66
Distance to PW (ft)
2749
NO DRAWDOWN, WATER LEVEL ROSE THROUGHOUT TEST
Drawdown (feet)
100
10
1
0.1
0.01
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

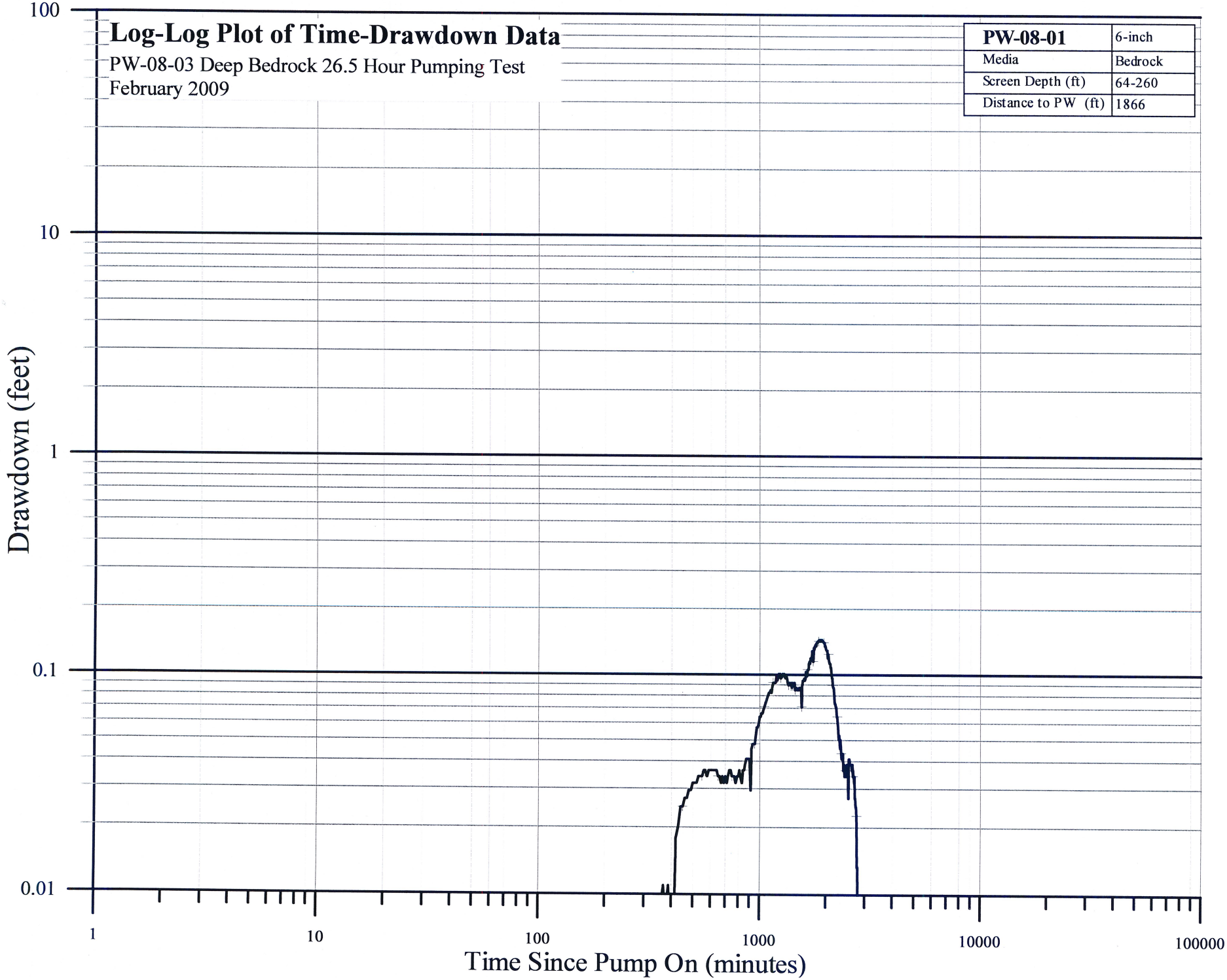

Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
PW-08-03 | 6-inch
Media | Bedrock
Screen Depth (ft) | 38-235
Distance to PW (ft) | 0.5
1000
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
PW-08-04 | 6-inch
Media | Bedrock
Screen Depth (ft) | 18-215
Distance to PW (ft) | 540
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

Log-Log Plot of Time-Drawdown Data

PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009

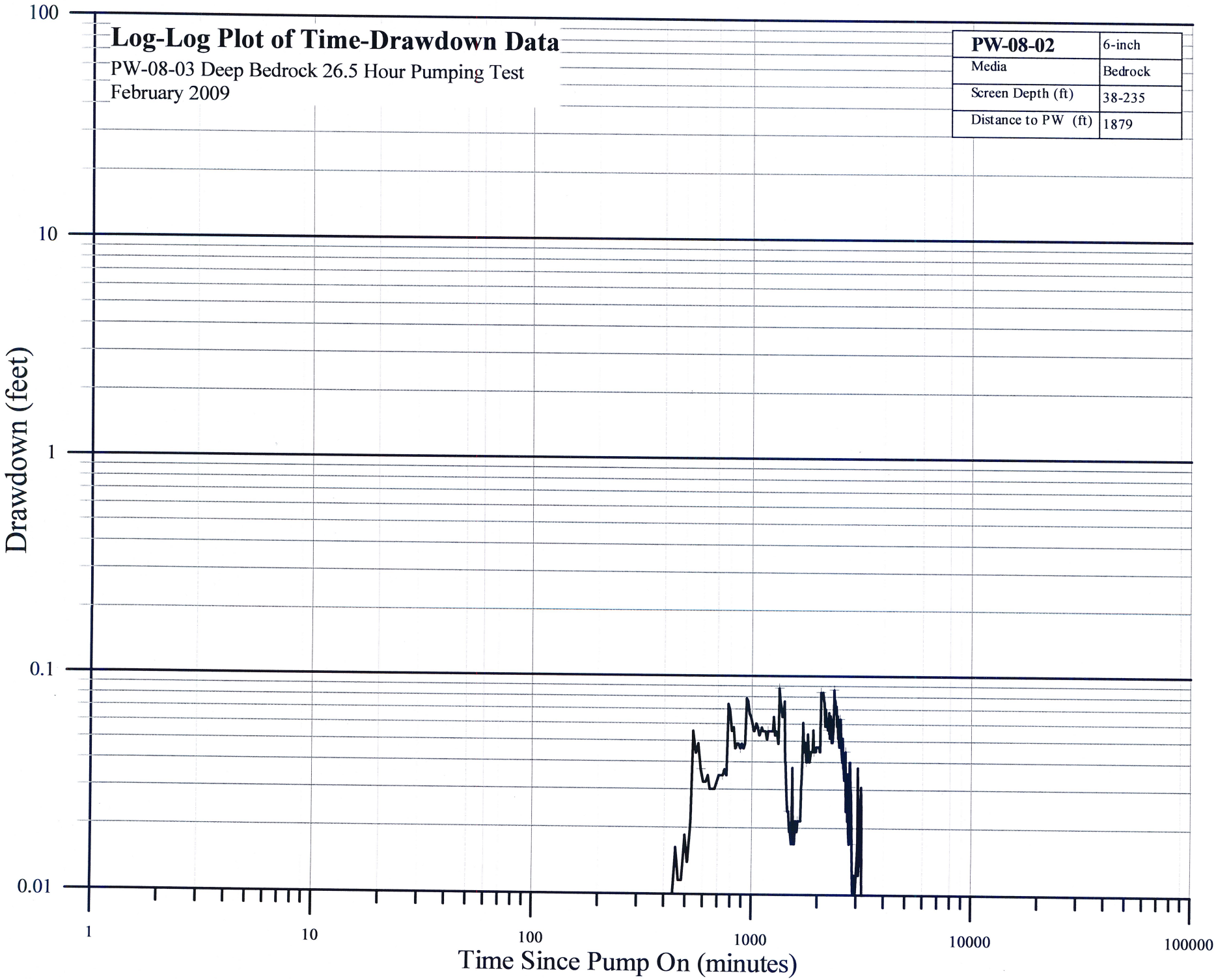
PW-08-01	6-inch
Media	Bedrock
Screen Depth (ft)	64-260
Distance to PW (ft)	1866

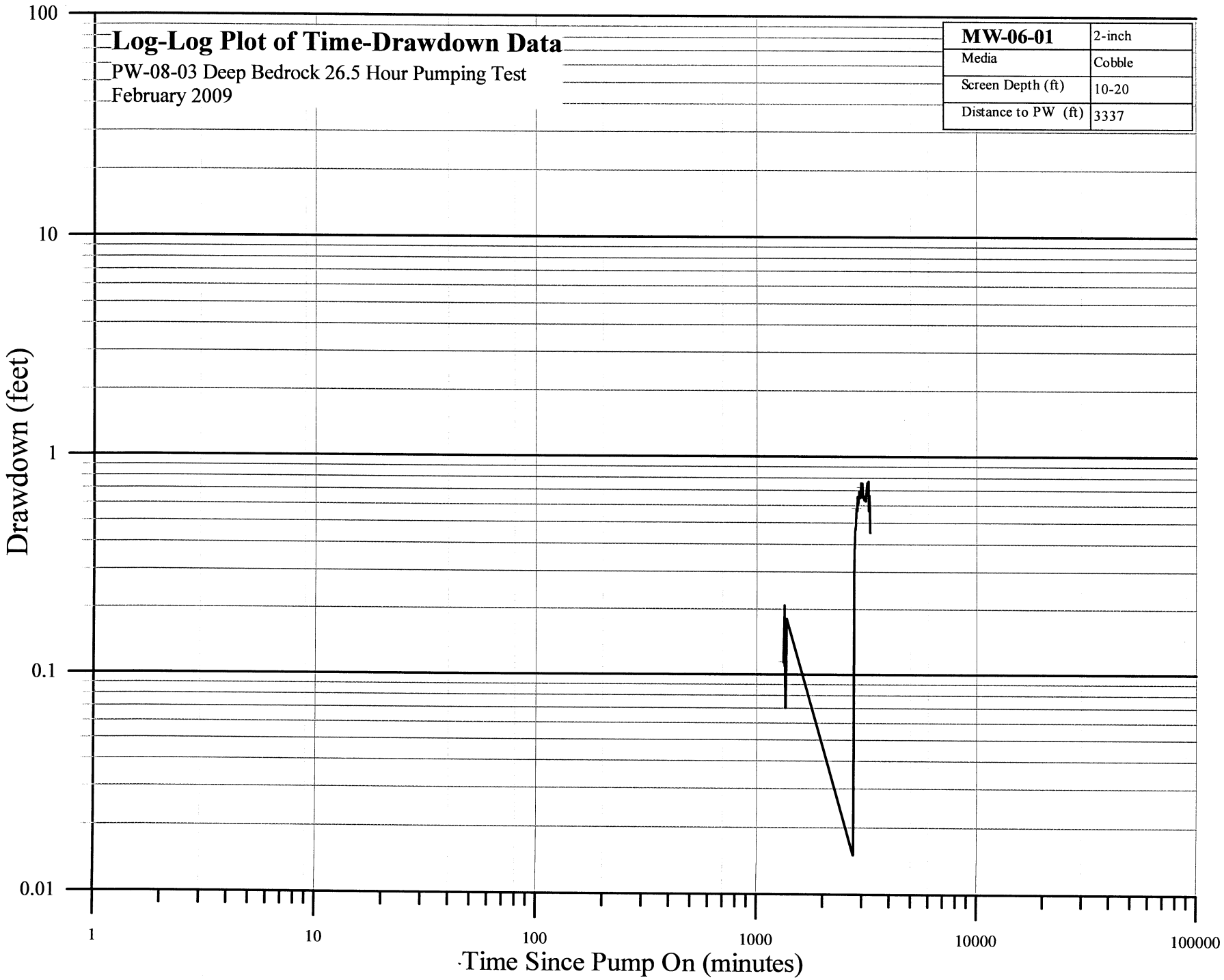


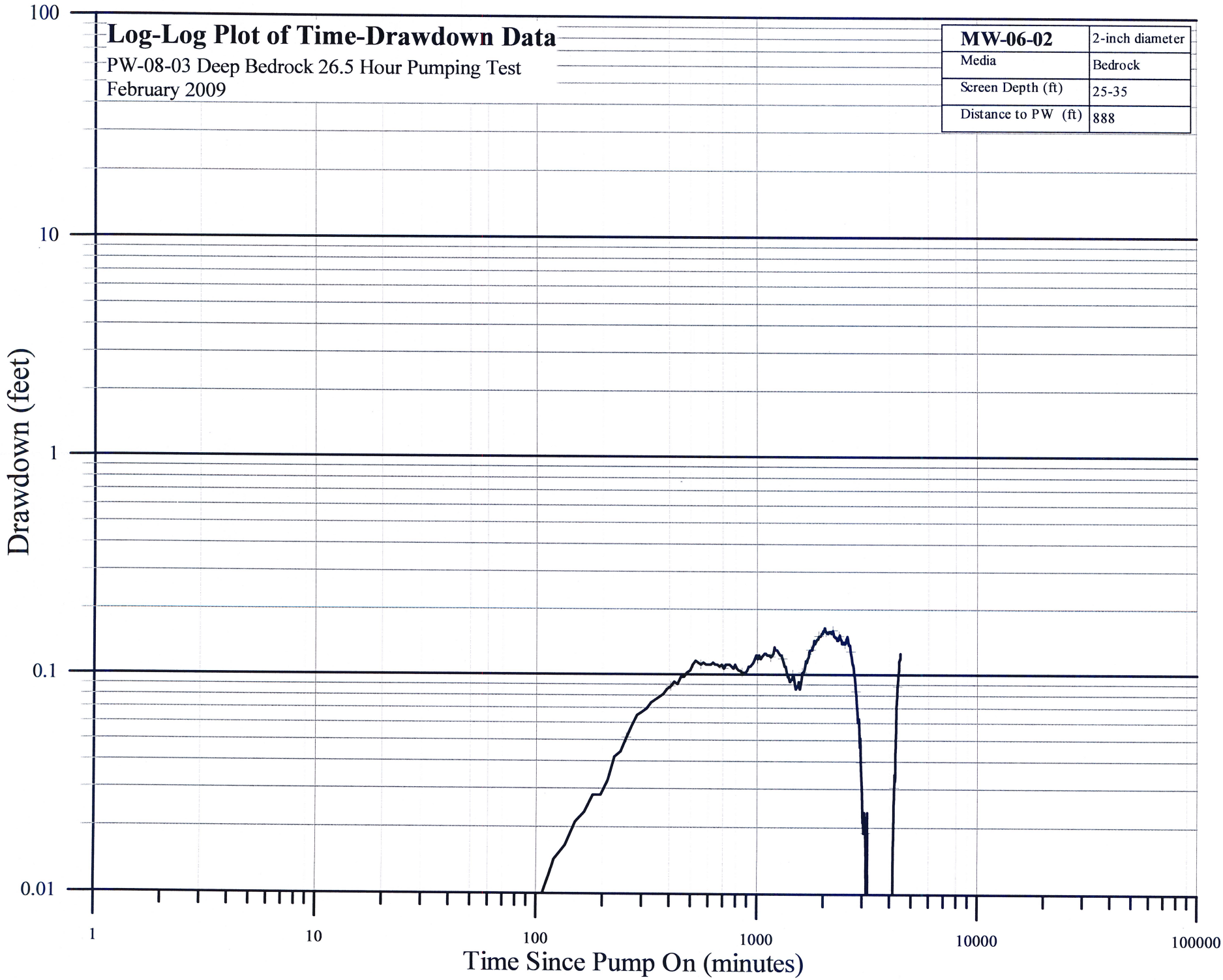
Log-Log Plot of Time-Drawdown Data

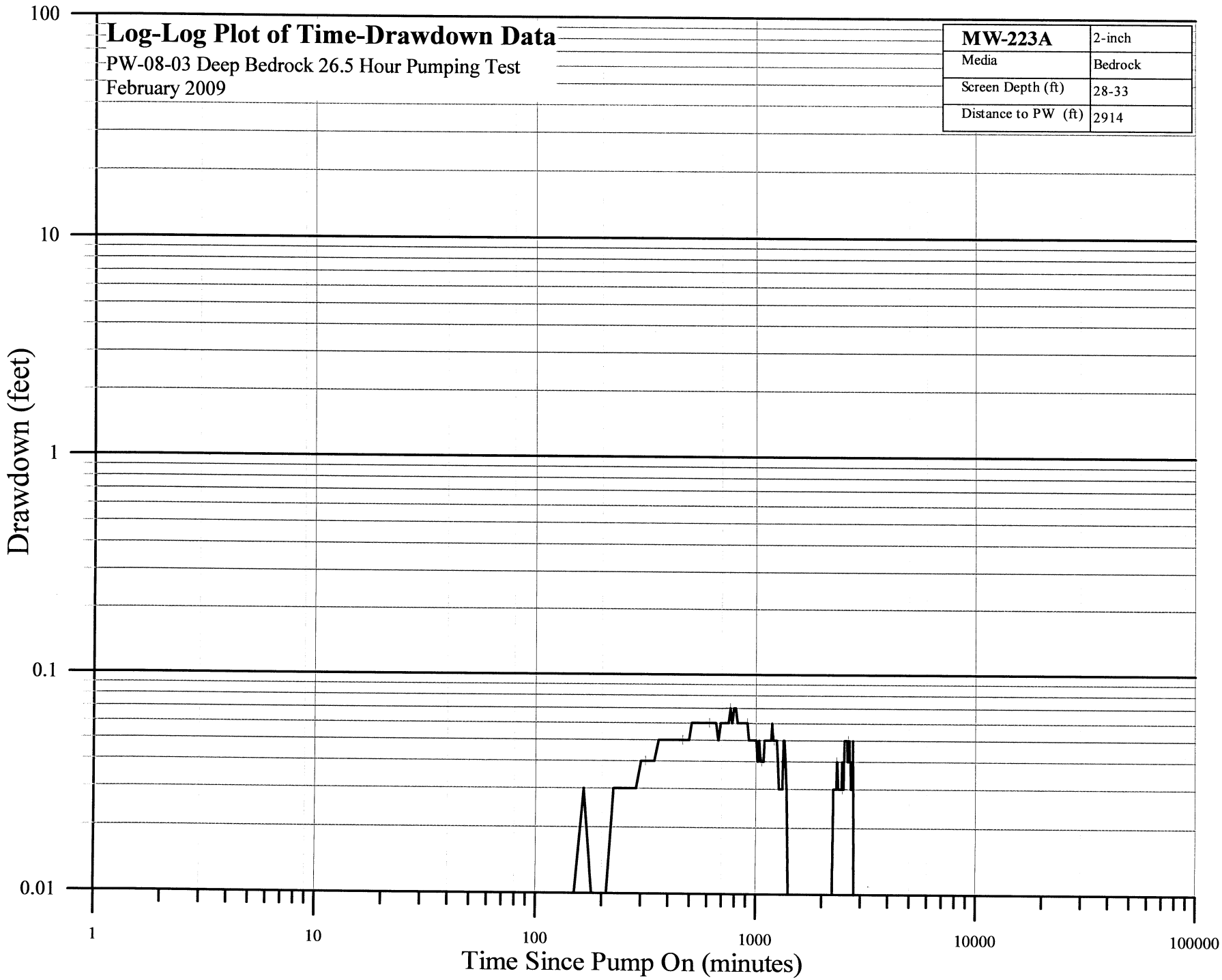
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009

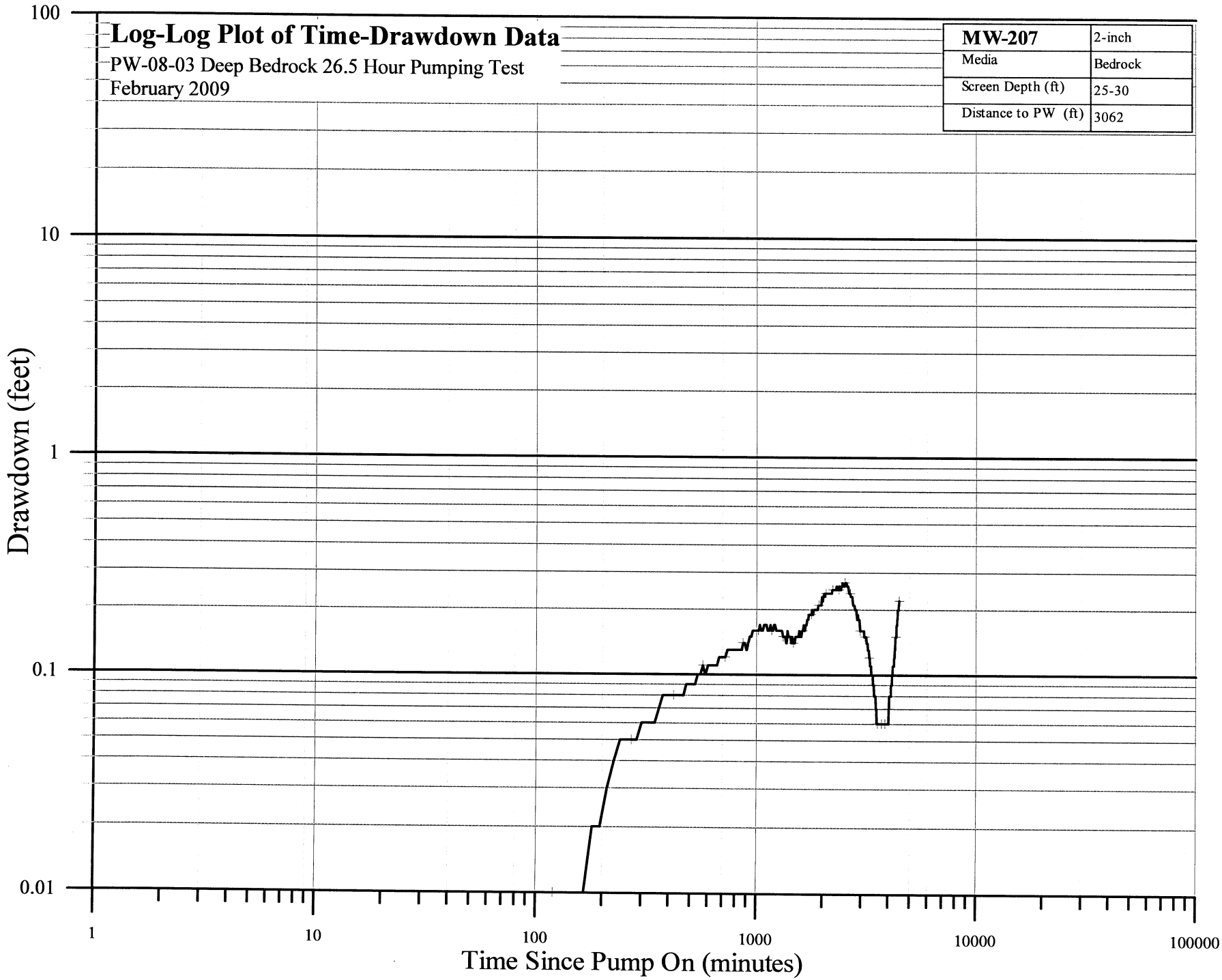
PW-08-02	6-inch
Media	Bedrock
Screen Depth (ft)	38-235
Distance to PW (ft)	1879

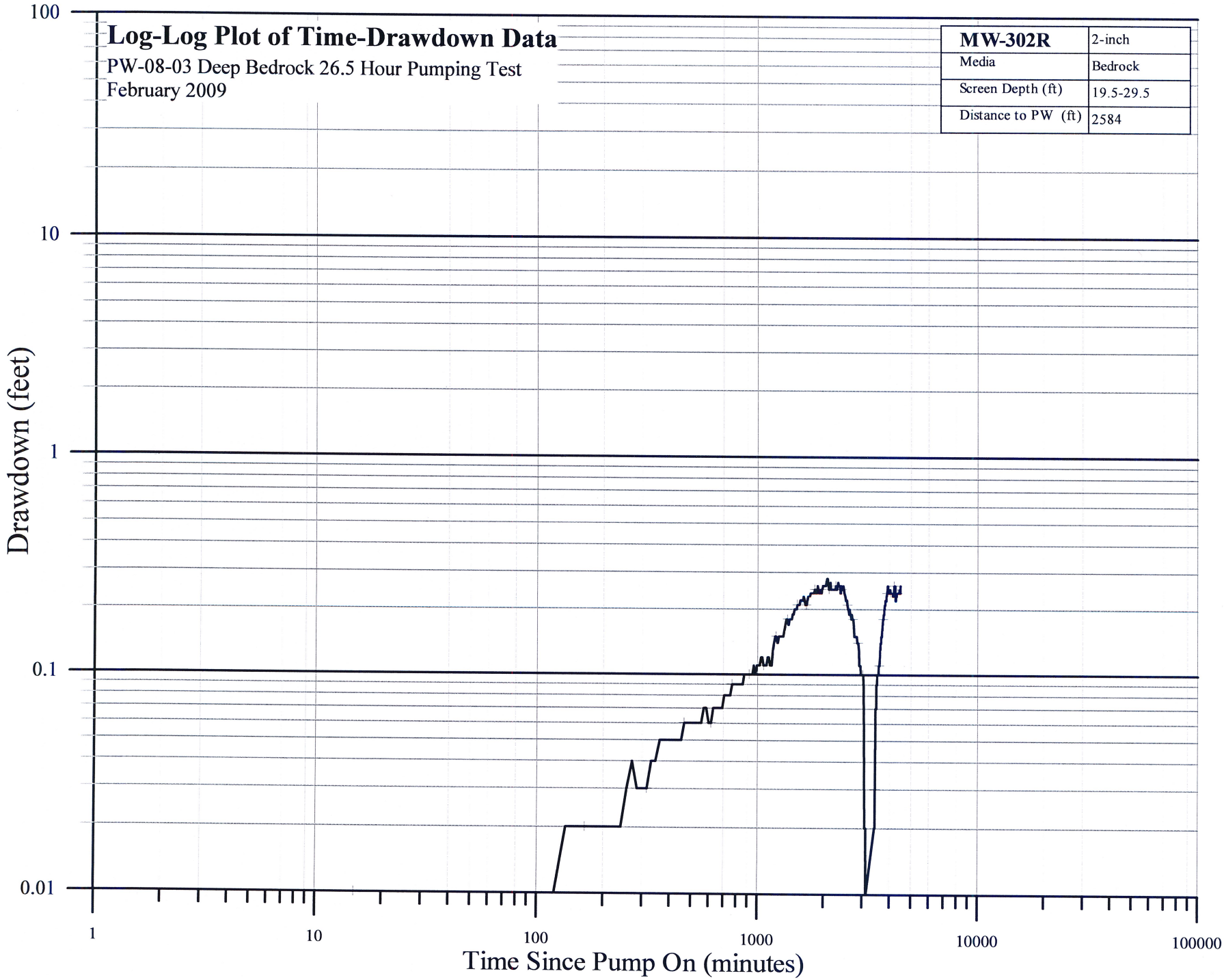


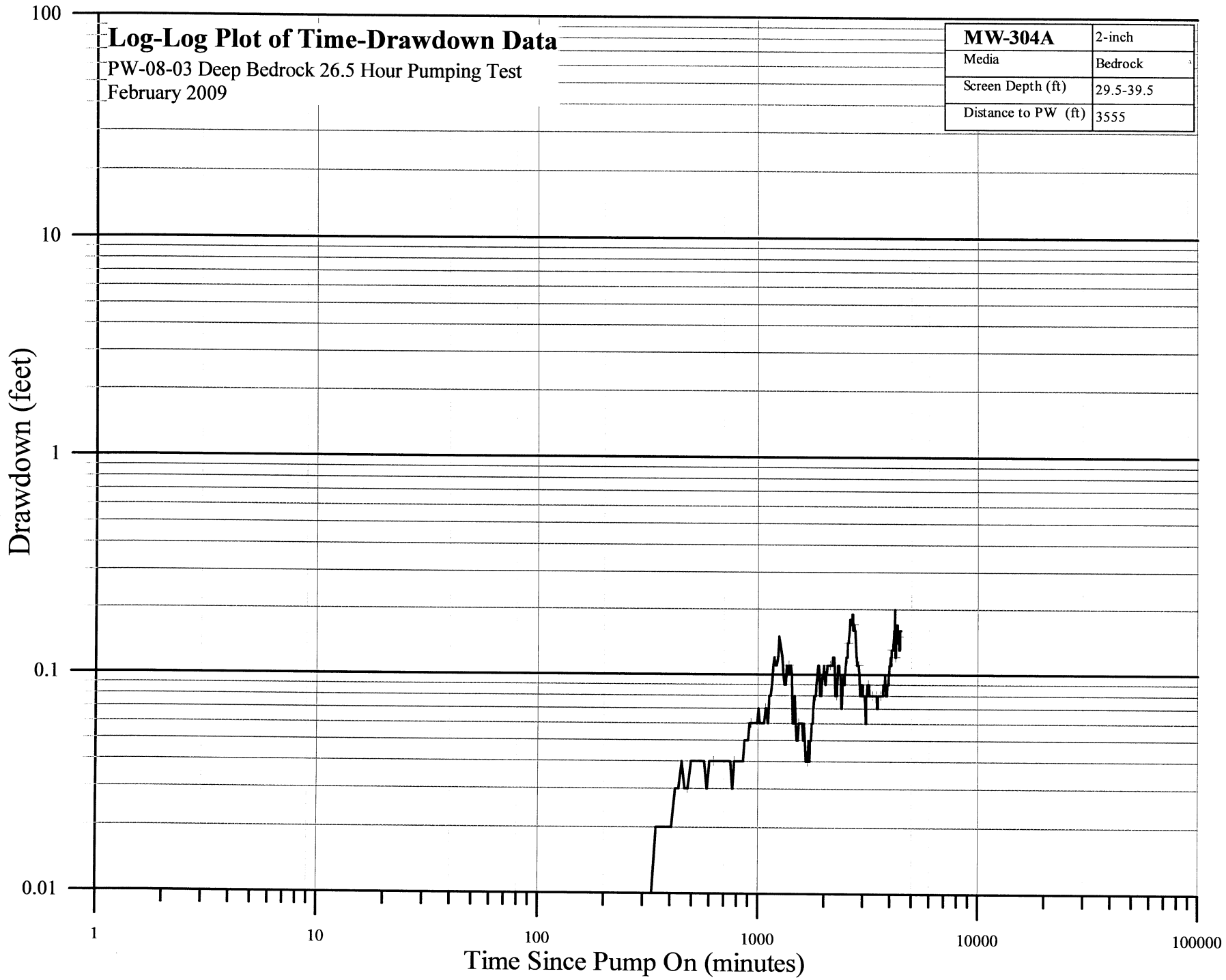

Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
MW-06-01 2-inch
Media Cobble
Screen Depth (ft) 10-20
Distance to PW (ft) 3337
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

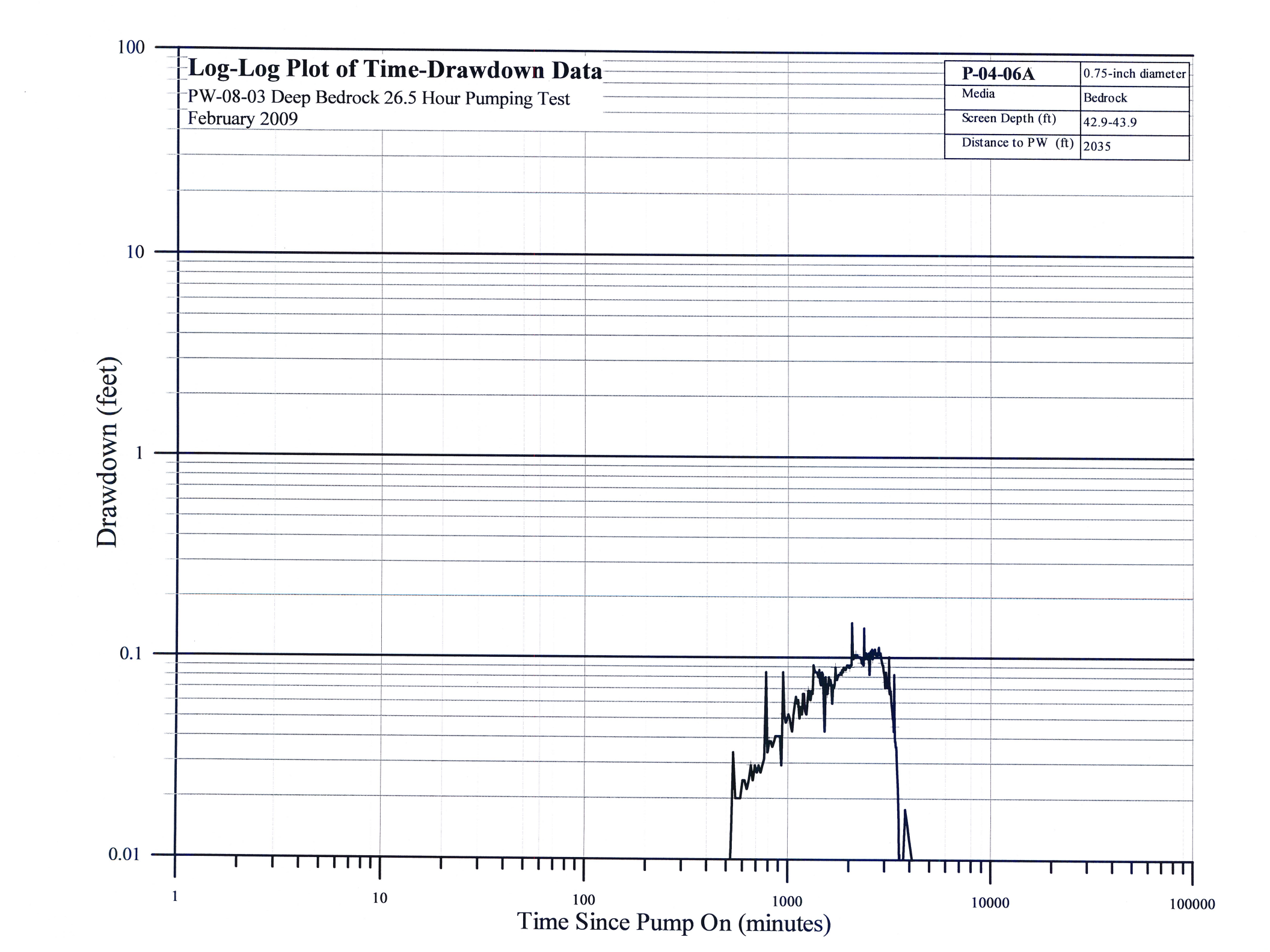

Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
MW-06-02
2-inch diameter
Media
Bedrock
Screen Depth (ft)
25-35
Distance to PW (ft)
888
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
MW-223A
2-inch
Media
Bedrock
Screen Depth (ft)
28-33
Distance to PW (ft)
2914
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
MW-207 | 2-inch
Media | Bedrock
Screen Depth (ft) | 25-30
Distance to PW (ft) | 3062
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
MW-302R
2-inch
Media
Bedrock
Screen Depth (ft)
19.5-29.5
Distance to PW (ft)
2584
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

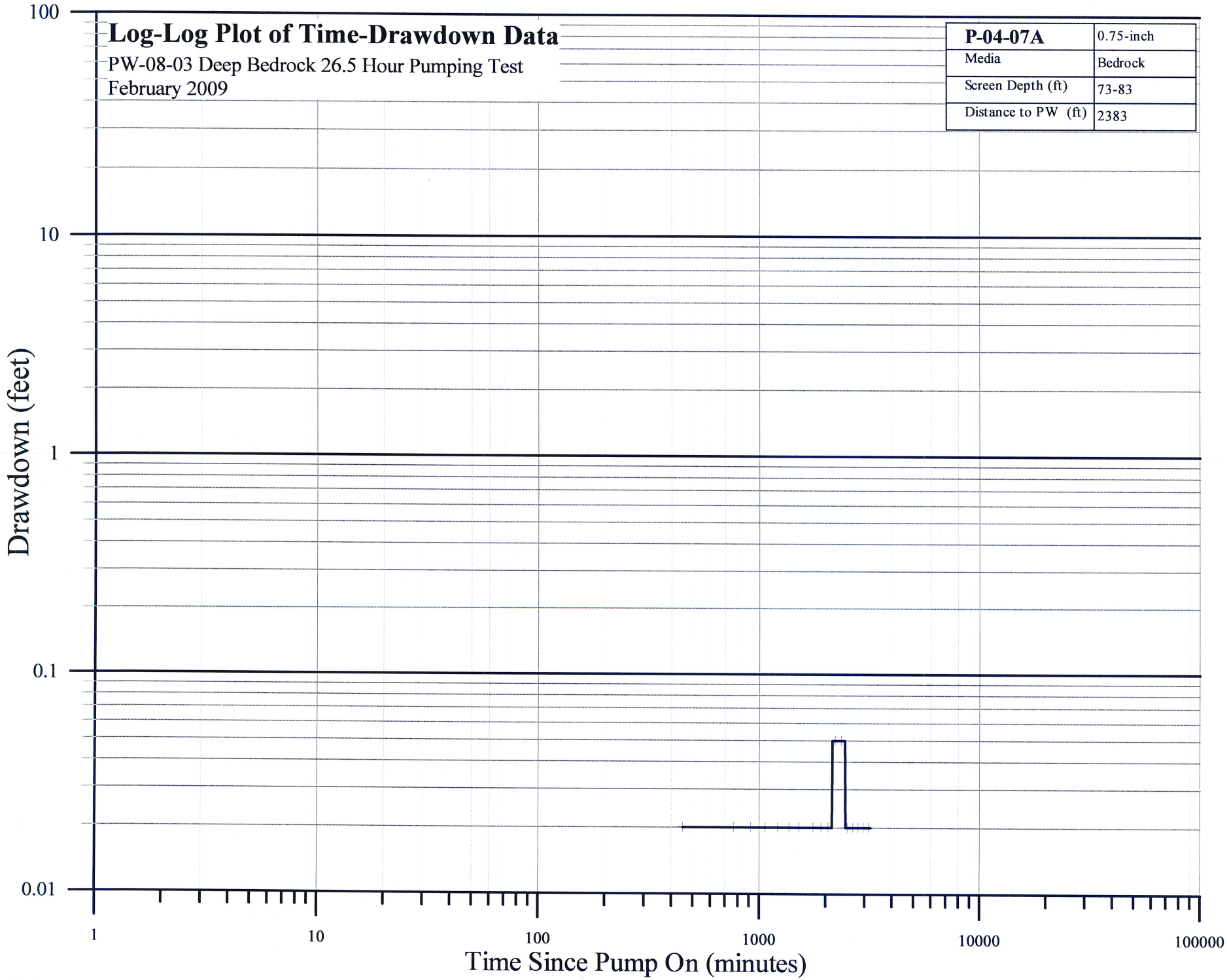

Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
MW-304A
2-inch
Media
Bedrock
Screen Depth (ft)
29.5-39.5
Distance to PW (ft)
3555
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
P-04-06A
0.75-inch diameter
Media
Bedrock
Screen Depth (ft)
42.9-43.9
Distance to PW (ft)
2035
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

Log-Log Plot of Time-Drawdown Data

PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009

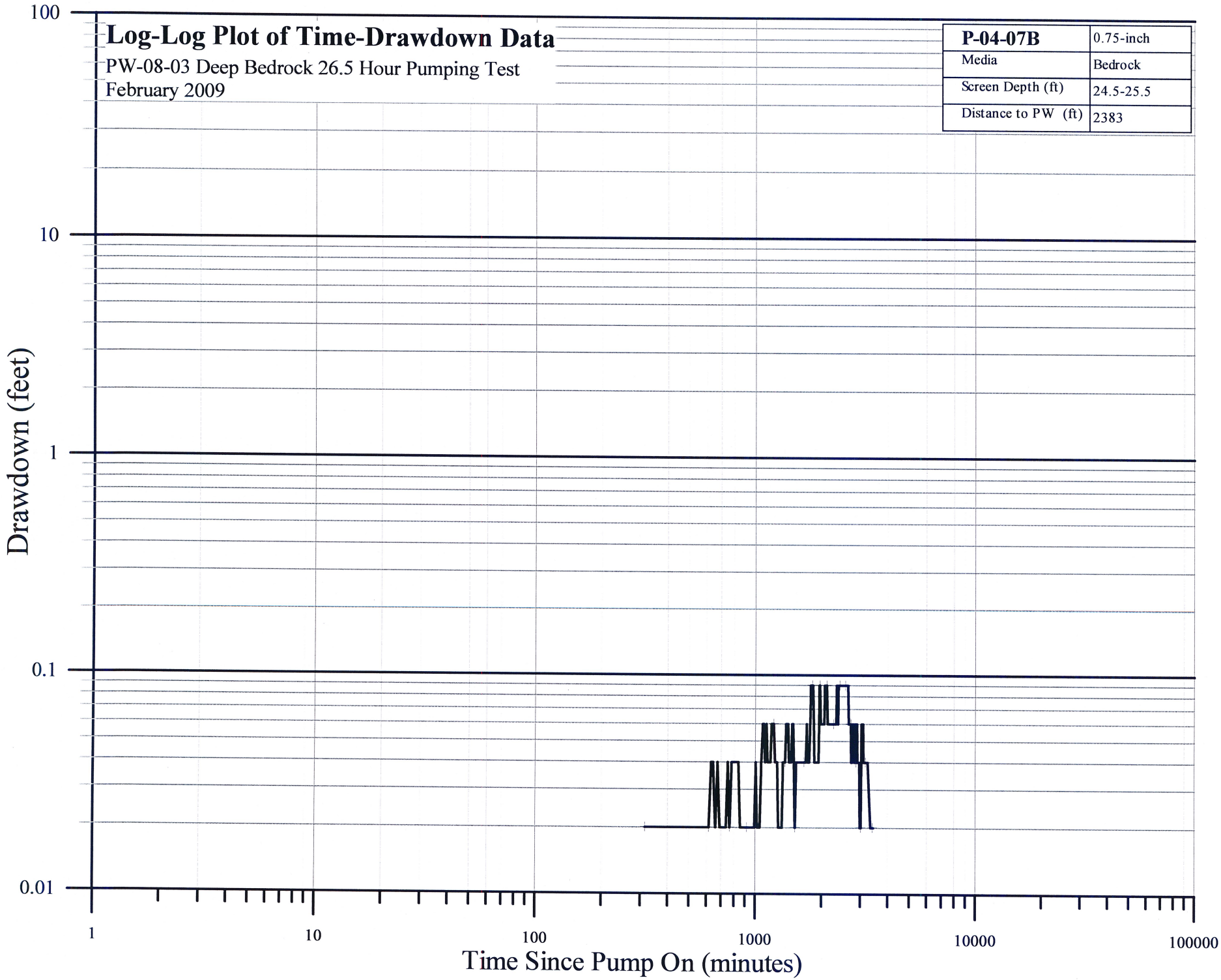
P-04-07A	0.75-inch
Media	Bedrock
Screen Depth (ft)	73-83
Distance to PW (ft)	2383



Log-Log Plot of Time-Drawdown Data

PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009

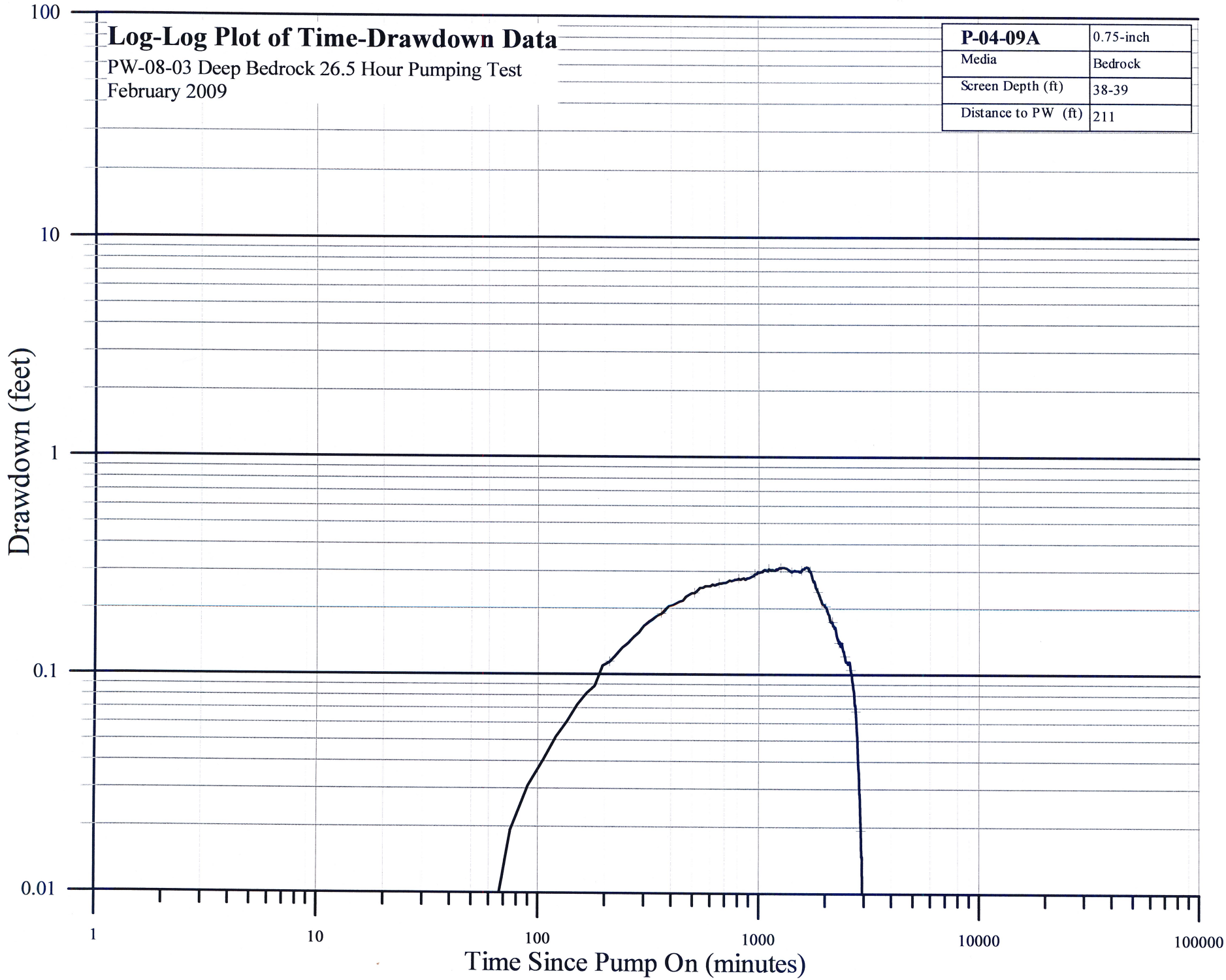
P-04-07B	0.75-inch
Media	Bedrock
Screen Depth (ft)	24.5-25.5
Distance to PW (ft)	2383



Log-Log Plot of Time-Drawdown Data

PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009

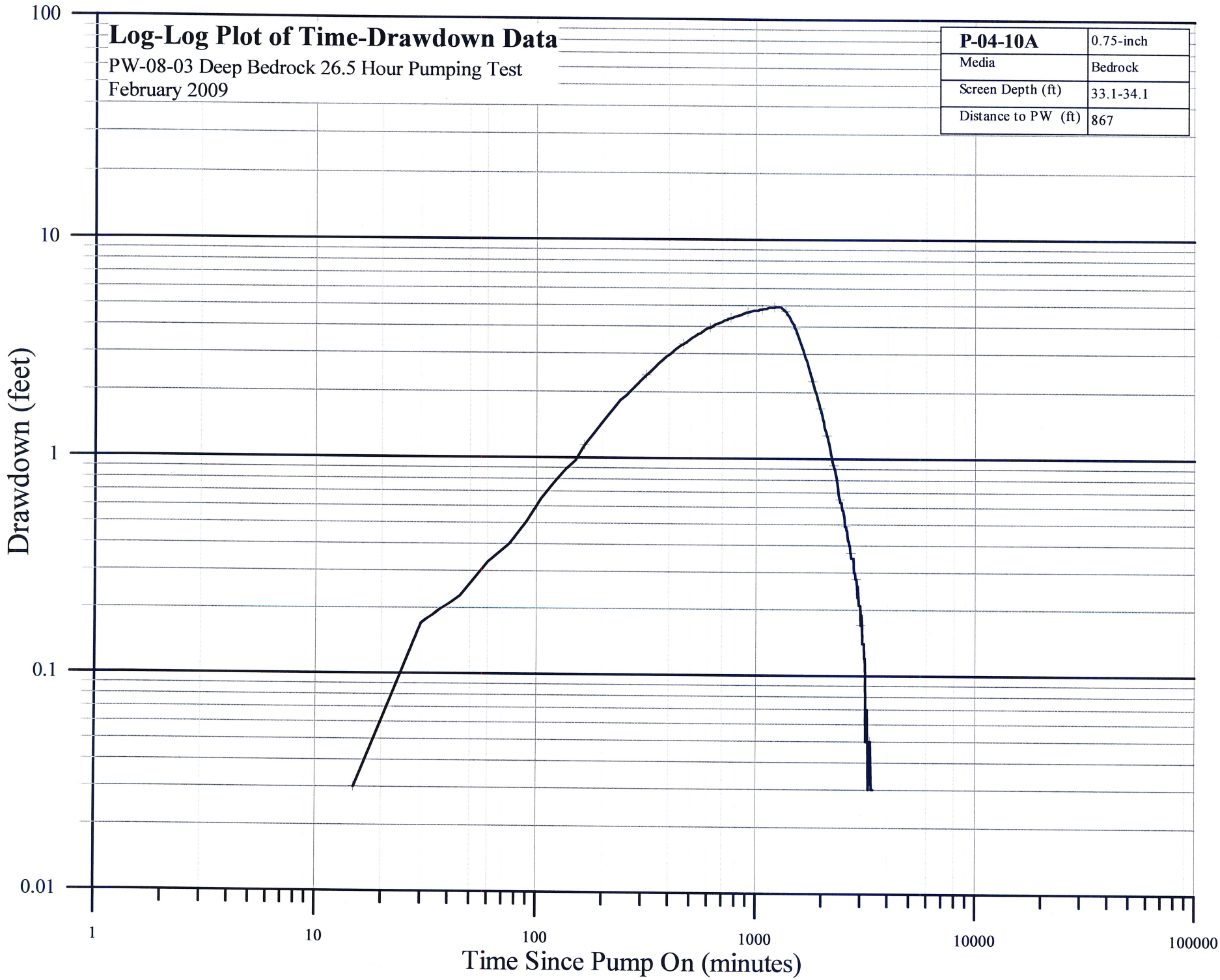
P-04-09A	0.75-inch
Media	Bedrock
Screen Depth (ft)	38-39
Distance to PW (ft)	211



Log-Log Plot of Time-Drawdown Data

PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009

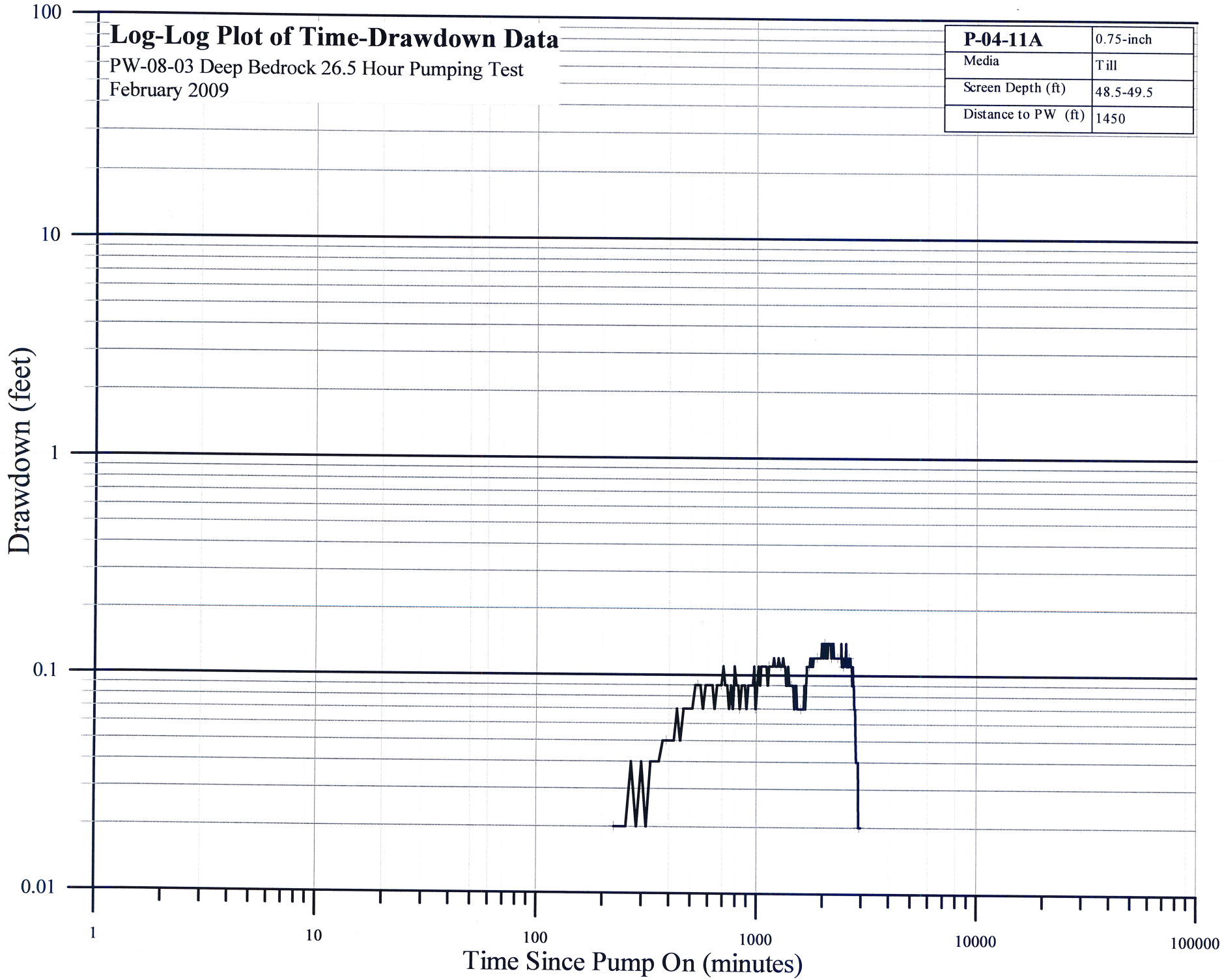
P-04-10A	0.75-inch
Media	Bedrock
Screen Depth (ft)	33.1-34.1
Distance to PW (ft)	867

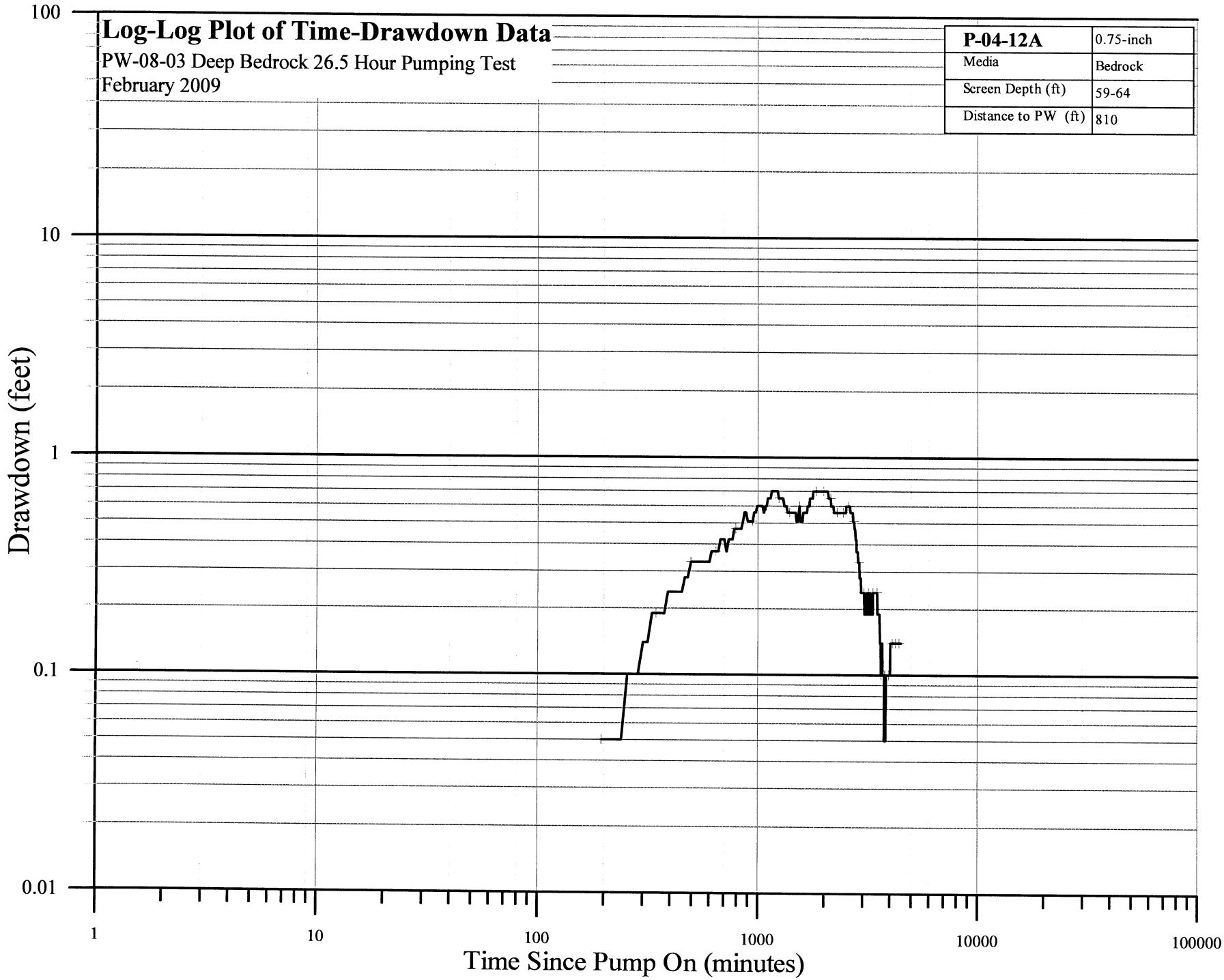


Log-Log Plot of Time-Drawdown Data

PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009

P-04-11A	0.75-inch
Media	Till
Screen Depth (ft)	48.5-49.5
Distance to PW (ft)	1450

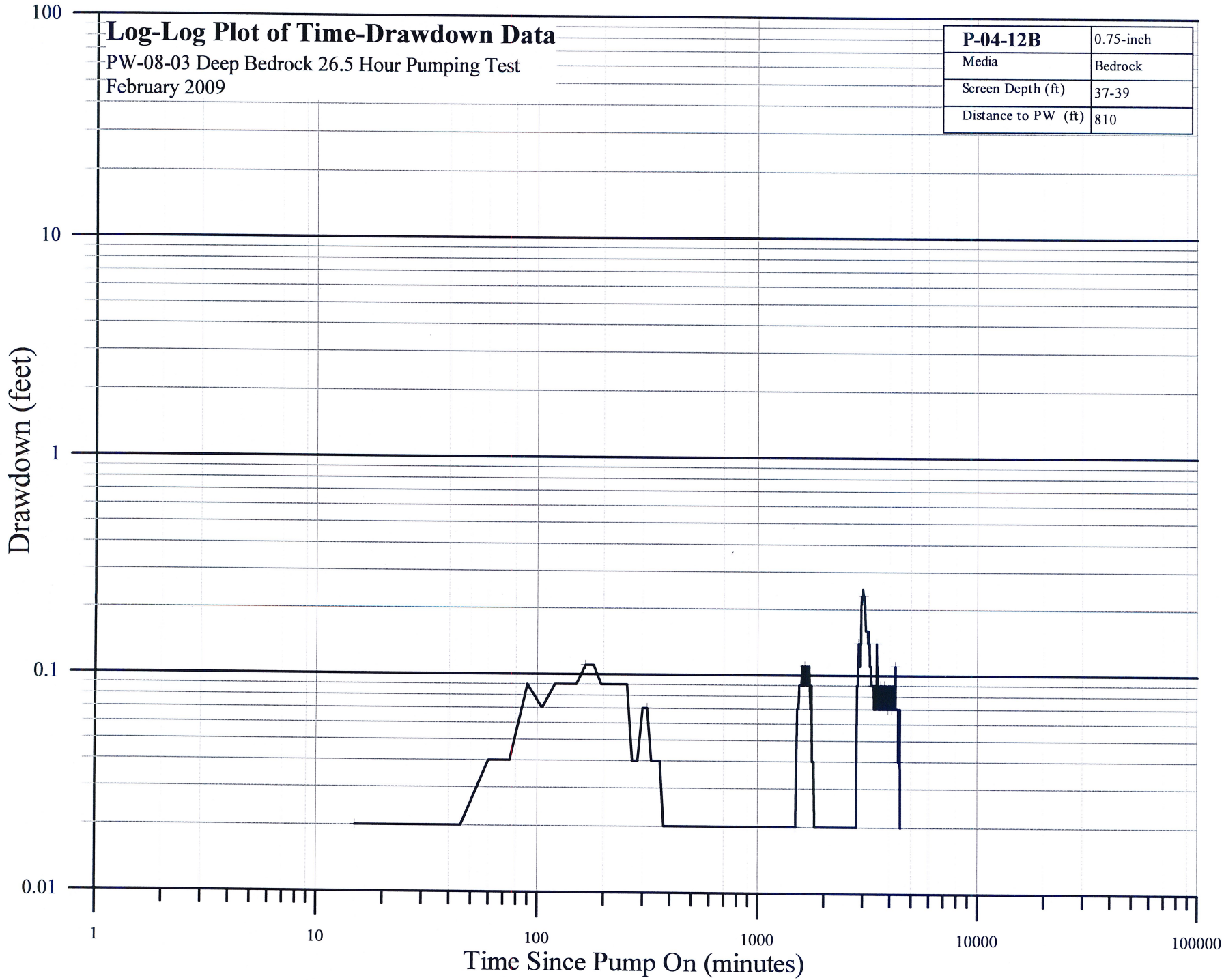


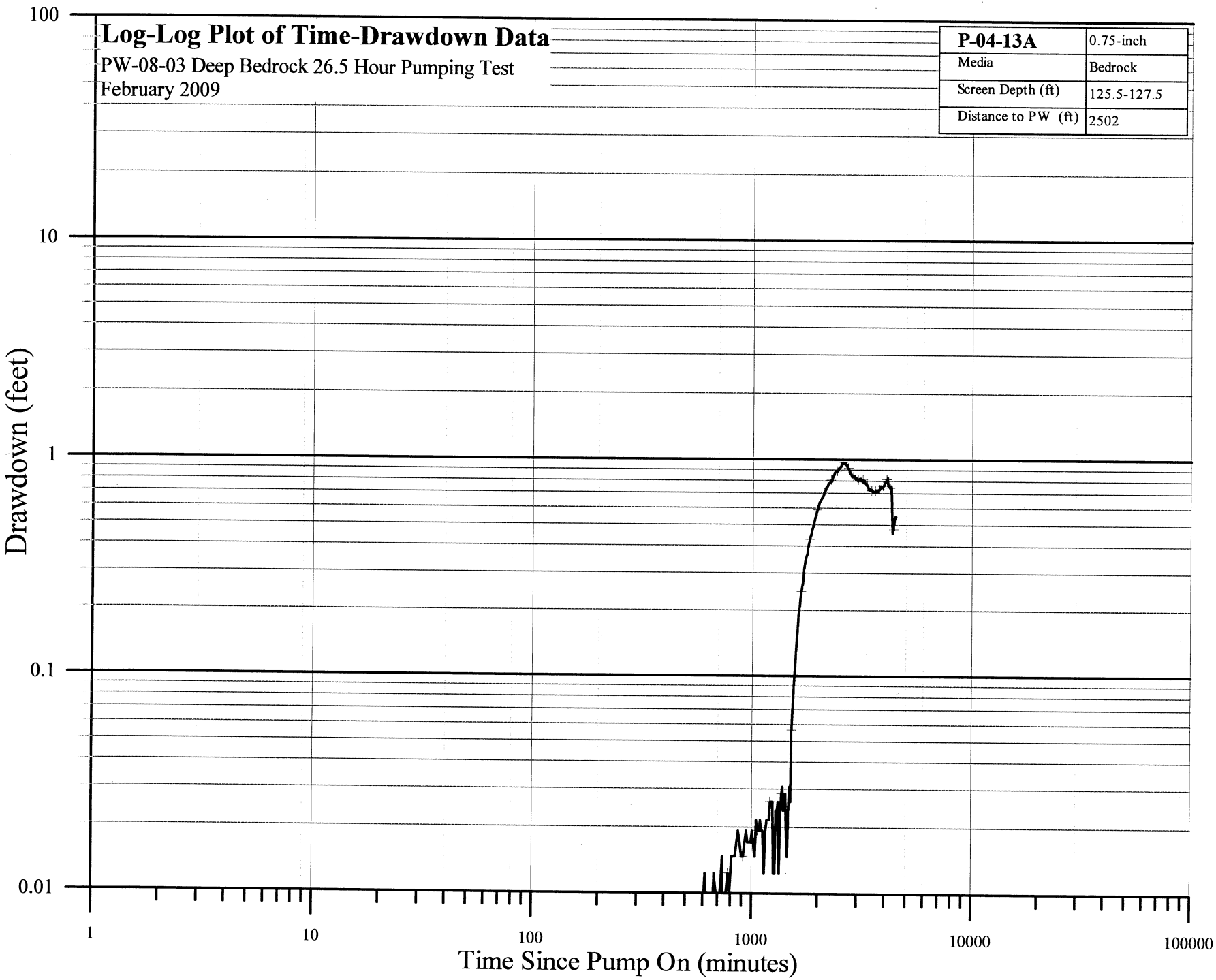

Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
P-04-12A
0.75-inch
Media
Bedrock
Screen Depth (ft)
59-64
Distance to PW (ft)
810
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

Log-Log Plot of Time-Drawdown Data

PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009

P-04-12B	0.75-inch
Media	Bedrock
Screen Depth (ft)	37-39
Distance to PW (ft)	810

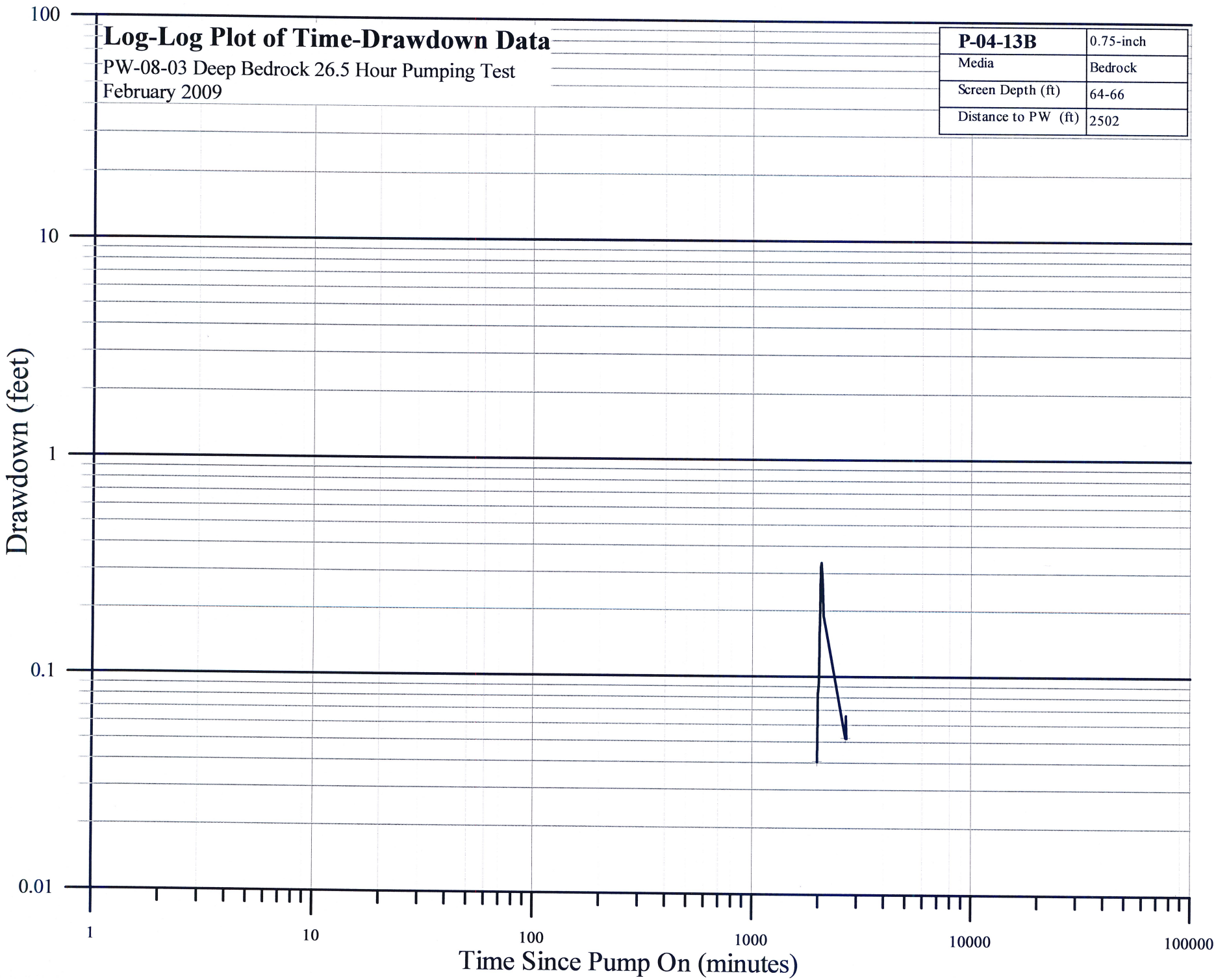



Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
P-04-13A
0.75-inch
Media
Bedrock
Screen Depth (ft)
125.5-127.5
Distance to PW (ft)
2502
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

Log-Log Plot of Time-Drawdown Data

PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009

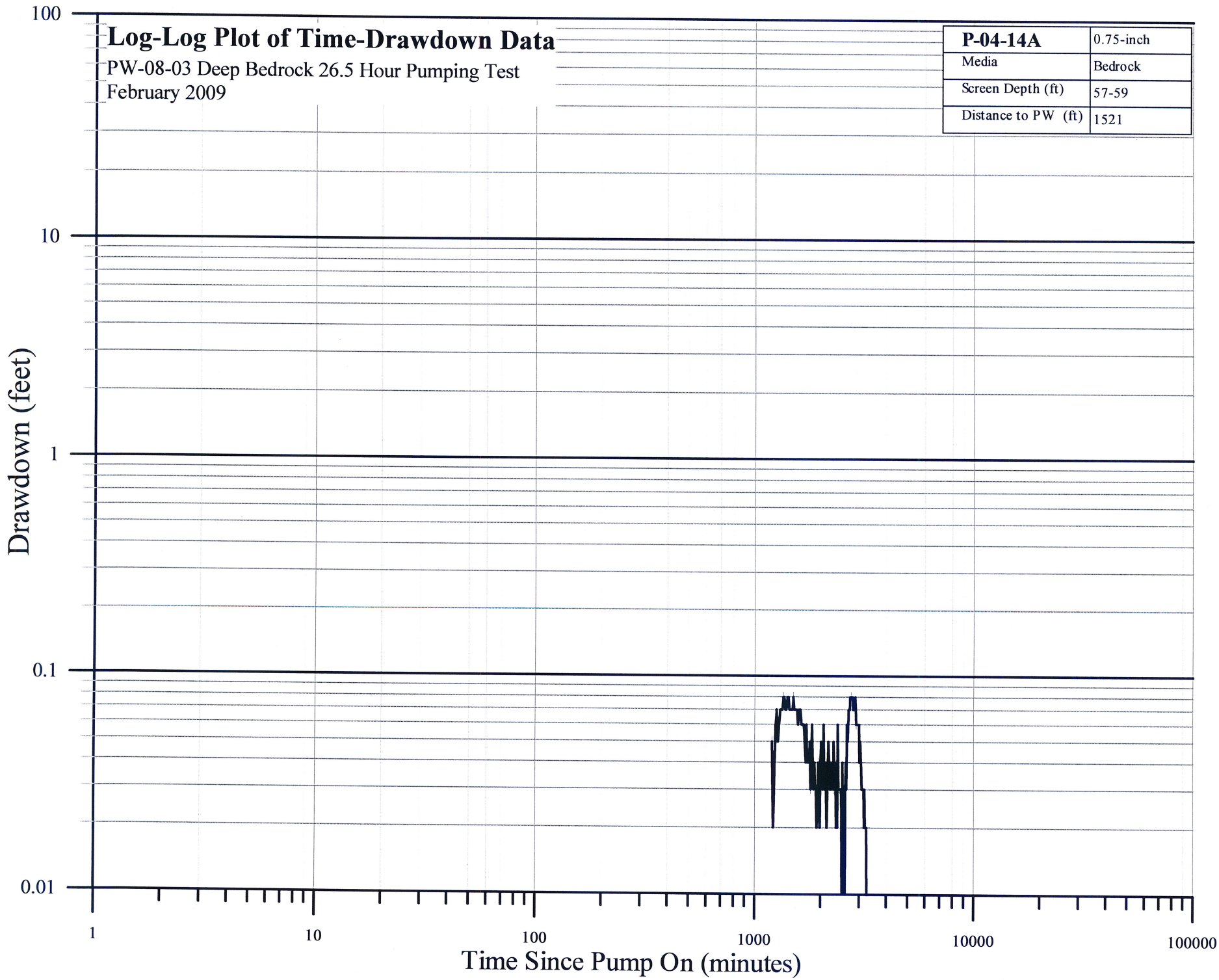
P-04-13B	0.75-inch
Media	Bedrock
Screen Depth (ft)	64-66
Distance to PW (ft)	2502

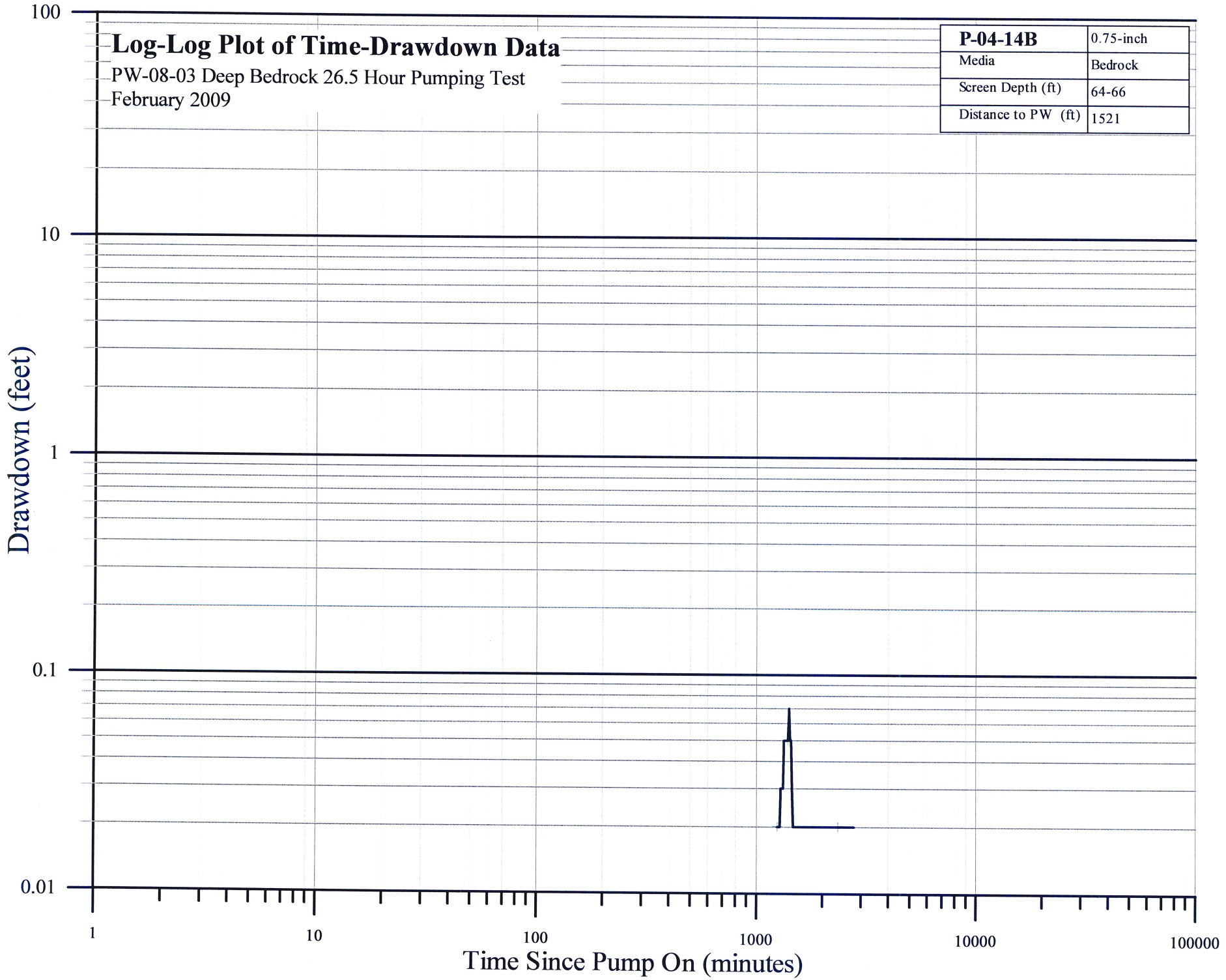


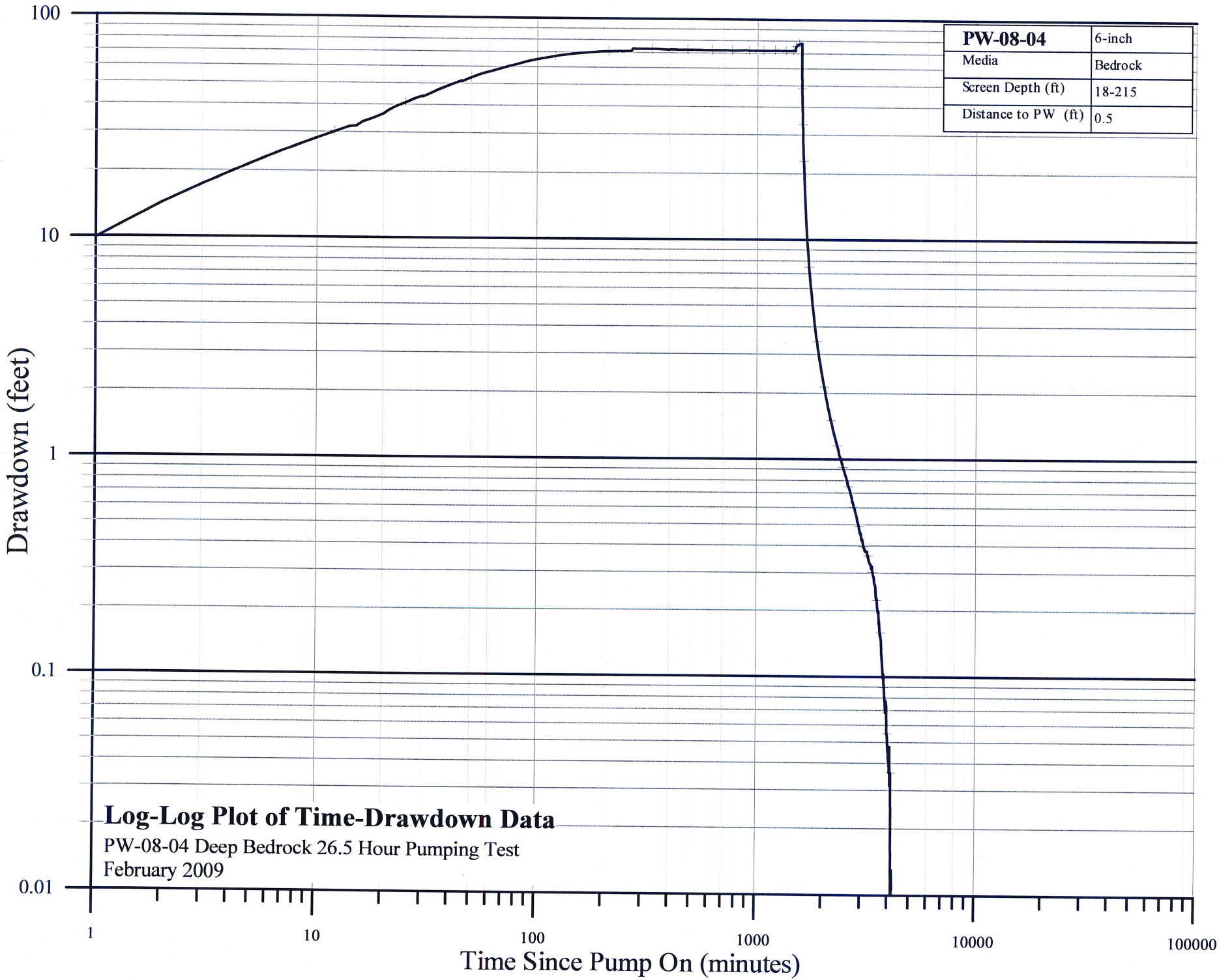
Log-Log Plot of Time-Drawdown Data

PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009

P-04-14A	0.75-inch
Media	Bedrock
Screen Depth (ft)	57-59
Distance to PW (ft)	1521



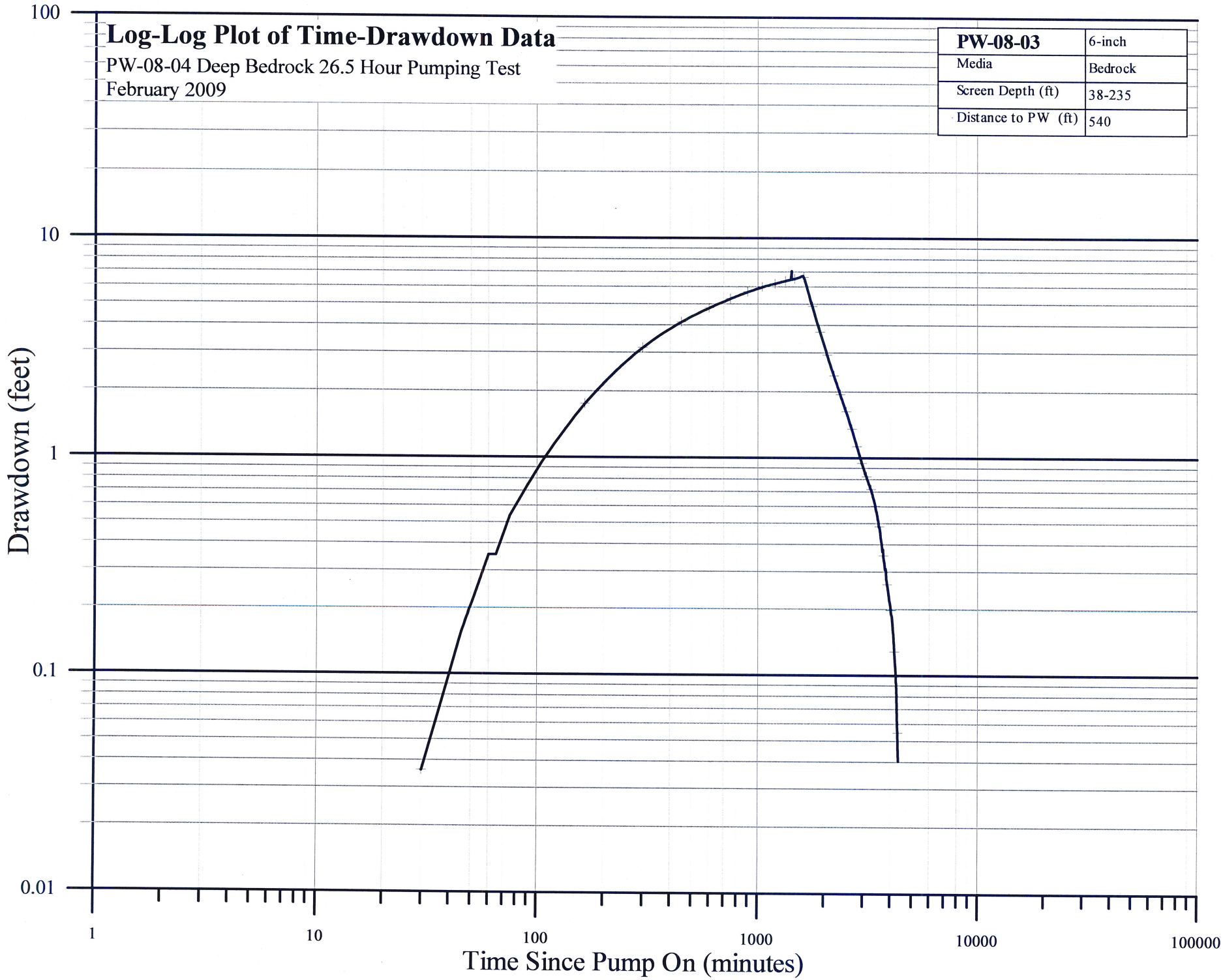

Log-Log Plot of Time-Drawdown Data
PW-08-03 Deep Bedrock 26.5 Hour Pumping Test
February 2009
P-04-14B
0.75-inch
Media
Bedrock
Screen Depth (ft)
64-66
Distance to PW (ft)
1521
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

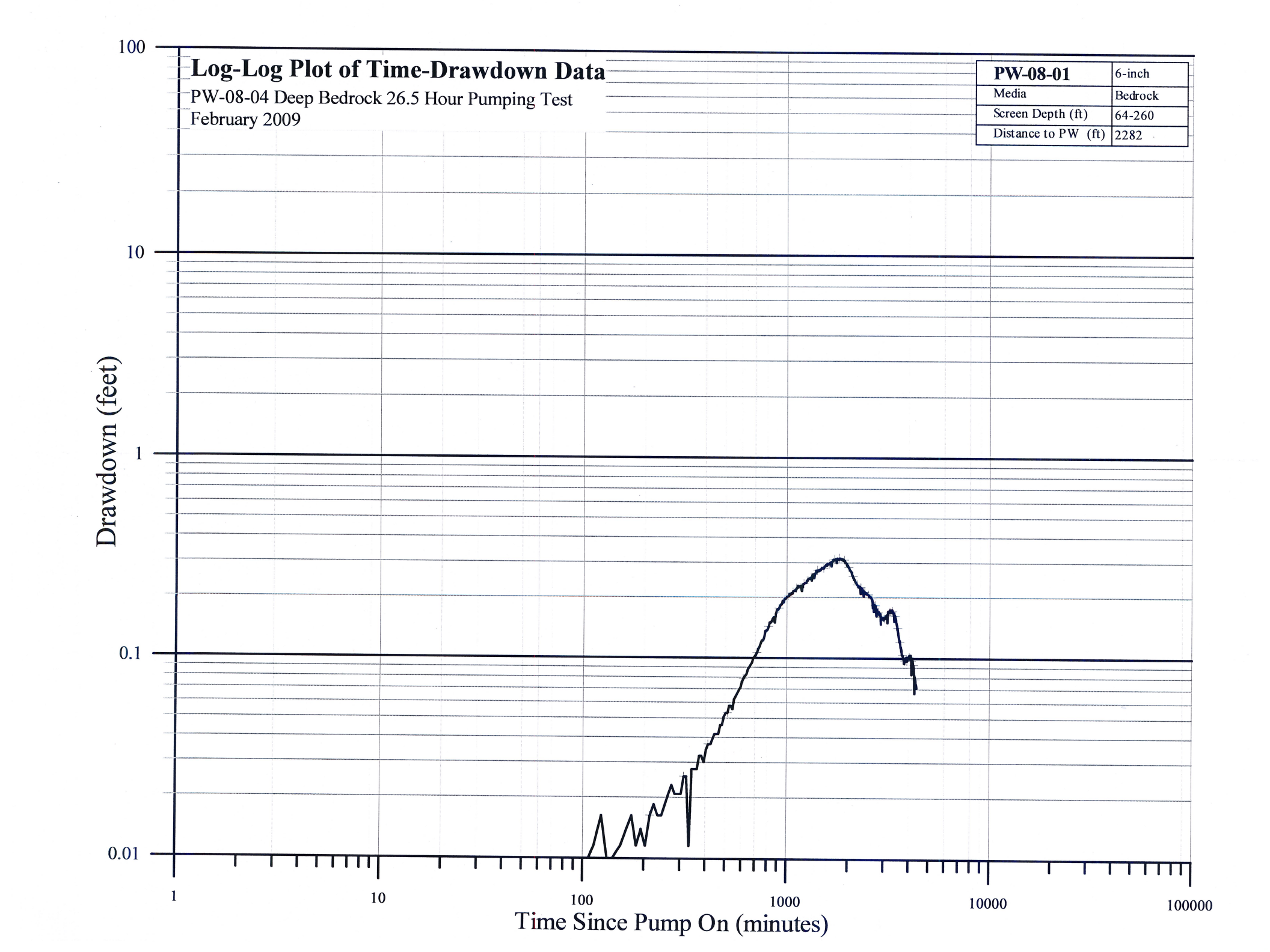

PW-08-04
6-inch
Media
Bedrock
Screen Depth (ft)
18-215
Distance to PW (ft)
0.5
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)
Log-Log Plot of Time-Drawdown Data
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009

Log-Log Plot of Time-Drawdown Data

PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009

PW-08-03	6-inch
Media	Bedrock
Screen Depth (ft)	38-235
Distance to PW (ft)	540

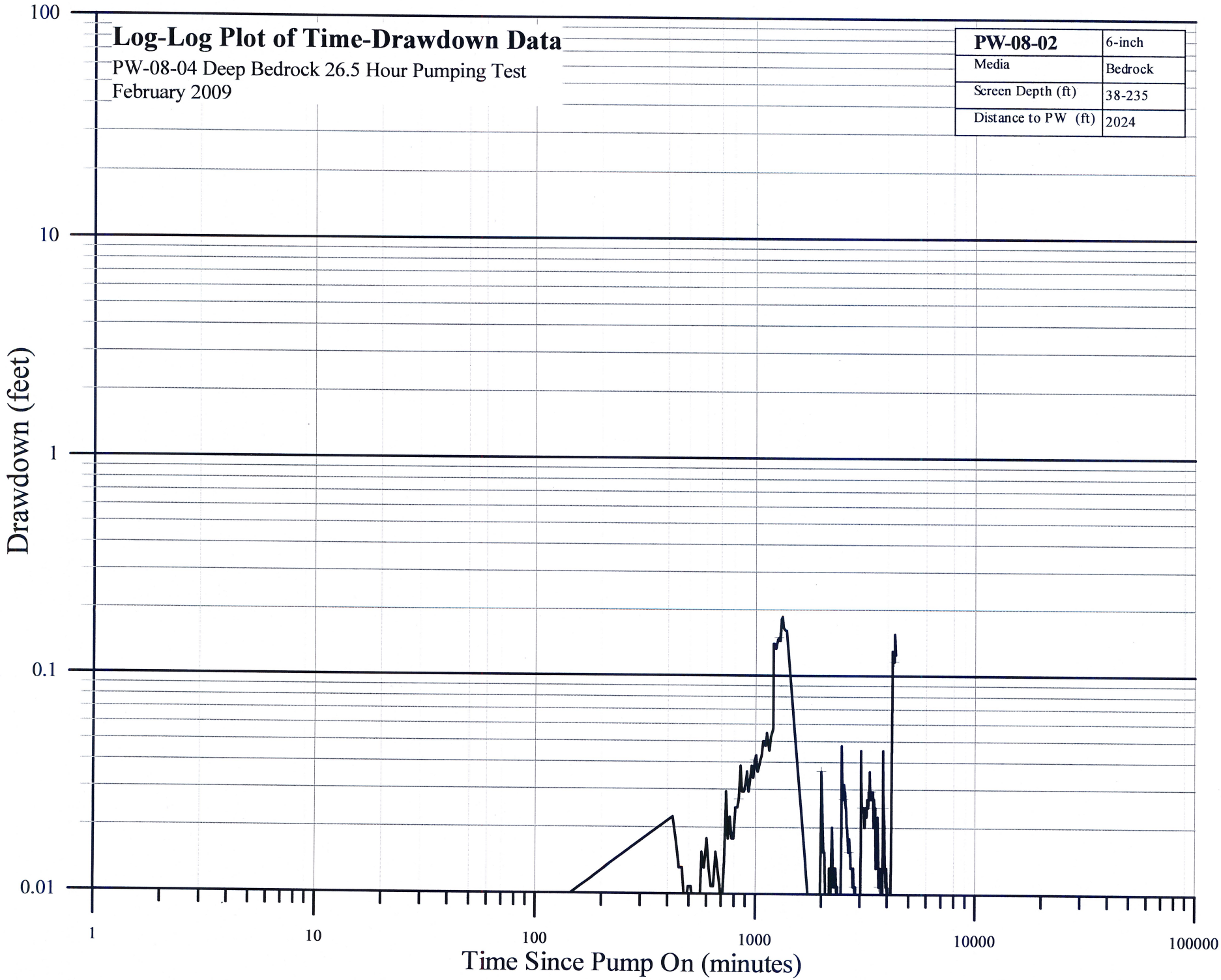


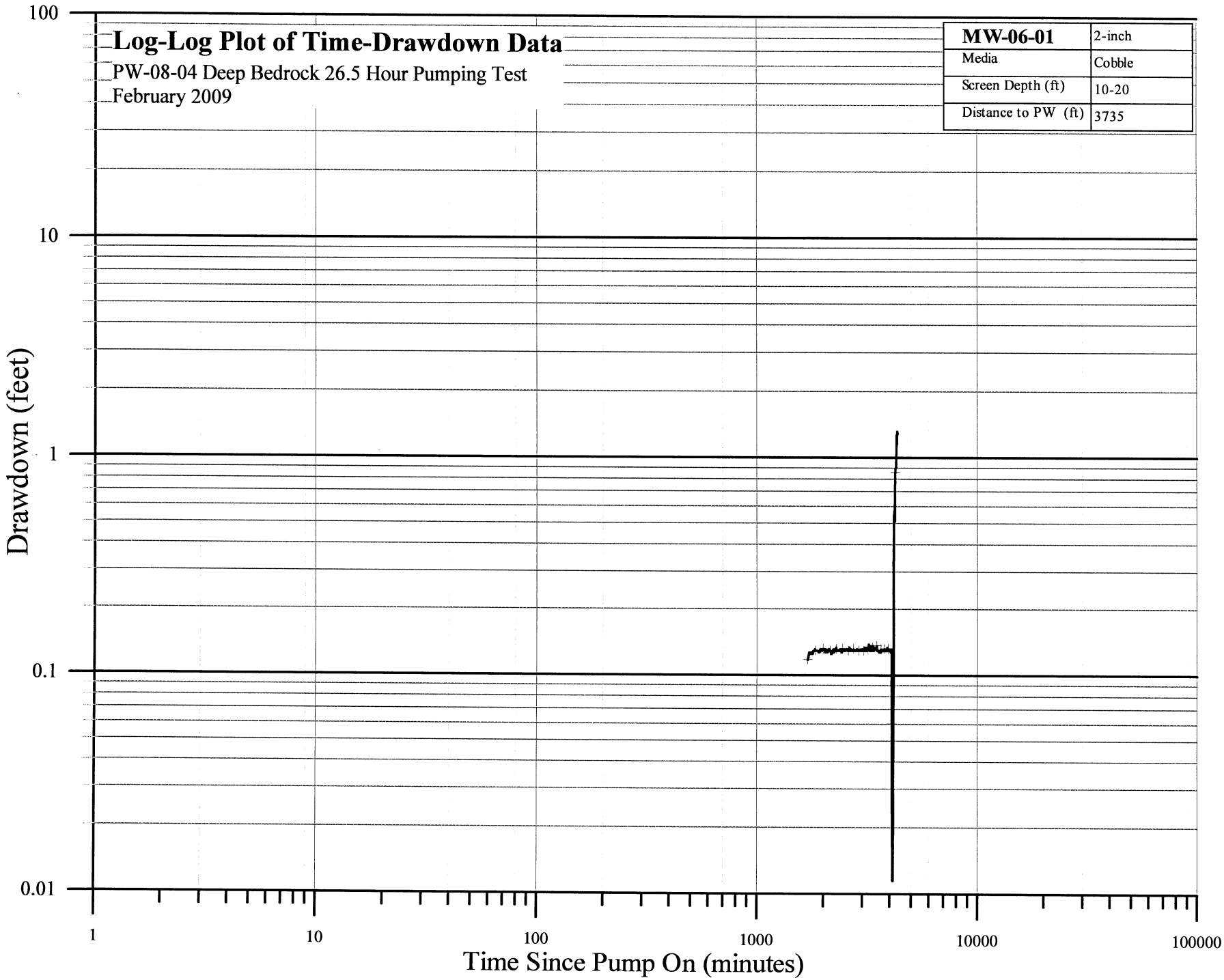

Log-Log Plot of Time-Drawdown Data
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009
PW-08-01 | 6-inch
Media | Bedrock
Screen Depth (ft) | 64-260
Distance to PW (ft) | 2282
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

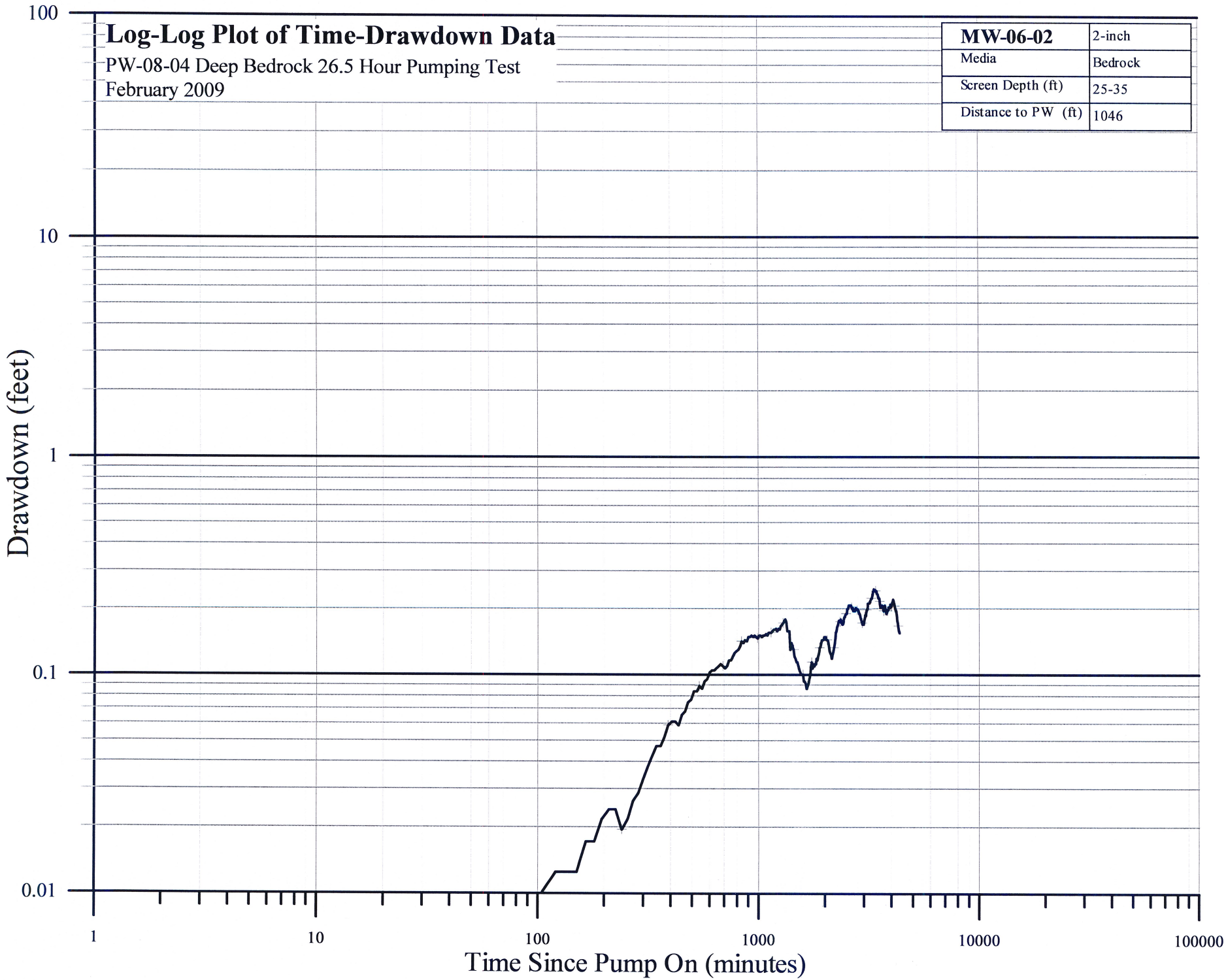
Log-Log Plot of Time-Drawdown Data

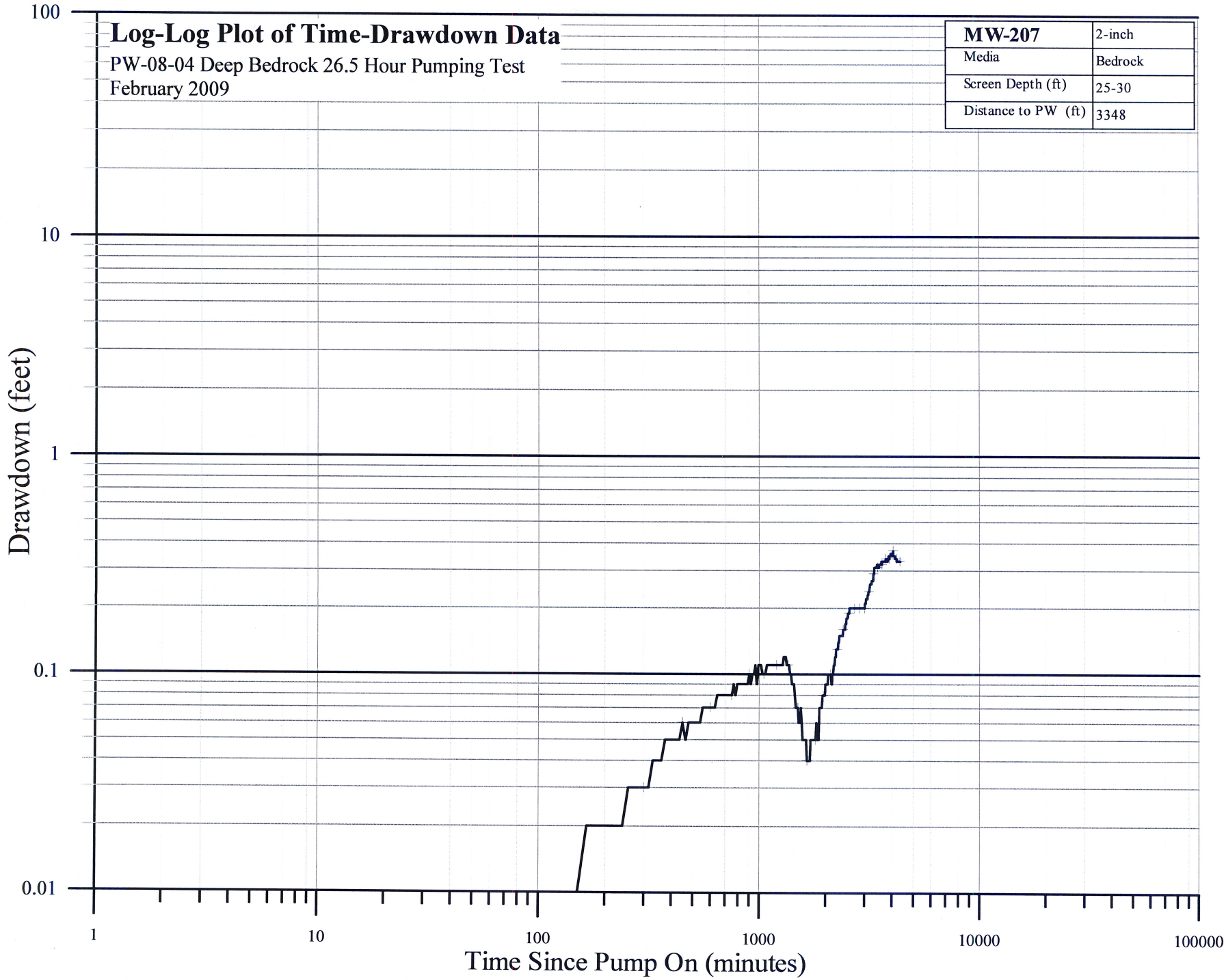
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009

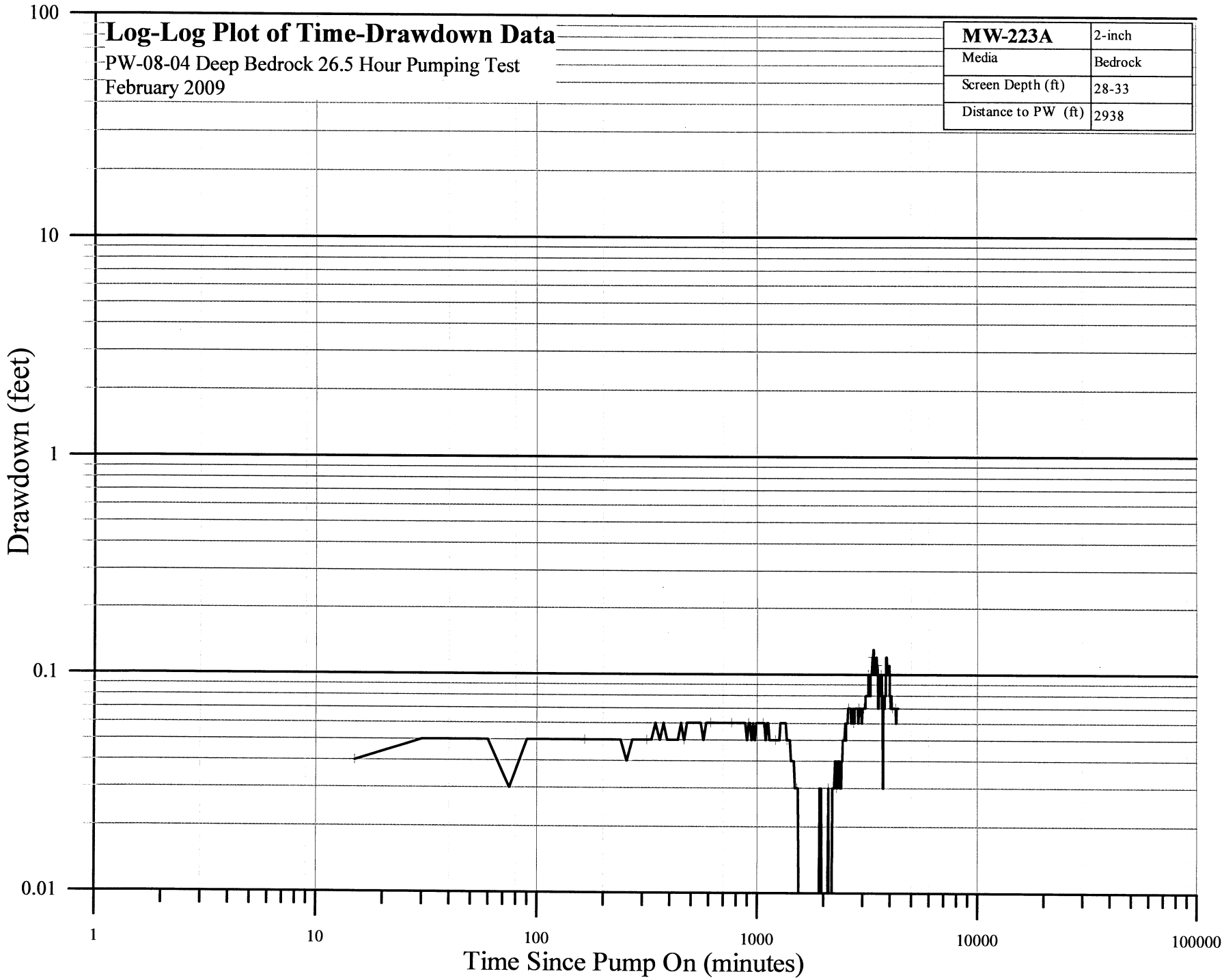
PW-08-02	6-inch
Media	Bedrock
Screen Depth (ft)	38-235
Distance to PW (ft)	2024




Log-Log Plot of Time-Drawdown Data
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009
MW-06-01 | 2-inch
Media | Cobble
Screen Depth (ft) | 10-20
Distance to PW (ft) | 3735
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009
MW-06-02
2-inch
Media
Bedrock
Screen Depth (ft)
25-35
Distance to PW (ft)
1046
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

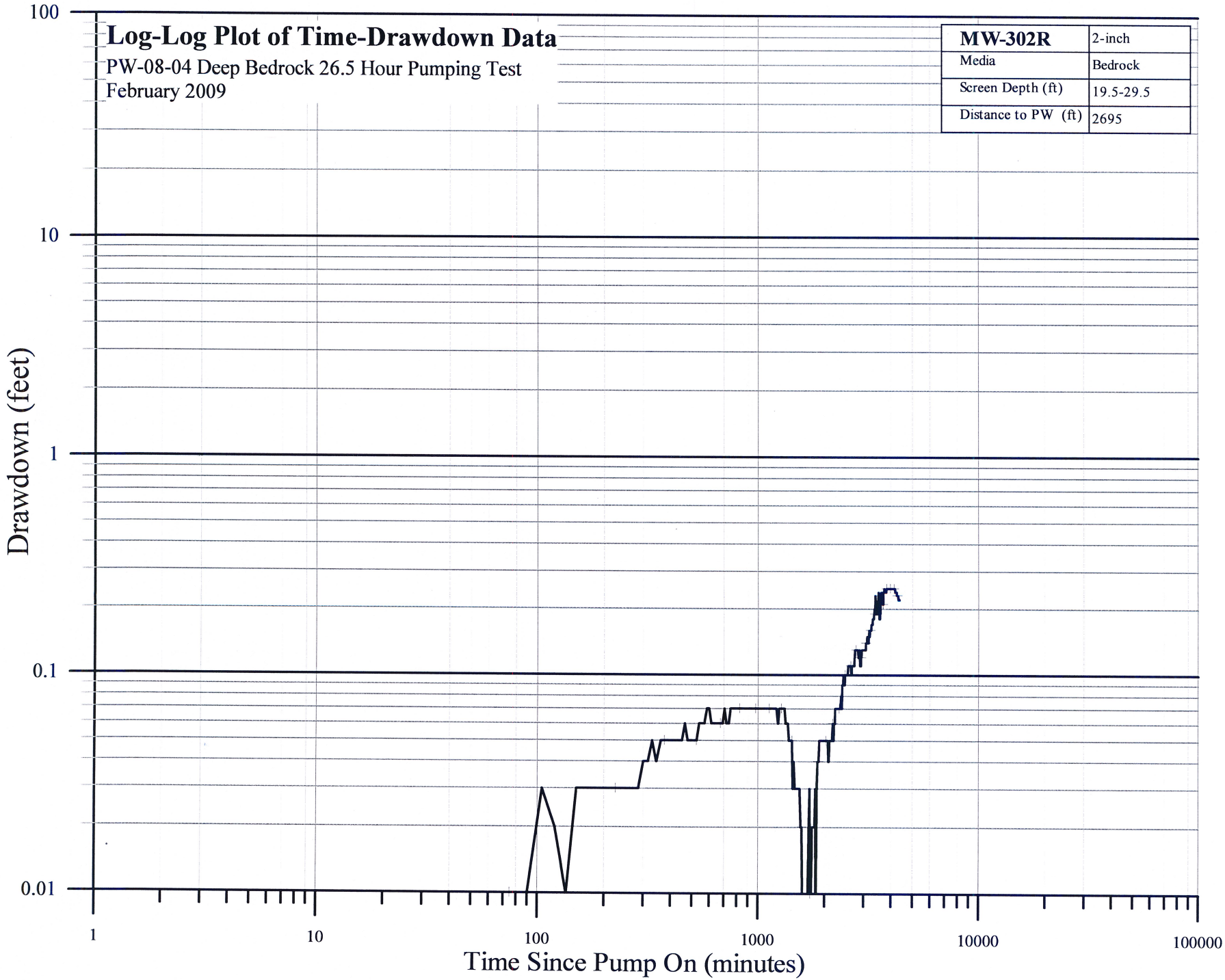

Log-Log Plot of Time-Drawdown Data
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009
MW-207 | 2-inch
Media | Bedrock
Screen Depth (ft) | 25-30
Distance to PW (ft) | 3348
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

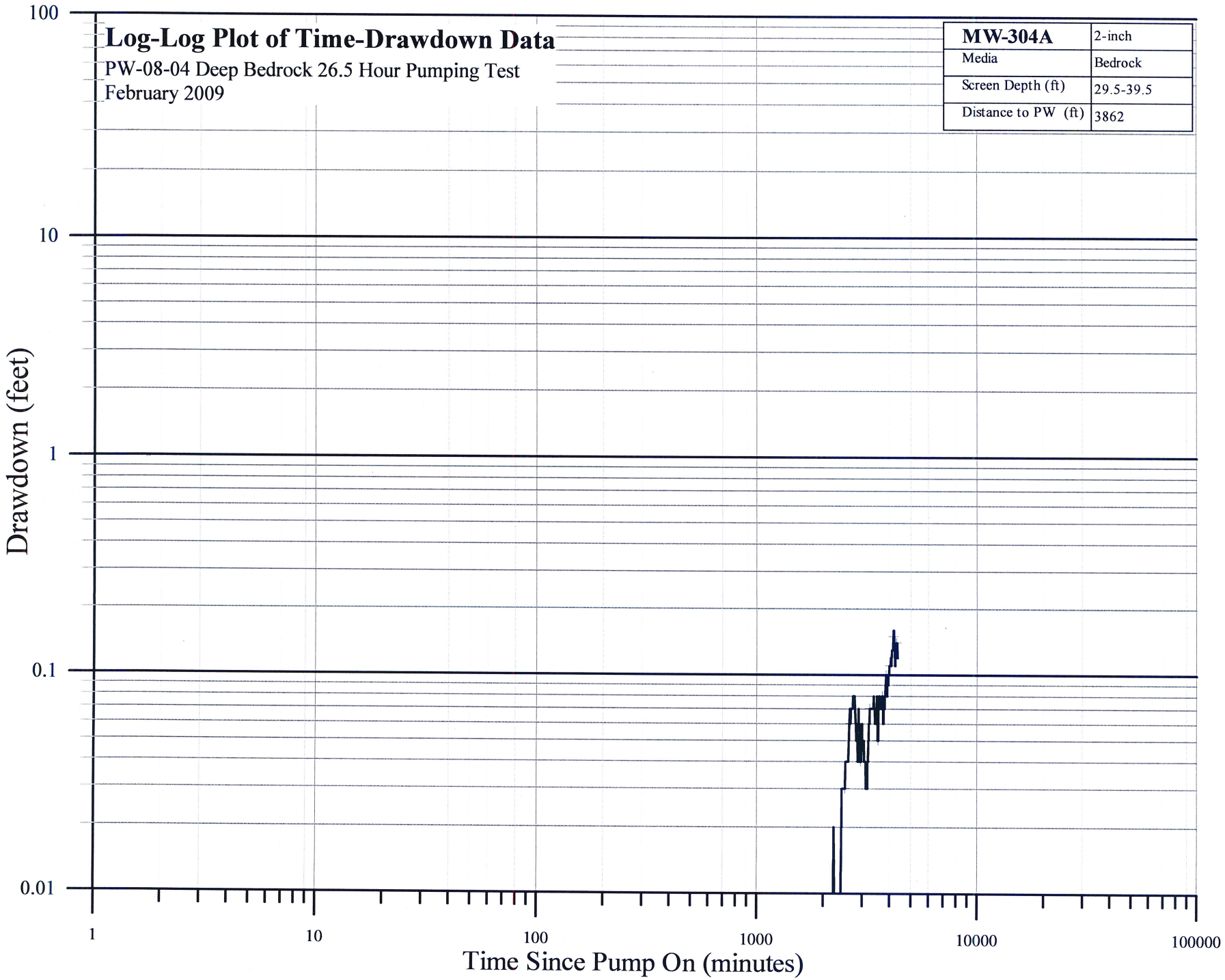

Log-Log Plot of Time-Drawdown Data
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009
MW-223A
2-inch
Media
Bedrock
Screen Depth (ft)
28-33
Distance to PW (ft)
2938
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

Log-Log Plot of Time-Drawdown Data

PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009

MW-302R	2-inch
Media	Bedrock
Screen Depth (ft)	19.5-29.5
Distance to PW (ft)	2695

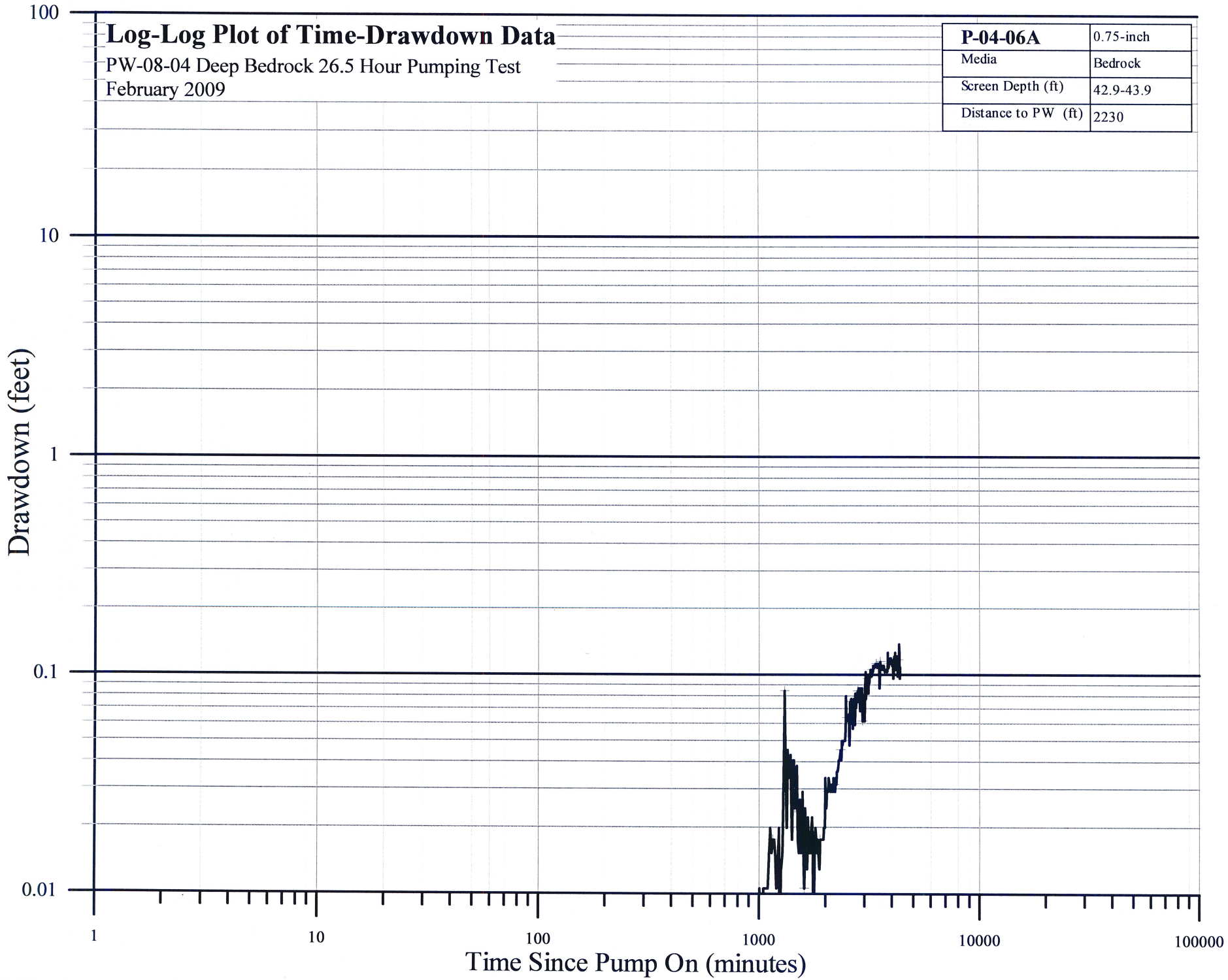



Log-Log Plot of Time-Drawdown Data
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009
MW-304A
2-inch
Media
Bedrock
Screen Depth (ft)
29.5-39.5
Distance to PW (ft)
3862
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

Log-Log Plot of Time-Drawdown Data

PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009

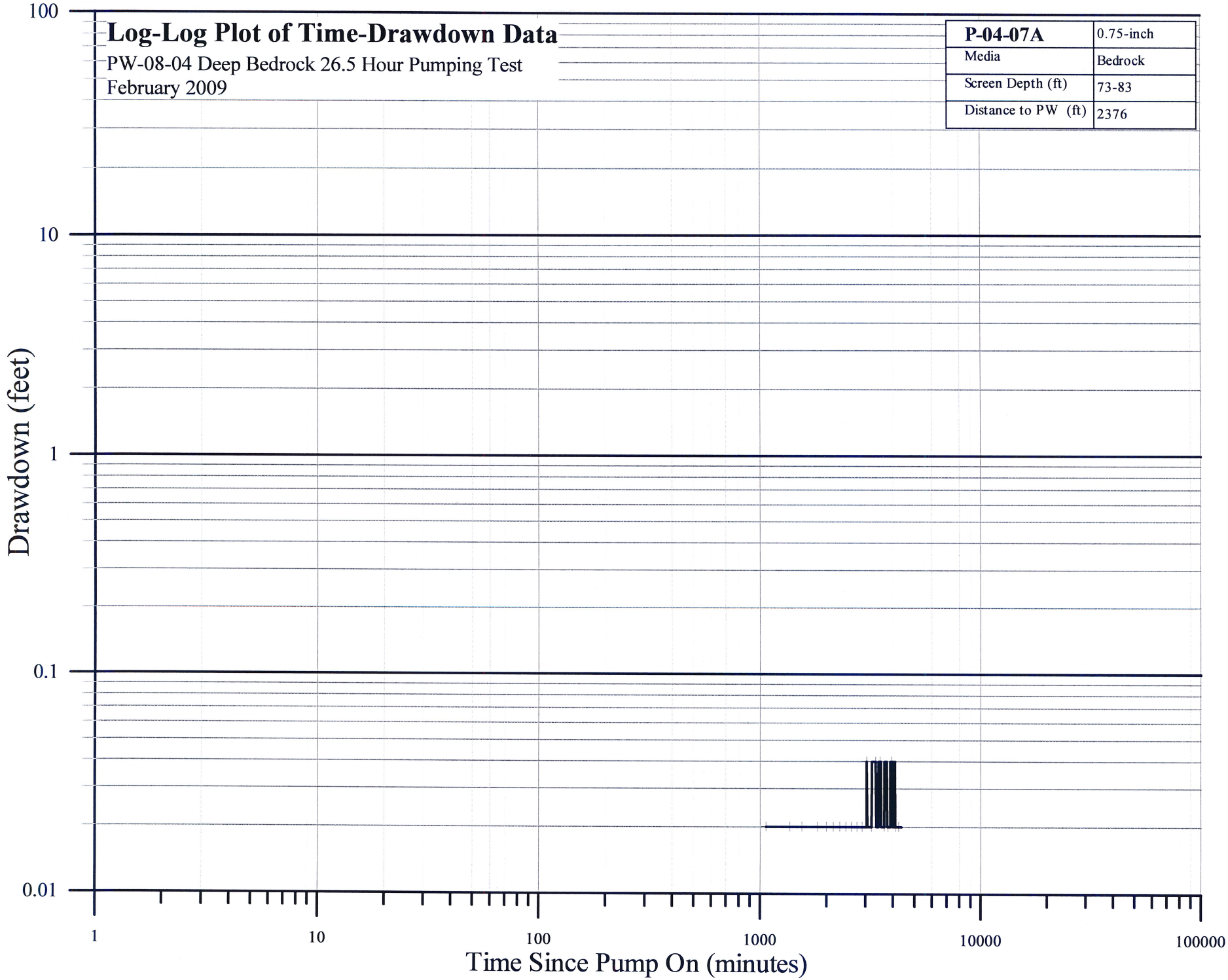
P-04-06A	0.75-inch
Media	Bedrock
Screen Depth (ft)	42.9-43.9
Distance to PW (ft)	2230

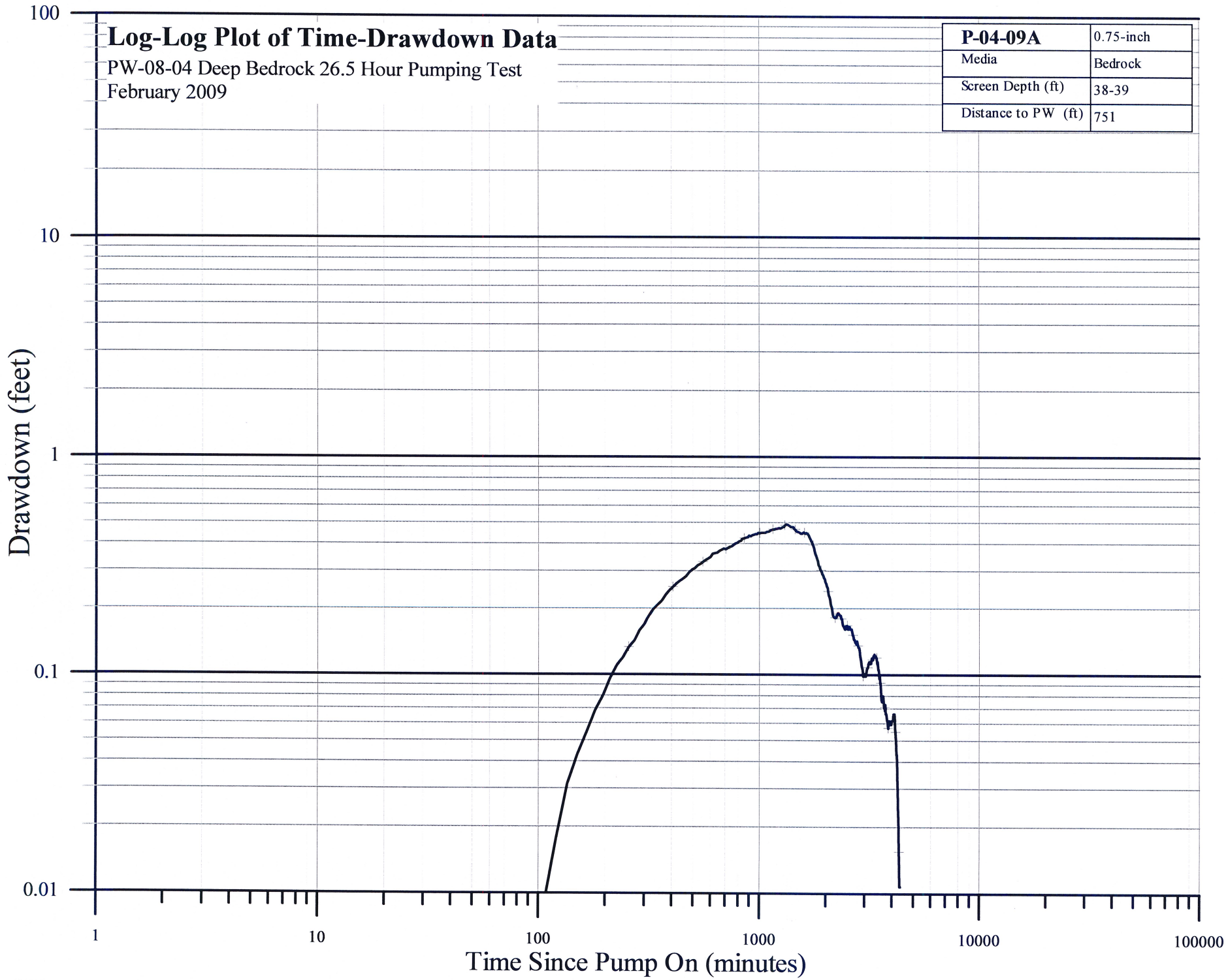


Log-Log Plot of Time-Drawdown Data

PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009

P-04-07A	0.75-inch
Media	Bedrock
Screen Depth (ft)	73-83
Distance to PW (ft)	2376

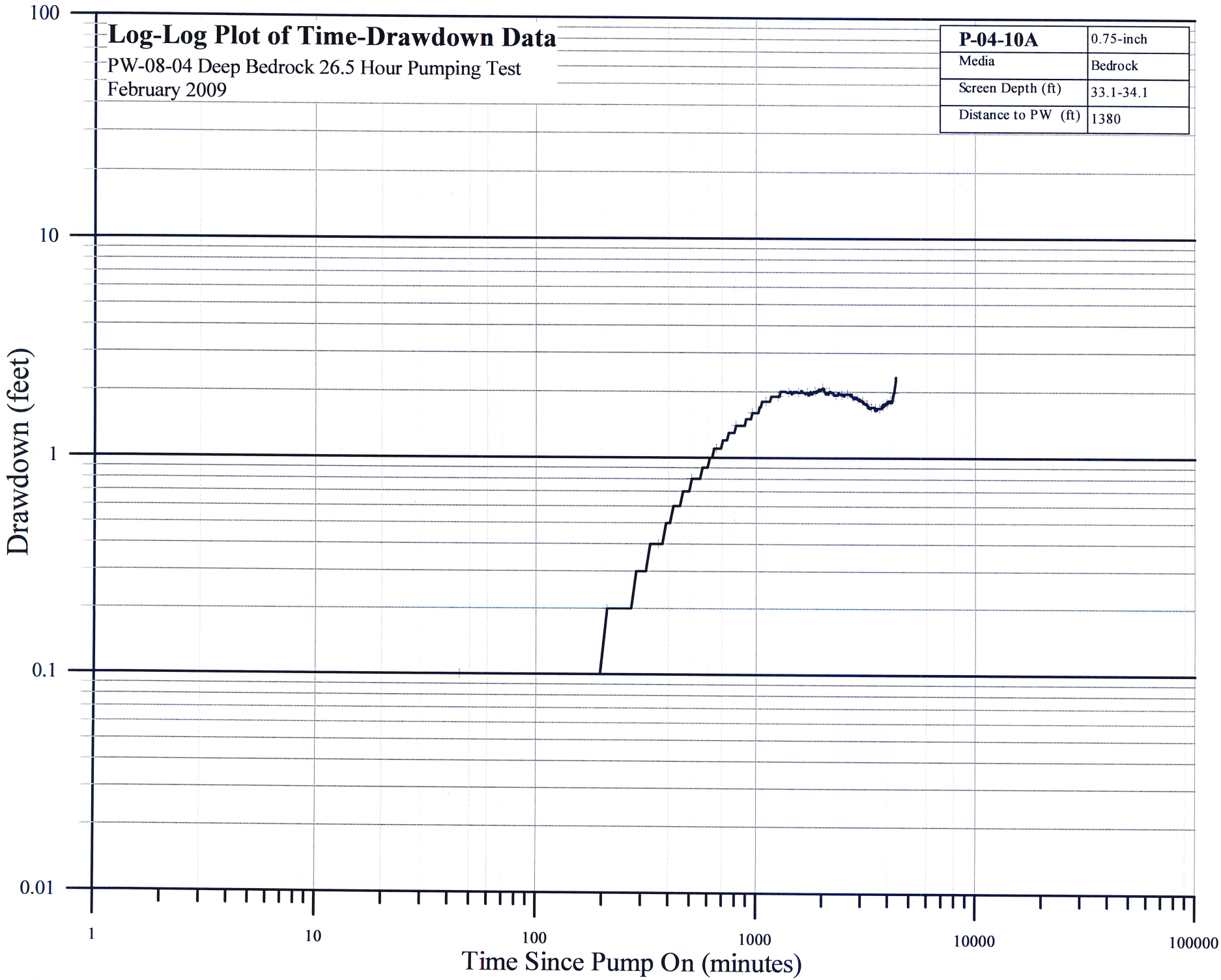



Log-Log Plot of Time-Drawdown Data
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009
P-04-09A
0.75-inch
Media
Bedrock
Screen Depth (ft)
38-39
Distance to PW (ft)
751
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

Log-Log Plot of Time-Drawdown Data

PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009

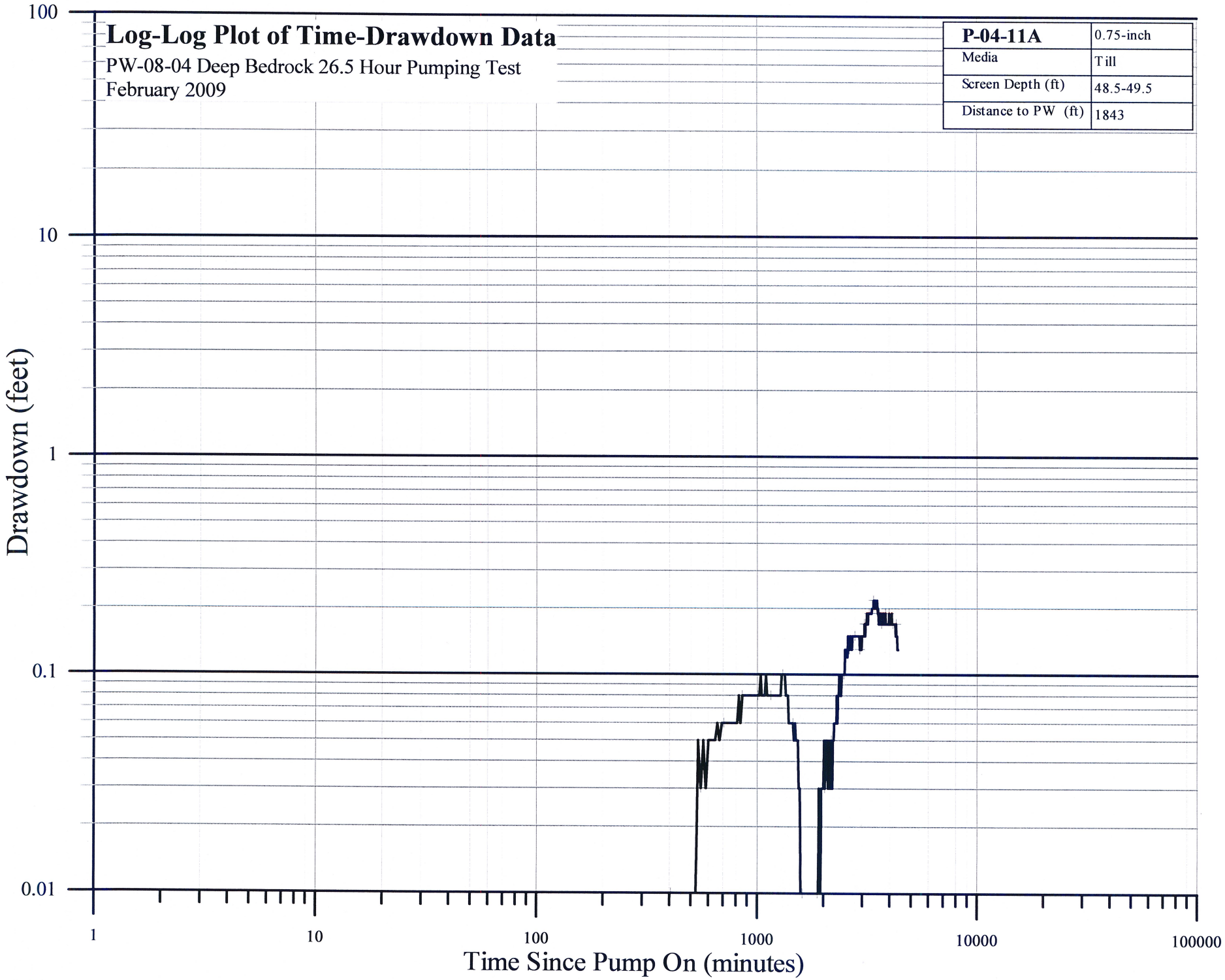
P-04-10A	0.75-inch
Media	Bedrock
Screen Depth (ft)	33.1-34.1
Distance to PW (ft)	1380

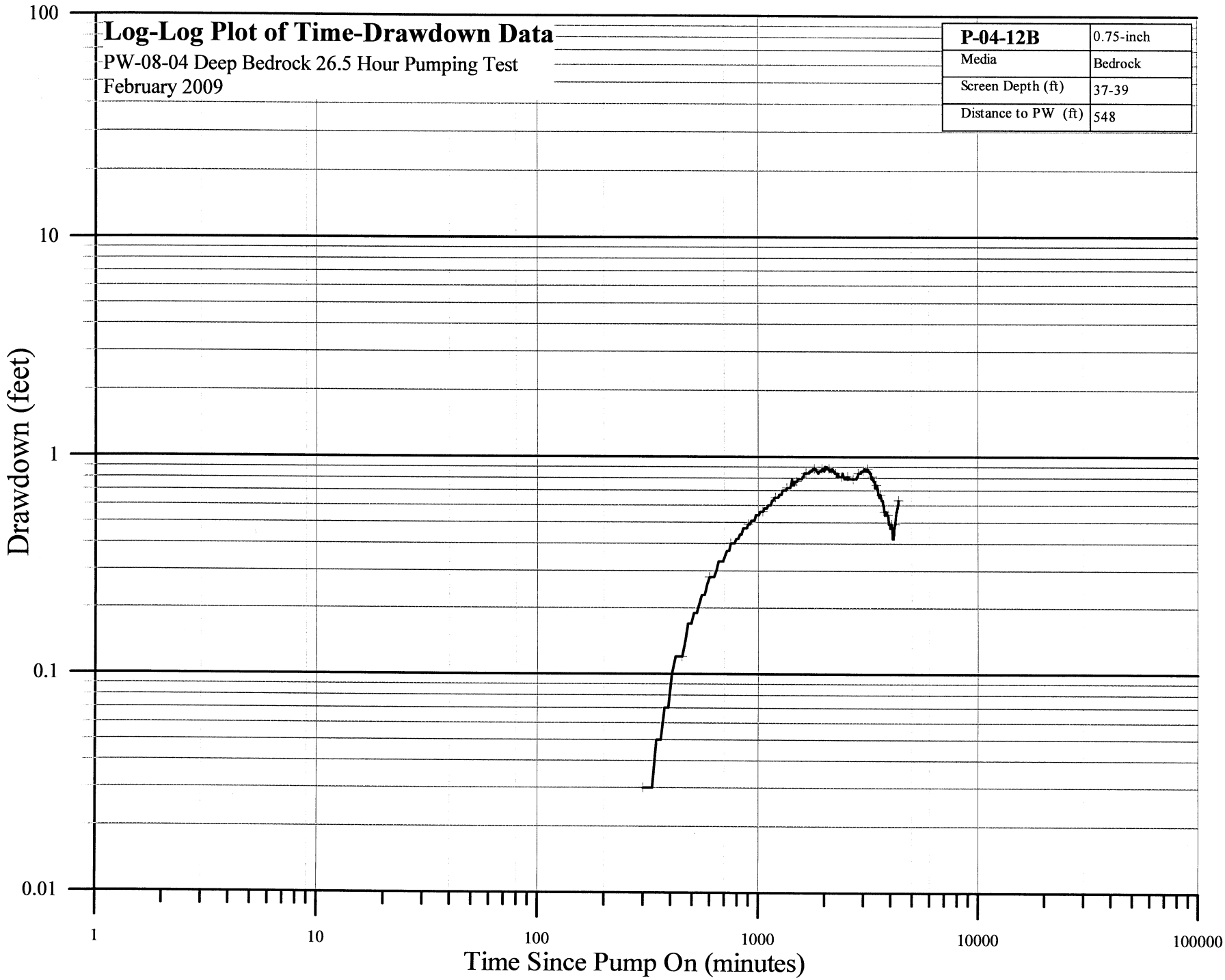


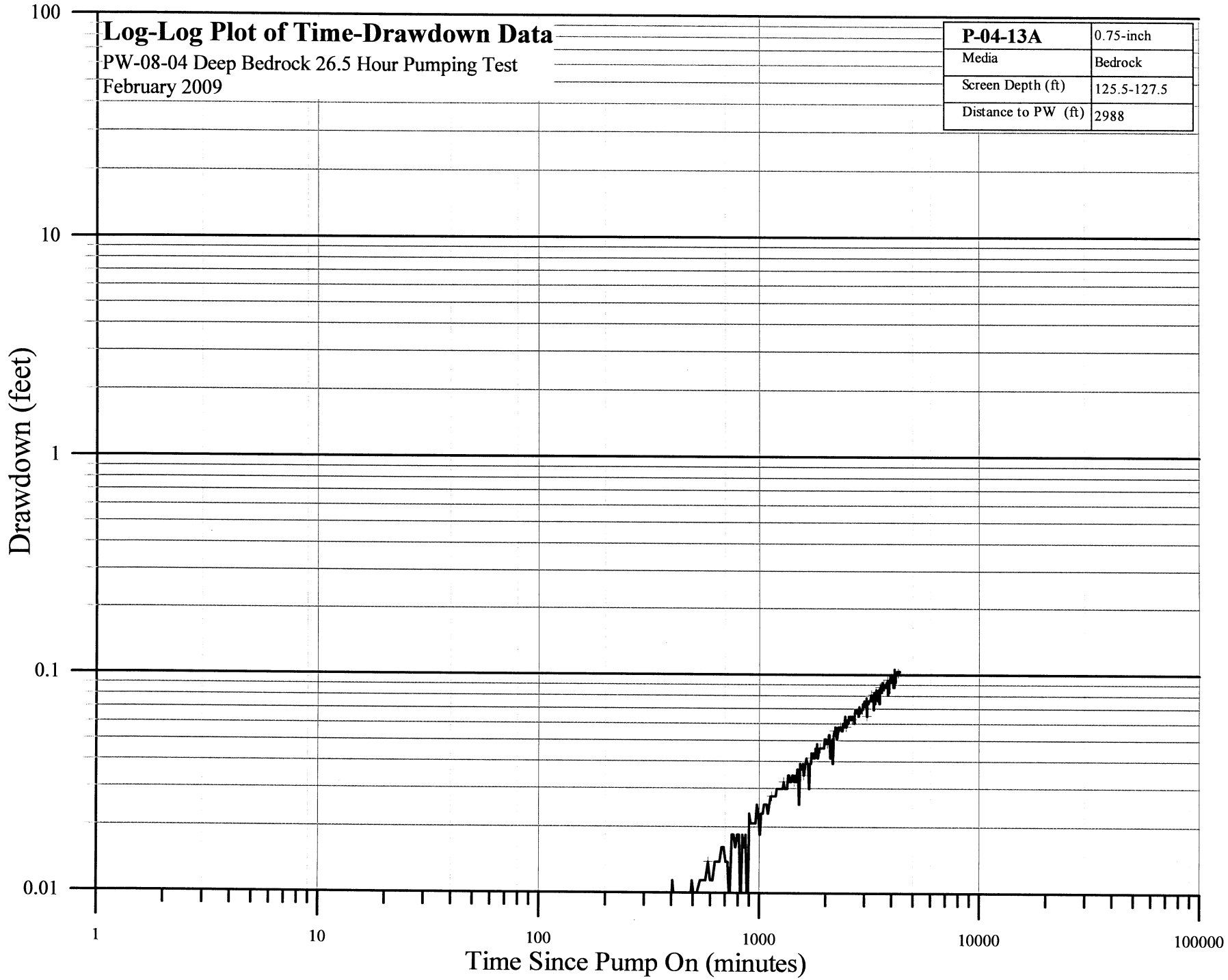
Log-Log Plot of Time-Drawdown Data

PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009

P-04-11A	0.75-inch
Media	Till
Screen Depth (ft)	48.5-49.5
Distance to PW (ft)	1843



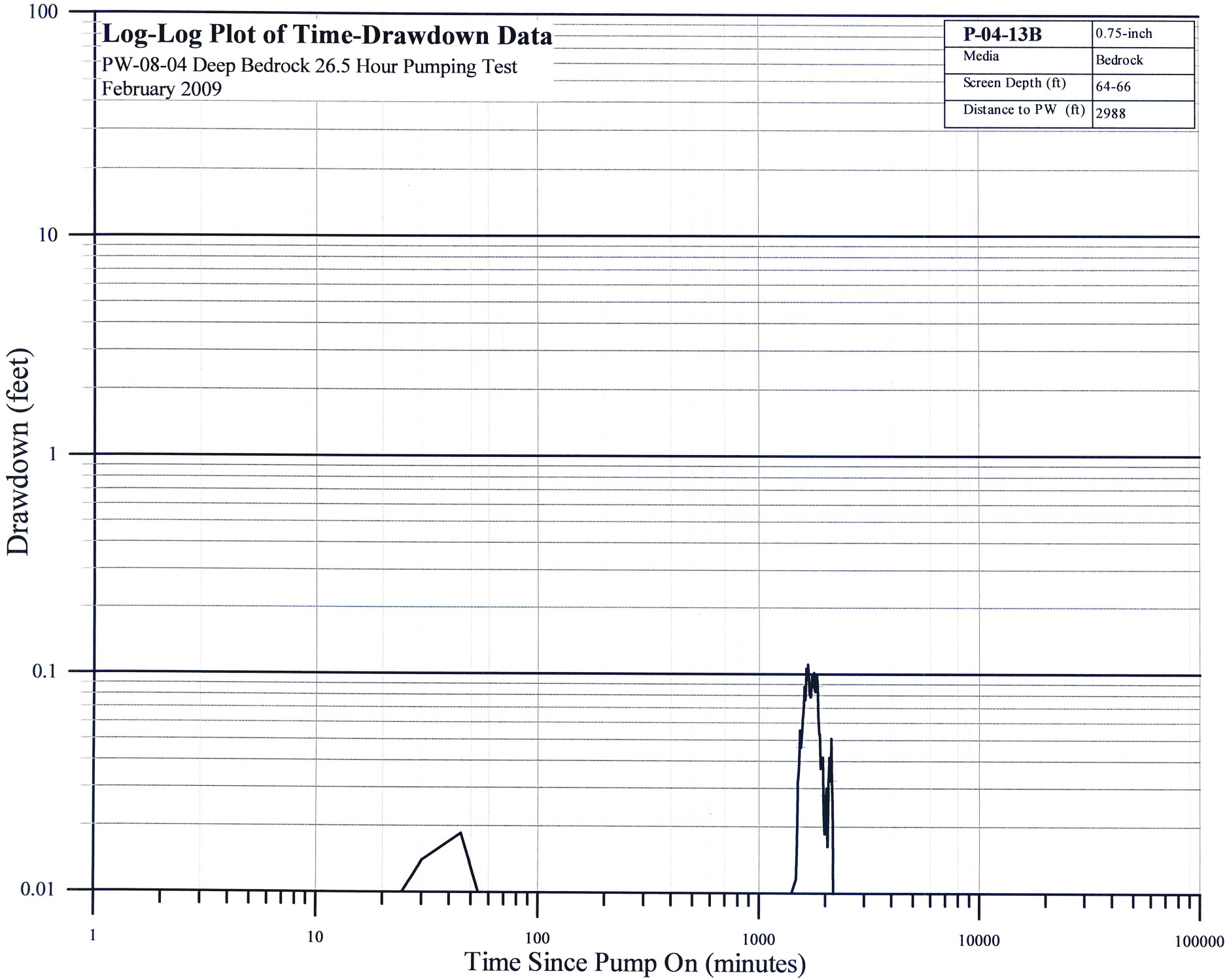

Log-Log Plot of Time-Drawdown Data
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009
P-04-12B
0.75-inch
Media
Bedrock
Screen Depth (ft)
37-39
Distance to PW (ft)
548
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009
P-04-13A
0.75-inch
Media
Bedrock
Screen Depth (ft)
125.5-127.5
Distance to PW (ft)
2988
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

Log-Log Plot of Time-Drawdown Data

PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009

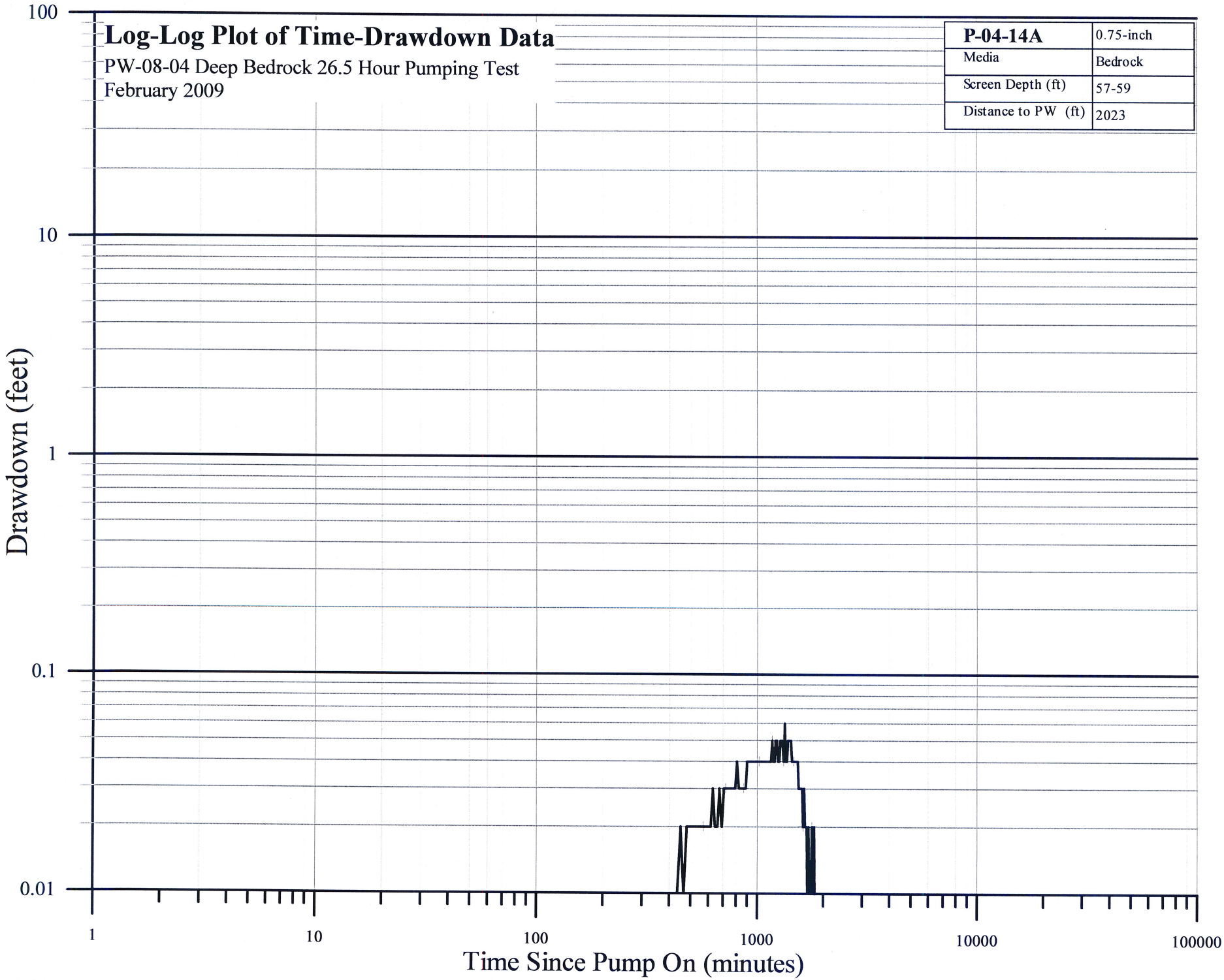
P-04-13B	0.75-inch
Media	Bedrock
Screen Depth (ft)	64-66
Distance to PW (ft)	2988

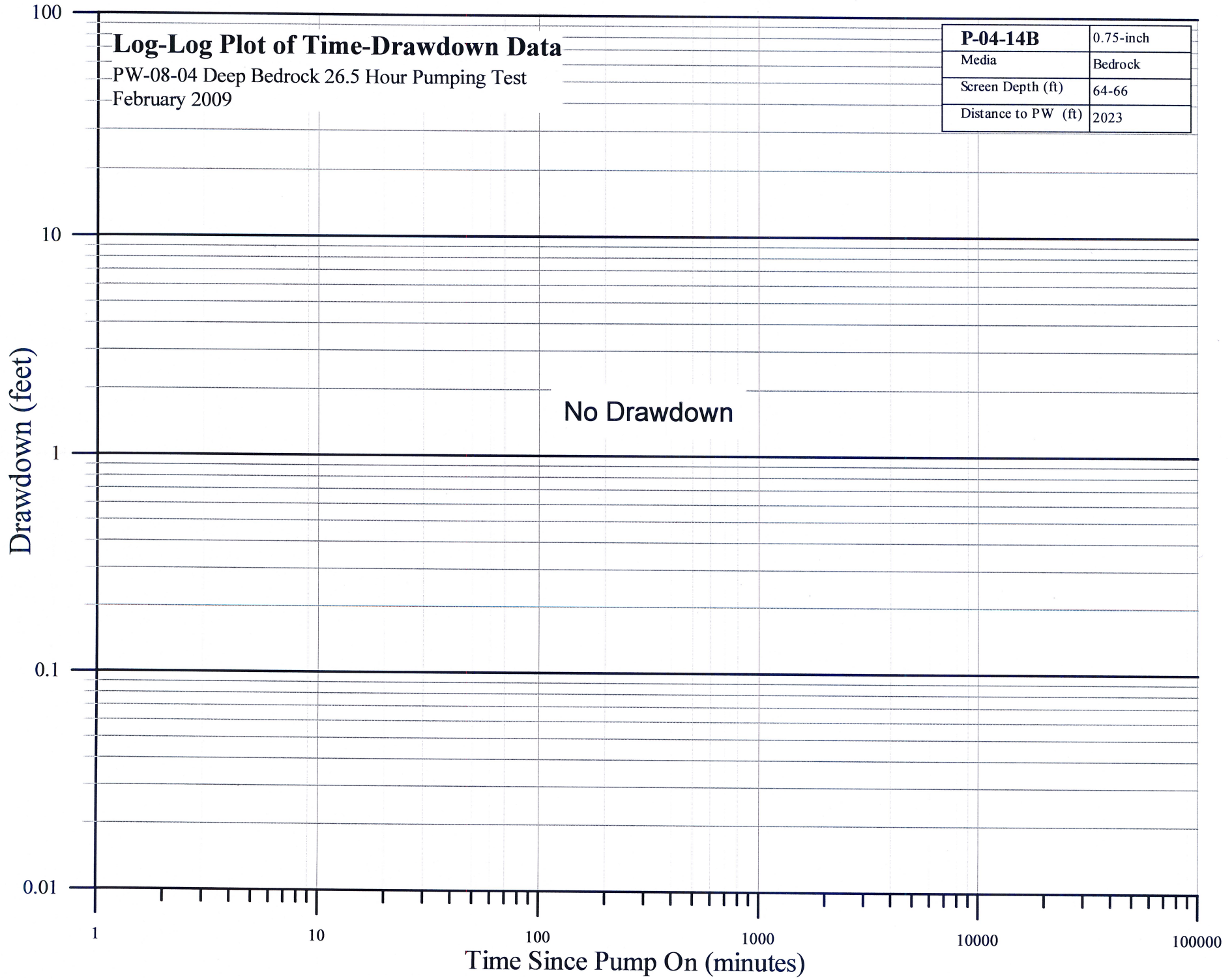


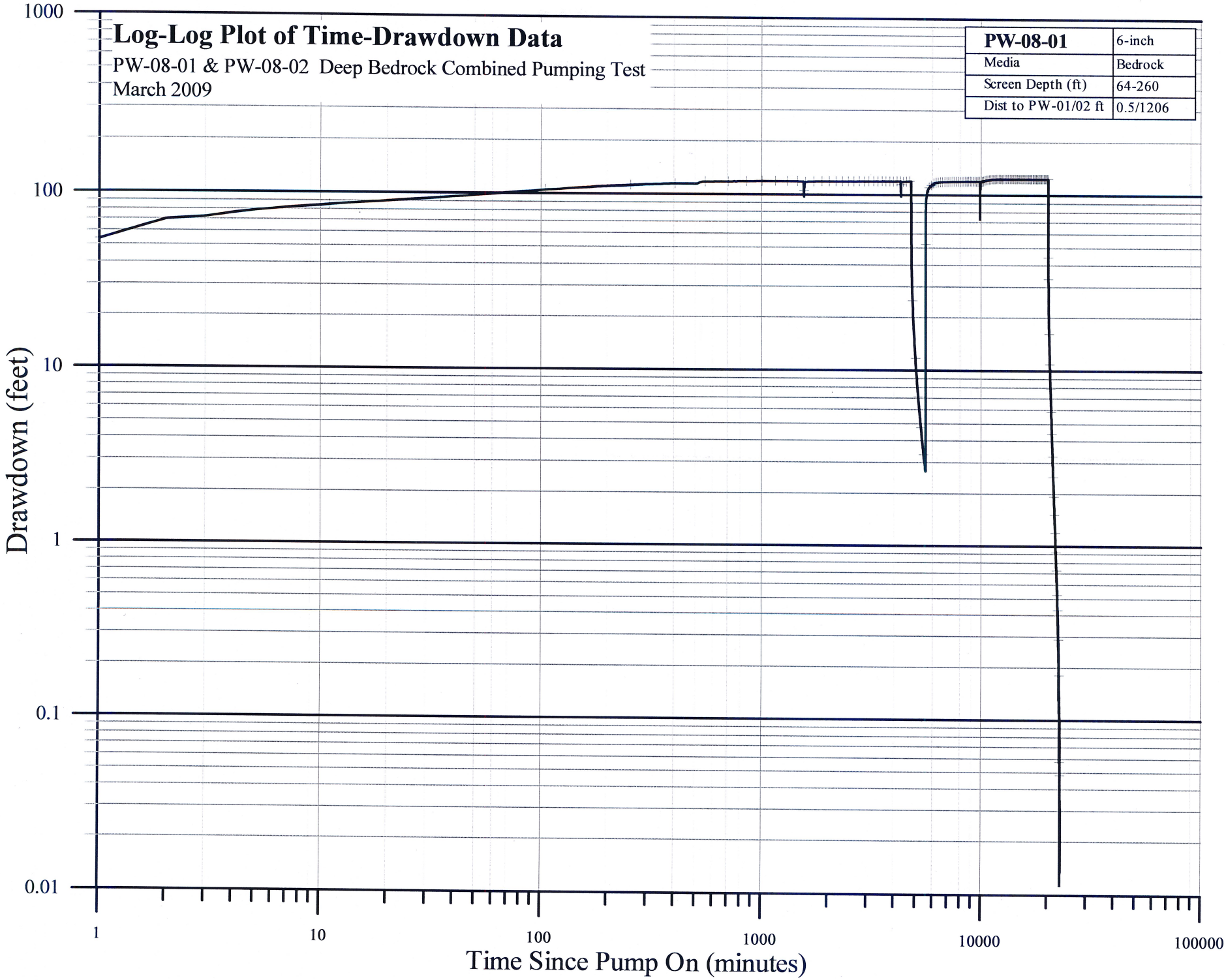
Log-Log Plot of Time-Drawdown Data

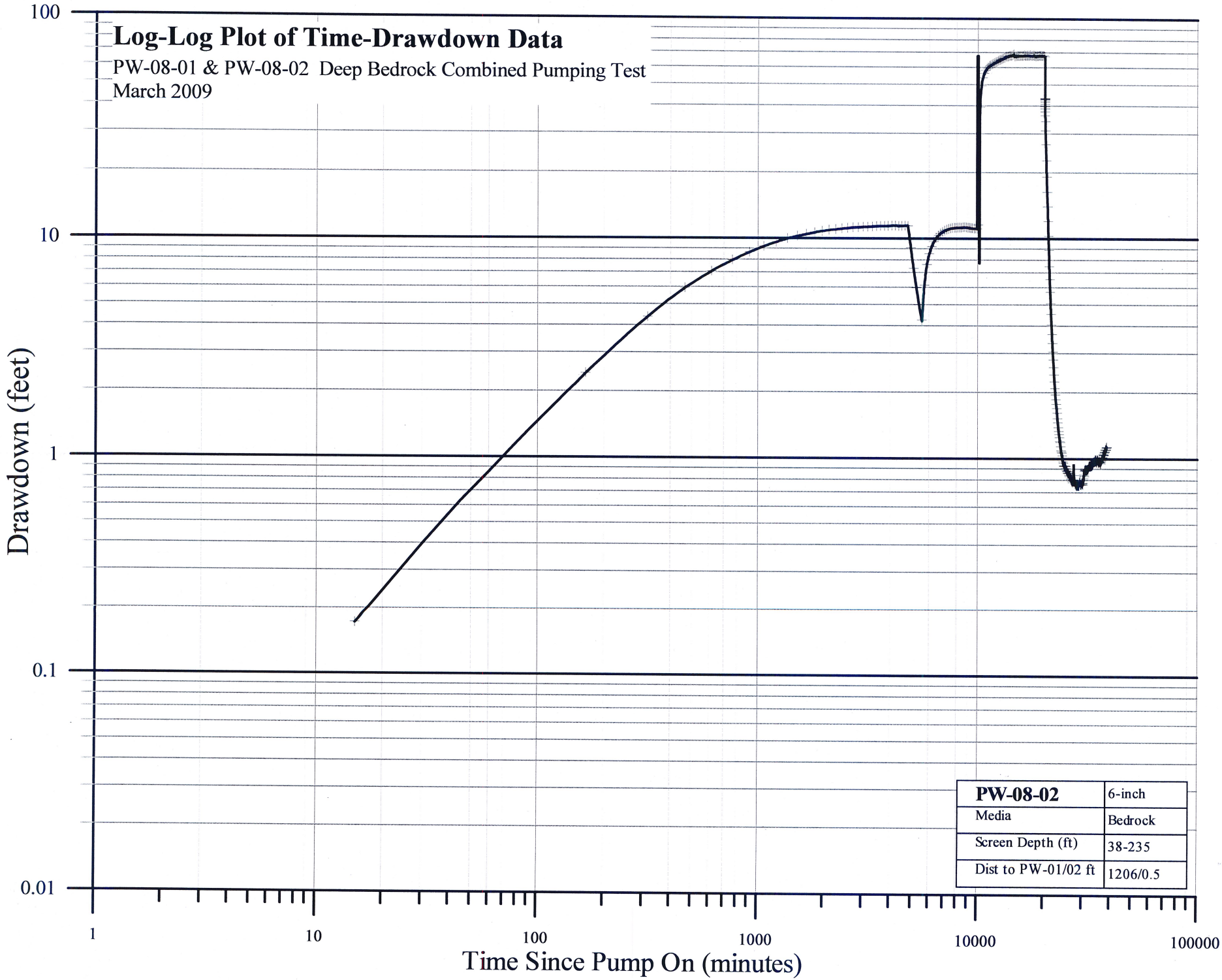
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009

P-04-14A	0.75-inch
Media	Bedrock
Screen Depth (ft)	57-59
Distance to PW (ft)	2023




Log-Log Plot of Time-Drawdown Data
PW-08-04 Deep Bedrock 26.5 Hour Pumping Test
February 2009
P-04-14B
0.75-inch
Media
Bedrock
Screen Depth (ft)
64-66
Distance to PW (ft)
2023
No Drawdown
Drawdown (feet)
100
10
1
0.1
0.01
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

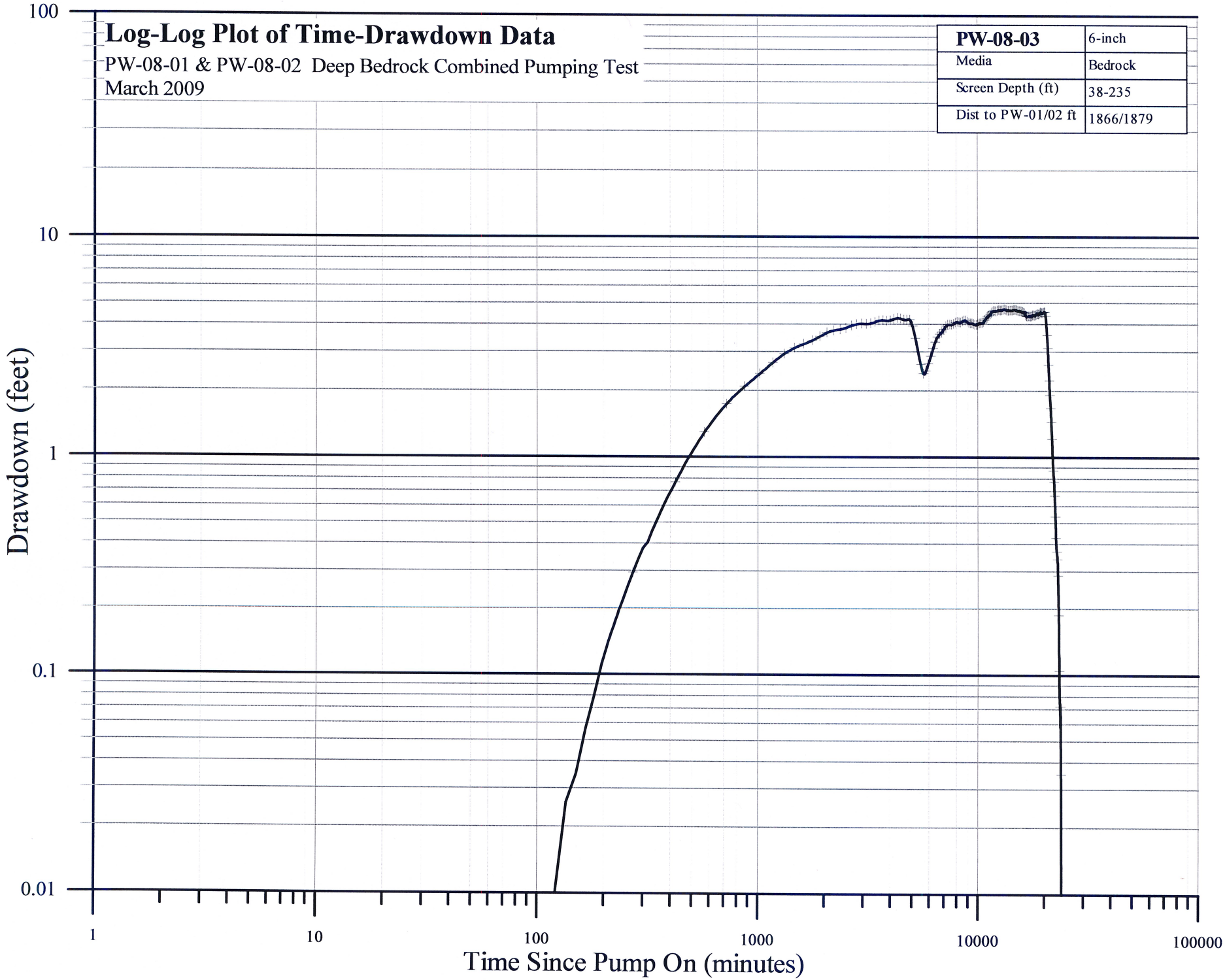

Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
PW-08-01 | 6-inch
Media | Bedrock
Screen Depth (ft) | 64-260
Dist to PW-01/02 ft | 0.5/1206
1000
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

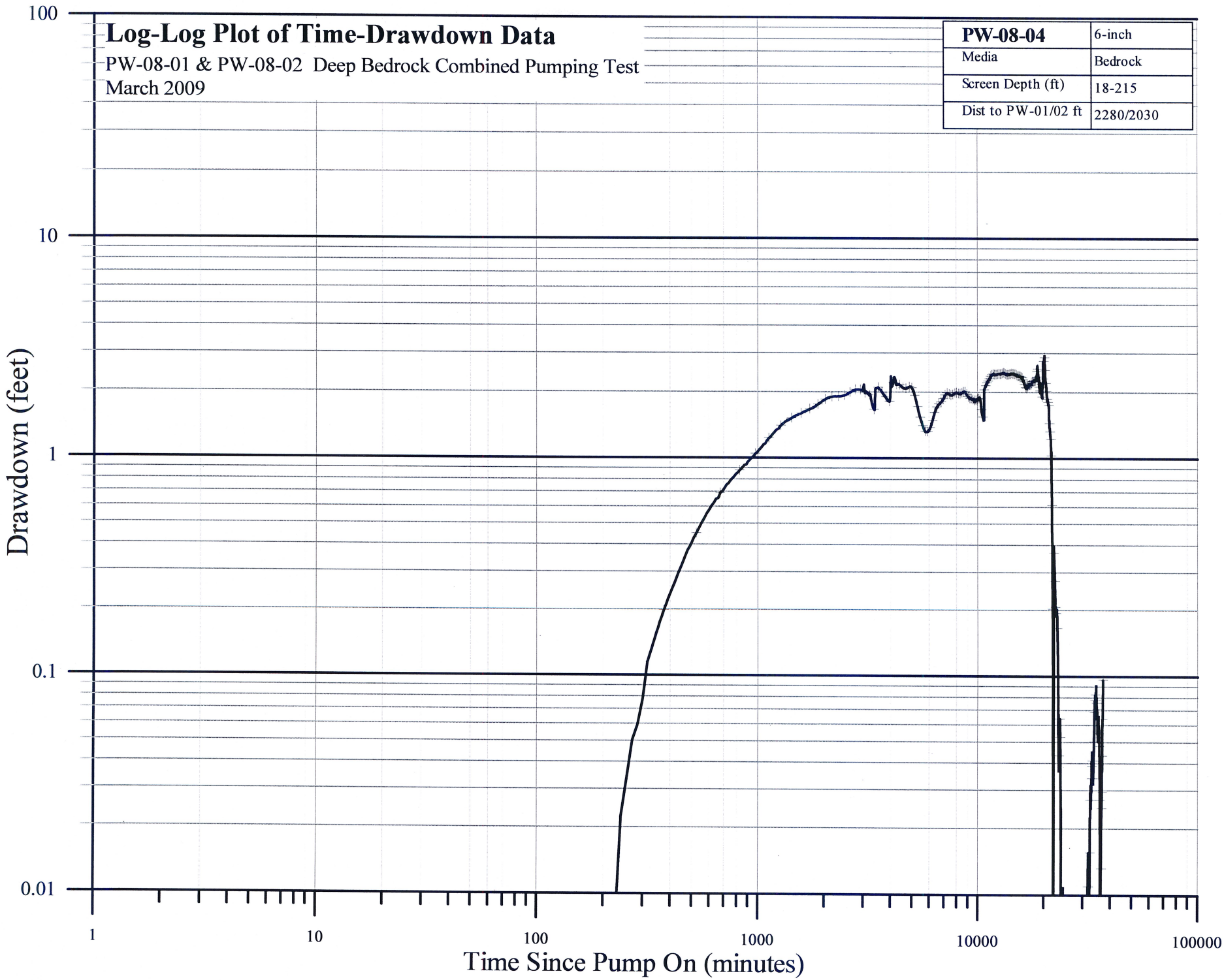

Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)
PW-08-02
6-inch
Media
Bedrock
Screen Depth (ft)
38-235
Dist to PW-01/02 ft
1206/0.5

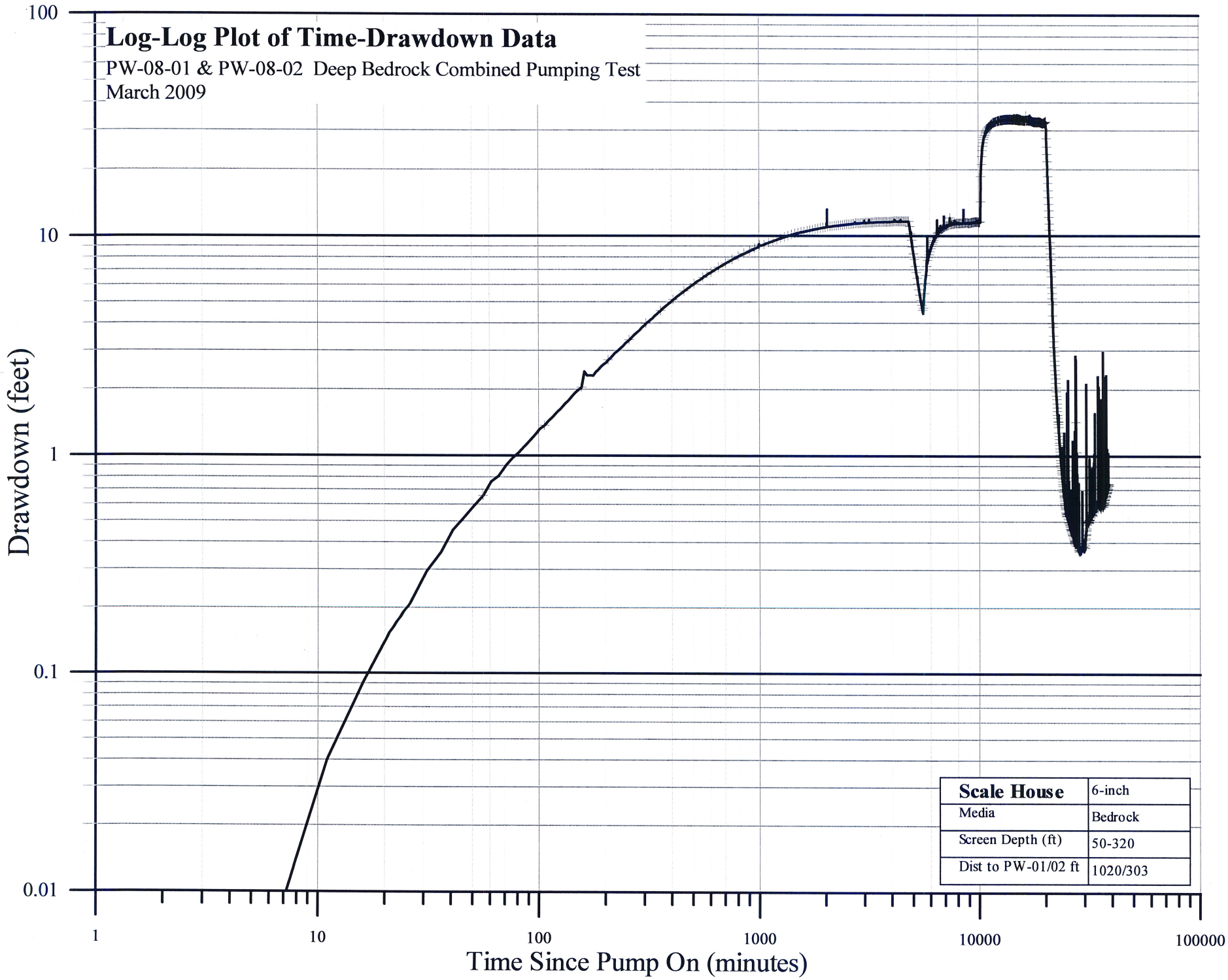
Log-Log Plot of Time-Drawdown Data

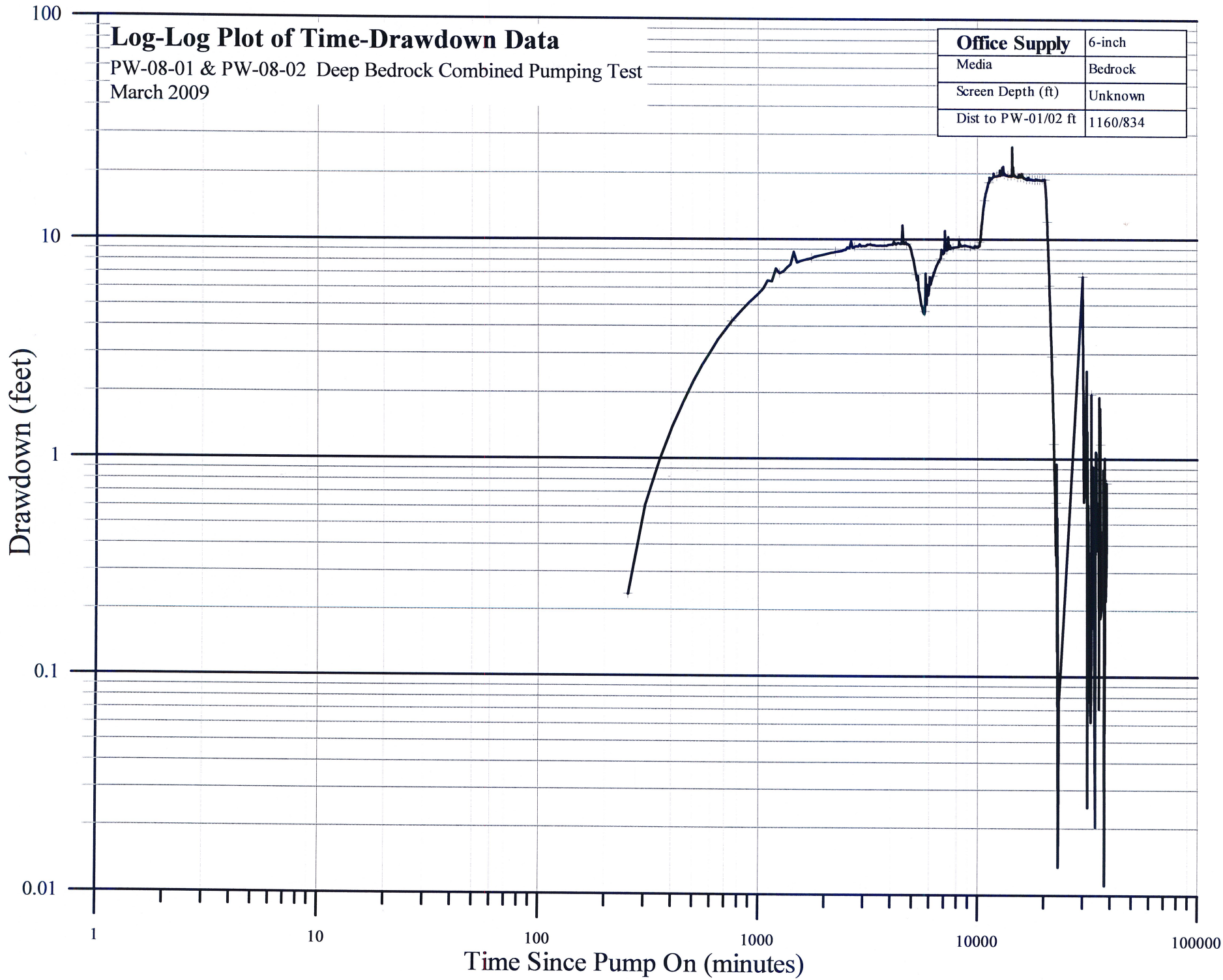
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009

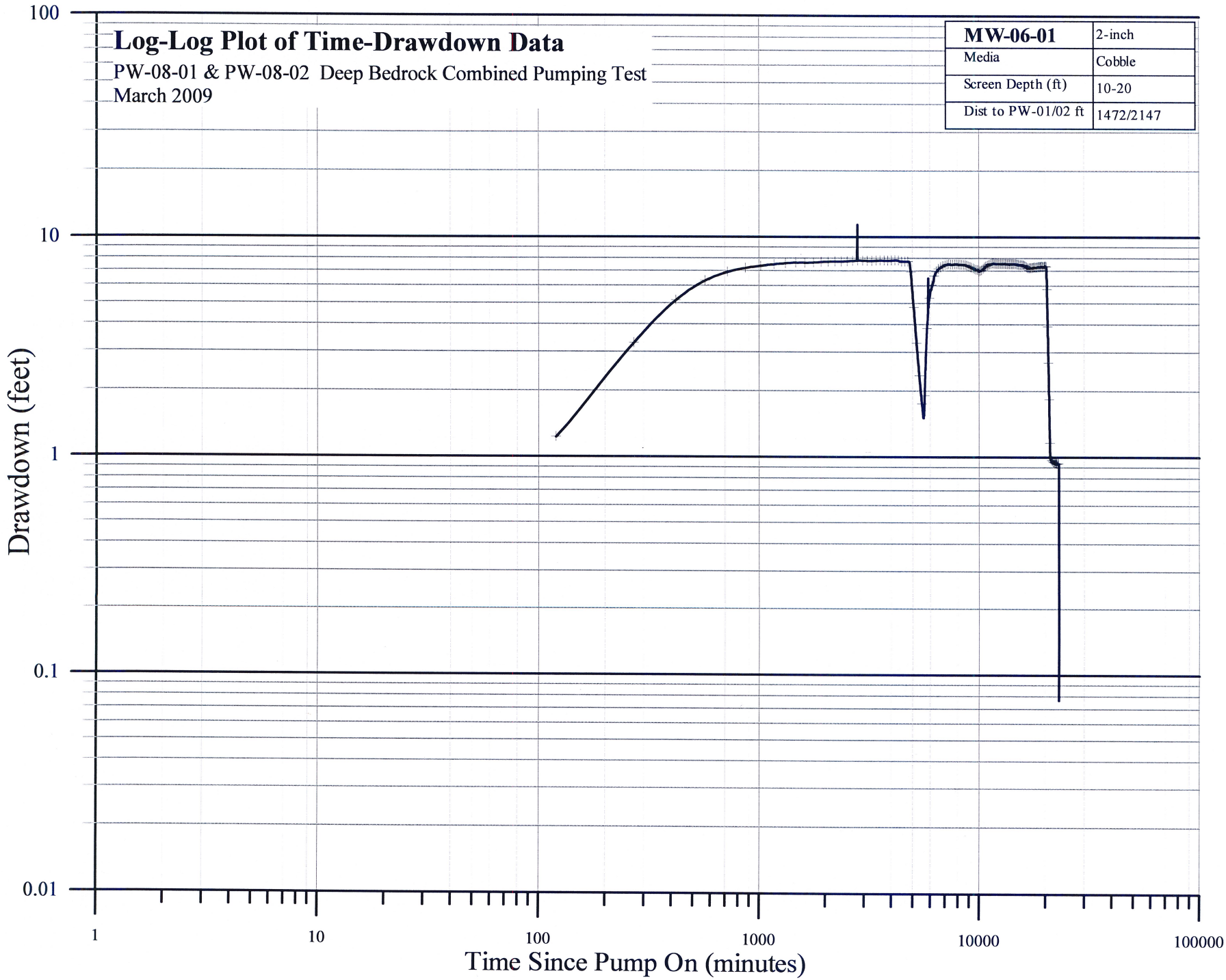
PW-08-03	6-inch
Media	Bedrock
Screen Depth (ft)	38-235
Dist to PW-01/02 ft	1866/1879

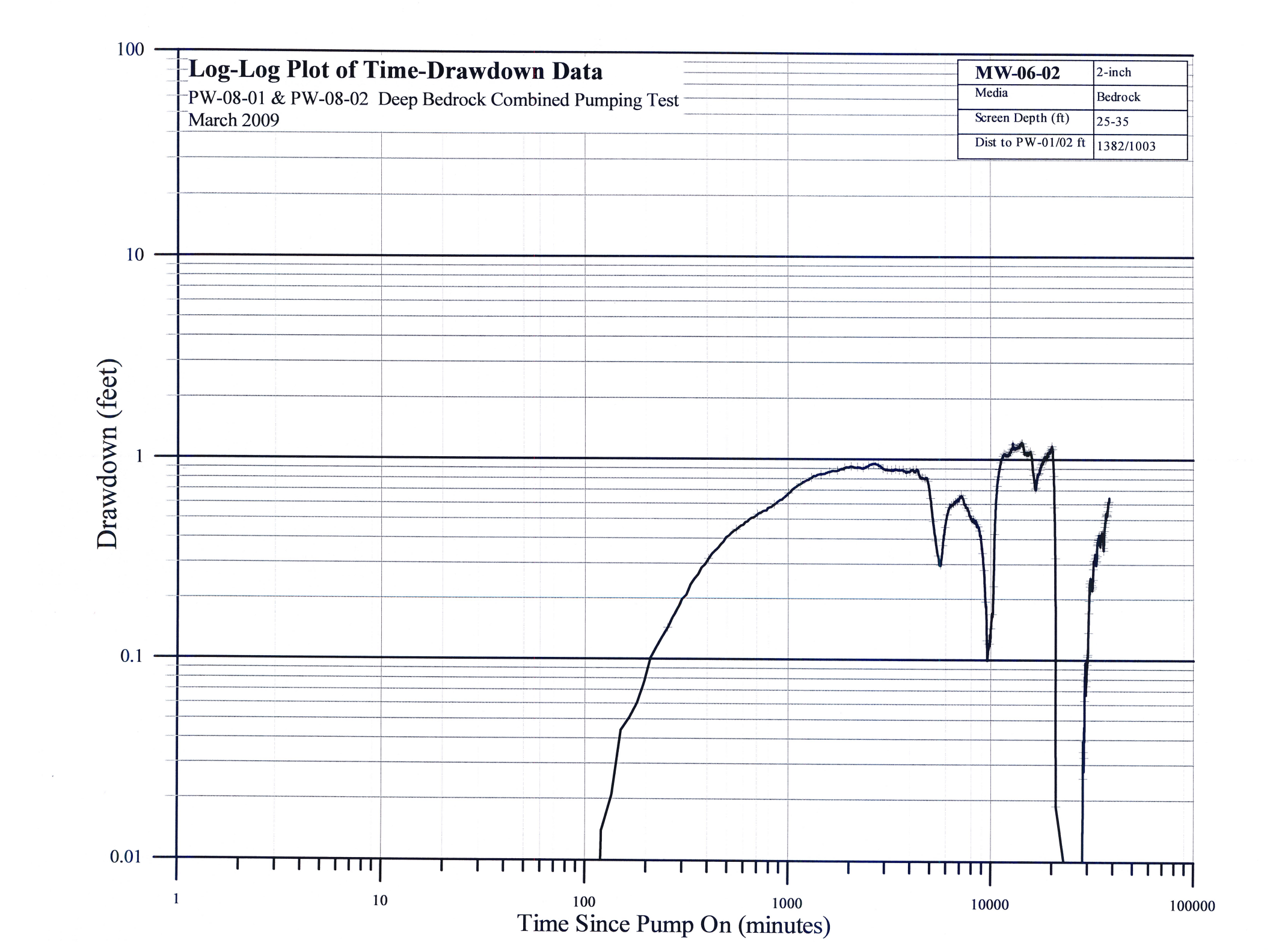


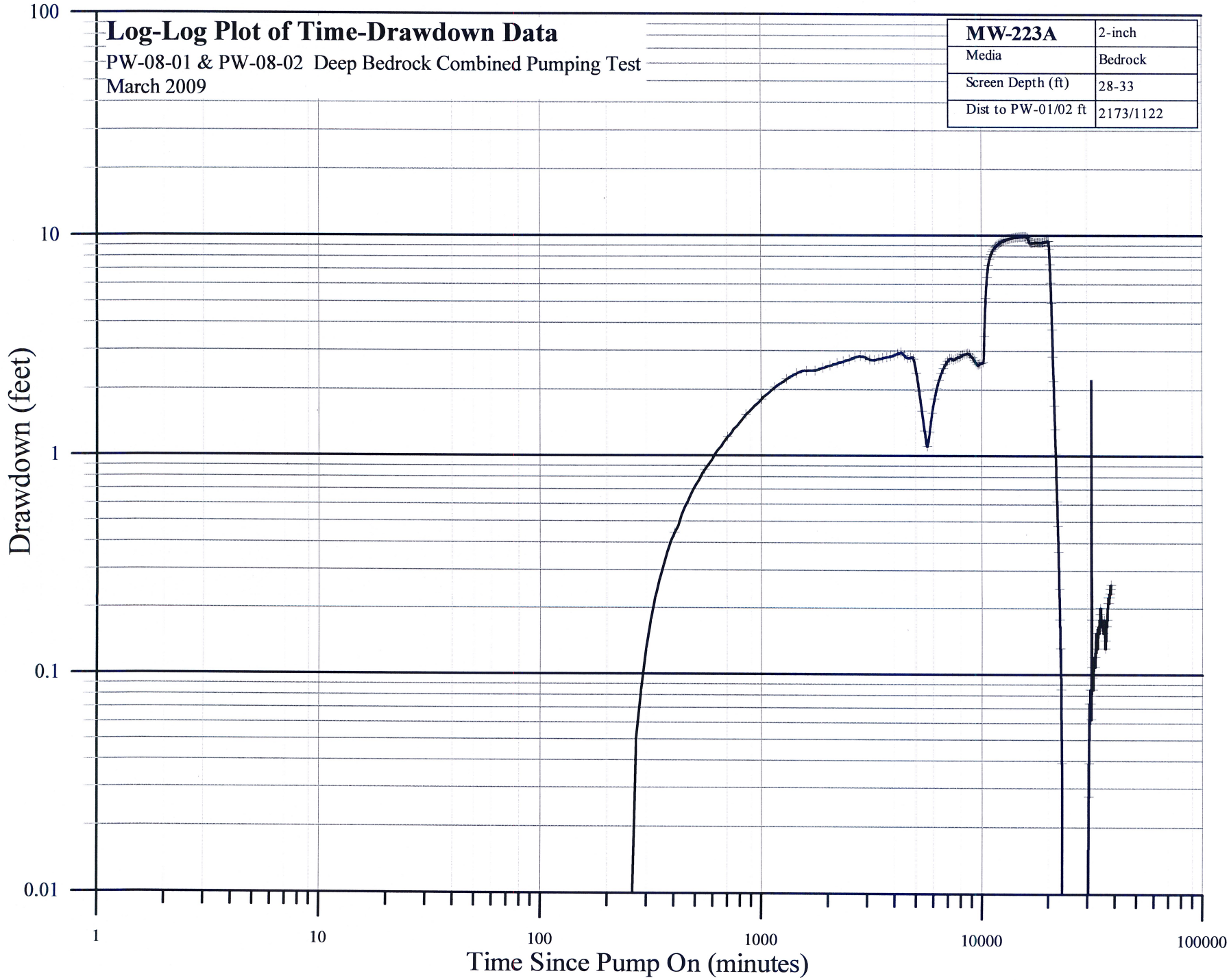

Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
PW-08-04
6-inch
Media
Bedrock
Screen Depth (ft)
18-215
Dist to PW-01/02 ft
2280/2030
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

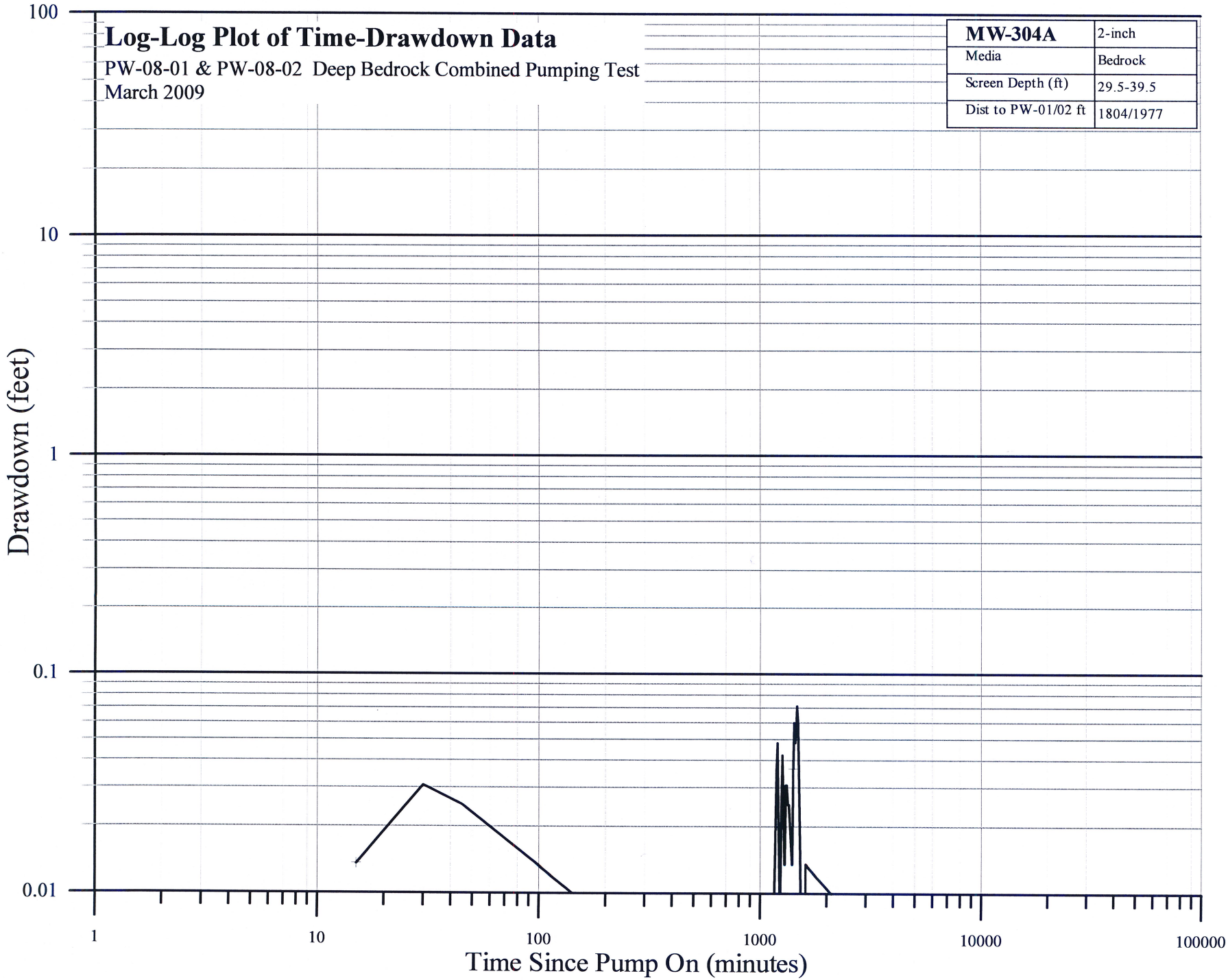

Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)
Scale House | 6-inch
Media | Bedrock
Screen Depth (ft) | 50-320
Dist to PW-01/02 ft | 1020/303

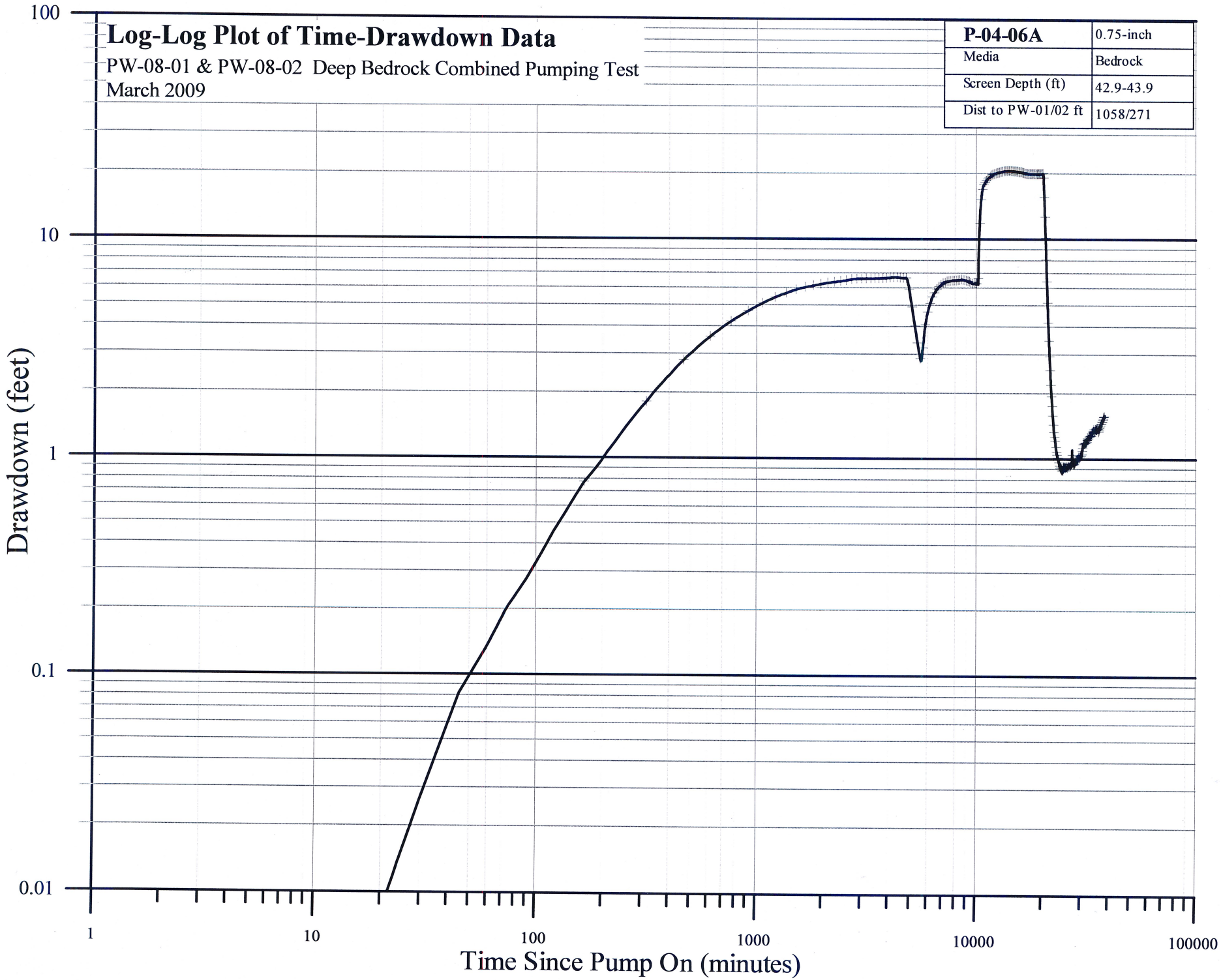

Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
Office Supply
6-inch
Media
Bedrock
Screen Depth (ft)
Unknown
Dist to PW-01/02 ft
1160/834
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

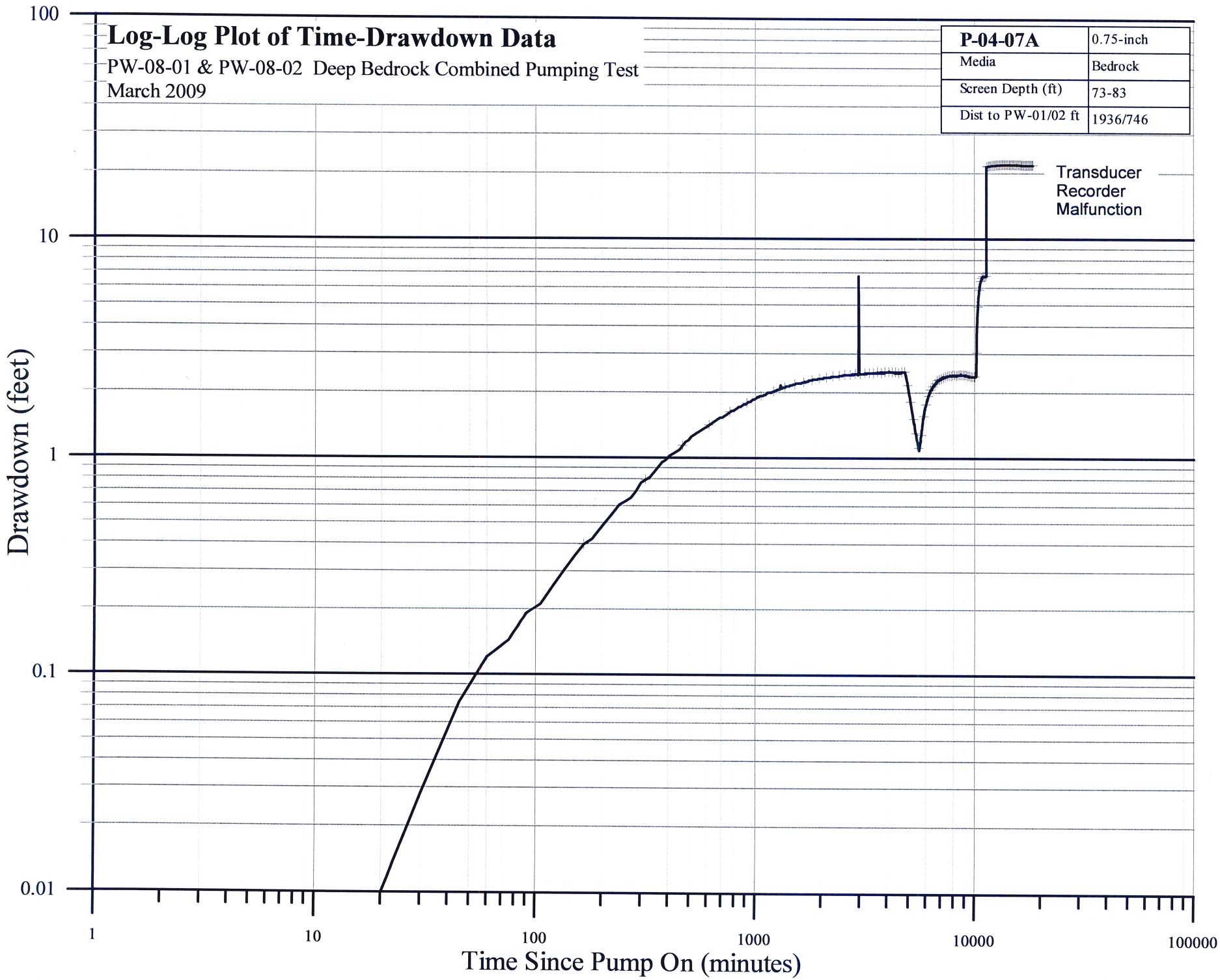

Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
MW-06-01 2-inch
Media Cobble
Screen Depth (ft) 10-20
Dist to PW-01/02 ft 1472/2147
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

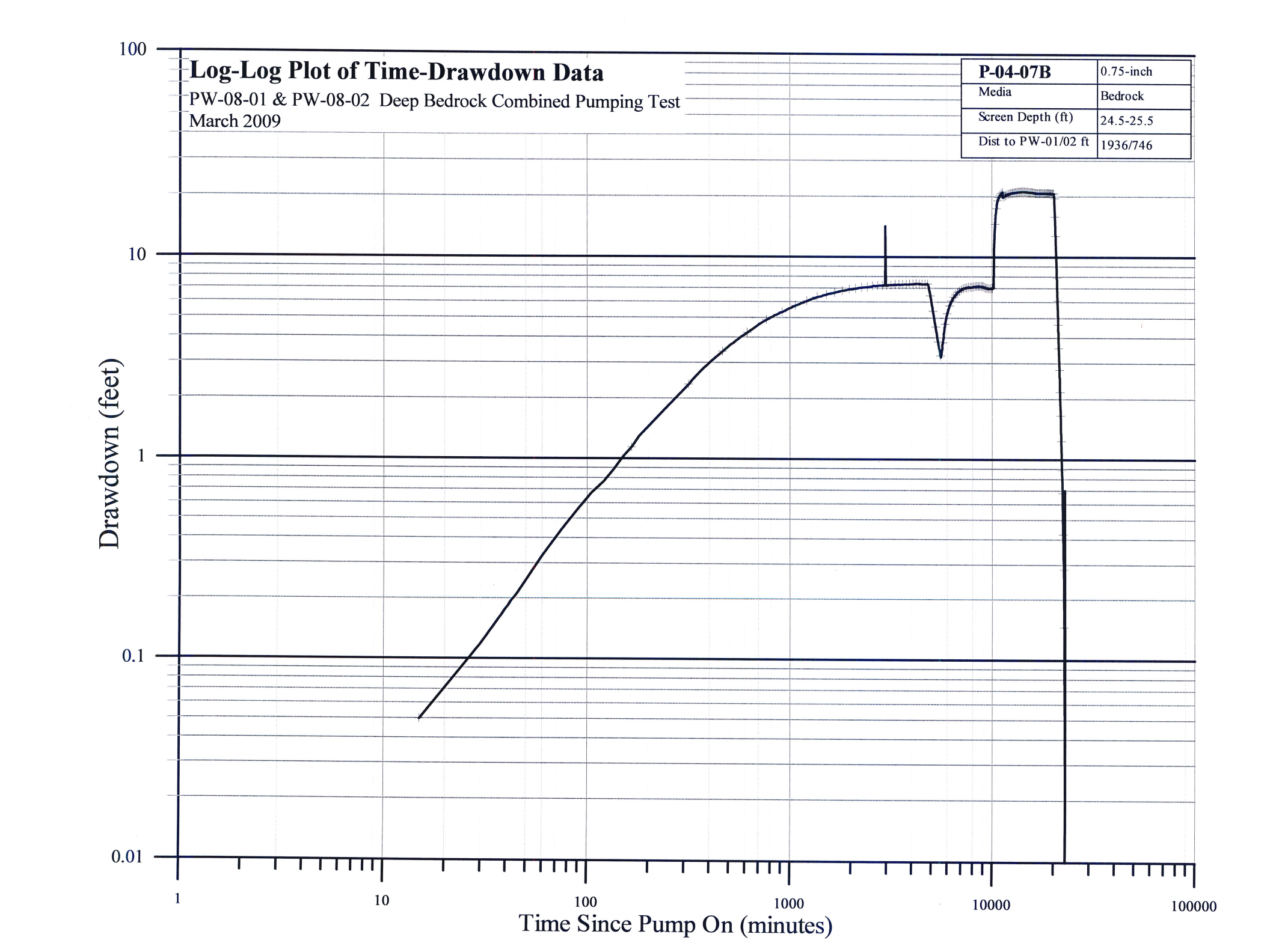

Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
MW-06-02 | 2-inch
Media | Bedrock
Screen Depth (ft) | 25-35
Dist to PW-01/02 ft | 1382/1003
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
MW-223A
2-inch
Media
Bedrock
Screen Depth (ft)
28-33
Dist to PW-01/02 ft
2173/1122
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
MW-304A | 2-inch
Media | Bedrock
Screen Depth (ft) | 29.5-39.5
Dist to PW-01/02 ft | 1804/1977
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)


Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
P-04-06A
0.75-inch
Media
Bedrock
Screen Depth (ft)
42.9-43.9
Dist to PW-01/02 ft
1058/271
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

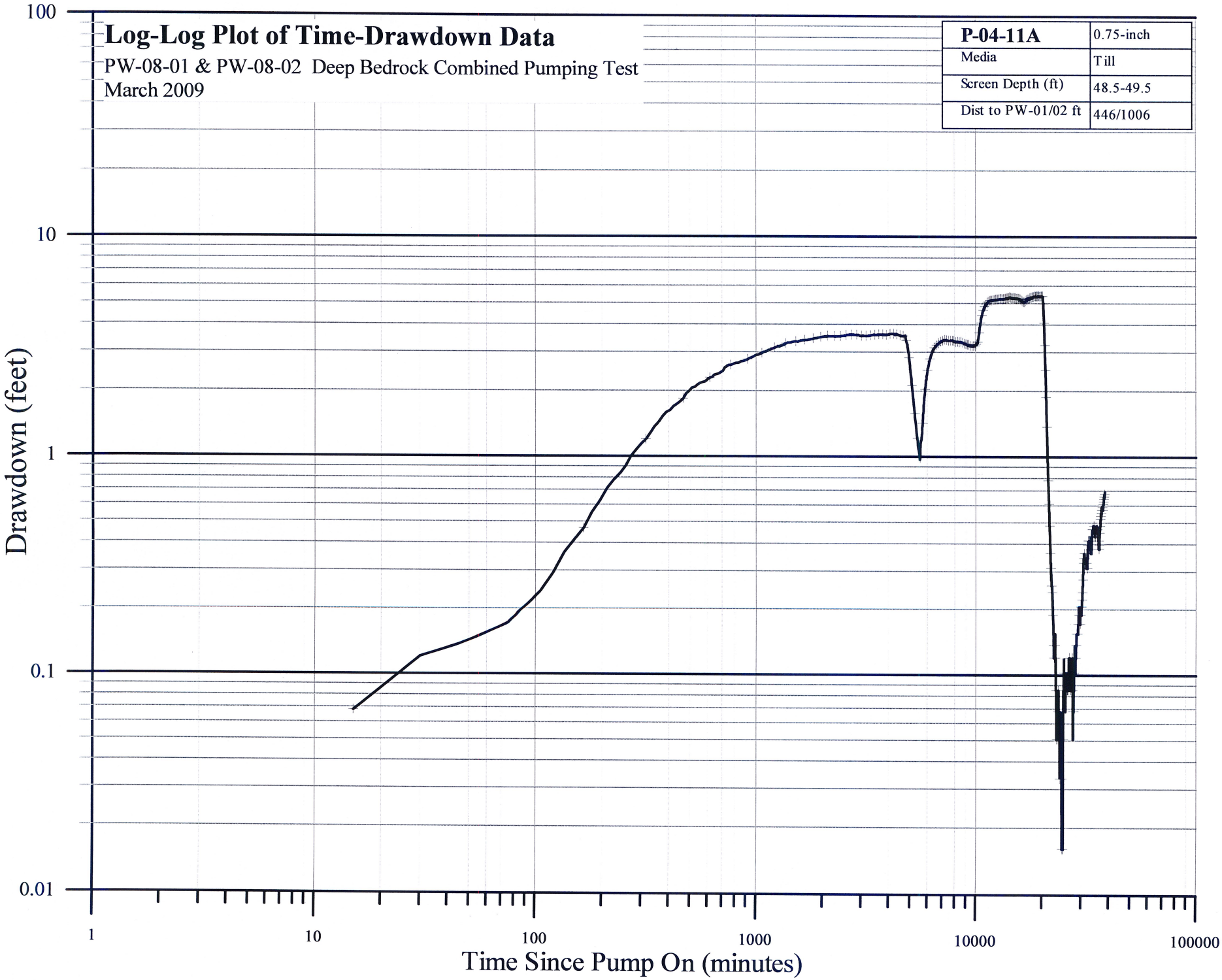

Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
P-04-07A
0.75-inch
Media
Bedrock
Screen Depth (ft)
73-83
Dist to PW-01/02 ft
1936/746
Transducer
Recorder
Malfunction
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

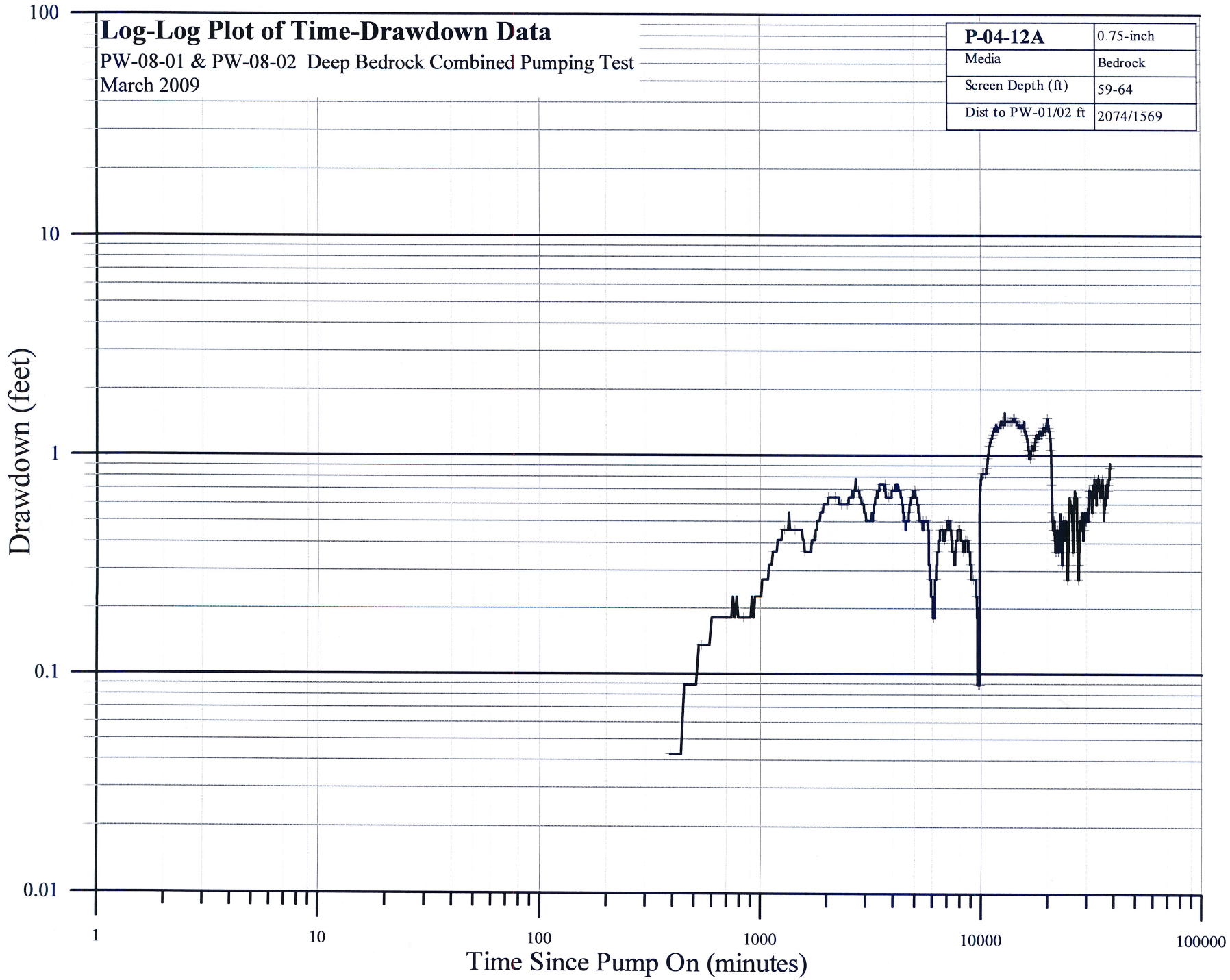

Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
P-04-07B
0.75-inch
Media
Bedrock
Screen Depth (ft)
24.5-25.5
Dist to PW-01/02 ft
1936/746
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

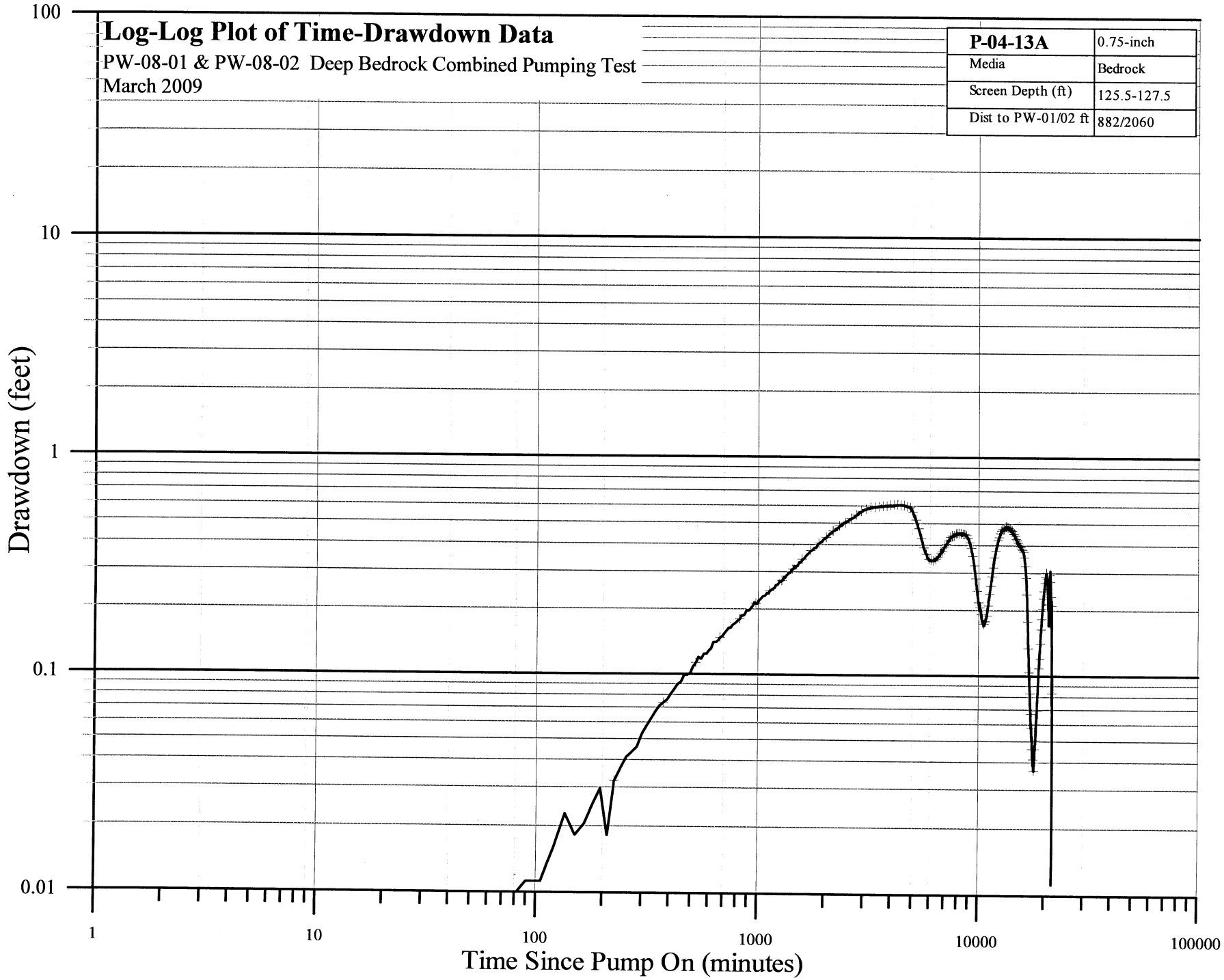
Log-Log Plot of Time-Drawdown Data

PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009

P-04-11A	0.75-inch
Media	Till
Screen Depth (ft)	48.5-49.5
Dist to PW-01/02 ft	446/1006



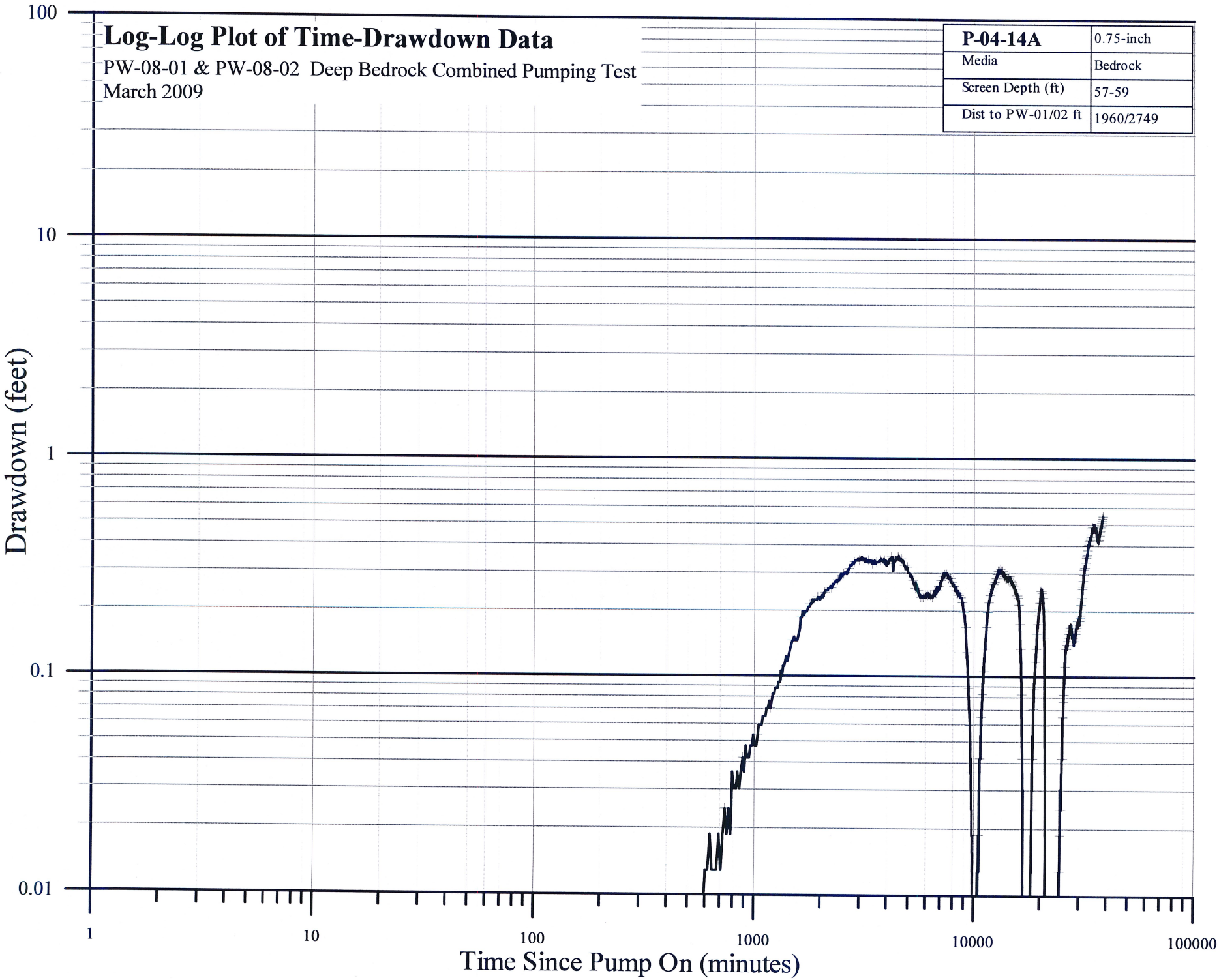

Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
P-04-12A
0.75-inch
Media
Bedrock
Screen Depth (ft)
59-64
Dist to PW-01/02 ft
2074/1569
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

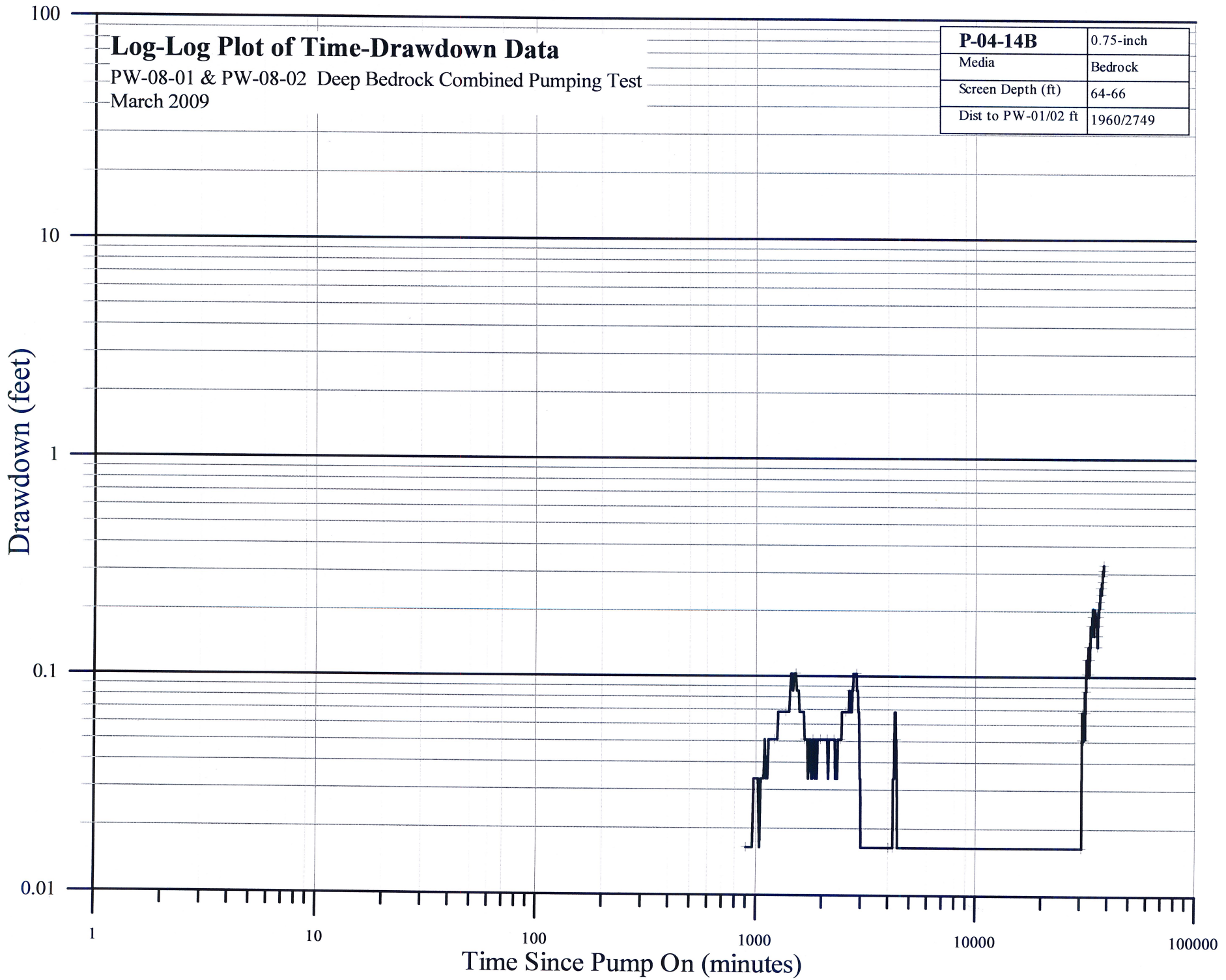

Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
P-04-13A
0.75-inch
Media
Bedrock
Screen Depth (ft)
125.5-127.5
Dist to PW-01/02 ft
882/2060
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

Log-Log Plot of Time-Drawdown Data

PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009

P-04-14A	0.75-inch
Media	Bedrock
Screen Depth (ft)	57-59
Dist to PW-01/02 ft	1960/2749




Log-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
P-04-14B
0.75-inch
Media
Bedrock
Screen Depth (ft)
64-66
Dist to PW-01/02 ft
1960/2749
100
10
1
0.1
0.01
Drawdown (feet)
1
10
100
1000
10000
100000
Time Since Pump On (minutes)

HAND-HELD GROUNDWATER LEVEL MEASUREMENTS DURING PUMP TESTING

WATER LEVEL SUMMARY

All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
MW04-111		Current ground surface elevation: 192.13 (feet)		
1/19/2009 12:55:00 PM		5.02	194.93	189.91
1/29/2009 10:33:00 AM		5.31		189.62
1/30/2009 10:41:00 AM		5.32		189.61
2/2/2009 10:44:00 AM		5.38		189.55
2/3/2009 11:33:00 AM		5.34		189.59
2/5/2009 9:54:00 AM		5.42		189.51
2/6/2009 1:11:00 PM		5.43		189.50
2/10/2009 10:21:00 AM		5.55		189.38
MW05-01		Current ground surface elevation: 191.77 (feet)		
1/19/2009 1:14:00 PM		5.22	194.86	189.64
1/29/2009 10:34:00 AM		5.50		189.36
1/30/2009 10:42:00 AM		5.51		189.35
2/2/2009 10:45:00 AM		5.57		189.29
2/3/2009 11:34:00 AM		5.53		189.33
2/5/2009 9:56:00 AM		5.62		189.24
2/6/2009 1:13:00 PM		5.62		189.24
2/10/2009 10:22:00 AM		5.73		189.13
MW05-02		Current ground surface elevation: 191.81 (feet)		
1/19/2009 1:15:00 PM		4.87	194.63	189.76
1/29/2009 10:35:00 AM		5.17		189.46
1/30/2009 10:42:00 AM		5.16		189.47
2/2/2009 10:45:00 AM		5.22		189.41
2/3/2009 11:34:00 AM		5.20		189.43
2/5/2009 9:57:00 AM		5.22		189.41
2/6/2009 1:13:00 PM		5.28		189.35
2/10/2009 10:23:00 AM		5.38		189.25
MW05-03		Current ground surface elevation: 192.21 (feet)		
1/19/2009 1:15:00 PM		5.13	194.88	189.75
1/29/2009 10:36:00 AM		5.42		189.46
1/30/2009 10:43:00 AM		5.44		189.44
2/2/2009 10:46:00 AM		5.50		189.38
2/3/2009 11:35:00 AM		5.47		189.41
2/5/2009 9:59:00 AM		5.55		189.33
2/6/2009 1:14:00 PM		5.55		189.33
2/10/2009 10:24:00 AM		5.66		189.22
MW05-04		Current ground surface elevation: 192.16 (feet)		
1/19/2009 1:16:00 PM		5.54	195.41	189.87
1/29/2009 10:37:00 AM		5.82		189.59
1/30/2009 10:44:00 AM		5.84		189.57
2/2/2009 10:46:00 AM		5.90		189.51
2/3/2009 11:36:00 AM		5.86		189.55
2/5/2009 9:52:00 AM		5.99		189.42
2/6/2009 1:14:00 PM		5.95		189.46
2/10/2009 10:25:00 AM		6.08		189.33
3/17/2009 12:22:00 PM		4.48		190.93
3/23/2009 10:19:00 AM		4.45		190.96
3/24/2009 10:49:00 AM		4.52		190.89

WATER LEVEL SUMMARY

All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(MW05-04)				
3/25/2009 9:33:00 AM		4.51	195.41	190.90
3/26/2009 9:13:00 AM		4.45		190.96
3/27/2009 12:38:00 PM		4.35		191.06
3/30/2009 11:28:00 AM		4.11		191.30
3/31/2009 10:20:00 AM		4.20		191.21
4/1/2009 9:54:00 AM		4.22		191.19
4/2/2009 9:44:00 AM		4.25		191.16
4/3/2009 10:17:00 AM		4.19		191.22
4/6/2009 9:56:00 AM		4.24		191.17
4/8/2009 10:21:00 AM		4.24		191.17
4/19/2009 9:21:00 AM		5.12		190.29
MW05-05			Current ground surface elevation: 191.95 (feet)	
1/19/2009 1:17:00 PM		5.10	194.86	189.76
1/29/2009 10:38:00 AM		5.40		189.46
1/30/2009 10:45:00 AM		5.40		189.46
2/2/2009 10:47:00 AM		5.46		189.40
2/3/2009 11:36:00 AM		5.44		189.42
2/5/2009 9:55:00 AM		5.53		189.33
2/6/2009 1:12:00 PM		5.52		189.34
2/10/2009 10:22:00 AM		5.61		189.25
MW06-01			Current ground surface elevation: 163.324 (feet)	
1/14/2009 2:33:00 PM		F1	166.13	166.13
1/29/2009 11:30:00 AM		F1		166.13
1/30/2009 11:39:00 AM		5.11		161.02
2/2/2009 11:52:00 AM		-0.21 ^		166.34
2/3/2009 8:52:00 AM		-0.30 ^		166.43
2/5/2009 8:32:00 AM		-0.14 ^		166.27
2/6/2009 11:52:00 AM		-0.14 ^		166.27
2/10/2009 12:06:00 PM		-0.12 ^		166.25
3/17/2009 9:52:00 AM		-0.35 ^		166.48
3/19/2009 1:15:00 PM		0.45		165.68
3/23/2009 11:01:00 AM		-0.94 ^		167.07
3/23/2009 2:06:00 PM		-0.08 ^		166.21
3/24/2009 1:19:00 PM		6.52		159.61
3/25/2009 11:16:00 AM		M		
3/26/2009 11:27:00 AM		6.83	166.13	159.30
3/27/2009 2:46:00 PM		3.52		162.61
3/30/2009 1:26:00 PM		6.03		160.10
3/31/2009 1:18:00 PM		6.47		159.66
4/1/2009 12:46:00 PM		6.43		159.70
4/2/2009 12:35:00 PM		6.40		159.73
4/3/2009 12:26:00 PM		6.32		159.81
4/6/2009 12:29:00 PM		6.22		159.91
4/8/2009 12:48:00 PM		-1.05 ^		167.18
4/19/2009 12:06:00 PM		-2.81 ^		168.94
MW06-02			Current ground surface elevation: 188.756 (feet)	
1/14/2009 11:05:00 AM		7.45	191.71	184.26
1/29/2009 10:43:00 AM		8.25		183.46
1/30/2009 10:36:00 AM		8.69		183.02

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(MW06-02)				
2/2/2009 10:40:00 AM		8.44	191.71	183.27
2/2/2009 3:28:00 PM		8.43		183.28
2/3/2009 11:38:00 AM		8.57		183.14
2/5/2009 9:49:00 AM		8.64		183.07
2/6/2009 1:20:00 PM		8.67		183.04
2/10/2009 10:15:00 AM		8.83		182.88
3/17/2009 12:25:00 PM		7.06		184.65
3/18/2009 2:05:00 PM		7.82		183.89
3/23/2009 11:28:00 AM		6.80		184.91
3/24/2009 10:51:00 AM		7.65		184.06
3/25/2009 9:31:00 AM		7.76		183.95
3/26/2009 9:16:00 AM		7.71		184.00
3/27/2009 12:40:00 PM		7.16		184.55
3/30/2009 11:31:00 AM		6.97		184.74
3/31/2009 10:22:00 AM		7.83		183.88
4/1/2009 9:58:00 AM		7.94		183.77
4/2/2009 9:46:00 AM		8.00		183.71
4/3/2009 10:21:00 AM		7.88		183.83
4/6/2009 10:00:00 AM		7.94		183.77
4/8/2009 10:25:00 AM		6.47		185.24
4/19/2009 9:27:00 AM		7.45		184.26
MW-207			Current ground surface elevation: 214.6 (feet)	
1/19/2009 1:55:00 PM		7.01	217.96	210.95
1/29/2009 9:13:00 AM		7.91		210.05
1/29/2009 2:49:00 PM		7.96		210.00
1/30/2009 11:59:00 AM		8.03		209.93
2/2/2009 11:49:00 AM		8.35		209.61
2/3/2009 8:28:00 AM		8.44		209.52
2/5/2009 8:48:00 AM		8.68		209.28
2/6/2009 12:11:00 PM		8.80		209.16
2/10/2009 12:22:00 PM		9.14		208.82
3/17/2009 9:36:00 AM		4.76		213.20
3/18/2009 10:43:00 AM		4.67		213.29
3/19/2009 12:49:00 PM		4.61		213.35
3/23/2009 11:42:00 AM		5.09		212.87
3/23/2009 3:03:00 PM		5.08		212.88
3/24/2009 9:50:00 AM		5.32		212.64
3/25/2009 8:41:00 AM		5.38		212.58
3/26/2009 8:08:00 AM		5.20		212.76
3/27/2009 10:44:00 AM		5.14		212.82
3/30/2009 7:34:00 AM		4.55		213.41
3/31/2009 8:23:00 AM		4.94		213.02
4/1/2009 8:32:00 AM		5.08		212.88
4/2/2009 8:35:00 AM		5.09		212.87
4/3/2009 8:54:00 AM		5.11		212.85
4/6/2009 8:28:00 AM		4.92		213.04
4/6/2009 3:22:00 PM		4.84		213.12
4/8/2009 8:47:00 AM		4.67		213.29
4/19/2009 11:32:00 AM		6.25		211.71
MW-223A			Current ground surface elevation: 173.35 (feet)	

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(MW-223A)				
1/14/2009 1:01:00 PM		F	176.54	175.59
1/29/2009 3:45:00 PM		F		174.04
1/30/2009 11:14:00 AM		F		174.04
2/2/2009 10:40:00 AM		F		173.99
2/3/2009 9:17:00 AM		F		174.09
2/5/2009 7:59:00 AM		F		174.09
2/6/2009 8:32:00 AM		F		174.10
2/10/2009 11:35:00 AM		F		174.04
3/17/2009 9:17:00 AM		2.37		174.17
3/18/2009 10:28:00 AM		8.67		167.87
3/19/2009 12:38:00 PM		9.78		166.76
3/23/2009 11:53:00 AM		0.70		175.84
3/23/2009 5:07:00 PM		1.03		175.51
3/24/2009 10:00:00 AM		3.17		173.37
3/25/2009 8:53:00 AM		3.81		172.73
3/26/2009 8:18:00 AM		3.91		172.63
3/27/2009 10:52:00 AM		2.12		174.42
3/30/2009 7:46:00 AM		3.63		172.91
3/31/2009 8:32:00 AM		9.53		167.01
4/1/2009 8:40:00 AM		10.46		166.08
4/2/2009 8:42:00 AM		10.76		165.78
4/3/2009 9:02:00 AM		10.85		165.69
4/6/2009 8:47:00 AM		10.36		166.18
4/6/2009 2:28:00 PM		10.24		166.30
4/8/2009 8:59:00 AM		1.09		175.45
4/19/2009 10:34:00 AM		1.24		175.30
MW-223B			Current ground surface elevation: 173.32 (feet)	
1/14/2009 1:02:00 PM		3.59	175.93	172.34
1/29/2009 3:46:00 PM		3.82		172.11
1/30/2009 11:15:00 AM		4.51		171.42
2/2/2009 10:40:00 AM		4.13		171.80
2/3/2009 9:18:00 AM		4.13		171.80
2/5/2009 8:00:00 AM		4.18		171.75
2/6/2009 8:33:00 AM		4.20		171.73
2/10/2009 11:36:00 AM		4.12		171.81
3/17/2009 9:17:00 AM		3.08		172.85
3/18/2009 10:30:00 AM		7.24		168.69
3/19/2009 12:38:00 PM		7.63		168.30
3/23/2009 11:53:00 AM		2.03		173.90
3/23/2009 5:08:00 PM		2.24		173.69
3/24/2009 10:00:00 AM		3.70		172.23
3/25/2009 8:53:00 AM		4.16		171.77
3/26/2009 8:18:00 AM		4.19		171.74
3/27/2009 10:52:00 AM		3.21		172.72
3/30/2009 7:47:00 AM		3.94		171.99
3/31/2009 8:32:00 AM		8.07		167.86
4/1/2009 8:40:00 AM		8.94		166.99
4/2/2009 8:42:00 AM		9.24		166.69
4/3/2009 9:02:00 AM		9.34		166.59
4/6/2009 8:47:00 AM		8.92		167.01
4/6/2009 2:28:00 PM		8.90		167.03

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(MW-223B)				
4/8/2009 8:59:00 AM		2.39	175.93	173.54
4/19/2009 10:35:00 AM		2.65		173.28
MW-227			Current ground surface elevation: 160.79 (feet)	
1/14/2009 1:06:00 PM		4.26	164.23	159.97
1/29/2009 3:41:00 PM		4.30		159.93
1/30/2009 11:11:00 AM		4.30		159.93
2/2/2009 10:50:00 AM		4.31		159.92
2/3/2009 9:14:00 AM		4.29		159.94
2/5/2009 8:03:00 AM		4.35		159.88
2/6/2009 8:35:00 AM		4.44		159.79
2/10/2009 11:39:00 AM		4.28		159.95
3/17/2009 9:24:00 AM		3.82		160.41
3/18/2009 10:32:00 AM		3.79		160.44
3/19/2009 12:40:00 PM		3.82		160.41
3/23/2009 11:49:00 AM		3.88		160.35
3/23/2009 5:04:00 PM		3.87		160.36
3/24/2009 9:57:00 AM		3.97		160.26
3/25/2009 8:49:00 AM		3.89		160.34
3/26/2009 8:15:00 AM		3.77		160.46
3/27/2009 10:47:00 AM		3.79		160.44
3/30/2009 7:50:00 AM		3.61		160.62
3/31/2009 8:37:00 AM		4.07		160.16
4/1/2009 8:44:00 AM		4.05		160.18
4/2/2009 8:45:00 AM		3.99		160.24
4/3/2009 9:05:00 AM		4.00		160.23
4/6/2009 8:51:00 AM		4.03		160.20
4/6/2009 2:32:00 PM		3.98		160.25
4/8/2009 9:02:00 AM		3.86		160.37
4/19/2009 10:41:00 AM		4.28		159.95
MW-302R			Current ground surface elevation: 204.49 (feet)	
1/14/2009 12:57:00 PM		7.88	206.86	198.98
1/29/2009 3:01:00 PM		9.55		197.31
1/30/2009 11:21:00 AM		9.65		197.21
2/2/2009 10:36:00 AM		9.97		196.89
2/3/2009 9:25:00 AM		10.06		196.80
2/5/2009 7:56:00 AM		10.20		196.66
2/6/2009 8:25:00 AM		10.30		196.56
2/10/2009 11:32:00 AM		10.31		196.55
3/17/2009 9:14:00 AM		5.36		201.50
3/18/2009 10:20:00 AM		5.42		201.44
3/19/2009 12:27:00 PM		5.38		201.48
3/23/2009 11:46:00 AM		5.54		201.32
3/23/2009 5:11:00 PM		5.58		201.28
3/24/2009 10:05:00 AM		5.78		201.08
3/25/2009 8:56:00 AM		5.83		201.03
3/26/2009 8:20:00 AM		5.80		201.06
3/27/2009 10:49:00 AM		5.74		201.12
3/30/2009 7:42:00 AM		5.20		201.66
3/31/2009 8:27:00 AM		5.31		201.55
4/1/2009 8:36:00 AM		5.34		201.52

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(MW-302R)				
4/2/2009 8:38:00 AM		5.50	206.86	201.36
4/3/2009 8:58:00 AM		5.62		201.24
4/6/2009 8:37:00 AM		5.39		201.47
4/8/2009 8:55:00 AM		4.83		202.03
4/19/2009 10:26:00 AM		7.08		199.78
MW-304A			Current ground surface elevation: 214.67 (feet)	
1/19/2009 3:05:00 PM		26.66	217.31	190.65
1/29/2009 12:18:00 PM		27.32		189.99
1/30/2009 11:51:00 AM		27.39		189.92
2/2/2009 11:29:00 AM		27.58		189.73
2/3/2009 8:36:00 AM		27.64		189.67
2/5/2009 8:13:00 AM		27.80		189.51
2/6/2009 11:41:00 AM		27.83		189.48
2/10/2009 11:53:00 AM		28.07		189.24
3/23/2009 11:28:00 AM		27.19		190.12
3/23/2009 2:17:00 PM		27.14		190.17
3/24/2009 1:31:00 PM		27.17		190.14
3/25/2009 11:33:00 AM		27.07		190.24
3/26/2009 11:38:00 AM		27.05		190.26
3/27/2009 3:01:00 PM		26.90		190.41
3/30/2009 1:37:00 PM		26.65		190.66
3/31/2009 1:06:00 PM		26.83		190.48
4/1/2009 12:33:00 PM		26.59		190.72
4/2/2009 12:23:00 PM		26.48		190.83
4/3/2009 12:17:00 PM		26.36		190.95
4/6/2009 12:17:00 PM		26.26		191.05
4/8/2009 12:26:00 PM		25.87		191.44
4/19/2009 11:56:00 AM		25.76		191.55
OSW			Current ground surface elevation: (feet)	
3/17/2009 10:45:00 AM		29.65		
3/18/2009 11:12:00 AM		45.66		
3/19/2009 2:36:00 PM		45.95		
3/23/2009 10:32:00 AM		30.63		
3/23/2009 5:33:00 PM		31.60		
3/24/2009 10:09:00 AM		38.27		
3/24/2009 3:50:00 PM		39.05		
3/25/2009 9:02:00 AM		40.19		
3/25/2009 2:55:00 PM		40.34		
3/26/2009 8:24:00 AM		40.47		
3/27/2009 8:50:00 AM		36.10		
3/27/2009 3:45:00 PM		36.60		
3/30/2009 8:11:00 AM		40.29		
3/30/2009 3:10:00 PM		40.54		
3/31/2009 9:21:00 AM		49.60		
3/31/2009 1:59:00 PM		49.99		
4/1/2009 9:03:00 AM		51.48		
4/2/2009 9:00:00 AM		50.53		
4/3/2009 9:26:00 AM		50.41		
4/3/2009 12:54:00 PM		50.76		
4/6/2009 9:11:00 AM		49.80		

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(OSW)				
4/6/2009 3:02:00 PM		49.43		
4/8/2009 9:24:00 AM		31.31		
4/19/2009 11:04:00 AM		31.01		
OW06-05			Current ground surface elevation: 187.627 (feet)	
1/14/2009 11:08:00 AM		7.03	190.53	183.50
1/29/2009 10:44:00 AM		7.83		182.70
1/30/2009 10:27:00 AM		8.35		182.18
2/2/2009 10:34:00 AM		8.14		182.39
2/2/2009 3:21:00 PM		8.13		182.40
2/3/2009 11:39:00 AM		8.29		182.24
2/5/2009 9:42:00 AM		8.39		182.14
2/6/2009 1:21:00 PM		8.41		182.12
2/10/2009 10:09:00 AM		8.55		181.98
3/17/2009 12:27:00 PM		6.73		183.80
3/18/2009 1:59:00 PM		7.46		183.07
3/23/2009 11:30:00 AM		6.53		184.00
3/24/2009 10:52:00 AM		7.30		183.23
3/25/2009 9:32:00 AM		7.53		183.00
3/26/2009 9:17:00 AM		7.44		183.09
3/27/2009 12:41:00 PM		6.93		183.60
3/30/2009 11:33:00 AM		6.77		183.76
3/31/2009 10:23:00 AM		7.69		182.84
4/1/2009 9:59:00 AM		7.88		182.65
4/2/2009 9:47:00 AM		8.00		182.53
4/3/2009 10:21:00 AM		7.84		182.69
4/6/2009 10:01:00 AM		7.92		182.61
4/8/2009 10:26:00 AM		6.30		184.23
4/19/2009 9:28:00 AM		7.26		183.27
OW06-06			Current ground surface elevation: 187.278 (feet)	
1/14/2009 11:09:00 AM		6.61	190.12	183.51
1/29/2009 10:45:00 AM		7.30		182.82
1/30/2009 10:28:00 AM		7.52		182.60
2/2/2009 10:35:00 AM		7.64		182.48
2/2/2009 3:22:00 PM		7.63		182.49
2/3/2009 11:40:00 AM		7.69		182.43
2/5/2009 9:43:00 AM		7.82		182.30
2/6/2009 1:22:00 PM		7.84		182.28
2/10/2009 10:10:00 AM		7.98		182.14
3/17/2009 12:28:00 PM		6.34		183.78
3/18/2009 2:00:00 PM		6.60		183.52
3/23/2009 11:30:00 AM		6.13		183.99
3/24/2009 10:53:00 AM		6.39		183.73
3/25/2009 9:33:00 AM		6.72		183.40
3/26/2009 9:18:00 AM		6.86		183.26
3/27/2009 12:42:00 PM		6.75		183.37
3/30/2009 11:34:00 AM		6.51		183.61
3/31/2009 10:23:00 AM		6.65		183.47
4/1/2009 10:00:00 AM		6.98		183.14
4/2/2009 9:48:00 AM		7.18		182.94
4/3/2009 10:22:00 AM		7.21		182.91

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(OW06-06)				
4/6/2009 10:02:00 AM		7.16	190.12	182.96
4/8/2009 10:27:00 AM		6.15		183.97
4/19/2009 9:29:00 AM		6.63		183.49
OW06-07			Current ground surface elevation: 186.609 (feet)	
1/14/2009 11:11:00 AM		9.02	189.16	180.14
1/29/2009 10:46:00 AM		9.74		179.42
1/30/2009 10:30:00 AM		10.78		178.38
2/2/2009 10:36:00 AM		10.27		178.89
2/2/2009 3:23:00 PM		10.26		178.90
2/3/2009 11:41:00 AM		10.55		178.61
2/5/2009 9:44:00 AM		10.62		178.54
2/6/2009 1:22:00 PM		10.64		178.52
2/10/2009 10:11:00 AM		10.72		178.44
3/17/2009 11:29:00 AM		9.27		179.89
3/18/2009 2:01:00 PM		10.80		178.36
3/23/2009 11:31:00 AM		8.60		180.56
3/24/2009 10:54:00 AM		10.19		178.97
3/25/2009 9:34:00 AM		11.12		178.04
3/26/2009 9:19:00 AM		11.32		177.84
3/27/2009 12:43:00 PM		10.41		178.75
3/30/2009 11:35:00 AM		10.84		178.32
3/31/2009 10:24:00 AM		12.24		176.92
4/1/2009 10:01:00 AM		13.15		176.01
4/2/2009 9:48:00 AM		13.34		175.82
4/3/2009 10:23:00 AM		13.32		175.84
4/6/2009 10:03:00 AM		13.23		175.93
4/8/2009 10:28:00 AM		9.03		180.13
4/19/2009 9:30:00 AM		9.39		179.77
OW06-08			Current ground surface elevation: 187.125 (feet)	
1/14/2009 11:13:00 AM		4.85	189.72	184.87
1/29/2009 10:47:00 AM		5.35		184.37
1/30/2009 10:31:00 AM		5.40		184.32
2/2/2009 10:37:00 AM		5.45		184.27
2/2/2009 3:25:00 PM		5.45		184.27
2/3/2009 11:42:00 AM		5.45		184.27
2/5/2009 9:45:00 AM		5.54		184.18
2/6/2009 1:23:00 PM		5.57		184.15
2/10/2009 10:12:00 AM		5.68		184.04
3/17/2009 12:30:00 PM		4.41		185.31
3/18/2009 2:02:00 PM		4.40		185.32
3/23/2009 11:32:00 AM		4.30		185.42
3/24/2009 10:55:00 AM		4.45		185.27
3/25/2009 9:36:00 AM		4.44		185.28
3/26/2009 9:20:00 AM		4.34		185.38
3/27/2009 12:44:00 PM		4.25		185.47
3/30/2009 11:36:00 AM		3.84		185.88
3/31/2009 10:25:00 AM		4.05		185.67
4/1/2009 10:02:00 AM		4.08		185.64
4/2/2009 9:49:00 AM		4.09		185.63
4/3/2009 10:23:00 AM		4.00		185.72

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(OW06-08)				
4/6/2009 10:04:00 AM		4.04	189.72	185.68
4/8/2009 10:29:00 AM		3.92		185.80
4/19/2009 9:31:00 AM		4.73		184.99
OW06-09			Current ground surface elevation: 187.222 (feet)	
1/14/2009 11:15:00 AM		5.84	190.10	184.26
1/29/2009 10:48:00 AM		6.43		183.67
1/30/2009 10:33:00 AM		6.69		183.41
2/2/2009 10:38:00 AM		6.57		183.53
2/2/2009 3:26:00 PM		6.57		183.53
2/3/2009 11:43:00 AM		6.66		183.44
2/5/2009 9:46:00 AM		6.71		183.39
2/6/2009 1:24:00 PM		6.75		183.35
2/10/2009 10:13:00 AM		6.82		183.28
3/17/2009 12:31:00 PM		5.51		184.59
3/18/2009 2:03:00 PM		5.92		184.18
3/23/2009 11:32:00 AM		5.32		184.78
3/24/2009 10:56:00 AM		5.88		184.22
3/25/2009 9:37:00 AM		5.95		184.15
3/26/2009 9:21:00 AM		5.88		184.22
3/27/2009 12:45:00 PM		5.51		184.59
3/30/2009 11:37:00 AM		5.34		184.76
3/31/2009 10:56:00 AM		5.87		184.23
4/1/2009 10:03:00 AM		5.99		184.11
4/2/2009 9:50:00 AM		6.03		184.07
4/3/2009 10:24:00 AM		5.94		184.16
4/6/2009 10:05:00 AM		5.98		184.12
4/8/2009 10:30:00 AM		5.04		185.06
4/19/2009 9:32:00 AM		5.88		184.22
OW06-10			Current ground surface elevation: 188.401 (feet)	
1/14/2009 11:16:00 AM		6.37	191.07	184.70
1/29/2009 10:50:00 AM		6.98		184.09
1/30/2009 10:34:00 AM		7.29		183.78
2/2/2009 10:39:00 AM		7.12		183.95
2/2/2009 3:27:00 PM		7.13		183.94
2/3/2009 11:43:00 AM		7.22		183.85
2/5/2009 9:47:00 AM		7.29		183.78
2/6/2009 1:25:00 PM		7.31		183.76
2/10/2009 10:14:00 AM		7.42		183.65
3/17/2009 12:32:00 PM		5.94		185.13
3/18/2009 2:04:00 PM		6.45		184.62
3/23/2009 11:32:00 AM		5.73		185.34
3/24/2009 10:57:00 AM		6.29		184.78
3/25/2009 9:38:00 AM		6.45		184.62
3/26/2009 9:22:00 AM		6.37		184.70
3/27/2009 12:46:00 PM		5.97		185.10
3/30/2009 11:38:00 AM		5.78		185.29
3/31/2009 10:27:00 AM		6.37		184.70
4/1/2009 10:04:00 AM		6.51		184.56
4/2/2009 9:51:00 AM		6.54		184.53
4/3/2009 10:25:00 AM		6.44		184.63

WATER LEVEL SUMMARY
All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(OW06-10)				
4/6/2009 10:06:00 AM		6.48	191.07	184.59
4/8/2009 10:31:00 AM		5.41		185.66
4/19/2009 9:33:00 AM		6.28		184.79
P-04-05A			Current ground surface elevation: 201.03 (feet)	
1/14/2009 2:56:00 PM		18.56	204.00	185.44
1/29/2009 11:50:00 AM		19.80		184.20
1/29/2009 2:37:00 PM		19.73		184.27
1/30/2009 12:48:00 PM		24.69		179.31
2/2/2009 11:39:00 AM		21.68		182.32
2/3/2009 9:35:00 AM		21.73		182.27
2/5/2009 9:04:00 AM		21.90		182.10
2/6/2009 8:48:00 AM		22.00		182.00
2/10/2009 12:31:00 PM		22.26		181.74
3/17/2009 10:16:00 AM		18.55		185.45
3/18/2009 10:59:00 AM		25.56		178.44
3/19/2009 1:46:00 PM		26.65		177.35
3/23/2009 12:03:00 PM		19.13		184.87
3/23/2009 2:46:00 PM		19.37		184.63
3/24/2009 9:39:00 AM		27.28		176.72
3/25/2009 8:30:00 AM		28.81		175.19
3/26/2009 7:52:00 AM		29.08		174.92
3/27/2009 10:34:00 AM		23.28		180.72
3/30/2009 7:21:00 AM		28.82		175.18
3/31/2009 11:57:00 AM		33.17		170.83
4/1/2009 8:19:00 AM		33.76		170.24
4/2/2009 8:23:00 AM		33.80		170.20
4/3/2009 8:41:00 AM		33.71		170.29
4/6/2009 8:15:00 AM		33.47		170.53
4/6/2009 2:05:00 PM		33.42		170.58
4/8/2009 8:31:00 AM		20.57		183.43
4/19/2009 11:15:00 AM		20.76		183.24
P-04-05B			Current ground surface elevation: 201.03 (feet)	
1/14/2009 2:57:00 PM		5.20	204.02	198.82
1/29/2009 11:51:00 AM		5.99		198.03
1/29/2009 2:38:00 PM		5.99		198.03
1/30/2009 12:48:00 PM		6.03		197.99
2/2/2009 11:40:00 AM		6.12		197.90
2/3/2009 9:36:00 AM		6.17		197.85
2/5/2009 9:05:00 AM		6.22		197.80
2/6/2009 8:48:00 AM		6.28		197.74
2/10/2009 12:32:00 PM		6.39		197.63
3/17/2009 10:16:00 AM		4.32		199.70
3/18/2009 10:59:00 AM		4.33		199.69
3/19/2009 1:45:00 PM		4.31		199.71
3/23/2009 12:02:00 PM		4.28		199.74
3/23/2009 2:47:00 PM		4.28		199.74
3/24/2009 9:40:00 AM		4.30		199.72
3/25/2009 8:31:00 AM		4.33		199.69
3/26/2009 7:53:00 AM		4.35		199.67
3/27/2009 10:34:00 AM		4.35		199.67

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-04-05B)				
3/30/2009 7:22:00 AM		4.25	204.02	199.77
3/31/2009 11:57:00 AM		4.24		199.78
4/1/2009 8:20:00 AM		4.26		199.76
4/2/2009 8:23:00 AM		4.30		199.72
4/3/2009 8:41:00 AM		4.32		199.70
4/6/2009 8:16:00 AM		4.32		199.70
4/6/2009 2:05:00 PM		4.34		199.68
4/8/2009 8:32:00 AM		4.27		199.75
4/19/2009 11:16:00 AM		4.86		199.16
P-04-06A			Current ground surface elevation: 208.29 (feet)	
1/14/2009 12:48:00 PM		23.92	210.98	187.06
1/29/2009 10:03:00 AM		24.77		186.21
1/29/2009 5:13:00 PM		25.20		185.78
1/30/2009 12:06:00 PM		28.56		182.42
2/2/2009 11:28:00 AM		26.15		184.83
2/3/2009 11:17:00 AM		26.20		184.78
2/5/2009 9:49:00 AM		26.29		184.69
2/6/2009 10:47:00 AM		26.50		184.48
2/6/2009 11:26:00 AM		26.36		184.62
2/10/2009 10:47:00 AM		26.50		184.48
3/17/2009 9:07:00 AM		24.84		186.14
3/18/2009 10:09:00 AM		39.71		171.27
3/19/2009 2:50:00 PM		41.55		169.43
3/23/2009 11:37:00 AM		23.68		187.30
3/23/2009 2:57:00 PM		24.29		186.69
3/24/2009 10:14:00 AM		29.23		181.75
3/25/2009 9:08:00 AM		30.19		180.79
3/26/2009 8:30:00 AM		30.32		180.66
3/27/2009 8:44:00 AM		26.63		184.35
3/27/2009 3:50:00 PM		28.10		182.88
3/30/2009 8:04:00 AM		29.91		181.07
3/30/2009 3:06:00 PM		30.98		180.00
3/31/2009 9:26:00 AM		42.73		168.25
3/31/2009 1:52:00 PM		43.12		167.86
4/1/2009 9:10:00 AM		43.80		167.18
4/2/2009 9:07:00 AM		44.12		166.86
4/2/2009 2:18:00 PM		44.10		166.88
4/3/2009 9:29:00 AM		43.93		167.05
4/3/2009 12:58:00 PM		43.91		167.07
4/6/2009 9:16:00 AM		43.51		167.47
4/6/2009 3:08:00 PM		41.50		169.48
4/8/2009 9:28:00 AM		24.80		186.18
4/19/2009 10:10:00 AM		25.11		185.87
P-04-06B			Current ground surface elevation: 208.29 (feet)	
1/14/2009 12:49:00 PM		6.83	211.02	204.19
1/29/2009 10:04:00 AM		8.11		202.91
1/29/2009 5:12:00 PM		8.14		202.88
1/30/2009 12:07:00 PM		8.18		202.84
2/2/2009 11:29:00 AM		8.45		202.57
2/3/2009 11:18:00 AM		8.49		202.53

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-04-06B)				
2/5/2009 9:50:00 AM		8.68	211.02	202.34
2/6/2009 11:27:00 AM		8.77		202.25
2/10/2009 10:48:00 AM		9.02		202.00
3/17/2009 9:07:00 AM		4.47		206.55
3/18/2009 10:09:00 AM		4.64		206.38
3/19/2009 2:50:00 PM		4.51		206.51
3/23/2009 11:38:00 AM		4.92		206.10
3/23/2009 2:58:00 PM		4.93		206.09
3/24/2009 10:15:00 AM		5.14		205.88
3/25/2009 9:09:00 AM		5.09		205.93
3/26/2009 8:31:00 AM		5.08		205.94
3/27/2009 8:45:00 AM		4.96		206.06
3/27/2009 3:51:00 PM		4.99		206.03
3/30/2009 8:05:00 AM		4.44		206.58
3/30/2009 3:07:00 PM		4.46		206.56
3/31/2009 9:27:00 AM		4.97		206.05
3/31/2009 1:53:00 PM		4.99		206.03
4/1/2009 9:12:00 AM		5.18		205.84
4/2/2009 9:08:00 AM		5.37		205.65
4/2/2009 2:19:00 PM		5.37		205.65
4/3/2009 9:30:00 AM		5.48		205.54
4/3/2009 12:58:00 PM		5.46		205.56
4/6/2009 9:17:00 AM		5.23		205.79
4/6/2009 3:10:00 PM		5.21		205.81
4/8/2009 9:29:00 AM		4.69		206.33
4/19/2009 10:11:00 AM		6.50		204.52
P-04-07A			Current ground surface elevation: 174.11 (feet)	
1/14/2009 12:24:00 PM		F	177.12	176.82
1/30/2009 2:32:00 PM		F		176.89
2/2/2009 11:12:00 AM		F		176.89
2/3/2009 11:06:00 AM		F		176.89
2/5/2009 10:07:00 AM		F		176.89
2/6/2009 12:29:00 PM		F		176.89
2/10/2009 11:04:00 AM		F		176.89
3/19/2009 3:35:00 PM		19.95		157.17
3/23/2009 10:35:00 AM		F		
3/24/2009 10:29:00 AM		F		
3/25/2009 2:08:00 PM		7.18	177.12	169.94
3/26/2009 8:42:00 AM		7.33		169.79
3/27/2009 11:29:00 AM		3.67		173.45
3/30/2009 8:31:00 AM		7.00		170.12
3/31/2009 8:46:00 AM		20.85		156.27
4/1/2009 8:53:00 AM		21.98		155.14
4/2/2009 8:53:00 AM		22.25		154.87
4/3/2009 9:13:00 AM		22.06		155.06
4/6/2009 9:01:00 AM		21.77		155.35
4/6/2009 2:38:00 PM		19.99		157.13
4/8/2009 9:12:00 AM		1.28		175.84
4/19/2009 10:51:00 AM		0.94		176.18
P-04-07B			Current ground surface elevation: 174.11 (feet)	

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-04-07B)				
1/14/2009 12:25:00 PM		F	177.15	176.80
1/30/2009 2:33:00 PM		F		176.88
2/2/2009 11:12:00 AM		F		176.88
2/3/2009 11:06:00 AM		F		176.88
2/5/2009 10:07:00 AM		F		176.88
2/6/2009 12:29:00 PM		F		176.88
2/10/2009 11:04:00 AM		F		176.88
3/19/2009 3:35:00 PM		20.47		156.68
3/23/2009 10:35:00 AM		Q		
3/24/2009 10:29:00 AM		Q		
3/25/2009 2:08:00 AM		Q		
3/26/2009 8:42:00 AM		Q		
3/27/2009 11:29:00 AM		3.67	177.15	173.48
3/30/2009 8:31:00 AM		Q		
3/31/2009 8:46:00 AM		19.85	177.15	157.30
4/1/2009 8:54:00 AM		Q		
4/2/2009 8:34:00 AM		Q		
4/3/2009 9:14:00 AM		Q		
4/6/2009 9:01:00 AM		Q		
4/6/2009 2:26:00 PM		19.91	177.15	157.24
4/8/2009 9:13:00 AM		1.46		175.69
4/19/2009 10:51:00 AM		1.13		176.02
P-04-07C			Current ground surface elevation: 174.02 (feet)	
1/14/2009 12:26:00 PM		3.79	177.00	173.21
1/30/2009 2:31:00 PM		4.00		173.00
2/2/2009 11:13:00 AM		4.01		172.99
2/3/2009 11:06:00 AM		3.97		173.03
2/5/2009 10:06:00 AM		4.04		172.96
2/6/2009 12:30:00 PM		4.04		172.96
2/10/2009 11:04:00 AM		4.00		173.00
3/19/2009 3:35:00 PM		3.23		173.77
3/23/2009 10:35:00 AM		3.38		173.62
3/24/2009 10:30:00 AM		3.33		173.67
3/25/2009 2:08:00 AM		3.37		173.63
3/26/2009 8:43:00 AM		3.32		173.68
3/27/2009 11:30:00 AM		3.28		173.72
3/30/2009 8:32:00 AM		3.09		173.91
3/31/2009 9:32:00 AM		3.22		173.78
4/1/2009 8:55:00 AM		3.30		173.70
4/2/2009 8:54:00 AM		3.32		173.68
4/3/2009 9:14:00 AM		3.30		173.70
4/6/2009 9:02:00 AM		3.29		173.71
4/6/2009 2:53:00 PM		3.29		173.71
4/8/2009 9:14:00 AM		3.21		173.79
4/19/2009 10:52:00 AM		3.89		173.11
P-04-08A			Current ground surface elevation: 188.81 (feet)	
1/14/2009 11:41:00 AM		11.53	191.55	180.02
1/29/2009 11:02:00 AM		12.13		179.42
1/29/2009 5:30:00 PM		12.15		179.40
1/30/2009 10:51:00 AM		12.86		178.69

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-04-08A)				
2/2/2009 10:53:00 AM		12.91	191.55	178.64
2/2/2009 4:11:00 PM		12.91		178.64
2/3/2009 11:27:00 AM		12.98		178.57
2/5/2009 10:06:00 AM		13.17		178.38
2/6/2009 12:47:00 PM		13.17		178.38
2/10/2009 9:17:00 AM		13.27		178.28
3/17/2009 10:34:00 AM		11.06		180.49
3/18/2009 11:18:00 AM		12.70		178.85
3/19/2009 1:55:00 PM		13.26		178.29
3/23/2009 10:09:00 AM		10.79		180.76
3/23/2009 3:28:00 PM		10.82		180.73
3/24/2009 11:01:00 AM		12.64		178.91
3/25/2009 9:29:00 AM		13.15		178.40
3/26/2009 9:10:00 AM		13.18		178.37
3/27/2009 12:17:00 PM		11.90		179.65
3/30/2009 11:09:00 AM		12.69		178.86
3/31/2009 10:01:00 AM		14.52		177.03
4/1/2009 9:40:00 AM		14.94		176.61
4/2/2009 9:29:00 AM		15.07		176.48
4/3/2009 10:01:00 AM		15.04		176.51
4/6/2009 9:35:00 AM		15.06		176.49
4/6/2009 3:45:00 PM		14.96		176.59
4/8/2009 10:07:00 AM		10.98		180.57
4/19/2009 9:01:00 AM		11.64		179.91
P-04-08B			Current ground surface elevation: 188.81 (feet)	
1/14/2009 11:42:00 AM		5.61	191.56	185.95
1/29/2009 11:03:00 AM		6.20		185.36
1/29/2009 5:31:00 PM		6.22		185.34
1/30/2009 10:52:00 AM		6.27		185.29
2/2/2009 10:54:00 AM		6.35		185.21
2/2/2009 4:11:00 PM		6.33		185.23
2/3/2009 11:28:00 AM		6.35		185.21
2/5/2009 10:05:00 AM		6.49		185.07
2/6/2009 12:48:00 PM		6.46		185.10
2/10/2009 9:18:00 AM		6.57		184.99
3/17/2009 10:34:00 AM		4.04		187.52
3/18/2009 11:18:00 AM		4.07		187.49
3/19/2009 12:27:00 PM		5.38		186.18
3/23/2009 10:09:00 AM		4.33		187.23
3/23/2009 3:28:00 PM		4.36		187.20
3/24/2009 11:02:00 AM		4.59		186.97
3/25/2009 9:30:00 AM		4.58		186.98
3/26/2009 9:10:00 AM		4.38		187.18
3/27/2009 12:18:00 PM		4.25		187.31
3/30/2009 11:10:00 AM		3.66		187.90
3/31/2009 10:01:00 AM		4.18		187.38
4/1/2009 9:41:00 AM		4.37		187.19
4/2/2009 9:30:00 AM		4.45		187.11
4/3/2009 10:01:00 AM		4.45		187.11
4/6/2009 9:35:00 AM		4.37		187.19
4/6/2009 3:45:00 PM		4.38		187.18

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-04-08B)				
4/8/2009 10:07:00 AM		4.10	191.56	187.46
4/19/2009 9:01:00 AM		5.15		186.41
P-04-09A			Current ground surface elevation: 167.01 (feet)	
1/14/2009 10:02:00 AM		5.83	169.89	164.06
1/29/2009 12:35:00 PM		6.18		163.71
1/30/2009 9:46:00 AM		6.37		163.52
2/2/2009 9:31:00 AM		6.29		163.60
2/2/2009 1:26:00 PM		6.27		163.62
2/2/2009 4:57:00 PM		6.42		163.47
2/3/2009 11:57:00 AM		6.74		163.15
2/5/2009 9:24:00 AM		6.32		163.57
2/5/2009 4:05:00 PM		6.38		163.51
2/6/2009 2:50:00 PM		6.56		163.33
2/10/2009 9:23:00 AM		6.30		163.59
3/17/2009 11:38:00 AM		5.21		164.68
3/18/2009 12:00:00 PM		5.23		164.66
3/19/2009 2:20:00 PM		5.12		164.77
3/23/2009 11:43:00 AM		5.15		164.74
3/23/2009 5:37:00 PM		5.20		164.69
3/24/2009 11:30:00 AM		5.48		164.41
3/25/2009 10:02:00 AM		5.55		164.34
3/26/2009 9:46:00 AM		5.47		164.42
3/27/2009 9:06:00 AM		5.24		164.65
3/30/2009 8:48:00 AM		5.02		164.87
3/31/2009 10:55:00 AM		5.26		164.63
4/1/2009 10:30:00 AM		5.28		164.61
4/2/2009 10:27:00 AM		5.28		164.61
4/3/2009 10:46:00 AM		5.22		164.67
4/6/2009 10:40:00 AM		5.27		164.62
4/6/2009 3:51:00 PM		5.21		164.68
4/8/2009 11:02:00 AM		4.87		165.02
4/19/2009 8:13:00 AM		5.54		164.35
P-04-09B			Current ground surface elevation: 167.01 (feet)	
1/14/2009 10:03:00 AM		5.30	169.93	164.63
1/30/2009 9:47:00 AM		5.78		164.15
2/2/2009 9:31:00 AM		5.81		164.12
2/2/2009 1:26:00 PM		5.80		164.13
2/2/2009 4:58:00 PM		5.81		164.12
2/3/2009 11:58:00 AM		5.82		164.11
2/5/2009 9:25:00 AM		5.84		164.09
2/5/2009 4:06:00 PM		5.84		164.09
2/6/2009 2:50:00 PM		5.86		164.07
2/10/2009 9:24:00 AM		5.84		164.09
3/17/2009 11:38:00 AM		4.57		165.36
3/18/2009 12:00:00 PM		4.50		165.43
3/19/2009 2:20:00 PM		4.29		165.64
3/23/2009 11:44:00 AM		M		
3/24/2009 11:30:00 AM		M		
3/25/2009 10:03:00 AM		M		
3/26/2009 9:47:00 AM		M		

WATER LEVEL SUMMARY

All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-04-09B)				
3/27/2009 9:07:00 AM		4.80	169.93	165.13
3/30/2009 8:48:00 AM		3.93		166.00
3/31/2009 10:55:00 AM		4.15		165.78
4/1/2009 10:30:00 AM		4.19		165.74
4/2/2009 10:27:00 AM		4.17		165.76
4/3/2009 10:46:00 AM		4.14		165.79
4/6/2009 10:41:00 AM		4.22		165.71
4/6/2009 3:51:00 PM		4.13		165.80
4/8/2009 11:02:00 AM		4.05		165.88
4/19/2009 8:13:00 AM		4.98		164.95
P-04-10A			Current ground surface elevation: 165.97 (feet)	
1/14/2009 9:23:00 AM		8.40	169.94	161.54
1/29/2009 11:16:00 AM		8.75		161.19
1/29/2009 3:04:00 PM		9.11		160.83
2/2/2009 9:09:00 AM		9.10		160.84
2/5/2009 9:03:00 AM		9.31		160.63
2/5/2009 4:33:00 PM		9.30		160.64
2/6/2009 2:22:00 PM		10.29		159.65
2/10/2009 8:50:00 AM		8.94		161.00
3/17/2009 10:42:00 AM		8.05		161.89
3/18/2009 11:24:00 AM		9.06		160.88
3/19/2009 1:59:00 PM		9.51		160.43
3/23/2009 9:47:00 AM		7.76		162.18
3/23/2009 3:40:00 PM		8.66		161.28
3/24/2009 11:38:00 AM		15.17		154.77
3/25/2009 10:15:00 AM		15.59		154.35
3/26/2009 10:04:00 AM		15.56		154.38
3/27/2009 1:18:00 PM		11.10		158.84
3/30/2009 12:05:00 PM		15.05		154.89
3/31/2009 11:07:00 AM		15.93		154.01
4/1/2009 10:42:00 AM		16.07		153.87
4/2/2009 10:37:00 AM		16.04		153.90
4/3/2009 10:59:00 AM		15.98		153.96
4/6/2009 10:53:00 AM		15.92		154.02
4/8/2009 11:13:00 AM		7.73		162.21
4/19/2009 7:58:00 AM		7.62		162.32
P-04-10B			Current ground surface elevation: 165.97 (feet)	
1/14/2009 9:24:00 AM		6.47	169.90	163.43
1/29/2009 11:17:00 AM		7.06		162.84
1/29/2009 4:05:00 PM		7.03		162.87
1/30/2009 12:29:00 PM		7.20		162.70
2/2/2009 9:10:00 AM		7.11		162.79
2/3/2009 10:36:00 AM		7.12		162.78
2/5/2009 9:04:00 AM		M		
2/5/2009 4:34:00 PM		7.04	169.90	162.86
2/6/2009 2:23:00 PM		7.09		162.81
2/10/2009 8:51:00 AM		7.06		162.84
3/23/2009 9:48:00 AM		M		
3/24/2009 11:38:00 AM		M		
3/25/2009 10:16:00 AM		M		

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-04-10B)				
3/26/2009 10:04:00 AM		M		
3/27/2009 1:18:00 PM		M		
3/31/2009 11:07:00 AM		5.64	169.90	164.26
4/1/2009 10:43:00 AM		5.52		164.38
4/2/2009 10:38:00 AM		5.49		164.41
4/3/2009 11:00:00 AM		5.44		164.46
4/6/2009 10:54:00 AM		5.58		164.32
4/8/2009 11:13:00 AM		5.04		164.86
4/19/2009 7:58:00 AM		5.94		163.96
P-04-11A			Current ground surface elevation: 183.99 (feet)	
1/14/2009 9:45:00 AM		10.04	187.08	177.04
1/29/2009 11:30:00 AM		11.06		176.02
1/29/2009 4:13:00 PM		11.49		175.59
1/30/2009 12:36:00 PM		13.30		173.78
2/2/2009 9:18:00 AM		11.52		175.56
2/3/2009 10:46:00 AM		11.60		175.48
2/5/2009 9:22:00 AM		11.71		175.37
2/6/2009 2:30:00 PM		11.73		175.35
2/10/2009 9:09:00 AM		11.96		175.12
3/17/2009 12:12:00 PM		8.29		178.79
3/18/2009 2:20:00 PM		11.27		175.81
3/23/2009 10:14:00 AM		9.08		178.00
3/23/2009 3:33:00 PM		9.76		177.32
3/24/2009 11:07:00 AM		12.72		174.36
3/25/2009 9:25:00 AM		12.86		174.22
3/26/2009 9:06:00 AM		12.90		174.18
3/27/2009 12:28:00 PM		10.80		176.28
3/30/2009 11:18:00 AM		12.50		174.58
3/31/2009 10:07:00 AM		14.35		172.73
4/1/2009 9:47:00 AM		14.51		172.57
4/2/2009 9:36:00 AM		14.59		172.49
4/3/2009 10:09:00 AM		14.54		172.54
4/6/2009 9:42:00 AM		14.69		172.39
4/8/2009 10:13:00 AM		9.37		177.71
4/19/2009 9:08:00 AM		9.93		177.15
P-04-11B			Current ground surface elevation: 183.99 (feet)	
1/14/2009 9:46:00 AM		3.95	187.14	183.19
1/29/2009 11:31:00 AM		4.67		182.47
1/29/2009 4:14:00 PM		4.69		182.45
1/30/2009 12:36:00 PM		4.70		182.44
2/2/2009 9:19:00 AM		4.83		182.31
2/3/2009 10:47:00 AM		4.77		182.37
2/5/2009 9:21:00 AM		4.82		182.32
2/6/2009 2:30:00 PM		4.91		182.23
2/10/2009 9:10:00 AM		5.05		182.09
3/23/2009 10:15:00 AM		M		
3/24/2009 11:07:00 AM		M		
3/25/2009 9:25:00 AM		M		
3/26/2009 9:06:00 AM		M		
3/27/2009 12:29:00 PM		M		

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-04-11B)				
3/30/2009 11:18:00 AM		M		
3/31/2009 12:18:00 PM		3.60	187.14	183.54
4/1/2009 9:48:00 AM		3.53		183.61
4/2/2009 9:37:00 AM		3.42		183.72
4/3/2009 10:10:00 AM		3.42		183.72
4/6/2009 9:43:00 AM		3.48		183.66
4/8/2009 10:14:00 AM		3.37		183.77
4/19/2009 9:08:00 AM		3.68		183.46
P-04-12A			Current ground surface elevation: 166.33 (feet)	
1/14/2009 10:46:00 AM		3.84	169.17	165.33
1/29/2009 12:42:00 PM		3.93		165.24
1/30/2009 10:14:00 AM		4.40		164.77
2/2/2009 10:24:00 AM		4.33		164.84
2/2/2009 3:08:00 PM		6.50		162.67
2/3/2009 11:50:00 AM		9.15		160.02
2/5/2009 10:34:00 AM		M		164.43
2/5/2009 4:24:00 PM		4.46		164.71
2/6/2009 2:40:00 PM		4.71		164.46
2/10/2009 9:52:00 AM		4.38		164.79
3/17/2009 11:49:00 AM		3.95		165.22
3/18/2009 1:27:00 PM		3.80		165.37
3/23/2009 9:59:00 AM		3.66		165.51
3/24/2009 11:17:00 AM		4.04		165.13
3/25/2009 9:48:00 AM		4.26		164.91
3/26/2009 9:35:00 AM		4.31		164.86
3/27/2009 1:05:00 PM		4.07		165.10
3/30/2009 11:55:00 AM		3.89		165.28
3/31/2009 10:39:00 AM		4.31		164.86
4/1/2009 10:11:00 AM		4.51		164.66
4/2/2009 10:14:00 AM		4.45		164.72
4/3/2009 10:34:00 AM		4.38		164.79
4/6/2009 10:19:00 AM		4.51		164.66
4/8/2009 10:43:00 AM		3.47		165.70
4/19/2009 8:42:00 AM		3.80		165.37
P-04-12B			Current ground surface elevation: 166.33 (feet)	
1/14/2009 10:47:00 AM		3.58	169.27	165.69
1/29/2009 12:43:00 PM		4.25		165.02
3/17/2009 11:49:00 AM		3.70		165.57
3/18/2009 1:27:00 PM		3.54		165.73
3/23/2009 10:00:00 AM		3.57		165.70
3/24/2009 11:17:00 AM		3.55		165.72
3/25/2009 9:48:00 AM		3.57		165.70
3/26/2009 9:35:00 AM		3.58		165.69
3/27/2009 1:05:00 PM		3.61		165.66
3/30/2009 11:55:00 AM		3.61		165.66
3/31/2009 10:40:00 AM		3.62		165.65
4/1/2009 10:12:00 AM		3.63		165.64
4/2/2009 10:14:00 AM		3.65		165.62
4/3/2009 10:34:00 AM		3.67		165.60
4/6/2009 10:19:00 AM		3.70		165.57

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-04-12B)				
4/8/2009 10:43:00 AM		3.65	169.27	165.62
4/19/2009 8:43:00 AM		3.60		165.67
P-04-12C			Current ground surface elevation: 166.31 (feet)	
1/14/2009 10:48:00 AM		F	169.51	165.73
1/30/2009 10:15:00 AM		3.45		166.06
2/2/2009 10:25:00 AM		3.43		166.08
2/2/2009 3:09:00 PM		3.40		166.11
2/3/2009 11:51:00 AM		3.54		165.97
2/5/2009 10:36:00 AM		3.38		166.13
2/5/2009 4:25:00 PM		F		166.15
2/6/2009 2:21:00 PM		F		166.15
2/10/2009 9:53:00 AM		F		166.15
3/17/2009 11:49:00 AM		3.86		165.65
3/18/2009 1:27:00 PM		3.74		165.77
3/23/2009 10:01:00 AM		3.23		166.28
3/24/2009 11:18:00 AM		3.30		166.21
3/25/2009 9:49:00 AM		3.26		166.25
3/26/2009 9:36:00 AM		3.20		166.31
3/27/2009 1:06:00 PM		3.13		166.38
3/30/2009 11:56:00 AM		2.95		166.56
3/31/2009 10:40:00 AM		3.22		166.29
4/1/2009 10:13:00 AM		3.12		166.39
4/2/2009 10:15:00 AM		3.09		166.42
4/3/2009 10:35:00 AM		3.00		166.51
4/6/2009 10:20:00 AM		3.23		166.28
4/8/2009 10:44:00 AM		3.19		166.32
4/19/2009 8:43:00 AM		3.43		166.08
P-04-13A			Current ground surface elevation: 144.38 (feet)	
1/14/2009 9:00:00 AM		4.16	147.27	143.11
1/29/2009 11:00:00 AM		4.55		142.72
1/29/2009 4:31:00 PM		1.36		145.91
1/30/2009 12:19:00 PM		F		145.55
2/2/2009 8:38:00 AM		F		145.53
2/3/2009 10:03:00 AM		F		145.38
2/5/2009 8:47:00 AM		F		145.43
2/6/2009 2:12:00 PM		F		145.39
2/10/2009 8:16:00 AM		F		145.39
3/17/2009 10:56:00 AM		3.61		143.66
3/18/2009 11:45:00 AM		3.58		143.69
3/23/2009 9:18:00 AM		3.45		143.82
3/23/2009 3:50:00 PM		3.49		143.78
3/24/2009 11:47:00 AM		3.77		143.50
3/25/2009 10:32:00 AM		4.01		143.26
3/26/2009 10:17:00 AM		4.07		143.20
3/27/2009 1:31:00 PM		3.82		143.45
3/30/2009 12:23:00 PM		3.67		143.60
3/31/2009 12:25:00 PM		3.74		143.53
4/1/2009 11:41:00 AM		3.93		143.34
4/2/2009 11:11:00 AM		3.92		143.35
4/3/2009 11:32:00 AM		3.84		143.43

WATER LEVEL SUMMARY
All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-04-13A)				
4/6/2009 11:37:00 AM		3.74	147.27	143.53
4/8/2009 11:47:00 AM		2.92		144.35
4/19/2009 7:06:00 AM		3.17		144.10
P-04-13B			Current ground surface elevation: 144.38 (feet)	
1/14/2009 9:01:00 AM		4.07	147.30	143.23
1/29/2009 11:00:00 AM		4.41		142.89
1/29/2009 4:32:00 PM		4.48		142.82
1/30/2009 12:20:00 PM		4.70		142.60
2/2/2009 8:39:00 AM		4.62		142.68
2/3/2009 10:04:00 AM		4.61		142.69
2/5/2009 8:48:00 AM		4.68		142.62
2/6/2009 2:12:00 PM		4.72		142.58
2/10/2009 8:17:00 AM		4.72		142.58
3/18/2009 11:45:00 AM		3.70		143.60
3/23/2009 9:19:00 AM		3.52		143.78
3/23/2009 3:50:00 PM		3.68		143.62
3/24/2009 11:47:00 AM		3.95		143.35
3/25/2009 10:32:00 AM		4.14		143.16
3/26/2009 10:17:00 AM		4.11		143.19
3/27/2009 1:31:00 PM		3.80		143.50
3/30/2009 12:24:00 PM		3.63		143.67
3/31/2009 12:26:00 PM		3.93		143.37
4/1/2009 11:42:00 AM		4.03		143.27
4/2/2009 11:12:00 AM		3.95		143.35
4/3/2009 11:33:00 AM		3.86		143.44
4/6/2009 11:38:00 AM		3.89		143.41
4/8/2009 11:47:00 AM		2.94		144.36
4/19/2009 7:07:00 AM		3.27		144.03
P-04-13C			Current ground surface elevation: 144.78 (feet)	
1/14/2009 9:03:00 AM		F	147.93	144.51
1/29/2009 11:00:00 AM		3.75		144.18
1/29/2009 2:53:00 PM		3.78		144.15
1/29/2009 4:33:00 PM		3.78		144.15
1/30/2009 12:21:00 PM		3.80		144.13
2/2/2009 8:40:00 AM		3.86		144.07
2/3/2009 10:04:00 AM		3.84		144.09
2/5/2009 8:46:00 AM		3.85		144.08
2/6/2009 2:11:00 PM		3.82		144.11
2/10/2009 8:17:00 AM		3.86		144.07
3/18/2009 11:45:00 AM		4.02		143.91
3/23/2009 9:20:00 AM		3.63		144.30
3/23/2009 3:51:00 PM		3.63		144.30
3/24/2009 11:48:00 AM		3.66		144.27
3/25/2009 10:33:00 AM		3.68		144.25
3/26/2009 10:18:00 AM		3.68		144.25
3/27/2009 1:32:00 PM		3.65		144.28
3/30/2009 12:24:00 PM		3.53		144.40
3/31/2009 12:26:00 PM		3.54		144.39
4/1/2009 11:42:00 AM		3.56		144.37
4/2/2009 11:12:00 AM		3.60		144.33

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-04-13C)				
4/3/2009 11:33:00 AM		3.59	147.93	144.34
4/6/2009 11:38:00 AM		3.56		144.37
4/8/2009 11:48:00 AM		3.47		144.46
4/19/2009 7:07:00 AM		3.80		144.13
P-04-14A			Current ground surface elevation: 150.21 (feet)	
1/14/2009 8:44:00 AM		F	153.26	151.21
1/29/2009 11:47:00 AM		2.04		151.22
1/30/2009 3:55:00 PM		F		151.30
2/2/2009 8:59:00 AM		F		151.34
2/3/2009 10:23:00 AM		F		151.33
2/5/2009 8:26:00 AM		F		151.23
2/6/2009 1:37:00 PM		F		151.34
2/10/2009 8:38:00 AM		F		151.35
3/23/2009 9:35:00 AM		F		
3/24/2009 3:06:00 PM		F		
3/25/2009 2:27:00 PM		2.91	153.26	150.35
3/26/2009 10:57:00 AM		1.47		151.79
3/27/2009 1:48:00 PM		1.27		151.99
3/30/2009 12:43:00 PM		0.97		152.29
3/31/2009 11:26:00 AM		1.15		152.11
4/1/2009 11:02:00 AM		1.23		152.03
4/2/2009 10:58:00 AM		1.20		152.06
4/3/2009 11:14:00 AM		1.11		152.15
4/6/2009 11:15:00 AM		1.09		152.17
4/8/2009 11:29:00 AM		0.67		152.59
4/19/2009 7:28:00 AM		1.25		152.01
P-04-14B			Current ground surface elevation: 150.21 (feet)	
1/14/2009 8:45:00 AM		F	153.28	152.48
1/29/2009 11:46:00 AM		3.25		150.03
1/30/2009 3:55:00 PM		3.26		150.02
2/2/2009 9:00:00 AM		F		150.15
2/3/2009 10:24:00 AM		F		150.15
2/5/2009 8:27:00 AM		F		150.16
2/6/2009 1:37:00 PM		F		150.20
2/10/2009 8:39:00 AM		F		150.13
3/23/2009 9:35:00 AM		F		
3/24/2009 3:06:00 PM		F		
3/25/2009 2:28:00 PM		3.48	153.28	149.80
3/26/2009 10:57:00 AM		3.65		149.63
3/27/2009 1:49:00 PM		2.48		150.80
3/30/2009 12:43:00 PM		1.98		151.30
3/31/2009 11:26:00 AM		2.21		151.07
4/1/2009 11:02:00 AM		2.29		150.99
4/2/2009 10:58:00 AM		2.26		151.02
4/3/2009 11:14:00 AM		2.18		151.10
4/6/2009 11:15:00 AM		2.20		151.08
4/8/2009 11:29:00 AM		2.08		151.20
4/19/2009 7:28:00 AM		2.84		150.44
P-06-04A			Current ground surface elevation: 186.232 (feet)	

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-06-04A)				
1/19/2009 2:30:00 PM		13.00	189.06	176.06
1/29/2009 11:40:00 AM		13.99		175.07
1/30/2009 11:36:00 AM		14.08		174.98
2/2/2009 11:41:00 AM		14.25		174.81
2/3/2009 8:45:00 AM		14.32		174.74
2/5/2009 8:20:00 AM		14.48		174.58
2/6/2009 11:47:00 AM		14.58		174.48
2/10/2009 12:01:00 PM		14.89		174.17
3/17/2009 9:43:00 AM		14.02		175.04
3/23/2009 10:56:00 AM		M		
3/23/2009 2:11:00 PM		M		
3/24/2009 1:24:00 PM		M		
3/25/2009 11:09:00 AM		M		
3/26/2009 11:31:00 AM		M		
3/27/2009 2:53:00 PM		13.70	189.06	175.36
3/30/2009 1:30:00 PM		13.10		175.96
3/31/2009 1:14:00 PM		12.19		176.87
4/1/2009 12:40:00 PM		11.76		177.30
4/2/2009 12:30:00 PM		11.59		177.47
4/3/2009 12:22:00 PM		11.44		177.62
4/6/2009 12:24:00 PM		11.17		177.89
4/8/2009 12:33:00 PM		10.46		178.60
4/19/2009 12:03:00 PM		11.42		177.64
P-06-04B			Current ground surface elevation: 186.232 (feet)	
1/19/2009 2:31:00 PM		15.52	189.17	173.65
1/29/2009 11:42:00 AM		15.65		173.52
1/30/2009 11:37:00 AM		15.65		173.52
2/2/2009 11:41:00 AM		15.83		173.34
2/3/2009 8:46:00 AM		15.77		173.40
2/5/2009 8:21:00 AM		15.85		173.32
2/6/2009 11:48:00 AM		15.90		173.27
2/10/2009 12:02:00 PM		16.16		173.01
3/17/2009 9:43:00 AM		15.63		173.54
3/18/2009 1:10:00 PM		15.97		173.20
3/23/2009 10:57:00 AM		15.62		173.55
3/23/2009 2:12:00 PM		15.57		173.60
3/24/2009 1:25:00 PM		15.61		173.56
3/25/2009 11:10:00 AM		15.57		173.60
3/26/2009 11:32:00 AM		15.58		173.59
3/27/2009 2:54:00 PM		15.56		173.61
3/30/2009 1:31:00 PM		15.17		174.00
3/31/2009 1:14:00 PM		14.92		174.25
4/1/2009 12:41:00 PM		14.90		174.27
4/2/2009 12:31:00 PM		14.97		174.20
4/3/2009 12:23:00 PM		14.95		174.22
4/6/2009 12:24:00 PM		14.94		174.23
4/8/2009 12:34:00 PM		14.67		174.50
4/19/2009 12:03:00 PM		15.30		173.87
P-08-04			Current ground surface elevation: 192.66 (feet)	
1/19/2009 12:31:00 PM		4.32	195.39	191.07

WATER LEVEL SUMMARY

All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-08-04)				
1/29/2009 10:22:00 AM		4.58	195.39	190.81
1/30/2009 2:21:00 PM		4.57		190.82
2/2/2009 11:04:00 AM		4.65		190.74
2/3/2009 10:59:00 AM		4.64		190.75
2/5/2009 9:59:00 AM		4.71		190.68
2/6/2009 12:38:00 PM		4.72		190.67
2/10/2009 10:56:00 AM		4.76		190.63
3/23/2009 10:26:00 AM		3.39		192.00
3/24/2009 10:38:00 AM		3.47		191.92
3/25/2009 10:44:00 AM		3.42		191.97
3/26/2009 8:58:00 AM		3.32		192.07
3/27/2009 12:03:00 PM		3.25		192.14
3/30/2009 11:01:00 AM		2.84		192.55
3/31/2009 9:39:00 AM		3.06		192.33
4/1/2009 9:27:00 AM		3.09		192.30
4/2/2009 9:20:00 AM		3.13		192.26
4/3/2009 9:54:00 AM		3.03		192.36
4/6/2009 9:27:00 AM		3.09		192.30
4/8/2009 10:01:00 AM		3.06		192.33
4/19/2009 9:40:00 AM		4.05		191.34
P-08-06			Current ground surface elevation: 182.24 (feet)	
1/14/2009 2:50:00 PM		5.93	184.89	178.96
1/29/2009 1:38:00 AM		7.09		177.80
1/29/2009 9:40:00 AM		6.99		177.90
1/29/2009 11:44:00 AM		7.04		177.85
1/29/2009 1:38:00 PM		7.09		177.80
1/29/2009 2:49:00 PM		7.10		177.79
1/30/2009 9:26:00 AM		7.71		177.18
1/30/2009 1:11:00 PM		7.76		177.13
2/2/2009 11:43:00 AM		7.60		177.29
2/3/2009 9:40:00 AM		7.66		177.23
2/5/2009 9:07:00 AM		7.74		177.15
2/6/2009 11:07:00 AM		7.81		177.08
2/10/2009 12:34:00 PM		7.96		176.93
3/17/2009 10:24:00 AM		4.78		180.11
3/18/2009 11:08:00 AM		4.79		180.10
3/19/2009 1:43:00 PM		4.92		179.97
3/23/2009 10:08:00 AM		4.72		180.17
3/23/2009 1:18:00 PM		4.72		180.17
3/23/2009 2:43:00 PM		4.72		180.17
3/23/2009 5:17:00 PM		4.77		180.12
3/24/2009 9:21:00 AM		5.91		178.98
3/25/2009 8:25:00 AM		6.84		178.05
3/26/2009 7:45:00 AM		6.65		178.24
3/27/2009 10:13:00 AM		6.05		178.84
3/30/2009 7:11:00 AM		6.41		178.48
3/31/2009 12:01:00 PM		7.03		177.86
4/1/2009 8:13:00 AM		6.99		177.90
4/2/2009 8:20:00 AM		6.83		178.06
4/3/2009 8:35:00 AM		6.82		178.07
4/6/2009 8:11:00 AM		7.11		177.78

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-08-06)				
4/6/2009 2:03:00 PM		7.08	184.89	177.81
4/6/2009 3:32:00 PM		7.06		177.83
4/8/2009 8:26:00 AM		5.21		179.68
4/19/2009 11:18:00 AM		5.34		179.55
P-08-07			Current ground surface elevation: 211.67 (feet)	
1/14/2009 3:09:00 PM		4.72	214.40	209.68
1/29/2009 11:55:00 AM		5.54		208.86
1/29/2009 12:46:00 PM		5.69		208.71
1/29/2009 2:44:00 PM		5.58		208.82
1/30/2009 12:46:00 PM		5.69		208.71
2/2/2009 11:37:00 AM		5.86		208.54
2/3/2009 9:31:00 AM		5.90		208.50
2/5/2009 8:59:00 AM		6.04		208.36
2/6/2009 8:45:00 AM		6.12		208.28
2/10/2009 12:27:00 PM		6.27		208.13
3/17/2009 10:12:00 AM		3.32		211.08
3/18/2009 10:54:00 AM		3.18		211.22
3/19/2009 1:31:00 PM		3.10		211.30
3/23/2009 11:59:00 AM		3.28		211.12
3/23/2009 2:51:00 PM		3.28		211.12
3/24/2009 9:44:00 AM		3.36		211.04
3/25/2009 8:37:00 AM		3.38		211.02
3/26/2009 8:02:00 AM		3.27		211.13
3/27/2009 10:38:00 AM		3.21		211.19
3/30/2009 7:28:00 AM		2.97		211.43
3/31/2009 11:48:00 AM		3.20		211.20
4/1/2009 8:24:00 AM		3.23		211.17
4/2/2009 8:29:00 AM		3.27		211.13
4/3/2009 8:47:00 AM		3.30		211.10
4/6/2009 8:21:00 AM		3.28		211.12
4/8/2009 8:40:00 AM		3.16		211.24
4/19/2009 11:12:00 AM		4.48		209.92
P-08-09A			Current ground surface elevation: 198.19 (feet)	
1/19/2009 2:44:00 PM		14.42	200.76	186.34
3/23/2009 12:12:00 PM		15.45		185.31
3/23/2009 4:53:00 PM		15.42		185.34
3/24/2009 1:06:00 PM		15.43		185.33
3/25/2009 11:27:00 AM		15.37		185.39
3/26/2009 11:12:00 AM		15.25		185.51
3/27/2009 2:23:00 PM		15.14		185.62
3/30/2009 1:02:00 PM		14.60		186.16
3/31/2009 11:53:00 AM		14.77		185.99
4/1/2009 12:13:00 PM		14.45		186.31
4/2/2009 12:01:00 PM		14.22		186.54
4/3/2009 12:01:00 PM		14.04		186.72
4/6/2009 12:01:00 PM		13.76		187.00
4/8/2009 12:10:00 PM		13.39		187.37
4/19/2009 11:44:00 AM		13.72		187.04
P-08-09B			Current ground surface elevation: 198.19 (feet)	

WATER LEVEL SUMMARY
All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-08-09B)				
1/19/2009 2:45:00 PM		14.61	200.80	186.19
3/23/2009 12:12:00 PM		15.53		185.27
3/23/2009 4:53:00 PM		15.51		185.29
3/24/2009 1:07:00 PM		15.55		185.25
3/25/2009 11:28:00 AM		15.47		185.33
3/26/2009 11:12:00 AM		15.38		185.42
3/27/2009 2:24:00 PM		15.26		185.54
3/30/2009 1:03:00 PM		14.67		186.13
3/31/2009 11:54:00 AM		14.81		185.99
4/1/2009 12:14:00 PM		14.49		186.31
4/2/2009 12:02:00 PM		14.29		186.51
4/3/2009 12:02:00 PM		14.10		186.70
4/6/2009 12:01:00 PM		13.87		186.93
4/8/2009 12:11:00 PM		13.50		187.30
4/19/2009 11:44:00 AM		13.94		186.86
P-08-09C			Current ground surface elevation: 198.19 (feet)	
1/19/2009 2:46:00 PM		12.27	200.92	188.65
3/23/2009 12:13:00 PM		D		
3/23/2009 4:53:00 PM		D		
3/24/2009 1:07:00 PM		D		
3/25/2009 11:28:00 AM		D		
3/26/2009 11:12:00 AM		D		
3/27/2009 2:24:00 PM		D		
3/30/2009 1:03:00 PM		D		
3/31/2009 11:54:00 AM		11.12	200.92	189.80
4/1/2009 12:14:00 PM		10.73		190.19
4/2/2009 12:02:00 PM		10.90		190.02
4/3/2009 12:02:00 PM		11.09		189.83
4/6/2009 12:02:00 PM		10.38		190.54
4/8/2009 12:11:00 PM		10.02		190.90
4/19/2009 11:45:00 AM		D		
P-08-10A			Current ground surface elevation: 202.18 (feet)	
1/19/2009 2:08:00 PM		19.13	204.87	185.74
3/23/2009 12:00:00 PM		19.87		185.00
3/23/2009 4:44:00 PM		19.82		185.05
3/24/2009 1:40:00 PM		19.94		184.93
3/25/2009 11:46:00 AM		19.82		185.05
3/26/2009 11:43:00 AM		19.74		185.13
3/27/2009 2:04:00 PM		19.67		185.20
3/30/2009 1:43:00 PM		19.22		185.65
3/31/2009 12:42:00 PM		19.44		185.43
4/1/2009 12:01:00 PM		19.08		185.79
4/2/2009 11:41:00 AM		18.81		186.06
4/3/2009 11:53:00 AM		18.60		186.27
4/6/2009 11:52:00 AM		18.50		186.37
4/8/2009 12:00:00 PM		18.12		186.75
4/19/2009 11:37:00 AM		18.58		186.29
P-08-10B			Current ground surface elevation: 202.18 (feet)	
1/19/2009 2:09:00 PM		19.21	204.98	185.77

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-08-10B)				
3/23/2009 12:01:00 PM		20.07	204.98	184.91
3/23/2009 4:44:00 PM		20.02		184.96
3/24/2009 1:41:00 PM		20.11		184.87
3/25/2009 11:47:00 AM		20.02		184.96
3/26/2009 11:43:00 AM		19.88		185.10
3/27/2009 2:05:00 PM		19.81		185.17
3/30/2009 1:43:00 PM		19.31		185.67
3/31/2009 12:43:00 PM		19.65		185.33
4/1/2009 12:02:00 PM		19.27		185.71
4/2/2009 11:41:00 AM		19.00		185.98
4/3/2009 11:54:00 AM		18.82		186.16
4/6/2009 11:52:00 AM		18.70		186.28
4/8/2009 12:01:00 PM		18.30		186.68
4/19/2009 11:38:00 AM		18.70		186.28
P-08-10C			Current ground surface elevation: 202.18 (feet)	
1/19/2009 2:10:00 PM		F	205.08	202.37
3/23/2009 12:02:00 PM		M		
3/24/2009 1:42:00 PM		M		
3/25/2009 11:47:00 AM		3.58	205.08	201.50
3/26/2009 11:44:00 AM		3.53		201.55
3/27/2009 2:05:00 PM		3.16		201.92
3/30/2009 1:44:00 PM		3.94		201.14
3/31/2009 12:43:00 PM		3.18		201.90
4/1/2009 12:02:00 PM		3.30		201.78
4/2/2009 11:42:00 AM		3.60		201.48
4/3/2009 11:54:00 AM		3.42		201.66
4/6/2009 11:53:00 AM		3.18		201.90
4/8/2009 12:01:00 PM		2.91		202.17
4/19/2009 11:38:00 AM		4.44		200.64
P-08-3A			Current ground surface elevation: 168.85 (feet)	
1/14/2009 9:36:00 AM		5.05	171.56	166.51
1/29/2009 11:21:00 AM		5.55		166.01
1/29/2009 4:07:00 PM		5.52		166.04
1/30/2009 12:30:00 PM		5.52		166.04
2/2/2009 9:12:00 AM		5.60		165.96
2/3/2009 10:40:00 AM		5.56		166.00
2/5/2009 9:08:00 AM		5.89		165.67
2/6/2009 2:26:00 PM		5.60		165.96
2/10/2009 8:56:00 AM		5.70		165.86
3/23/2009 9:52:00 AM		4.02		167.54
3/23/2009 3:42:00 PM		4.06		167.50
3/24/2009 11:41:00 AM		4.23		167.33
3/25/2009 10:18:00 AM		4.31		167.25
3/26/2009 10:06:00 AM		4.22		167.34
3/27/2009 1:22:00 PM		4.07		167.49
3/30/2009 12:09:00 PM		3.42		168.14
3/31/2009 11:09:00 AM		3.75		167.81
4/1/2009 10:48:00 AM		3.83		167.73
4/2/2009 10:41:00 AM		3.82		167.74
4/3/2009 11:03:00 AM		3.73		167.83

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-08-3A)				
4/6/2009 11:00:00 AM		3.85	171.56	167.71
4/8/2009 11:17:00 AM		3.54		168.02
4/19/2009 8:06:00 AM		4.71		166.85
P-08-3B			Current ground surface elevation: 168.85 (feet)	
1/14/2009 9:37:00 AM		5.10	171.75	166.65
1/29/2009 11:22:00 AM		5.66		166.09
1/29/2009 4:08:00 PM		5.69		166.06
1/30/2009 12:31:00 PM		5.71		166.04
2/2/2009 9:13:00 AM		5.81		165.94
2/3/2009 10:41:00 AM		5.80		165.95
2/5/2009 9:09:00 AM		5.62		166.13
2/6/2009 2:26:00 PM		5.88		165.87
2/10/2009 8:57:00 AM		5.93		165.82
3/23/2009 9:52:00 AM		4.10		167.65
3/23/2009 3:43:00 PM		4.12		167.63
3/24/2009 11:41:00 AM		4.25		167.50
3/25/2009 10:18:00 AM		4.31		167.44
3/26/2009 10:06:00 AM		4.23		167.52
3/27/2009 1:22:00 PM		4.15		167.60
3/30/2009 12:09:00 PM		3.42		168.33
3/31/2009 11:09:00 AM		3.62		168.13
4/1/2009 10:48:00 AM		3.67		168.08
4/2/2009 10:41:00 AM		3.71		168.04
4/3/2009 11:03:00 AM		3.60		168.15
4/6/2009 11:00:00 AM		3.66		168.09
4/8/2009 11:17:00 AM		3.56		168.19
4/19/2009 8:06:00 AM		4.91		166.84
P-213			Current ground surface elevation: 180.32 (feet)	
1/19/2009 2:51:00 PM		0.00	184.34	184.34
P-213A			Current ground surface elevation: (feet)	
3/23/2009 1:57:00 PM		-1.02 ^		
3/24/2009 1:12:00 PM		-0.88 ^		
3/25/2009 11:21:00 AM		-0.99 ^		
3/26/2009 11:15:00 AM		-1.09 ^		
3/27/2009 2:31:00 PM		-1.13 ^		
3/30/2009 1:15:00 PM		-1.64 ^		
3/31/2009 1:00:00 PM		-1.41 ^		
4/1/2009 12:22:00 PM		-1.79 ^		
4/2/2009 12:11:00 PM		-1.63 ^		
4/3/2009 12:09:00 PM		-2.21 ^		
4/6/2009 12:10:00 PM		-2.35 ^		
4/8/2009 12:21:00 PM		-2.75 ^		
4/19/2009 11:51:00 AM		-2.27		
P-213B			Current ground surface elevation: (feet)	
3/23/2009 2:00:00 PM		-0.75 ^		
3/25/2009 11:22:00 AM		0.00		
3/26/2009 11:16:00 AM		0.00		
3/27/2009 2:33:00 PM		-0.87 ^		

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(P-213B)				
3/30/2009 1:16:00 PM		-1.30 ^		
3/31/2009 1:00:00 PM		-1.15 ^		
4/1/2009 12:22:00 PM		-1.34 ^		
4/2/2009 12:10:00 PM		-2.00 ^		
4/3/2009 12:08:00 PM		-1.85 ^		
4/6/2009 12:08:00 PM		-1.81 ^		
4/8/2009 12:19:00 PM		-2.29 ^		
4/19/2009 11:49:00 AM		-1.75		
PW-08-01			Current ground surface elevation: 173.1 (feet)	
1/14/2009 2:44:00 PM		11.94	176.01	164.07
1/29/2009 9:45:00 AM		12.32		163.69
1/29/2009 11:41:00 AM		12.39		163.62
1/29/2009 12:49:00 PM		12.42		163.59
1/29/2009 1:00:00 PM		12.41		163.60
1/29/2009 1:01:00 PM		33.33		142.68
1/29/2009 1:02:00 PM		40.61		135.40
1/29/2009 1:03:00 PM		43.54		132.47
1/29/2009 1:04:00 PM		45.71		130.30
1/29/2009 1:05:00 PM		47.13		128.88
1/29/2009 1:06:00 PM		48.08		127.93
1/29/2009 1:07:00 PM		48.93		127.08
1/29/2009 1:08:00 PM		49.81		126.20
1/29/2009 1:09:00 PM		50.22		125.79
1/29/2009 1:10:00 PM		50.71		125.30
1/29/2009 1:12:00 PM		51.61		124.40
1/29/2009 1:14:00 PM		52.40		123.61
1/29/2009 1:16:00 PM		53.09		122.92
1/29/2009 1:18:00 PM		53.73		122.28
1/29/2009 1:20:00 PM		54.35		121.66
1/29/2009 1:22:00 PM		54.90		121.11
1/29/2009 1:24:00 PM		55.42		120.59
1/29/2009 1:26:00 PM		55.91		120.10
1/29/2009 1:28:00 PM		56.37		119.64
1/29/2009 1:30:00 PM		56.77		119.24
1/29/2009 1:35:00 PM		57.88		118.13
1/29/2009 1:40:00 PM		58.83		117.18
1/29/2009 1:45:00 PM		59.72		116.29
1/29/2009 1:50:00 PM		60.53		115.48
1/29/2009 1:55:00 PM		61.30		114.71
1/29/2009 2:00:00 PM		62.04		113.97
1/29/2009 2:10:00 PM		63.34		112.67
1/29/2009 2:20:00 PM		64.49		111.52
1/29/2009 2:30:00 PM		65.54		110.47
1/29/2009 2:51:00 PM		68.83		107.18
1/29/2009 3:09:00 PM		70.34		105.67
1/29/2009 3:29:00 PM		71.85		104.16
1/29/2009 3:51:00 PM		73.26		102.75
1/29/2009 4:30:00 PM		74.63		101.38
1/29/2009 4:58:00 PM		76.26		99.75
1/29/2009 8:41:00 PM		80.35		95.66
1/30/2009 8:09:00 AM		79.90		96.11

WATER LEVEL SUMMARY

All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-01)				
1/30/2009 8:32:00 AM		67.28	176.01	108.73
1/30/2009 8:46:00 AM		73.82		102.19
1/30/2009 9:01:00 AM		78.03		97.98
1/30/2009 9:21:00 AM		80.03		95.98
1/30/2009 11:01:00 AM		82.10		93.91
1/30/2009 12:52:00 PM		82.68		93.33
1/30/2009 1:00:00 PM		82.68		93.33
1/30/2009 1:01:00 PM		58.60		117.41
1/30/2009 1:02:00 PM		51.04		124.97
1/30/2009 1:03:00 PM		48.56		127.45
1/30/2009 1:04:00 PM		47.36		128.65
1/30/2009 1:05:00 PM		46.59		129.42
1/30/2009 1:06:00 PM		45.88		130.13
1/30/2009 1:07:00 PM		45.40		130.61
1/30/2009 1:08:00 PM		44.80		131.21
1/30/2009 1:09:00 PM		44.37		131.64
1/30/2009 1:10:00 PM		43.91		132.10
1/30/2009 1:12:00 PM		43.16		132.85
1/30/2009 1:14:00 PM		42.46		133.55
1/30/2009 1:16:00 PM		41.76		134.25
1/30/2009 1:18:00 PM		41.14		134.87
1/30/2009 1:20:00 PM		40.58		135.43
1/30/2009 1:22:00 PM		40.05		135.96
1/30/2009 1:24:00 PM		39.56		136.45
1/30/2009 1:26:00 PM		39.08		136.93
1/30/2009 1:28:00 PM		38.65		137.36
1/30/2009 1:30:00 PM		38.23		137.78
1/30/2009 4:15:00 PM		24.18		151.83
2/2/2009 11:45:00 AM		11.95		164.06
2/2/2009 3:40:00 PM		11.98		164.03
2/3/2009 9:42:00 AM		12.20		163.81
2/5/2009 9:09:00 AM		12.04		163.97
2/6/2009 11:07:00 AM		12.10		163.91
2/10/2009 12:37:00 PM		12.03		163.98
3/17/2009 10:20:00 AM		11.10		164.91
3/18/2009 5:15:00 PM		13.81		162.20
3/19/2009 1:39:00 PM		17.80		158.21
3/23/2009 10:10:00 AM		10.09		165.92
3/23/2009 12:30:00 PM		10.33		165.68
3/23/2009 12:30:30 PM		51.05		124.96
3/23/2009 12:31:00 PM		64.25		111.76
3/23/2009 12:31:30 PM		71.45		104.56
3/23/2009 12:32:00 PM		80.15		95.86
3/23/2009 12:33:00 PM		82.55		93.46
3/23/2009 12:34:00 PM		86.40		89.61
3/23/2009 12:35:00 PM		88.90		87.11
3/23/2009 12:36:00 PM		90.70		85.31
3/23/2009 12:37:00 PM		92.13		83.88
3/23/2009 12:38:00 PM		93.15		82.86
3/23/2009 12:39:00 PM		94.04		81.97
3/23/2009 12:40:00 PM		94.83		81.18

WATER LEVEL SUMMARY

All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-01)				
3/23/2009 12:41:00 PM		95.53	176.01	80.48
3/23/2009 12:42:00 PM		96.19		79.82
3/23/2009 12:43:00 PM		96.90		79.11
3/23/2009 12:44:00 PM		97.40		78.61
3/23/2009 12:45:00 PM		97.85		78.16
3/23/2009 12:46:00 PM		98.43		77.58
3/23/2009 12:48:00 PM		99.15		76.86
3/23/2009 12:50:00 PM		100.00		76.01
3/23/2009 12:55:00 PM		101.70		74.31
3/23/2009 1:00:00 PM		103.09		72.92
3/23/2009 1:05:00 PM		104.43		71.58
3/23/2009 1:10:00 PM		105.59		70.42
3/23/2009 1:15:00 PM		106.64		69.37
3/23/2009 1:20:00 PM		107.67		68.34
3/23/2009 1:25:00 PM		108.49		67.52
3/23/2009 1:30:00 PM		109.30		66.71
3/23/2009 1:40:00 PM		110.84		65.17
3/23/2009 1:50:00 PM		112.19		63.82
3/23/2009 2:00:00 PM		113.20		62.81
3/23/2009 2:10:00 PM		114.62		61.39
3/23/2009 3:20:00 PM		118.87		57.14
3/23/2009 3:50:00 PM		120.57		55.44
3/23/2009 5:15:00 PM		123.03		52.98
3/23/2009 10:26:00 PM		127.96		48.05
3/24/2009 8:00:00 AM		129.20		46.81
3/24/2009 9:00:00 AM		129.25		46.76
3/24/2009 12:00:00 PM		129.43		46.58
3/24/2009 12:30:00 PM		129.44		46.57
3/24/2009 1:51:00 PM		129.05		46.96
3/24/2009 2:18:00 PM		129.05		46.96
3/24/2009 2:25:00 PM		107.67		68.34
3/24/2009 2:26:00 PM		112.23		63.78
3/24/2009 2:27:00 PM		115.50		60.51
3/24/2009 2:28:00 PM		117.90		58.11
3/24/2009 2:29:00 PM		119.69		56.32
3/24/2009 2:30:00 PM		121.19		54.82
3/24/2009 2:32:00 PM		123.30		52.71
3/24/2009 2:34:00 PM		124.78		51.23
3/24/2009 2:36:00 PM		126.21		49.80
3/24/2009 2:38:00 PM		127.27		48.74
3/24/2009 2:40:00 PM		127.60		48.41
3/24/2009 2:50:00 PM		128.18		47.83
3/24/2009 3:45:00 PM		128.83		47.18
3/24/2009 10:47:00 PM		129.46		46.55
3/25/2009 8:18:00 AM		129.51		46.50
3/25/2009 10:54:00 AM		129.62		46.39
3/25/2009 12:06:00 PM		129.64		46.37
3/25/2009 3:11:00 PM		129.64		46.37
3/25/2009 10:37:00 PM		129.80		46.21
3/26/2009 7:47:00 AM		129.86		46.15
3/26/2009 11:54:00 AM		129.98		46.03

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-01)				
3/26/2009 12:08:00 PM		108.48	176.01	67.53
3/26/2009 12:09:00 PM		112.73		63.28
3/26/2009 12:10:00 PM		115.76		60.25
3/26/2009 12:11:00 PM		117.95		58.06
3/26/2009 12:12:00 PM		119.71		56.30
3/26/2009 12:13:00 PM		121.24		54.77
3/26/2009 12:14:00 PM		122.37		53.64
3/26/2009 12:16:00 PM		124.23		51.78
3/26/2009 12:18:00 PM		125.75		50.26
3/26/2009 12:20:00 PM		127.20		48.81
3/26/2009 12:25:00 PM		128.00		48.01
3/26/2009 12:30:00 PM		128.36		47.65
3/26/2009 2:43:00 PM		129.60		46.41
3/27/2009 8:29:00 AM		13.26		162.75
3/27/2009 9:30:00 AM		13.26		162.75
3/27/2009 9:31:00 AM		62.65		113.36
3/27/2009 9:32:00 AM		78.65		97.36
3/27/2009 9:33:00 AM		85.84		90.17
3/27/2009 9:34:00 AM		90.20		85.81
3/27/2009 9:35:00 AM		92.87		83.14
3/27/2009 9:36:00 AM		94.90		81.11
3/27/2009 9:37:00 AM		96.20		79.81
3/27/2009 9:38:00 AM		97.27		78.74
3/27/2009 9:39:00 AM		98.20		77.81
3/27/2009 9:40:00 AM		98.88		77.13
3/27/2009 9:41:00 AM		99.65		76.36
3/27/2009 9:42:00 AM		100.23		75.78
3/27/2009 9:43:00 AM		100.81		75.20
3/27/2009 9:44:00 AM		101.31		74.70
3/27/2009 9:45:00 AM		101.74		74.27
3/27/2009 9:46:00 AM		102.16		73.85
3/27/2009 9:48:00 AM		102.90		73.11
3/27/2009 9:50:00 AM		103.60		72.41
3/27/2009 9:55:00 AM		105.08		70.93
3/27/2009 10:00:00 AM		106.35		69.66
3/27/2009 11:49:00 AM		118.19		57.82
3/27/2009 3:15:00 PM		124.00		52.01
3/27/2009 3:34:00 PM		124.27		51.74
3/30/2009 7:14:00 AM		130.07		45.94
3/30/2009 9:21:00 AM		130.20		45.81
3/30/2009 9:36:00 AM		99.93		76.08
3/30/2009 9:37:00 AM		108.76		67.25
3/30/2009 9:38:00 AM		110.80		65.21
3/30/2009 9:39:00 AM		113.95		62.06
3/30/2009 9:41:00 AM		118.17		57.84
3/30/2009 9:47:00 AM		124.84		51.17
3/30/2009 9:51:00 AM		127.60		48.41
3/30/2009 9:56:00 AM		127.88		48.13
3/30/2009 10:01:00 AM		128.26		47.75
3/30/2009 1:54:00 PM		130.06		45.95
3/30/2009 3:18:00 PM		130.67		45.34

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-01)				
3/30/2009 6:34:00 PM		131.88	176.01	44.13
3/31/2009 8:15:00 AM		133.46		42.55
3/31/2009 12:03:00 PM		133.56		42.45
4/1/2009 8:14:00 AM		133.94		42.07
4/1/2009 11:31:00 AM		133.98		42.03
4/1/2009 1:22:00 PM		134.02		41.99
4/2/2009 8:18:00 AM		134.01		42.00
4/2/2009 12:47:00 PM		134.10		41.91
4/2/2009 2:04:00 PM		134.10		41.91
4/2/2009 6:34:00 PM		134.18		41.83
4/3/2009 8:33:00 AM		134.10		41.91
4/3/2009 12:41:00 PM		134.14		41.87
4/6/2009 8:10:00 AM		134.11		41.90
4/6/2009 12:42:00 PM		134.12		41.89
4/6/2009 1:15:00 PM		134.12		41.89
4/6/2009 1:16:00 PM		134.12		41.89
4/6/2009 1:17:00 PM		97.72		78.29
4/6/2009 1:18:00 PM		86.27		89.74
4/6/2009 1:19:00 PM		75.63		100.38
4/6/2009 1:20:00 PM		67.03		108.98
4/6/2009 1:21:00 PM		61.44		114.57
4/6/2009 1:22:00 PM		57.73		118.28
4/6/2009 1:23:00 PM		54.47		121.54
4/6/2009 1:24:00 PM		53.78		122.23
4/6/2009 1:25:00 PM		52.82		123.19
4/6/2009 1:26:00 PM		51.98		124.03
4/6/2009 1:27:00 PM		51.25		124.76
4/6/2009 1:28:00 PM		50.59		125.42
4/6/2009 1:29:00 PM		49.96		126.05
4/6/2009 1:30:00 PM		49.41		126.60
4/6/2009 1:31:00 PM		48.90		127.11
4/6/2009 1:32:00 PM		48.40		127.61
4/6/2009 1:45:00 PM		43.53		132.48
4/6/2009 1:50:00 PM		42.18		133.83
4/6/2009 1:55:00 PM		40.88		135.13
4/6/2009 2:00:00 PM		39.75		136.26
4/6/2009 3:30:00 PM		29.14		146.87
4/8/2009 8:24:00 AM		10.34		165.67
4/19/2009 11:19:00 AM		9.94		166.07
PW-08-02			Current ground surface elevation: 203.98 (feet)	
1/14/2009 12:00:00 PM		29.41	206.47	177.06
1/29/2009 10:03:00 AM		29.94		176.53
1/29/2009 5:10:00 PM		31.35		175.12
1/30/2009 9:33:00 AM		36.94		169.53
1/30/2009 12:11:00 PM		37.33		169.14
2/2/2009 11:23:00 AM		32.18		174.29
2/2/2009 3:34:00 PM		32.16		174.31
2/3/2009 8:17:00 AM		32.31		174.16
2/3/2009 11:23:00 AM		32.16		174.31
2/5/2009 10:16:00 AM		32.30		174.17
2/6/2009 12:42:00 PM		32.34		174.13

WATER LEVEL SUMMARY
All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-02)				
2/10/2009 10:37:00 AM		32.39	206.47	174.08
3/17/2009 2:00:00 PM		31.16		175.31
3/17/2009 2:01:00 PM		59.00		147.47
3/17/2009 2:02:00 PM		57.25		149.22
3/17/2009 2:03:00 PM		56.90		149.57
3/17/2009 2:04:00 PM		57.40		149.07
3/17/2009 2:05:00 PM		58.30		148.17
3/17/2009 2:06:00 PM		58.82		147.65
3/17/2009 2:07:00 PM		59.90		146.57
3/17/2009 2:08:00 PM		60.35		146.12
3/17/2009 2:09:00 PM		61.15		145.32
3/17/2009 2:10:00 PM		61.65		144.82
3/17/2009 2:11:00 PM		62.28		144.19
3/17/2009 2:12:00 PM		62.61		143.86
3/17/2009 2:14:00 PM		63.45		143.02
3/17/2009 2:16:00 PM		64.20		142.27
3/17/2009 2:18:00 PM		65.14		141.33
3/17/2009 2:20:00 PM		65.81		140.66
3/17/2009 2:25:00 PM		67.40		139.07
3/17/2009 2:31:00 PM		68.60		137.87
3/17/2009 2:35:00 PM		69.62		136.85
3/17/2009 2:45:00 PM		71.28		135.19
3/17/2009 2:50:00 PM		71.85		134.62
3/17/2009 3:02:00 PM		73.80		132.67
3/17/2009 3:10:00 PM		74.62		131.85
3/17/2009 3:20:00 PM		75.49		130.98
3/17/2009 3:32:00 PM		76.50		129.97
3/17/2009 3:50:00 PM		77.75		128.72
3/17/2009 4:40:00 PM		81.02		125.45
3/17/2009 5:45:00 PM		83.45		123.02
3/17/2009 6:00:00 PM		83.88		122.59
3/17/2009 6:10:00 PM		81.59		124.88
3/17/2009 10:30:00 PM		84.70		121.77
3/18/2009 9:30:00 AM		88.54		117.93
3/18/2009 1:41:00 PM		89.78		116.69
3/18/2009 2:35:00 PM		89.95		116.52
3/18/2009 10:20:00 PM		90.10		116.37
3/18/2009 10:32:00 PM		89.75		116.72
3/19/2009 12:10:00 PM		90.35		116.12
3/19/2009 4:00:00 PM		90.54		115.93
3/19/2009 4:00:30 PM		74.00		132.47
3/19/2009 4:31:00 PM		72.12		134.35
3/19/2009 4:32:00 PM		69.90		136.57
3/19/2009 4:33:00 PM		67.45		139.02
3/19/2009 4:34:00 PM		66.20		140.27
3/19/2009 4:35:00 PM		65.20		141.27
3/19/2009 4:36:00 PM		64.55		141.92
3/19/2009 4:37:00 PM		64.20		142.27
3/19/2009 4:38:00 PM		63.65		142.82
3/19/2009 4:39:00 PM		63.35		143.12
3/19/2009 4:40:00 PM		63.10		143.37

WATER LEVEL SUMMARY
All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-02)				
3/19/2009 4:42:00 PM		62.35	206.47	144.12
3/19/2009 4:44:00 PM		61.90		144.57
3/19/2009 4:46:00 PM		61.52		144.95
3/19/2009 4:48:00 PM		61.21		145.26
3/19/2009 4:50:00 PM		60.81		145.66
3/19/2009 4:55:00 PM		60.02		146.45
3/19/2009 5:00:00 PM		59.34		147.13
3/19/2009 5:15:00 PM		57.80		148.67
3/23/2009 11:58:00 AM		29.58		176.89
3/23/2009 5:29:00 PM		33.65		172.82
3/24/2009 10:20:00 AM		39.49		166.98
3/24/2009 3:24:00 PM		40.03		166.44
3/25/2009 9:12:00 AM		40.84		165.63
3/25/2009 2:16:00 PM		40.90		165.57
3/26/2009 8:36:00 AM		41.07		165.40
3/26/2009 2:49:00 PM		41.03		165.44
3/27/2009 10:21:00 AM		34.56		171.91
3/27/2009 11:40:00 AM		35.65		170.82
3/27/2009 4:03:00 PM		37.90		168.57
3/30/2009 10:05:00 AM		40.57		165.90
3/30/2009 2:08:00 PM		40.90		165.57
3/30/2009 2:15:00 PM		40.90		165.57
3/30/2009 2:16:00 PM		57.72		148.75
3/30/2009 2:17:00 PM		60.66		145.81
3/30/2009 2:18:00 PM		61.82		144.65
3/30/2009 2:19:00 PM		62.69		143.78
3/30/2009 2:20:00 PM		63.10		143.37
3/30/2009 2:21:00 PM		63.58		142.89
3/30/2009 2:22:00 PM		63.99		142.48
3/30/2009 2:23:00 PM		64.37		142.10
3/30/2009 2:24:00 PM		64.77		141.70
3/30/2009 2:25:00 PM		65.03		141.44
3/30/2009 2:26:00 PM		65.32		141.15
3/30/2009 2:27:00 PM		65.82		140.65
3/30/2009 2:28:00 PM		65.92		140.55
3/30/2009 2:29:00 PM		66.03		140.44
3/30/2009 2:30:00 PM		66.32		140.15
3/30/2009 2:32:00 PM		66.76		139.71
3/30/2009 2:34:00 PM		67.15		139.32
3/30/2009 2:36:00 PM		67.53		138.94
3/30/2009 2:38:00 PM		67.88		138.59
3/30/2009 2:40:00 PM		68.21		138.26
3/30/2009 2:45:00 PM		68.96		137.51
3/30/2009 2:50:00 PM		69.62		136.85
3/30/2009 2:55:00 PM		70.21		136.26
3/30/2009 3:00:00 PM		70.77		135.70
3/30/2009 3:41:00 PM		74.11		132.36
3/30/2009 3:45:00 PM		74.32		132.15
3/30/2009 6:26:00 PM		81.51		124.96
3/30/2009 10:22:00 PM		86.11		120.36
3/31/2009 8:02:00 AM		90.20		116.27

WATER LEVEL SUMMARY
All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-02)				
3/31/2009 9:33:00 AM		90.47	206.47	116.00
3/31/2009 11:38:00 AM		90.91		115.56
3/31/2009 1:36:00 PM		91.35		115.12
4/1/2009 7:57:00 AM		94.52		111.95
4/1/2009 11:19:00 AM		94.99		111.48
4/1/2009 1:03:00 PM		95.29		111.18
4/1/2009 2:58:00 PM		95.56		110.91
4/2/2009 8:04:00 AM		97.11		109.36
4/2/2009 11:28:00 AM		97.53		108.94
4/2/2009 2:12:00 PM		97.82		108.65
4/2/2009 6:42:00 PM		96.57		109.90
4/2/2009 9:08:00 PM		97.03		109.44
4/3/2009 8:22:00 AM		97.25		109.22
4/3/2009 11:44:00 AM		97.30		109.17
4/3/2009 1:24:00 PM		97.20		109.27
4/6/2009 8:00:00 AM		97.26		109.21
4/6/2009 12:49:00 PM		96.72		109.75
4/6/2009 1:00:00 PM		96.72		109.75
4/6/2009 1:02:00 PM		96.72		109.75
4/6/2009 1:15:00 PM		96.72		109.75
4/6/2009 1:15:30 PM		96.72		109.75
4/6/2009 2:12:00 PM		64.06		142.41
4/6/2009 2:13:00 PM		63.93		142.54
4/6/2009 2:15:00 PM		63.78		142.69
4/6/2009 2:16:00 PM		63.71		142.76
4/6/2009 2:18:00 PM		63.55		142.92
4/6/2009 2:19:00 PM		63.48		142.99
4/6/2009 2:20:00 PM		63.39		143.08
4/6/2009 2:25:00 PM		63.04		143.43
4/6/2009 3:40:00 PM		58.25		148.22
4/8/2009 9:43:00 AM		31.24		175.23
4/19/2009 9:47:00 AM		30.71		175.76
PW-08-03			Current ground surface elevation: 169.4 (feet)	
1/14/2009 10:08:00 AM		9.76	171.12	161.36
1/29/2009 12:00:00 PM		11.31		159.81
1/29/2009 5:34:00 PM		11.39		159.73
1/30/2009 9:39:00 AM		13.35		157.77
2/2/2009 10:02:00 AM		11.77		159.35
2/2/2009 11:56:00 AM		11.76		159.36
2/2/2009 1:20:00 PM		12.17		158.95
2/2/2009 4:52:00 PM		14.77		156.35
2/3/2009 8:12:00 AM		17.97		153.15
2/3/2009 12:00:00 PM		18.88		152.24
2/5/2009 9:27:00 AM		12.37		158.75
2/5/2009 1:00:00 PM		12.26		158.86
2/5/2009 1:01:00 PM		20.77		150.35
2/5/2009 1:02:00 PM		25.49		145.63
2/5/2009 1:03:00 PM		29.63		141.49
2/5/2009 1:04:00 PM		33.33		137.79
2/5/2009 1:05:00 PM		36.78		134.34
2/5/2009 1:06:00 PM		40.05		131.07

WATER LEVEL SUMMARY
All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-03)				
2/5/2009 1:07:00 PM		42.97	171.12	128.15
2/5/2009 1:08:00 PM		45.86		125.26
2/5/2009 1:09:00 PM		48.29		122.83
2/5/2009 1:10:00 PM		51.03		120.09
2/5/2009 1:12:00 PM		55.89		115.23
2/5/2009 1:14:00 PM		60.60		110.52
2/5/2009 1:16:00 PM		64.11		107.01
2/5/2009 1:18:00 PM		67.94		103.18
2/5/2009 1:20:00 PM		72.42		98.70
2/5/2009 1:22:00 PM		76.59		94.53
2/5/2009 1:24:00 PM		80.90		90.22
2/5/2009 1:26:00 PM		85.31		85.81
2/5/2009 1:28:00 PM		89.71		81.41
2/5/2009 1:30:00 PM		93.84		77.28
2/5/2009 1:32:00 PM		97.97		73.15
2/5/2009 1:35:00 PM		104.17		66.95
2/5/2009 1:38:00 PM		110.17		60.95
2/5/2009 1:42:00 PM		117.84		53.28
2/5/2009 1:46:00 PM		125.98		45.14
2/5/2009 1:48:00 PM		130.08		41.04
2/5/2009 1:50:00 PM		134.40		36.72
2/5/2009 1:58:00 PM		151.02		20.10
2/5/2009 2:00:00 PM		155.47		15.65
2/5/2009 2:01:00 PM		155.71		15.41
2/5/2009 2:02:00 PM		155.01		16.11
2/5/2009 2:03:00 PM		154.29		16.83
2/5/2009 2:04:00 PM		153.61		17.51
2/5/2009 2:05:00 PM		152.91		18.21
2/5/2009 2:06:00 PM		152.06		19.06
2/5/2009 2:07:00 PM		151.48		19.64
2/5/2009 2:09:00 PM		150.20		20.92
2/5/2009 2:10:00 PM		149.44		21.68
2/5/2009 2:12:00 PM		148.01		23.11
2/5/2009 2:14:00 PM		146.64		24.48
2/5/2009 2:16:00 PM		145.38		25.74
2/5/2009 2:18:00 PM		144.02		27.10
2/5/2009 2:20:00 PM		142.48		28.64
2/5/2009 2:25:00 PM		138.59		32.53
2/5/2009 2:30:00 PM		135.66		35.46
2/5/2009 2:35:00 PM		133.12		38.00
2/5/2009 2:40:00 PM		130.77		40.35
2/5/2009 2:45:00 PM		128.75		42.37
2/5/2009 2:50:00 PM		126.99		44.13
2/5/2009 2:55:00 PM		124.98		46.14
2/5/2009 3:00:00 PM		123.08		48.04
2/5/2009 3:05:00 PM		121.55		49.57
2/5/2009 3:10:00 PM		120.12		51.00
2/5/2009 3:15:00 PM		118.93		52.19
2/5/2009 3:25:00 PM		117.11		54.01
2/5/2009 3:35:00 PM		115.86		55.26
2/5/2009 3:45:00 PM		115.02		56.10

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-03)				
2/5/2009 3:55:00 PM		114.34	171.12	56.78
2/5/2009 4:00:00 PM		113.97		57.15
2/5/2009 4:15:00 PM		113.05		58.07
2/5/2009 4:45:00 PM		112.26		58.86
2/5/2009 5:00:00 PM		112.19		58.93
2/5/2009 5:15:00 PM		112.19		58.93
2/5/2009 5:20:00 PM		112.16		58.96
2/5/2009 5:30:00 PM		112.26		58.86
2/5/2009 5:45:00 PM		112.78		58.34
2/5/2009 10:00:00 PM		114.57		56.55
2/5/2009 10:05:00 PM		115.45		55.67
2/6/2009 8:13:00 AM		112.77		58.35
2/6/2009 8:17:00 AM		113.80		57.32
2/6/2009 8:55:00 AM		118.88		52.24
2/6/2009 9:00:00 AM		119.44		51.68
2/6/2009 9:01:00 AM		120.73		50.39
2/6/2009 9:02:00 AM		122.42		48.70
2/6/2009 9:04:00 AM		123.94		47.18
2/6/2009 9:05:00 AM		126.99		44.13
2/6/2009 9:06:00 AM		128.52		42.60
2/6/2009 9:07:00 AM		129.96		41.16
2/6/2009 9:09:00 AM		132.93		38.19
2/6/2009 9:10:00 AM		134.38		36.74
2/6/2009 9:12:00 AM		137.10		34.02
2/6/2009 9:14:00 AM		139.91		31.21
2/6/2009 9:16:00 AM		142.70		28.42
2/6/2009 9:18:00 AM		145.45		25.67
2/6/2009 9:20:00 AM		148.14		22.98
2/6/2009 9:22:00 AM		151.22		19.90
2/6/2009 9:24:00 AM		153.45		17.67
2/6/2009 9:26:00 AM		156.10		15.02
2/6/2009 9:28:00 AM		158.80		12.32
2/6/2009 9:30:00 AM		161.37		9.75
2/6/2009 9:35:00 AM		167.70		3.42
2/6/2009 9:37:00 AM		170.35		0.77
2/6/2009 9:42:00 AM		176.00		-4.88
2/6/2009 9:45:00 AM		179.60		-8.48
2/6/2009 9:51:00 AM		187.07		-15.95
2/6/2009 9:56:00 AM		192.18		-21.06
2/6/2009 10:00:00 AM		197.08		-25.96
2/6/2009 10:01:00 AM		197.75		-26.63
2/6/2009 10:02:00 AM		198.16		-27.04
2/6/2009 10:03:00 AM		198.59		-27.47
2/6/2009 10:04:00 AM		199.13		-28.01
2/6/2009 10:05:00 AM		199.27 G		-28.15
2/6/2009 10:06:00 AM		199.27 G		-28.15
2/6/2009 10:07:00 AM		199.27 G		-28.15
2/6/2009 10:08:00 AM		199.27 G		-28.15
2/6/2009 10:09:00 AM		199.27 G		-28.15
2/6/2009 10:10:00 AM		199.27 G		-28.15
2/6/2009 10:11:00 AM		199.27		

WATER LEVEL SUMMARY
All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-03)				
2/6/2009 10:13:00 AM		199.21	171.12	-28.09
2/6/2009 10:14:00 AM		199.10		-27.98
2/6/2009 10:24:00 AM		198.93		-27.81
2/6/2009 10:26:00 AM		198.75		-27.63
2/6/2009 10:28:00 AM		198.60		-27.48
2/6/2009 10:30:00 AM		198.45		-27.33
2/6/2009 10:35:00 AM		197.88		-26.76
2/6/2009 10:40:00 AM		197.42		-26.30
2/6/2009 10:45:00 AM		196.92		-25.80
2/6/2009 10:55:00 AM		196.25		-25.13
2/6/2009 11:00:00 AM		195.91		-24.79
2/6/2009 11:30:00 AM		195.51		-24.39
2/6/2009 12:15:00 PM		192.35		-21.23
2/6/2009 1:00:00 PM		193.51		-22.39
2/6/2009 1:51:00 PM		190.25		-19.13
2/6/2009 2:00:00 PM		189.95		-18.83
2/6/2009 3:04:00 PM		188.77		-17.65
2/6/2009 3:25:00 PM		188.46		-17.34
2/6/2009 3:30:00 PM		188.40		-17.28
2/6/2009 3:31:00 PM		175.95		-4.83
2/6/2009 3:32:00 PM		169.44		1.68
2/6/2009 3:33:00 PM		163.01		8.11
2/6/2009 3:34:00 PM		156.64		14.48
2/6/2009 3:35:00 PM		150.30		20.82
2/6/2009 3:36:00 PM		143.91		27.21
2/6/2009 3:37:00 PM		137.59		33.53
2/6/2009 3:38:00 PM		131.36		39.76
2/6/2009 3:39:00 PM		125.20		45.92
2/6/2009 3:40:00 PM		119.15		51.97
2/6/2009 3:42:00 PM		107.27		63.85
2/6/2009 3:44:00 PM		95.74		75.38
2/6/2009 3:46:00 PM		84.65		86.47
2/6/2009 3:48:00 PM		73.91		97.21
2/6/2009 3:50:00 PM		63.71		107.41
2/6/2009 3:52:00 PM		54.43		116.69
2/6/2009 3:54:00 PM		46.25		124.87
2/6/2009 3:56:00 PM		39.38		131.74
2/6/2009 3:58:00 PM		33.53		137.59
2/6/2009 4:00:00 PM		28.80		142.32
2/6/2009 4:02:00 PM		24.98		146.14
2/6/2009 4:03:00 PM		23.42		147.70
2/6/2009 4:07:00 PM		18.45		152.67
2/6/2009 4:08:00 PM		17.95		153.17
2/6/2009 4:10:00 PM		17.00		154.12
2/6/2009 4:15:00 PM		15.66		155.46
2/6/2009 4:41:00 PM		14.94		156.18
2/6/2009 4:45:00 PM		14.91		156.21
2/10/2009 9:32:00 AM		11.12		160.00
3/17/2009 12:15:00 PM		9.26		161.86
3/18/2009 12:34:00 PM		9.70		161.42
3/19/2009 2:10:00 PM		10.02		161.10

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-03)				
3/23/2009 10:57:00 AM		9.05	171.12	162.07
3/23/2009 5:40:00 PM		9.53		161.59
3/24/2009 11:26:00 AM		12.15		158.97
3/24/2009 3:16:00 PM		12.37		158.75
3/25/2009 9:59:00 AM		13.11		158.01
3/25/2009 2:39:00 PM		13.16		157.96
3/26/2009 9:44:00 AM		13.38		157.74
3/27/2009 8:56:00 AM		11.75		159.37
3/27/2009 4:08:00 PM		11.81		159.31
3/30/2009 8:51:00 AM		13.13		157.99
3/30/2009 3:29:00 PM		13.21		157.91
3/31/2009 10:50:00 AM		13.62		157.50
4/1/2009 10:25:00 AM		13.81		157.31
4/2/2009 10:24:00 AM		13.78		157.34
4/3/2009 10:44:00 AM		13.85		157.27
4/6/2009 10:35:00 AM		13.72		157.40
4/8/2009 10:59:00 AM		9.51		161.61
4/19/2009 8:15:00 AM		9.06		162.06
PW-08-04			Current ground surface elevation: 172.52 (feet)	
1/14/2009 10:13:00 AM		9.16	174.44	165.28
1/29/2009 12:00:00 PM		9.77		164.67
1/29/2009 5:36:00 PM		9.74		164.70
1/30/2009 9:53:00 AM		10.52		163.92
2/2/2009 10:13:00 AM		10.03		164.41
2/2/2009 12:15:00 PM		10.12		164.32
2/2/2009 12:16:00 PM		20.19		154.25
2/2/2009 12:17:00 PM		24.62		149.82
2/2/2009 12:18:00 PM		27.59		146.85
2/2/2009 12:19:00 PM		29.90		144.54
2/2/2009 12:20:00 PM		31.87		142.57
2/2/2009 12:21:00 PM		33.53		140.91
2/2/2009 12:22:00 PM		34.97		139.47
2/2/2009 12:23:00 PM		36.25		138.19
2/2/2009 12:24:00 PM		37.38		137.06
2/2/2009 12:25:00 PM		38.49		135.95
2/2/2009 12:27:00 PM		40.39		134.05
2/2/2009 12:29:00 PM		42.12		132.32
2/2/2009 12:31:00 PM		43.68		130.76
2/2/2009 12:33:00 PM		45.09		129.35
2/2/2009 12:35:00 PM		46.73		127.71
2/2/2009 12:36:00 PM		47.96		126.48
2/2/2009 12:37:00 PM		48.96		125.48
2/2/2009 12:38:00 PM		50.48		123.96
2/2/2009 12:39:00 PM		49.74		124.70
2/2/2009 12:40:00 PM		51.16		123.28
2/2/2009 12:41:00 PM		51.84		122.60
2/2/2009 12:42:00 PM		52.51		121.93
2/2/2009 12:43:00 PM		53.09		121.35
2/2/2009 12:45:00 PM		54.20		120.24
2/2/2009 12:50:00 PM		57.04		117.40
2/2/2009 12:55:00 PM		59.51		114.93

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-04)				
2/2/2009 1:00:00 PM		61.77	174.44	112.67
2/2/2009 1:05:00 PM		63.72		110.72
2/2/2009 1:10:00 PM		65.56		108.88
2/2/2009 1:15:00 PM		67.04		107.40
2/2/2009 1:33:00 PM		71.25		103.19
2/2/2009 1:50:00 PM		74.44		100.00
2/2/2009 2:00:00 PM		75.74		98.70
2/2/2009 2:15:00 PM		77.28		97.16
2/2/2009 2:19:00 PM		77.62		96.82
2/2/2009 2:30:00 PM		78.52		95.92
2/2/2009 2:46:00 PM		79.34		95.10
2/2/2009 4:15:00 PM		81.30		93.14
2/2/2009 4:26:00 PM		81.39		93.05
2/2/2009 4:40:00 PM		81.42		93.02
2/2/2009 10:34:00 PM		82.30		92.14
2/3/2009 8:08:00 AM		82.38		92.06
2/3/2009 12:02:00 PM		82.39		92.05
2/3/2009 12:04:00 PM		82.39		92.05
2/3/2009 12:11:00 PM		82.39		92.05
2/3/2009 1:00:00 PM		82.40		92.04
2/3/2009 1:02:00 PM		83.59		90.85
2/3/2009 1:03:00 PM		83.98		90.46
2/3/2009 1:04:00 PM		84.42		90.02
2/3/2009 1:07:00 PM		85.08		89.36
2/3/2009 1:08:00 PM		85.28		89.16
2/3/2009 1:10:00 PM		85.51		88.93
2/3/2009 1:12:00 PM		85.73		88.71
2/3/2009 1:14:00 PM		85.95		88.49
2/3/2009 1:16:00 PM		86.04		88.40
2/3/2009 1:18:00 PM		86.14		88.30
2/3/2009 1:20:00 PM		86.28		88.16
2/3/2009 1:30:00 PM		86.81		87.63
2/3/2009 1:45:00 PM		87.31		87.13
2/3/2009 2:00:00 PM		87.60		86.84
2/3/2009 2:30:00 PM		87.95		86.49
2/3/2009 2:45:00 PM		88.08		86.36
2/3/2009 2:46:00 PM		72.45		101.99
2/3/2009 2:47:00 PM		65.77		108.67
2/3/2009 2:48:00 PM		61.76		112.68
2/3/2009 2:49:00 PM		58.78		115.66
2/3/2009 2:50:00 PM		56.65		117.79
2/3/2009 2:51:00 PM		54.77		119.67
2/3/2009 2:52:00 PM		53.14		121.30
2/3/2009 2:53:00 PM		51.72		122.72
2/3/2009 2:54:00 PM		50.43		124.01
2/3/2009 2:55:00 PM		49.26		125.18
2/3/2009 2:57:00 PM		47.16		127.28
2/3/2009 2:59:00 PM		45.28		129.16
2/3/2009 3:01:00 PM		43.64		130.80
2/3/2009 3:03:00 PM		42.13		132.31
2/3/2009 3:05:00 PM		40.74		133.70

WATER LEVEL SUMMARY

All Pumping Test Locations

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(PW-08-04)				
2/3/2009 3:07:00 PM		39.46	174.44	134.98
2/3/2009 3:09:00 PM		38.30		136.14
2/3/2009 3:11:00 PM		37.20		137.24
2/3/2009 3:13:00 PM		36.17		138.27
2/3/2009 3:15:00 PM		35.20		139.24
2/3/2009 3:18:00 PM		33.80		140.64
2/3/2009 3:20:00 PM		33.07		141.37
2/3/2009 3:25:00 PM		31.17		143.27
2/3/2009 3:30:00 PM		29.58		144.86
2/3/2009 4:05:00 PM		22.50		151.94
2/5/2009 9:31:00 AM		10.27		164.17
2/5/2009 3:19:00 PM		10.49		163.95
2/6/2009 2:54:00 PM		11.69		162.75
2/10/2009 9:38:00 AM		10.05		164.39
3/17/2009 12:05:00 PM		9.01		165.43
3/18/2009 12:15:00 PM		9.43		165.01
3/19/2009 2:07:00 PM		10.65		163.79
3/23/2009 11:02:00 AM		8.88		165.56
3/23/2009 5:42:00 PM		8.97		165.47
3/24/2009 11:23:00 AM		10.36		164.08
3/24/2009 3:18:00 PM		10.48		163.96
3/25/2009 9:55:00 AM		10.91		163.53
3/25/2009 2:43:00 PM		10.89		163.55
3/26/2009 9:41:00 AM		11.01		163.43
3/27/2009 8:59:00 AM		10.33		164.11
3/27/2009 4:14:00 PM		10.21		164.23
3/30/2009 8:55:00 AM		10.71		163.73
3/30/2009 3:32:00 PM		10.77		163.67
3/31/2009 10:47:00 AM		11.21		163.23
4/1/2009 10:19:00 AM		11.29		163.15
4/2/2009 10:20:00 AM		11.29		163.15
4/3/2009 10:40:00 AM		11.23		163.21
4/6/2009 10:29:00 AM		11.27		163.17
4/8/2009 10:53:00 AM		9.08		165.36
4/19/2009 8:22:00 AM		9.08		165.36
SHSW			Current ground surface elevation: (feet)	
3/17/2009 11:05:00 AM		35.16		
3/18/2009 10:13:00 AM		60.45		
3/19/2009 2:48:00 PM		61.55		
3/23/2009 10:47:00 AM		33.72		
3/23/2009 5:24:00 PM		37.33		
3/24/2009 10:13:00 AM		43.36		
3/24/2009 3:27:00 PM		43.98		
3/25/2009 9:06:00 AM		44.88		
3/25/2009 2:51:00 PM		45.32		
3/26/2009 8:29:00 AM		45.15		
3/27/2009 8:43:00 AM		38.24		
3/27/2009 3:53:00 PM		41.73		
3/30/2009 8:07:00 AM		44.86		
3/30/2009 3:04:00 PM		50.37		
3/31/2009 9:28:00 AM		65.29		

Location / Date	Height Above Measuring Point (feet)	Depth Below Measuring Point (feet)	Measuring Point Elevation (feet)	Water Level Elevation (feet)
(SHSW)				
3/31/2009 1:55:00 PM		66.12		
4/1/2009 9:13:00 AM		66.96		
4/2/2009 9:09:00 AM		67.14		
4/2/2009 2:20:00 PM		67.17		
4/3/2009 9:31:00 AM		66.88		
4/3/2009 1:13:00 PM		66.84		
4/6/2009 9:19:00 AM		66.32		
4/6/2009 3:13:00 PM		60.32		
4/8/2009 9:31:00 AM		34.95		
4/19/2009 10:09:00 AM		34.36		
SW-1			Current ground surface elevation: (feet)	
1/14/2009 12:00:00 PM		^		

Measurement Qualifier Notes:

^ - Artesian condition, if there is an associated value it was measured using one of several apparatus.

D - The sampling location was dry.

F - The sampling location was frozen.

F1 - Well was flowing

G - Greater than specified amount.

M - Results are missing or not reliable due to a meter malfunction.

Q - An obstruction prevented the collection of data.

HANTUSH AND JACOB
TRANSMISSIVITY CALCULATIONS

Hydrogeologic Anaysis Results - Walton Method (Leaky Confined Aquifer)
PW-08-01 7-Day Pump Test - March 23, 2009 to March 30, 2009
Juniper Ridge Landfill, Old Town, Maine

Well ID	Bedrock Transmissivity (cm^2/s)	Storativity	Drawdown Near End of Test (ft)	Distance from PW-08-01 (ft)	Saturated Till Thickness, b'(ft)	Hydraulic Resistance, c (min)	Till Hydraulic Conductivity, K'=b'/c (cm/s)
PW-08-02	4.61	7.58E-05	11.32	1,206	30	3.05E+07	5.00E-07
PW-08-03	4.83	1.75E-04	4.08	1,866	32	1.12E+07	1.43E-06
PW-08-04	3.34	1.42E-04	1.83	2,280	5	7.45E+06	3.74E-07
OSW	0.49	8.55E-05	9.66	1,160	41	8.81E+06	2.36E-06
SHSW	6.01	1.01E-04	11.14	1,020	42	4.29E+07	4.96E-07
P-04-06A	4.94	2.21E-04	7.30	1,058	42	7.15E+06	2.99E-06
P-04-07B	3.78	5.15E-05	7.10	1,936	5	2.40E+07	9.95E-08
MW-223A	1.57	8.06E-05	2.93	2,173	17	9.59E+06	9.06E-07

Minimum	**0.49**	**5.15E-05**	**9.95E-08**
Maximum	**6.01**	**2.21E-04**	**2.99E-06**
Range	**5.52**	**1.70E-04**	**2.89E-06**
Average	**3.70**	**1.17E-04**	**1.14E-06**
Geomean	**2.99**	**1.05E-04**	**7.34E-07**

Waterloo Hydrogeologic Inc.
180 Columbia St. Unit 1104
Waterloo, Ontario, Canada
Phone 519 746-1798

Pumping Test Analysis Report

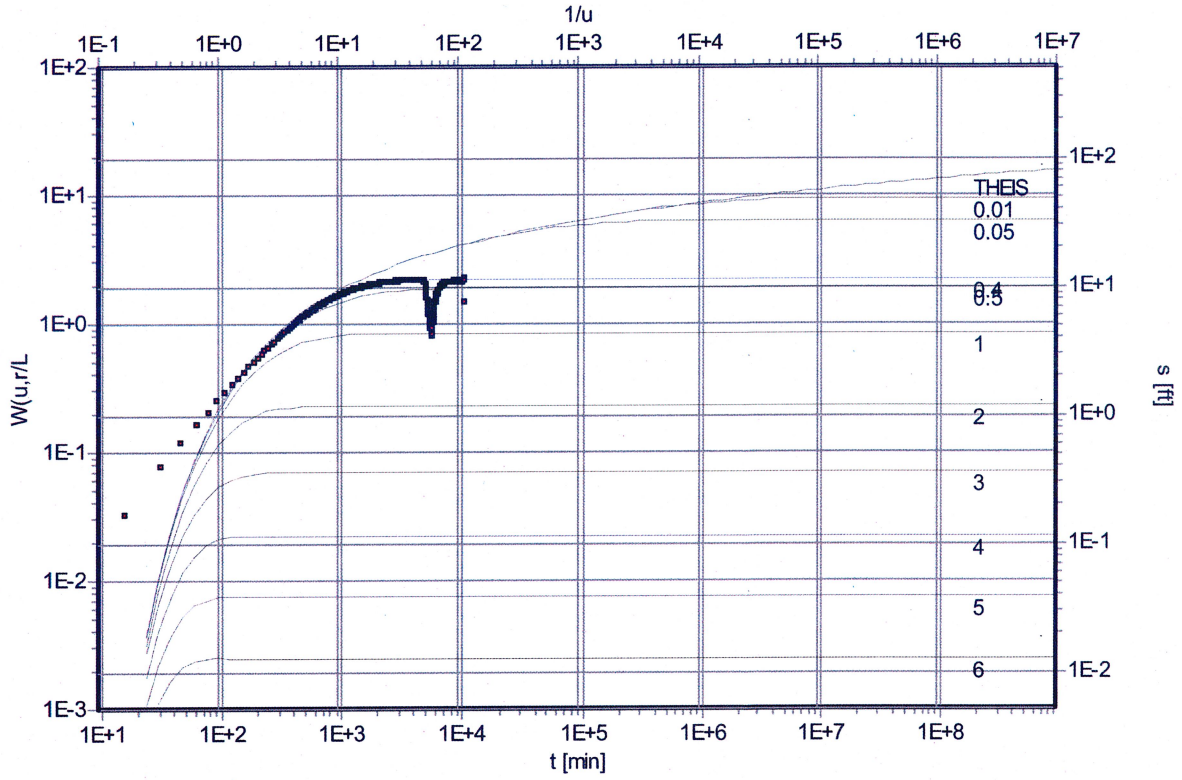
Project: Casella - Juniper Ridge Landfill

Number: 08097.03

Client: Casella

PW-08-01 7-Day Pump Test [Walton]

▪ PW-08-02



Pumping Test: **PW-08-01 7-Day Pump Test**

Analysis Method: **Walton**

Analysis Results:				
	Transmissivity:	4.61E+0 [cm²/s]	Conductivity:	5.95E-4 [cm/s]
	Storativity:	7.58E-5	c:	3.05E+7 [min]

Test parameters:				
	Pumping Well:	PW-08-01	Aquifer Thickness:	254.67 [ft]
	Casing radius:	0.25 [ft]	r/L:	0.4
	Screen length:	196 [ft]		
	Boring radius:	0.25 [ft]		
	Discharge Rate:	145.28433 [U.S. gal/min]		

Comments:

- GW Drawdown from PW-08-02 during 7-Day Pump Test of PW-08-01 (3/23/09-3/30/09)
- Estimated Saturated Thickness of Till at PW-08-02: b' = 30 feet
- Estimated Hydraulic Conductivity of Till at PW-08-02: K' = 5.00E-7 cm/s

Evaluated by: APG

Evaluation Date: 5/5/2009

Waterloo Hydrogeologic Inc.
180 Columbia St. Unit 1104
Waterloo, Ontario, Canada
Phone 519 746-1798

Pumping Test Analysis Report

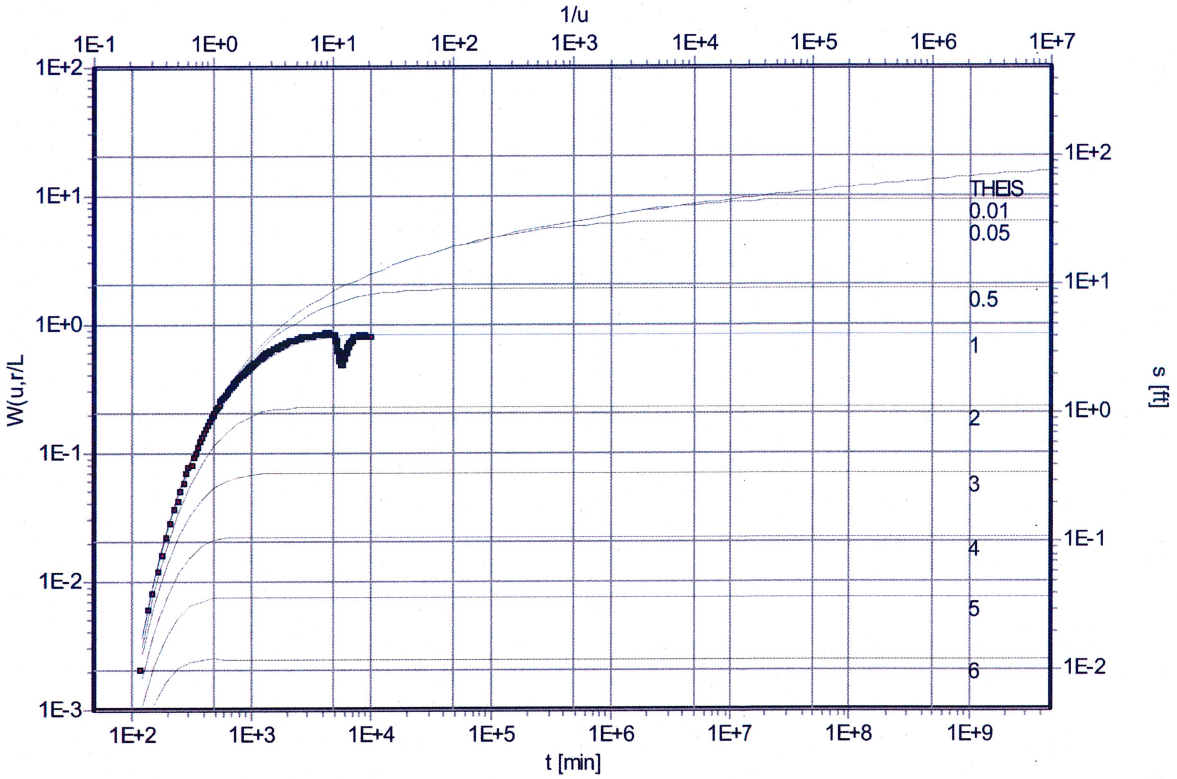
Project: Casella - Juniper Ridge Landfill

Number: 08097.03

Client: Casella

PW-08-01 7-Day Pump Test [Walton]

▪ PW-08-03



Pumping Test: **PW-08-01 7-Day Pump Test**

Analysis Method: **Walton**

Analysis Results:				
	Transmissivity:	4.83E+0 [cm²/s]	Conductivity:	6.22E-4 [cm/s]
	Storativity:	1.75E-4	c:	1.12E+7 [min]

Test parameters:				
	Pumping Well:	PW-08-01	Aquifer Thickness:	254.67 [ft]
	Casing radius:	0.25 [ft]	r/L:	1
	Screen length:	196 [ft]		
	Boring radius:	0.25 [ft]		
	Discharge Rate:	145.28433 [U.S. gal/min]		

Comments:

- GW Drawdown from PW-08-03 during 7-Day Pump Test of PW-08-01 (3/23/09-3/30/09)
- Estimated Saturated Thickness of Till at PW-08-03: b' = 32 feet
- Estimated Hydraulic Conductivity of Till at PW-08-03: K' = 1.43E-6 cm/s

Evaluated by: APG

Evaluation Date: 5/4/2009

Waterloo Hydrogeologic Inc.
180 Columbia St. Unit 1104
Waterloo, Ontario, Canada
Phone 519 746-1798

Pumping Test Analysis Report

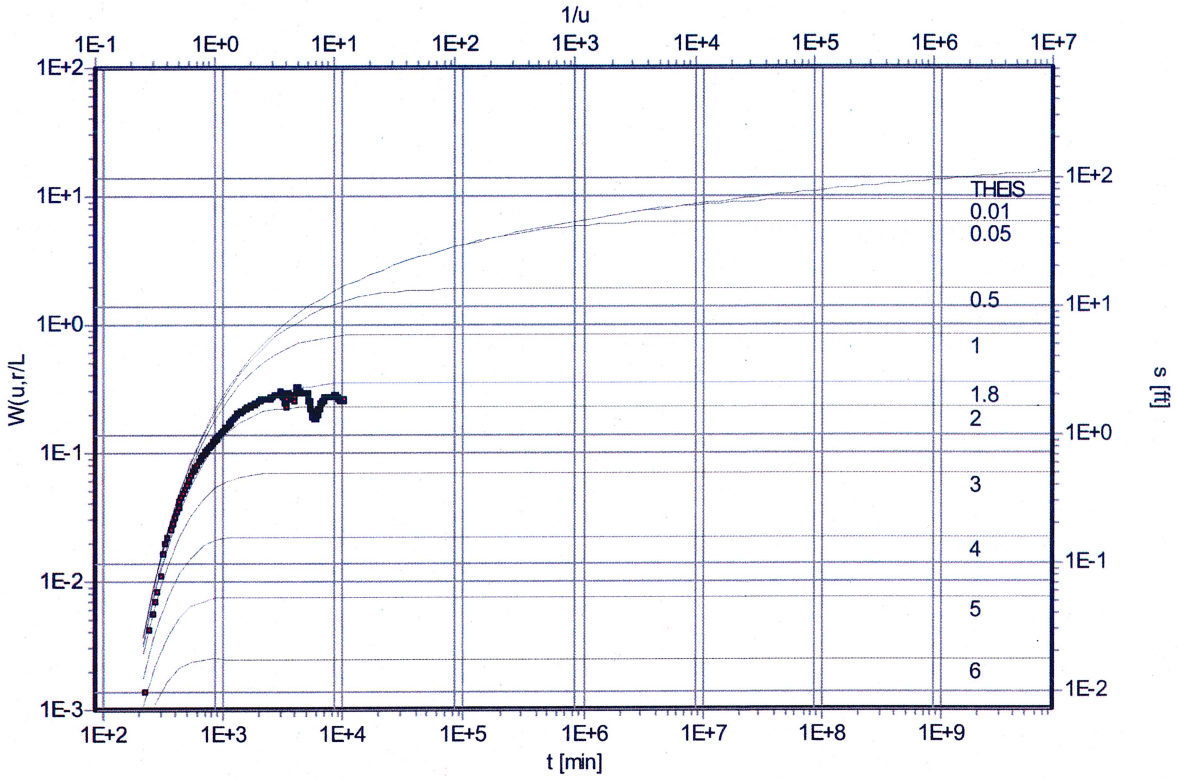
Project: Casella - Juniper Ridge Landfill

Number: 08097.03

Client: Casella

PW-08-01 7-Day Pump Test [Walton]

▪ PW-08-04



Pumping Test: **PW-08-01 7-Day Pump Test**

Analysis Method: **Walton**

Analysis Results:				
	Transmissivity:	3.34E+0 [cm²/s]	Conductivity:	4.31E-4 [cm/s]
	Storativity:	1.42E-4	c:	7.45E+6 [min]

Test parameters:				
	Pumping Well:	PW-08-01	Aquifer Thickness:	254.67 [ft]
	Casing radius:	0.25 [ft]	r/L:	1.8
	Screen length:	196 [ft]		
	Boring radius:	0.25 [ft]		
	Discharge Rate:	145.28433 [U.S. gal/min]		

Comments:

- GW Drawdown from PW-08-04 during 7-Day Pump Test of PW-08-01 (3/23/09-3/30/09)
- Estimated Saturated Thickness of Till at PW-08-04: b' = 5 feet
- Estimated Hydraulic Conductivity of Till at PW-08-04: K' = 3.74E-7 cm/s

Evaluated by: APG

Evaluation Date: 5/4/2009

Waterloo Hydrogeologic Inc.
180 Columbia St. Unit 1104
Waterloo, Ontario, Canada
Phone 519 746-1798

Pumping Test Analysis Report

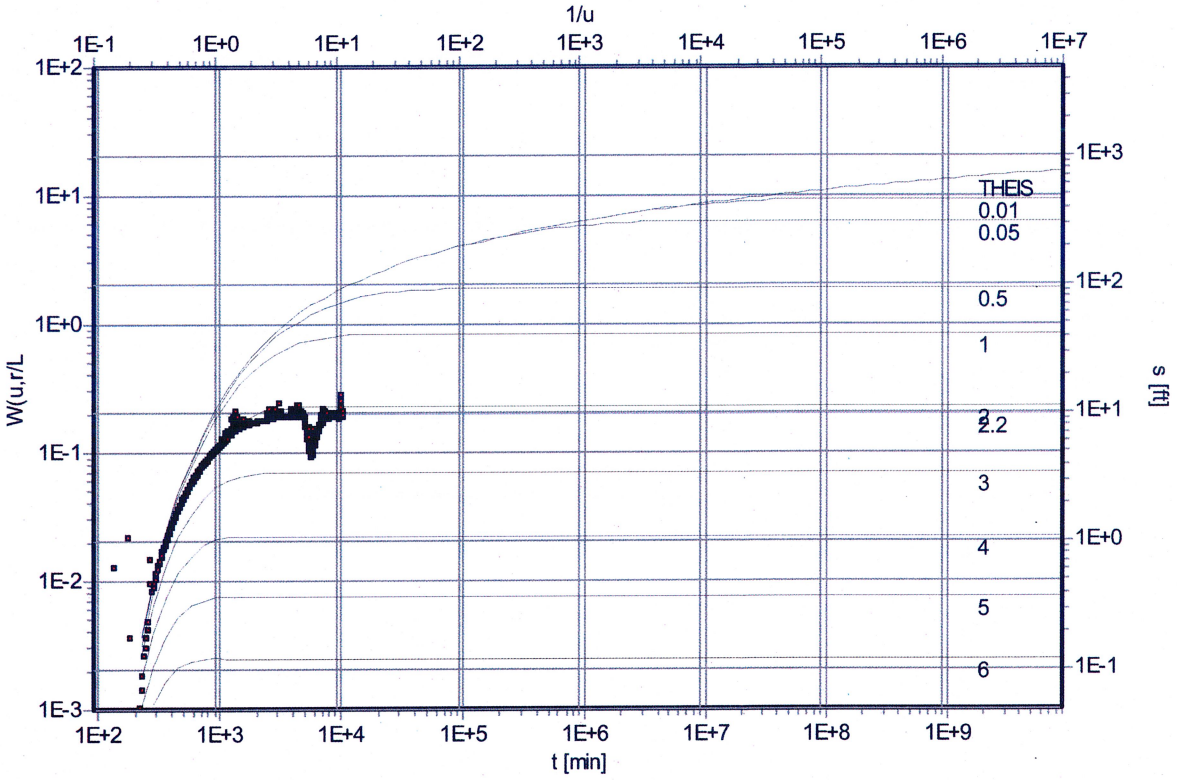
Project: Casella - Juniper Ridge Landfill

Number: 08097.03

Client: Casella

PW-08-01 7-Day Pump Test [Walton]

▪ OSW



Pumping Test: **PW-08-01 7-Day Pump Test**

Analysis Method: **Walton**

Analysis Results:				
	Transmissivity:	4.89E-1 [cm²/s]	Conductivity:	6.29E-5 [cm/s]
	Storativity:	8.55E-5	c:	8.81E+6 [min]

Test parameters:				
	Pumping Well:	PW-08-01	Aquifer Thickness:	254.67 [ft]
	Casing radius:	0.25 [ft]	r/L:	2.2
	Screen length:	196 [ft]		
	Boring radius:	0.25 [ft]		
	Discharge Rate:	145.28433 [U.S. gal/min]		

Comments:

- GW Drawdown from OSW during 7-Day Pump Test of PW-08-01 (3/23/09-3/30/09)
- Estimated Saturated Thickness of Till at OSW: b' = 41 feet
- Estimated Hydraulic Conductivity of Till at OSW: K' = 2.36E-6 cm/s

Evaluated by: APG

Evaluation Date: 5/5/2009

Waterloo Hydrogeologic Inc.
180 Columbia St. Unit 1104
Waterloo, Ontario, Canada
Phone 519 746-1798

Pumping Test Analysis Report

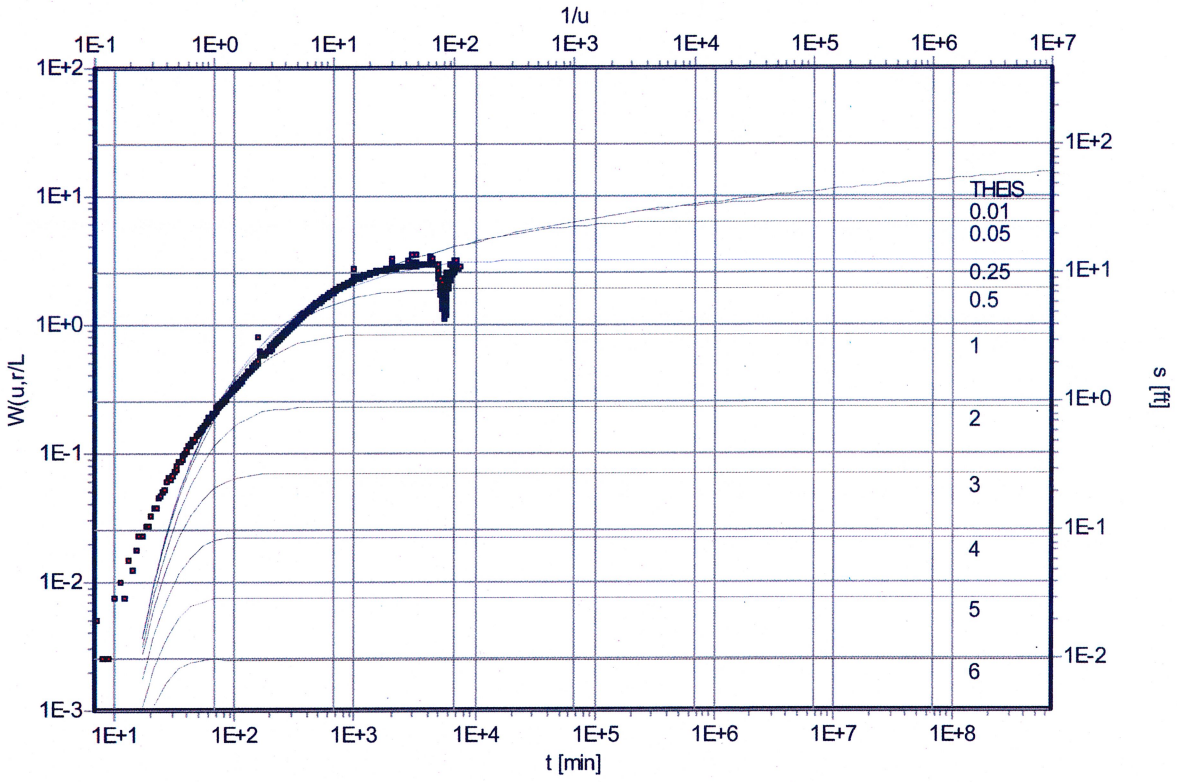
Project: Casella - Juniper Ridge Landfill

Number: 08097.03

Client: Casella

PW-08-01 7-Day Pump Test [Walton]

▪ SHSW



Pumping Test: **PW-08-01 7-Day Pump Test**

Analysis Method: **Walton**

Analysis Results:	Transmissivity:	6.01E+0 [cm²/s]	Conductivity:	7.74E-4 [cm/s]
	Storativity:	1.01E-4	c:	4.29E+7 [min]
Test parameters:	Pumping Well:	PW-08-01	Aquifer Thickness:	254.67 [ft]
	Casing radius:	0.25 [ft]	r/L:	0.25
	Screen length:	196 [ft]		
	Boring radius:	0.25 [ft]		
	Discharge Rate:	145.28433 [U.S. gal/min]		

Comments:

- GW Drawdown from SHSW during 7-Day Pump Test of PW-08-01 (3/23/09-3/30/09)
- Estimated Saturated Thickness of Till at SHSW: b' = 42 feet
- Estimated Hydraulic Conductivity of Till at SHSW: K' = 4.96E-7 cm/s

Evaluated by: APG

Evaluation Date: 5/5/2009

Waterloo Hydrogeologic Inc.
180 Columbia St. Unit 1104
Waterloo, Ontario, Canada
Phone 519 746-1798

Pumping Test Analysis Report

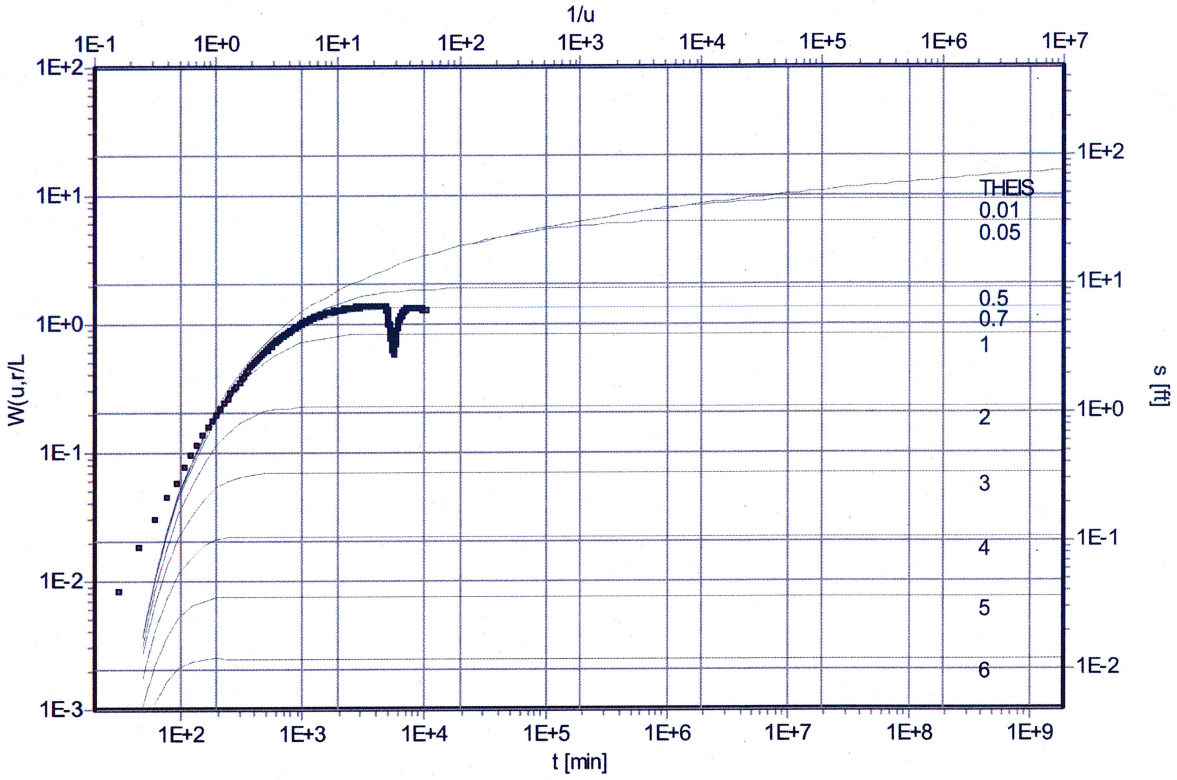
Project: Casella - Juniper Ridge Landfill

Number: 08097.03

Client: Casella

PW-08-01 7-Day Pump Test [Walton]

▪ P-04-06A



Pumping Test: **PW-08-01 7-Day Pump Test**

Analysis Method: **Walton**

Analysis Results:				
	Transmissivity:	4.94E+0 [cm²/s]	Conductivity:	6.37E-4 [cm/s]
	Storativity:	2.21E-4	c:	7.15E+6 [min]

Test parameters:				
	Pumping Well:	PW-08-01	Aquifer Thickness:	254.67 [ft]
	Casing radius:	0.25 [ft]	r/L:	0.7
	Screen length:	196 [ft]		
	Boring radius:	0.25 [ft]		
	Discharge Rate:	145.28433 [U.S. gal/min]		

Comments:

- GW Drawdown from P-04-06A during 7-Day Pump Test of PW-08-01 (3/23/09-3/30/09)
- Estimated Saturated Thickness of Till at P-04-06A: b' = 42 feet
- Estimated Hydraulic Conductivity of Till at P-04-06A: K' = 2.99E-6 cm/s

Evaluated by: APG

Evaluation Date: 5/4/2009

Waterloo Hydrogeologic Inc.
180 Columbia St. Unit 1104
Waterloo, Ontario, Canada
Phone 519 746-1798

Pumping Test Analysis Report

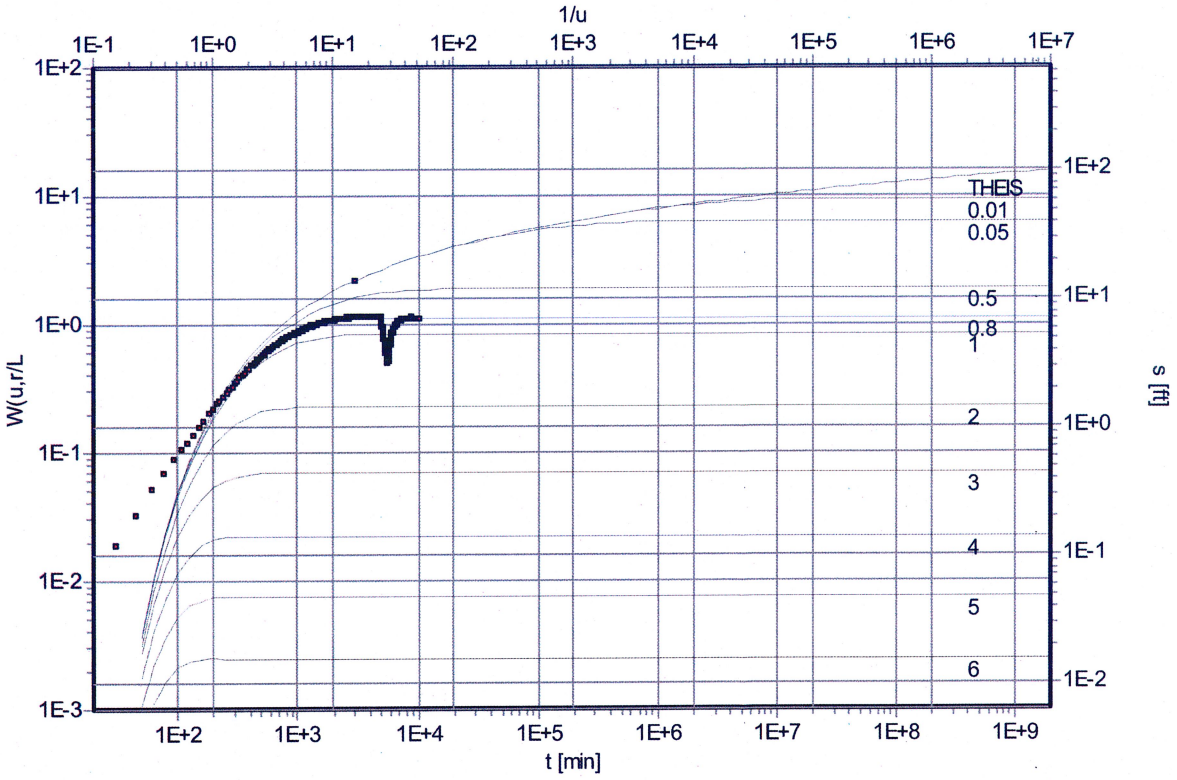
Project: Casella - Juniper Ridge Landfill

Number: 08097.03

Client: Casella

PW-08-01 7-Day Pump Test [Walton]

▪ P-04-07B



Pumping Test: **PW-08-01 7-Day Pump Test**

Analysis Method: **Walton**

Analysis Results:	Transmissivity:	3.78E+0 [cm²/s]	Conductivity:	4.87E-4 [cm/s]
	Storativity:	5.15E-5	c:	2.40E+7 [min]
Test parameters:	Pumping Well:	PW-08-01	Aquifer Thickness:	254.67 [ft]
	Casing radius:	0.25 [ft]	r/L:	0.8
	Screen length:	196 [ft]		
	Boring radius:	0.25 [ft]		
	Discharge Rate:	145.28433 [U.S. gal/min]		

Comments:

- GW Drawdown from P-04-07B during 7-Day Pump Test of PW-08-01 (3/23/09-3/30/09)
- Estimated Saturated Thickness of Till at P-04-07B: b' = 5 feet
- Estimated Hydraulic Conductivity of Till at P-04-07B: K' = 9.95E-8 cm/s

Evaluated by: APG

Evaluation Date: 5/4/2009

Waterloo Hydrogeologic Inc.
180 Columbia St. Unit 1104
Waterloo, Ontario, Canada
Phone 519 746-1798

Pumping Test Analysis Report

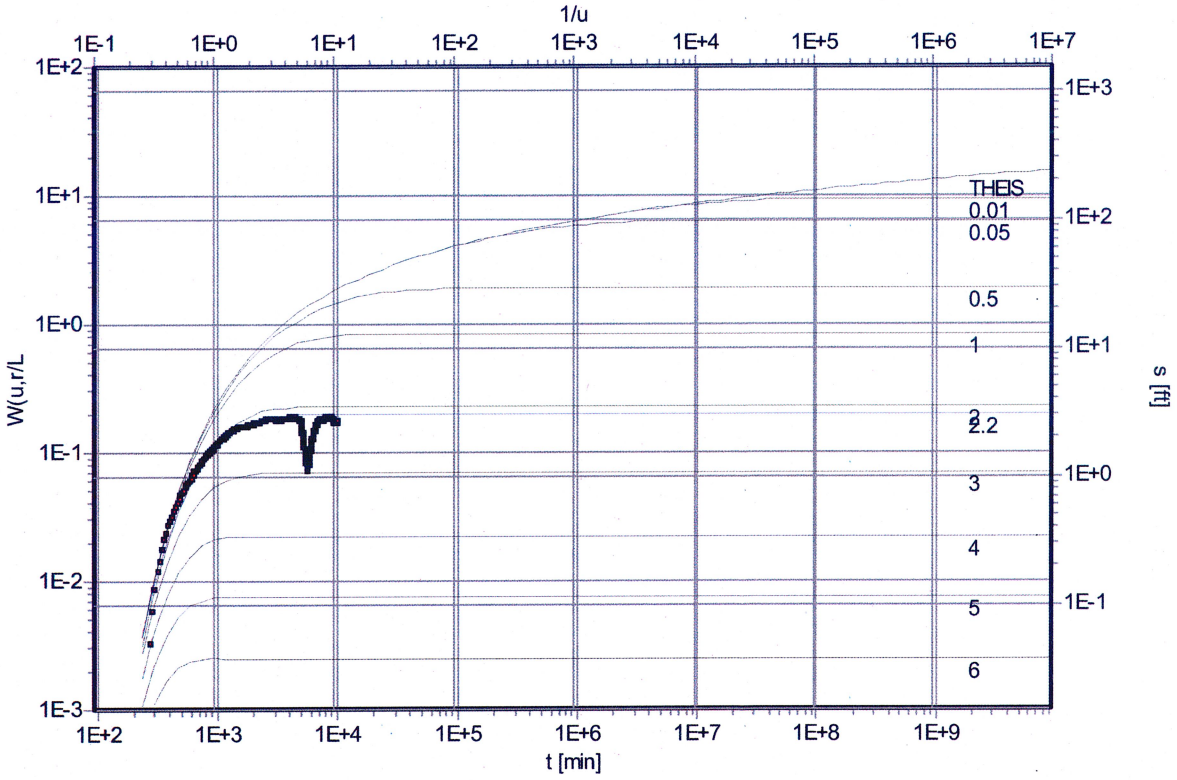
Project: Casella - Juniper Ridge Landfill

Number: 08097.03

Client: Casella

PW-08-01 7-Day Pump Test [Walton]

▪ MW-223A



Pumping Test: **PW-08-01 7-Day Pump Test**

Analysis Method: **Walton**

Analysis Results:				
	Transmissivity:	1.57E+0 [cm²/s]	Conductivity:	2.03E-4 [cm/s]
	Storativity:	8.06E-5	c:	9.59E+6 [min]

Test parameters:				
	Pumping Well:	PW-08-01	Aquifer Thickness:	254.67 [ft]
	Casing radius:	0.25 [ft]	r/L:	2.2
	Screen length:	196 [ft]		
	Boring radius:	0.25 [ft]		
	Discharge Rate:	145.28433 [U.S. gal/min]		

Comments:

- GW Drawdown from MW-223A during 7-Day Pump Test of PW-08-01 (3/23/09-3/30/09)
- Estimated Saturated Thickness of Till at MW-223A: b' = 17 feet
- Estimated Hydraulic Conductivity of Till at MW-223A: K' = 9.06E-7 cm/s

Evaluated by: APG

Evaluation Date: 5/5/2009

PAPADOPOULOS
ANISOTROPY CALCULATIONS

ANISOTROPIC TRANSMISSIVITY ESTIMATION

(after Papadopulis, 1965)

WEST OLD TOWN LANDFILL DATA FROM PUMP TEST ON PW-08-01

COMBINING WELLS P-04-12A, MW-223A, P-04-14A

$x_0 := 710$ ft $\quad y_0 := -1930$ ft $\quad Q := 29069$ ft^3/day

$x_1 := -1591 \quad y_1 := -1486$

$x_2 := 1960 \quad y_2 := -20$

$to_0 := \frac{550}{1440}$ day $\quad \Delta s := 1.83$ ft/ $\log_{10}$ cycle

$to_1 := \frac{330}{1440}$ day

$to_2 := \frac{910}{1440}$ day

$a := \frac{2.303 \cdot Q}{4\pi \cdot \Delta s}$ ft^2/day

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} (y_0)^2 & (x_0)^2 & -2 \cdot (x_0 \cdot y_0) \\ (y_1)^2 & (x_1)^2 & -2 \cdot (x_1 \cdot y_1) \\ (y_2)^2 & (x_2)^2 & -2 \cdot (x_2 \cdot y_2) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$$S := \frac{1}{a}\cdot\sqrt{A\cdot B - C^2} \qquad S = 3.611 \times 10^{-4}$$

$$Txx := \frac{A}{S} \qquad Txx = 2.032 \times 10^{3}$$

$$Tyy := \frac{B}{S} \qquad Tyy = 8.613 \times 10^{3}$$

$$Txy := \frac{C}{S} \qquad Txy = 3.004 \times 10^{3}$$

$$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\xi = 9.778 \times 10^{3} \text{ ft}^2/\text{day}$$

$$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\eta = 866.705 \text{ ft}^2/\text{day}$$

$$\theta prime := \operatorname{atan}\left(\frac{T\xi - Txx}{Txy}\right) \qquad \frac{\theta prime \cdot 180}{\pi} = 68.805 \text{ degrees}$$

COMBINING WELLS P-04-12A, PW-08-03, P-04-06A

$x_1 := 1270 \text{ ft}$ $y_1 := -1370$ ft

$x_0 := 710$ $y_0 := -1930$

$x_2 := -681$ $y_2 := -798$

$Q := 29069$ ft^3/day

$to_1 := \frac{290}{1440}$ day

$to_0 := \frac{550}{1440}$ day

$to_2 := \frac{170}{1440}$ day

$\Delta s := 3.93$ ft/ $\log_{10}$ cycle

$$a := \frac{2.303\cdot Q}{4\pi\cdot\Delta s} \text{ ft}^2/\text{day}$$

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} \left(y_0\right)^2 & \left(x_0\right)^2 & -2 \cdot \left(x_0 \cdot y_0\right) \\ \left(y_1\right)^2 & \left(x_1\right)^2 & -2 \cdot \left(x_1 \cdot y_1\right) \\ \left(y_2\right)^2 & \left(x_2\right)^2 & -2 \cdot \left(x_2 \cdot y_2\right) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$$S := \frac{1}{a} \cdot \sqrt{A \cdot B - C^2} \qquad S = 2.006 \times 10^{-4}$$

$$Txx := \frac{A}{S} \qquad Txx = 2.347 \times 10^3$$

$$Tyy := \frac{B}{S} \qquad Tyy = 882.69$$

$$Txy := \frac{C}{S} \qquad Txy = -483.87$$

$$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\xi = 2.492 \times 10^3 \ ft^2/day$$

$$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\eta = 737.248 \ ft^2/day$$

$$\theta prime := atan\left(\frac{T\xi - Txx}{Txy}\right) \qquad \frac{\theta prime \cdot 180}{\pi} = -16.73 \ degree$$

COMBINING WELLS P-04-14A, P-04-06A, PW-08-03

$x_0 := 1960 ft$ $\quad y_0 := -20 ft$ $\quad Q := 29069 \ ft^3/day$

$x_2 := -681$ $\quad y_2 := -798$

$x_1 := 1270$ $\quad y_1 := -1370$

$to_0 := \frac{910}{1440}$ day

$\Delta s := 3.81$ ft/ $\log_{10}$ cycle

$to_2 := \frac{170}{1440}$ day

$to_1 := \frac{290}{1440}$ day

$a := \frac{2.303 \cdot Q}{4\pi \cdot \Delta s}$ ft^2/day

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} \left(y_0\right)^2 & \left(x_0\right)^2 & -2 \cdot \left(x_0 \cdot y_0\right) \\ \left(y_1\right)^2 & \left(x_1\right)^2 & -2 \cdot \left(x_1 \cdot y_1\right) \\ \left(y_2\right)^2 & \left(x_2\right)^2 & -2 \cdot \left(x_2 \cdot y_2\right) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$S := \frac{1}{a} \cdot \sqrt{A \cdot B - C^2}$ $S = 1.434 \times 10^{-4}$

$Txx := \frac{A}{S}$ $Txx = 532.196$

$Tyy := \frac{B}{S}$ $Tyy = 5.057 \times 10^3$

$Txy := \frac{C}{S}$ $Txy = -857.998$

$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right]$ $T\xi = 5.214 \times 10^3$ ft^2/day

$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right]$ $T\eta = 374.965$ ft^2/day

$\theta prime := \operatorname{atan}\left(\frac{T\xi - Txx}{Txy}\right)$ $\qquad \frac{\theta prime \cdot 180}{\pi} = -79.616$ degrees

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COMBINING WELLS P-04-14A, MW-06-02, PW-08-02

$x_0 := 1960\text{ft}$ $\qquad y_0 := -20\text{ ft}$ $\qquad Q := 29069$ ft^3/day

$x_1 := 397$ $\qquad y_1 := -1322$

$x_2 := -581$ $\qquad y_2 := -1049$

$to_0 := \frac{910}{1440}$ day $\qquad \Delta s := 3.57$ ft/ $\log_{10}$ cycle

$to_1 := \frac{180}{1440}$ day

$to_2 := \frac{101}{1440}$ day

$a := \frac{2.303 \cdot Q}{4\pi \cdot \Delta s}$ ft^2/day

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} (y_0)^2 & (x_0)^2 & -2 \cdot (x_0 \cdot y_0) \\ (y_1)^2 & (x_1)^2 & -2 \cdot (x_1 \cdot y_1) \\ (y_2)^2 & (x_2)^2 & -2 \cdot (x_2 \cdot y_2) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$S := \frac{1}{a} \cdot \sqrt{A \cdot B - C^2}$ $\qquad S = 2.633 \times 10^{-4}$

$Txx := \frac{A}{S}$ $\quad Txx = 788.982$

$Tyy := \frac{B}{S}$ $\quad Tyy = 3.117 \times 10^3$

$Txy := \frac{C}{S}$ $\quad Txy = 481.711$

$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right]$ $\quad T\xi = 3.212 \times 10^3$ ft²/day

$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right]$ $\quad T\eta = 693.227$ ft²/day

$\theta prime := \operatorname{atan}\left(\frac{T\xi - Txx}{Txy}\right)$ $\quad \frac{\theta prime \cdot 180}{\pi} = 78.757$ degree

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COMBINING WELLS P-04-12A, P-04-14A, PW-08-02

$x_2 := -581$ ft $\quad y_2 := -1049$ft $\quad Q := 29069$ ft³/day

$x_1 := 1960 \quad y_1 := -20$

$x_0 := 710 \quad y_0 := -1930$

$to_2 := \frac{101}{1440}$ day $\quad \Delta s := 3.61$ ft/ $\log_{10}$ cycle

$to_1 := \frac{910}{1440}$ day

$to_0 := \frac{550}{1440}$ day

$a := \frac{2.303 \cdot Q}{4\pi \cdot \Delta s}$ ft²/day

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} \left(y_0\right)^2 & \left(x_0\right)^2 & -2 \cdot \left(x_0 \cdot y_0\right) \\ \left(y_1\right)^2 & \left(x_1\right)^2 & -2 \cdot \left(x_1 \cdot y_1\right) \\ \left(y_2\right)^2 & \left(x_2\right)^2 & -2 \cdot \left(x_2 \cdot y_2\right) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$$S := \frac{1}{a} \cdot \sqrt{A \cdot B - C^2} \qquad S = 2.867 \times 10^{-4}$$

$$Txx := \frac{A}{S} \qquad Txx = 916.336$$

$$Tyy := \frac{B}{S} \qquad Tyy = 2.795 \times 10^{3}$$

$$Txy := \frac{C}{S} \qquad Txy = 619.128$$

$$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\xi = 2.981 \times 10^{3}\ ft^2/day$$

$$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\eta = 730.645\ ft^2/day$$

$$\theta prime := \operatorname{atan}\left(\frac{T\xi - Txx}{Txy}\right) \qquad \frac{\theta prime \cdot 180}{\pi} = 73.305 \text{ degrees}$$

COMBINING WELLS P-04-07B, P-04-14A, MW-06-02

$x_0 := -1161\text{ft}$ $y_0 := -1560$ ft $Q := 29069$ ft^3/day

$x_1 := 1960$ $y_1 := -20$

$x_2 := 397$ $y_2 := -1322$

$to_0 := \frac{130}{1440}$ day $\Delta s := 2.81$ $ft/\log_{10}\text{ cycle}$

$to_1 := \frac{910}{1440}$ day

$to_2 := \frac{180}{1440}$ day

$a := \frac{2.303 \cdot Q}{4\pi \cdot \Delta s}$ ft^2/day

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} \left(y_0\right)^2 & \left(x_0\right)^2 & -2 \cdot \left(x_0 \cdot y_0\right) \\ \left(y_1\right)^2 & \left(x_1\right)^2 & -2 \cdot \left(x_1 \cdot y_1\right) \\ \left(y_2\right)^2 & \left(x_2\right)^2 & -2 \cdot \left(x_2 \cdot y_2\right) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$S := \frac{1}{a} \cdot \sqrt{A \cdot B - C^2}$ $S = 1.547 \times 10^{-4}$

$Txx := \frac{A}{S}$ $Txx = 1.31 \times 10^3$

$Tyy := \frac{B}{S}$ $\quad Tyy = 8.53 \times 10^{3}$

$Txy := \frac{C}{S}$ $\quad Txy = 2.754 \times 10^{3}$

$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right]$ $\quad T\xi = 9.46 \times 10^{3}\ ft^2/day$

$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right]$ $\quad T\eta = 379.937\ ft^2/day$

$\theta prime := atan\left(\frac{T\xi - Txx}{Txy}\right)$ $\quad \frac{\theta prime \cdot 180}{\pi} = 71.332$ degrees

COMBINING WELLS P-04-06A, P-04-13A, PW-08-02

$x_0 := -681$ ft $\quad y_0 := -798$ ft $\quad Q := 29069$ ft^3/day

$x_1 := 156$ $\quad y_1 := 860$

$x_2 := -581$ $\quad y_2 := -1049$

$to_0 := \frac{170}{1440}$ day $\quad \Delta s := 5.45$ ft/ $\log_{10}$ cycle

$to_1 := \frac{610}{1440}$ day

$to_2 := \frac{101}{1440}$ day

$a := \frac{2.303 \cdot Q}{4\pi \cdot \Delta s}$ ft^2/day

$$time := \begin{bmatrix} \left(2.247 \cdot a^2 \cdot to_0\right) \\ \left(2.247 \cdot a^2 \cdot to_1\right) \\ \left(2.247 \cdot a^2 \cdot to_2\right) \end{bmatrix} \qquad coord := \begin{bmatrix} \left(y_0\right)^2 & \left(x_0\right)^2 & -2 \cdot \left(x_0 \cdot y_0\right) \\ \left(y_1\right)^2 & \left(x_1\right)^2 & -2 \cdot \left(x_1 \cdot y_1\right) \\ \left(y_2\right)^2 & \left(x_2\right)^2 & -2 \cdot \left(x_2 \cdot y_2\right) \end{bmatrix}$$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} := coord^{-1} \cdot time$$

$$S := \frac{1}{a} \cdot \sqrt{A \cdot B - C^2} \qquad S = 7.958 \times 10^{-4}$$

$$Txx := \frac{A}{S} \qquad Txx = 2.929 \times 10^3$$

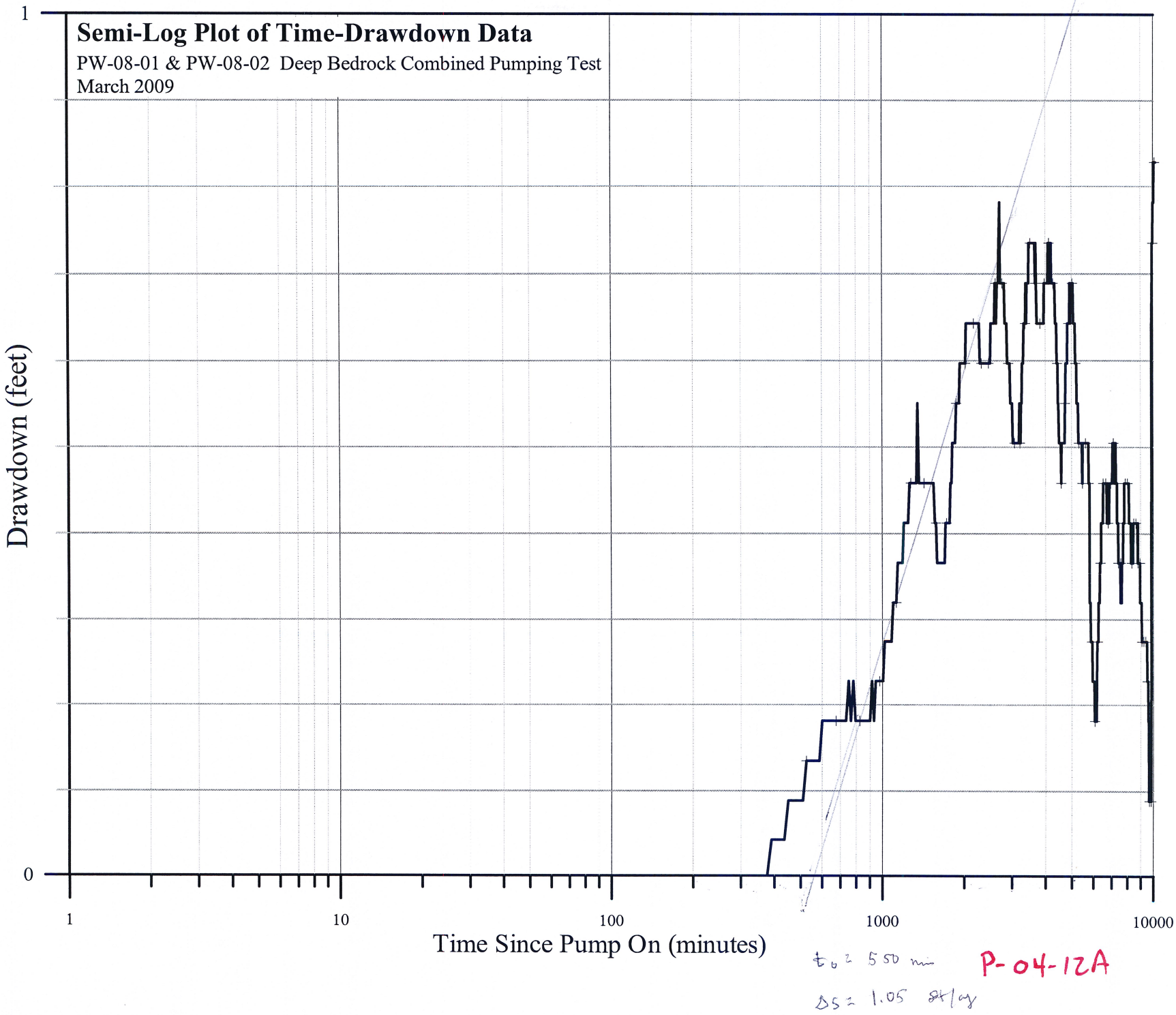
$$Tyy := \frac{B}{S} \qquad Tyy = 7.117 \times 10^3$$

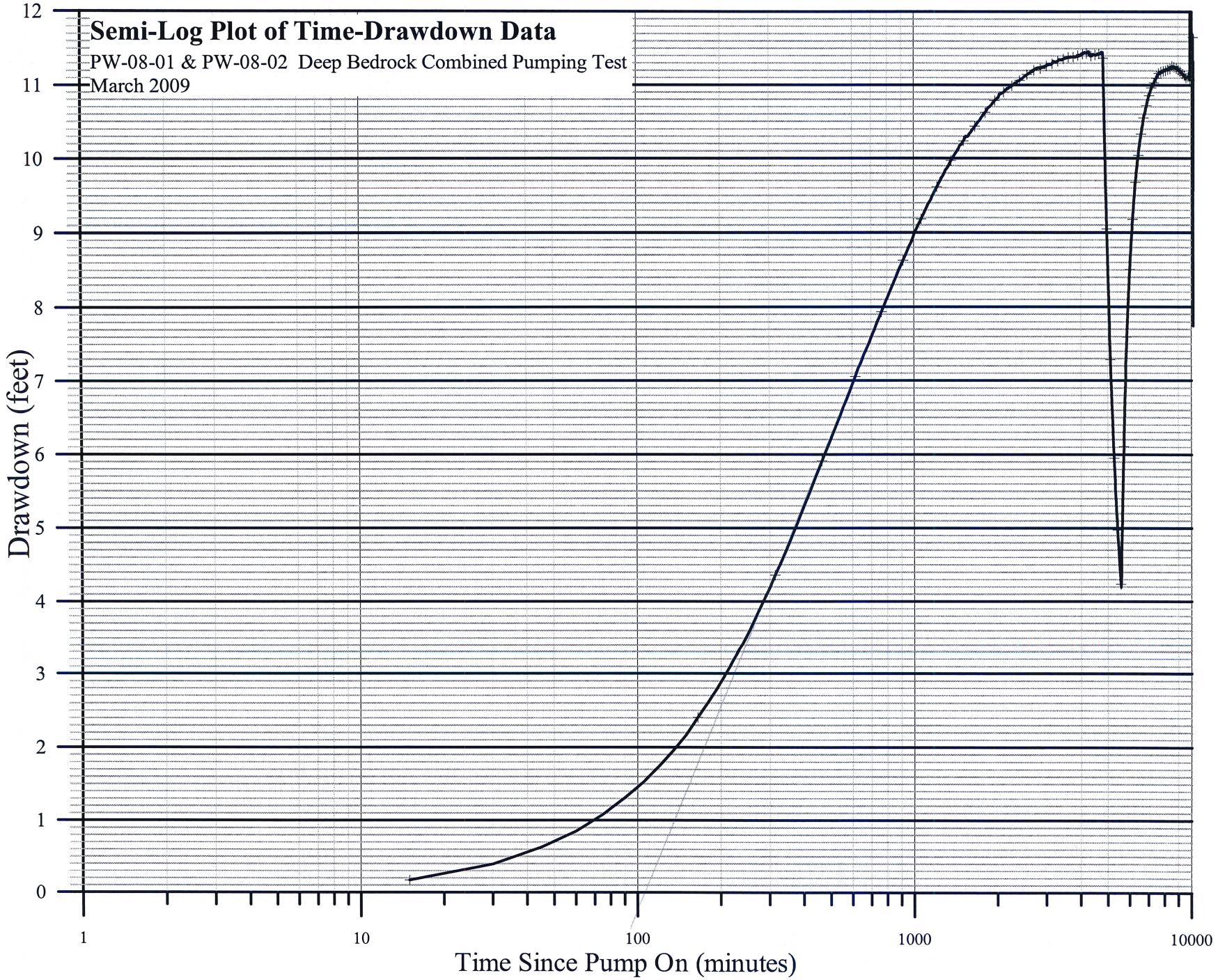
$$Txy := \frac{C}{S} \qquad Txy = 4.46 \times 10^3$$

$$T\xi := 0.5\left[(Txx + Tyy) + \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\xi = 9.95 \times 10^3 \text{ ft}^2\text{/day}$$

$$T\eta := 0.5\left[(Txx + Tyy) - \left[(Txx - Tyy)^2 + 4Txy^2\right]^{0.5}\right] \qquad T\eta = 96.03 \text{ ft}^2\text{/day}$$

$$\theta prime := atan\left(\frac{T\xi - Txx}{Txy}\right) \qquad \frac{\theta prime \cdot 180}{\pi} = 57.576 \text{ degrees}$$

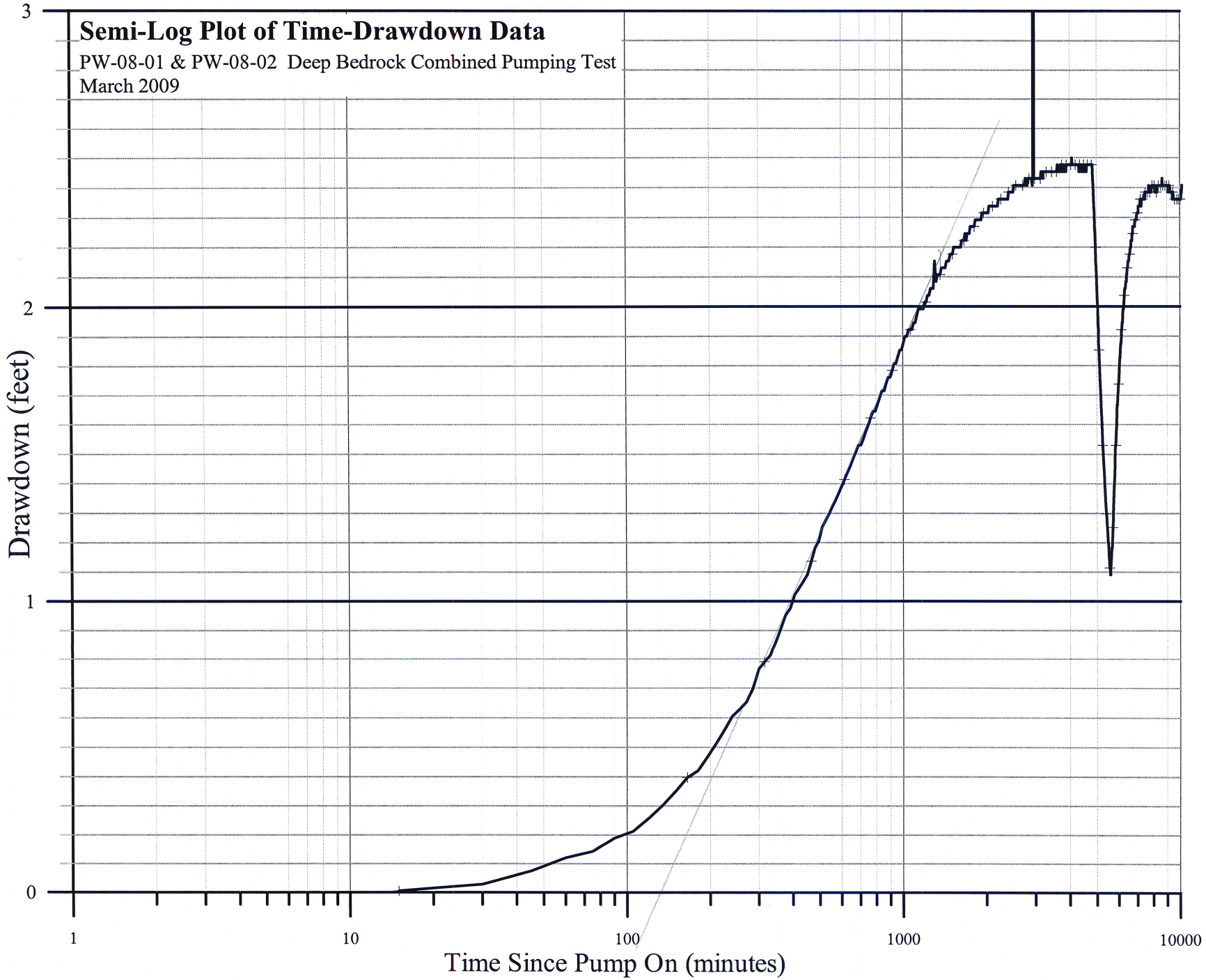

Semi-Log Plot of Time-Drawdown Data
PW-08-01 & PW-08-02 Deep Bedrock Combined Pumping Test
March 2009
Drawdown (feet)
1
0
1
10
100
1000
10000
Time Since Pump On (minutes)
t_0 = 550 min
P-04-12A
Δs = 1.05 ft/cy



$t_0 = 101$ mi

$DS = 9.1$ ft

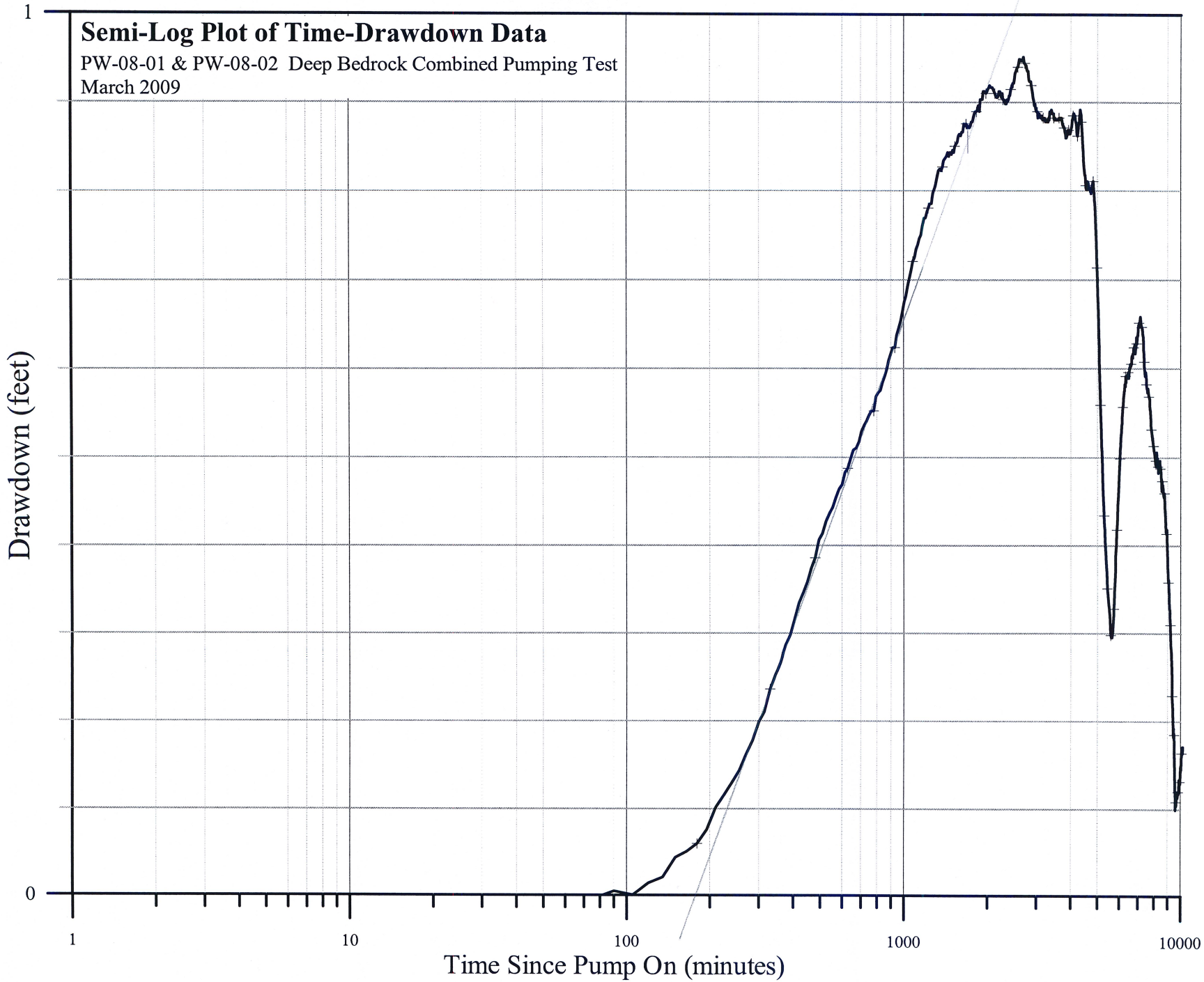
PW-08-02



$t_0 = 125$ min

$\Delta S = 2.18$ ft/cycle

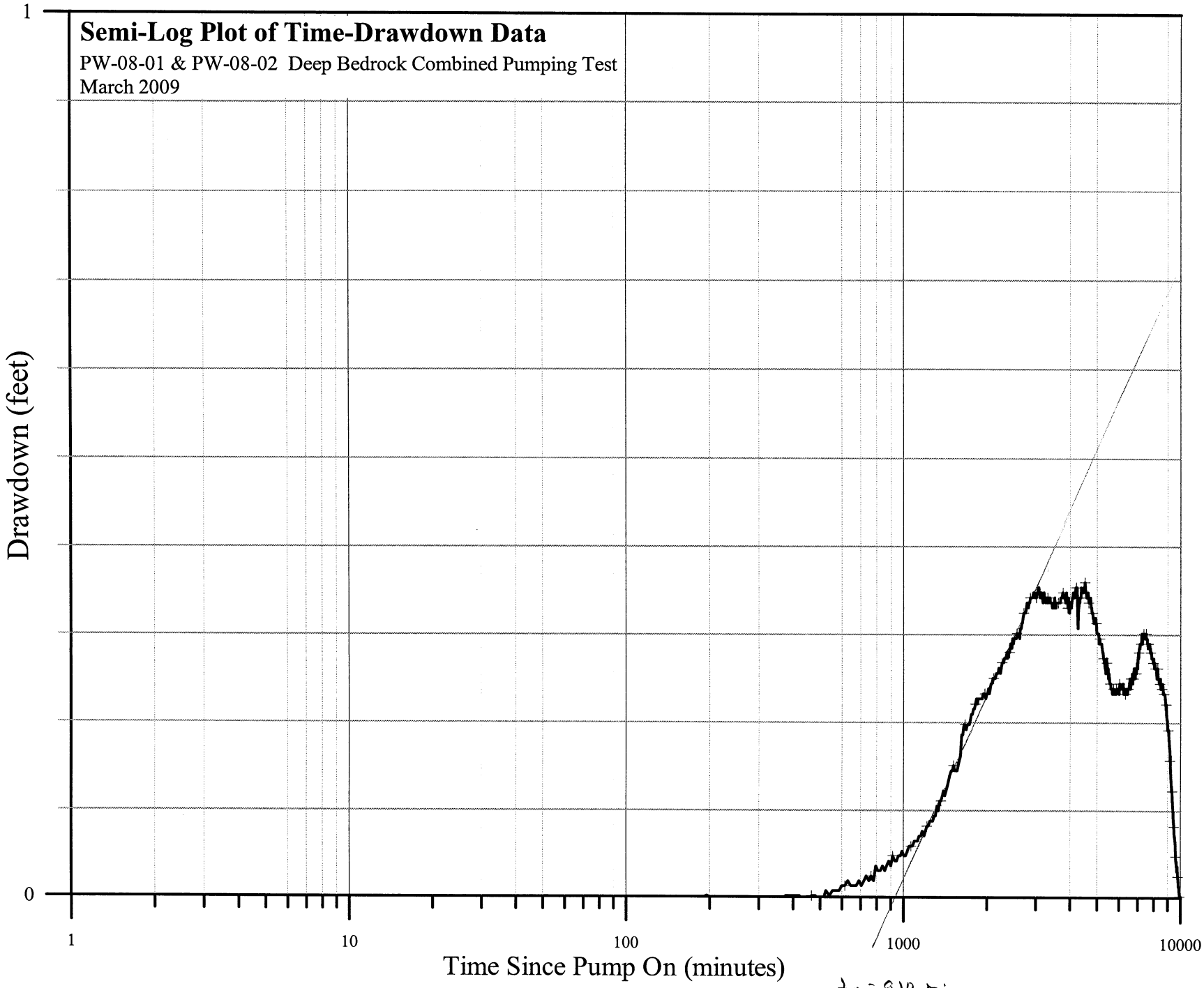
P-04-07A



$t_0 = 180$

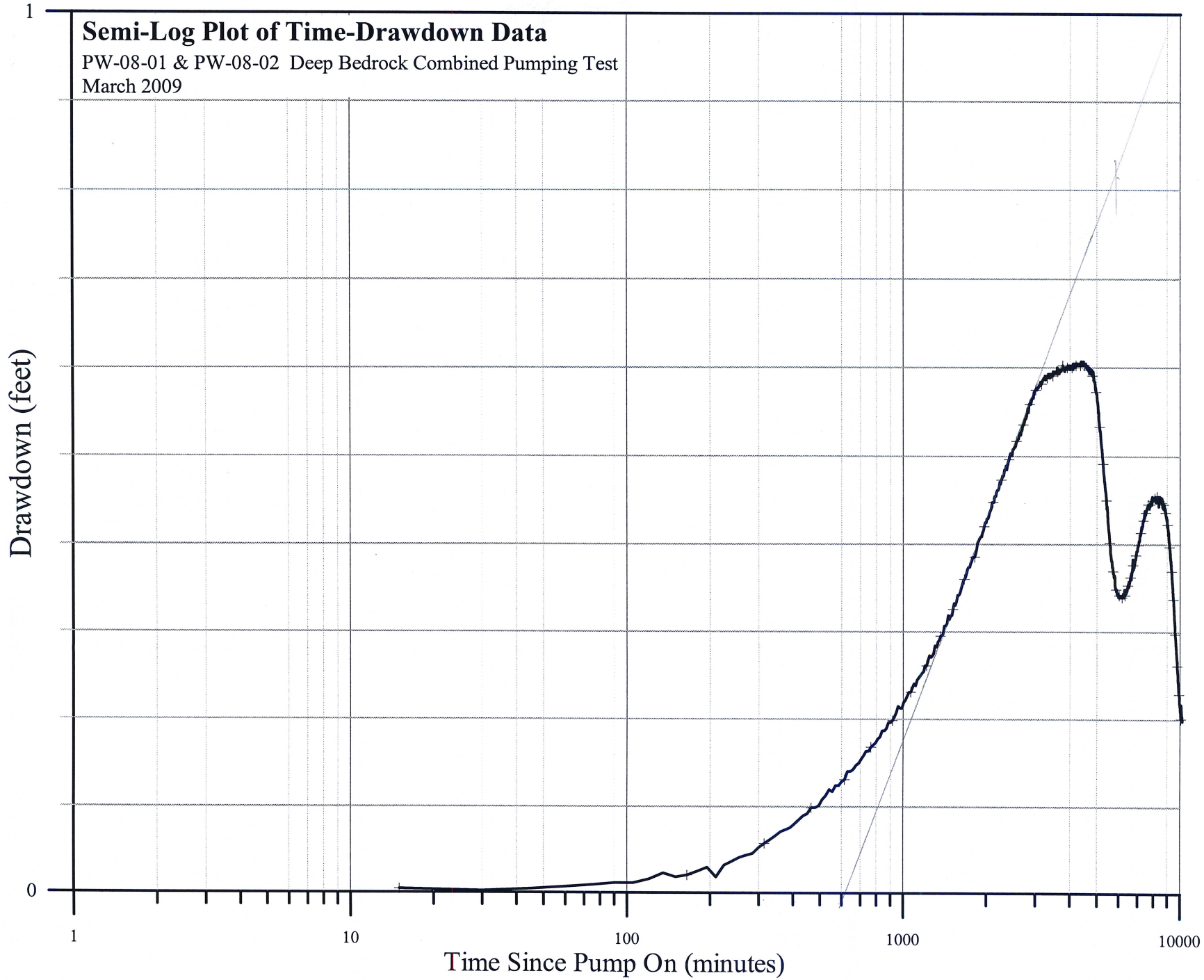
$\Delta S = 0.87$ ft/cyc

MW-06-02



$t_0 = 910$ min

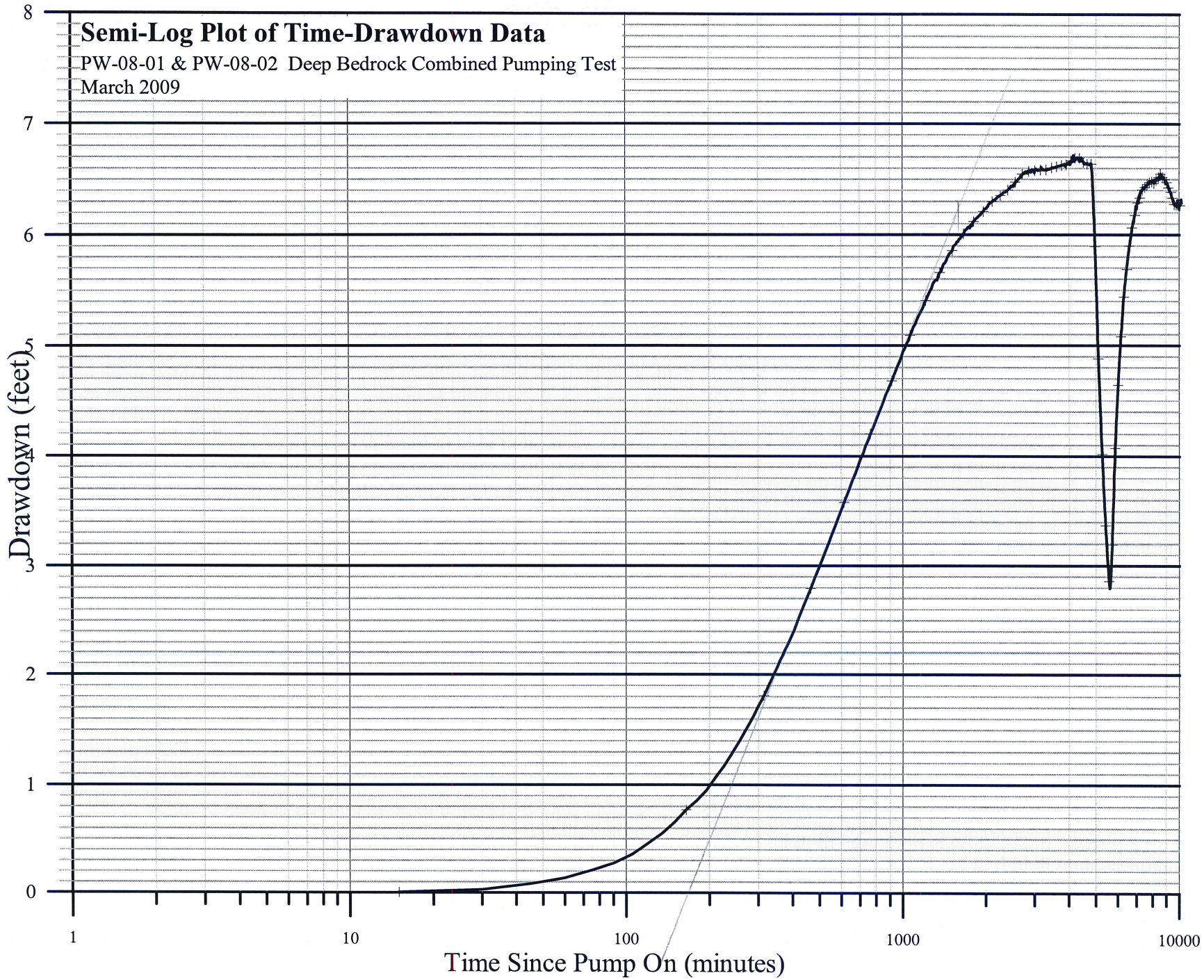
$\Delta S = 0.695$ ft/cy P-04-14A



$t_0 = 610$ min

$\Delta S = 0.82$ ft/cm

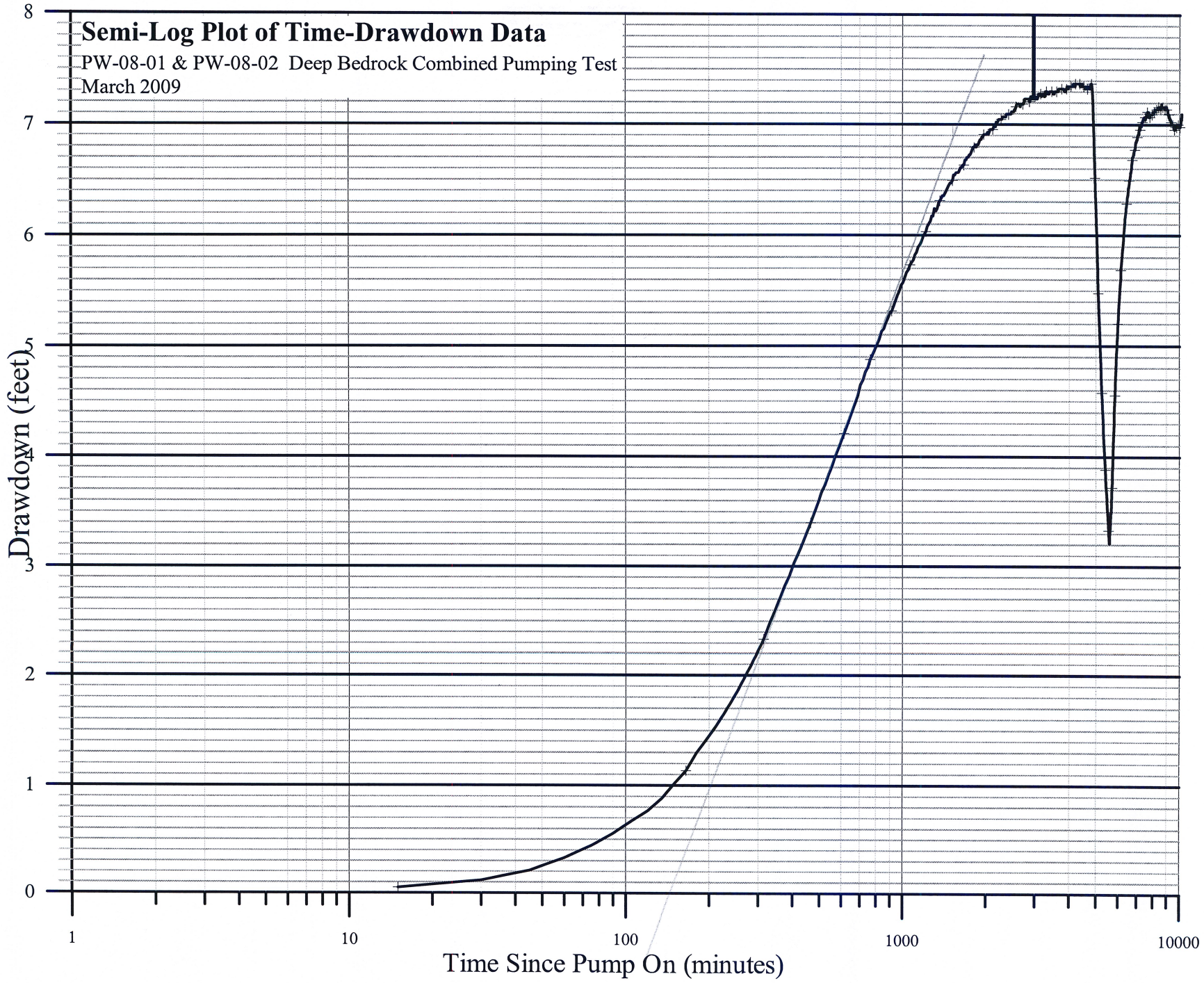
P-04-13A



$t_0 = 170$ min

$\Delta S = 6.45$ ft/cy

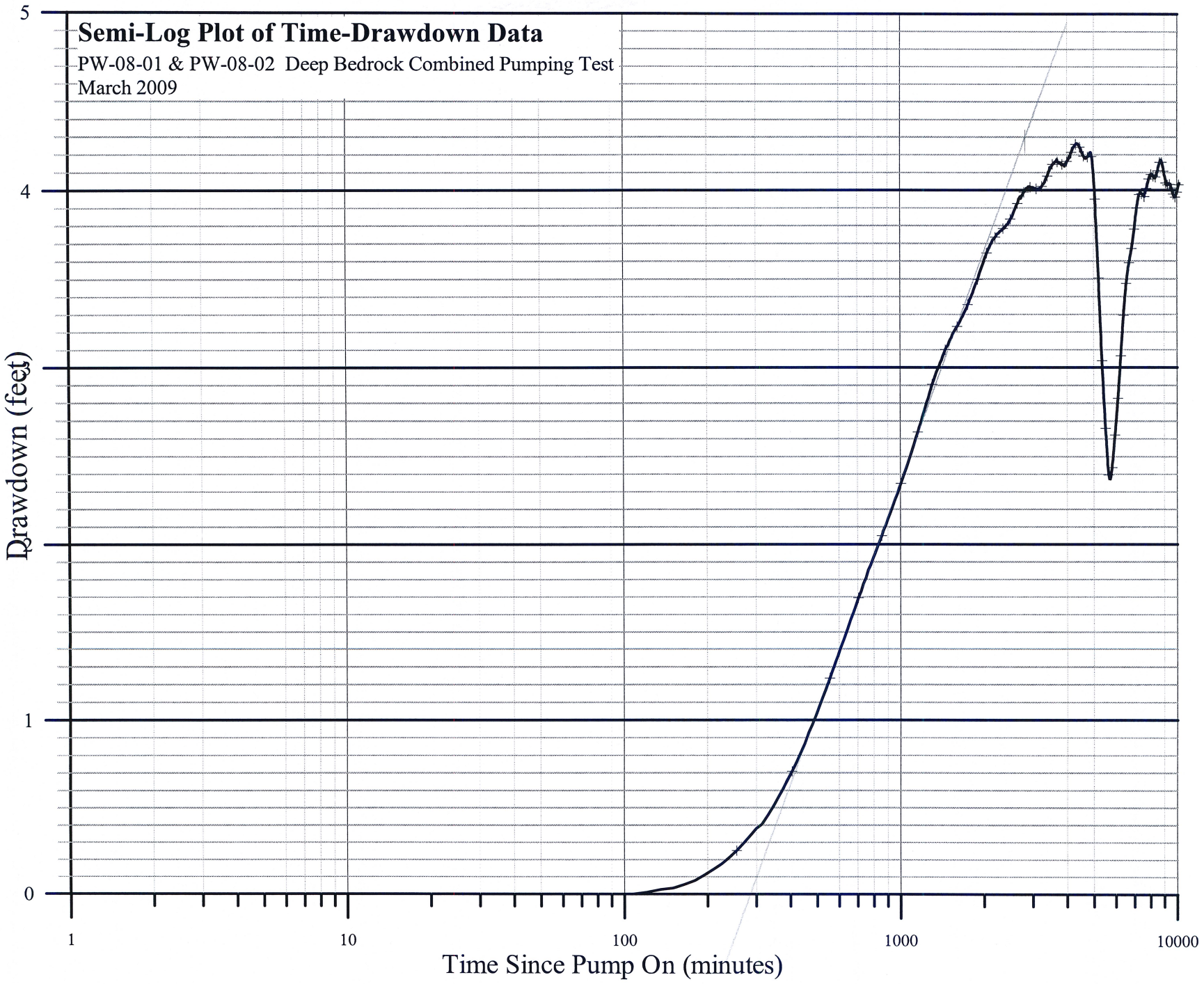
P-04-06A



t_0 = 130 min

ΔS = 6.9 ft/log cycle

P-04-07B



$t_0 = 290$ min

$\Delta s = 4.3$ ft/cycle

PW-08-03

APPENDIX N

WETLAND DELINEATION

Juniper Ridge Landfill Expansion Project: Wetland and Waterbody Delineation and Vernal Pool Survey Report

Juniper Ridge Landfill
Old Town, Maine

Prepared for:
Bureau of General Services
77 State House Station
Augusta, ME 04333

And

NEWSME Landfill Operations LLC
358 Emerson Mill Road
Hampden, ME 04444

Prepared by:
Stantec Consulting Services Inc.
30 Park Drive
Topsham, ME 04086

June 26, 2015

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1.0 INTRODUCTION

Stantec Consulting Service Inc. (Stantec) is working with Sevee & Maher Engineers (SME) on behalf of NEWSME Landfill Operations LLC (NEWSME), as operator, and The State of Maine Bureau of General Services, as owner, to provide environmental permitting support for the proposed expansion of the Juniper Ridge Landfill (the project) located in Old Town, Maine (Figure 1). The project will encompass about 74 acres including new landfill cells and site infrastructure (e.g., roadways, stormwater ponds, scale house, and administrative buildings). To support state and federal permitting requirements pursuant to the Maine Natural Resources Protection Act (NRPA) and the U.S. Clean Water Act (CWA), Stantec completed a wetland and waterbody delineation and vernal pool survey of the approximately 74-acre expansion area (project area).

The project area contains wetlands and vernal pools that were identified during previous wetland delineations and vernal pool surveys conducted in 2004 and 2008 as part of a larger survey area. The following summarizes the methods and results of the 2014 and 2015 field investigations completed to update the previous surveys conducted within the proposed expansion area.

2.0 SURVEY METHODS

2.1 WETLAND DELINEATION METHODS

Surveys for regulated wetland and waterbody resources within the project area were conducted on September 25 and October 9, 2014, and on May 5, 6, and 14, 2015. Surveys were performed by walking transects across the proposed expansion area. The proposed electrical line and exterior fence line, as well as areas immediately adjacent to the proposed scale house and administrative building site in the northeast corner of the expansion area, were also surveyed. Wetland boundaries under federal and state jurisdiction were determined and verified using the technical criteria described in the U.S. Army Corps of Engineers (Corps) *1987 Wetlands Delineation Manual*[1] and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Regional Supplement*[2]. Wetland boundaries were marked with pink, alphanumeric-coded flags. Wetland boundary flags were located using Trimble® Global Positioning System (GPS) receivers.

[1] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS.
[2] U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

2.2 VERNAL POOL SURVEY METHODS

Stantec conducted updated vernal pool surveys on May 5, 6, and 14, 2015, within the proposed expansion area. Vernal pool surveys were conducted in accordance with the protocols outlined in the *Maine Association of Wetland Scientists (MAWS) Vernal Pool Survey Protocol*[3]. The results of these surveys were derived using standard field techniques and represent observations made during the 2015 amphibian breeding season. The presence, absence, and number of egg masses presented in this report reflect the results of these surveys. Vernal pools are dynamic habitats that vary in water level, vegetative cover, and other physical characteristics during the course of a year, as well as from year to year. In addition, the breeding activity of amphibians, particularly the initiation of breeding, depends upon seasonal environmental parameters such as temperature and precipitation. Due to this variability, the presence and number of egg masses may differ between breeding seasons and during the course of a given breeding season. Based on observed field conditions, Stantec determined that the field surveys in 2015 were conducted at an appropriate time of year.

The surveys involved searching for amphibian breeding activity, primarily the presence of egg masses, and use by other vernal pool-dependent species. Information was collected on the physical characteristics of the pool such as the likely hydro-period (i.e., how long surface water will remain in the pool) and the presence and/or type of inlet and outlet. Information on the biological and physical characteristics of the pool then was used to determine if the vernal pool met the criteria of a Significant Vernal Pool (SVP) as defined in Chapter 335 of the NRPA. According to this rule, a vernal pool is a natural, temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools have no permanently flowing inlet or outlet and no viable populations of predatory fish. In addition, an SVP contains one or any combination of the following:

- 40 or more wood frog (*Lithobates sylvatica*) egg masses;
- 20 or more spotted salamander (*Ambystoma maculatum*) egg masses;
- 10 or more blue spotted salamander (*Ambystoma laterale*) egg masses;
- Presence of fairy shrimp (*Eubranchipus* spp.); and/or
- Documented use by a state-listed rare, threatened or endangered species that commonly require a vernal pool to complete a critical portion of their life-history such as Blanding's turtle (*Emydoidea blandingii*), spotted turtle (*Clemmys guttata*), ringed boghaunter dragonfly (*Williamsonia lintneri*), wood turtles (*Clemmys insculpta*), ribbon snakes (*Thamnophis sauritus*), swamp darner dragonflies (*Epiaeschna heros*), and comet darner dragonflies (*Anax longipes*).

The characteristics of the pools were also compared to the regulatory definition of a vernal pool used by the Corps. In Maine, vernal pools are regulated by the Corps according to the Maine General Permit (GP), which provides the following definition for vernal pools:

[3] Maine Association of Wetland Scientists Vernal Pool Technical Committee. 2014. Vernal Pool Survey Protocol. April 2014.

> "A vernal pool, also referred to as a seasonal forest pool, is a temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet or outlet and no viable populations of predatory fish.
>
> A vernal pool may provide the primary breeding habitat for wood frogs (*Lithobates sylvatica*), spotted salamanders (*Ambystoma maculatum*), blue-spotted salamanders (*Ambystoma laterale*), and fairy shrimp (*Eubranchipus* sp.), as well as valuable habitat for other plants and wildlife, including several rare, threatened, and endangered species. A vernal pool intentionally created for the purposes of compensatory mitigation is included in this definition. For the purposes of this GP, the presence of any of the following species in any life stage in any abundance level/quantity would designate the waterbody as a vernal pool: fairy shrimp, blue spotted salamanders, spotted salamanders or wood frogs."

3.0 SURVEY RESULTS

3.1 GENERAL SITE DESCRIPTION

The project area includes approximately 74 acres and encompasses the proposed expansion area, a proposed area for scale and administration buildings, two access roads on the east and west sides of the expansion area, and an electrical line and perimeter fence. The proposed project area consists of second-growth hardwood and mixed forested uplands and forested wetlands. Also included in the project area are paved and gravel roads, a scale house, and administrative buildings associated with the existing landfill. Topography within the project area is generally flat to gently sloping.

Wooded uplands in the project area are relatively uniform in composition. These areas exhibit evidence of recent and historic timber harvesting. This disturbance is evident from skidder trails and areas of regenerating vegetation. Dominant canopy species include eastern hemlock (*Tsuga canadensis*), eastern white pine (*Pinus strobus*), quaking aspen (*Populus tremuloides*), red spruce *(Picea rubens*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), balsam fir (*Abies balsamea*), paper birch (*Betula papyrifera*), yellow birch (*Betula alleghaniensis*), American beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), and northern red oak (*Quercus rubra*). Shrubs include the aforementioned tree species and beaked hazelnut (*Corylus cornuta*), American witch-hazel (*Hamamelis virginiana*), and Alleghany blackberry (*Rubus allegheniensis*). Wild sarsaparilla (*Aralia nudicaulis*), maystar (*Trientalis borealis*), Canadian bunchberry (*Cornus canadensis*), false lily-of-the-valley (*Maianthemum canadense*), northern bracken fern (*Pteridium aquilinum*), and whorled nodding-aster (*Oclemena acuminata*) are present in the herbaceous layer.

3.2 WETLAND DELINEATION RESULTS

A total of 8 wetlands were identified within the proposed expansion area. Each wetland is described below and shown on Figure 1. Corps Wetland Determination Data Forms are provided in Appendix C.

3.2.1 Wetland 01TTA

Wetland 01TTA is located between the existing scale and the western edge of the proposed expansion area. It is a palustrine forested wetland[4] mixed with palustrine emergent wetland areas (Photo 1). Wetland 01TTA was likely created by past timber harvest disturbance and recent construction of adjacent stormwater infrastructure and was not identified as a wetland during previous wetland delineations in the expansion area. Hydrology in the wetland is influenced by the stormwater pond outlet located near the southwestern edge of the wetland (Photo 2). Dominant tree species include red maple, balsam fir, and white ash. Shrubs include balsam fir, gray birch, and red maple. Bluejoint (*Calamagrostis canadensis*), sensitive fern (*Onoclea sensibilis*), fowl manna grass (*Glyceria striata*), and woodland horsetail (*Equisetum sylvaticum*) dominate the herbaceous layer. Hydric soils are predominately a depleted silt loam with 5 to 10 percent redoximorphic concentrations. Hydrology indicators present in the wetland included saturation, water-stained leaves, surface water, and drainage patterns. Wetland 01TTA contained 1 man-made vernal pool that was identified during the 2015 vernal pool survey.

3.2.2 Wetland 01TTB

Wetland 01TTB is a small, forested wetland located just north of the existing administration building (Photo 3). Balsam fir is the dominant tree species. Shrubs include gray birch, balsam fir, white meadowsweet (*Spiraea alba*), and common winterberry *(Ilex verticilliata*). Royal fern (*Osmunda spectabilis*), interrupted fern (*Osmunda claytoniana*), northern water-horehound *(Lycopus uniflorus*), and greater bladder sedge (*Carex intumescens*) dominate the herbaceous layer. Hydric soil is a depleted silt loam with 2 to 4 percent redoximorphic concentrations. At the time of the site visit, water-stained leaves were the primary indicator of hydrology.

3.2.3 Wetland 01TTC

Wetland 01TTC is primarily forested (Photo 4) with an emergent area at the southern end resulting from past timber harvesting (Photo 5). The wetland is located in the center of the project area and parallel to the existing access road. Dominant tree species include red maple, balsam fir, eastern hemlock, and yellow birch). Shrubs include speckled alder (*Alnus incana*), white meadowsweet, steeplebush (*Spiraea tomentosa*), red maple, winterberry, and beaked hazelnut (*Corylus cornuta*). Bluejoint, cottongrass bulrush (*Scirpus cyperinus*), sensitive fern, fowl manna grass, woodland horsetail, cinnamon fern (*Osmundastrum cinnamomeum*), and

[4] Wetland classifications per: Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services, U.S. Fish and Wildlife Service. FWS/OBS-79/31.

interrupted fern dominate the herbaceous layer. Hydric soils predominately had a dark mineral or organic layer at the surface over a depleted silt loam matrix with 5 to 10 percent redoximorphic concentrations. Hydrology indicators included saturation, water-stained leaves, and small areas of surface water. Wetland 01TTC contained 4 man-made vernal pools that were identified during the 2015 vernal pool survey.

3.2.4 Wetland 01TTD

Wetland 01TTD is primarily forested and located adjacent to the existing access road (Photo 6) near the proposed location of the scale house and administrative building. The southern portion of the wetland is an emergent wetland along the access road. Dominant tree species include red maple, gray birch, and balsam fir. Shrubs include those species observed in the tree layer, as well as quaking aspen (*Populus tremuloides*), and white meadowsweet. Bluejoint, interrupted fern, northern water-horehound, northern lady fern (*Athyrium angustum*), dwarf red raspberry (*Rubus pubescens*), and rattlesnake manna grass (*Glyceria canadensis*) dominate the herbaceous layer. Hydric soils had a depleted silt loam matrix with 10 percent redoximorphic concentrations. At the time of the site visit, water-stained leaves were the primary indicator of hydrology.

3.2.5 Wetland 01RKB

Wetland 01RKB is located adjacent to an open gravel area east of the proposed expansion area (Photo 7). It is forested and interspersed with areas of scrub-shrub wetland. The wetland consists of two parts that are separated by a narrow section of upland. Dominant tree species include gray birch and balsam fir. Gray willow (*Salix bebbiana*) dominates the shrub layer. Sensitive fern, dwarf red raspberry, water horsetail (*Equisetum fluviatile*), and fringed sedge (*Carex crinita*) dominate the herbaceous layer. Hydric soils predominately are a depleted silt loam matrix with redoximorphic concentrations. At the time of the site visit, hydrology indicators included water-stained leaves, presence of reduced iron, and drainage patterns. This wetland extends off-site to the east, where it contains a Significant Vernal Pool (SVP). The portion of the wetland containing the SVP and the 250-foot critical terrestrial habitat would be considered a Wetland of Special Significance.

3.2.6 Wetland 01BEE

Wetland 8 is a forested and emergent wetland located adjacent to the existing access road at the north end of the proposed new electrical line. The emergent portion of the wetland is located at the proposed crossing of the new electrical line. Dominant canopy species include red maple, balsam fir, green ash (*Fraxinus pensylvanica*), and yellow birch. The shrub layer consists of white meadowsweet, speckled alder, steeplebush, and those species observed in the canopy. Hydric soils predominantly had a depleted silt loam matrix with 10 percent redoximorphic concentrations. Hydrology indicators included saturation, water-stained leaves, areas of surface water, and drainage patterns. Wetland 01BEE contained 4 man-made vernal

pools near the proposed electrical line crossing that were identified during the 2008 and 2015 vernal pool surveys.

3.2.7 Wetland 01BEA

Wetland 01BEA is a small, isolated forested wetland located at the western edge of the expansion area. The canopy is dominated by balsam fir with cinnamon fern, three-leaved goldthread (*Coptis trifolia*) and peat moss (*Sphagnum* sp.) present. Soils were disturbed but consisted of a depleted silt loam matrix with redoximorphic concentrations. Indicators of hydrology included areas of inundation and saturation at the soil surface. Wetland 01BEA contained 1 man-made vernal pool that was identified during the 2015 vernal pool surveys.

3.2.8 Wetland 01BED

Wetland 01BED is a small emergent wetland located in an historic woods road at the southern end of the proposed fence line. The wetland is dominated by emergent species such as sensitive fern, cinnamon fern, northern lady fern, and cottongrass bulrush. Soils were disturbed, but consisted of a depleted silt loam matrix with redoximorphic concentrations. Indicators of hydrology included areas of inundation, saturation at the soil surface, and wetland drainage *patterns. Wetland 01BED contained 1 man-made vernal pool that was identified during the* 2015 vernal pool surveys.

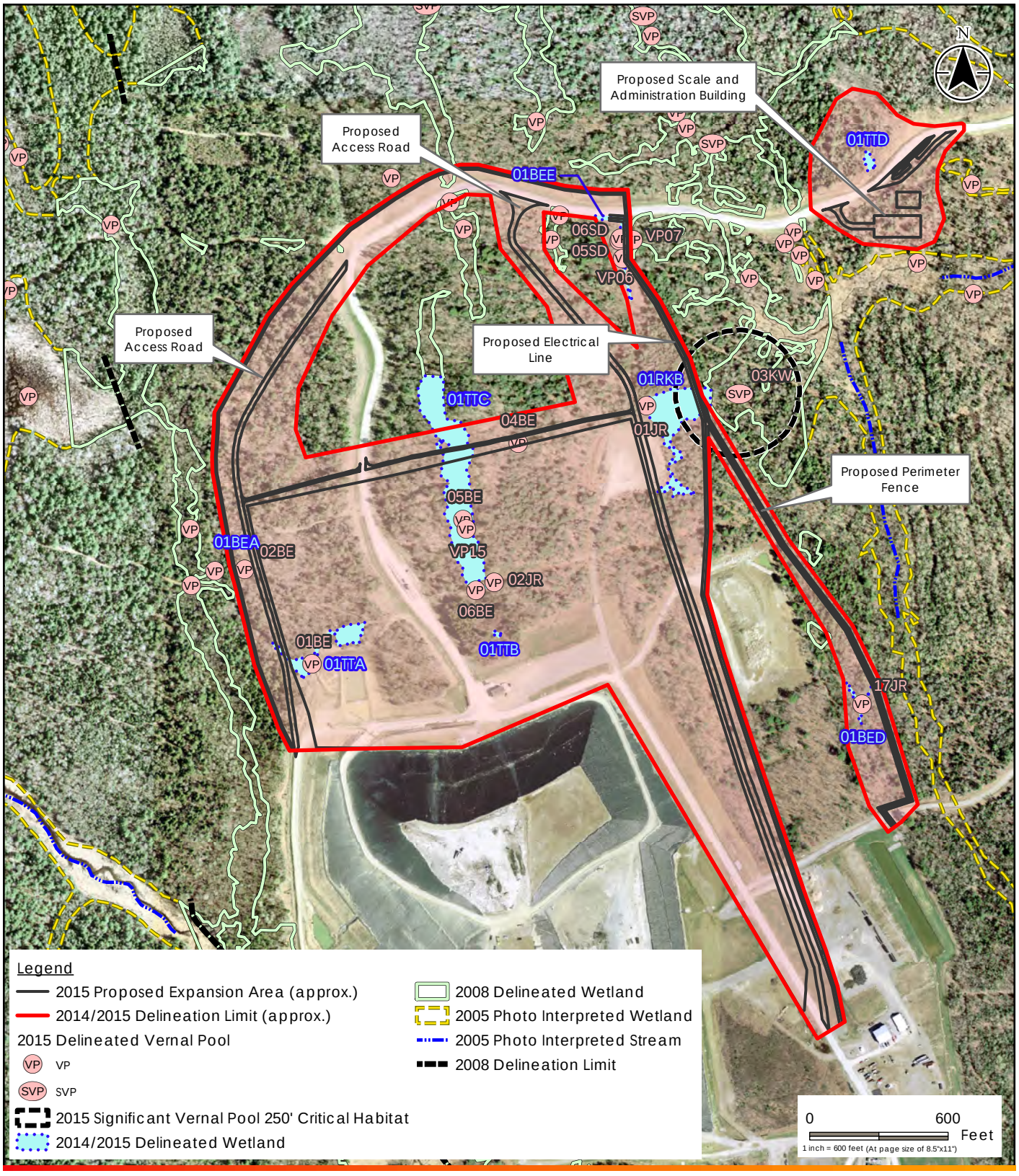
3.3 VERNAL POOL SURVEY RESULTS

A total of 14 vernal pools were identified within the survey area adjacent to the expansion area. There were 45 other vernal pools surveyed in 2015 within the property boundaries that are discussed in the Wetland Compensation Plan (Attachment 13). Of the 14 vernal pools identified in the survey area, 1 vernal pool met the criteria to be considered a Significant Vernal Pool (SVP), 03KW. This SVP will not be directly impacted by the project, but clearing for the proposed electrical line and fence line will occur within the 250-foot critical terrestrial habitat surrounding this pool. Of the 14 total vernal pools, 12 met the definition of a vernal pool as provided in the Corps' Maine GP. Two of the vernal pools were small depressions that were located in upland areas. Because these vernal pools were not located in jurisdictional wetlands, they are not regulated by the Corps. Information for each vernal pool is provided in Table 1 below and is shown on Figure 1. Maine State Vernal Pool Assessment Forms with photos for the vernal pools being impacted by the proposed expansion are included in Appendix D. The first visit and second visit vernal pool surveys were conducted on May 5, 6, and 14, 2015.

Table 1. Vernal Pool Survey Results for Juniper Ridge Landfill Proposed Expansion

Vernal Pool ID	Associated Wetland ID	Origin	MDEP SVP	Corps vernal pool	Wood Frog		Spotted Salamander		Blue-Spotted Salamander		Notes
					1st visit	2nd visit	1st visit	2nd visit	1st visit	2nd visit	
03KW	Off-site	Natural	X	X	10	0	40	49	0	0	
01BE	01TTA	Man-made		X	0	0	18	18	0	0	
02BE	01BEA	Man-made		X	0	0	4	4	0	0	
04BE	Not in wetland	Natural			0	0	1	1	0	0	Isolated depression in upland
05BE	01TTC	Natural		X	0	0	1	1	0	0	natural-modified
VP 15	01TTC	Man-made		X	3	hatched	47	41	0	0	wood frog tadpoles observed on second visit
06BE	01TTC	Man-made		X	0	0	1	1	0	0	
02JR	01TTC	Man-made		X	1	hatched	0	0	0	0	wood frog tadpoles observed on second visit
06SD	01BEE	Man-made		X	0	0	8	7	0	0	
05SD	01BEE	Man-made		X	6	hatched	22	23	0	0	wood frog tadpoles observed on second visit
VP 06	01BEE	Man-made		X	0	0	9	9	0	0	
VP 07	01BEE	Man-made		X	0	0	25	19	0	0	
01JR	Not in wetland	Natural			0	0	2	4	0	0	Isolated depression in upland
17JR	01BED	Man-made		X	0	--	1	--	0	--	

Appendix A FIGURES



Stantec

30 Park Drive
Topsham, ME USA 04086
Phone (207) 729-1199

Prepared by KWH on 2015-06-03
Reviewed by BPE on 2015-06-05

00983_01_JuniperRidge_WetMap.mxd

Notes

1. Wetland boundaries delineated in accordance with USACE Wetland Delineation Manual (1987) or subsequent versions.
2. Vernal pools surveyed in accordance with Maine Association of Wetland Scientists Vernal Pool Technical Committee Vernal Pool Survey Protocol, April 2014.
3. Wetland and vernal pool boundaries were located utilizing a Trimble Geo-XH GeoExplorer 6000 Series Receiver. Expected accuracy of GPS data is within 1 meter of actual position.
4. Coordinate System: NAD 1983 StatePlane Maine East FIPS 1801 Feet
5. Orthophotography from 2013 provided by Maine Office of GIS.

195600983

Client/Project
NEWSME Landfill Operations LLC
Juniper Ridge Landfill Expansion
Old Town, Maine

Figure No.
1

Title
2014/2015 Wetland Survey
6/25/2015

Appendix B REPRESENTATIVE SITE PHOTOGRAPHS



Photo 1. Forested wetland with emergent wetland area in Wetland 01TTA. Stantec, September 25, 2014.



Photo 2. Stormwater pond outlet pipe draining into Wetland 01TTA. Stantec, September 25, 2014.



Photo 3. Forested Wetland 01TTB. Stantec, September 25, 2014.



Photo 4. Forested portion of Wetland 01TTC. Stantec, September 25, 2014.



Photo 5. Emergent wetland at southern end of Wetland 01TTC. Stantec, September 25, 2014.



Photo 6. Forested Wetland 01TTD looking towards existing access road. Stantec, September 25, 2014.



Photo 7. Mixed forested and scrub-shrub Wetland 01RKB. Stantec, October 9, 2014.



Photo 8. Emergent wetland portion of Wetland 01BEE. Stantec, May 14, 2015.



Photo 9. Forested Wetland 01BEA, containing vernal pool 02BE. Stantec, May 5, 2015.



Photo 10. Emergent Wetland 01BED in old woods road. Stantec, May 14, 2015.

Appendix C CORPS WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Juniper Ridge Landfill	Stantec Project #:	195600983
Applicant:	NEWSME Landfill Operations and State of Maine BGS		
Investigator #1:	Bryan Emerson	Investigator #2:	
Soil Unit:	Howland very stony loam	NWI/WWI Classification:	PFO
Landform:	Depression	Local Relief:	Linear
Slope (%):	2-5	Latitude: 44.983886	Longitude: -68.724885 Datum: --

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐, Soil ☐, or Hydrology ☐significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐naturally problematic?

Are normal circumstances present? ☑ Yes ☐No

Date:	05/06/15
County:	Penobscot
State:	Maine
Wetland ID:	01TTC
Sample Point:	**wet1**
Community ID:	PFO
Section:	--
Township:	--
Range:	-- Dir: --

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present):☐

Primary:
- ☑ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth:	2-6	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	n/a	(in.)
Saturation Present?	☑ Yes ☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Howland very stony loam — Series Drainage Class: [E.g. moderately well, poorly, etc]

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	6	1	10YR 5/1	95	10YR 4/6	5	C	M	silt loam
6	14	2	2.5Y 5/2	80	7.5YR 4/4	20	C	M	silt loam
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present)☐
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat or Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Rock Depth: 14"

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Juniper Ridge Landfill | Wetland ID: 01TTC | Sample Point: **wet1**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	50	Y	FAC
2.	*Abies balsamea*	30	Y	FAC
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	80		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Abies balsamea*	20	Y	FAC
2.	*Acer rubrum*	20	Y	FAC
3.	*Alnus incana*	10	N	FACW
4.	*Spiraea alba*	5	N	FACW
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	55		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	25	Y	FACW
2.	*Calamagrostis canadensis*	20	Y	OBL
3.	*Osmundastrum cinnamomeum*	20	Y	FACW
4.	*Osmunda spectabilis*	5	N	OBL
5.	*Juncus effusus*	5	N	OBL
6	*Rubus hispidus*	5	N	FACW
7.	*Glyceria striata*	2	N	OBL
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	82		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	32	x 1 =	32
FACW spp.	65	x 2 =	130
FAC spp.	120	x 3 =	360
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	217 (A)		522 (B)

Prevalence Index = B/A = ***2.406***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Juniper Ridge Landfill	Stantec Project #:	195600983
Applicant:	NEWSME Landfill Operations and State of Maine BGS		
Investigator #1:	Bryan Emerson	Investigator #2:	
Soil Unit:	Howland very stony loam	NWI/WWI Classification:	n/a
Landform:	Depression	Local Relief:	Linear
Slope (%):	2-5	Latitude: 44.984225	Longitude: -68.724885 Datum: --

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐, Soil ☐, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☑ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/06/15
County:	Penobscot
State:	Maine
Wetland ID:	01TTC
Sample Point:	**up1**
Community ID:	n/a
Section:	--
Township:	--
Range:	-- Dir: --

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present): ☑

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	n/a	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	n/a	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	n/a	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Howland very stony loam — Series Drainage Class: [E.g. moderately well, poorly, etc]

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	4	1	10YR 3/2	100	--	--	--	--	silt loam
4	8	2	10YR 4/4	95	7.5YR 4/6	5	C	M	silt loam
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present): ☑

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Rock/till Depth: 8"

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Juniper Ridge Landfill | Wetland ID: 01TTC | Sample Point: up1

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Abies balsamea*	40	Y	FAC
2.	*Tsuga canadensis*	40	Y	FACU
3.	*Acer rubrum*	5	N	FAC
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	85		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Abies balsamea*	30	Y	FAC
2.	*Tsuga canadensis*	25	Y	FACU
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	55		

Herb Stratum (Plot size: 2 meter radius)

1.	*Pteridium aquilinum*	10	Y	FACU
2.	*Dryopteris intermedia*	8	Y	FAC
3.	*Maianthemum canadense*	5	N	FACU
4.	*Gaultheria procumbens*	5	N	FACU
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	28		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***50.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	83	x 3 =	249
FACU spp.	85	x 4 =	340
UPL spp.	0	x 5 =	0
Total	168 (A)		589 (B)

Prevalence Index = B/A = ***3.506***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Juniper Ridge Landfill	Stantec Project #:	195600983
Applicant:	NEWSME Landfill Operations and State of Maine BGS		
Investigator #1:	Thomas Tetreau	Investigator #2:	
Soil Unit:	Howland very stony loam	NWI/WWI Classification:	PFO
Landform:	Depression	Local Relief:	Linear
Slope (%):	2-5	Latitude: 44.982380	Longitude: -68.727613 Datum: --

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐, Soil ☐, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☑ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	09/25/14
County:	Penobscot
State:	Maine
Wetland ID:	01TTA
Sample Point:	**wet1**
Community ID:	PFO
Section:	--
Township:	--
Range:	-- Dir: --

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Wetland hydrology influenced by stormwater outfall discharging water. Wetland is newly created after construction of adjacent stormwater pond and associated outlet.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present): ☐

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth: n/a	(in.)
Water Table Present?	☐ Yes	☑ No	Depth: n/a	(in.)
Saturation Present?	☑ Yes	☐ No	Depth: 12	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Howland very stony loam — Series Drainage Class: [E.g. moderately well, poorly, etc]

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	7	1	10YR	5/1	80	10YR	4/6	20	C	M	silt loam
7	16	2	2.5Y	5/2	75	7.5YR	4/4	25	C	M	silt loam
16	22	3	2.5Y	5/1	98	10YR	4/4	2	C	M	sandy loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present): ☐

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat or Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Hard pack Depth: 22"

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Juniper Ridge Landfill | Wetland ID: 01TTA | Sample Point: **wet1**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	30	Y	FAC
2.	*Abies balsamea*	25	Y	FAC
3.	*Fraxinus nigra*	5	N	FACW
4.	*Fraxinus americana*	5	N	FACU
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	65		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Abies balsamea*	30	Y	FAC
2.	*Acer rubrum*	10	Y	FAC
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	40		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	30	Y	FACW
2.	*Calamagrostis canadensis*	25	Y	OBL
3.	*Glyceria striata*	20	Y	OBL
4.	*Equisetum sylvaticum*	10	N	FACW
5.	*Rubus hispidus*	15	N	FACW
6	*Acer rubrum*	8	N	FAC
7.	*Symphyotrichum novae-angliae*	5	N	FACW
8.	*Juncus effusus*	5	N	OBL
9.	*Abies balsamea*	2	N	FAC
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	120		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	50	x 1 =	50
FACW spp.	65	x 2 =	130
FAC spp.	105	x 3 =	315
FACU spp.	5	x 4 =	20
UPL spp.	0	x 5 =	0
Total	225 (A)		515 (B)

Prevalence Index = B/A = ***2.289***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Juniper Ridge Landfill	Stantec Project #:	195600983
Applicant:	NEWSME Landfill Operations and State of Maine BGS		
Investigator #1:	Thomas Tetreau	Investigator #2:	
Soil Unit:	Howland very stony loam	NWI/WWI Classification:	n/a
Landform:	Depression	Local Relief:	Linear
Slope (%):	2-5	Latitude: 44.982380	Longitude: -68.727613 Datum: --

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐, Soil ☐, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☑ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	09/25/14
County:	Penobscot
State:	Maine
Wetland ID:	01TTA
Sample Point:	**up1**
Community ID:	n/a
Section:	--
Township:	--
Range:	-- Dir: --

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present): ☑

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	n/a	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	n/a	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	n/a	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Howland very stony loam — Series Drainage Class: [E.g. moderately well, poorly, etc]

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	1	1	10YR 3/2	100	-- --	--	--	--	silt loam
--	--	--	-- --	--	-- --	--	--	--	--
--	--	--	-- --	--	-- --	--	--	--	--
--	--	--	-- --	--	-- --	--	--	--	--
--	--	--	-- --	--	-- --	--	--	--	--
--	--	--	-- --	--	-- --	--	--	--	--
--	--	--	-- --	--	-- --	--	--	--	--
--	--	--	-- --	--	-- --	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present): ☑
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Rock Depth: 1"

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

Stantec

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Juniper Ridge Landfill | Wetland ID: 01TTA | Sample Point: up1

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	50	Y	FAC
2.	*Abies balsamea*	40	Y	FAC
3.	*Fraxinus americana*	10	N	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	100		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Abies balsamea*	50	Y	FAC
2.	*Acer rubrum*	5	Y	FAC
3.	*Ulmus americana*	5	N	FACW
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	60		

Herb Stratum (Plot size: 2 meter radius)

1.	*Dryopteris intermedia*	5	Y	FAC
2.	*Pteridium aquilinum*	3	Y	FACU
3.	*Maianthemum canadense*	2	N	FACU
4.	*Aralia nudicaulis*	2	N	FACU
5.	*Trientalis borealis*	1	N	FAC
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	13		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***83.3%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	5	x 2 =	10
FAC spp.	151	x 3 =	453
FACU spp.	17	x 4 =	68
UPL spp.	0	x 5 =	0
Total	173 (A)		531 (B)

Prevalence Index = B/A = ***3.069***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Additional Remarks:

Appendix D MAINE STATE VERNAL POOL ASSESSMENT FORMS

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: 17JR **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Jake Riley

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☒ Wet meadow
- ☐ Lake or Pond Cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Isolated pool
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ○ Natural-Modified ◉ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Skidder rut in wetland

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Shallow water depth and vegetation in rut

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 4 ○ m ◉ ft Length: 10 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☒ Other: Adult wood frog observed in pool

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/14/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0			3			n/a			N			3		
Spotted Salamander	1			3			A			N			3		
Blue-spotted Salamander	0			3			n/a			N			3		
Fairy Shrimp[3]	0			3											

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_17JR_M.
Date: May 14, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: VP15 **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☒ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or Pond Cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Isolated pool
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ○ Natural-Modified ◉ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Pool in old woods road

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Shallow water depth, past visits in 2008 documented dry-out in mid-summer

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 10 ○ m ◉ ft Length: 75 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/5/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	3	0		3	3		n/a	n/a		N	Y		3	3	
Spotted Salamander	47	41		3	3		M	A		N	N		3	3	
Blue-spotted Salamander	0	0		3	3		n/a	n/a		N	N		3	3	
Fairy Shrimp[3]	0	0		3	3										

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_15_M.
Date: May 5, 2015. Stantec.



Photo 2: VP_15_M.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: VP07 **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☒ Wet meadow
- ☐ Lake or Pond Cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Isolated pool
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ○ Natural-Modified ◉ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Ditch along old road

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ◉ Semi-permanent (drying partially in all years and completely in drought years)
- ○ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Deep water, portions of pool may dry but deepest sections likely hold water year round

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ◉ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 30 ○ m ◉ ft Length: 150 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ◉ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☒ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☒ Other: Adult green frog on second visit

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/6/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0	0		3	3		n/a	n/a		N	N		3	3	
Spotted Salamander	25	19		3	3		M	A		N	N		3	3	
Blue-spotted Salamander	0	0		3	3		n/a	n/a		N	N		3	3	
Fairy Shrimp[3]	0	0		3	3										

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_07_M.
Date: May 6, 2015. Stantec.



Photo 2: VP_07_M.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: 06SD **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☒ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or Pond Cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Isolated pool
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ○ Natural-Modified ◉ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Borrow pit along old road

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ◉ Semi-permanent (drying partially in all years and completely in drought years)
- ○ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Deep water, no vegetation in pool

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ◉ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 10 ○ m ◉ ft Length: 15 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☒ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/6/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0	0		3	3		n/a	n/a		N	N		3	3	
Spotted Salamander	8	7		3	3		A	A		N	N		3	3	
Blue-spotted Salamander	0	0		3	3		n/a	n/a		N	N		3	3	
Fairy Shrimp[3]	0	0		3	3										

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_06SD_M.
Date: May 6, 2015. Stantec.



Photo 2: VP_06SD_M – In photo foreground.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: 06BE **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☒ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☒ Wet meadow
- ☐ Lake or Pond Cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Isolated pool
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ○ Natural-Modified ◉ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Skidder ruts through wetland

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Shallow water depth, vegetation in pool

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 10 ○ m ◉ ft Length: 50 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/5/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0	0		3	3		n/a	n/a		N	N		3	3	
Spotted Salamander	1	1		3	3		M	H		N	N		3	3	
Blue-spotted Salamander	0	0		3	3		n/a	n/a		N	N		3	3	
Fairy Shrimp[3]	0	0		3	3										

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_06BE_M.
Date: May 5, 2015. Stantec.



Photo 2: VP_06BE_M.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: VP06 **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☒ Wet meadow
- ☐ Lake or Pond Cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Isolated pool
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ○ Natural-Modified ◉ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Ditch along old road

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ◉ Semi-permanent (drying partially in all years and completely in drought years)
- ○ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Deep water, little vegetation in pool

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ◉ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 8 ○ m ◉ ft Length: 100 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ◉ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☒ Other: Adult green frog and wood frog in pool

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/6/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae				
	#		Confidence Level[1]		Egg Mass Maturity[2]		Observed		Confidence Level[1]		
Wood Frog	0	0	3	3	n/a	n/a	N	N	3	3	
Spotted Salamander	9	14	3	3	M	A	N	N	3	3	
Blue-spotted Salamander	0	0	3	3	n/a	n/a	N	N	3	3	
Fairy Shrimp[3]	0	0	3	3							

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_06_M.
Date: May 6, 2015. Stantec.



Photo 2: VP_06_M.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: 05SD **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☒ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or Pond Cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Isolated pool
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ○ Natural-Modified ◉ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Borrow pit along old road

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ◉ Semi-permanent (drying partially in all years and completely in drought years)
- ○ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Deep water, little vegetation in pool

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ◉ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 10 ○ m ◉ ft Length: 15 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/6/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	6	0		3	3		H	n/a		N	Y		3	3	
Spotted Salamander	22	23		3	3		M	A		N	N		3	3	
Blue-spotted Salamander	0	0		3	3		n/a	n/a		N	N		3	3	
Fairy Shrimp[3]	0	0		3	3										

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_05SD_M.
Date: May 6, 2015. Stantec.



Photo 2: VP_05SD_M – In photo background.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: 05BE **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☒ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or Pond Cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Isolated pool
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ◉ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Skidder ruts through pit and mound wetland

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Shallow water depth, mineral substrate

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 5 ○ m ◉ ft Length: 15 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ◉ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☒ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☒ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/5/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0	0		3	3		n/a	n/a		N	N		3	3	
Spotted Salamander	1	1		3	3		M	A		N	N		3	3	
Blue-spotted Salamander	0	0		3	3		n/a	n/a		N	N		3	3	
Fairy Shrimp[3]	0	0		3	3										

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_05BE_N.
Date: May 5, 2015. Stantec.



Photo 2: VP_05BE_N.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: 04BE **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- (•) Isolated depression
- ( ) Floodplain depression
- ( ) Pool associated with larger wetland complex
- ( ) Other: _____

■ Check all wetland types that best apply to this pool:

- [ ] Forested swamp
- [ ] Shrub swamp
- [ ] Peatland (fen or bog)
- [ ] Emergent marsh
- [ ] Wet meadow
- [ ] Lake or Pond Cove
- [ ] Abandoned beaver flowage
- [ ] Active beaver flowage
- [ ] Slow stream
- [ ] Floodplain
- [x] Isolated pool
- [ ] Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: (•) Natural ( ) Natural-Modified ( ) Unnatural ( ) Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Upland depression in tree tip-up

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ( ) Permanent
- ( ) Semi-permanent (drying partially in all years and completely in drought years)
- (•) Ephemeral (drying out completely in most years)
- ( ) Unknown

Explain:

Shallow water depth, mineral soil substrate

■ Maximum depth at survey: (•) 0-12" (0-1 ft.) ( ) 12-36" (1-3 ft.) ( ) 36-60" (3-5 ft.) ( ) >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 5 ( ) m (•) ft Length: 15 ( ) m (•) ft

■ Predominate substrate in order of increasing hydroperiod:

- (•) Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ( ) Mineral soil (sphagnum moss present)
- ( ) Organic matter (peat/muck) shallow or restricted to deepest portion
- ( ) Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- [ ] Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- [ ] Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- [ ] Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- [ ] Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- [ ] Sphagnum moss (anchored or suspended)
- [ ] Wet site ferns (e.g. royal fern, marsh fern)
- [ ] Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- [ ] Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- [ ] Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- [ ] Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- [x] No vegetation in pool

■ Faunal indicators (check all that apply):

- [ ] Fish
- [ ] Bullfrog or Green Frog tadpoles
- [ ] Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- (•) No inlet or outlet
- ( ) Intermittent inlet or outlet
- ( ) Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ( ) Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/5/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0	0		3	3		n/a	n/a		N	N		3	3	
Spotted Salamander	1	1		3	3		M	A		N	N		3	3	
Blue-spotted Salamander	0	0		3	3		n/a	n/a		N	N		3	3	
Fairy Shrimp[3]	0	0		3	3										

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_04BE_N.
Date: May 5, 2015. Stantec.



Photo 2: VP_04BE_N.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: 02JR **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Jake Riley

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☒ Wet meadow
- ☐ Lake or Pond Cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Isolated pool
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ○ Natural-Modified ◉ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Skidder rut in wetland

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Shallow water depth

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 2 ○ m ◉ ft Length: 12 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/5/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	1	0		3	3		M	n/a		N	Y		3	3	
Spotted Salamander	0	0		3	3		n/a	n/a		N	N		3	3	
Blue-spotted Salamander	0	0		3	3		n/a	n/a		N	N		3	3	
Fairy Shrimp[3]	0	0		3	3										

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_02JR_M.
Date: May 5, 2015. Stantec.



Photo 2: VP_02JR_M.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: 02BE **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- (•) Isolated depression
- ( ) Floodplain depression
- ( ) Pool associated with larger wetland complex
- ( ) Other: _____

■ Check all wetland types that best apply to this pool:

- [X] Forested swamp
- [ ] Shrub swamp
- [ ] Peatland (fen or bog)
- [ ] Emergent marsh
- [ ] Wet meadow
- [ ] Lake or Pond Cove
- [ ] Abandoned beaver flowage
- [ ] Active beaver flowage
- [ ] Slow stream
- [ ] Floodplain
- [ ] Isolated pool
- [ ] Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ( ) Natural ( ) Natural-Modified (•) Unnatural ( ) Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Pool in skidder rut

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ( ) Permanent
- ( ) Semi-permanent (drying partially in all years and completely in drought years)
- (•) Ephemeral (drying out completely in most years)
- ( ) Unknown

Explain:

Shallow water depth, firm mineral substrate

■ Maximum depth at survey: ( ) 0-12" (0-1 ft.) (•) 12-36" (1-3 ft.) ( ) 36-60" (3-5 ft.) ( ) >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 3 ( ) m (•) ft Length: 15 ( ) m (•) ft

■ Predominate substrate in order of increasing hydroperiod:

- (•) Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ( ) Mineral soil (sphagnum moss present)
- ( ) Organic matter (peat/muck) shallow or restricted to deepest portion
- ( ) Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- [ ] Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- [ ] Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- [ ] Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- [ ] Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- [ ] Sphagnum moss (anchored or suspended)
- [ ] Wet site ferns (e.g. royal fern, marsh fern)
- [ ] Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- [ ] Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- [ ] Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- [ ] Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- [X] No vegetation in pool

■ Faunal indicators (check all that apply):

- [ ] Fish
- [ ] Bullfrog or Green Frog tadpoles
- [ ] Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- (•) No inlet or outlet
- ( ) Intermittent inlet or outlet
- ( ) Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ( ) Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/5/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0	0		3	3		n/a	n/a		N	N		3	3	
Spotted Salamander	4	4		3	3		M	A		N	N		3	3	
Blue-spotted Salamander	0	0		3	3		n/a	n/a		N	N		3	3	
Fairy Shrimp[3]	0	0		3	3										

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_02BE_M.
Date: May 5, 2015. Stantec.



Photo 2: VP_02BE_M.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: 01JR **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Jake Riley

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- (•) Isolated depression
- ( ) Floodplain depression
- ( ) Pool associated with larger wetland complex
- ( ) Other: _____

■ Check all wetland types that best apply to this pool:

- [ ] Forested swamp
- [ ] Shrub swamp
- [ ] Peatland (fen or bog)
- [ ] Emergent marsh
- [ ] Wet meadow
- [ ] Lake or Pond Cove
- [ ] Abandoned beaver flowage
- [ ] Active beaver flowage
- [ ] Slow stream
- [ ] Floodplain
- [x] Isolated pool
- [ ] Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: (•) Natural ( ) Natural-Modified ( ) Unnatural ( ) Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Upland depression next to boulder in upland

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ( ) Permanent
- ( ) Semi-permanent (drying partially in all years and completely in drought years)
- (•) Ephemeral (drying out completely in most years)
- ( ) Unknown

Explain:

Shallow water depth and small size

■ Maximum depth at survey: (•) 0-12" (0-1 ft.) ( ) 12-36" (1-3 ft.) ( ) 36-60" (3-5 ft.) ( ) >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 3 ( ) m (•) ft Length: 6 ( ) m (•) ft

■ Predominate substrate in order of increasing hydroperiod:

- ( ) Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ( ) Mineral soil (sphagnum moss present)
- (•) Organic matter (peat/muck) shallow or restricted to deepest portion
- ( ) Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- [ ] Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- [ ] Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- [ ] Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- [ ] Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- [ ] Sphagnum moss (anchored or suspended)
- [ ] Wet site ferns (e.g. royal fern, marsh fern)
- [ ] Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- [ ] Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- [ ] Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- [ ] Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- [x] No vegetation in pool

■ Faunal indicators (check all that apply):

- [ ] Fish
- [ ] Bullfrog or Green Frog tadpoles
- [ ] Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- (•) No inlet or outlet
- ( ) Intermittent inlet or outlet
- ( ) Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ( ) Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/5/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0	0		3	3		n/a	n/a		N	N		3	3	
Spotted Salamander	2	4		3	3		M	A		N	N		3	3	
Blue-spotted Salamander	0	0		3	3		n/a	n/a		N	N		3	3	
Fairy Shrimp[3]	0	0		3	3										

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_01JR_N.
Date: May 5, 2015. Stantec.



Photo 2: VP_01JR_N.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: 01BE **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☒ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or Pond Cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Isolated pool
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ○ Natural-Modified ◉ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Pool located behind erosion control berm and impounded, hydrology from stormwater outfall

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Shallow water depth, terrestrial vegetation in pool

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 5 ○ m ◉ ft Length: 15 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☒ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☒ Other: adult wood frog in pool

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ◉ Other or Unknown (explain): stormwater outfall acts as ephemeral inlet, no outlet

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/5/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae				
	#		Confidence Level[1]		Egg Mass Maturity[2]		Observed		Confidence Level[1]		
Wood Frog	0	0	3	3	n/a	n/a	N	N	3	3	
Spotted Salamander	18	18	3	3	M	A	N	N	3	3	
Blue-spotted Salamander	0	0	3	3	n/a	n/a	N	N	3	3	
Fairy Shrimp[3]	0	0	3	3							

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Hydrology of pool influenced by stormwater outfall, wetland is newly present after construction of adjacent stormwater pond and associated outlet.

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: VP_01BE_M.
Date: May 5, 2015. Stantec.



Photo 2: VP_01BE_M.
Date: May 20, 2015. Stantec.

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: 03KW **MDIFW Pool ID:** _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Bryan Emerson

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Juniper Ridge Landfill Expansion

NOTE: Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required for nonprofessional observers and encouraged for all observers.

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: _____ Phone: _____

Street Address: _____ City: _____ State: _____ Zip: _____

c. ☒ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Old Town

Brief site directions to the pool (using mapped landmarks):

See attached maps.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☒ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or Pond Cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Isolated pool
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Natural depression in wetland

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Shallow water depth, terrestrial vegetation in pool

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 30 ○ m ◉ ft Length: 50 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ◉ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☒ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☒ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☒ Other: Adult wood frog in pool

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/5/15, 5/20/15

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? (•) Yes ( ) No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae				
	#		Confidence Level[1]		Egg Mass Maturity[2]		Observed		Confidence Level[1]		
Wood Frog	10	0	3	3	A	H	N	Y	3	3	
Spotted Salamander	40	49	3	3	M	A	N	N	3	3	
Blue-spotted Salamander	0	0	3	3	n/a	n/a	N	N	3	3	
Fairy Shrimp[3]	0	0	3	3							

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☒ SVP ☐ Potential SVP ☐ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ( ) does not meet biological criteria. ( ) does not meet MDEP vernal pool criteria.

Comments:



Photo 1: SVP_03KW_N.
Date: May 5, 2015. Stantec.

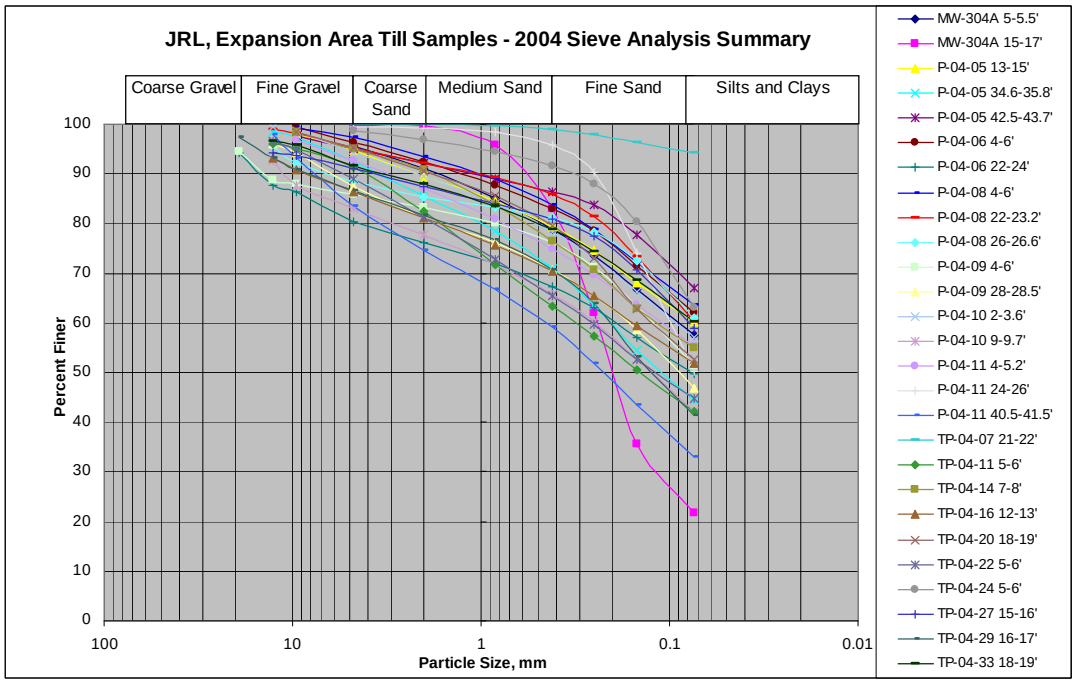


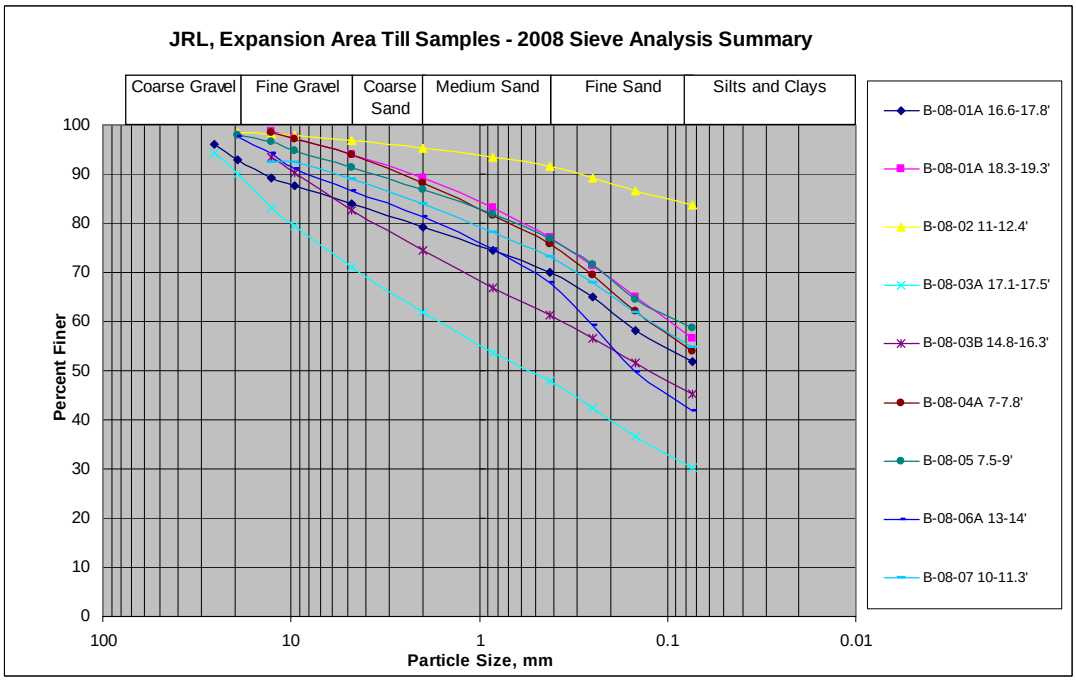
Photo 2: SVP_03KW_N.
Date: May 20, 2015. Stantec.

APPENDIX O

GRAIN SIZE TEST RESULTS

APPENDIX O


JRL, Expansion Area Till Samples - 2004 Sieve Analysis Summary
Coarse Gravel
Fine Gravel
Coarse Sand
Medium Sand
Fine Sand
Silts and Clays
Percent Finer
Particle Size, mm
100
10
1
0.1
0.01
MW-304A 5-5.5'
MW-304A 15-17'
P-04-05 13-15'
P-04-05 34.6-35.8'
P-04-05 42.5-43.7'
P-04-06 4-6'
P-04-06 22-24'
P-04-08 4-6'
P-04-08 22-23.2'
P-04-08 26-26.6'
P-04-09 4-6'
P-04-09 28-28.5'
P-04-10 2-3.6'
P-04-10 9-9.7'
P-04-11 4-5.2'
P-04-11 24-26'
P-04-11 40.5-41.5'
TP-04-07 21-22'
TP-04-11 5-6'
TP-04-14 7-8'
TP-04-16 12-13'
TP-04-20 18-19'
TP-04-22 5-6'
TP-04-24 5-6'
TP-04-27 15-16'
TP-04-29 16-17'
TP-04-33 18-19'


JRL, Expansion Area Till Samples - 2008 Sieve Analysis Summary
Coarse Gravel
Fine Gravel
Coarse Sand
Medium Sand
Fine Sand
Silts and Clays
Percent Finer
Particle Size, mm
100
10
1
0.1
0.01
B-08-01A 16.6-17.8'
B-08-01A 18.3-19.3'
B-08-02 11-12.4'
B-08-03A 17.1-17.5'
B-08-03B 14.8-16.3'
B-08-04A 7-7.8'
B-08-05 7.5-9'
B-08-06A 13-14'
B-08-07 10-11.3'

APPENDIX P

WATER CONTENT AND SPECIFIC GRAVITY TEST RESULTS

APPENDIX P

SOIL WATER CONTENTS
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

Location	Unit	Sample No.	Sample Depth (ft)	Water Content (%)	Total Porosity[1]
B-207	Basal Till	6D	10 – 11	12	0.25
	Basal Till	8D	15.5 – 16.8	13	0.26
B-212	Basal Till	6D	12 – 13.5	11	0.23
	Basal Till	9D	20 – 21.5	16	0.31
	Basal Till	11D	25 – 25.5	11	0.23
B-213	Basal Till	6D	10 – 11	12	0.25
	Basal Till	8D	14 – 15.5	11	0.23
	Basal Till	11D	20 – 21.5	12	0.25
B-222	Basal Till	7D	10 – 11.5	9	0.20
	Basal Till	9D	16.5 – 18	16	0.31
B-223	Basal Till	5D	7.5 – 9	10	0.22
	Basal Till	9D	15.5 – 17	12	0.25
B-225	Basal Till	3D	10 – 11	10	0.22
B-226	Basal Till	3D	10 – 11.5	10	0.22
	Basal Till	4D	15 – 16	9	0.20
	Basal Till	5D	20 – 21.5	11	0.23
MW-304A	Basal Till	2D	5 – 5.5	11.6	0.24
	Basal Till	4D	15 – 16.5	18.2	0.34
P-04-05	Basal Till	3D	10 – 11.5	10.2	0.22
	Basal Till	1R	35 – 36	9.6	0.21
	Basal Till	17D	42.5 – 44	14.3	0.28
P-04-06	Basal Till	3D	4 – 6	12	0.25
	Basal Till	12D	22 – 24	12.4	0.26
P-04-07	Basal Till	1D	1 – 2	11.6	0.24
	Basal Till	3D	4 – 5	11.4	0.24
P-04-08	Basal Till	3D	4 – 6	13.3	0.27
	Basal Till	12D	22 – 23.5	13	0.26
	Basal Till	13D	25 – 25.5	14.3	0.28
P-04-09	Basal Till	3D	4 – 6	11.4	0.24
	Basal Till	14D	28 – 28.5	13	0.26
P-04-10	Basal Till	2D	2 – 3.5	12.4	0.26
	Basal Till	5D	9.5 – 10	12.2	0.25
P-04-11	Basal Till	3D	4 – 5	13.2	0.27
	Basal Till	12D	24 – 26	20.6	0.36
	Basal Till	19D	40.5 – 41.5	10.4	0.22
P-04-12	Basal Till	4D	6 – 7	13.3	0.27
	Basal Till	8D	16 – 17	10.9	0.23
	Basal Till	8D	16 – 17	10.3	0.22
P-04-13	Basal Till	12D	24 – 26	10.4	0.22
TP-302	Basal Till		5	12	0.25
	Basal Till		10	12	0.25
TP-04-01	Basal Till		16.5	22.2	0.38
TP-04-02	Basal Till		19.5	11.1	0.24
TP-04-03	Basal Till		5.5	12.9	0.26
	Basal Till		7.5	9.1	0.20
	Basal Till		12.5	9.1	0.20
	Basal Till		15.5	19.2	0.35
	Basal Till		20.5	16.6	0.31

SOIL WATER CONTENTS (cont'd)

Location	Unit	Sample No.	Sample Depth (ft)	Water Content (%)	Total Porosity[1]
TP-04-06	Basal Till		4.5	10.6	0.23
	Basal Till		8.5	12.6	0.26
	Basal Till		12.5	13.1	0.27
	Basal Till		18.5	10.8	0.23
TP-04-07	Basal Till		13.5	12.4	0.26
	Basal Till		15.5	13	0.26
	Basal Till		16.5	19	0.34
	Basal Till		21.5	22.6	0.39
TP-04-11	Basal Till		5.5	12.7	0.26
TP-04-14	Basal Till		7.5	12.6	0.26
TP-04-16	Basal Till		12.5	10.8	0.23
TP-04-20	Basal Till		4.5	11.2	0.24
TP-04-22	Basal Till		5.5	13.6	0.27
TP-04-24	Basal Till		5.5	14.2	0.28
TP-04-27	Basal Till		15.5	14.3	0.28
TP-04-29	Basal Till		16.5	10	0.22
TP-04-33	Basal Till		18.5	13.7	0.28
TP-04-34	Basal Till		16.5	12.1	0.25

Notes:
1. Specific gravity basal till measured at 2.77.

SPECIFIC GRAVITY OF SOIL SOLIDS (G_s)

Project CASELLA Job No. 08097.03

Location of Project JUNIPER RIDGE LANDFILL Boring No. SB-10 Sample No. 1S

Description of Soil Br/gr sandy clayey SILT Depth of Sample 11.5

Tested By EJL Date of Testing 7 JAN 09

Test no.	1	2		
Vol. of flask at 20°C	200 ml →			
Method of air removal[a]	VACUUM →			
Wt. flask + water + soil = W_{bws}	495.2	490.1		
Temperature, °C	23.8	24.1		
Wt. flask + water[b] = W_{bw}	418.8	419.7		
Evap. dish no.	A-4	A-36		
Wt. evap. dish + dry soil	345.67	331.84		
Wt. of evap. dish	226.30	221.90		
Wt. of dry soil = W_s	119.37	109.94		
$W_w = W_s + W_{bw} - W_{bws}$	42.97	39.54		
$G_s = \alpha W_s / W_w$	2.77[1]	2.77[3]		

[a]Indicate vacuum or aspirator for air removal.

[b]W_{bw} is the weight of the flask filled with water at same temp. ± 1°C as for W_{bws} or value from calibration curve at T of W_{bws}.

Remarks

Average specific gravity of soil solids (G_s) = 2.77

Typical values of the correction factor,

T, °C	α	γ_w, g/cm³
16	1.0007	0.99897
18	1.0004	0.99862
20	1.0000	0.99823
22	0.9996	0.99780
24	0.9991	0.99732
26	0.9986	0.99681

Typical values of G_s

Type of soil	G_s
Sand	2.65-2.67
Silty sand	2.67-2.70
Inorganic clay	2.70-2.80
Soils with micas or iron	2.75-3.00
Organic soils	Variable but may be under 2.00

APPENDIX Q

LABORATORY HYDRAULIC CONDUCTIVITY TEST RESULTS

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Brown silt, litle sand

Exploration: B08-02

Sample No.: 1S

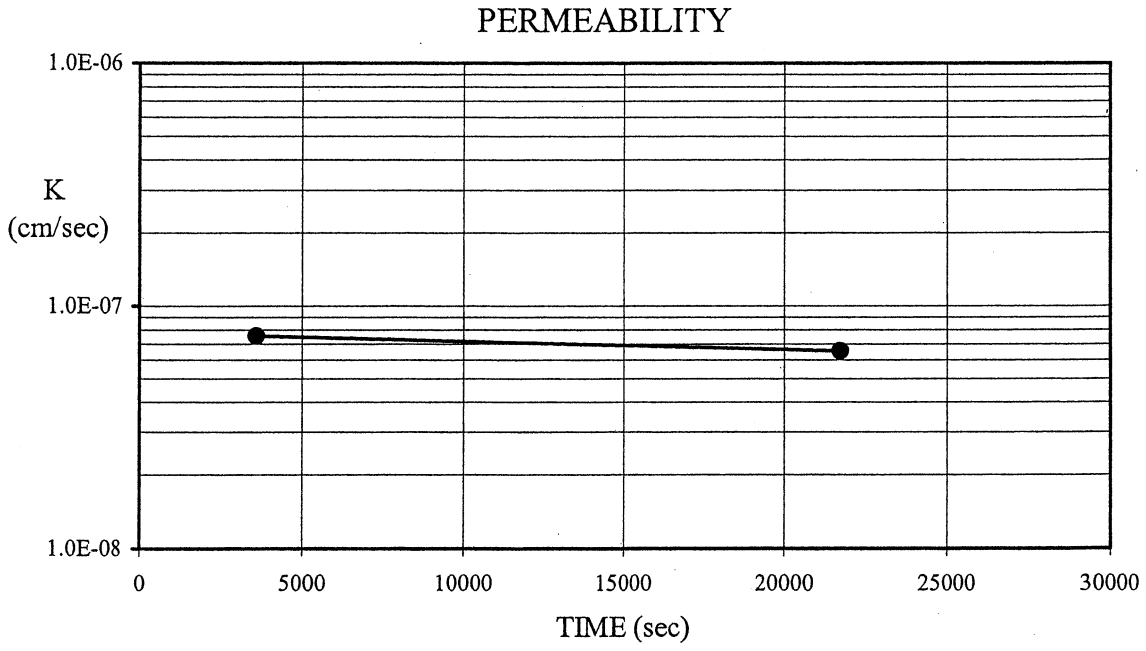
Depth (ft.): 11-12.4

(X) Undisturbed

( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	7.027	7.264
Length (cm)=	5.868	5.762
Moist. Cont. (%)=	n/a	3.6
Wet Wt. Soil (gms)=	484	496.6
Wet Density (pcf)=	132.8	129.8
Dry Density (pcf)=	n/a	125.3

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	0.98
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	24.4



Average Permeability (cm/sec)= 7.0E-08

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Gray sandy SILT, little gravel

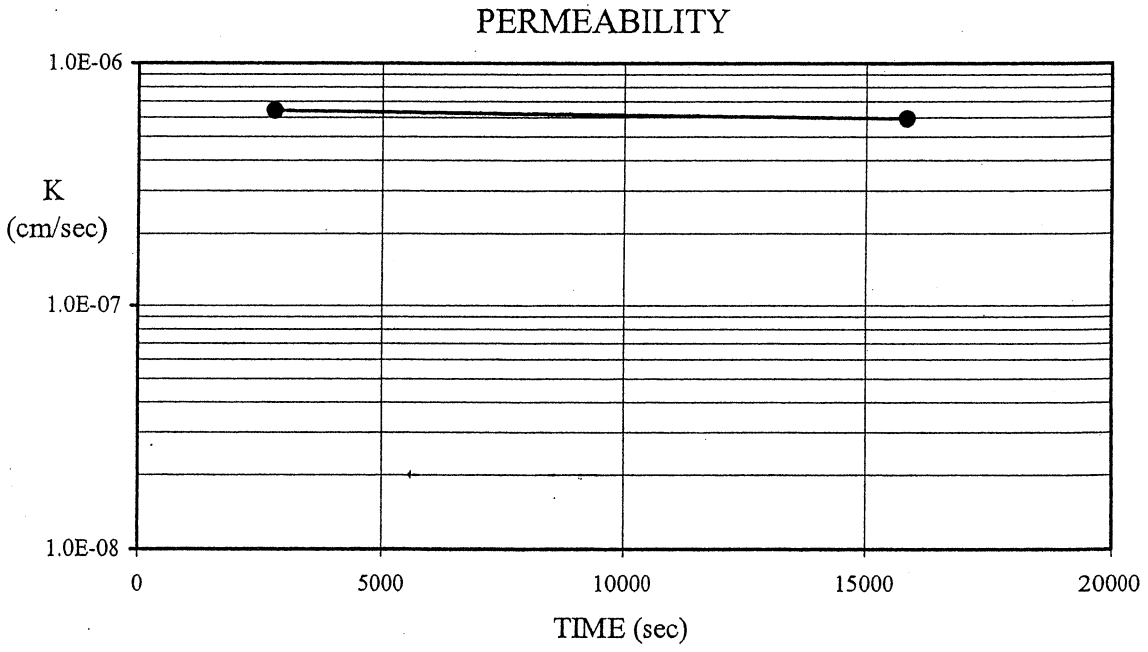
Exploration: B08-03

Sample No.: 2S (X) Undisturbed

Depth (ft.): 14.8-~~16.3~~ 15.5 ( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	7.006	6.989
Length (cm)=	6.327	6.194
Moist. Cont. (%)=	n/a	9.8
Wet Wt. Soil (gms)=	548	548.8
Wet Density (pcf)=	140.2	144.2
Dry Density (pcf)=	n/a	131.3

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	0.94
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	22.7



Average Permeability (cm/sec)= 6.2E-07

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Gray sandy SILT, little gravel

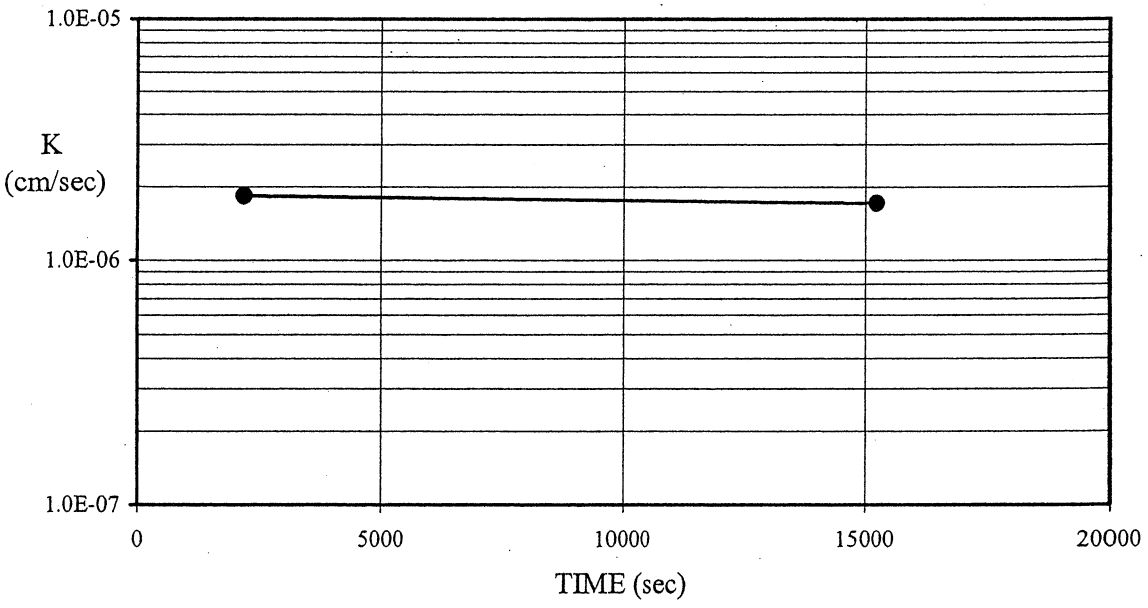
Exploration: B08-04
Sample No.: 1S
Depth (ft.): 7-7.8

(X) Undisturbed
( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	6.985	6.985
Length (cm)=	15.431	15.240
Moist. Cont. (%)=	n/a	14.2
Wet Wt. Soil (gms)=	1261.5	1244.3
Wet Density (pcf)=	133.2	133.0
Dry Density (pcf)=	n/a	116.5

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	0.96
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	9.2

PERMEABILITY



Average Permeability (cm/sec)= 1.8E-06

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Brown sandy SILT, little gravel

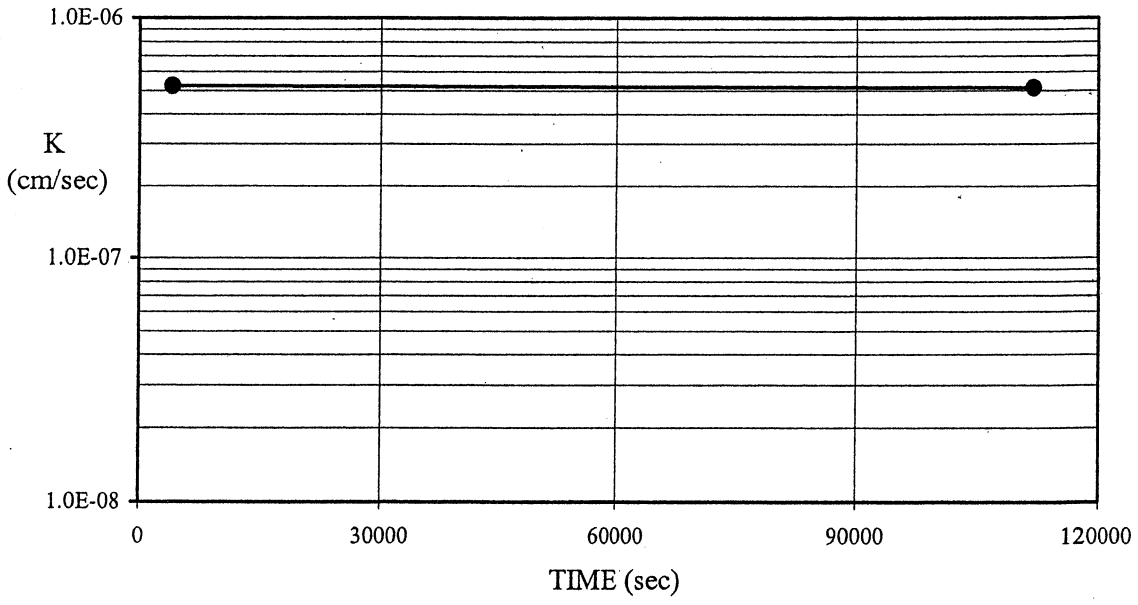
Exploration: B08-05
Sample No.: 1S
Depth (ft.): 7.5-9.0

(X) Undisturbed
( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	7.011	7.004
Length (cm)=	16.669	16.510
Moist. Cont. (%)=	n/a	12.4
Wet Wt. Soil (gms)=	1452	1457.7
Wet Density (pcf)=	140.8	143.1
Dry Density (pcf)=	n/a	127.3

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	0.98
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	8.5

PERMEABILITY



Average Permeability (cm/sec)= 5.2E-07

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Gray sandy SILT, little gravel

Exploration: B08-06

Sample No.: 1S

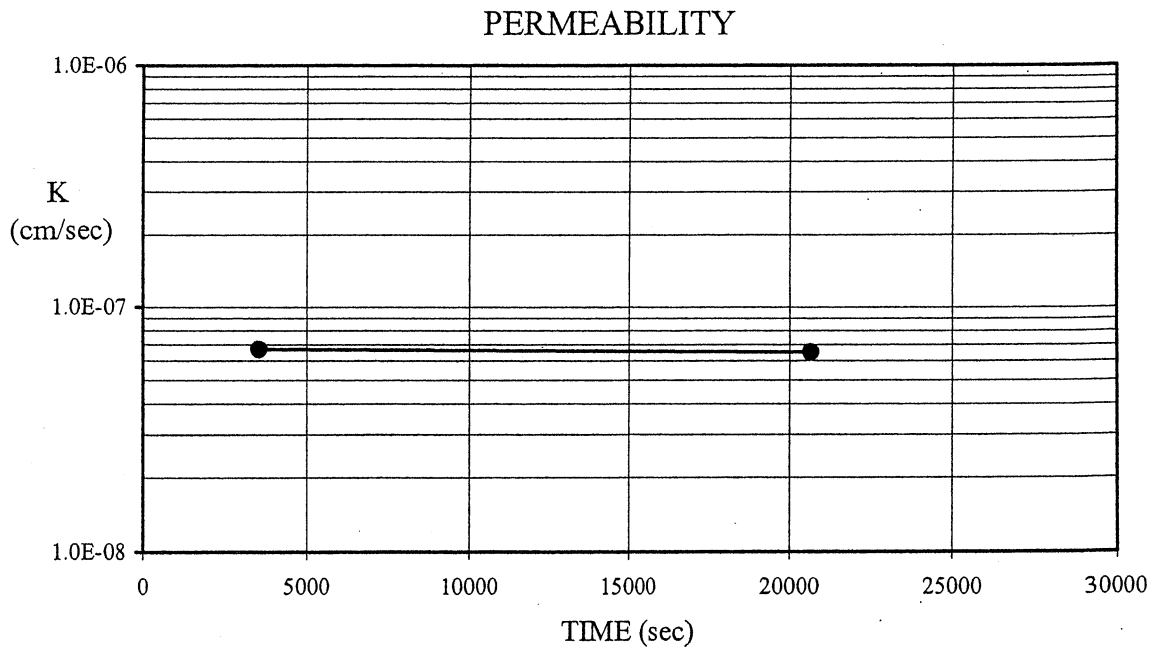
Depth (ft.): 13-14

(X) Undisturbed

( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	7.038	7.010
Length (cm)=	17.145	17.145
Moist. Cont. (%)=	n/a	11.0
Wet Wt. Soil (gms)=	1510.7	1500.5
Wet Density (pcf)=	141.4	141.5
Dry Density (pcf)=	n/a	127.5

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	0.96
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	8.2



Average Permeability (cm/sec)= 6.6E-08

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Brown sandy SILT, little gravel

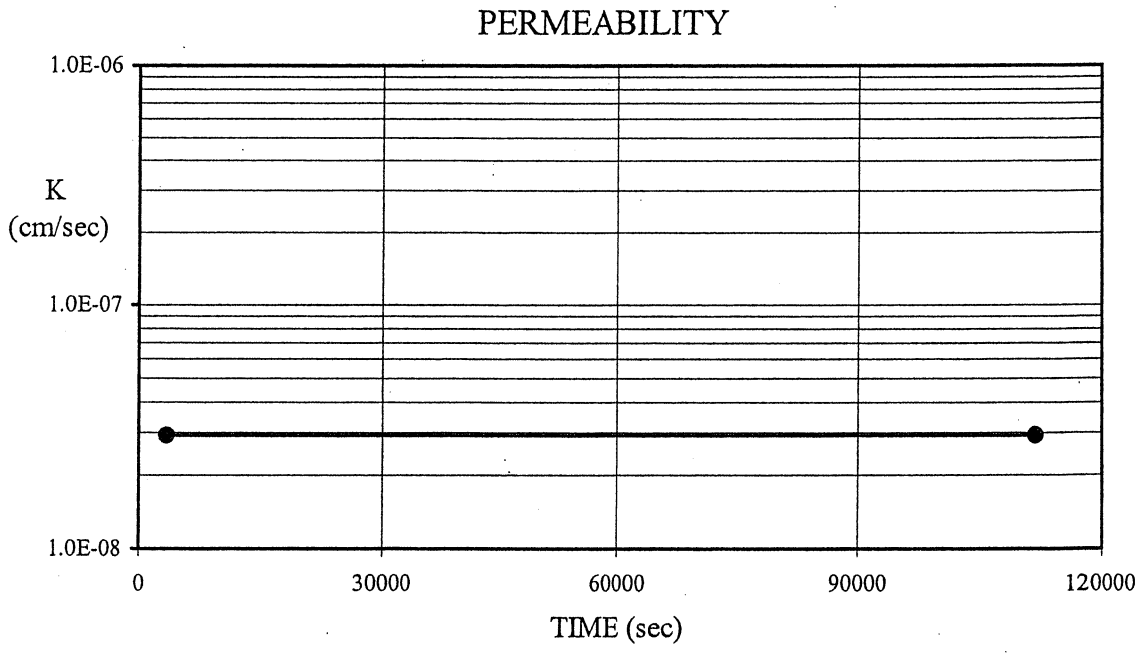
Exploration: B08-07

Sample No.: 1S (X) Undisturbed

Depth (ft.): 10-11.3 ( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	7.004	6.990
Length (cm)=	7.383	7.303
Moist. Cont. (%)=	n/a	11.0
Wet Wt. Soil (gms)=	641.7	642.1
Wet Density (pcf)=	140.8	143.0
Dry Density (pcf)=	n/a	128.9

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	0.94
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	19.3



Average Permeability (cm/sec)= 2.9E-08

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Gray silty SAND, some gravel

Exploration: B08-09

Sample No.: 1S

Depth (ft.): 10.8-11.3

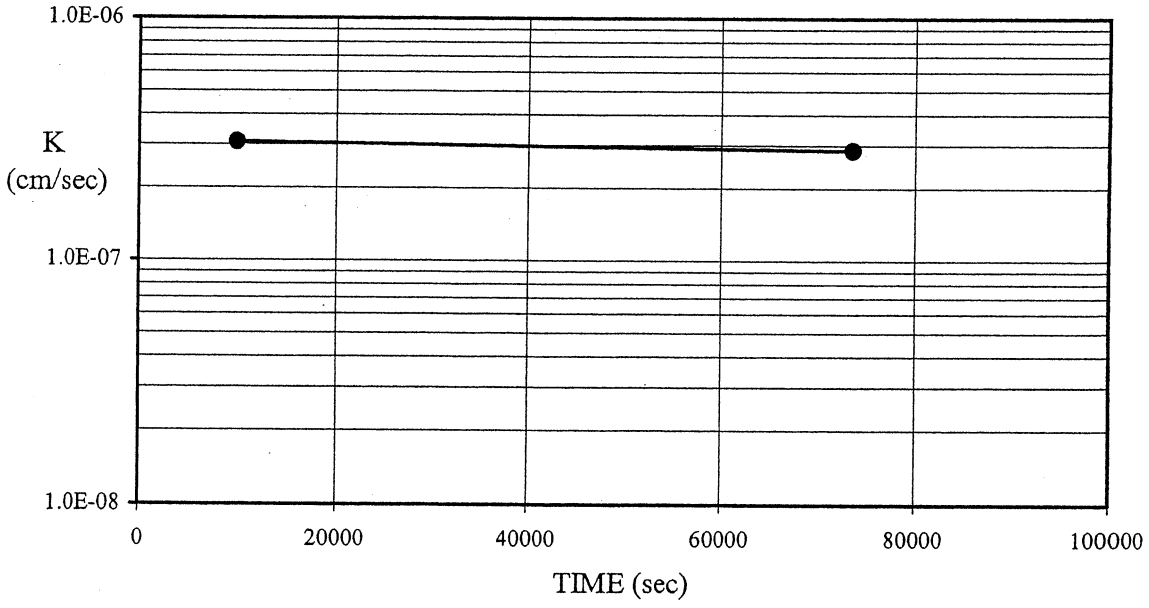
(X) Undisturbed

( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	6.975	6.985
Length (cm)=	10.550	10.283
Moist. Cont. (%)=	n/a	12.8
Wet Wt. Soil (gms)=	896.7	895.2
Wet Density (pcf)=	138.9	141.8
Dry Density (pcf)=	n/a	125.7

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	0.94
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	13.7

PERMEABILITY



Average Permeability (cm/sec)= 3.0E-07

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Gray sandy clayey SILT, little gravel

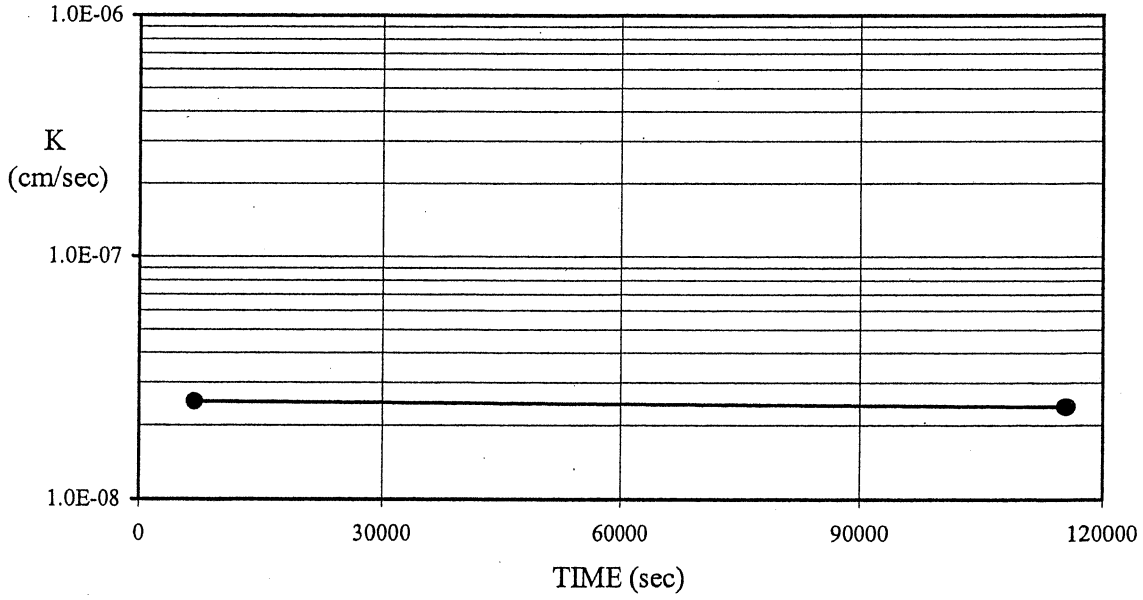
Exploration: B08-10
Sample No.: 1S
Depth (ft.): 11-12.5

(X) Undisturbed
( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	6.987	6.985
Length (cm)=	14.656	14.623
Moist. Cont. (%)=	n/a	13.7
Wet Wt. Soil (gms)=	1257.7	1259.7
Wet Density (pcf)=	139.7	140.3
Dry Density (pcf)=	n/a	123.4

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	1
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	9.6

PERMEABILITY



Average Permeability (cm/sec)= 2.4E-08

Hydraulic Conductivity- ASTM D 5084

Project: Casella WOTLF Expansion

Job No.: 03076.09

Description: Brown sandy SILT with gravel

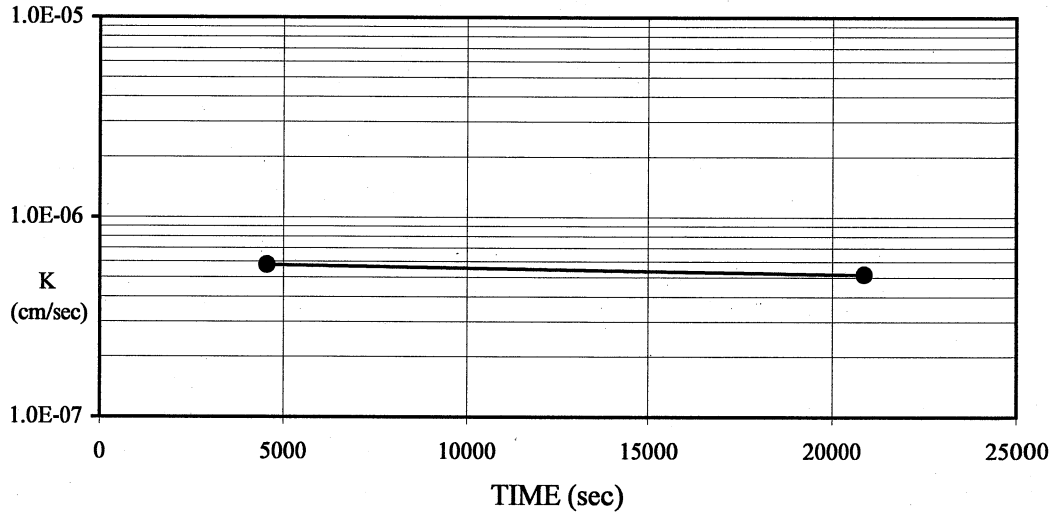
Exploration: B04-05
Sample No.: ^1R
Depth (ft.): 34.6-35.8

(X) Undisturbed
( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	6.617	6.617
Length (cm)=	5.104	5.104
Moist. Cont. (%)=	n/a	9.6
Wet Wt. Soil (gms)=	376.23	378.5
Wet Density (pcf)=	133.8	134.6
Dry Density (pcf)=	n/a	122.8

TEST CONDITIONS	
Cell Press. (psi)=	115.0
Influent Press. (psi)=	110.0
Effluent Press. (psi)=	109.0
B-Value=	0.95
Head (cm)=	70.3
Hyd. Gradient (cm/cm)=	13.8

PERMEABILITY



Average Permeability (cm/sec)= 5.5E-07

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Gray sandy clayey SILT, little gravel

Exploration: B08-01

Sample No.: 1S

Depth (ft.): 16.6-17.8

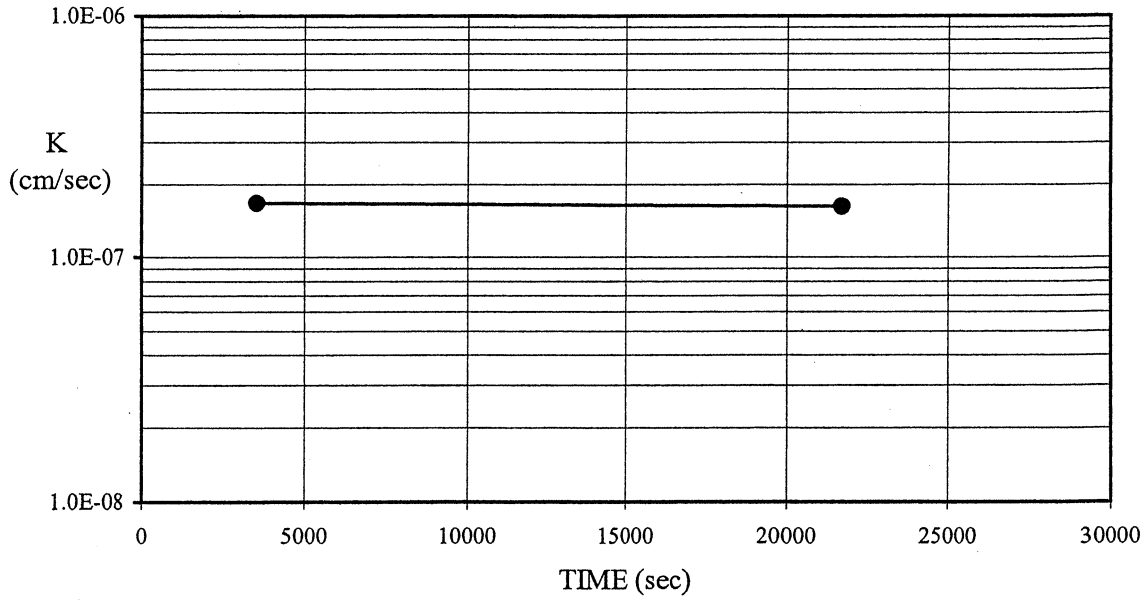
(X) Undisturbed

( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	7.120	7.286
Length (cm)=	18.415	18.415
Moist. Cont. (%)=	n/a	11.9
Wet Wt. Soil (gms)=	1586.8	1577.8
Wet Density (pcf)=	135.1	128.3
Dry Density (pcf)=	n/a	114.7

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	0.92
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	7.6

PERMEABILITY



Average Permeability (cm/sec)= 1.6E-07

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Gray sandy clayey SILT, trace gravel

Exploration: B08-01

Sample No.: 2S

Depth (ft.): 18.3-19.3

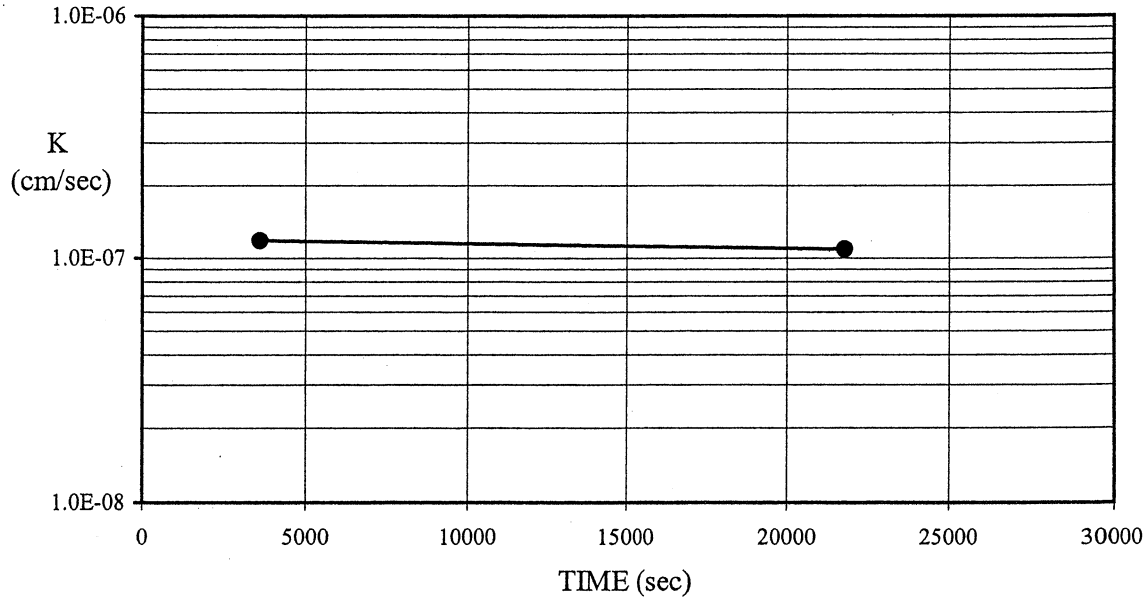
(X) Undisturbed

( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	6.993	6.968
Length (cm)=	5.784	5.538
Moist. Cont. (%)=	n/a	11.9
Wet Wt. Soil (gms)=	469.9	467.6
Wet Density (pcf)=	132.0	138.2
Dry Density (pcf)=	n/a	123.5

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	0.92
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	25.4

PERMEABILITY



Average Permeability (cm/sec)= 1.1E-07

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Gray sandy clayey SILT, little gravel

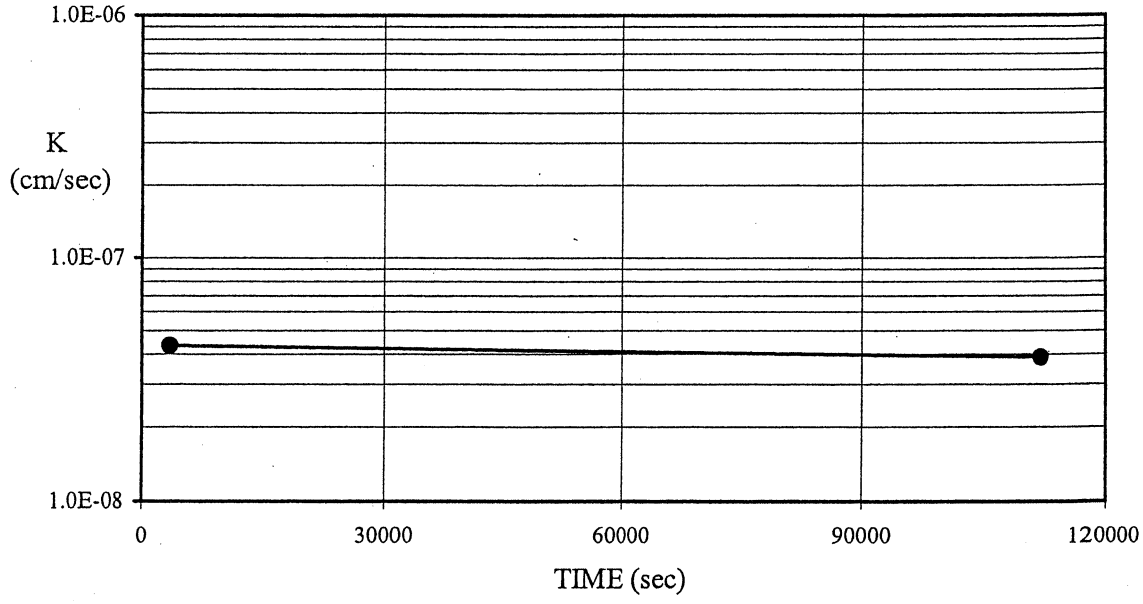
Exploration: B08-10
Sample No.: 3S
Depth (ft.): 15.5-17.0

(X) Undisturbed
( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	6.989	7.009
Length (cm)=	7.487	7.295
Moist. Cont. (%)=	n/a	12.9
Wet Wt. Soil (gms)=	609.3	608.9
Wet Density (pcf)=	132.4	135.1
Dry Density (pcf)=	n/a	119.7

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	0.96
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	19.3

PERMEABILITY



Average Permeability (cm/sec)= 4.1E-08

Hydraulic Conductivity- ASTM D 5084

Project: Casella - JRL Expansion

Job No.: 08097.03

Description: Gray silty SAND, some gravel

Exploration: B08-03

Sample No.: 2 ~~1~~S

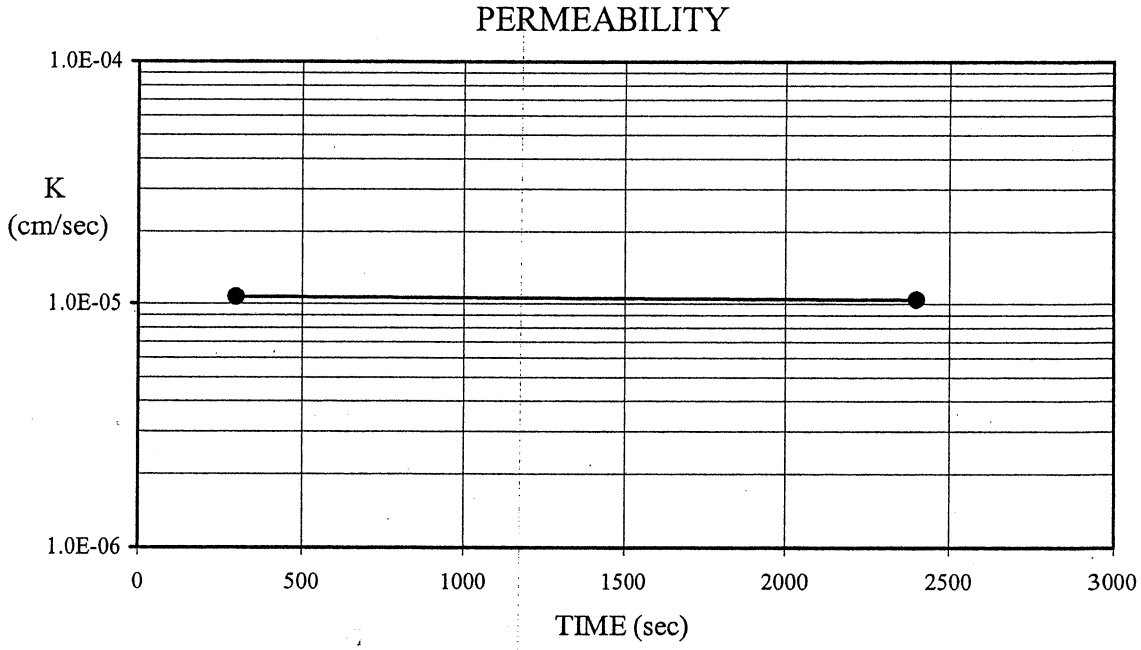
Depth (ft.): ~~17.1-17.5~~ 15.5-16.3

(X) Undisturbed

( ) Remolded

SAMPLE	INITIAL	FINAL
Diameter (cm)=	6.930	6.951
Length (cm)=	7.779	7.583
Moist. Cont. (%)=	n/a	7.9
Wet Wt. Soil (gms)=	651.7	647.3
Wet Density (pcf)=	138.7	140.4
Dry Density (pcf)=	n/a	130.2

TEST CONDITIONS	
Cell Press. (psi)=	105.0
Influent Press. (psi)=	100.0
Effluent Press. (psi)=	98.0
B-Value=	1
Head (cm)=	140.7
Hyd. Gradient (cm/cm)=	18.6



Average Permeability (cm/sec)= 1.1E-05

APPENDIX R

BASAL TILL LABORATORY COLUMN TRACER TEST RESULTS

APPENDIX R

LABORATORY COLUMN TRACER TESTING OF BASAL TILL JUNIPER RIDGE LANDFILL EXPANSION OLD TOWN, MAINE

To determine the effective porosity of the basal till for the groundwater time-of-travel analyses, a laboratory column tracer test was conducted on a remolded sample of silty till collected from the proposed Expansion.

A solute breakthrough curve (BTC) for transport of a nonreactive tracer through a remolded cylindrical soil specimen was generated. A continuous reservoir of a solution of sodium bromide was applied to the soil column input, and the concentration of bromide in the column effluent was measured periodically thereafter. Effluent bromide concentrations were compared to a predicted BTC expressed in terms of relative tracer concentrations and pore volumes. The predicted BTC was determined using the van Genuchten and Parker, 1984 analytical solution to the convection-dispersion equation. Although originally developed to incorporate a semi-infinite soil profile boundary condition, the van Genuchten and Parker solution has been applied to soil columns of finite length. All the variables in the advection-dispersion equation were measured prior to the column test, except effective porosity, solute retardation, and dispersivity. Retardation of the bromide was assumed to be 1.0 and was checked using mass balance of the bromide. Dispersivity was estimated using information from Bear (1972) and Selim and Amacher (1997). Through an iterative process, a series of predicted BTCs were generated reflecting successive refinements to the estimates for the effective porosity and dispersivity. The effective porosity was selected from the predicted BTC that "best fit" the measured effluent bromide concentrations over time.

The column tracer test yielded an effective porosity of 0.255 for the basal till versus a total porosity of 0.245. From this testing, an effective porosity approximately equal to the total porosity appears to be reasonable for the basal till.

References:

Bear, J., 1972. Dynamics of Fluid in Porous Media; American Elsevier, New York, N.Y.

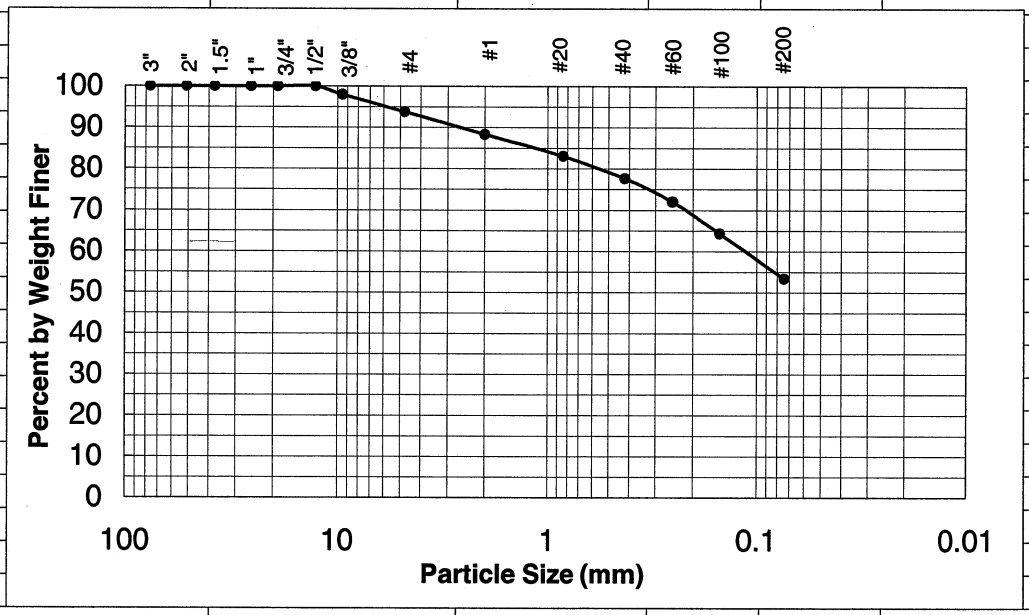
Selim, H.M. and M.C. Amacher, 1997. Reactivity and Transport of Heavy Metals in Soils; CRC Press, Inc., Lewis Publishers, New York.

van Genuchten, M.T. and J.C. Parker, 1984. Boundary Conditions for Displacement Experiments Through Short Laboratory Soil Columns, Soil Science Society of America Journal, Vol. 48, pp.703-708.

SEVEE & MAHER ENGINEERS
4 BLANCHARD ROAD
CUMBERLAND CTR., MAINE 04021
(207) 829-5016

GRAIN SIZE ANALYSIS - ASTM D422

PROJECT NAME:	Casella		PROJECT No:		05055
	WOTLF		DATE:		JUNE 05
SAMPLE SOURCE:	TRACER TEST		SAMPLE No:		Composite
SAMPLE DESCRIP:	Brown sandy SILT, trace gravel				
		DATA			
			SPECIFICATION		
U.S Std SIEVE (in.)	PARTICLE SIZE (mm)	% by WT. FINER	Min	Max	P / F
3	76.2	**100.0**			
2	50.8	**100.0**			
1.5	37.5	**100.0**			
1	25.4	**100.0**			
3/4	19.1	**100.0**			
1/2	12.7	**100.0**			
3/8	9.5	**97.9**			
#4	4.76	**93.7**			
#10	2.0	**88.3**			
#20	0.84	**83.1**			
#40	0.42	**77.6**			
#60	0.25	**72.0**			
#100	0.149	**64.3**			
#200	0.074	**53.3**			



Water Content (%) =	11.2

SPECIFIC GRAVITY OF SOIL SOLIDS (G_s)

Project CASELLA Job No. _____

Location of Project JUNIPER RIDGE LANDFILL Boring No. B08-10 Sample No. 1S

Description of Soil Br/gr sandy clayey SILT Depth of Sample 11.5

Tested By EJL Date of Testing 7 JAN 09

Test no.	1	2		
Vol. of flask at 20°C	200ml			
Method of air removal[a]				
Wt. flask + water + soil = W_{bws}	495.2	490.1		
Temperature, °C	23.8	24.1		
Wt. flask + water[b] = W_{bw}	418.8	419.7		
Evap. dish no.	A-4	A-36		
Wt. evap. dish + dry soil	345.67	331.84		
Wt. of evap. dish	226.30	221.90		
Wt. of dry soil = W_s	119.37	109.94		
$W_w = W_s + W_{bw} - W_{bws}$	42.97	39.54		
$G_s = \alpha W_s / W_w$	2.77[1]	2.77[3]		

[a]Indicate vacuum or aspirator for air removal.

[b]W_{bw} is the weight of the flask filled with water at same temp. ± 1°C as for W_{bws} or value from calibration curve at T of W_{bws}.

Remarks _____

Average specific gravity of soil solids (G_s) = 2.77

Typical values of the correction factor, α

T, °C	α	γ_w, g/cm³
16	1.0007	0.99897
18	1.0004	0.99862
20	1.0000	0.99823
22	0.9996	0.99780
24	0.9991	0.99732
26	0.9986	0.99681

Typical values of G_s

Type of soil	G_s
Sand	2.65-2.67
Silty sand	2.67-2.70
Inorganic clay	2.70-2.80
Soils with micas or iron	2.75-3.00
Organic soils	Variable but may be under 2.00

Hydraulic Conductivity - ASTM D 5084

Project:	Casella -WOTLF Expansion		Job No.:	05055	
Exploration:	MW04-1,2,4	( ) Undisturbed	Description:	Brown sandy SILT	
Sample No.:	composite	(X) Remolded			
Depth (ft.):	5-10.7			331.714	Vt
				247.807	Vs
				83.907	Vv

Initial Specimen Conditions

Diameter (in)	Length (in)	Moisture Content (%)		
2.825	3.282	148.28	Wet Wt. of Soil=	766.9
2.827	3.280	139.25	Wet Density (pcf)=	141.8
2.828	3.290	51.16	Dry Density (pcf)=	128.5
7.180 cm	8.341 cm	10.3 %	% Compaction (%)=	111.8

Final Specimen Conditions

Diameter (in)	Length (in)	Moisture Content (%)		
2.815	3.231	985.80	Wet Wt. of Soil=	771.5
2.821	3.225	908.20	Wet Density (pcf)=	145.2
2.827	3.260	214.70	Dry Density (pcf)=	130.6
7.165 cm	8.226 cm	11.2 %	% Compaction (%)=	113.5

Test Conditions

Cell Pressure (psi)=	115.0
Infuent Pressure (psi)=	110.0
Effluent Pressure (psi)=	109.0
Head (cm)=	70.3
Hydraulic Gradient (cm/cm)=	8.55
B-Value=	0.96

Permeability

	TIME	El. Time (sec)	IN (cc)	OUT (cc)	AVE	Q (cc/sec)	K (cm/sec)
start	6/2/2004 13:45	0	9.20	13.80	0.00		
reading	6/2/2004 17:48	14580	9.65	13.30	0.48	3.3E-05	9.4E-08
stop	6/3/2004 19:43	107880	12.60	9.90	3.65	3.4E-05	9.8E-08
	6/4/2004 11:04	148560	14.30	8.05	4.95	3.3E-05	9.7E-08
	6/6/2004 9:07	221040	19.00	2.90	6.70	3.0E-05	8.8E-08
	6/7/2004 10:05	255660	21.40	0.30	7.43	2.9E-05	8.4E-08

Exploration: MW04-1,2,4
Sample No.: composite
Depth (ft.): 5-10.7

CASELLA - COLUMN TRACER STUDY #1

BROWN SANDY SILT

							Volume to bottom of sample (cc)=		10.9								
	Length (cm)=	8.22621					Pore Volume (cc)=		83.907				Tot. Porosity=	0.25			
	Area (sq.cm)=	40.3241				Volume from top of sample to sampling port (cc)=			14.3				Eff. Porosity=	0.27			
	Head (cm)=	70.338					Initial concentration (Co)=		4076				Dispersion=	.35 * V			
		Elasped		Wt.	Temp	Volume	Volume	Ave. Total	Pore	Chloride							
	Time	Time	Sample	sample	Sample	IN	OUT	Volume	Volume	Reading	Diluted	C	C/Co	k	BTCPV	BTC(C)	BTC(C/Co)
Date	(min)	(min)	No.	(gms)	(degree C)	(ml)	(ml)	(ml)	(cc)	(ppm)	(ppm)	(ppm)	(%)	(cm/sec)			
6/2/2005 10:04																	
6/2/2005 17:23	439	439	1	3.22	23	4.9	4.75	-6.08	-0.07	3.0	6.8	48.9	0.01	5.3E-07	0.1	1.00E-03	0.00
6/2/2005 17:34																	
6/3/2005 8:39	905	1344	2	3.23	21.9	9.5	9.6	3.48	0.04	2.8	6.3	45.7	0.01	5.1E-07	0.2	4.7	0.00
6/3/2005 9:07																	
6/3/2005 15:12	365	1709	3	3.27	22.2	4.05	4	7.50	0.09	3.0	6.8	48.9	0.01	5.3E-07	0.3	71.2	0.02
6/3/2005 15:36																	
6/4/2005 9:14	1058	2767	4	3.28	23.5	9.2	9.35	16.78	0.20	2.9	6.5	47.3	0.01	4.2E-07	0.4	270.8	0.07
6/4/2005 9:28																	
6/4/2005 20:15	647	3414	5	3.26	23.2	6.45	6.55	23.28	0.28	3.0	6.8	48.9	0.01	4.9E-07	0.5	591.3	0.15
6/4/2005 20:29																	
6/5/2005 9:29	780	4194	6	3.3	23.2	8.85	8.8	32.10	0.38	3.1	7.0	50.5	0.01	5.5E-07	0.6	977.5	0.24
6/5/2005 9:41																	
6/5/2005 19:18	577	4771	7	3.26	22.4	5.15	5	37.18	0.44	4.2	9.5	68.5	0.02	4.3E-07	0.7	1,379.0	0.34
6/5/2005 19:28																	
6/6/2005 8:52	804	5575	8	3.15	22.3	7.65	7.7	44.85	0.53	10.0	22.5	163.0	0.04	4.6E-07	0.8	1,763	0.43
6/6/2005 9:08																	
6/6/2005 16:21	433	6008	9	3.15	22.3	4	4	48.85	0.58	12.0	27.0	195.7	0.05	4.5E-07	0.9	2,111	0.52
6/6/2005 16:31																	
6/7/2005 8:51	980	6988	10	3.23	22.6	9.15	8.75	57.80	0.69	25.0	56.3	407.6	0.10	4.4E-07	1	2,418	0.59
6/7/2005 9:02																	
6/7/2005 18:28	566	7554	11	3.27	22.9	5.55	5.55	63.35	0.76	44.0	99.0	717.4	0.18	4.7E-07	1.1	2,682	0.66
6/7/2005 18:33																	
6/8/2005 8:32	839	8393	12	3.21	22.7	8.1	8.15	71.48	0.85	70.0	157.5	1141.3	0.28	4.7E-07	1.2	2,906	0.71
6/8/2005 9:31																	
6/8/2005 18:12	521	8914	13	3.31	22.7	5.5	5.5	76.98	0.92	92.0	207.0	1500.0	0.37	5.1E-07	1.3	3,095	0.76
6/8/2005 18:23																	
6/9/2005 8:49	866	9780	14	3.14	22.3	9.25	9.3	86.25	1.03	120	270.0	1956.5	0.48	5.2E-07	1.4	3,252	0.80
6/9/2005 8:58																	
6/9/2005 19:42	644	10424	15	3.26	22.7	6.2	6.1	92.40	1.10	150	337.5	2445.7	0.60	4.6E-07	1.5	3,383	0.83
6/9/2005 19:50																	
6/10/2005 9:18	808	11232	16	3.23	22.6	8.4	8.5	100.85	1.20	175	393.8	2853.3	0.70	5.1E-07	1.6	3,491	0.86
6/10/2005 9:39																	
6/10/2005 20:03	624	11856	17	3.28	23.3	5.9	6	106.80	1.27	190	427.5	3097.8	0.76	4.6E-07	1.7	3,581	0.88
6/10/2005 20:25																	

Exploration: MW04-1,2,4
Sample No.: composite
Depth (ft.): 5-10.7

CASELLA - COLUMN TRACER STUDY #1

BROWN SANDY SILT

								Volume to bottom of sample (cc)=		10.9							
	Length (cm)=		8.22621					Pore Volume (cc)=		83.907				Tot. Porosity=	0.25		
	Area (sq.cm)=		40.3241				Volume from top of sample to sampling port (cc)=			14.3				Eff. Porosity=	0.27		
	Head (cm)=		70.338					Initial concentration (Co)=		4076				Dispersion=	.35 * V		
		Elasped		Wt.	Temp	Volume	Volume	Ave. Total	Pore	Chloride							
	Time	Time	Sample	sample	Sample	IN	OUT	Volume	Volume	Reading	Diluted	C	C/Co	k	BTCPV	BTC(C)	BTC(C/Co)
Date	(min)	(min)	No.	(gms)	(degree C)	(ml)	(ml)	(ml)	(cc)	(ppm)	(ppm)	(ppm)	(%)	(cm/sec)			
6/11/2005 8:45	740	12596	18	3.25	23.3	8.5	8.65	115.38	1.38	220	495.0	3587.0	0.88	5.6E-07	1.8	3,655	0.90
6/11/2005 19:59																	
6/12/2005 10:45	886	13482	19	3.26	23.3	10	10.15	125.45	1.50	235	528.8	3831.5	0.94	5.5E-07	1.9	3,715	0.91
6/12/2005 10:50																	
6/12/2005 19:53	543	14025	20	3.3	23.4	6.4	6.4	131.85	1.57	240	540.0	3913.0	0.96	5.7E-07	2	3,766	0.92
6/12/2005 20:07																	
6/13/2005 8:28	741	14766	21	3.25	22.4	8.3	8	140.00	1.67	250	562.5	4076.1	1.00	5.3E-07			
6/13/2005 8:35																	
6/13/2005 20:13	698	15464	22	3.27	22.5	6.9	7	146.95	1.75	255	573.8	4157.6	1.02	4.8E-07			
6/13/2005 20:22																	
6/14/2005 15:16	1134	16598	23	3.26	22.3	10.25	10.3	157.23	1.87	250	562.5	4076.1	1.00	4.4E-07			
6/14/2005 15:27																	
6/15/2005 17:02	1535	18133	24	3.32	23.1	12.95	13.05	170.23	2.03	250	562.5	4076.1	1.00	4.1E-07			
6/15/2005 17:11																	
6/16/2005 17:05	1434	19567	25	3.26	23	12.2	12.2	182.43	2.17	250	562.5	4076.1	1.00	4.1E-07			
			Average	3.25	22.8									4.9E-07			

Van Genuchten and Parker Column Tracer Test Solution-JRL

remolded sample of brown sandy silt till

solution to one-dimensional solute transport equation after van genuchten and parker 1984. finite column which assumes concentration grad at L is equal to zero. flux into column preserves dispersive and advective qualities thru use of type 3 boundary condition.

for $\alpha < L$

note: burette volumes in cc, conc of tracer in mg/l, and elapsed time in min.

temperature during test varied from 21.9 to 23.5 °C.

number of data points: $ndp := 24$

$cndp := ndp - 2$

$$M := \begin{pmatrix} 3.47 & 0 & 1344 \\ 7.49 & 0 & 1709 \\ 16.78 & 0 & 2767 \\ 23.28 & 0 & 3414 \\ 32.1 & 50.5 & 4194 \\ 37.18 & 68.5 & 4771 \\ 44.85 & 163 & 5575 \\ 48.85 & 195.7 & 6008 \\ 57.8 & 407.6 & 6988 \\ 63.35 & 717.4 & 7554 \\ 71.48 & 1141.3 & 8393 \\ 76.98 & 1500 & 8914 \\ 86.25 & 1956.5 & 9780 \\ 92.4 & 2445.7 & 10424 \\ 100.85 & 2853.3 & 11232 \\ 106.8 & 3097.8 & 11856 \\ 115.38 & 3587 & 12596 \\ 125.45 & 3831.5 & 13482 \\ 131.85 & 3913 & 14025 \\ 140 & 4076.1 & 14766 \\ 146.95 & 4157.6 & 15464 \\ 157.23 & 4076.1 & 16598 \\ 170.23 & 4076.1 & 18133 \\ 182.43 & 4076.1 & 19567 \end{pmatrix}$$

$xx := M^{\langle 0 \rangle}$ $\quad yy := M^{\langle 1 \rangle}$ $\quad zz := M^{\langle 2 \rangle}$

$i := 0, 1 .. cndp$

$$q_i := \frac{xx_{i+1} - xx_i}{zz_{i+1} - zz_i} \cdot \frac{1}{60}$$

$indp := ndp - 1$

$$avgq := \frac{\sum_{l=0}^{cndp} q_l}{indp}$$

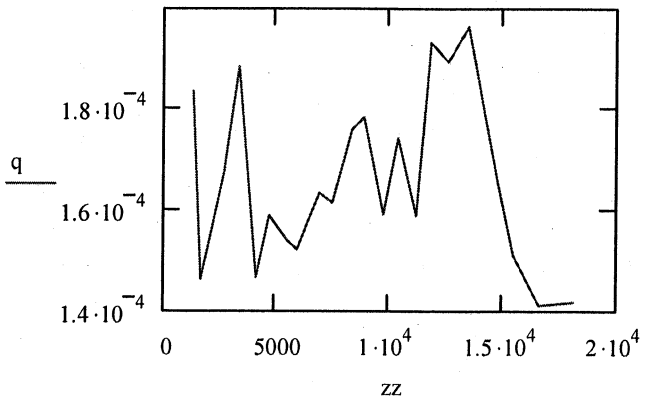
$avgq = 1.666 \times 10^{-4}$ cc/s

$$qavg := \frac{xx_{indp} - xx_0}{zz_{indp} - zz_0} \frac{1}{60}$$

$qavg = 1.637 \times 10^{-4}$ cc/s

$$\frac{avgq}{qavg} = 1.018$$

note: within 2%



a few checks before we calculate theoretical breakthru curve:

fixed parameters(cgs units):

$H := 70.338$ $Co := 4076.$ $L := 8.226$ $\tau := 1.2$

$Dm := 20.1 \cdot 10^{-6}$ $sg := 2.77$ $d := 7.165$ $nt := .245$

$$k := \frac{avgq \cdot 4 \cdot L}{H \cdot d^2 \cdot \pi} \qquad k = 4.832 \times 10^{-7} \quad cm/s$$

Dm from table 10.1 domenico and schwartz, 1990 for bromide at 25 deg C , τ from page 368 ibid

adjustible variables(cgs units):

$ne := .255$ $\alpha := .25$

Is α/L less than 1? $\frac{\alpha}{L} = 0.03$

calculated parameters(cgs units):

$$v := \frac{avgq \cdot 4}{\pi \cdot d^2 \cdot ne} \qquad v = 1.62 \times 10^{-5} \quad cm/s$$

$$D := \alpha \cdot v + Dm \cdot \frac{ne}{\tau} \qquad PV := \frac{L \cdot ne \cdot \pi \cdot d^2}{4} \qquad PV = 84.577$$

$$\frac{D}{Dm} = 0.414$$

travel time check thru column of length L: $\frac{L}{v \cdot 3600 \cdot 24} = 5.876$ days

less than test length

peclet number check:

$\frac{L \cdot v}{D} = 16.016$ note the use of L and not grain size

advective dispersion over-rides molecular diffusion

Reynolds number check(cgs units):

$\rho w := .99762$ gm/cc average density at 23^0 C and average salinity

$\mu := .00933$ gm/cm-s average viscosity of water at 23^0 C

$deff := .003$ cm assumed effective particle size

$\frac{v \cdot ne \cdot deff \cdot \rho w}{\mu} = 1.325 \times 10^{-6}$ laminar flow (less than 1 to 10)

recalculate hydraulic conductivity for 10° C:

$\mu 10 := .01308$ $\rho w10 := 0.99977$

$k \cdot \frac{\mu}{\mu 10} \cdot \frac{\rho w10}{\rho w} = 3.454 \times 10^{-7}$ cm/s

check on retardation coefficent(R) based on tracer mass balance in/thru column::

volume of tubing and stone before soil specimen (v1) and after soil specimen up to sampling port (v2).

$v1 := 10.9$ cc $v2 := 14.3$ cc volume zero offset: $v3 := 10.9$ cc

$\rho := (1 - nt) \cdot sg \cdot \rho w$

$indp := ndp - 1$

assume conc at specimen exit (C_{out}) is about the same as at sampling port ($M_{x,1}$)

$Cout := M_{indp,1}$

$$A := \left[\left[\sum_{m=0}^{cndp} \frac{\left(M_{m+1,0} - M_{m,0}\right)\cdot\left(M_{m,1} + M_{m+1,1}\right)}{2000}\right] + \frac{Co + Cout}{2}\cdot\frac{PV}{1000}\right] + \frac{v2\cdot\left(M_{indp,1} + Cout\right)}{2000}$$

$A = 792.468$ mg Br

$$B := \frac{\left(M_{indp,0} + v3\right)\cdot Co}{1000}$$

$B = 788.013$ mg Br

$CC := B - A$

$$Kd := \frac{CC\cdot 8}{\rho\cdot L\cdot\pi\cdot d^2}\cdot\frac{1000}{Co + M_{indp,1}}$$

$Kd = -1.579 \times 10^{-3}$

$$RC := 1 + \frac{\rho\cdot Kd}{ne}$$

$RC = 0.987$

$$\frac{CC}{B}\cdot 100 = -0.565\ \%$$

the above difference is within the variability of the test kit for tracer concentration measurement. assume R=1.

theoretical breakthru curve:

solve for roots of iterative expression in solution:

$R := 1.$

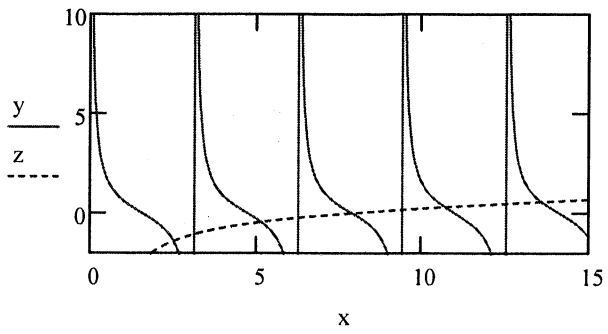
$i := 1, 2 .. 1500$ $\quad x_i := \frac{i}{100}$

$y_i := \cot\left(x_i\right)$ $\quad a := \frac{D}{L\cdot v}$ $\quad b := \frac{L\cdot v}{4\cdot D}$

$a = 0.062$

$b = 4.004$

$$z_i := a\cdot x_i - \frac{b}{x_i}$$



$x := 2.5$

$\beta_1 := \text{root}\left[\left(x \cdot \cot(x) - x^2 \cdot a + b\right), x\right]$ $\beta_1 = 2.53$

$x := 5.2$

$\beta_2 := \text{root}\left[\left(x \cdot \cot(x) - x^2 \cdot a + b\right), x\right]$ $\beta_2 = 5.142$

$\pi \cdot 2 = 6.283$

$x := 8$

$\beta_3 := \text{root}\left[\left(x \cdot \cot(x) - x^2 \cdot a + b\right), x\right]$ $\beta_3 = 7.871$

$x := 9.9$

$\beta_4 := \text{root}\left[\left(x \cdot \cot(x) - x^2 \cdot a + b\right), x\right]$ $\beta_4 = 10.709$

$\pi \cdot 4 = 12.566$

$x := 13.6$

$\beta_5 := \text{root}\left[\left(x \cdot \cot(x) - x^2 \cdot a + b\right), x\right]$

$\beta_5 = 13.629$

$\pi \cdot 5 = 15.708$

$x := 16.8$

$\beta_6 := \text{root}\left[\left(x \cdot \cot(x) - x^2 \cdot a + b\right), x\right]$ $\beta_6 = 16.607$

$\pi \cdot 6 = 18.85$

$x := 18.9$

$\beta_7 := \text{root}\left[\left(x \cdot \cot(x) - x^2 \cdot a + b\right), x\right]$ $\beta_7 = 19.624$

$\pi \cdot 7 = 21.991$

$x := 22$

$\beta_8 := \text{root}\left[\left(x\cdot\cot(x) - x^2\cdot a + b\right), x\right]$ $\beta_8 = 22.67$

$\pi\cdot 8 = 25.133$

$x := 25.17$

$\beta_9 := \text{root}\left[\left(x\cdot\cot(x) - x^2\cdot a + b\right), x\right]$ $\beta_9 = 25.736$

$\pi\cdot 9 = 28.274$

$x := 28.3$

$\beta_{10} := \text{root}\left[\left(x\cdot\cot(x) - x^2\cdot a + b\right), x\right]$ $\beta_{10} = 28.816$

$\pi\cdot 10 = 31.416$

$x := 31.4$

$\beta_{11} := \text{root}\left[\left(x\cdot\cot(x) - x^2\cdot a + b\right), x\right]$ $\beta_{11} = 31.908$

$\pi\cdot 11 = 34.558$

$x := 34.58$

$\beta_{12} := \text{root}\left[\left(x\cdot\cot(x) - x^2\cdot a + b\right), x\right]$ $\beta_{12} = 35.007$

$\pi\cdot 12 = 37.699$

$x := 37.7$

$\beta_{13} := \text{root}\left[\left(x\cdot\cot(x) - x^2\cdot a + b\right), x\right]$ $\beta_{13} = 38.113$

$i := 14, 15 .. 200$

$\beta_i := (i - 1)\cdot\pi$ $\beta_{14} = 40.841$

note that this approximation at large i will change with slope "a"

$j := 1, 2 .. 30$

$P_j := \frac{j}{10}$ $P_0 := 0$ $C_0 := 0$

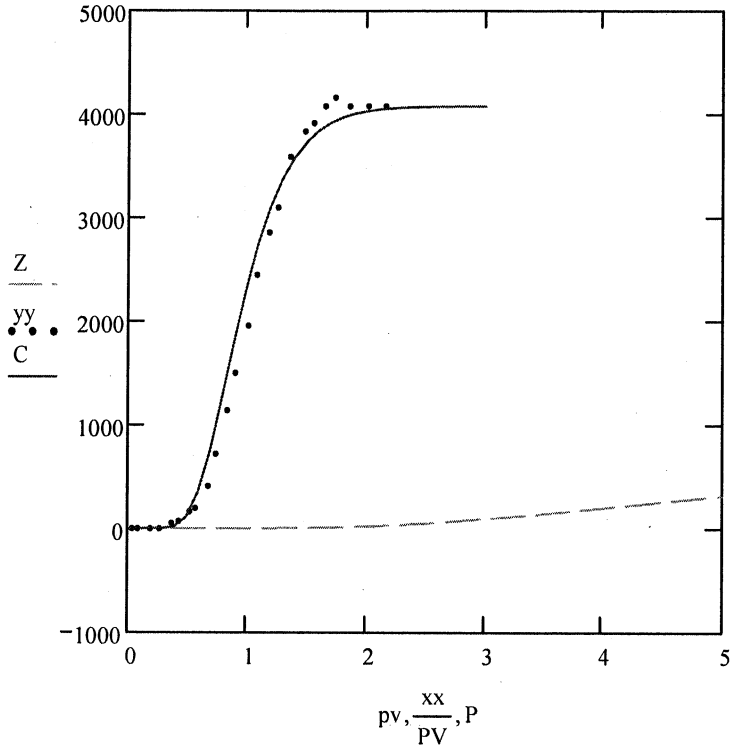
$$C_j := Co - Co \cdot \sum_{m=1}^{200} \frac{2 \cdot \beta_m \cdot \sin(\beta_m) \cdot \exp\left[\frac{L \cdot v}{2 \cdot D} - \frac{L \cdot P_j \cdot v}{4 \cdot D \cdot R} - \frac{(\beta_m)^2 \cdot D \cdot P_j}{L \cdot R \cdot v}\right]}{(\beta_m)^2 + \left(\frac{L \cdot v}{2 \cdot D}\right)^2 + \frac{L \cdot v}{D}}$$

$P_j =$	$C_j =$
0.1	-3.004
0.2	$7.117 \cdot 10^{-4}$
0.3	0.655
0.4	17.177
0.5	110.647
0.6	352.867
0.7	754.873
0.8	$1.263 \cdot 10^3$
0.9	$1.801 \cdot 10^3$
1	$2.307 \cdot 10^3$
1.1	$2.744 \cdot 10^3$
1.2	$3.099 \cdot 10^3$
1.3	$3.375 \cdot 10^3$
1.4	$3.581 \cdot 10^3$
1.5	$3.732 \cdot 10^3$
1.6	$3.84 \cdot 10^3$

if only molecular diffusion controlled transport thru column(no advective transport):

$jj := 1, 2 .. 66$ $\qquad tt_{jj} := jj \cdot 2000$

$$Z_{jj} := Co \cdot \operatorname{erfc}\left(.5 \cdot \sqrt{\frac{L^2 \cdot \tau}{Dm \cdot tt_{jj} \cdot 60 \cdot ne}}\right) \qquad pv_{jj} := tt_{jj} \cdot \frac{v}{L} \cdot 60$$



check on residuals for curve fit using sum-of-squares and arithmetic difference sum:

$$j := 0, 1 .. cndp$$

$$Cest_j := Co - Co \cdot \sum_{m=1}^{200} \frac{2 \cdot \beta_m \cdot \sin(\beta_m) \cdot \exp\left[\frac{L \cdot v}{2 \cdot D} - \frac{L \cdot \frac{xx_j}{PV} \cdot v}{4 \cdot D \cdot R} - \frac{\left[(\beta_m)^2 \cdot D\right] \cdot \frac{xx_j}{PV}}{L \cdot R \cdot v}\right]}{(\beta_m)^2 + \left(\frac{L \cdot v}{2 \cdot D}\right)^2 + \frac{L \cdot v}{D}}$$

$$resss := \left[\frac{\sum_{n=0}^{cndp} \left(Cest_n - yy_n\right)^2}{indp}\right]$$

$$resd := \sum_{n=0}^{cndp} \left(Cest_n - yy_n\right)$$

$$resss = 1.508 \times 10^5$$

$$resd = -54.056$$

APPENDIX S

CLAY LINER SOIL TEST RESULTS

APPENDIX S

MARINE CLAY SUMMARY
USED IN CELLS 3B AND 4
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

Sample Lab ID#	Water Content (%)	Fines Content (%)	Maximum Dry Density[2] (pcf)	Optimum Water Content (%)	Measured Laboratory Hydraulic Conductivity (cm/sec)	Liquid Limit (%)	Plastic Limit (%)	Unified Soil Classification	Total Porosity From Dry Density[1]	Total Porosity From Water Content[1]
CELL 3B										
5736B	24.2	99.2	107.0	20.0	3.7E-08	34	20	CL	0.39	0.41
5737B	22.6	99.0	106.1	19.7	5.3E-08	35	19	CL	0.40	0.39
5738B	25.6	98.6	106.7	18.7	4.5E-08	32	18	CL	0.39	0.42
5739B	25.1	100	109.1	17.4	6.7E-08	31	19	CL	0.38	0.41
5740B	23.8	99.4	107.6	18.4	2.6E-08	33	19	CL	0.39	0.40
5741B	23.9	99.7	109.1	17.9	1.9E-08	32	19	CL	0.38	0.40
5742B	25.5	99.8	109.5	18.7	3.7E-08	32	21	CL	0.38	0.42
6262B	19.5	98.7	111.0	17.2	2.6E-08	31	22	CL	0.37	0.35
6263B	23.7	99.7	109.2	18.5	6.2E-08	32	20	CL	0.38	0.40
CELL 4										
8934B	26.3	91.0	108.7	17.0	4.0E-08	31	18	CL	0.38	0.43
8935B	24.7	90.1	109.7	17.1	8.3E-08	31	21	CL	0.38	0.41
9264B	26.1	99.5	105.4	20.4	3.1E-08	31	18	CL	0.40	0.42
9265B	26.2	99.5	106.7	18.4	2.1E-08	33	19	CL	0.39	0.43
9266B	24.0	99.3	105.6	20.2	3.6E-08	33	20	CL	0.40	0.40
9267B	23.0	97.5	108.1	18.3	7.3E-08	33	19	CL	0.39	0.39
9268B	24.2	96.1	106.8	18.2	2.3E-08	33	19	CL	0.39	0.41
9269B	23.2	99.4	109.0	19.6	2.6E-08	35	20	CL	0.38	0.40
Average[3]	24.2	98.0	108.0	18.6	3.8E-08				0.39	0.41

Notes
1. Total porosity calculated using an average specific gravity of 2.82 derived from testing of comparable marine clay at two other Maine Sites.
2. Maximum dry density determined by ASTM Method D 698.
3. Hydraulic conductivity value represents a geometric mean, all other averages are arithmetic mean.
4. From SME construction documentation records.

APPENDIX T

MARINE CLAY EFFECTIVE POROSITY TRACER TEST SUMMARY

APPENDIX T

MARINE CLAY EFFECTIVE POROSITY TESTING
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

Site	Water Content (%)	Dry Density (pcf)	Measured Laboratory Hydraulic Conductivity (cm/sec)	Liquid Limit (%)	Plastic Limit (%)	Measured Specific Gravity	Total Porosity from Dry Density	Total Porosity from Water Content	Column Tracer Effective Porosity	Comments
Sappi[1]										
B03-7	44.6	77.5	4.1E-08	-	-	2.85	0.56	0.56	0.56	Undisturbed Gray Silty Clay
B04-10	34.9	88.1	3.4E-08	-	-	2.83	0.50	0.50	0.48	Undisturbed Brown Silty clay
PTL[2]										
B96-05	24.4	102.5	8.1E-08	32	19	2.83	0.42	0.41	0.42	Undisturbed Gray silty Clay (CL)
B96-06	28.3	96.2	9.2E-08	-	-	2.78	0.45	0.44	0.45	Undisturbed Brown Silty Clay
B96-06	16.7	116.5	1.5E-08	-	-	2.78	0.33	0.32	0.33	Remolded Brown Silty Clay

Notes:
1. Sappi East Cell Landfill Expansion, 2005, Fairfield, Maine.
2. Pine Tree Landfill Secure III Landfill Expansion, 1998, Hampden, Maine.

APPENDIX U

BEDROCK FRACTURE INTERCONNECTIVITY

APPENDIX U

BEDROCK FRACTURE INTERCONNECTIVITY

1.0 INTRODUCTION

Bedrock characterization at the Juniper Ridge Landfill (JRL) Expansion site followed multi-disciplinary methodology as outlined in hydrogeologic literature (Shapiro, et al, 1998). The purpose was to develop greater confidence in predicting the groundwater flow behavior in the bedrock by examining fracture interconnectivity. By having a better understanding of how groundwater moves through the bedrock, a groundwater monitoring approach that matches Site-specific conditions has been developed. Furthermore, the evaluation of bedrock characteristics and groundwater movement through the bedrock, which accounts for the observed degree of fracture interconnection, justifies a continuous medium approach for groundwater movement over a regional scale for this Site. The justification of a continuous medium approach justifies simulation of groundwater movement away from the landfill when evaluating potential impacts to sensitive receptors.

2.0 BACKGROUND

A key to the understanding of groundwater flow behavior in fractured bedrock is to define the scale of interest (Domenico and Schwartz, 1998; Bear, 1972; Desbarats and Bachu, 1994). Bedrock fracturing can have a fractal nature, that is, replicating fracture patterns at different scales. This is a result of the forces involved in the creation of the fractures, as well as the rock mineralogy and lithologic structure. Because the way groundwater flows through rock can be described differently depending on the scale of the fracturing, examination at the various geologic scales can be important. For instance, bedrock may behave heterogeneously on small scales, such that an average hydraulic parameter value may not be sufficient to describe the local groundwater behavior. However, due to fracture density and interconnectedness, an average parameter value may be adequate to describe regional groundwater flow behavior in the same rock. Even porous granular media at very small scales (e.g., the scale of individual grains) is

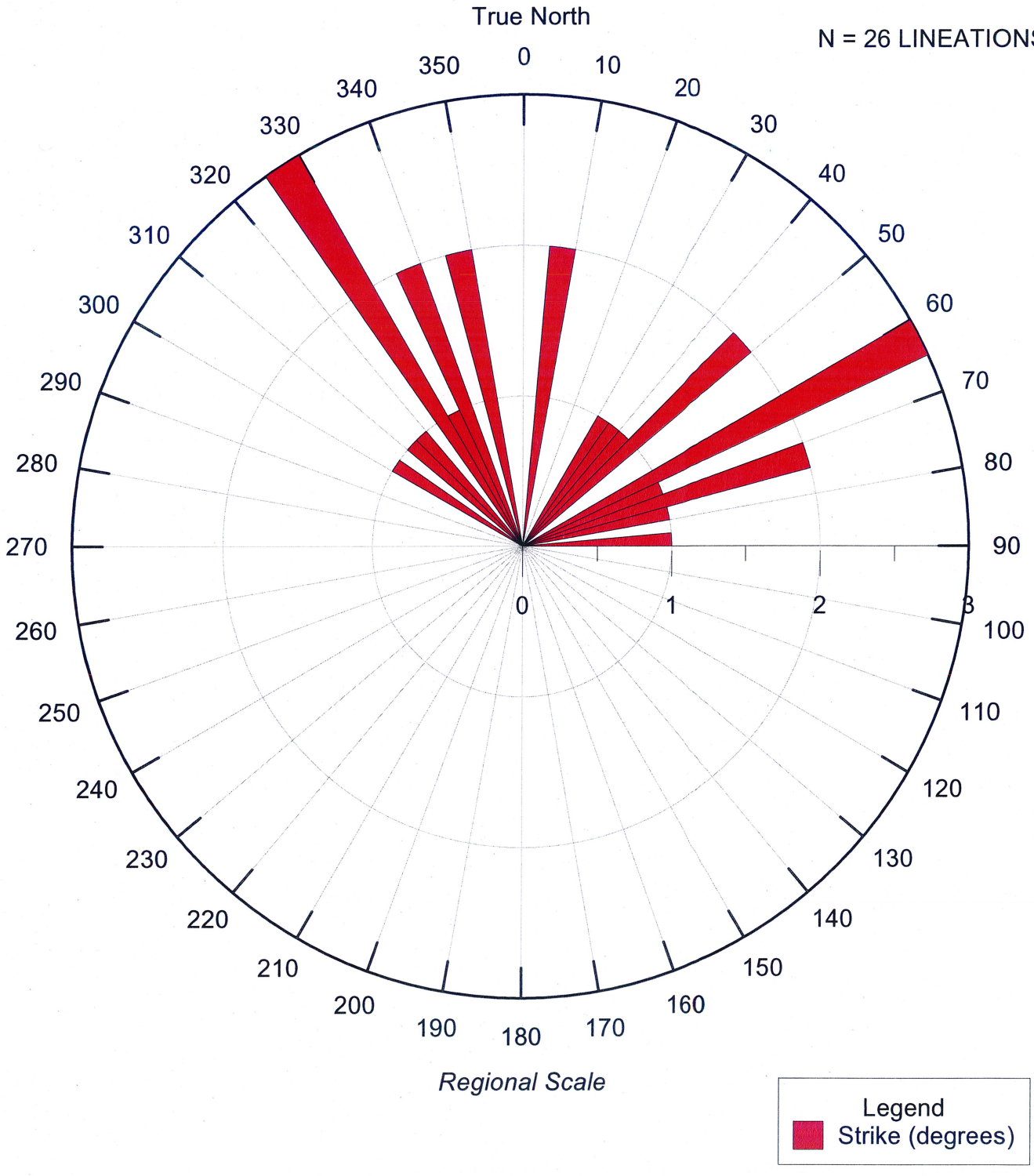
heterogeneous, but on larger, bulk scales (e.g., that of the laboratory or site-wide), a soil is often described with homogeneous or near-homogeneous properties. If there are numerous individual fractures (i.e., dense fracture network) that transmit water and interweave in all directions, then the bedrock will transmit water similar to the pores in a soil.

Data collected on the bedrock fracture characteristics creates a foundation for interpretation of the hydraulic integration or interconnectedness of individual fractures and how groundwater behaves throughout the bedrock formation. This generalized interpretation, based on the detailed fracture studies, can be tested by determining whether it is corroborated and reinforced by the results of groundwater pumping tests and tracer tests conducted within the bedrock. This is essentially the approach taken at the JRL Expansion Site.

3.0 REGIONAL SCALE TO LOCAL SCALE

Investigation of the fractured nature of the bedrock at JRL was implemented on different scales. Fractures that extend for significant distances may be found on the regional scale that are representative of the tectonic evolution of Maine bedrock (Bradley, 1983; Osberg, 1978; Ludman, et al, 1993; Rast and Skehan, 1993). This scale is associated with regional collisions of the continental plates, glacial loading and unloading, earthquakes, earth tides, and other large-scale tectonism. The fractures detectable on a regional scale can be associated with lithologic contacts and faulting. Regional scale fractures can have widths of tens or even hundreds of feet. In order to investigate for such regional fracture zones, aerial photographs of the JRL Expansion were examined for photolineaments. Figure U-1 shows a rose diagram of the orientation of the strikes of the identified photolineaments. From the rose diagram, it is apparent that the predominant strike orientations of the lineaments to the northeast are between N30°E and N80°E relative to True North (12 of 26 photolineaments). The predominant orientations of the photolineaments to the northwest strike between N60°W and N10°W (11 of 26 photolineaments). Because of their regular and nearly orthogonal pattern, these photolineaments

FIGURE U-1
STRIKE OF INTERPRETED PHOTOLINEAMENT FEATURES
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE



are presumably associated with ancient orogenic activities. Photolineament analysis of aerial photographs obtained from high and low altitudes is discussed in Section 3.2.10.

Regional studies can also include inspection of bedrock outcrops over a large region to map lithology. Foliation and bedding patterns, if present, can be recorded on a regional scale to allow for interpretation of folding, formation boundaries, and other structural features in the bedrock. For instance, Griffin, 1976 shows the predominant mineral cleavage (foliation) direction in the finer grained metasediments commonly strikes northeast/southwest for the region around the Expansion site. This cleavage is commonly steeply dipping (i.e., greater than 70 degrees to the northwest).

A more refined step is to examine individual fractures observed in bedrock exposures, bedrock core samples, and borehole geophysical surveys, and compare these to the regional setting (Barton and Hsieh, 1989). Unlike the regional survey, which is largely inferential to a particular location, individual fractures are mapped and examined at the site scale. Compatibility between the regional bedrock geology and the site geology provides a confidence level to formulate a hydraulic model of the bedrock. At the JRL Site, there are clear similarities in lithology, structure, and fracture orientation between the regional and site scales.

4.0 DETAILED DESCRIPTION OF BEDROCK FRACTURE FEATURES AT THE EXPANSION SITE

The following sections discuss the collected Expansion site bedrock fracture information: (1) the orientations of fractures, (2) the fracture spacing and density, (3) the fracture lengths, and (4) the ability of the fractures to transmit water. Site-specific information includes bedrock fracture feature measurements collected from five bedrock outcrops, four deep (i.e., 200 feet into bedrock) boreholes at different locations across the proposed Expansion, and bedrock cores collected from borings within the Expansion.

4.1 Bedrock Fracture Orientations

The orientations (i.e., strike and dip) of a few hundred bedrock fractures were measured at bedrock outcrops and through oriented-downhole geophysical logging. The measurements were accumulated and plotted on the rose diagram shown on Figure U-2. Figure U-2 includes strikes from outcrops OC-1, OC-2, OC-3, and OC-AG and boreholes PW-08-01, PW-08-02, PW-08-03, and PW-08-04. The results show that fracture orientations are essentially striking in all azimuthal directions with predominant fracture sets trending to the northeast/southwest and northwest/southeast. Approximately 48 percent of the measurements are striking between N25°E and N70°E. There is a less prominent fracture orientation set to the northwest striking between N75°W and N15°W. These two principal fracture sets agree with the regional photolineament mapping summarized in Figure U-1. The rose diagram in Figure U-2 also shows other less frequent orientations of bedrock fractures. These multiple fracture strikes facilitate interconnection of fractures across the site.

Dips are widely distributed, with a dominant frequency dipping steeply between 70° and 85°. This is particularly evident with the prominent fracture set to the northeast, where dip directions are split roughly even between southeast and northwest. This variation in dip direction facilitates the interconnection of fractures across the site.

Bedrock outcrop OC-AG was selected for detailed mapping of all observed fractures greater than one foot in length within a 6-foot by 4-foot area. Strikes and dips of fractures measured at outcrop OC-AG are shown on Figure U-3 and results from its study are discussed in Section 3.2.11. Eighty-one bedrock fracture orientations from the 6-foot by 4-foot area of outcrop OC-AG and supplemental fracture orientations located elsewhere on an expanded area of the same outcrop are plotted on the rose diagram shown on Figure U-3. The rose diagram in Figure U-3 also shows other, less-frequent, oriented bedrock fractures. The results show a fairly wide distribution of bedrock fracture orientations with notable trends of near orthogonal fracture sets to the northeast (striking between N35°E and N70°E) and to the northwest (striking between

FIGURE U-2
STRIKE AND DIP OF MEASURED FRACTURES AT OUTCROPS
OC-1, OC-2, OC-3, & OC-AG, AND BOREHOLES AT
PW-08-01, PW-08-02, PW-08-03, & PW-08-04
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

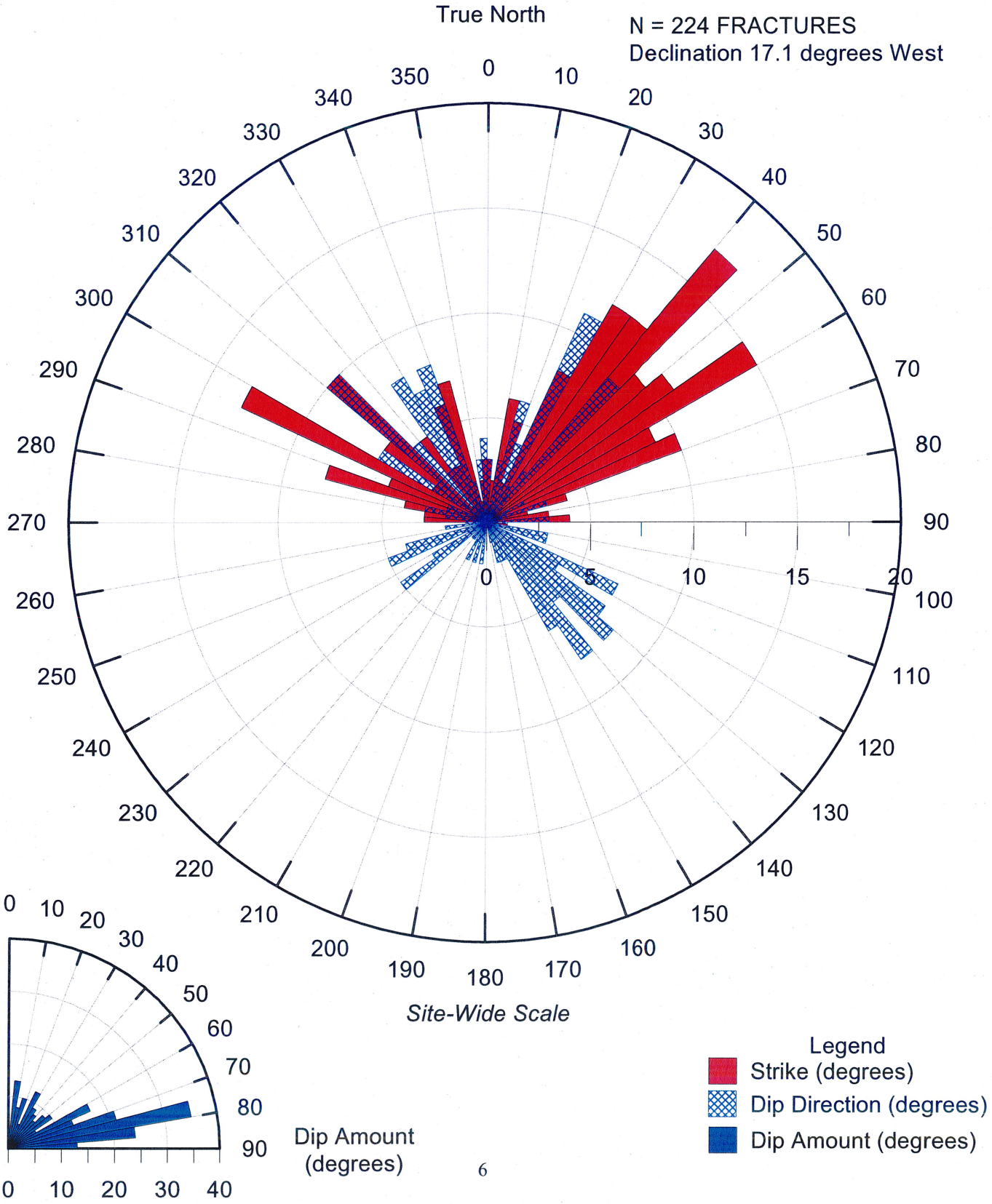
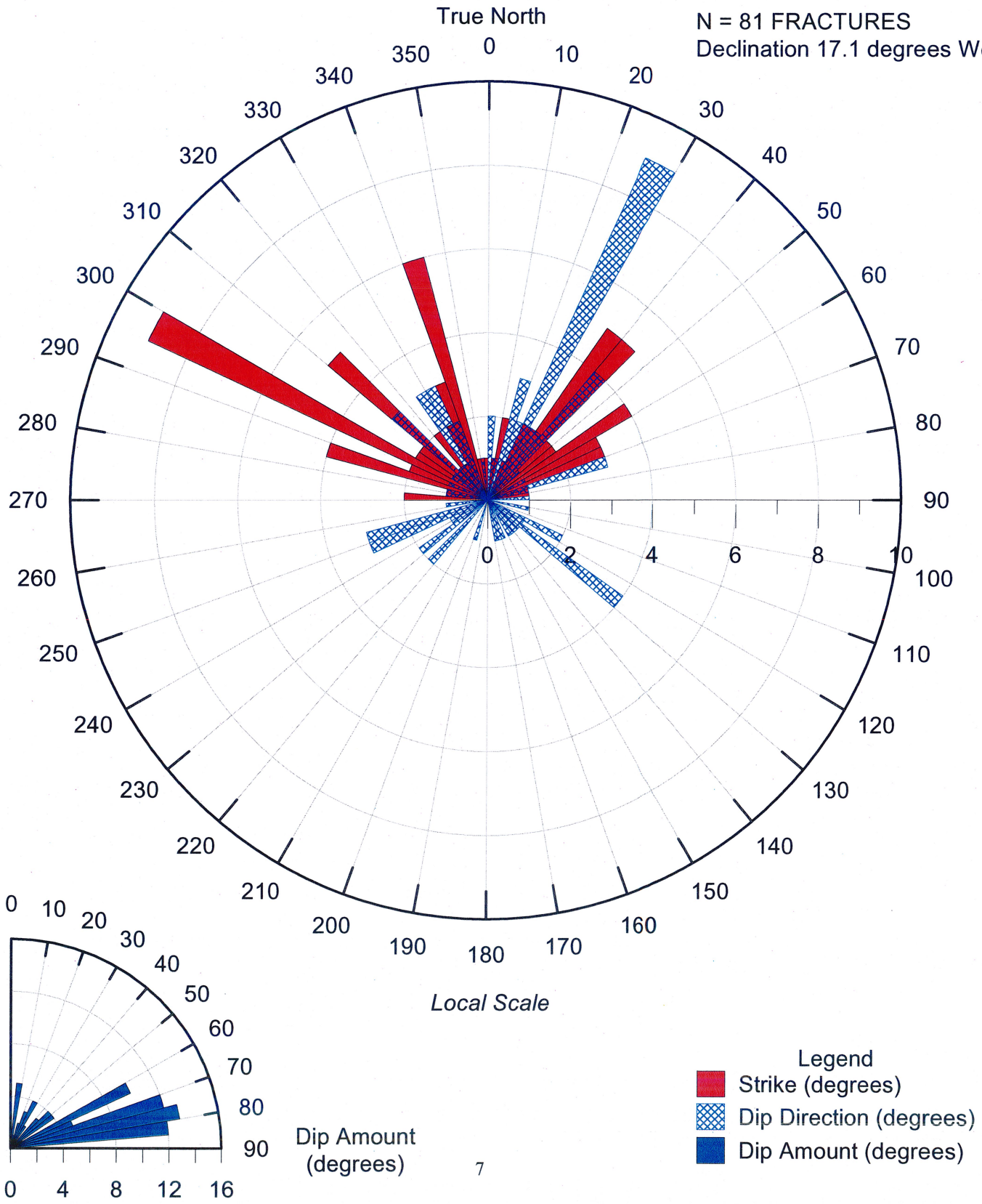


FIGURE U-3
STRIKE AND DIP OF MEASURED FRACTURES AT OUTCROP OC-AG
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE



N75°W and N15°W). The predominant trend to the northeast is not as strong in the data collected at outcrop OC-AG as it is at other locations or scales. This is presumably due to the northeast orientation of the outcrop (N42°E), which created a bias toward the fractures intersecting the outcrop face. Fracture dips at outcrop OC-AG are typically steep (i.e., between 60° and 85°).

The bedrock fracture orientations were identified and measured in PW-08-01, PW-08-02, PW-08-03, and PW-08-04 using optical televiewer images. These televiewer images are included in Appendix F. Since the bedrock fractures were identified indirectly, they should be considered as interpreted fractures. For the same reason, a number of fractures may have been missed in the interpretation, especially fractures with small apertures parallel to the planes of mineral foliation. The bedrock fracture orientations measured in PW-08-01, PW-08-02, PW-08-03, and PW-08-04 were each plotted on rose diagrams which are displayed on Figures U-4, U-5, U-6, and U-7, respectively. The bedrock fracture orientations at all four locations show a predominant fracture set to the northeast, ranging approximately between N25°E and N70°E.

Comparison of the regional photolineaments and local scale fracture orientations shows general support for the finding that there is a dominant fracture set oriented to the northeast/southwest, an approximately orthogonal secondary fracture set oriented to the northwest/southeast, as well as a wide distribution of less frequently oriented bedrock fractures.

It should be noted that while the compiled measurements are indicative of two principal, steeply dipping fracture sets, these two sets are comprised of fractures with varying orientation. For example, the northwest/southeast fracture set has an azimuth range of approximately 60°. Fractures within this set also vary in dip amount and dip direction. An example of this is shown on photographs of outcrop OC-AG in Figures U-8 and U-9. The two fracture planes shown cutting into this outcrop are striking N18°W (left fracture) and N65°W (right fracture). Hence, while these two northwest striking fracture planes have been grouped as part of the

FIGURE U-4
STRIKE AND DIP OF MEASURED FRACTURES
AT BOREHOLE PW-08-01
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

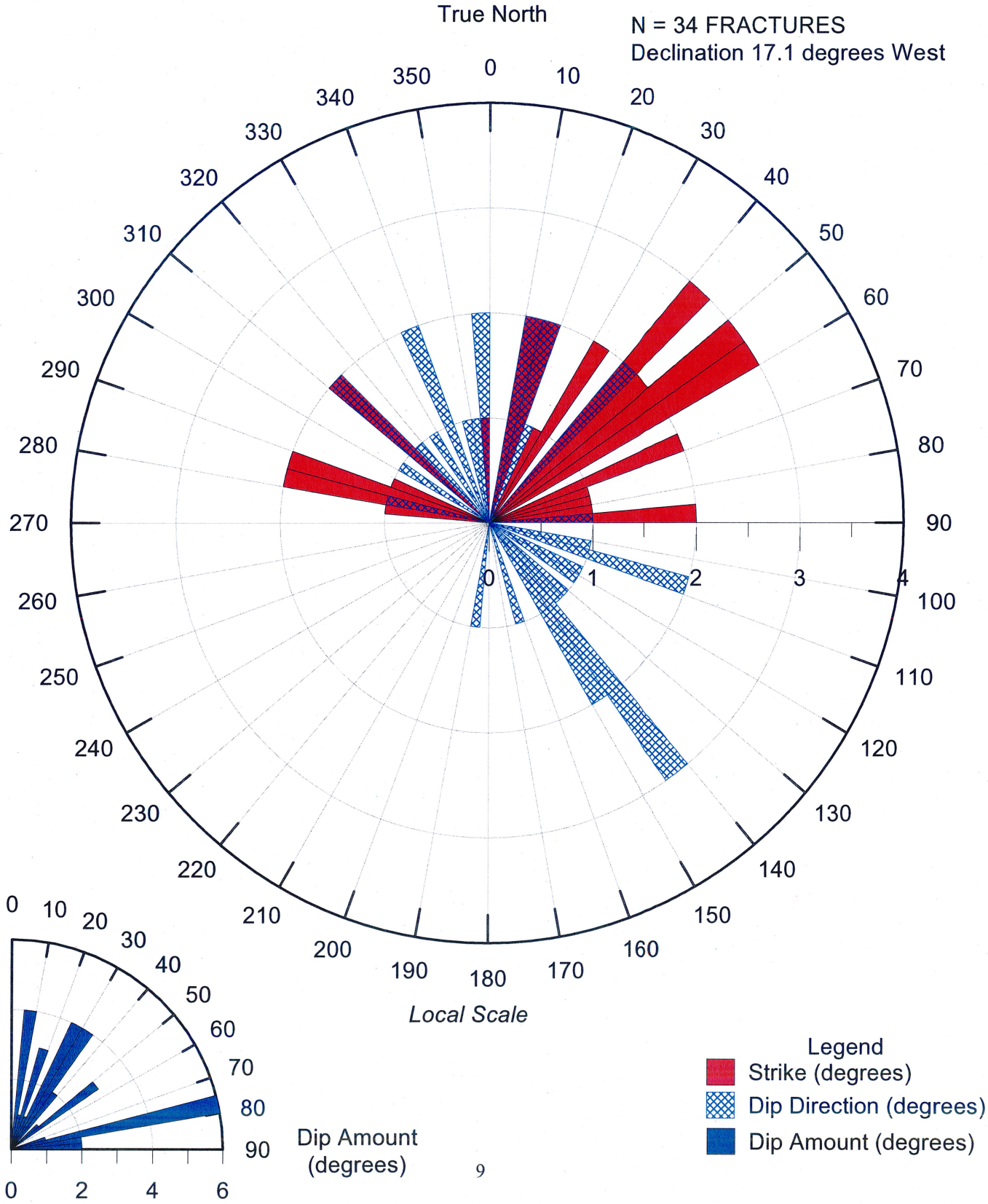


FIGURE U-5
STRIKE AND DIP OF MEASURED FRACTURES
AT BOREHOLE PW-08-02
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

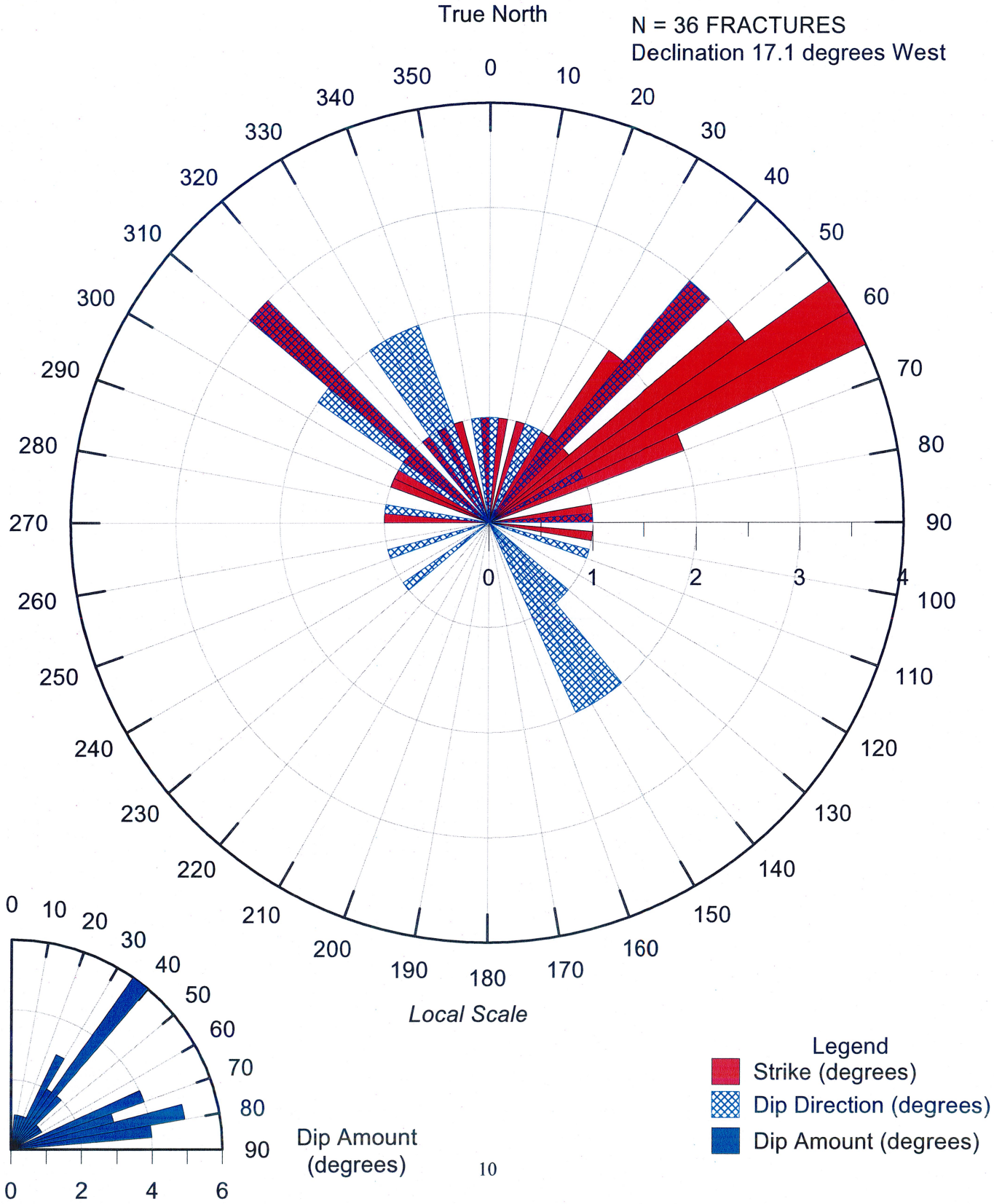


FIGURE U-6
STRIKE AND DIP OF MEASURED FRACTURES
AT BOREHOLE PW-08-03
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

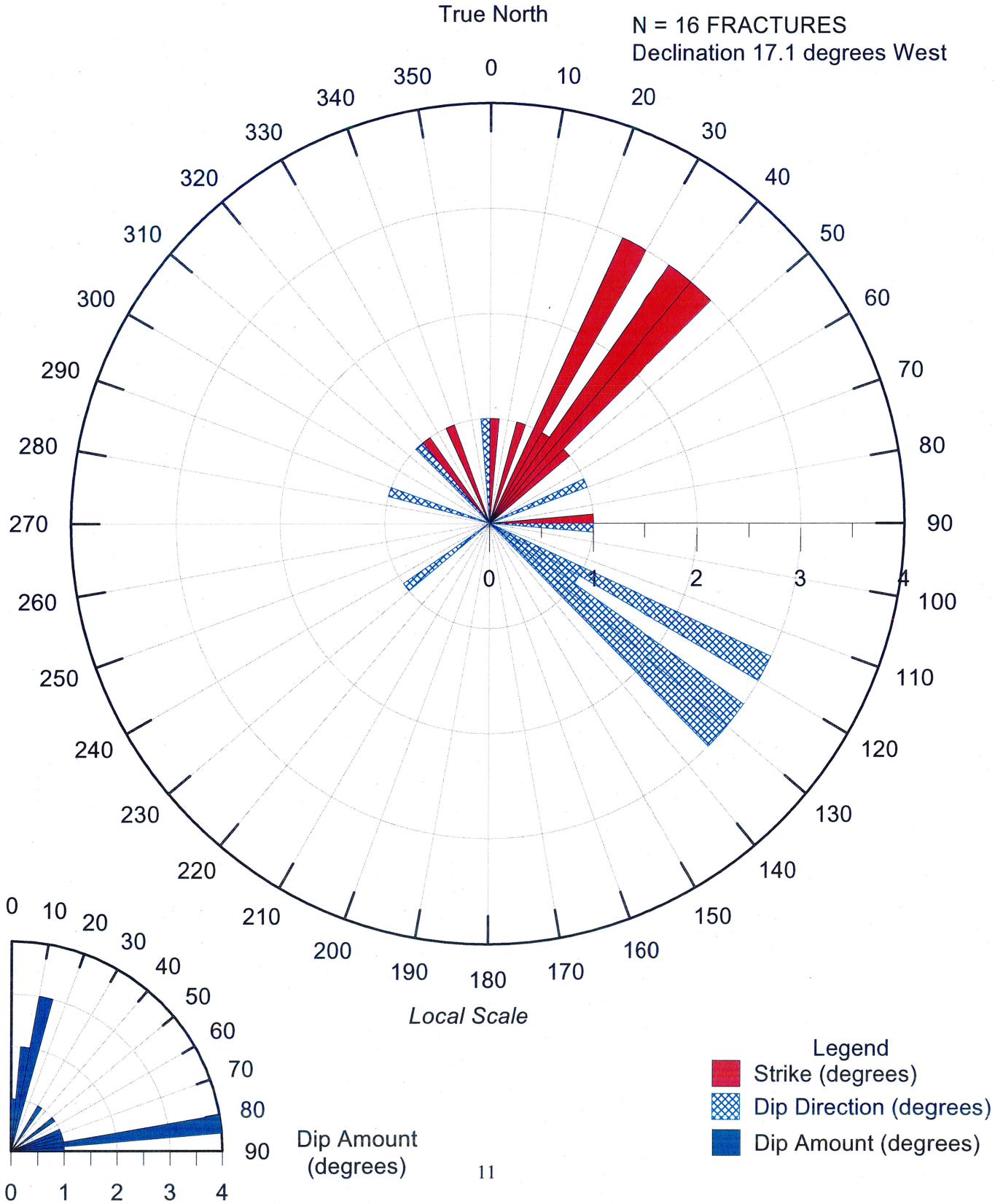
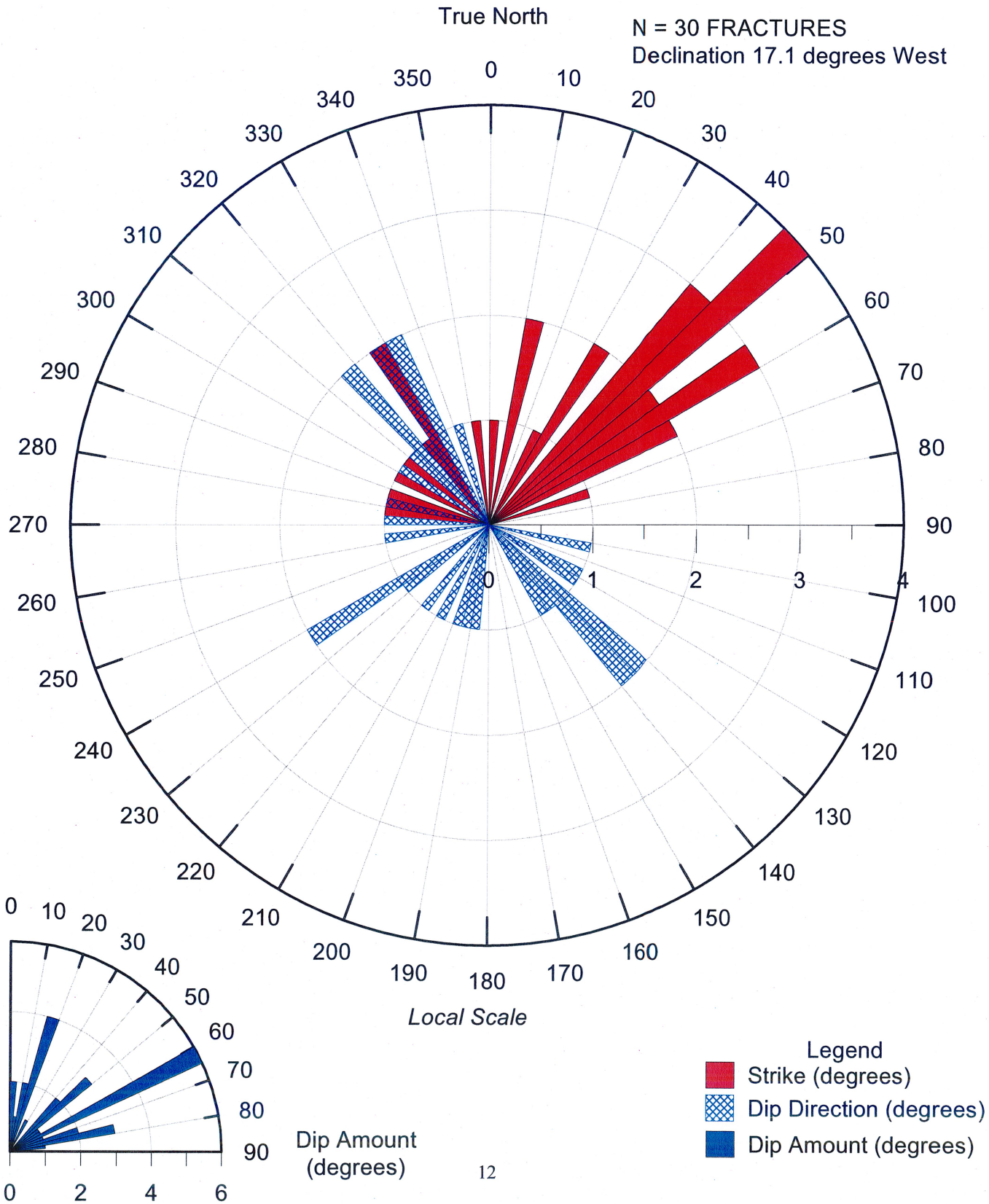


FIGURE U-7
STRIKE AND DIP OF MEASURED FRACTURES
AT BOREHOLE PW-08-04
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE



northwest/southeast set of fractures, a detailed inspection shows that they are interconnected both through their variations in strike and dip. Similarly, the most prominent trend of northeast oriented bedrock fractures has an azimuth range of approximately 45° with a near equal split of easterly and westerly dip directions. This "fanning" of fractures within a set and the different dip directions enhance the interconnection of the bedrock fractures and the ability of groundwater moving along one bedrock fracture and into another to follow the local hydraulic gradient. Add to this feature the intersection of the many fractures in two nearly orthogonal fracture sets and fracture interconnection becomes inevitable.

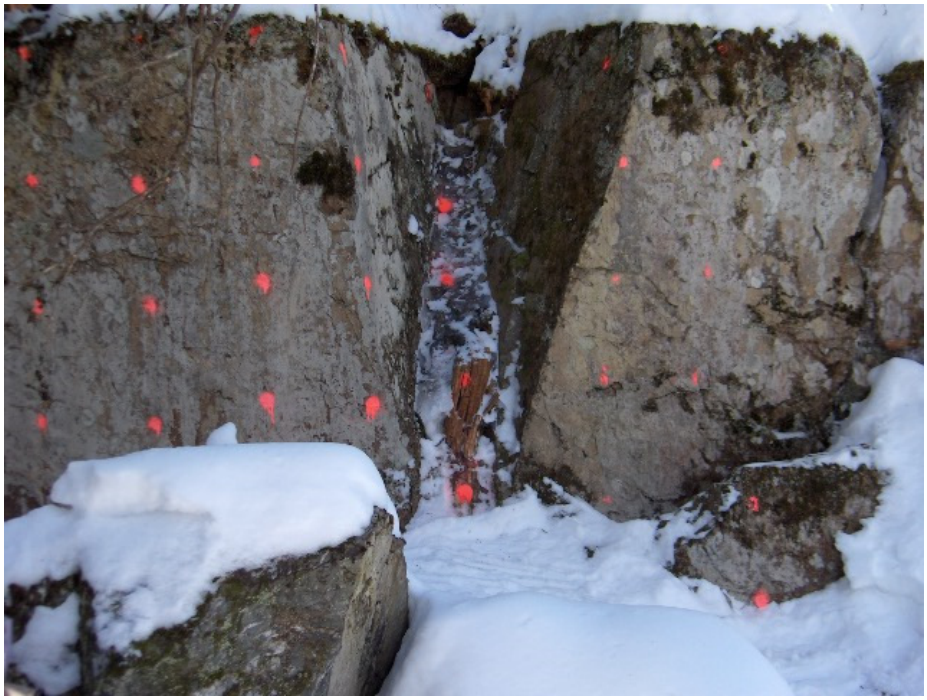


FIGURE U-8

TWO NORTHWEST STRIKING FRACTURES WITH A 47° ORIENTATION DIFFERENCE DIPPING STEEPLY IN OPPOSITE DIRECTIONS. THE OUTCROP FACE IS ROUGHLY STRIKING N42°E.



FIGURE U-9

CLOSE-UP OF SAME AREA SHOWING THE INTERSECTION OF THE NORTHWEST STRIKING FRACTURES WITH TWO CLOSELY SPACED NORTHEAST STRIKING FRACTURES.

4.2 Bedrock Fracture Spacing and Density

Bedrock fracture spacing was measured directly at bedrock outcrop OC-AG and within bedrock cores. Bedrock fracture spacing was also measured indirectly at the four bedrock boreholes logged with the downhole optical televiewer.

At outcrop OC-AG, mean bedrock fracture spacing was analyzed by transecting the outcrop with three straight vertical lines and two straight horizontal lines (see Figure 3-3 in Section 3.2.11) and counting the number of fractures crossing the lines. The mean spacing was calculated by dividing the line lengths by the number of transecting bedrock fractures. The mean fracture spacing for each line ranged from 0.22 to 0.55 feet, with an overall mean of 0.39 feet. Sixty-seven bedrock fractures with lengths greater than one foot were identified in the 6-foot by 4-foot

detailed study area at outcrop OC-AG. Thus, the density of bedrock fractures greater than one foot in length in this area is about 2.8 fractures per square foot.

The spacing of naturally occurring fractures was measured in bedrock cores. The bedrock cores are from vertically oriented borings identified as B-04-07, B-04-12, B-04-13, and B-04-14. Continuous bedrock core samples up to a depth of approximately 100 feet below the bedrock surface were observed for each of the four borings. Visible staining along the fractures provides an indication of continuous water movement within the fracture systems. The fracture spacings were plotted versus the depths at which they were identified, as illustrated in Figure U-10. Figure U-11 shows the fracture spacings to be log-normally distributed for the bedrock cores. The fracture spacings are occasionally clustered, but on a whole tend to be relatively consistent to a depth of 80 feet below the bedrock surface. More fractures appear to occur near the surface where weathering and glacial ice effects are the greatest. A significant decrease in bedrock fracture spacing was observed in all four core holes from approximately 80 feet to 100 feet below the bedrock surface. The mean fracture spacings calculated from bedrock core samples collected at boring locations B-04-07, B-04-12, B-04-13, and B-04-14 were 1.2 feet, 1.2 feet, 0.8 feet, and 0.8 feet, respectively. These mean fracture spacings are slightly greater than for OC-AC, possibly due to weathering which can enhance the degree of fracturing in an outcrop.

Bedrock fractures were identified in boreholes at the four six-inch diameter bedrock wells using optical televiewer images. Each boring extends approximately 200 feet into bedrock. These images are included as part of Appendix F. Again, since the bedrock fractures were identified indirectly, they should be considered as interpreted fractures. Fractures with small apertures may have been missed in the interpretation, especially seams along the planes of mineral foliation. Often with images, it is difficult to distinguish fractures from lithologic boundaries, calcite and quartz fillings, and drill bit marks. Only those features that could be confidently identified as an opening were included for the geophysical logging. The calculated mean fracture spacing at bedrock boreholes at PW-08-01, PW-08-02, PW-08-03, and PW-08-04 were 4.8 feet, 5.1 feet,

FIGURE U-10
FRACTURE SPACING VERSUS DEPTH BELOW SURFACE OF BEDROCK BASED ON BEDROCK CORE SAMPLES FROM BORINGS B-04-07, B-04-12, B-04-13, AND B-04-14
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

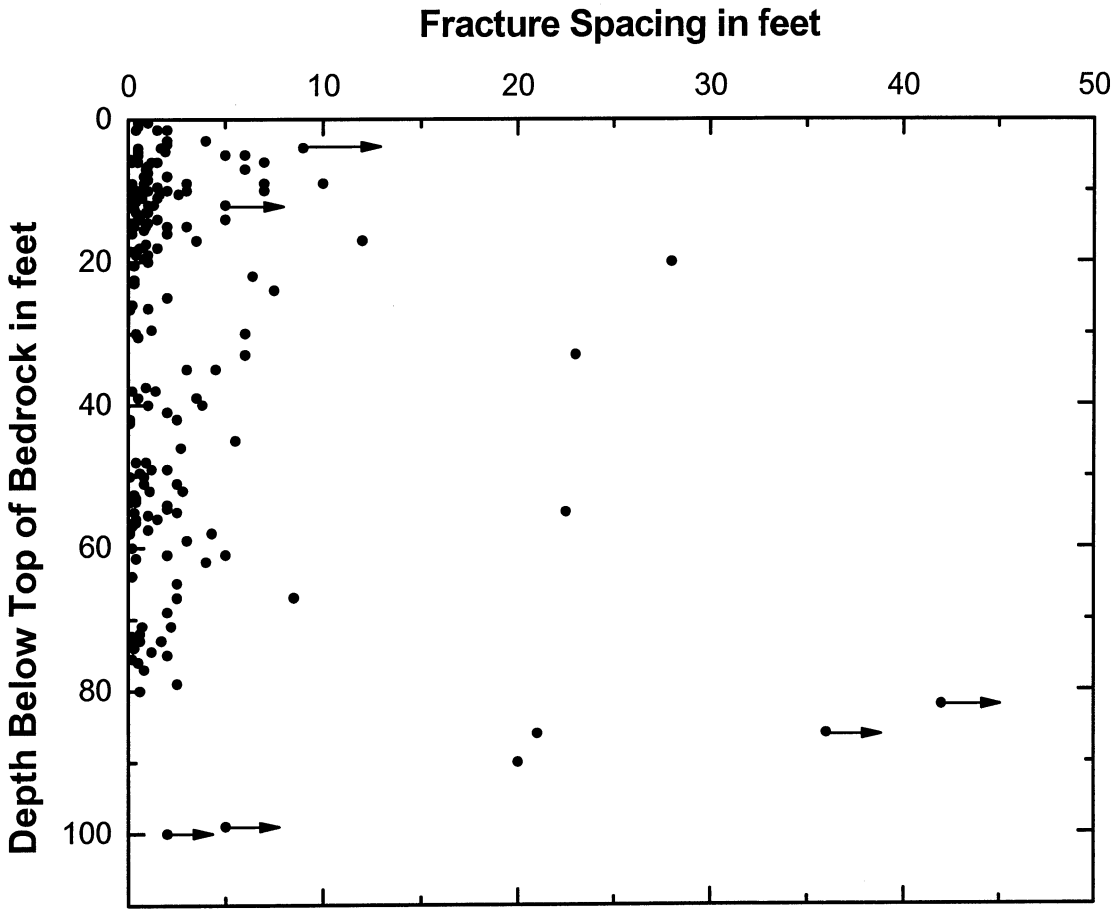
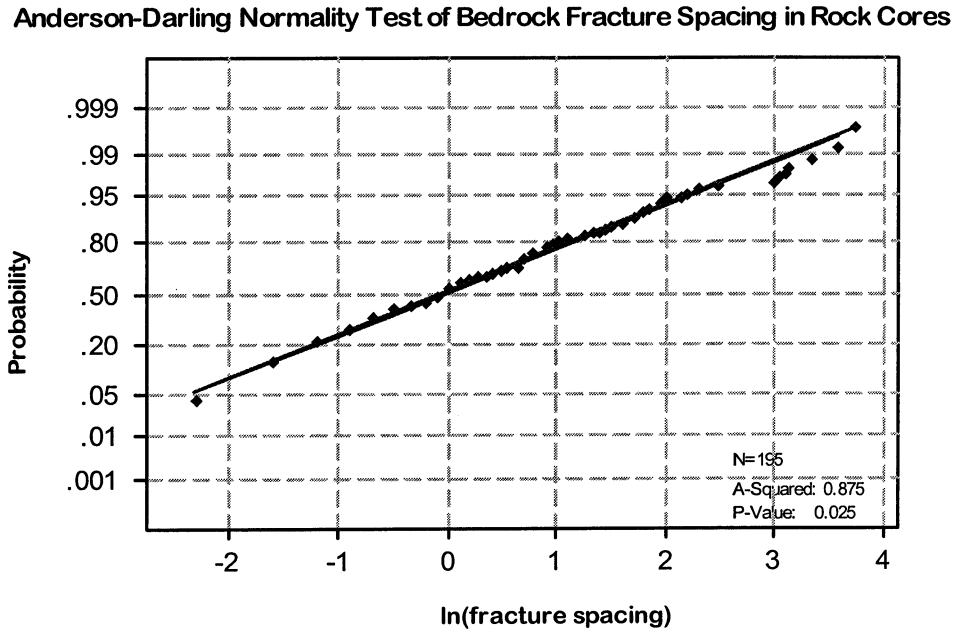


FIGURE U-11
ANDERSON-DARLING NORMALITY TEST OF BEDROCK FRACTURE SPACING IN ROCK CORES AT BORINGS B-04-07, B-04-12, B-04-13, AND B-04-14
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE



8.5 feet, and 5.3 feet, respectively. These spacings are greater than for the cores and outcrop OC-AG.

As a generalization, fracture spacing is in the order of a few tenths of a foot to a few feet. This range is a small fraction of the landfill Expansion footprint and SPO site. It's important to recognize that these fracture spacings ignore the individual fracture orientations. However, this does not effect our evaluation of fracture interconnection since the fracture density is so great.

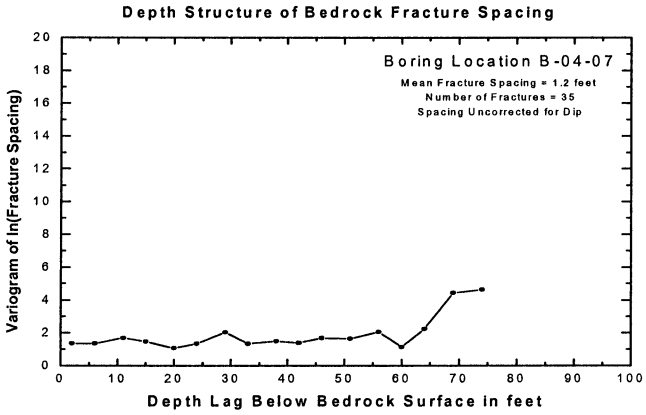
To examine structure of the fracture spacing, the measured bedrock core fracture spacings were plotted on a variogram (Kitanidis, 1993; deMarsily, 1985). Figure U-12 represents variograms of the fracture spacings with depth used as the parameter for each of the four bedrock core borings. This figure shows that there is variability of fracture spacing with depth, suggesting some fracture clustering. This is consistent with the bedrock electrical resistivity profiles, which show resistivity variability in the bedrock, both with depth and horizontally. It is not unexpected that fracture densities vary over the rock mass. Local increases in fracture density will locally increase bedrock hydraulic conductivity, but since the average fracture spacings are relatively close, fracture density variability should not affect bulk fracture interconnectivity.

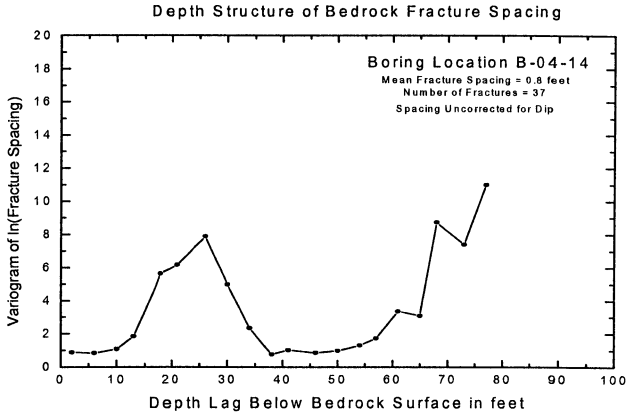
4.3 Bedrock Fracture Lengths

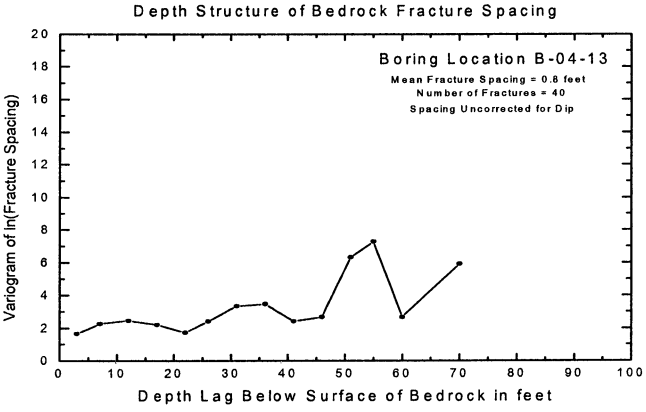
Bedrock fracture lengths were measured as part of detailed mapping of outcrop OC-AG. Sixty-seven bedrock fractures were identified in this area that were equal to or greater than 1 foot in length. The lengths of the fractures are illustrated on a histogram in Figure U-13. The fracture lengths in the 4-foot by 6-foot area ranged from less than 1 foot to greater than 5 feet. The mean fracture length was estimated to be approximately two feet. The maximum measured fractured length for the entire outcrop was about 21 feet.

The fracture lengths at bedrock outcrops OC-1, OC-2, OC-3, and OC-4 were not specifically measured, but many fracture lengths exceed the size of the exposed bedrock outcrops (SME,

FIGURE U-12
VARIOGRAM OF FRACTURE SPACING OF ROCK CORES
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE







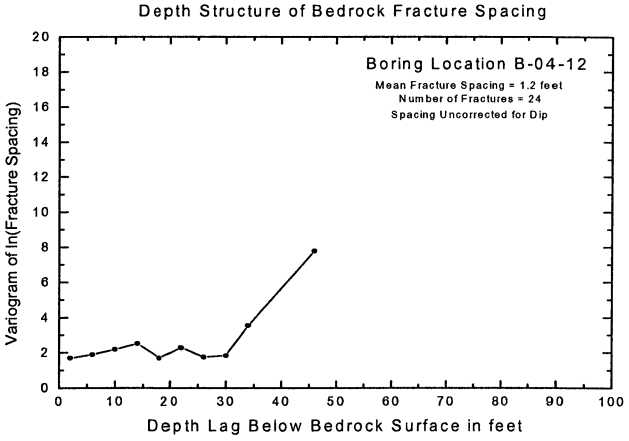
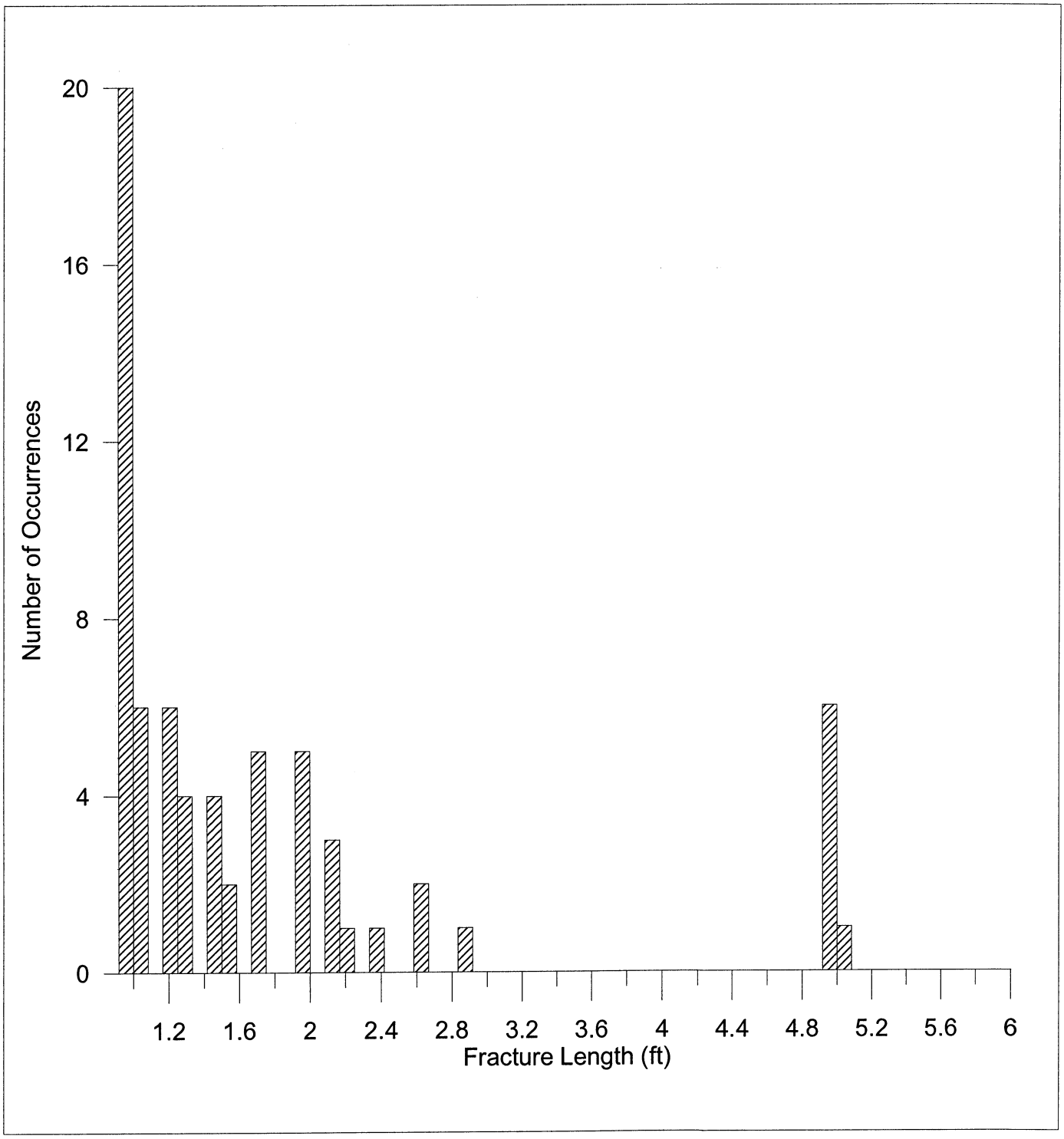


FIGURE U-13
HISTOGRAM OF BEDROCK FRACTURE
LENGTHS MEASURED AT OUTCROP OC-AG
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE



N = 67 FRACTURES

1991). This is true for both the principal fracture set striking northeast/southwest and the fracture set striking northwest/southeast. Fracture lengths of up to 20 feet were observed. Thus, there are fractures with lengths that well exceed the average fracture spacing. Therefore, a significant degree of fracture intersection is expected (Long, et al, 1982).

4.4 Permeability of Bedrock Fractures

Proof of the hydraulic capabilities of the bedrock fractures was demonstrated through the following methods:

- Slug Tests. Slug tests were performed at twenty-four bedrock monitoring wells or piezometers in order to estimate the hydraulic conductivities of the bedrock fractures at those locations. This testing showed how groups of multiple fractures allowed for the movement of water.

- Downhole Flowmeter Measurements. Flowmeter measurements were made as part of the downhole geophysical logging of PW-08-01, PW-08-02, PW-08-03, and PW-08-04. These measurements demonstrated individual fracture flow.

- Pump Tests. Pump tests were performed at PW-08-01, PW-08-02, PW-08-03, PW-08-04, and MW-06-02. The drawdowns of groundwater levels at varying distances required groundwater to flow from those remote fractures towards the pumping well.

4.5 Summary

These data collected for individual fractures demonstrate a significant degree of fracture interconnectedness. Fracture orientations are extremely variable leading to many fracture intersections. Fracture lengths are greater than fracture spacings, indicating that fracture intersections must occur. Finally, fractures are open and capable of transmitting groundwater.

5.0 PUMP TEST PROOF OF BEDROCK FRACTURE INTERCONNECTIVITY

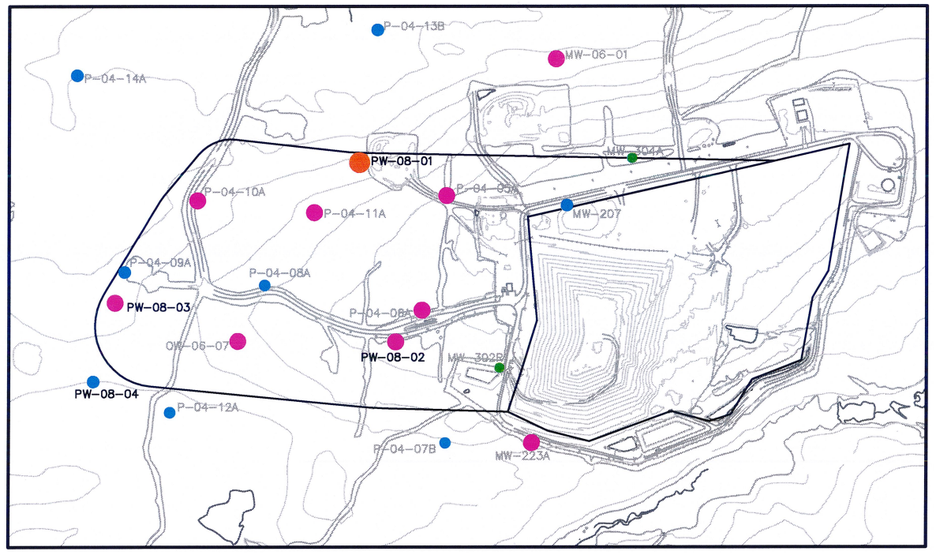
There appear to be greater fracture lengths in the northeast/southwest striking fracture set than in the northwest/southeast fracture set. This observation by itself can suggest a greater bulk bedrock hydraulic conductivity to the northeast/southwest than in other directions. Fracture spacing is in the order of a few feet or less, which when combined with fracture lengths of tens of feet, allows for frequent fracture intersections. Conceptually, because there are two sets of nearly orthogonal fractures, dipping at various angles from the horizontal, some fractures of both sets will be interconnected. There are frequent fracture intersections or interconnections based on visual evidence at the bedrock outcrops. Although there may be preferential pathways along the fracture set orientations (i.e., northeast/southwest and northwest/southeast), groundwater seepage through the bedrock in other directions, over site-wide scales, appears possible based on the available information documenting observed fractures from bedrock outcrops, cores, and downhole geophysical logging. This was confirmed by the pump testing. Groundwater pump tests were conducted at pump wells PW-08-01, PW-08-02, PW-08-03, and PW-08-04 between January 2009 and April 2009, and at monitoring well MW-06-02 in July 2006. The details of the pump test operations are discussed in Section 3.2.9 and Section 3.2.13.

The pump tests were invaluable in confirming the fracture integration and interconnectivity suggested by the bedrock fracture mapping. In addition, it confirmed the value of the earth resistivity survey, which was useful in locating zones of higher rock fracture density or frequency. Thus, it demonstrated the value of this technique if, in the future, additional bedrock

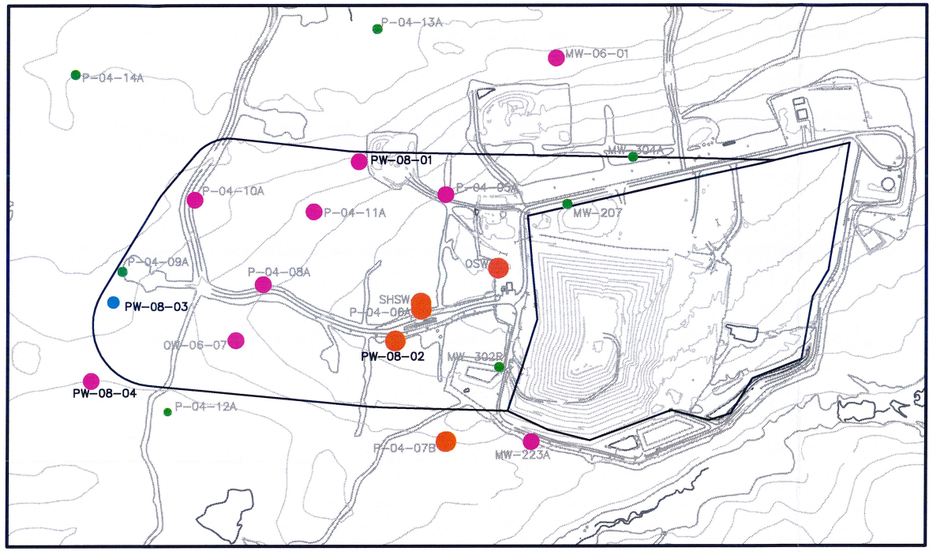
wells need to be drilled into areas of the rock where fractures are likely to be present. Because of fracture interconnectivity, the pumping tests demonstrated that drawdown of groundwater extended up to 2,000 feet away from the pumping well depending on the pumping rates. This degree of drawdown allowed downward groundwater leakage to occur into the bedrock from the overlying glacial till. Although temporary, this till leakage was able to balance the groundwater extraction rates in the bedrock pumping wells because of the integrated fracture system and was able to satisfy the demand of the wells, at least in the short-term of the pumping period.

Bedrock groundwater drawdowns are illustrated by ranges at the end of each short-term pump test and at the end of the long-term combined pump test in Figure U-14 and Figure U-15, respectively. Spatial distribution of the groundwater drawdown across the site at the bedrock monitoring locations signifies that bedrock fractures are hydraulically interconnected throughout the Expansion footprint. During the long-term combined pump test, groundwater drawdown of several feet was observed in multiple groundwater monitoring locations ranging from approximately 1,100 feet to 2,300 feet from the pumping locations and in multiple radial directions from the pumping wells. Closer to the pumping wells groundwater drawdowns of tens of feet were observed in several wells. Drawdown of groundwater levels at distance from the pumping wells demonstrates interconnection of fractures between the pumping wells and observation wells. Drawdowns generally decreased with distance from the pumping wells. This behavior is consistent with typical continuum aquifer hydraulics. In all tests, there are some monitoring locations in bedrock that have little to no observable drawdown. This is a sign that there are some smaller isolated bedrock fracture networks.

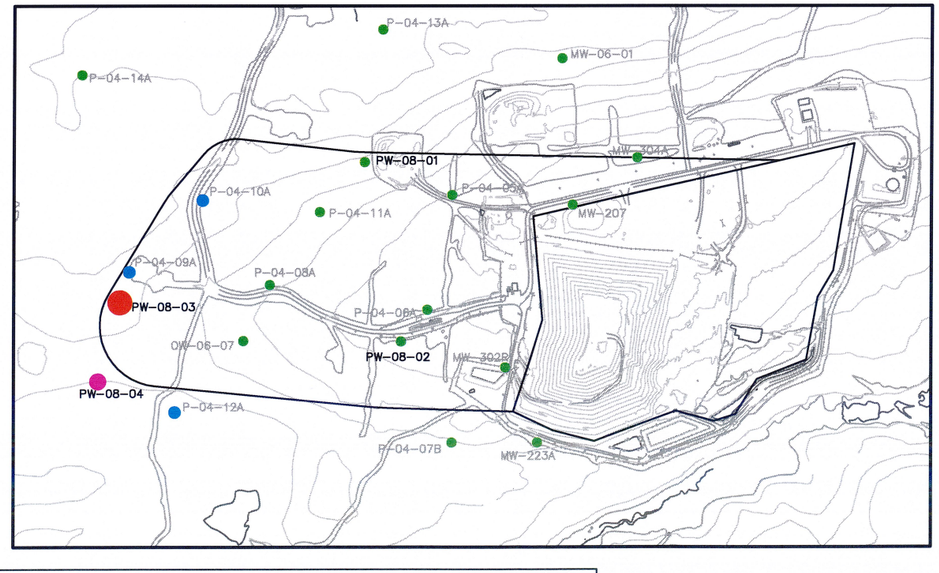
PW-08-01
24-HOUR PUMP TEST
JAN 29, 2009 TO JAN 30, 2009
AVERAGE 96 gpm



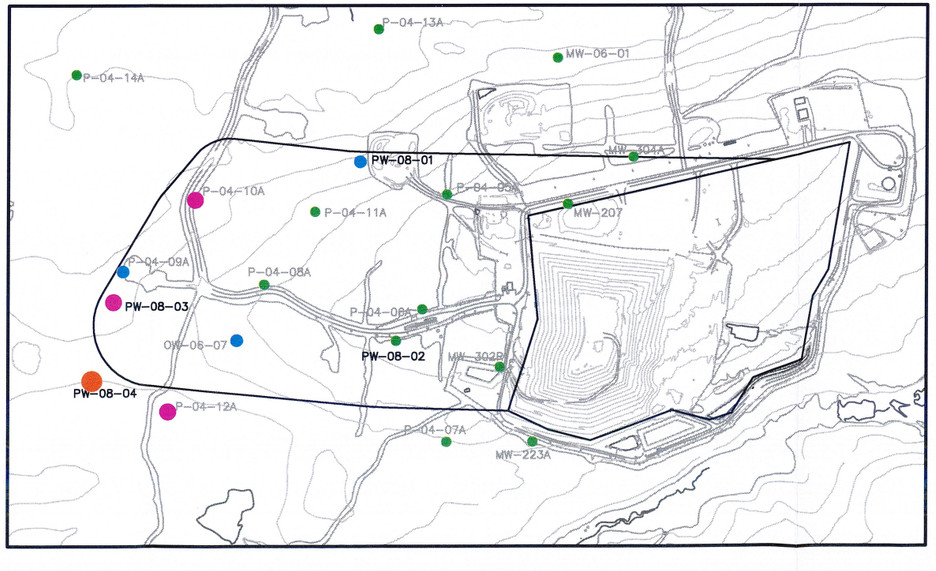
PW-08-02
50-HOUR PUMP TEST
MARCH 17, 2009 TO MARCH 19, 2009
AVERAGE 93 gpm



PW-08-03
26.5-HOUR PUMP TEST
FEB 5, 2009 TO FEB 6, 2009
AVERAGE 8 gpm



PW-08-04
26.5-HOUR PUMP TEST
FEB 2, 2009 TO FEB 3, 2009
AVERAGE 32 gpm



MEASURED DRAWDOWNS (FEET)

- <0.1
- 0.1 TO 1
- 1 TO 10
- 10 TO 100
- >100

500 0 1000 FEET

FIGURE U-14
DRAWDOWN INTERCONNECTIVITY
IN BEDROCK AT COMPLETION OF
SHORT-TERM PUMP TESTS
SITE ASSESSMENT REPORT
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.

DWG: PumpTests LMN: PT-Short Term CTB: PumpTests REV: 6/11/09

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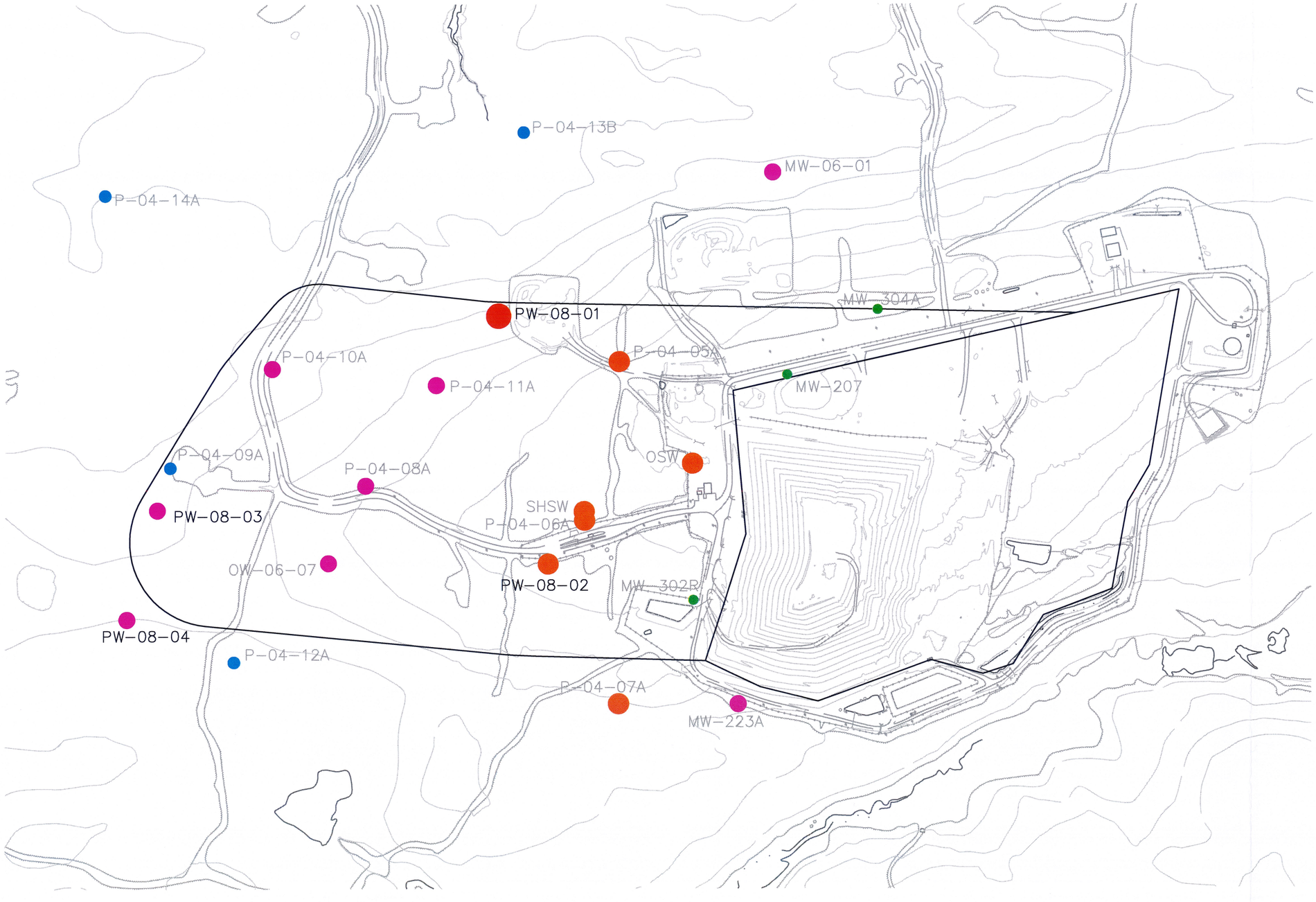
PW–08–01
337–HOUR PUMP TEST
MARCH 23, 2009 TO APRIL 6, 2009
AVERAGE 149 gpm

PW–08–02
167–HOUR PUMP TEST
MARCH 30, 2009 TO APRIL 6, 2009
AVERAGE 81 gpm



MEASURED DRAWDOWNS (FEET)

- <0.1
- 0.1 TO 1
- 1 TO 10
- 10 TO 100
- >100

250 0 500 FEET

FIGURE U–15
DRAWDOWN INTERCONNECTIVITY
IN BEDROCK AT COMPLETION
OF LONG–TERM
COMBINED PUMP TEST
SITE ASSESSMENT REPORT
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.

DWG: PumpTests LMN: PT–Long Term CTB: PumpTests REV: 6/11/09

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- During the 24-hour pump test at PW-08-01, 24 bedrock monitoring locations and 25 till monitoring locations across the site were observed. Monitoring locations ranged from 141 feet to 2,501 feet from PW-08-01. At the bedrock monitoring locations, four wells had less than 0.1 foot of drawdown, eleven wells had between 0.1 foot and 1 foot of drawdown, eight wells had between 1 foot and 10 feet of drawdown, and one well (pump well PW-08-01) had between 10 feet and 100 feet of drawdown. At the till monitoring locations, seventeen wells had less than 0.1 foot of drawdown, five wells had between 0.1 foot and 1 foot of drawdown, and three wells had between 1 foot and 10 feet of drawdown.

- During the 26.5-hour pump test at PW-08-04, 25 bedrock monitoring locations and 28 till monitoring locations across the site were observed. Monitoring locations ranged from 540 feet to 3,862 feet from PW-08-04. At the bedrock monitoring locations, sixteen wells had less than 0.1 foot of drawdown, five wells had between 0.1 foot and 1 foot of drawdown, three wells had between 1 foot and 10 feet of drawdown, and one well (pump well PW-08-04) had between 10 feet and 100 feet of drawdown. At the till monitoring locations, twenty-seven wells had less than 0.1 foot of drawdown, and one well had between 0.1 foot and 1 foot of drawdown.

- During the 26.5-hour pump test at PW-08-03, 25 bedrock monitoring locations and 26 till monitoring locations across the site were observed. Monitoring locations ranged from 211 feet to 3,555 feet from PW-08-03. At the bedrock monitoring locations, twenty wells had less than 0.1 foot of drawdown, three wells had between 0.1 foot and 1 foot of drawdown, one well had between 1 foot and 10 feet of drawdown, no wells had between 10 feet and 100 feet of drawdown, and one well (pump well PW-08-03) had greater than 100 feet of

drawdown. At the till monitoring locations, twenty-four wells had less than 0.1 foot of drawdown, and two wells had between 0.1 foot and 1 foot of drawdown.

- During the 50-hour pump test at PW-08-02, 27 bedrock monitoring locations and 14 till monitoring locations across the site were observed. Monitoring locations ranged from 271 feet to 2,749 feet from PW-08-02. At the bedrock monitoring locations, ten wells had less than 0.1 foot of drawdown, six wells had between 0.1 foot and 1 foot of drawdown, six wells had between 1 foot and 10 feet of drawdown, and five wells had between 10 feet and 100 feet of drawdown. At the till monitoring locations, six wells had less than 0.1 foot of drawdown, two wells had between 0.1 foot and 1 foot of drawdown, and six wells had between 1 foot and 10 feet of drawdown.

- During the long-term pump test at PW-08-01 and PW-08-02, 28 bedrock monitoring locations and 25 till monitoring locations across the site were observed. Monitoring locations ranged from 141 feet to 2,756 feet from PW-08-01. Monitoring locations ranged from 271 feet to 2,948 feet from PW-08-02. At the bedrock monitoring locations, five wells had less than 0.1 foot of drawdown, eight wells had between 0.1 foot and 1 foot of drawdown, eight wells had between 1 foot and 10 feet of drawdown, six wells had between 10 feet and 100 feet of drawdown, and one well (pump well PW-08-01) had greater than 100 feet of drawdown. At the till monitoring locations, seventeen wells had less than 0.1 foot of drawdown, two wells had between 0.1 foot and 1 foot of drawdown, five wells had between 1 foot and 10 feet of drawdown, and one well had between 10 feet and 100 feet of drawdown.

Table U-1 summarizes the ranges of drawdowns for individual pump tests. The pumping tests confirmed the hydraulic interconnectivity of bedrock fractures at the JRL Site and the ability of groundwater to move through the bedrock.

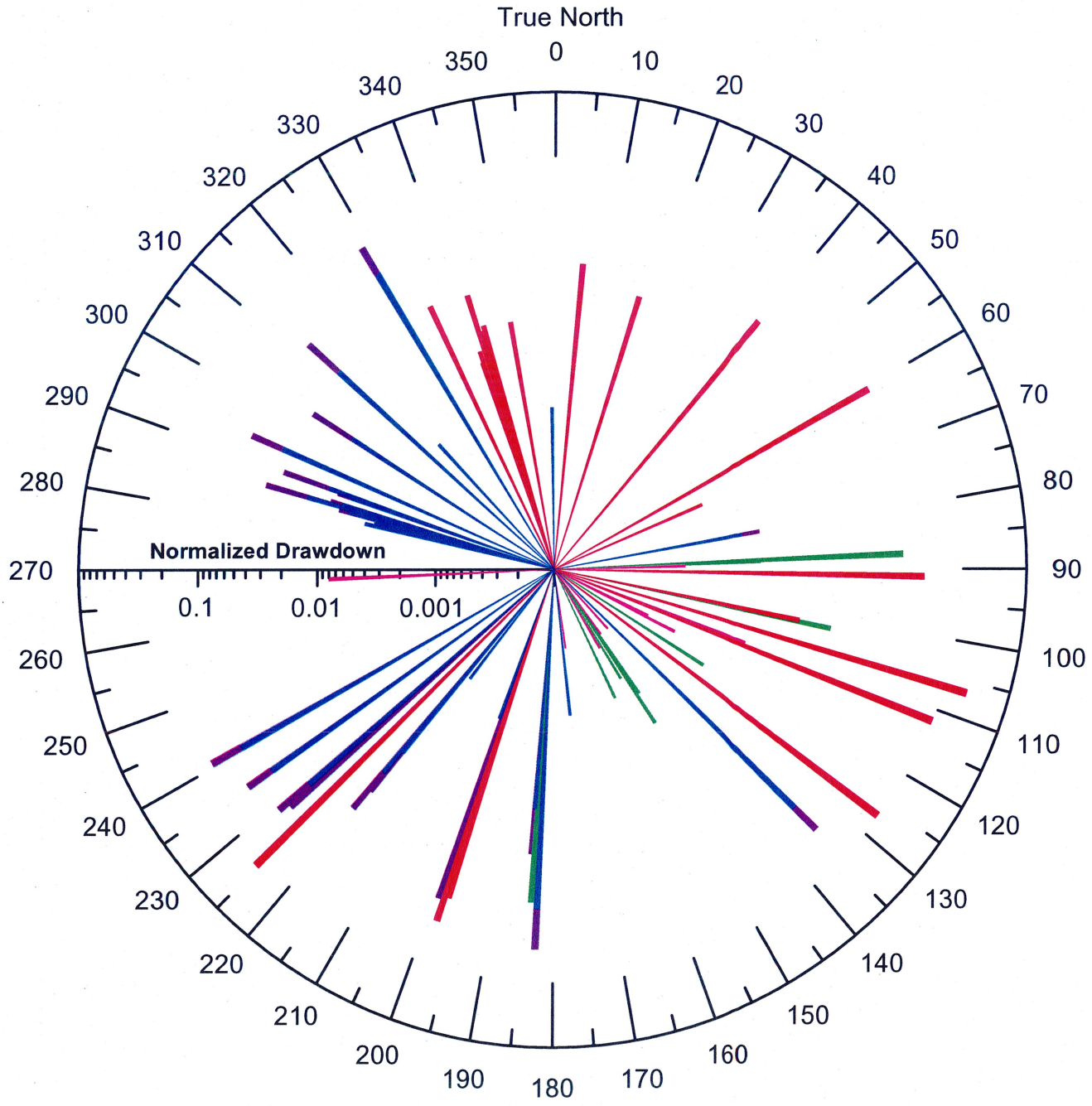
TABLE U-1

MAGNITUDE OF DRAWDOWN AT MONITORING LOCATIONS AT COMPLETION OF PUMP TESTS

		PW-08-01 24-hour test Avg. 96 gpm		PW-08-04 26.5-hour test Avg. 32 gpm		PW-08-03 26.5-hour test Avg. 8.2 gpm		PW-08-02 50-hour test Avg. 92 gpm		PW-08-01 (149 gpm) and PW-08-02 (81 gpm)	
Bedrock Wells	<0.1 foot	4 of 24	16.7%	16 of 25	64%	20 of 25	80%	10 of 27	37%	5 of 28	17.9%
	0.1 to 1 foot	11 of 24	45.8%	5 of 25	20%	3 of 25	12%	6 of 27	22.2%	8 of 28	28.6%
	1 to 10 feet	8 of 24	33.3%	3 of 25	12%	1 of 25	4%	6 of 27	22.2%	8 of 28	28.6%
	10 to 100 feet	1 of 24	4.2%	1 of 25	4%	0 of 25	0%	5 of 27	18.5%	6 of 28	21.4%
	<100 feet	0 of 24	0%	0 of 25	0%	1 of 25	4%	0 of 27	0%	1 of 28	3.6%
Overburden Wells	<0.1 foot	17 of 25	68%	27 of 28	96.4%	24 of 26	92.3%	6 of 14	42.9%	17 of 25	68%
	0.1 to 1 foot	5 of 25	20%	1 of 28	3.6%	2 of 26	7.7%	2 of 14	14.3%	2 of 25	8%
	1 to 10 feet	3 of 25	12%	0 of 28	0%	0 of 26	0%	6 of 14	42.9%	5 of 25	20%
	10 to 100 feet	0 of 25	0%	0 of 28	0%	0 of 26	0%	0 of 14	0%	1 of 25	4%
	<100 feet	0 of 25	0%	0 of 28	0%	0 of 26	0%	0 of 14	0%	0 of 25	0%

Drawdowns occurred in various azimuthal directions surrounding each pumping well. However, in some directions, groundwater monitoring points were not available. Since groundwater monitoring wells and piezometers were absent in some radial directions for each particular pump test, the results of each of these pump tests were included on one graph to demonstrate that interconnectivity of bedrock fractures essentially occurs in all azimuthal directions across the site. Figure U-16 summarizes the normalized drawdowns; that is, end-of-test drawdowns at a particular monitoring point divided by the drawdown at the pumping well, for various azimuths around each of the individual well pumping tests. It is important to note that the plot combines the results of the various tests since the origin of each test (the respective pump well) varies, and since the values of normalized drawdown for the different pump tests are not directly comparable to one another due to varied pumping rates and pump well characteristics. The results do show, however, that drawdowns occur essentially at all directions away from the various pump wells.

FIGURE U-16
LOG OF NORMALIZED DRAWDOWN VERSUS AZIMUTH FROM PUMPING WELLS



Legend
- PW-08-01 - End of 24-Hour Pump Test
- PW-08-02 - End of 50 Hour Pump Test
- PW-08-03 - End of 26.5-Hour Pump Test
- PW-08-04 - End of 26.5-Hour Pump Test
- PW-08-01 - End of First 7-Days of Combined Pump Test

This graph presents normalized drawdown (observation well drawdown:pumping well drawdown) versus azimuth direction from pumping wells. The origin of azimuth directions for each pump test is from its respective pumping well.

6.0 THEORETICAL CONFIRMATION OF BEDROCK FRACTURE INTERCONNECTIVITY

Using the measured fractured features described above, an interpretation of the degree of interconnectedness of these fractures is possible. Interconnectedness of bedrock fractures allows the fractures to transmit groundwater from one location to another through a network of fractures. That is, enough fractures intersecting one another allow groundwater to move through the bedrock. This evaluation leads to defining two important characteristics that describe groundwater flow behavior in a fractured rock mass: first, is whether enough fractures are interconnected to allow groundwater to move between two points; and, second, is the degree of interconnection, which determines whether the formation will behave discretely or as a near-continuum.

Individual fractures are not infinite in extent. Therefore, where flow is supported, fracture density must be high enough to ensure connectivity through the system. The fracture density required to sustain advective flow is termed the "percolation threshold." Below that threshold, fractures may be connected, but only in small localized regions. Above the threshold, localized regions become interconnected and flow can take place through the bulk rock mass. With an increase in fracture density, the system becomes increasingly pervious. Theoretical studies have been completed by Robinson (1982) to determine whether or not a fractured media has the ability to transmit groundwater as a function of the average number of intersections that a single fracture has with others in a fracture network. Robinson used numerical simulations to determine that when the average number of fracture intersections for a particular domain divided by the number of individual fractures in that domain exceeds approximately 3.2 to 3.8, a percolation threshold is reached where the fractures are effectively connected hydraulically. Based on the data collected in the detailed bedrock fracture survey at outcrop OC-AG, each of the sixty-seven bedrock fractures identified that have lengths greater than one foot are intersected an average of 4.2 times each. This would suggest that Robinson's percolation threshold for a

fractured media has been exceeded for the JRL site, inferring an interconnected bedrock fracture network.

Robinson (1982) also found that the percolation threshold can be estimated for randomly oriented fractures when the number of fractures and their lengths are known for a given area. Robinson determined that the percolation threshold is reached when the product of the areal fracture density (the number of fractures per unit area) and the average square length of the fractures exceeds approximately 1.5. A similar study by Quintanilla and Ziff (2007) determined the percolation threshold to be approximately 1.12. Based on the measurements made inside the 6-foot by 4-foot area at outcrop OC-AG (a correction of lengths of fractures crossing the survey area perimeter has been made to only include the portion of the fractures inside the survey area perimeter for this calculation), the fracture density is 2.8 fractures per square foot and the average square length of the fractures is 3.7 square feet. The product of the two values is 10.24, which exceeds the suggested percolation thresholds of 1.5 or 1.12.

The most relevant observation relative to fracture interconnectedness at the Expansion site is the mapping of the intersection of the fractures at outcrop OC-AG. Any one particular fracture that is greater than one foot in length has been shown to be interconnected with all of the fractures mapped on that outcrop. That is to say that beginning at any one particular fracture, following the trace of the fractures on the outcrop face, any other fracture can be reached without entering the rock mass and without moving off of a recorded fracture. This is further evidence of the ability of the bedrock beneath the Expansion site to have the ability to move groundwater along fracture pathways within the bedrock over regional scales.

7.0 CONCEPTUALIZATION OF THE BULK BEDROCK GROUNDWATER FLOW

Freeze and Cherry (1975) and Domenico and Schwartz (1998) describe a continuum or equivalent porous media approach for treating fractured bedrock. In this method, the flow of groundwater through individual fractures is not analyzed, but rather the bulk or average

groundwater flow through the bedrock formation. This means fractures must be numerous, the distance between fractures should be small in comparison to the size of the area being studied, and fractures should be well connected (Bradbury, et al, 1991). Lipfert (2002) found justification for using the continuum approach with Maine bedrock for large-scale wellhead protection area delineation. Some authors have recommended that in order to evaluate fracture interconnectedness on a regional or site-wide scale, beginning the evaluation on a local scale may lead to a concept similar to porous media at larger scales. Lipfert, et al, 2005 agreed that a uniformly fractured Maine bedrock could be approximated as a hydraulic continuum for groundwater on a regional scale that was at least 100 times the average fracture spacing. This would imply, since fracture spacing for the Expansion site is less than a few feet, that for distances or scales of a few hundred feet or more, the bedrock can be conceptualized as a continuum. In a similar way, Long, et al, 1982 suggests a fractured rock will behave increasingly as a continuum as fracture density, scale of interest, and distributions of fracture strikes and dips increase; and as the variation or distribution of fracture aperture sizes decreases. Requisite to these approaches is detailed structural characterization of the fracture network; that is, measurement of fracture orientation, spacing, aperture, density, porosity, and hydraulic conductivity. Furthermore, the continuum approach can be applied for fractured bedrock groundwater flow modeling with favorable results when the appropriate conditions are met. This approach is supported by various authors (Tiedeman, et al, 1997, Hsieh, et al, 1999, Pankow, et al, 1986; and Endo, et al, 1984) and is recognized by the U.S.EPA (Schmelling and Ross, 1989).

Based on all the observations of the fracture features and the corroboration from the pump testing, the bedrock fractures beneath the JRL Site appear to be hydraulically interconnected over scales of a few hundred feet or less. Furthermore, this bedrock can be conceptually treated as a continuum at distances larger than a few hundred feet. This behavior is the result of the relative fracture spacing compared to the fracture lengths, as well as the broad range of fracture strikes and dips. The value of the detailed investigation of the bedrock lies in the increased confidence level developed in terms of interpreting the groundwater flow behavior in the rock over site-wide

or regional scales. The ability to treat the bedrock as a continuum, hydraulically, justifies the regional groundwater simulation in Appendix V.

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APPENDIX V

GROUNDWATER SIMULATION

APPENDIX V

GROUNDWATER SIMULATION
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

STATE OF MAINE BUREAU OF GENERAL SERVICES
as Owner
&
NEWSME LANDFILL OPERATIONS, LLC,
as Operator

July 2015

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Sevee & Maher Engineers, Inc.

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APPENDIX V

GROUNDWATER SIMULATION
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

1.0 PURPOSE

In order to examine the groundwater flow pathways away from the Expansion, a three-dimensional groundwater simulation was performed. This is a more detailed groundwater model than the one prepared for the original landfill site application in 1991. The purpose of this model was to examine the distance that groundwater can migrate away from the landfill based on the natural geologic and topographic setting. As discussed in Section 5.3 of the Site Assessment, the regional hilly topography would tend to limit the distance that groundwater can migrate away from the landfill, thereby protecting groundwater users along Route 43, Route 16, Old Stagecoach Road, and other small roads in proximity to the Expansion site. The three-dimensional groundwater simulation is capable of incorporating the topographic features as well as the wetlands and streams where groundwater would discharge. The simulation allows for consideration of existing residential and business groundwater supply wells which under pumping conditions can potentially move water beneath hydrologic boundaries. This simulation was a useful tool to corroborate the interpretations of Section 5.3 of the Site Assessment and demonstrate the value of the Expansion's remote setting relative to naturally protecting groundwater users.

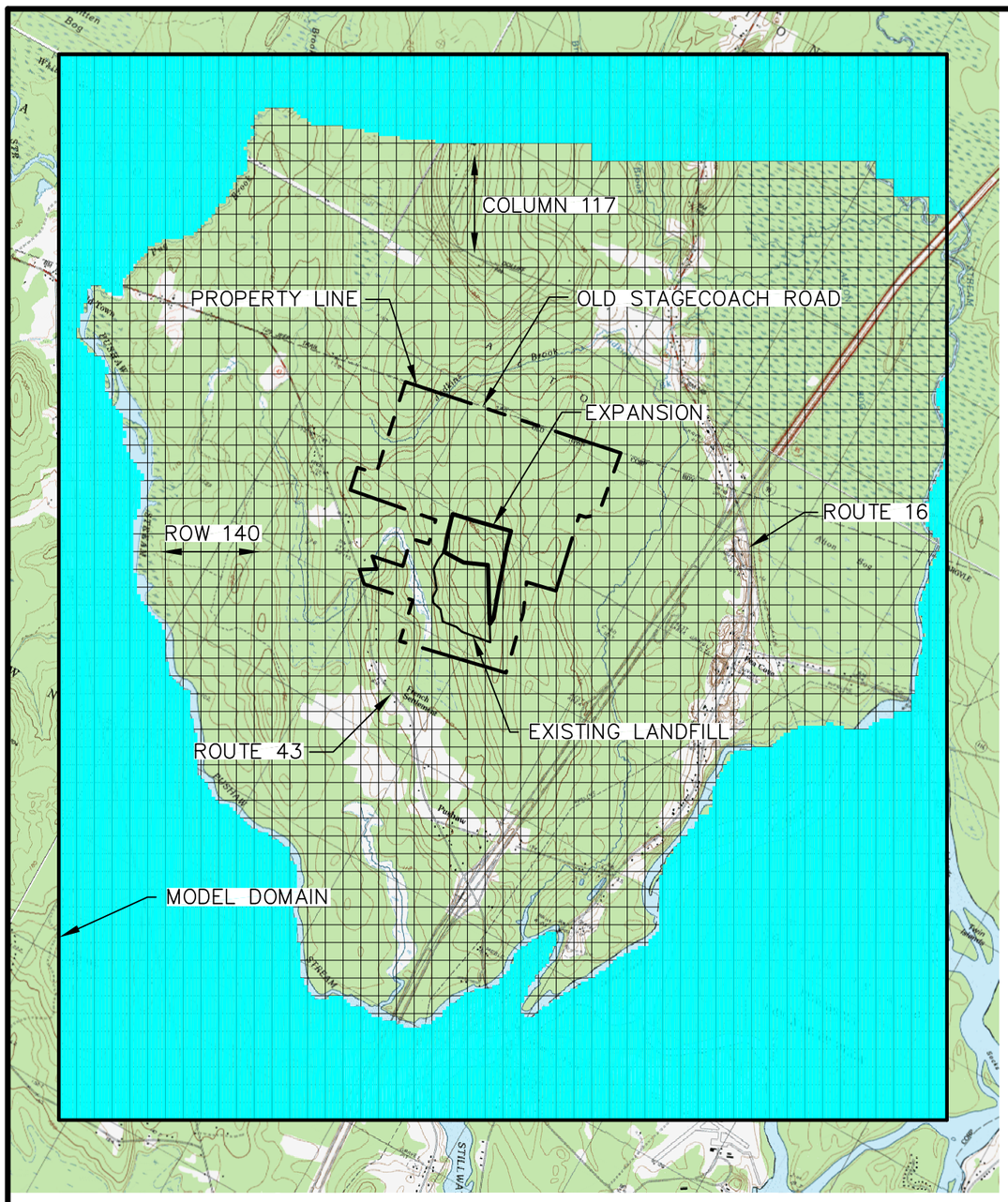
2.0 MODEL SELECTION

MODFLOW, developed originally by the U.S. Geological Survey, was utilized to simulate the steady-state three-dimensional groundwater behavior for this Site (WHI, 2006). The model is well documented and has been used significantly throughout the world for simulating groundwater flow, as well as solute transport. The solute transport portion of this code was not utilized. The level of documentation and use of this model makes it a technically defendable tool for simulating groundwater flow.

3.0 SELECTION OF MODEL DOMAIN AND GROUNDWATER MODEL SETUP

Because the groundwater model seeks to evaluate potential groundwater users along Route 43, Route 16, Old Stagecoach Road, and other auxiliary roads, the area of the simulation includes the portions of these features that are proximate to the Site. The groundwater model grid is oriented parallel with the interpreted directions of the principal hydraulic conductivities (as discussed in Section 3.2.9 of the Site Assessment). The x-axis of the model is oriented N61°E and the y-axis of the model is oriented N29°W; these values were selected based on the interpreted results of the bedrock pumping test at well MW-06-02 (see Section 3.2.9 of the Site Assessment). Both orientations are relative to True North. The model domain is 30,000 feet along the y-axis and 25,000 feet along the x-axis. The model domain is illustrated in Figure V-1 atop portions of the four U.S.G.S. topographic quadrangle maps that it lies in; Old Town, Pushaw Lake, Greenbush, and South Lagrange.

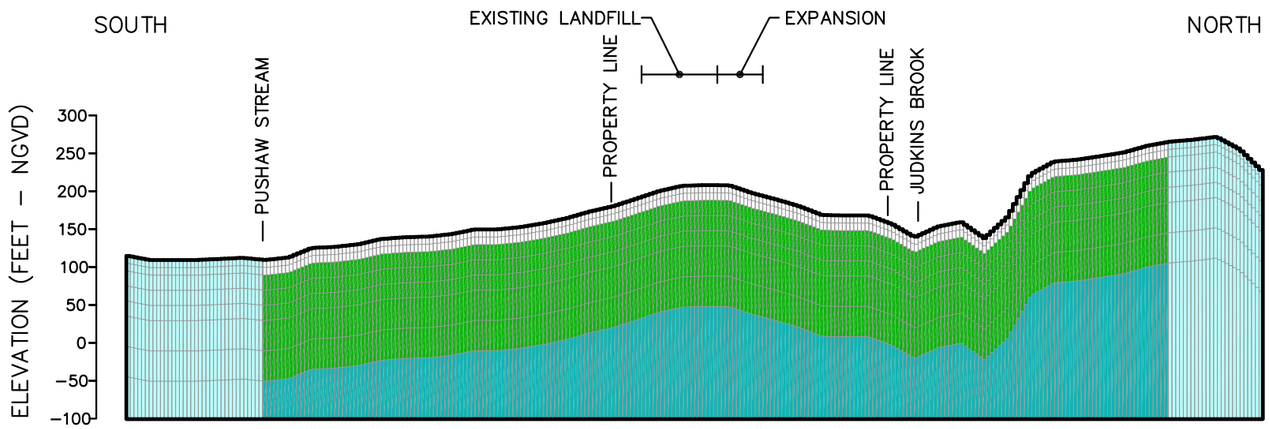
The major hydrologic boundaries and hydrogeologic features that help to shape the perimeter of the active model domain include the Pushaw Stream, Stillwater River, Birch Stream, and Alton Bog. These features are at topographic lows in the model domain as shown on Figure V-2. The higher topographic elevations also create no groundwater flow boundaries in this geologic setting. Smaller streams, brooks, and wetlands are included within the interior of the model domain. Incorporation of the hydrologic boundaries and hydrogeologic features into the model is discussed in detail below. The model domain was extended beyond the hydrologic boundaries local to the Expansion footprint, which is situated more or less in the central portion of the model domain. The Expansion footprint is situated along the ridge of a drumlin, one of the topographic highs of the model domain. By keeping the model boundaries remote from the Expansion footprint, groundwater pathways have an opportunity to pass beneath the nearby streams or wetlands in response to pumping wells, if that's what the wells and geologic setting would allow.



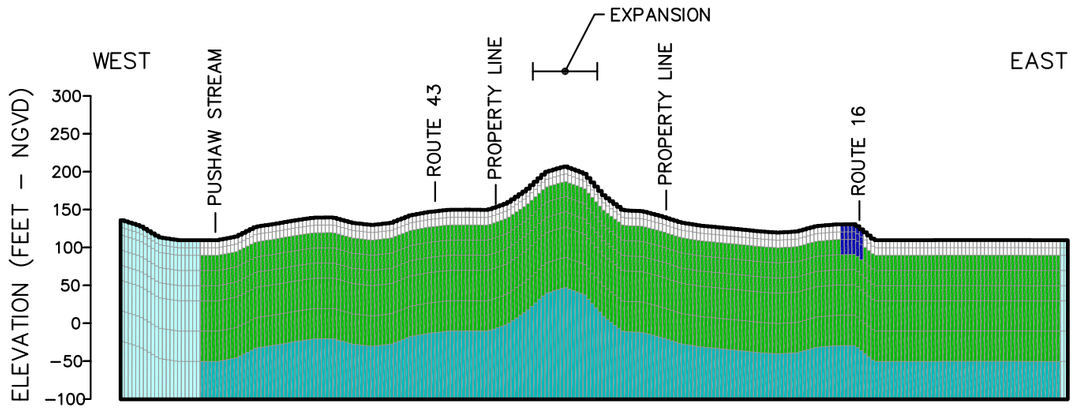
PLAN
HORIZONTAL DISCRETIZATION
100 FEET x 100 FEET CELL SPACING

NOTE: HORIZONTAL DISCRETIZATION IS 5X GRID SPACING SHOWN ABOVE FOR THE PURPOSE OF CLARITY.

2000 0 4000 FEET



VERTICAL DISCRETIZATION (COLUMN 117)
SCALE: 1 INCH = 4000 FEET (HORIZ)
1 INCH = 200 FEET (VERT)



VERTICAL DISCRETIZATION (ROW 140)
SCALE: 1 INCH = 4000 FEET (HORIZ)
1 INCH = 200 FEET (VERT)

GEOLOGIC UNITS

- GLACIAL TILL
- UPPER BEDROCK
- LOWER BEDROCK
- SAND AND GRAVEL ESKER
- INACTIVE FLOW CELLS

FIGURE V–1
DISCRETIZATION OF MODEL DOMAIN
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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DWG: V–2 DISCRETIZATION LMN: CTB: V1 REV: 6/11/15

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3.1 Model Domain Discretization

The simulation region was discretized into cells in both the horizontal and vertical directions as required by the model. A uniform grid with 100 feet by 100 feet cell spacing was applied horizontally to the model domain. Selecting cells of this size allows for sufficient detail for groundwater flow around the hilly topography of the drumlin and is sensitive to the local variations in topography around the Expansion Site. The Expansion solid waste boundary dimensions are approximately 1,400 feet by 1,700 feet. Therefore, the selected horizontal cell size is sufficiently smaller than the size of the landfill.

In the vertical dimension, eight layers were incorporated into the model. The upper two layers represent the glacial till soil for the majority of the model with the exception of the upper three layers in the area beneath Route 16, which were used to represent the sand and gravel esker deposits. The basis of the increased thickness of overburden in this deposit is from overburden thickness reported in the Maine Geologic Survey Significant Sand and Gravel Aquifer maps in this area (Tolman and Lanctot, 2001). A stratified sand zone located southeast of the proposed Expansion footprint is represented in a portion of layer three of the model. In other areas of the model domain, the third layer, and layers four through eight represent bedrock. The deeper layers of bedrock were incorporated into the model to allow underflows of localized hydrologic boundaries such as streams to occur (either from natural groundwater movement or from residential well pumping) without impediment from the boundary. Representation of the model orientation and discretizations in the horizontal and vertical directions are shown in Figure V-1.

The vertical discretization is complex and varies with topography and the interpreted thicknesses of the geologic units. The surface of the first layer of the model was created by importing the vertices of “polylines” of the 10-foot ground surface elevation contours obtained for the four U.S.G.S. topographic quadrangles. With that information, kriging was used to interpolate a ground surface elevation for each cell in layer one. Detail on the thickness of the till is only available in proximity to the Expansion footprint and existing landfill area because of the considerable amount of investigatory work that has been done. Outside of the current and expansion landfill limits and beyond the Site property line, only limited information on the till thickness and depth to bedrock is available. Based on the typical thickness of about 20 feet of

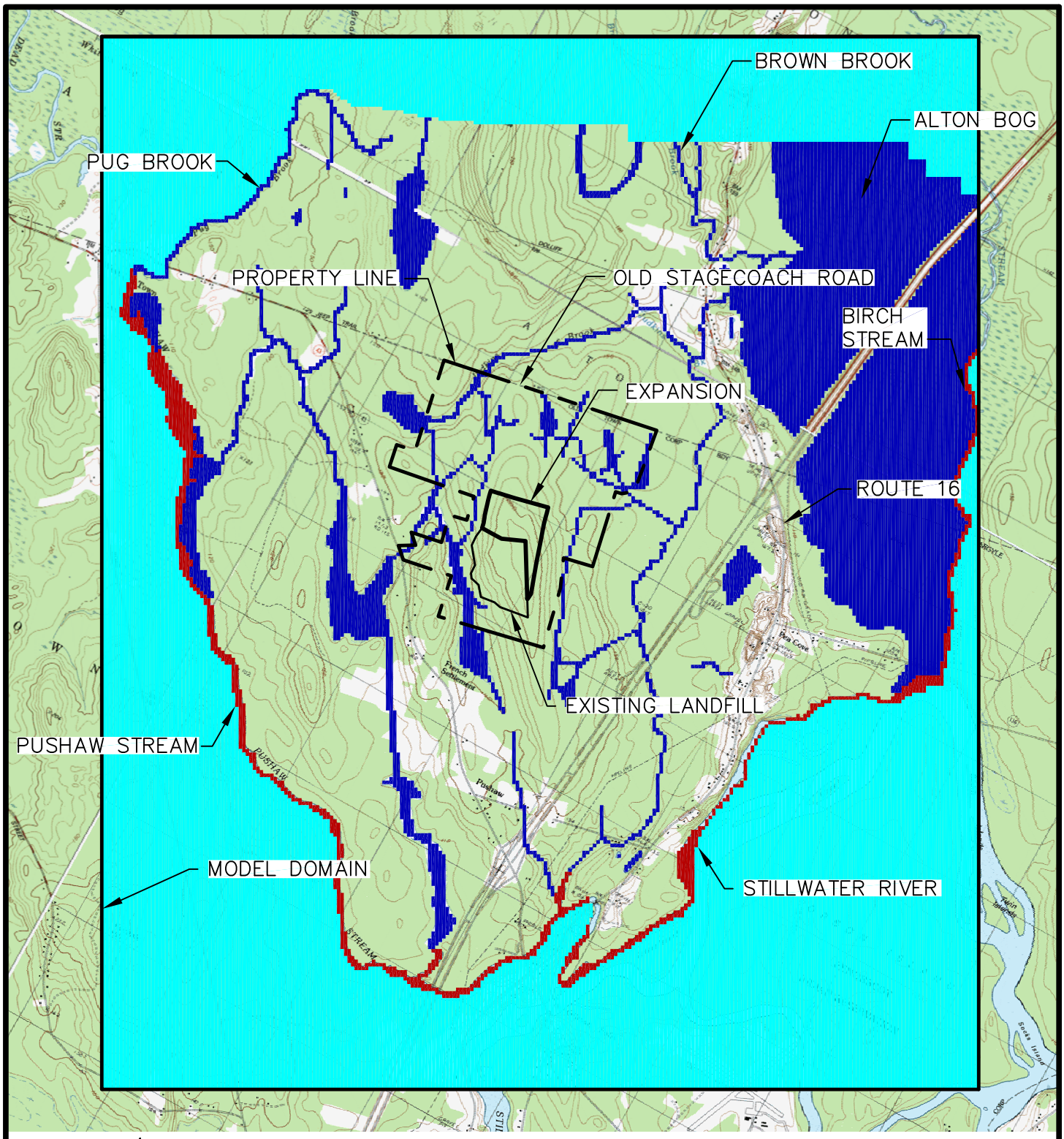
till at the Expansion Site, a uniform till thickness of 20 feet across the model domain was assumed. As the top two layers of the model by and large represent the till, each layer was assigned a thickness of 10 feet. The top of the second layer of till was assigned an elevation of local topography minus ten feet. Likewise, bedrock was assumed to follow the local topography minus the thickness of the till. The regional surficial geologic mapping provides a basis for selecting the till and sand and gravel areas outside the Site investigation area (Borns and Thompson, 1981).

3.2 Hydrologic Boundary Conditions

Three hydrologic boundary conditions were incorporated into the model through add-on "Packages" included with MODFLOW-2000. These include the Constant Head Package, the River Package, and the Recharge Package. Additionally, no-flow boundaries are incorporated into the model by assigning no-flow cells, along the base of the model, and at topographic divides. The no-flow, leakage, and constant-head boundaries for the upper model layer are shown in Figure V-2.

The Constant Head Package was used along the larger water courses (Pushaw Stream, Stillwater River, and Birch Stream) that surround the Site in three directions. All of these water courses represent the lowest topographic elevation in the model domain and have comparatively equal elevations with little relief. Constant-heads were only applied to the upper model layer when utilized. The Recharge Package simulates precipitation recharge to the groundwater through the top layer of the model.

The River Package was used to simulate the water courses and wetlands that are present across the model domain. The River Package utilizes cells as leakage nodes allowing groundwater to either exit or enter into these cells to or from the surface water, but also allows the groundwater to continue through the cells beyond the stream without any impediments to flow. In all instances that the River Package was used in this model, the conductance was calculated using the vertical hydraulic conductivity of the till overburden materials and an assumed leakage layer thickness of 1 foot. The entire area of each cell assigned as a leakage node using the River Package was used, assuming contribution from adjacent wetlands was



LEGEND

- LEAKAGE NODES (RIVER PACKAGE) FOR STREAMS, RIVERS, BROOKS AND WETLANDS.
- CONSTANT HEAD CELLS
- INACTIVE FLOW CELLS

2000 0 4000 FEET

DWG: FIGS–APPENDIX V LMN: V–2 CTB: BOUNDARIES REV: 6/11/15

FIGURE V–2
MODEL HYDROLOGIC BOUNDARY CONDITIONS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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present for narrow water courses. Additionally, hydraulic head elevations were specified for these cells based on topographic elevations. Leakage nodes were assigned to the upper layer of the model.

The incorporation of the hydrologic boundaries into the model is described in further detail below:

- Northwestern Border of Model Domain

  Pug Brook, on the east-most corner of the model domain, was used as a hydraulic boundary using the River Package. Brown Brook and an unnamed tributary to it were used as hydraulic boundaries using the River Package on the north-most corner. Toward the northwestern border of the model domain is a topographic ridge. A no-flow boundary was assigned across the top of the ridge and perpendicular to the elongate direction of the ridge. This no-flow boundary was created between Pug Brook and Brown Brook by use of inactive flow cells.

- Southwestern Border of Model Domain

  Pushaw Stream was used as a hydraulic boundary along the southwestern border of the model domain by assigning constant-head values to layer one of the model along the Stream. A constant-head elevation of 104 feet above Mean Sea Level (or NGVD) was assigned to this portion of Pushaw Stream based on the nearest U.S.G.S. topographic map ground surface elevation contours that run along this portion of the stream. All model cells to the southwest of Pushaw Stream were assigned as inactive flow cells.

- Southeastern Border of Model Domain

  Pushaw Stream and Stillwater River were used as hydraulic boundaries along the southeastern border of the model domain by assigning constant-head values to the upper layer of the model along them. A constant-head elevation of 104 feet (NGVD) was assigned to these portions of Pushaw Stream and Stillwater River based on the U.S.G.S. maps. All model cells to the southeast of Pushaw Stream and Stillwater River were assigned as inactive flow cells.

- Northeastern Border of Model Domain

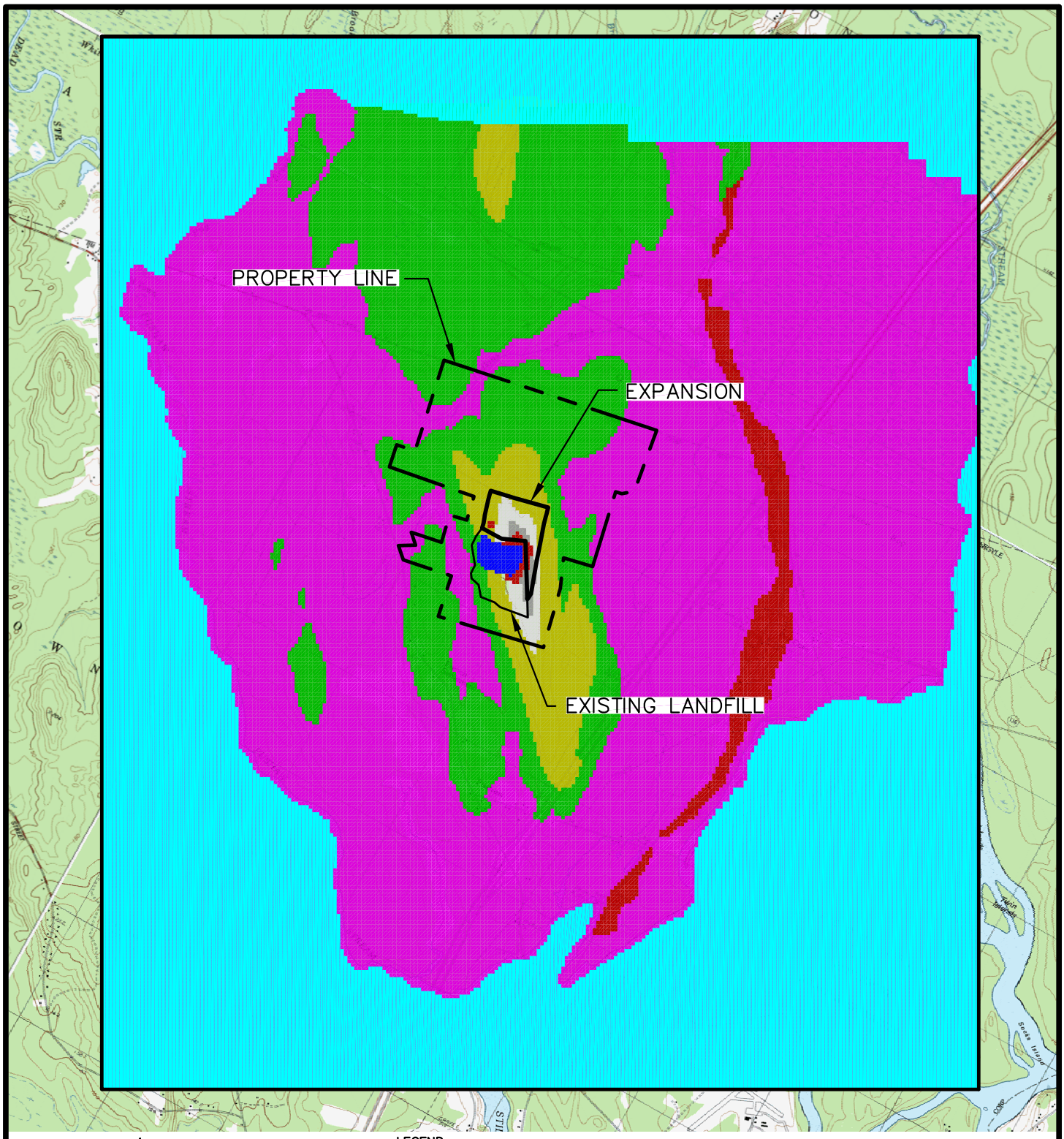
  Birch Stream was used as a hydraulic boundary by assigning constant-head values along the Stream. A constant-head elevation of 104 feet (NGVD) was assigned to this portion of Birch Stream based on U.S.G.S. maps. All model cells to the northeast of Birch Stream were assigned as inactive flow cells.

- Interior of Model Domain

  The interior of the model domain incorporated several brooks, streams, and wetland topographic features. In addition to several unnamed streams, Judkins Brook was modeled by use of the River Package. Wetlands within the model domain were identified in detail by delineation in the Expansion Site, as mapped on U.S.G.S. topography maps, and as interpreted from aerial photos.

3.3 Model Recharge

Precipitation recharge into the upper model layer was incorporated using the Recharge Package. The objective in assigning recharge values to cells in the model was to provide a sufficient volume of water to obtain reasonable hydraulic head elevations, while staying within a realistic range of recharge values (see Section 2.3 of Site Assessment). During model setup, a uniform recharge of 0.5 inches per year was initially assigned across the top layer of the entire model. This was generally sufficient for the areas of low lying topography. However, this was not a sufficient amount of recharge to saturate the upper layers of the model in the higher regional topography. The amount of recharge was incrementally increased in the remaining unsaturated zones of the upper layers based on topography. In effect, the amount of simulated recharge radially decreased away from the localized topographic high points in the model domain. The range of recharge values used in this model was between 0.5 inches per year to 10 inches per year on the assumed till surfaces, and 10 inches per year on the assumed sand and gravel esker deposits. The higher range of recharge values used for till was limited to relatively few cells located at the highest topographic elevations in the model domain. The assigned recharge values are shown on Figure V-3.



LEGEND

- INACTIVE FLOW CELLS
- 0 IN/YEAR
- 0.5 IN/YEAR
- 2 IN/YEAR
- 4 IN/YEAR
- 6 IN/YEAR
- 8 IN/YEAR
- 10 IN/YEAR

NOTE: RECHARGE CUTOFF ESTIMATE BASED ON 2009 LANDFILL DEVELOPMENT.

2000 0 4000 FEET

DWG: V-2 discretization LMN: V-3 CTB: RECHARGE REV: 6/11/15

FIGURE V-3
MODEL RECHARGE
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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The area of the existing covered landfill in 2009 was assigned a recharge value of 0 inches per year for model calibration. Post-closure simulation results, including particle tracking away from the existing and Expansion landfills, were completed with 0 inches per year over the entire area of the existing and Expansion landfills. These results are discussed in Section 5.0.

3.4 Parameter Selection

The main parameter selection required for the steady-state groundwater flow simulation without assessing contaminant transport is hydraulic conductivity. Substantial information on the hydraulic conductivities of the till and bedrock is available in the existing landfill area and the Expansion Site. Outside of this area, the hydraulic conductivity of the till and bedrock are assumed to be similar.

The model incorporates a horizontal hydraulic conductivity for the till of 9.4×10^{-6} cm/s, which was estimated based on the geometric mean values calculated from field measurements.

The hydraulic conductivity of the till used for the model was assumed to be uniform and isotropic. It was applied to the top two layers of the model with the exception of the sand and gravel esker deposits along Route 16. A single mean hydraulic conductivity for the till simplified the till deposit regionally and allowed for recharge to be a principal calibration parameter.

The stratified sand zone southeast of the Expansion Site was assigned a hydraulic conductivity of 4.4×10^{-5} cm/s, which is the geometric mean of the vertical and horizontal conductivity measurements of the stratified sand zone. The reason for incorporating the sandy zone is because it represents a possible groundwater flow pathway away from the Expansion. As stated in Section 4.1 of the Site Assessment, this zone appears to be of limited areal extent and not geologically contemporaneous with the sand and gravel deposits along Route 16. This zone was included in a portion of the third layer of the model, just below the glacial till and above bedrock.

The hydraulic conductivity values of the sand and gravel esker deposits were assigned a value of $1.0x10^{-1}$ cm/s, which was estimated based on literature values for course sediments (Fetter, 1994). This value was assigned for the top three layers of the model for the sand and gravel esker deposit.

The horizontal hydraulic conductivity values assigned for the bedrock were $7.8x10^{-5}$ cm/s in the northeast/southwest direction (i.e., along the x-axis of the model), and $2.3x10^{-5}$ cm/s in the northwest/southeast direction (i.e., along the y-axis of the model); the vertical hydraulic conductivity was assigned a value of $7.0x10^{-5}$ cm/s. These values are based on the geometric mean of hydraulic conductivity measurements in the bedrock at the Expansion site and an anisotropy ratio in bedrock estimated by long-term bedrock pumping tests (see Section 5.2.4 of the Site Assessment). These values were assigned to layers three through seven in the model. Layer eight, the bottom layer of the model, was assigned hydraulic conductivity values of one order of magnitude less in all three directions assuming increased rock competence with depth. Furthermore, based on the detailed analysis of fracture mapping and pump testing, the bedrock was treated as a continuum rather than as a discretized fractured medium. For the regional scale of interest (e.g., horizontal distances of hundreds or thousands of feet away from the Expansion), this approach is reasonable and supported by the Site data. The hydraulic conductivity anisotropy ratio of the bedrock was assumed constant during the calibration process.

3.5 Residential Groundwater Supply Wells and Expansion Site Head Observation Wells

At the existing dwellings (residential and business) within the model domain, groundwater supply wells drawing from the bedrock were simulated. Because this area is not sewered, individual water usage is recycled back into the ground surface. For the purpose of our analysis, this water was assumed not to be recycled. This results in a conservative estimation of the effect of groundwater pumping in the vicinity of each well. Groundwater consumption for each well was assumed to be 270 gallons per day, based on use for a typical three-bedroom residence as specified in the Maine Subsurface Wastewater Disposal Rules. Well locations are estimated based on an assessment of aerial photos of the model domain taken within the past several years. This assessment does not include the exact location of groundwater supply wells

or verification that all groundwater supply wells are included in the model. Additionally, simulation of groundwater supply wells identified within approximate survey areas of 500 feet by 500 feet are located in a central cell within that area due to the regional nature of the groundwater model (i.e., an area containing two 270 gallons per day groundwater supply wells is represented in one cell with one 540 gallons per day groundwater supply well. The number of wells represented by a single cell ranges from one to fifteen. All simulated groundwater supply wells are assumed to be bedrock wells extending from their respective top of bedrock elevations to the base of the model domain.

Forty-eight groundwater head observation wells (including multiple depth well clusters) were also incorporated into the model in the Expansion area in order to provide a model calibration tool in that area of the model. Groundwater supply well and groundwater head observation well locations are shown in Figure V-4.

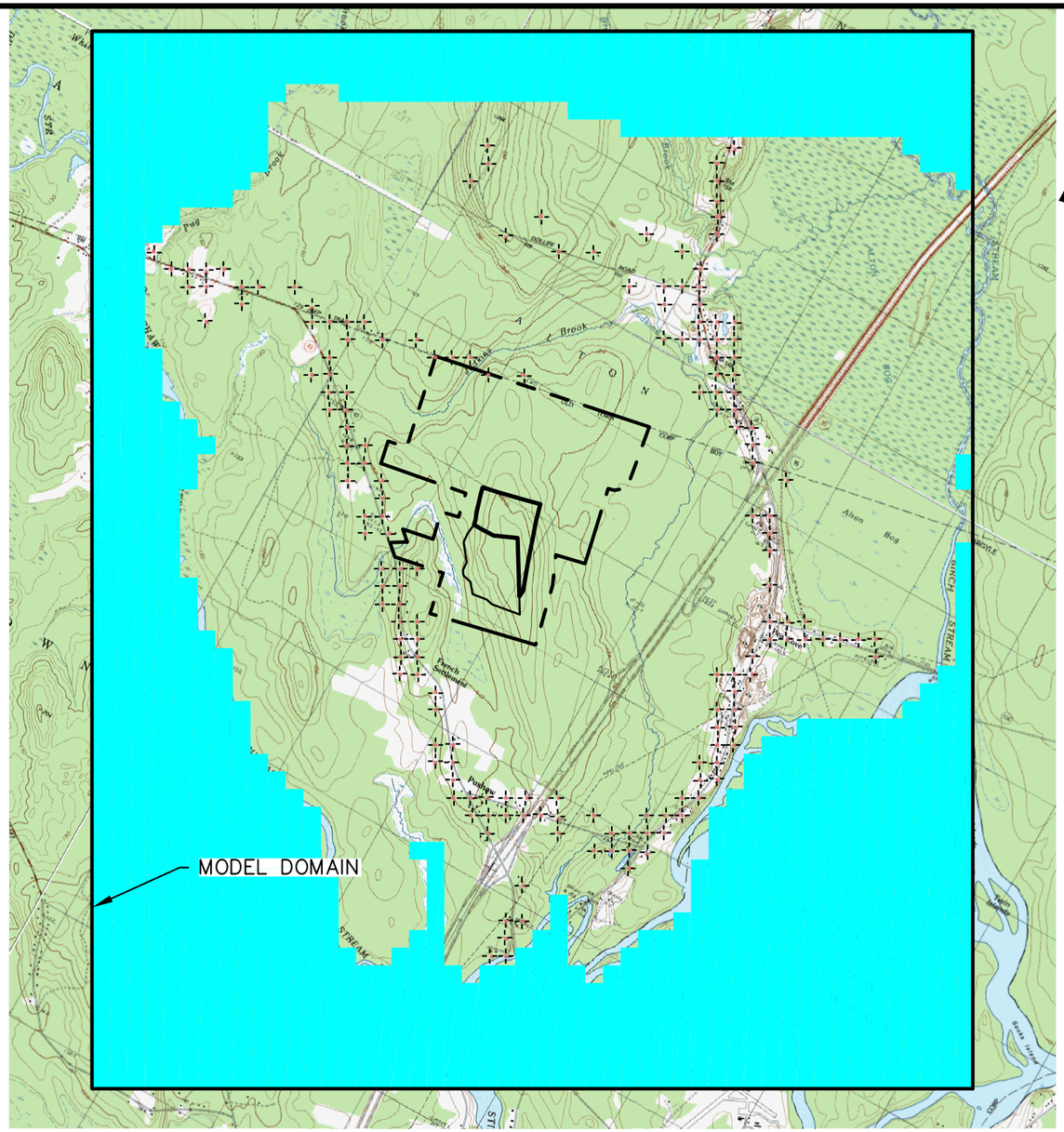
3.6 Particle Tracking

The particle tracking tool was utilized to assess the pathways of discrete groundwater particles. Forward tracking particles were assigned to the top model layer on an approximate 500-foot by 500-foot grid over the existing landfill and Expansion. The particle tracking was run post-calibration and includes a recharge cutoff over all of the existing landfill and Expansion. The results of the particle tracking are discussed in the Simulation Results section.

4.0 MODEL CALIBRATION

The calibration of the groundwater flow model involved a quantitative comparison of static groundwater elevations at forty-eight observation wells. All of these wells are located in proximity to the Expansion on the site property. Fifteen of these wells are located in clusters of two or three with differing screen depths in till and bedrock. This allowed for sufficient detail for groundwater level calibration.

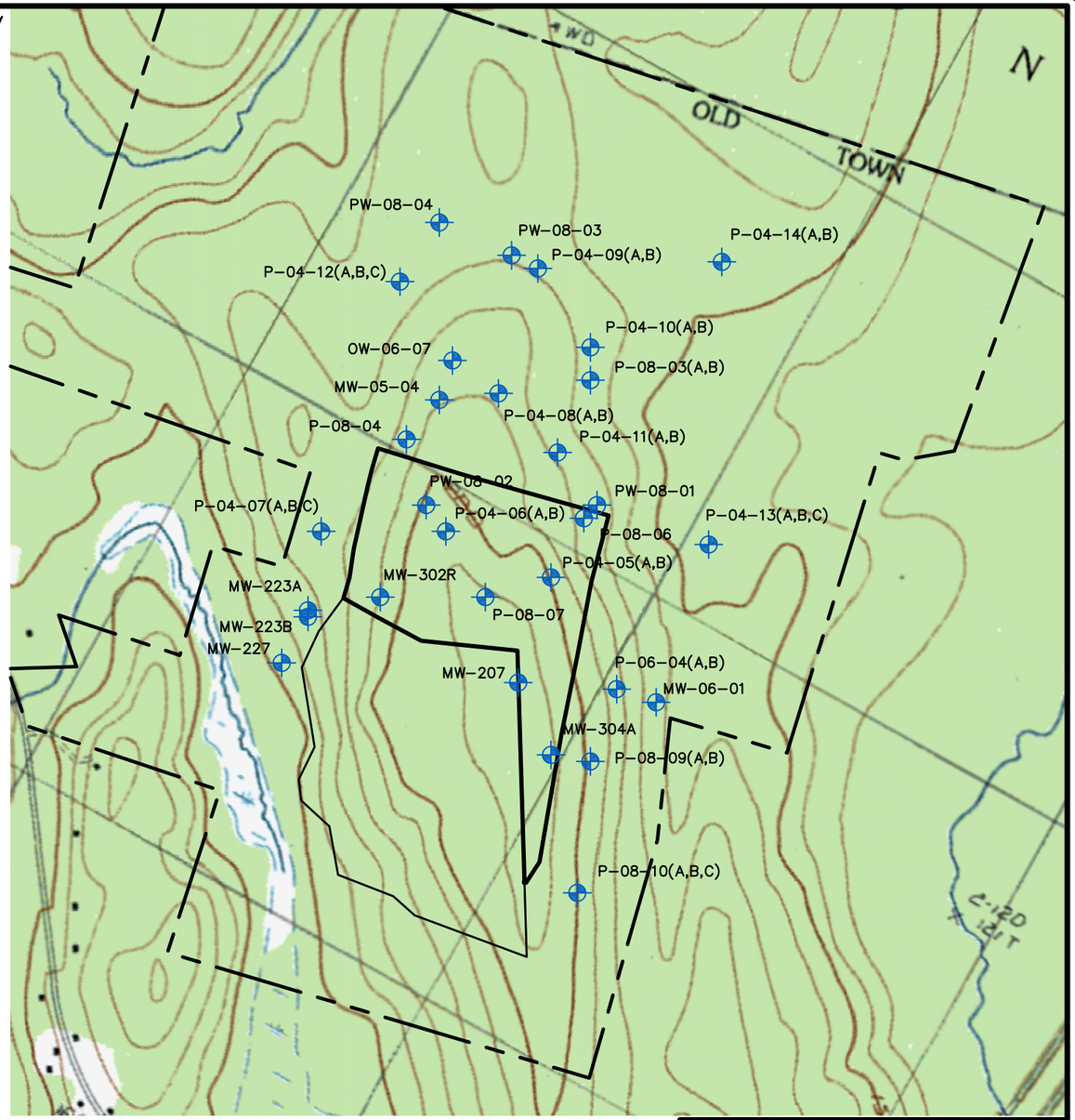
As mentioned above, precipitation recharge was used as the main calibration parameter in the model. MODFLOW calibration tools were used to evaluate the model conditions in comparison



2000 0 4000 FEET

LEGEND

⊹ MODELED BUSINESS AND/OR RESIDENTIAL WATER SUPPLY WELLS (EACH MARKED CELL REPRESENTS BETWEEN 1 AND 15 WELLS IN A 500 FT x 500 FT AREA)



500 0 1000 FEET

LEGEND

P-04-07(A,B,C) GROUNDWATER HEAD OBSERVATION WELLS

FIGURE V-4
ASSUMED RESIDENTIAL & BUSINESS WATER SUPPLY WELL LOCATIONS AND EXPANSION GROUNDWATER HEAD OBSERVATION WELL LOCATIONS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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DWG: V-2 discretization LMN: V4 CTB: WELLS REV: 6/11/15

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to static groundwater level elevations measured at the Site on April 19, 2009. At the simulated forty-eight groundwater head observation wells, the calibrated groundwater model simulation resulted in a minimum residual (difference between measured and simulated groundwater levels) of +0.05 feet. The maximum residual was -20.86 feet. The mean of absolute values of residuals was 5.0 feet and the root-mean-squared value was 6.8 feet. These residuals are satisfactory considering the regional nature of the model (Anderson and Woosner, 2001). The mean residual was -0.5 feet, which indicates that residuals are relatively balanced between positive and negative differences. The calibration report is included as an attachment to this Appendix.

The groundwater observation well clusters with varying screen depths also allows for a comparison of the groundwater vertical hydraulic gradient magnitudes and directions between the model simulation and the observed conditions at the Expansion. Of the twenty-three head observation well couplings modeled, 15 of them are in agreement with the vertical hydraulic gradient direction. Those that are not in agreement are east and northeast of the Expansion boundary. Along this side of the existing landfill and the Expansion, the actual vertical hydraulic gradient is in an upward direction along the side of the drumlin. This is seen in column 127 in the model where observation clusters are present P-08-09. The simulated vertical gradient in these cells show downward hydraulic gradients. However, at approximately 400 feet away in a downslope direction the vertical hydraulic gradient reverses to an upward direction. A summary of the comparison of simulated and actual vertical hydraulic gradients is included with the attached MODFLOW calibration report.

Model calibration in the remaining portions of the model domain away from the Expansion was limited to a qualitative assessment. This was done by ensuring that groundwater table elevations were reasonable in relation to topography (i.e., near the ground surface in till and at greater depths in the sand and gravel deposits along Route 16), and that vertical and horizontal hydraulic gradients are consistent with localized topography and surface water features.

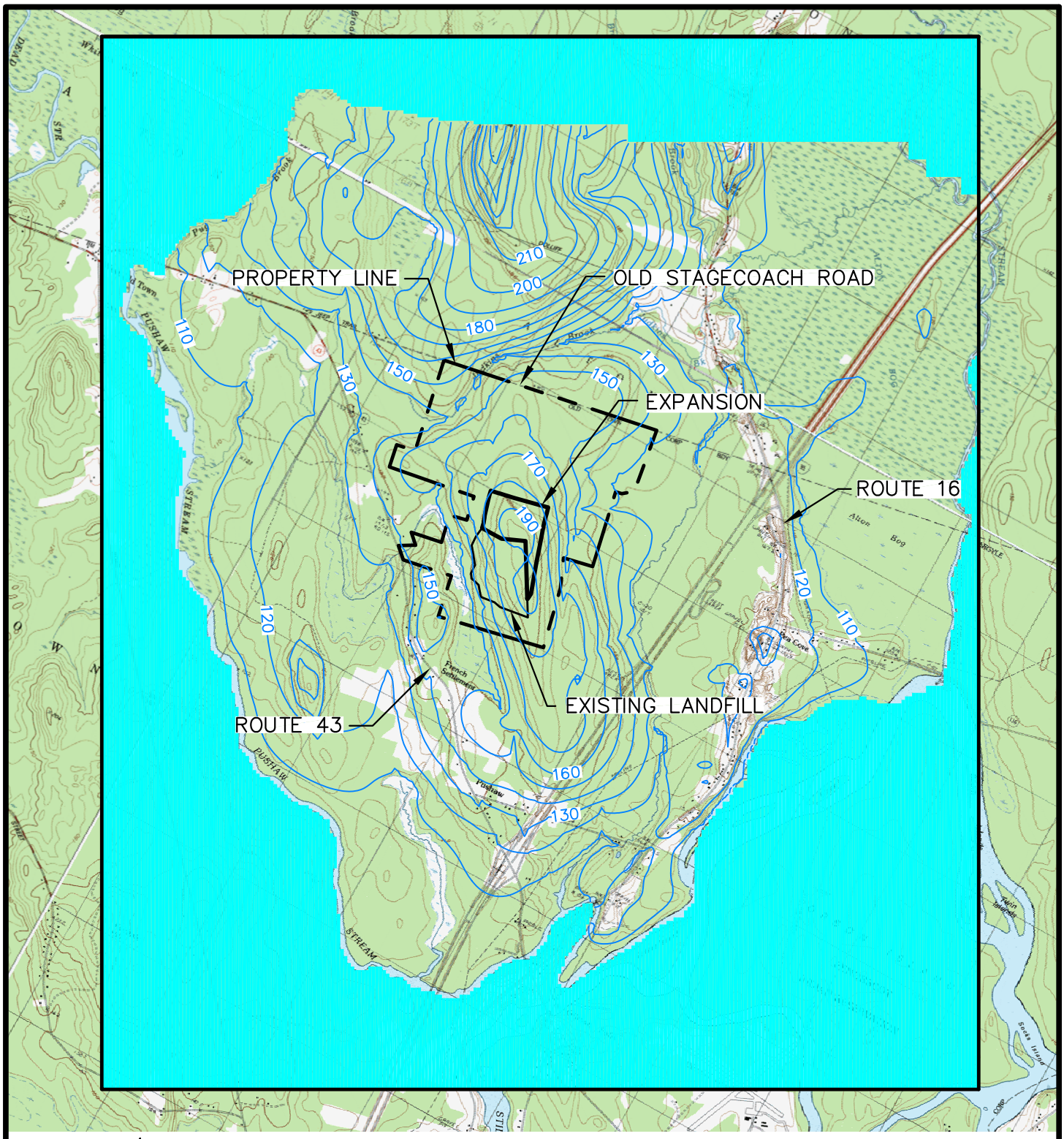
Through the calibration process, a reasonable estimation of the groundwater table configuration was achieved both within the Expansion and its regional setting. This was favorably done without altering the hydraulic parameters of the till and bedrock from the geometric means of

values measured during the Site investigations. During the calibration process, the respective hydraulic conductivities of these units were kept constant. The assumed hydraulic conductivity anisotropy ratio of 3.4:1 in the bedrock was kept constant during the calibration process. Thus, the final model represented a slightly higher hydraulic conductivity in the northeast/southwest direction than in the orthogonal direction. This is consistent with the increased bedrock fracture frequency in that strike and the pump test results.

5.0 SIMULATION RESULTS

The results of the calibrated groundwater model are presented in Figure V-5. Figure V-5 shows the plan view of groundwater head equipotential contour lines for layer two of the model. Figure V-5 shows that in higher topographic areas the groundwater is generally higher in elevation and follows the local topography, consistent with the interpretations of the hydrogeology in Section 5.3 of the Site Assessment. In layer one, groundwater flow away from topographic highs is typical of an isotropic media (the till), flowing radially from the highest elevations. In layers three through eight of the model, the anisotropy of groundwater flow through the shallow and deep bedrock is evident.

Once the model was calibrated, the model was re-run with a recharge of 0 inches per year over the entire existing and Expansion landfills to simulate post-construction conditions. Particle tracking was used for this simulation in order to determine the fate of groundwater flow pathways from the Expansion (see Figure V-6). Particles were assumed to exist uniformly throughout portions of the Expansion and allowed to move to their final point of discharge under steady-state conditions. This particle tracking shows that the groundwater from beneath the Expansion discharges into the local surface water features and does not reach any of the water supply wells along Route 43, Route 16, Old Stagecoach Road, or other roads within the model domain.



LEGEND

130 — GROUNDWATER HEAD EQUIPOTENTIAL CONTOURS (10 FEET INTERVALS)

N

2000 0 4000 FEET

FIGURE V–5
GROUNDWATER HEAD EQUIPOTENTIAL FOR MODEL CALIBRATION LAYER 2
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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DWG: V–2 discretization LMN: V–5 CTB: Equipotential REV: 6/16/15

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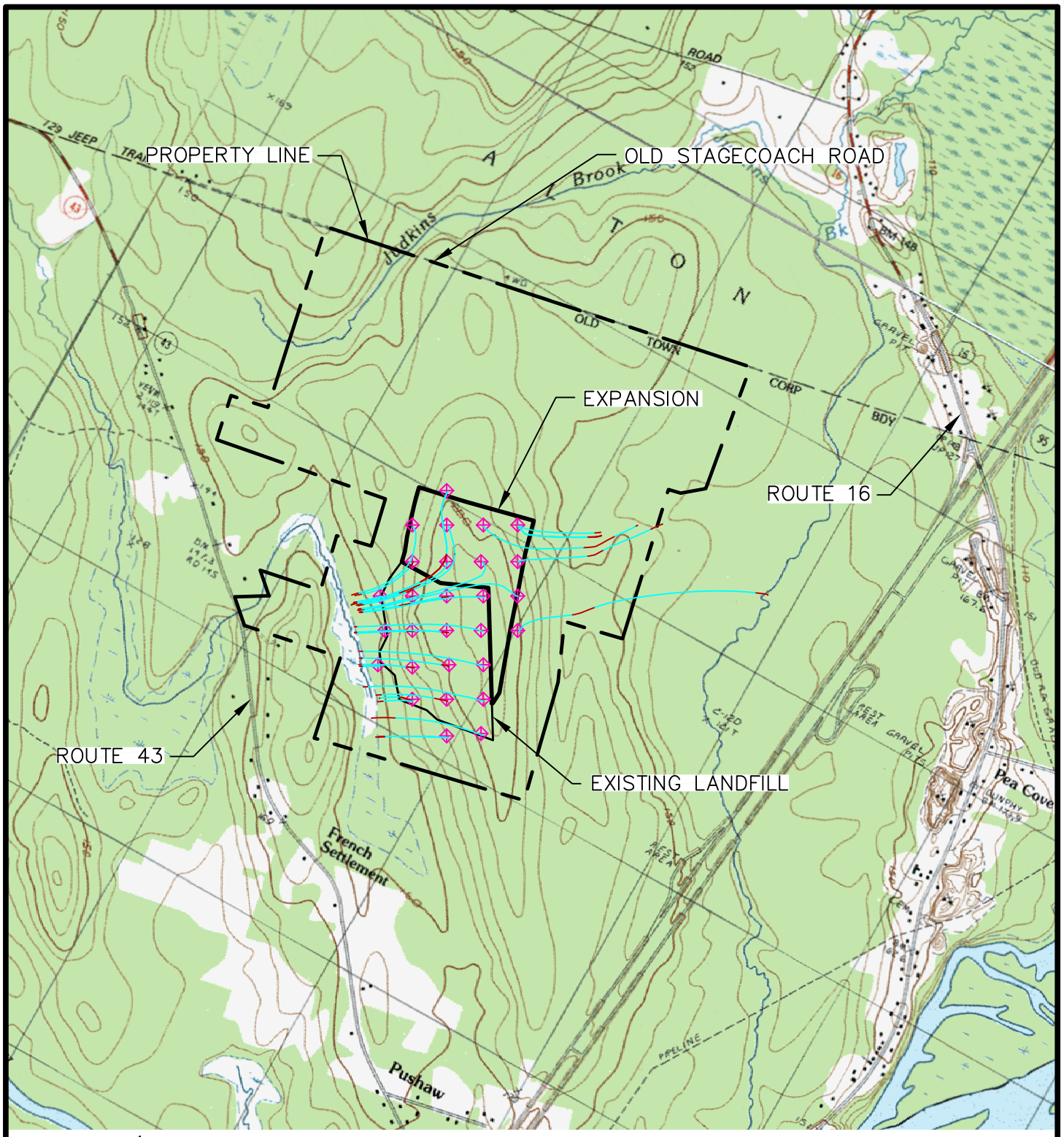

FIGURE V–6
GROUNDWATER PARTICLE PATHWAYS
AWAY FROM EXISTING LANDFILL
AND EXPANSION AREA
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

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DWG: V–2 discretization LMN: V–6 CTB: Particle–Path REV: 6/11/15

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The results of this model are useful in confirming the overall hydrogeologic interpretation of the Site and surrounding areas. The results reinforce the selection of the Site as being protective of the regional groundwater resources. Furthermore, the particle tracking confirmed the identification of the sensitive environmental receptors discussed in Section 7.0 of the Site Assessment. Particles tracked to wetlands and water course tributaries east and west of the landfill, in some cases beyond the Site boundaries. Thus, the off-site groundwater in bedrock is a sensitive receptor.

REFERENCES

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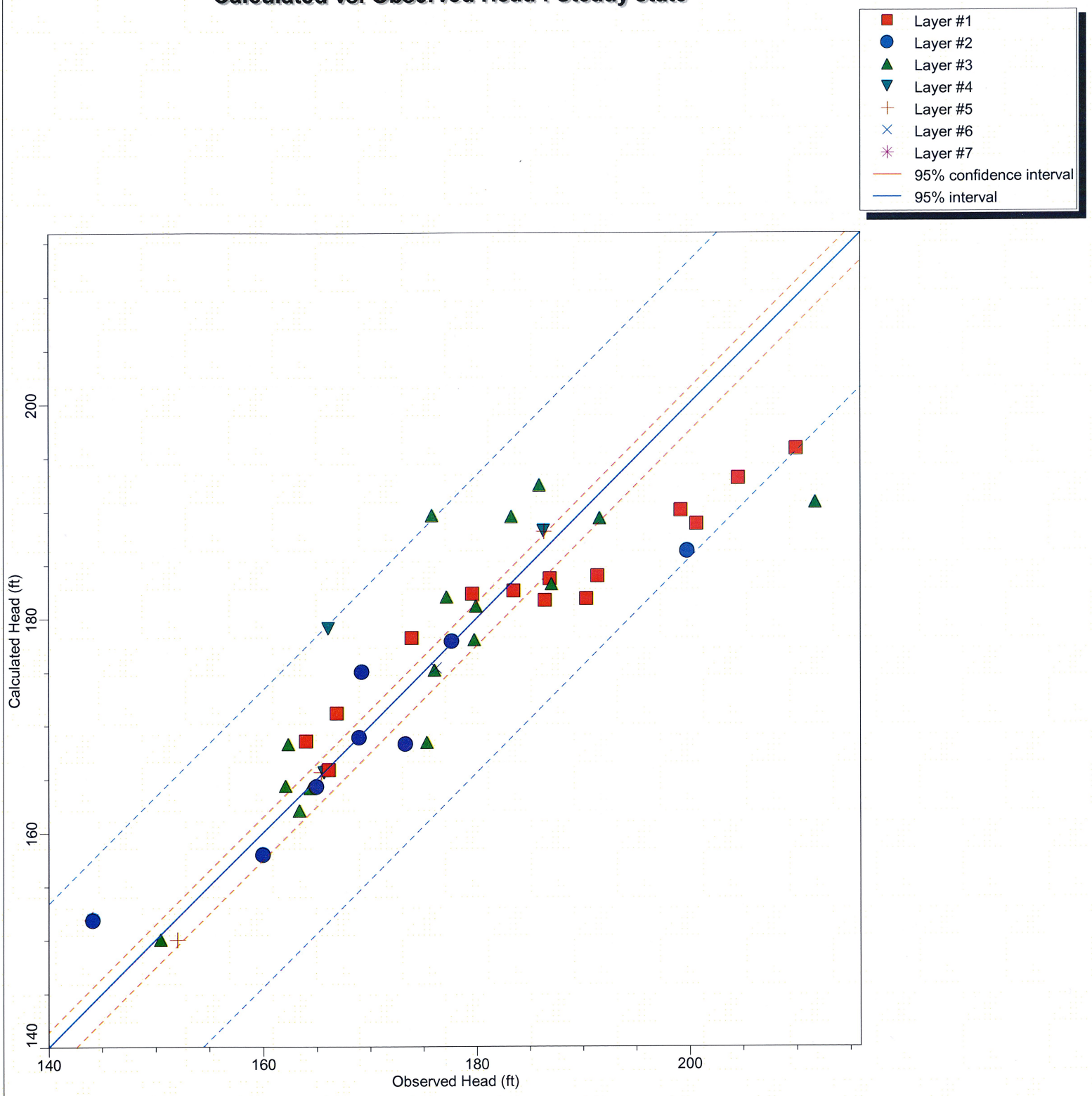
MODFLOW CALIBRATION RESULTS

Calculated vs. Observed Head : Steady state



Max. Residual: -20.859 (ft) at MW-207/A
Min. Residual: -0.052 (ft) at P-04-12/B
Residual Mean : -0.534 (ft)
Abs. Residual Mean : 5.023 (ft)

Num. of Data Points : 48
Standard Error of the Estimate : 0.995 (ft)
Root Mean Squared : 6.844 (ft)
Normalized RMS : 10.112 (%)
Correlation Coefficient : 0.919

Calibration Results for Regional Groundwater Flow Model
Juniper Ridge Landfill Expansion
Old Town, Maine

Monitoring Well/Piezometer Name	Observed Groundwater Head (ft)	Calculated Groundwater Head (ft)	Calculated-Observed	Well Screen Depth (ft BGS)
MW-05-04	190.29	181.84	-8.45	179.70
MW-06-01	168.94	168.88	-0.06	148.00
MW-207	211.71	190.84	-20.87	187.20
MW-223A	175.30	168.44	-6.86	143.00
MW-223B	173.28	168.28	-5.00	158.50
MW-227	159.95	157.92	-2.03	143.50
MW-302R	199.78	186.28	-13.50	180.00
MW-304A	191.55	189.36	-2.19	180.20
OW-06-07	179.77	177.99	-1.78	153.60
P-04-05A	183.24	189.49	6.25	153.50
P-04-05B	199.16	190.12	-9.04	186.50
P-04-06A	185.87	192.43	6.56	164.90
P-04-06B	204.52	193.10	-11.42	198.80
P-04-07C	169.20	175.00	5.80	169.20
P-04-07B	176.02	175.17	-0.85	149.10
P-04-07A	176.18	175.34	-0.84	96.10
P-04-08A	179.91	181.13	1.22	149.80
P-04-08B	186.41	181.67	-4.74	172.80
P-04-09A	164.35	164.16	-0.19	128.50
P-04-09B	164.95	164.30	-0.65	152.50
P-04-10A	162.32	168.28	5.96	132.40
P-04-10B	163.96	168.55	4.59	157.30
P-04-11A	177.15	182.00	4.85	135.00
P-04-11B	183.46	182.56	-0.90	174.50
P-04-12A	165.37	165.61	0.24	104.80
P-04-12B	165.67	165.61	-0.06	128.80
P-04-12C	166.08	165.86	-0.22	161.50
P-04-13B	144.03	151.88	7.85	79.40
P-04-13A	144.10	151.99	7.89	17.90
P-04-13C	144.13	151.83	7.70	136.30
P-04-14B	150.44	150.03	-0.41	134.70
P-04-14A	152.01	150.00	-2.01	92.20
P-06-04B	173.87	178.18	4.31	173.50
P-06-04A	177.64	177.85	0.21	157.00
P-08-03B	166.84	171.15	4.31	164.60
P-08-03A	166.85	171.15	4.30	154.40
P-08-07	209.92	195.76	-14.16	200.70
P-08-09B	186.86	183.70	-3.16	180.50
P-08-09A	187.04	183.19	-3.85	161.90
P-08-10B	186.28	188.15	1.87	145.20
P-08-10A	186.29	188.06	1.77	114.20
P-08-10C	200.64	188.84	-11.80	187.55
PW-08-01	166.07	179.07	13.00	109.10
PW-08-02	175.76	189.61	13.85	165.98
PW-08-03	162.06	164.37	2.31	131.40
PW-08-04	163.35	162.07	-1.28	145.00
P-08-04	191.34	183.98	-7.36	186.50
P-08-06	179.55	182.29	2.74	170.00

Hydraulic Gradient Comparison

Well Coupling Compared	Obs.Vertical Gradient	Calc.Vertical Gradient
MW-223A&B	1.30E-01	1.03E-02
P-04-05A&B	-4.82E-01	-1.91E-02
P-04-06AB	-5.50E-01	-1.98E-02
P-04-07A&B	3.02E-03	3.21E-03
P-04-07A&C	9.55E-02	4.65E-03
P-04-07B&C	3.39E-01	8.46E-03
P-04-08A&B	-2.83E-01	-2.35E-02
P-04-09A&B	-2.50E-02	-5.83E-03
P-04-10A&B	-6.59E-02	-1.08E-02
P-04-11A&B	-1.60E-01	-1.42E-02
P-04-12A&B	-1.25E-02	0.00E+00
P-04-12A&C	-1.25E-02	-4.41E-03
P-04-12B&C	-1.25E-02	-7.65E-03
P-04-13A&B	1.14E-03	1.79E-03
P-04-13A&C	-1.76E-03	8.79E-04
P-04-13B&C	-2.53E-04	1.35E-03
P-04-14A&B	3.69E-02	-7.06E-04
P-06-04A&B	2.28E-01	-2.00E-02
P-08-03A&B	9.80E-04	0.00E+00
P-08-09A&B	9.68E-03	-2.74E-02
P-08-10A&B	3.23E-04	-2.90E-03
P-08-10A&C	-3.39E-01	-1.63E-02
P-08-10B&C	-1.96E-01	-1.06E-02

* Note - Negative values indicate downward groundwater movement.

APPENDIX W

2014 ANNUAL WATER QUALITY REPORT

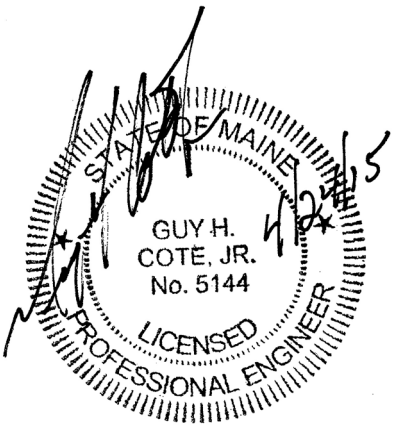
2014 ANNUAL WATER QUALITY REPORT
JUNIPER RIDGE LANDFILL

Prepared for

NEWSME LANDFILL OPERATIONS, LLC

April 2015

SME
Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE



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2014 ANNUAL WATER QUALITY REPORT
JUNIPER RIDGE LANDFILL

EXECUTIVE SUMMARY

During 2014, water quality samples were collected at the Juniper Ridge Landfill (JRL) in accordance with the Environmental Monitoring Program (EMP) during April, July, and October of 2014. Sampling during 2014 was completed in accordance with the current Environmental Monitoring Program (EMP), which was revised in April 2014.[1]

With few exceptions, the downgradient groundwater quality is similar to or has parameter concentrations only slightly greater than that of the upgradient groundwater at the JRL. Site groundwater and surface water quality data do not show adverse effects from the performance of the landfill cells or leachate collection and transport systems. The differences that do exist in water quality downgradient from the JRL (e.g., statistically significant parameter increasing trends) are largely attributable to the changes in redox conditions, which occur as expected around the landfill due to the construction and operations of the landfill (e.g., from the cutoff of precipitation), and not from malfunction of the landfill liners.

Prior to 2014, multiple parameter increases were investigated for several monitoring locations northeast of the landfill, including MW-302R, MW-223A, MW-223B, and underdrains for the northwest portions of the JRL. The water quality from those wells has been interpreted to have been influenced by site infrastructure in the vicinity of these wells (e.g., stormwater runoff and detention), and discolored soil exposed during 2013 construction activities outside of the lined portion of the landfill.[2] During 2013, improvements were made to the site infrastructure, including re-construction of Detention Pond #5 with a liner, regrading and paving portions of the road and stormwater drainage ditches northwest of the landfill, and removal of the exposed discolored soils. Detention Pond #5 was also designed and constructed with phased treatment

[1] SME, April 2014, Environmental Monitoring Plan, Juniper Ridge Landfill, Old Town, Maine, prepared for NEWSME Landfill Operations LLC.
[2] SME, April 2014, 2013 Annual Water Quality Report, Juniper Ridge Landfill, prepared for NEWSME Landfill Operations LLC.

capabilities, including an initial phase sand filtration unit. While statistically significant increasing trends (95% confidence level) still currently remain for multiple parameters (four or more) at MW-223A, MW-223B, and LF-UD-2 over three-year and five-year periods, review of the 2014 water quality at these locations suggests that the removal of the discolored soils and the infrastructure improvements made at the northwest corner of the landfill in 2013 is having some effect on water quality at these locations with several parameter concentrations stabilizing or decreasing during the last two rounds of sampling in 2014 .

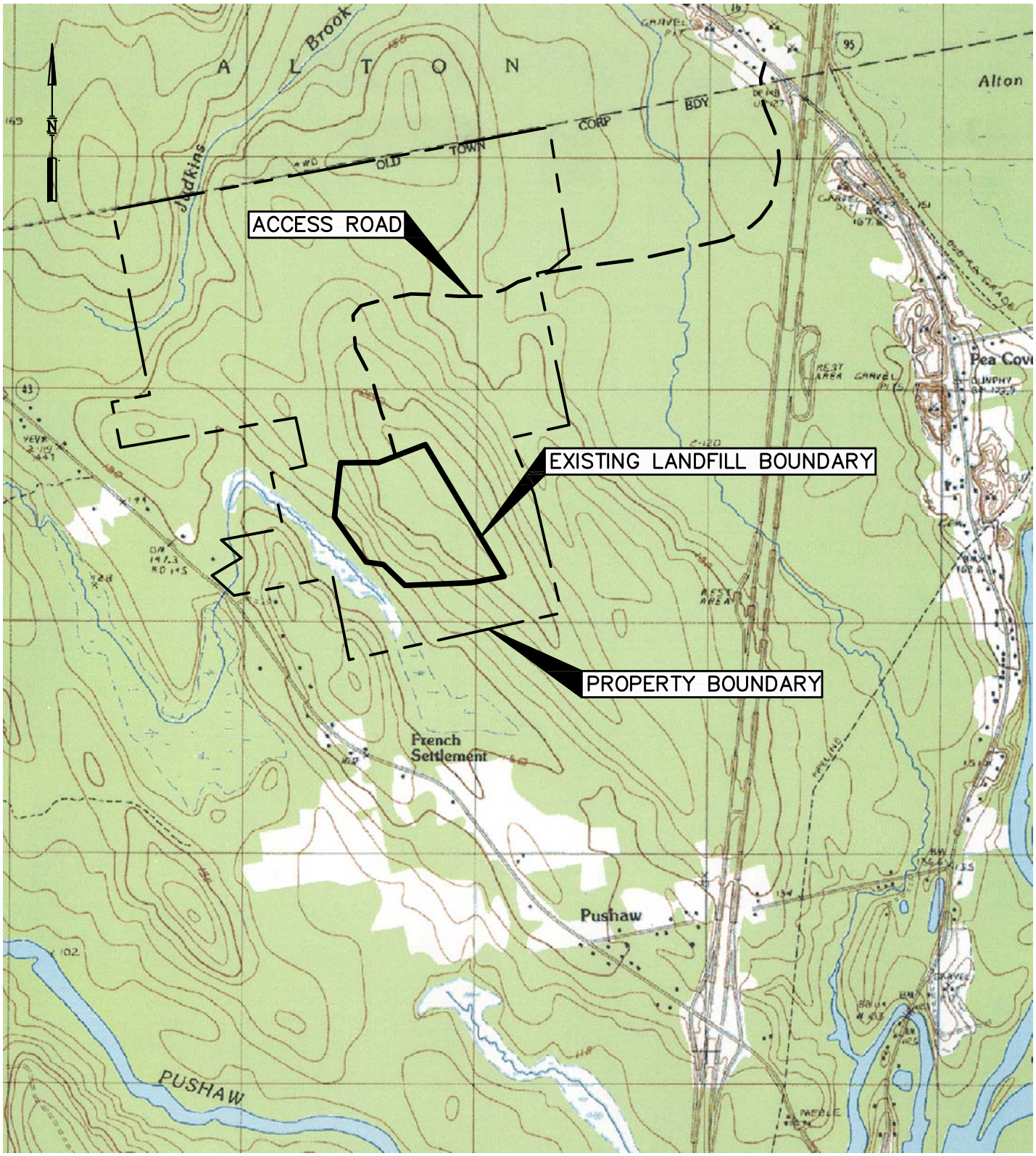
1.0 INTRODUCTION

The Juniper Ridge Landfill (JRL), located in Old Town, Maine, is currently owned by the Maine Bureau of General Services (BGS) and is operated by NEWSME Landfill Operations, LLC (NEWSME). The JRL, formerly known as the West Old Town Landfill, was originally owned and operated by Georgia-Pacific (previously known as Fort James and James River Paper Company) as a secure, non-hazardous, generator-owned waste disposal facility. A comprehensive description of the site setting and hydrogeology is contained in the 1991 report by Sevee and Maher Engineers Inc. (SME) entitled: *James River Paper Company Inc., West Old Town Landfill Project, Old Town Maine, Volume III, Site Investigation and Hydrogeologic Evaluation, August 1991*). Figure 1-1 shows the location of the site. Figures 1-2 and 1-3 show the general site layout and monitoring locations.

Water quality has been monitored at the site since 1990 when the site was first selected for the landfill. This report describes the results of the water quality sampling and analyses for 2014 and compares the results to historical water quality at the site and to State and Federal water quality standards. Sampling during 2014 was completed in accordance with the current EMP, which was revised in April 2014. The 2014 data evaluation includes statistical and graphical evaluations of trends in the data by sample location. Description of the site setting, facility layout, monitoring locations, 2014 site activities, and analytical parameters are also included herein.

1.1 Landfill Conditions

The landfill has been designed and constructed as a secure waste disposal facility in that the groundwater beneath and adjacent to the site is protected by a composite liner and a leachate collection system. Leachate generated at the site is collected and stored in an on-site storage tank, then transported to the Expera Specialty Solutions wastewater treatment facility for treatment in Old Town. The City of Brewer's treatment facility is available as a back-up leachate disposal location.



BASE MAP ADAPTED FROM 7.5 MIN
USGS TOPOGRAPHIC QUADRANGLE
OLD TOWN, MAINE–1988

1000 0 2000 4000 FEET

DWG: SITELOC LMN: FIG 1 CTB: HPSTD REV: 3/26/2014

FIGURE 1–1
SITE LOCATION MAP
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

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N

SW-AR3
DISCONTINUED

HYDROGEN SULFIDE
MONITOR LOCATION A
N 482095.70
E 929404.13

HYDROGEN SULFIDE
MONITOR LOCATION B
N 477352.97
E 930685.56

SW-AR1
DISCONTINUED

SW-AR2
DISCONTINUED

PROPERTY
BOUNDARY

NORTHEAST
PROPERTY LINE

MW-304A

MW11-207R

MW12-303R

MW-206

P-206A

LT-C4LR

LF-UD-8

SW-DP6

SOUTH PROPERTY LINE

SEE FIGURE 1-3

LF-UD-6

MW-302R

SW-DP5

P-04-04

P-04-02R

MW-402B

MW-402A

MW-09-901

SW-2

STORMWATER
DETENTION POND #5

SW-DP1

MW-223A

MW-223B

MW-04-102

MW-227

PWS10-3

LF-UD-5AND6

MW-04-109R

MW-401B

MW-401A

PWS10-1

WEST PROPERTY LINE B

MW-04-105

MW-301

SW-1

DP-4

MW-204

PWS10-2

WEST PROPERTY LINE A

HYDROGEN SULFIDE
MONITOR LOCATION D
N 482955.24
E 921878.25

HYDROGEN SULFIDE
MONITOR LOCATION C
N 478101.11
E 923701.00

SW-3

LEGEND

- GROUNDWATER SAMPLING LOCATION
- SURFACE WATER SAMPLING LOCATION
- GAS MONITORING LOCATION
- HYDROGEN SULFIDE MONITORING LOCATION
- PORE WATER SAMPLE LOCATION
- FALL FIELD PARAMETER

400 0 800 1600 FEET

FIGURE 1-2
SITE LAYOUT AND
ENVIRONMENTAL
MONITORING LOCATIONS
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

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DWG: EMP LMN: EML CTB: SME-STD REV: 4/24/2015

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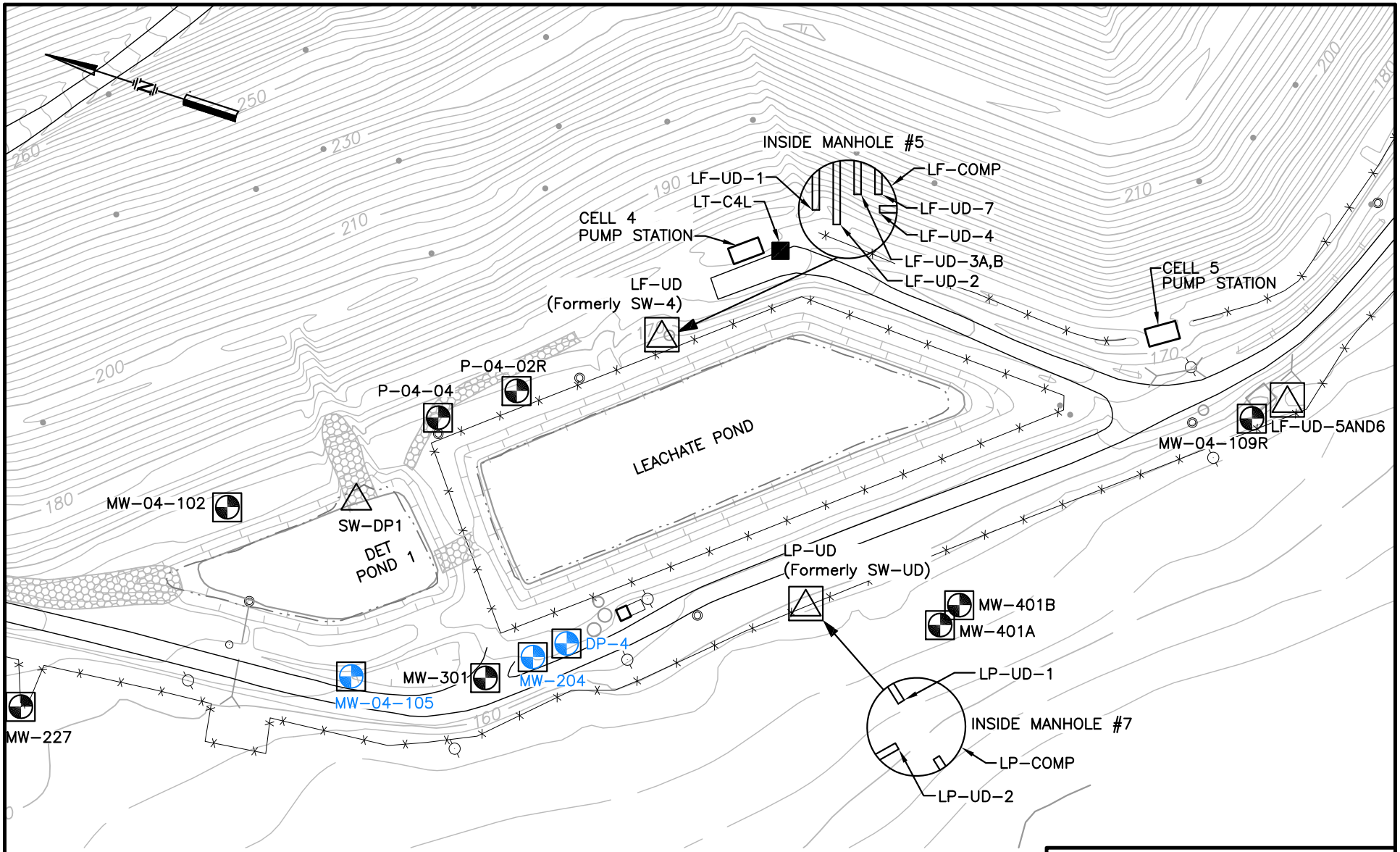

NOTE

USE OF LEACHATE POND TO STORE LEACHATE DISCONTINUED WITH CONSTRUCTION OF CELL 4 IN 2008.

50 0 100 200 FEET

LEGEND

- GROUNDWATER SAMPLING LOCATION
- SURFACE WATER/UNDERDRAIN SAMPLING LOCATION
- GAS MONITORING LOCATION
- LEACHATE PUMP STATION
- FALL FIELD PARAMETER ONLY

FIGURE 1-3
ENVIRONMENTAL MONITORING LOCATIONS ADJACENT TO LEACHATE POND
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

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The facility was originally permitted for the disposal of pulp and papermaking residuals (primarily wastewater treatment plant sludges) from the Old Town mill (then owned by James River), bottom ash from Lincoln Pulp & Paper, and burn pile ash from the City of Old Town transfer station. In addition to the waste streams historically disposed of at the landfill, the landfill is now permitted to receive non-hazardous waste streams including, but not limited to, construction and demolition debris, municipal solid waste, incinerator ash, sludges, contaminated soils, and other solid waste for which the facility has either blanket or individual permits.

To date, Cells 1, 2, 3A, 3B, 4, 5, 6, 7, and 8 have been constructed; this accounts for approximately 56 acres of the permitted 68-acre facility. The majority of the waste filling in 2013 occurred in Cell 8, and in the second elevations cells, which overlie Cells 3A, 3B, 4, 5 and 7. As of December 2014, approximately 3,903,600 cubic yards of the site's permitted capacity remains. In 2014, there was no new landfill cell construction; however, intermediate cover, and landfill gas collection piping and wells were installed to several areas within the active landfill area. Also during 2014, the landfill gas treatment building was constructed on the southeast side of the facility between May and December.

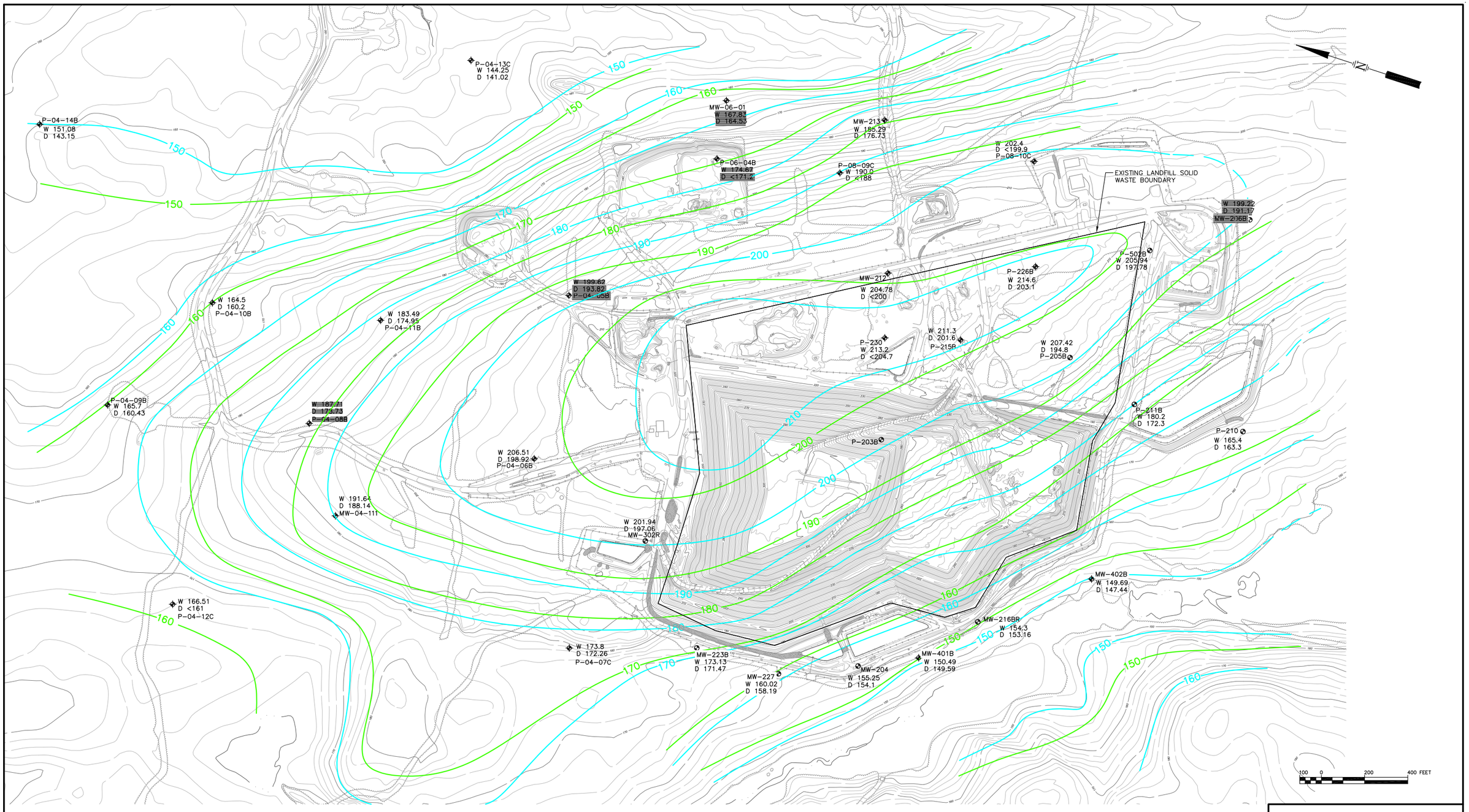
1.2 Hydrogeologic Setting

The existing JRL facility is located on the southwestern side of a northwest-southeast trending drumlin. The natural topography in the landfill area slopes downward to the southwest towards a large wetland and an unnamed stream which empties into Pushaw Stream (Class B). Pushaw Stream empties into the Stillwater River (Class B) which flows to the Penobscot River (Class B). Groundwater beneath the landfill is interpreted to follow the natural surficial topography and, therefore, generally flows towards the southwest and towards the unnamed stream. The large change in elevation from northeast to southwest across the landfill area results in upward groundwater seepage gradients near the unnamed stream and wetland area. Horizontal groundwater seepage gradients on the western side of the stream indicate that groundwater also moves from the west towards the stream, and, thus, the stream acts as a hydrologic boundary for groundwater flow from the landfill towards the west. The interpreted shallow groundwater phreatic surface and shallow bedrock groundwater potentiometric surface are

shown in Figures 1-4 and 1-5. The 2014 groundwater level data are generally consistent with the data utilized to construct these figures.

The site is underlain primarily by glacial till with marine clay of the Presumpscot Formation in the lower topographic areas (e.g., the wetlands in the southwestern portion of the site). Throughout the site, the glacial till generally consists of a very dense brown till, grading to very dense gray till with depth. The till typically ranges from 20 to 50 feet thick beneath the landfill and thus provides a natural containment layer for the landfill. In addition, there are several isolated, discontinuous washed till zones found beneath the till.

Bedrock beneath the facility has been identified as a light gray and brown metagraywacke and metaquartzite interbedded with dark gray phyllite. The metasediments are typically competent and unfoliated except for zones within the phyllite. The bedrock is mostly unweathered, although some discontinuous weathered zones have been observed. No faulting has been observed in bedrock cores and there are no faults mapped in the vicinity of the site. The bedrock surface beneath the landfill is locally variable; however, the surface generally slopes towards the southeast towards a bedrock trough that exists in the vicinity of the wetlands and unnamed stream at the southwest corner of the site. There are locations outside of the landfill boundary where no soil is present and bedrock is exposed at the ground surface. This is the case on the northwestern corner of the site adjacent to Detention Pond #5.



NOTES

1.EXISTING GROUND CONTOURS FROM NOVEMBER 12, 2010 AERIAL SURVEY PERFORMED BY AERIAL SURVEY AND PHOTO, INC. OF NORRIDGEWOCK, MAINE.

2.PROPERTY LINE LOCATIONS ARE A RESULT OF FIELD SURVEY PERFORMED BY HERRICK AND SALSBURY, INC. LAND SURVEYORS, ELLSWORTH, MAINE FOR TRYTON TREE FARM PROJECT, PATTEN CORPORATION–DOWNEAST, OLD TOWN, MAINE, FEBRUARY 23, 1988, REVISED APRIL 7, 1988.

3.LOCATIONS OF EXPLORATIONS ARE APPROXIMATE.

4.GROUND WATER CONTOURS BASED ON WATER LEVEL MEASUREMENTS RECORDED DURING 2007, AND FROM HISTORICAL DATA FOR SOME LOCATIONS BEYOND THE EXPANSION FOOTPRINT.

DWG: FIGURES LMN: PHREATIC–2007 CTB: PHREATIC REV: 4/9/2012

LEGEND

150 — INTERPRETED WET–SEASON POTENTIOMETRIC SURFACE, (2007) IN BEDROCK (ELEVATION IN FEET NGVD).

150 — INTERPRETED DRY–SEASON POTENTIOMETRIC SURFACE, (2007), IN BEDROCK (ELEVATION IN FEET NGVD).

MW-227 W 160.02 D 158.19 — WELL/PIEZOMETER LOCATION WITH ELEVATION OF GROUNDWATER FOR WET (W) AND DRY (D) SEASON.

FIGURE 1–4
INTERPRETED PHREATIC SURFACE
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

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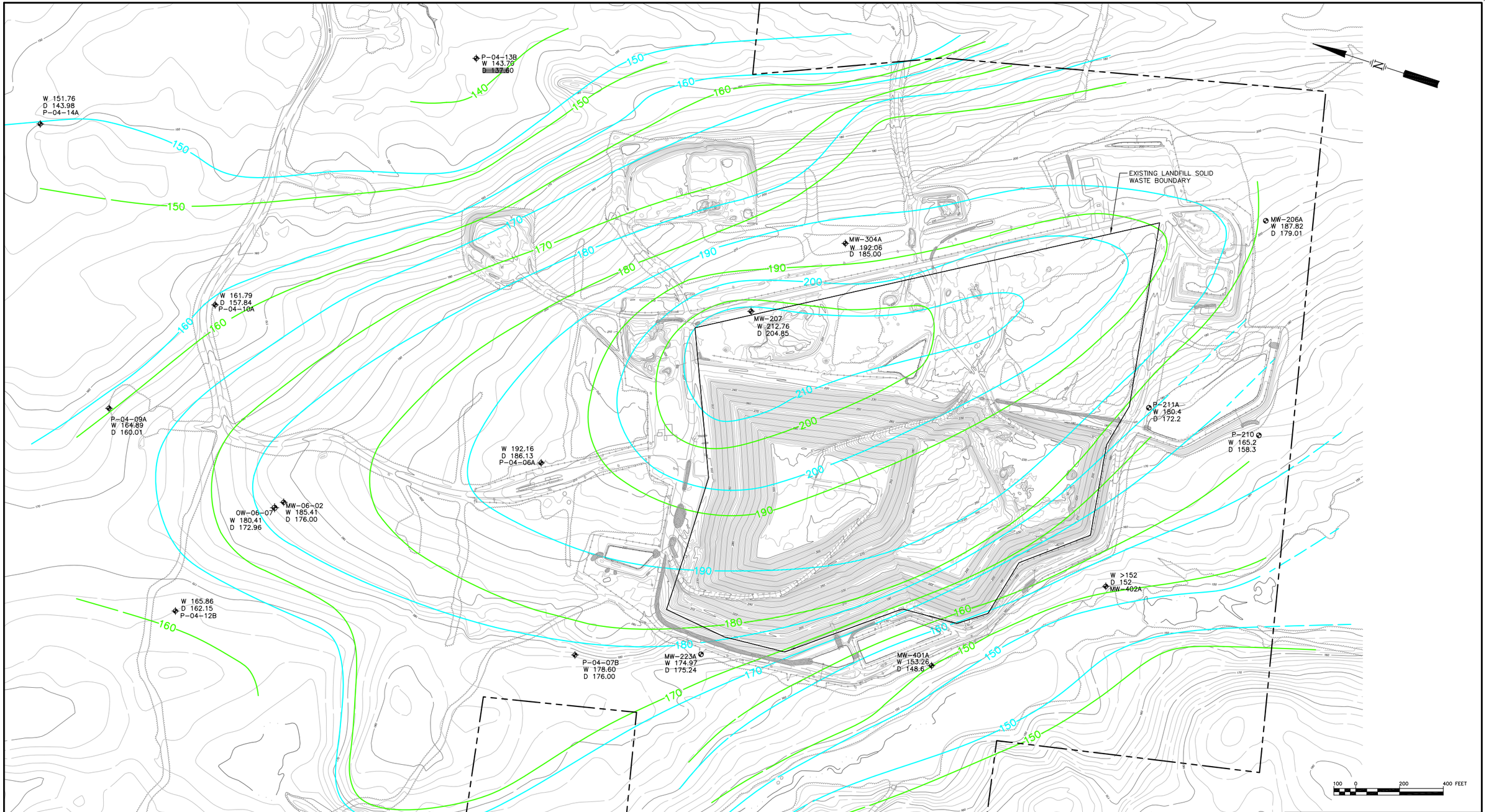

NOTES

1.EXISTING GROUND CONTOURS FROM NOVEMBER 12, 2010 AERIAL SURVEY PERFORMED BY AERIAL SURVEY AND PHOTO, INC. OF NORRIDGEWOCK, MAINE.

2.PROPERTY LINE LOCATIONS ARE A RESULT OF FIELD SURVEY PERFORMED BY HERRICK AND SALSBURY, INC. LAND SURVEYORS, ELLSWORTH, MAINE FOR TRYTON TREE FARM PROJECT, PATTEN CORPORATION–DOWNEAST, OLD TOWN, MAINE, FEBRUARY 23, 1988, REVISED APRIL 7, 1988.

3.LOCATIONS OF EXPLORATIONS ARE APPROXIMATE.

4.GROUND WATER CONTOURS BASED ON WATER LEVEL MEASUREMENTS RECORDED DURING 2007, AND FROM HISTORICAL DATA FOR SOME LOCATIONS BEYOND THE EXPANSION FOOTPRINT.

LEGEND

150 — INTERPRETED WET–SEASON POTENTIOMETRIC SURFACE, (2007) IN BEDROCK (ELEVATION IN FEET NGVD).

–150– INTERPRETED DRY–SEASON POTENTIOMETRIC SURFACE, (2007), IN BEDROCK (ELEVATION IN FEET NGVD).

MW–223A
W 174.97
D 173.04

WELL/PIEZOMETER LOCATION WITH ELEVATION OF GROUNDWATER FOR WET (W) AND DRY (D) SEASON.

FIGURE 1–5
INTERPRETED POTENTIOMETRIC SURFACE IN BEDROCK
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.
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DWG: FIGURES LMN: POTENTIO–BEDROCK CTB: PHREATIC REV: 4/9/2012

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2.0 MONITORING LOCATIONS

2.1 2014 Monitoring Locations

In 2014, water quality samples were collected by SME from 21 groundwater monitoring wells and piezometers,[3] three pore-water sample locations, three surface water locations, three stormwater locations, seven[4] underdrain locations, and one leachate monitoring location. These monitoring points are summarized in Table 2-1 and Table 2-2 and their locations are shown in Figures 1-2 and 1-3. Information on the geologic formation in which each monitoring well is screened, as well as the elevation and distance below ground of each screened interval, is listed in Table 2-1.

Groundwater, surface water, stormwater, leachate, and underdrain samples from the landfill site were collected in April, July, and October 2014. Measurement of field parameters (e.g., temperature and specific conductance) at the underdrain locations were completed on a monthly basis by NEWSME personnel. Sampling during 2014 was completed in accordance with the current EMP, which was revised in April 2014.

2.2 Groundwater Locations

Groundwater monitoring wells MW-206, P-206A, MW11-207R, MW-303R, and MW-304A are positioned upgradient of the landfill. Groundwater monitoring wells MW-204, MW-223A, MW-223B, MW-227, MW-301, MW-401A, MW-401B, MW-402A, MW-402B, and MW09-901 are positioned downgradient of the landfill. Groundwater monitoring wells P-04-04, MW04-102, MW04-105, MW04-109R, and DP-4 are located in the proximity of the leachate pond and are also downgradient of the landfill. Monitoring well MW-302R is considered to be side-gradient to the landfill directly adjacent to and above Detention Pond #5.

[3] Three of the 21 groundwater monitoring wells (DP-4, MW04-105, and MW-204) are sampled only during fall sampling round for field parameters only.

TABLE 2-1

2014 GROUNDWATER MONITORING LOCATIONS

Monitoring Well	Position Relative to Landfill	Screen Depth Interval (feet-BGS)	Ground Surface Elevation (ft-MSL)	Screen Interval Elevation (ft-MSL)	Geologic Formation Screened
MW-204 [1]	Downgradient	13.8 – 18.8	164.0	150.2 – 145.2	Till
MW-206	Upgradient	15.0 – 20.0	200.9	185.9 – 180.9	Till
P-206A	Upgradient	85.5 – 90.5	201.5	111.0 – 116.0	Bedrock
MW11-207R	Upgradient	39.5 – 44.5	212.5	173.0 – 168.0	Bedrock
MW-223A	Downgradient	28.0 – 33.0	173.4	145.4 – 140.4	Bedrock
MW-223B	Downgradient	12.6 – 17.6	173.3	160.7 – 155.7	Till
MW-227	Downgradient	15.0 – 20.0	160.8	145.8 – 140.8	Till
MW-301	Downgradient	162.7 – 182.7	163.5	0.8 – -19.2	Bedrock
MW-302R	Side-gradient	19.5 – 29.5	204.5	185.0 – 175.0	Bedrock
MW12-303R	Upgradient	30.4 – 40.4	206.1	175.7 – 165.7	Till
MW-304A	Upgradient	29.5 – 39.5	214.7	185.2 – 175.2	Bedrock
MW-401A	Downgradient	98.8 – 108.8	153.6	54.8 – 44.8	Bedrock
MW-401B	Downgradient	10.0 – 20.0	154.2	144.2 – 134.2	Till
MW-402A	Downgradient	95.5 – 105.5	149.3	53.8 – 43.8	Bedrock
MW-402B	Downgradient	12.0 – 22.0	149.7	137.7 – 127.7	Till
DP-4 [1]	Downgradient (In proximity of leachate pond)	18.5 – 24.5	165.5	147.0 – 141.0	Till
P-04-02 [2]	Downgradient (In proximity of leachate pond)	32.11 – 37.11	166.1	136.6 – 131.6	Till
P-04-04	Downgradient (In proximity of leachate pond)	27.21 – 32.21	166.7	142.1 – 137.1	Till
MW04-102	Downgradient (In proximity of leachate pond)	10.0 – 15.0	167.0	157.0 – 152.0	Till
MW04-105 [1]	Downgradient (In proximity of leachate pond)	14.8 – 19.8	162.2	147.4 – 142.4	Till
MW04-109R	Downgradient (In proximity of leachate pond)	15.0 – 20.0	157.1	142.1 – 137.1	Till
MW09-901	Downgradient	15.0 – 20.0	161.9	146.9 – 141.9	Till

Notes
1. MW-204, DP-4, and MW04-105 are sampled only during the fall sampling events for field parameters only.
2. P-04-02 was found damaged beyond repair during the April 2013 monitoring event; a replacement well for P-04-02 is planned to be installed during 2015.

[4] Three additional locations were not sampled due to dry conditions, including LF-UD-3A,B, LF-UD-7, and LP-UD-1. No composite samples were required to be taken at Manhole #5 and Manhole #7.

TABLE 2-2

2014 SURFACE WATER, STORMWATER, LEACHATE, AND UNDERDRAIN MONITORING LOCATIONS

Location Designation	Water Body Description
SW-1	Unnamed tributary of Pushaw Stream
SW-2	Unnamed tributary of Pushaw Stream
SW-3	Unnamed tributary of Pushaw Stream
SW-DP1	Stormwater Detention Pond #1
SW-DP5	Stormwater Detention Pond #5
SW-DP6	Stormwater Detention Pond #6
PWS10-1	Downgradient Stream Alluvium
PWS10-2	Downgradient Stream Alluvium
PWS10-3	Downgradient Stream Alluvium
LF-UD-1	Cell 1 underdrain at MH #5
LF-UD-2	Cell 2 underdrain at MH #5
LF-UD-3A,B	Cell 3A & Cell 3B underdrain at MH #5
LF-UD-4	Cell 4 underdrain at MH #5
LF-UD-5and6	Cell 5 & Cell 6 Underdrain (combined flow)
LF-UD-6	Cell 6 Underdrain
LF-UD-7	Cell 7 Underdrain at MH #5
LF-UD-8	Cell 8 Underdrain
LP-UD-1	Leachate pond underdrain south end at MH #7
LP-UD-2	Leachate pond underdrain north end at MH #7
LF-COMP	Composite sample of LF-UD-1, LF-UD-2, LF-UD-3A,B, LF-UD-4, and LF-UD-7 when water level in manhole covers the inlet pipes at MH #5
LP-COMP	Composite sample of LP-UD-1 and LP-UD-2 when water level in manhole covers both of the inlet pipes at MH #7
LT-C4LR	Leachate – On-site leachate storage tank

Monitoring well P-04-02 was found damaged beyond repair during the April 2013 sampling event, and was not in the sampling program during 2014; a replacement well for P-04-02 is planned to be installed during 2015, as recommended by MEDEP.[5]

Monitoring locations MW-204, DP-4, and MW04-105 are sampled for field parameters during fall sampling events. The remainder of the groundwater monitoring wells in the EMP are sampled for the parameters of the detection monitoring analytical program, which is discussed in Section 3.0.

[5] MEDEP, December 16, 2014, Memorandum regarding *2013 Annual Report, Juniper Ridge Landfill-Old-Town Maine-MEDEP LIC. #S-020700-7A-A-N and Amendment #S-020700-WD-N-A Prepared by Sevee & Maher Engineers, Inc.-April 2014*

2.3 Surface Water and Stormwater Locations

Surface water samples SW-1, SW-2, and SW-3 are collected at the unnamed tributary to Pushaw Stream. SW-1 and SW-3 are located downstream of the landfill while SW-2 is located upstream of the landfill. Stormwater samples SW-DP1, SW-DP5, and SW-DP6 are collected at Detention Pond #1, Detention Pond #5, and Detention Pond #6, respectively. Stream-based pore-water sample locations PWS10-1, PWS10-2, and PWS10-3 are located downgradient of the landfill along the unnamed tributary to Pushaw Stream and represent water in the sediments at the base of the stream.

2.4 Leachate Sample Location

During the 2014 sampling events, leachate samples were collected from the on-site leachate storage tank (i.e., LT-C4LR) in order to provide a representative sample of the site-wide leachate quality. Leachate samples associated with compliance monitoring for off-site wastewater treatment are also collected at the leachate storage tank when transport tanker trucks are being loaded. The location of the leachate storage tank sampling location, LT-C4LR, is shown on Figure 1-3.

2.5 Underdrain Monitoring

The sample locations where underdrain samples were collected in 2014 are shown on Figures 1-2 and 1-3. The landfill underdrain system supplements as a cell leak detection system. Manhole MH #5, located northeast of the leachate pond, is the sample location which receives groundwater entering the underdrains beneath Cells 1, 2, 3A, 3B, 4, and 7. The underdrain for Cell 6 (LF-UD-6) is sampled from a stilling well in the underdrain line. Flow from the Cell 6 underdrain is then connected to the Cell 5 underdrain line. The combined flow from the Cell 5 and Cell 6 underdrains then drains to a 6-inch diameter pipe outfall located on the southern perimeter of the landfill. Beginning in June 2010, samples collected from this 6-inch diameter pipe outfall are now a composite sample from the Cell 5 and Cell 6 underdrains (LF-UD-5 and 6); prior to June 2010, samples collected from this 6-inch diameter outfall pipe were for the Cell 5 underdrain only (LF-UD-5).

The underdrain for Cell 8 was constructed in 2012 at a discrete location shown on Figure 1-2. LF-UD-8 was added to the monitoring program during the April 2013 sampling event as the underdrain monitoring location for Cell 8.

Underdrain samples were collected by SME tri-annually for laboratory analysis and monthly by NEWSME for field parameters at sample locations LF-UD-1, LF-UD-2, LF-UD-3A,B, LF-UD-4, LF-UD-5 and 6, LF-UD-6, LF-UD-7, and LF-UD-8 during 2014, unless those locations were dry or their sample pipe inverts were submerged.

Manhole location MH #7, which is located southwest of the leachate pond, is the sample location for LP-UD-1 and LP-UD-2, which monitor groundwater entering the southern and northern underdrains, respectively, of the leachate pond. LP-UD-1 and LP-UD-2 were monitored by SME tri-annually for laboratory parameters and monthly for field parameters by NEWSME in 2014, unless those locations were dry or their sample pipe inverts were submerged.

Historically, during times when LF-UD-1, LF-UD-2, LF-UD-3A&B, LF-UD-4, and LF-UD-7 were not able to be sampled separately due to pipe invert submergence, LF-COMP has been collected from the manhole MH #5. This sample provides a composite sample of the aforementioned underdrain locations. Sample pipe submergence did not occur during the tri-annual monitoring events during 2014; however, LF-COMP samples were collected anyways and analyzed for field parameters during nine months of the year during 2014.

LP-COMP samples were not collected during the tri-annual monitoring events in 2014 because the conditions did not exist where LP-UD-1 and LP-UD-2 were t able to be sampled separately (i.e., no pipe invert submergence).

2.6 Annual Monitoring Well Specific Conductance Measurements

Specific conductance measurements were taken from an expanded select list of monitoring wells surrounding the existing landfill operations at JRL during the fall sample round of 2014. This sampling has occurred since 2008 when MEDEP made a request that these samples be collected. Locations measured annually for specific conductance are shown on Figure 2-1 and listed in Table 2-3 below. The results of the 2014 and historical fall specific conductance measurements are included in Appendix F.

TABLE 2-3

2014 MONITORING WELL AND PIEZOMETER LOCATIONS USED FOR ANNUAL SPECIFIC CONDUCTANCE MEASUREMENTS

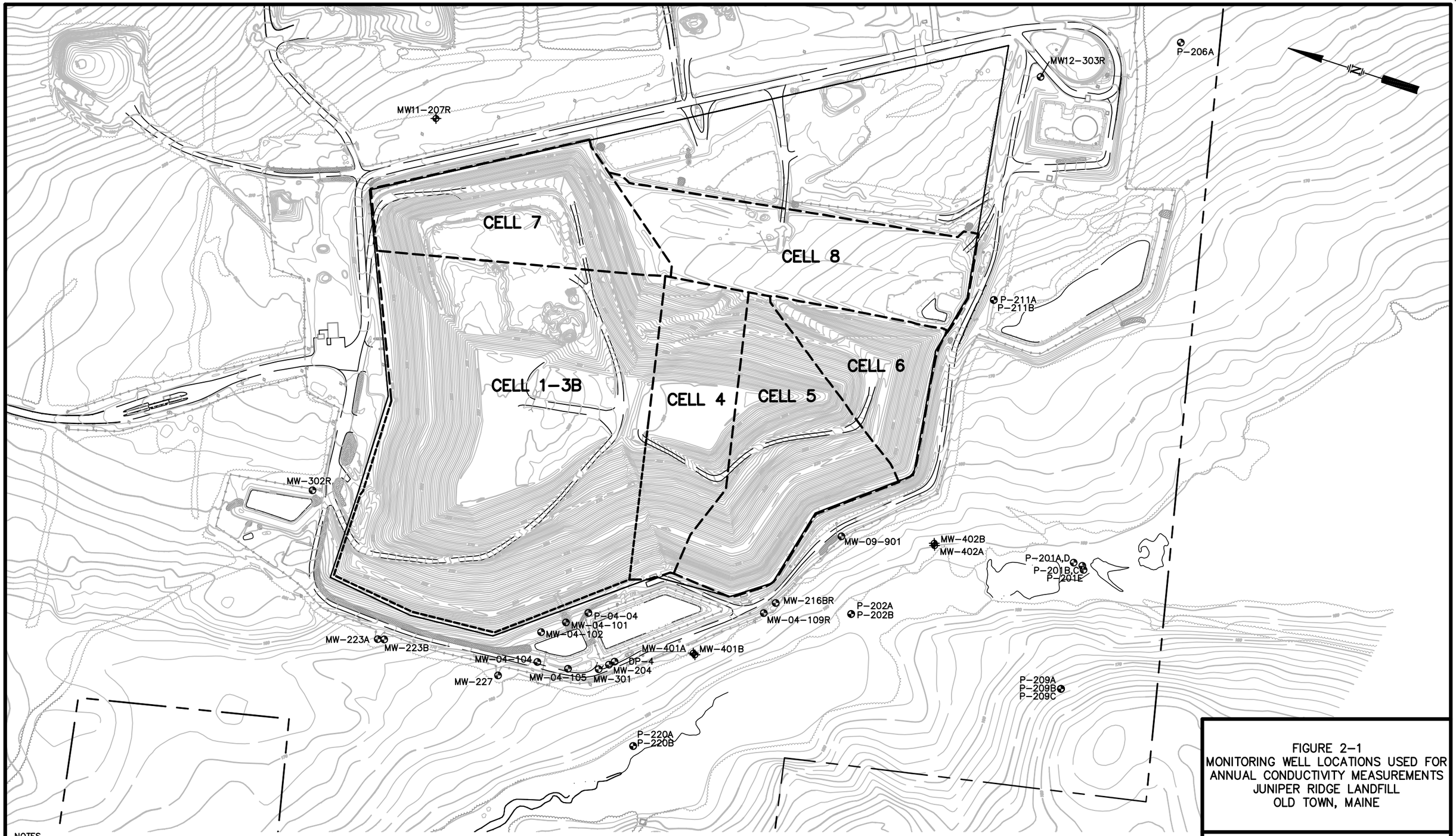
DP-4	MW-402B
MW04-101	MW11-207R
MW04-102	P-206A
MW04-104	P-04-04
MW04-105	P-201A
MW04-109R	P-201B
MW-204	P-201C
MW09-901	P-201D
MW-216BR	P-201E
MW-223A	P-202A
MW-223B	P-202B
MW-227	P-209A
MW-301	P-209B
MW-302R	P-209C
MW12-303R	P-211A
MW-401A	P-211B
MW-401B	P-220A
MW-402A	P-220B

Notes:

Monitoring locations MW04-110, P-214A, P-214B, P-214C, and P-04-02 are included in the EMP (April 2010) for annual specific conductance measurements, but have since been either damaged or decommissioned.

Monitoring well MW-212 is included in the EMP (April 2014) for annual specific conductance measurements, but has historically been dry.

P-206A was added for annual specific conductance measurements during 2013.



NOTES

1. EXISTING GROUND CONTOURS FROM NOVEMBER 6, 2012 AERIAL SURVEY PERFORMED BY AERIAL SURVEY AND PHOTO, INC. OF NORRIDGEWOCK, MAINE.
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DWG: FIGURES LMN: FIG3-3 CONDUCTIVITY CTB: CONDUCTIVITY REV: 4/8/2014

FIGURE 2-1
MONITORING WELL LOCATIONS USED FOR ANNUAL CONDUCTIVITY MEASUREMENTS
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

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Sevee & Maher Engineers, Inc.
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

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2.7 Landfill Gas Monitoring Program

Concurrent with the site tri-annual water quality monitoring events, site monitoring wells, underdrain locations, leachate manholes, leak detection manhole, and JRL site property boundaries were monitored for the presence of landfill-related gases during 2014 using a hand-held, GEM 2000 gas meter. Figures 1-2 and 1-3 show the gas monitoring locations associated with the landfill's water quality monitoring program.

3.0 MONITORING PARAMETERS

Detection monitoring was performed in 2014 at the locations shown in Tables 2-1 and 2-2. The majority of the locations listed in Tables 2-1 and 2-2 were analyzed for the detection monitoring parameters as listed in Table 3-1 during April, July, and October 2014. As requested by the MEDEP, analysis for volatile organic compounds (VOCs) was included during the April 2014 monitoring event for multiple locations (LF-UD-1, LF-UD-2, LF-UD-3A,B, LF-UD-4, LF-UD-5 and 6, LF-UD-6, LF-UD-7, LF-UD-8, LP-UD-1, LP-UD-2, and MW-401B), provided that there was sufficient water available for sampling. The leachate samples from LT-C4LR were analyzed for VOCs during the April, July, and October 2014 monitoring events. The leachate location (LT-C4LR) was also analyzed for the parameters listed in Appendix A, Column 3 of the Chapter 405 MEDEP Solid Waste Regulations during the April 2014 sample event.

One supplementary addition to the 2014 monitoring program included sampling and analyses for dissolved methane at MW-223B in April, July, and October 2014. The results of the supplementary dissolved methane monitoring are discussed in Section 6.0.

TABLE 3-1

2014 DETECTION MONITORING ANALYTICAL PROGRAM

Water Quality Parameter	Method	PQL[1] (mg/l)
Total Dissolved Solids	SM 2540C	10
Total Suspended Solids	SM 2540D	4
Tannins/Lignins	SM 5550B	0.20
Ammonia (NH_3-N) [9]	SM 4500 NH3 E/4500NH3 B	0.5
Arsenic (As)	SW846/6010B/3010A	0.005
Calcium (Ca)	SW846/6010B/3010A	0.3
Iron (Fe)	SW846/6010B/3010A	0.05
Magnesium (Mg)	SW846/6010B/3010A	0.3
Manganese (Mn)	SW846/6010B/3010A	0.05
Potassium (K)	SW846/6010B/3010A	0.3
Sodium (Na)	SW846/6010B/3010A	0.3
Total Organic Carbon (TOC)	SW846/9060A	2.0
Chloride (Cl)	SW846/9056	1.0
Bromide (Br)	SW846/9056	0.1
Sulfate (SO_4)	SW846/9056	2.0
Nitrate (NO_3-N)	SW846/9056	0.3
Bicarbonate (HCO_3-$CaCO_3$)	SM 2320B	1.5
Volatile Organic Compounds (VOCs)[3,7]	U.S.EPA 8260B	0.0005 – 0.02
Chemical Oxygen Demand (COD)	Hach 8000	10
Sulfide[8]	SW846/9030B	0.10
Total Kjeldahl Nitrogen (TKN)[4]	SM 4500 NORC	0.50
Total Phosphorous[5]	U.S.EPA 365.3	0.04
Biochemical Oxygen Demand (BOD)[6]	SM 5210B	2
Cadmium (Cd)	SW846/6010B/3010A	0.0006
Copper (Cu) [9]	SW846/6010B/3010A	0.003
Nickel (Ni)	SW846/6010B/3010A	0.005
Field Parameters		
Groundwater Elevation	Field Measurement	NA
Specific Conductance	Field Measurement	NA
Dissolved Oxygen (DO)	Field Measurement	NA
pH	Field Measurement	NA
Eh	Field Measurement	NA
Temperature	Field Measurement	NA
Turbidity	Field Measurement (APHA 2130)	NA
Monitoring Well Pumping Rate	Field Measurement	NA
Surface Water Flow Rate	Field Measurement	NA
Field Observations	Visual Observations	NA
Total Alkalinity (as $CaCO_3$)	Field Measurement	5

Notes:

1. At dilution factor of unity. Some PQLs may differ for surface and stormwater analysis.
2. NA = Not Applicable.
3. VOCs are the 47 organic constituents listed in Appendix I of 40 CFR Part 258. PQLs for VOCs are reported at a dilution factor of unity.
4. Monitoring wells and leachate only.
5. Surface waters, stormwater, and underdrain only.
6. Surface waters only (excluding stormwater detention ponds and underdrains).
7. In April 2014, LF-UD-1, LF-UD-2, LF-UD-3A,B, LF-UD-4, LF-UD-5 and 6, LF-UD-6, LF-UD-7, LF-UD-8, LP-UD-1, LP-UD-2, and MW-401B were analyzed for VOC compounds, unless those locations were dry. The proposed replacement well for P-04-02 will be added to this list in 2015. Leachate location LTC4LR was sampled for VOCs during the April, July, and October events during 2014.
8. In April 2014, leachate was analyzed for Appendix A, Column 3 parameters (from Chapter 405 MEDEP Solid Waste Regulations), including sulfide.
9. Ammonia and copper are only analyzed for leachate samples (beginning during 2013).

4.0 SAMPLING TECHNIQUES

4.1 Monitoring Wells

Groundwater samples were obtained from the monitoring wells utilizing the low-flow sample collection techniques in general accordance with the EMP for the landfill. The low-flow sampling program includes dedication of a small-diameter (1/8-inch I.D.) polyethylene tubing in each well. The tubing is secured at the top of the well such that the inlet of the tubing is placed approximately at the middle of the screen zone in each well. Prior to sampling, the static water level is measured in each well. A peristaltic pump with an adjustable flow rate is used to purge and sample monitoring wells with relatively shallow water tables. Monitoring wells with water tables greater than 28 feet below ground surface are sampled with dedicated deep well submersible pumps rather than a peristaltic pump due to the depth of the groundwater.

The low-flow sampling procedure at the JRL consists of purging the monitoring well at approximately 100 to 200 ml/min. While the wells are purged, water levels and measurements of specific conductance, temperature, pH, Eh, dissolved oxygen, and turbidity are taken through a flow-through-cell at regular intervals. Field parameters and water level measurements are monitored to determine if parameter stabilization has occurred as outlined in the EMP. Once stabilization of the field parameters has occurred, in particular water levels and turbidity, a sample is collected for chemical analysis. Several of the wells have very low recharge rates and, therefore, do not stabilize even under these low purge rates. For these wells, a sample is obtained after purging the liquid present in the sampling tube and pump.

4.2 Surface Water, Stormwater, Underdrain, and Leachate Sampling Locations

Grab samples are collected at the surface water, stormwater, underdrain, and leachate sampling locations, which is consistent with historical sampling methods and in accordance with the EMP. These samples are not filtered prior to analysis.

4.3 Gas Monitoring

Gas monitoring at the monitoring wells, underdrain locations, leachate manholes, leak detection manhole, and JRL site property boundaries was done using a GEM 2000 gas meter manufactured by Landtec of Colton, California with an auxiliary H_2S pod. Measurement of headspace gas in the monitoring wells is measured by placing the probe tip into the upper few inches of the well casing immediately after the well cap is removed. Gas measurements at underdrain locations are measured by placing the probe at the manhole opening where underdrain samples are collected. The meter is calibrated daily before use. Methane equivalent, carbon dioxide, and oxygen are reported as percent by volume. Hydrogen sulfide is reported in parts per million by volume.

4.4 Sample Handling and Chain-of-Custody

After collecting the water quality samples, the samples were preserved on ice in coolers and shipped by SME to Maine Environmental Laboratory of Yarmouth, Maine for analyses. Katahdin Analytical Services of Scarborough, Maine performed the semi-volatile organic compounds (SVOCS), pesticides, herbicides, and polychlorinated biphenyls (PCBs) analyses for the spring (April) 2014 sampling event. Chain-of-custody sheets prepared by the sampling personnel accompanied the samples and contain the signatures documenting the transfer of the water quality samples from the field sampler to the receiving laboratory.

5.0 DATA VALIDATION AND QUALITY CONTROL (QC)/QUALITY ASSURANCE (QA)

QA/QC activities associated with sampling include the utilization of standardized collection procedures and sample data records, calibration of field instruments, and the use of chain-of-custody procedures. SME followed the EMP procedures to ensure that both the field instruments and protocols employed generate data that is reliable and provide valid analysis results. Instruments were calibrated, analyses were conducted to determine potential matrix interference as necessary, precision and accuracy were checked, and hold-times were verified. Analytical QA/QC involves the use of approved analytical protocols by a qualified laboratory. Water quality samples were all analyzed within the required hold-times.

Data validation and laboratory quality control procedures were followed and documented as described in the MEDEP Solid Waste Management Rules, Chapter 405. During 2014 sampling rounds, duplicate water quality samples were obtained from several monitoring locations, as discussed in water quality data submittals for each round. Reports on Relative Percent Difference (RPD), calculated ratios of TDS to specific conductance, and values falling outside of historic ranges for each sampling round were presented in each of the three data transmittals provided in 2014.

6.0 WATER QUALITY EVALUATION

Groundwater, surface water, stormwater, leachate, and underdrain water quality samples were collected at monitoring locations as described in Section 2.0 of this report. Samples were collected during April, July, and October 2014. Laboratory analytical reports, field data sheets, and data validation documentation have been presented in tri-annual data submittals forwarded to MEDEP during 2014 for each sampling round.

Noteworthy observations in the data for 2014 have been identified and are reported below for groundwater monitoring locations (Section 6.1), surface water and stormwater monitoring locations (Section 6.2), leachate monitoring (Section 6.3), and underdrain monitoring (Section 6.4). Appendix A contains tables of historic water quality data collected over the past ten years, including 2014, for the sampling locations and parameters identified in this report. Water quality data not specifically referenced in this report are considered to be generally consistent with the previously collected water quality data for the JRL and are not changing significantly over time.

The methods used for analyzing the water quality data in 2014 are summarized below.

Box and Whisker Plots and Data Summary Sheets. 2014 water quality data for each monitoring location are summarized in the data summary sheets contained in Appendix B of this document. The summary sheet prepared for each sampling location contains a map and description of the monitoring point, a 2014 water quality data summary, and a statistical summary of the historic data prior to 2014. Parameter concentrations that exceeded historical minimum and maximum concentration values in 2014 at site monitoring locations are identified on the individual water quality summary sheets contained in Appendix B.

Also included in Appendix B are box and whisker plots of select monitoring parameters for each of the sampling locations. The box and whisker plots graphically illustrate the annual concentration ranges and annual median value for the analytical results of each parameter shown, and also provide a useful way to visually identify long-term and short-term trends in the water quality data. Where long-term trends occur in the data, the trends are typically visually

detectable on the plots. Plotting the range of annual values on the box and whisker plots also provides a sense of the variability of the annual data (statistically expressed as a standard deviation) and whether or not an apparent trend may be real or lies within the inherent variability of the data. Visual observation of water quality trends over time using the historical data (including 2014 data) is aided by using a fast-Fourier transform regression of each of the select parameter annual mean concentration values. A graph of the fast-Fourier regression accompanies the box and whisker plots in Appendix B.

Mann-Kendall Trend Analyses. Mann-Kendall trend analyses were run for the JRL water quality data to screen for potential statistically significant changes in water quality parameter concentrations over time. The Mann-Kendall analysis was chosen because it is nonparametric and is robust to outliers, missing data, and non-detects. Time-series plots of water quality parameter concentrations often contain multiple trends over time due to various factors. In order to evaluate current trends for this annual report, the Mann-Kendall trend analyses were run for the site data over two time periods; from the end of 2014 back five years and three years. The three-year and five-year timeframes are suitable for evaluating landfill performance and changes in water quality related to recent site operations, and to identify ongoing trends.

The Mann-Kendall test was run with a 0.05 Type-I error (i.e., 95% confidence level). For this evaluation, we consider a statistically significant trend to be one in which the potential Type-I error is less than 0.05. The Mann-Kendall results for groundwater, surface water, stormwater, leachate, and underdrain locations are included in Appendix C and are discussed by location in Sections 6.1 through 6.4. It should be noted that individual parameter trend analysis calculations using analytical data that is typically non-detect are at times positive for increasing or decreasing trend screenings due to changes in the laboratory detection limit reported. In those cases, trends are interpreted and reported as no trends; these instances are identified in Appendix C. This occurrence is frequent for JRL site water quality due to the generally low parameter concentrations in groundwater at the site. Examples of parameters for which this occurs frequently include (but are not limited to) cadmium and nitrate, which are typically non-detect at most groundwater monitoring locations, but had increases in reporting limits over the past five years.

Although rapid increases in concentrations of multiple parameters at a monitoring location may reflect site operational impacts such as spillage of leachate or a landfill liner failure, changes in one or only a few parameters at a given monitoring location are likely the result of changes in groundwater conditions unrelated to the landfill leachate (e.g., decreases in natural precipitation recharge to the groundwater will change redox, alkalinity, and pH conditions, which results in the release of various constituents such as iron, manganese, and arsenic from soils and bedrock into the groundwater). Generally, at a given monitoring well, an increase in landfill leachate contribution should result in increased chloride concentrations due to its presence at high concentrations in the JRL leachate (i.e., between 7,070 mg/L to 13,950 mg/L at LT-C4LR in 2014) and the conservative nature of chloride in terms of adsorption, precipitation, and degradation. Therefore, sudden increases in chloride concentration, in conjunction with changes in other parameter concentrations, can be a reliable indicator of landfill impacts resulting from the presence of JRL leachate assuming that no other natural or anthropogenic sources of chloride are present. It is important to note that increases in chloride may also be due to runoff and recharge from salting or dust control of nearby roadways. Therefore, any increase in chloride levels needs to be reviewed in terms of site conditions. Specific conductance is also a useful parameter for assessing water quality across the site as it gives an indication of the total dissolved constituents at each monitoring location. Nearly all other chemical constituents are subject to changes in concentrations resulting from interactions between soil, rock, and groundwater in addition to the presence of leachate. Increases in multiple (four or more) parameters, especially when including chloride, are believed to be a reliable indicator of *potential* landfill leachate impacts that require further investigation. At locations where this criterion is met, further analysis of water quality data is completed to ascertain the potential causes for the change in water quality.

The trend analysis is used as one of the screening tools to review the water quality and must be viewed in conjunction with other factors such as the specific parameter exhibiting the trend and the parameter concentration detected at the monitoring locations (i.e., a specific parameter could have an increasing trend, but remain within a range consistent with upgradient concentrations). The results of the trend screening analyses are compared visually with the time-series plots (box and whisker plots) described above to aid in assessing the actual

significance of a statistical trend. During 2014, there were fourteen locations between the groundwater monitoring wells and underdrain monitoring locations that had multiple (4 or more) parameters with three-year and/or five-year statistically significant increasing trends. In most instances, the groundwater quality in downgradient wells and underdrain monitoring locations remains similar to or has only moderately greater parameter values compared to upgradient monitoring locations. Recent historical interpretations of changes groundwater quality in downgradient groundwater and underdrain locations with respect to upgradient locations, including in 2014, are that they are largely attributable to changes in redox conditions, which occur as expected around the landfill due to the construction and operations of the landfill (e.g., from the cutoff of precipitation), and not from malfunction of the landfill liners. MEDEP agreed with this assessment in its memorandum regarding its review of the 2013 Annual Report for the Juniper Ridge Landfill.[6]

Concentrations above MCL, MEG, MFCCC. Parameters measured at the site groundwater monitoring wells and pore-water sample locations that were above their U.S.EPA Maximum Contamination Levels (MCLs) or Maine Maximum Exposure Guidelines (MEGs) during 2014 are identified in detail in Sections 6.1 and 6.2. Only two parameters of the parameters analyzed at groundwater monitoring well locations were detected above an MCL in 2014. Cadmium slightly exceeded its MCL (0.005 mg/L) at one upgradient bedrock groundwater monitoring location during only one 2014 monitoring event. Arsenic concentrations were detected above its MCL (0.010 mg/L) at 14 groundwater monitoring wells during 2014. This was consistent with water quality results for 2013. Arsenic concentrations in groundwater were reported as high as 0.031 mg/L in 2014 (MW-401B in April 2014).

The arsenic MCL exceedances at the site are generally consistent with historical arsenic exceedances at the site and include exceedances at multiple upgradient monitoring locations. The occurrence of generally site wide arsenic exceedances in groundwater is likely attributed to reducing conditions associated with decreasing groundwater recharge from site development.

[6] MEDEP, December 16, 2014, Memorandum regarding *2013 Annual Report, Juniper Ridge Landfill-Old-Town Maine-MEDEP LIC. #S-020700-7A-A-N and Amendment #S-020700-WD-N-A Prepared by Sevee & Maher Engineers, Inc.-April 2014*

These reducing conditions are interpreted to favor reductive dissolution of arsenic and iron hydroxides that are present naturally in the soils, which results in the release and mobility of dissolved arsenic in the groundwater. The occurrence of increasing arsenic concentrations at multiple monitoring locations across the site in 2014 was not accompanied by similar increases in chloride concentrations that would be expected from impact from the JRL leachate. The 2014 arsenic concentrations in groundwater monitoring locations are, therefore, not interpreted as impact from the landfill leachate.

Four parameters (i.e., arsenic, sodium, cadmium, and iron) were detected in groundwater monitoring locations at concentrations above an MEG in 2014. Cadmium and iron were above their MEGs at only one location (P-206A), an upgradient background location, and sodium was above its MEG at only two locations (MW-302R and MW12-303R).

The groundwater monitoring results did not detect concentrations of nitrate, nickel, manganese, or VOCs[7] above their respective MCL or MEG at the groundwater monitoring locations sampled in 2014.

Pore-water sample results from PWS10-1, PWS10-2, and PWS10-3, which are collected in shallow saturated soils along the edge of the unnamed tributary to Pushaw Stream, are also compared to MCLs and MEGs. During 2014, arsenic and iron were above their respective MCLs and/or MEGs at two pore-water sampling locations, and cadmium was above its MEG at one pore-water sampling location. These results discussed in Section 6.2 and are not interpreted as being leachate related.

Parameters measured at the site surface water monitoring locations that were above their Maine Freshwater Criterion Continuous Concentrations (MFCCCs) are identified in detail in Section 6.2. In summary, the MFCCC for iron was exceeded at one surface water monitoring location (SW-2) in 2014. There were no MFCCC exceedances for chloride, arsenic, nickel, or cadmium at any of the surface water monitoring locations in 2014.

[7] Groundwater analyses for VOCs occurred at MW-401B in 2014.

6.1 Groundwater Quality

6.1.1 Bedrock Groundwater. Groundwater quality in the bedrock is measured at eight locations. Bedrock groundwater upgradient of the site is monitored at MW-304A, P-206A, and MW11-207R. The upgradient bedrock groundwater monitoring wells are currently located in areas that have not been disturbed by landfill development, and are presently considered to be unaffected by both landfill leachate and landfill operations. Bedrock groundwater downgradient of the landfill area is monitored at MW-223A, MW-301, MW-401A, and MW-402A. Monitoring well MW-302R monitors bedrock groundwater along the northwestern side of the landfill and is interpreted to be side-gradient of the landfill rather than downgradient. Notable observations in bedrock groundwater quality during 2014 are as follows:

6.1.1.1 Upgradient Bedrock Groundwater Monitoring Wells

- MW11-207R is located outside of the construction and operational area of the landfill and replaced MW-207 in 2011. Consistent with historical data since sampling began in 2011, there were no exceedances of MCLs or MEGs for parameters analyzed at MW11-207R in 2014. Water quality at MW11-207R in 2014 was consistent with historical data since the fall round of 2011, and there are not statistically significant increasing or decreasing trends (95% confidence level) for multiple parameters (four or more) in the past three years of monitoring at this location. There is insufficient data at MW11-207R for five-year Mann-Kendall trend analyses. The 2014 annual maximum specific conductance value of 89 µmhos/cm and chloride concentration of 4.4 mg/L at MW11-207R were very low and in the range expected in natural background groundwater monitoring well.

- Monitoring well MW-304A is located upgradient from the landfill and outside of the area of landfill construction. There were no MCL or MEG exceedances of analyzed parameters at MW-304A in 2014. In 2014 and historically, groundwater quality data from MW-304A has not indicated influence from site activities.

The Mann-Kendall analyses indicate that there are five parameters with statistically significant increasing trends (95% confidence level) for the past five years at MW-304A, including specific conductance, Eh, iron, total dissolved solids, and bicarbonate. Review of the 2014 data for these parameters, however, indicates that their values are low (i.e., consistent with upgradient conditions) and in their respective historical ranges. There were no parameters with statistically significant increasing trends (95% confidence level) over the past three years at MW-304A. The Mann-Kendall analyses indicate that there are not statistically significant decreasing trends (95% confidence level) for multiple parameters (four or more) at MW-304A for five-year or three-year periods from the end of 2014.

The 2014 annual maximum specific conductance value of 183 µmhos/cm and chloride concentration of 4.0 mg/L at MW-304A were very low and in the range expected in an upgradient groundwater monitoring well at this facility.

- P-206A is a bedrock piezometer located upgradient from the landfill and outside of the area of landfill construction. P-206A was added to the monitoring program during the July 2013 sampling event to provide an additional upgradient bedrock monitoring location. The location has limited recharge so the parameters analyzed at this location vary depending on the amount of sample that can be collected. The parameters included during the three 2014 monitoring events are indicated on the P-206A data summary sheet included in Appendix B.

  During 2014, cadmium slightly exceeded its MCL (0.005 mg/L) during the July monitoring event at a concentration of 0.0058 mg/L, but was below the MCL during the April and October monitoring events. Cadmium exceeded its MEG (0.001 mg/L) during the April 2014 (0.0015 mg/L) and July 2014 monitoring events. These were first time cadmium MCL and MEG exceedances at P-206A; however, this well had only been sampled once before 2014 in October 2013. Cadmium was not detected above its laboratory reporting limit (0.0006 mg/L) during the October 2014 monitoring event. The MEG for iron (5 mg/L) was

exceeded at P-206A during the April 2014 and July 2014 sampling events at concentrations of 10.3 mg/L and 16.8 mg/L, respectively.

There is insufficient data for three-year and five-year Mann-Kendall trend analyses at P-206A at this time. The 2014 annual maximum specific conductance value of 131 µmhos/cm and chloride concentration of 6.2 mg/L at P-206A were very low and in the range expected in an upgradient groundwater monitoring well at this facility.

6.1.1.2 Downgradient Bedrock Groundwater Monitoring Wells

- Water quality from downgradient bedrock monitoring well MW-223A includes concentrations of multiple parameters greater than those at the upgradient bedrock monitoring wells. Twelve parameters at MW-223A have statistically significant increasing trends (95% confidence level) over the past five years, including specific conductance, pH, arsenic, calcium, magnesium, potassium, sodium, total dissolved solids, sulfate, bicarbonate, alkalinity, and chloride. Similarly, seven parameters have statistically significant increasing trends (95% confidence level) over the past three years at MW-223A. Seven parameters were detected at new historic maximum values during of 2014, including specific conductance, arsenic, calcium, total dissolved solids, sulfate, bicarbonate, and chloride. The increasing parameter concentrations are coupled with statistically significant five-year and three-year decreasing trends (95% confidence level) for dissolved oxygen.

  While the statistically significant increasing trends (95% confidence level) discussed above remain at MW-223A in 2014, following the 2013 corrective actions that were made to the site infrastructure along the northwest corner of the JRL, review of the 2014 water quality data at MW-223A indicates that the corrective actions may possibly be beginning to show some effects on the water quality. Many of the parameters with increasing trends appear to have values that visually appear to have begun to either stabilize from previous increasing

rates, or decrease over the course of 2014 beginning with the summer and fall sampling events. These parameters include specific conductance, calcium, magnesium, potassium, sodium, and chloride. Additional time is required to verify these potential improvements to water quality at MW-223A and potential trend reversals. The annual maximum specific conductance value and chloride concentration in 2014 at MW-223A were 460 µmhos/cm and 57.6 mg/L, respectively. By the late 2014 monitoring event in October, the specific conductance value and chloride concentration at MW-223A were 435 µmhos/cm and 32 mg/L, respectively. For comparison, the annual maximum values during 2013 were 454 µmhos/cm (specific conductance) and 45.2 mg/L (chloride). Arsenic was the only monitored parameter at MW-223A with an MCL or MEG exceedance in 2014. Arsenic exceeded its MCL and MEG of 0.01 mg/L at MW-223A during the April 2014 (0.014 mg/L) and July 2014 (0.016 mg/L) sampling events. These exceedances are consistent with historical exceedances at this location.

- MW-301 is a deep bedrock monitoring well (screened between162.7 feet-BGS to 182.7 feet-BGS) located downgradient from the landfill in proximity of the leachate pond. Arsenic slightly exceeded its MCL and MEG (0.01 mg/L) during only one of the 2014 monitoring events at a concentration of 0.011 mg/L (October 2014). This is consistent with historical exceedances at this location. As discussed above, the occurrence of generally site wide arsenic MCL and MEG exceedances in groundwater is likely attributed to reducing conditions associated with decreasing groundwater recharge from site development. There were no other MCL or MEG exceedances of analyzed parameters at MW-301 in 2014.

  Parameter concentrations at MW-301 remained relatively low and consistent with historical data during 2014. The Mann-Kendall analyses indicate that there are six parameters with statistically significant increasing trends (95% confidence level) for the past five years at MW-301, including Eh, calcium, magnesium, manganese, bicarbonate, and chloride. Review of the 2014 data for these

parameters, however, indicates that their values are low (i.e., generally consistent with upgradient conditions) and in their respective historical ranges. There were not multiple parameters (four or more) with statistically significant increasing trends (95% confidence level) over the past three years at MW-301. The Mann-Kendall analyses indicate that there are not statistically significant decreasing trends (95% confidence level) for multiple parameters (four or more) at MW-301 for five-year or three-year periods through the end of 2014.

The concentrations of several parameters at MW-301 are marginally higher than at the upgradient bedrock monitoring locations, but are still at low levels (e.g., the 2014 annual maximum specific conductance value at MW-301 was 299 µmhos/cm in October 2014 compared to the annual maximum value of 183 µmhos/cm reported for MW-304A in 2014). The 2014 annual maximum chloride concentration remains very low at MW-301 (4.3 mg/L), which is an indication that the subtle differences in water quality at MW-301 compared to upgradient water quality are not a result of leachate influence.

- Downgradient bedrock monitoring wells MW-401A and MW-402A both have relatively low parameter concentrations, similar to or only slightly greater than those measured upgradient of the landfill. There were no MCL or MEG exceedances of analyzed parameters at MW-401A in 2014. Consistent with historical data, arsenic was detected above its MCL and MEG (0.010 mg/L) in MW-402A during April 2014 at 0.023 mg/L, July 2014 at 0.022 mg/L, and October 2014 at 0.024 mg/L. As discussed above, the occurrence of generally site-wide arsenic MCL and MEG exceedances in groundwater is likely attributed to reducing conditions associated with decreasing groundwater recharge from site development. Besides arsenic, there were no other monitored parameters above their respective MCL or MEG at MW-402A in 2014.

  Water quality remains essentially unchanged at MW-401A and MW-402A since sampling began at these locations in 2004. There were no statistically significant increasing or decreasing trends (95% confidence level) over that past three years

or five years for multiple (four or more) parameters at MW-401A. The Mann-Kendall analyses indicate that there are four parameters with statistically significant increasing trends (95% confidence level) for the past five years at MW-402A, including pH, calcium, magnesium, and sulfate. Review of the 2014 data for these parameters, however, indicates that their values are generally consistent with upgradient conditions, and are within their respective historical ranges. There were not multiple parameters (four or more) with statistically significant increasing trends (95% confidence level) over the past three years at MW-402A. The Mann-Kendall analyses indicate that there are not statistically significant decreasing trends (95% confidence level) for multiple parameters (four or more) at MW-402A for five-year or three-year periods from the end of 2014.

The 2014 annual maximum specific conductance value and chloride concentration at MW-401A were 131 µmhos/cm and 2.9 mg/L, respectively. The 2014 annual maximum specific conductance value and chloride concentration at MW-402A were 130 µmhos/cm and 1.7 mg/L, respectively. These parameter values are low and comparable to upgradient monitoring locations for both MW-401A and MW-402A, and do not indicate water quality impacts from the landfill.

6.1.1.3 Cross-gradient Bedrock Groundwater Monitoring Well

- Monitoring well MW-302R is located side-gradient of the landfill on the northwest side of the site, but downgradient from the office facility, former topsoil and stump stockpile area, and a subsurface wastewater disposal field. MW-302R is directly adjacent to Detention Pond #5. The roadways and paved parking area uphill and adjacent to MW-302R, along with the area of where the old flare pad and associated condensate drains, drain into a ditch that passes alongside of the well and into Detention Pond #5. Additionally, portions of both access roads to Cell 7, and Cells 1 and 2 drain to this pond. Prior to the 2013 reconstruction and lining of Detention Pond #5, and the paving of the access road and ditches in this area, the water quality at MW-302R indicated possible influence from these site

features. MW-302R has a distinct water quality signature as compared to other groundwater monitoring locations at the site. While the potential sources of impact to this well were addressed in late 2013, the effects of these site improvements are not yet evident in the water quality at MW-302R.

During 2014, arsenic exceeded its MEG and MCL (0.01 mg/L) at MW-302R during only one monitoring event with a concentration of 0.015 mg/L in October 2014. As discussed above, the occurrence of generally site-wide arsenic MCL and MEG exceedances in groundwater is likely attributed to reducing conditions associated with decreasing groundwater recharge from site development. Sodium slightly exceeded its MEG of 20 mg/L during the July 2014 and October 2014 monitoring events with concentrations of 20.8 mg/L and 26.7 mg/L, respectively. These parameter exceedances are consistent with historical exceedances for this location. There were no additional MCL or MEG exceedances of analyzed parameters at MW-302R in 2014.

Sodium and chloride concentrations at MW-302R are higher than the sodium and chloride concentrations detected at upgradient bedrock groundwater monitoring wells. An historical maximum chloride concentration of 91.3 mg/L was detected in April 2014; however, chloride concentrations declined consecutively in July 2014 (89.7 mg/L) and October 2014 (63.1 mg/L). Specific conductance values at MW-302R, which ranged from 336 µmhos/cm in April 2014 to 500 µmhos/cm in October 2014, are also higher than at upgradient monitoring locations, but are consistent with the construction related activities, (i.e., the reconstruction of the detention pond, and paving of the roadway which occurred around this well in 2013).

There were not statistically significant increasing or decreasing trends (95% confidence level) for multiple parameters (four or more) over that past three years or five years at MW-302R.

6.1.2 Soil Overburden Groundwater. During 2014, groundwater quality in the overburden was monitored at 13 monitoring wells. Ten of the overburden monitoring locations were sampled in April, July, and October 2014 and analyzed for the parameters in the detection monitoring analytical program (MW-206, MW12-303R, MW-223B, MW-227, MW-401B, MW-402B, P-04-04, MW04-102, MW04-109R, and MW09-901). Three of the overburden monitoring locations were monitored only during October 2014 for field parameters (DP-4, MW-204, and MW04-105). The soil overburden at the site consists of glacial till at the upper site elevations and marine clay along the unnamed stream west of the landfill. Notable observations in soil overburden groundwater quality are discussed below.

6.1.2.1 Upgradient Overburden Groundwater Monitoring Wells

Soil overburden groundwater upgradient of the site was monitored at two locations during 2014: MW-206 and MW12-303R. While the overburden groundwater monitoring wells upgradient from the landfill are not influenced by landfill leachate, MW12-303R is located in an area that could be influenced by roadways, nearby, temporary stormwater structures, or an area that has been affected by disturbance of vegetation and soils). Notable observations in upgradient overburden groundwater quality are as follows.

- Upgradient soil overburden groundwater monitoring well MW-206 generally has had relatively low historic parameter concentrations. Monitoring well MW-206 does not have multiple (four or more) parameters with statistically significant increasing or decreasing trends (95% confidence level) over the past five years or three years. Groundwater quality at MW-206 has been generally consistent since sampling began at this location in 1993.

  MW12-303R replaced MW-303 following the April 2012 sampling event and was installed in the same geologic formation (till) as MW-303. Groundwater quality measured at MW12-303R since October 2012 has generally been similar to groundwater quality measured previously at MW-303 (i.e., relatively low historic parameter concentrations); however, sodium, chloride, total dissolved solids, and specific conductance each had notable increases during the October 2014

sampling event. Monitoring well MW12-303R has seven parameters with statistically significant increasing trends (95% confidence level) over the past three years, including specific conductance, Eh, calcium, magnesium, bicarbonate, alkalinity (field), and chloride. There is insufficient data for statistically significant trend analyses at MW12-303R for the past five-year period. Based on the location of MW12-303R relative to the landfill, which is hydraulically upgradient, the noted increased parameter concentrations during October 2014 are not indicative of landfill liner performance. Rather, these increases may be related to the location of the well, which as stated above, is in an area that could be influenced by site operations or soil disturbance, construction related activities which occurred in close proximity to this well in 2014 (e.g., installation of a force main from the gas treatment building).

Arsenic was detected above its MCL and MEG (0.010 mg/L) at MW-206 at a concentration of 0.014 mg/L in October 2014, and at MW12-303R at a concentration of 0.013 mg/L during both the July 2014 and October 2014 sampling events. These exceedances are consistent with historical arsenic MCL and MEG exceedances at these monitoring locations. As discussed above, the occurrence of generally site-wide arsenic MCL and MEG exceedances in groundwater is likely attributed to reducing conditions associated with decreasing groundwater recharge from site development. At MW12-303R, sodium exceeded its MEG (20 mg/L) only during the October 2014 monitoring event with a concentration of 46.8 mg/L. This was a first time MEG exceedance for sodium at MW12-303R. There were no additional MCL or MEG exceedances for parameters monitored at MW-206 and MW12-303R during 2014.

The 2014 annual maximum specific conductance values and chloride concentrations at upgradient monitoring wells MW-206 and MW12-303R are included below on Table 6-1. Table 6-1 also includes the 2014 annual maximum chloride concentrations and specific conductance values for all downgradient overburden monitoring wells for reference throughout this section.

TABLE 6-1

2014 ANNUAL MAXIMUM SPECIFIC CONDUCTANCE VALUES AND CHLORIDE CONCENTRATIONS AT OVERBURDEN GROUNDWATER MONITORING LOCATIONS

Location Designation	Specific Conductance (µmhos/cm)	Chloride (mg/L)	Position Relative To Landfill
MW-206	170	2.6	Upgradient
MW12-303R	440	48.3	Upgradient
DP-4	239	Not Analyzed	Downgradient
MW-204	192	Not Analyzed	Downgradient
MW-223B	377	55.7	Downgradient
MW-227	187	2.0	Downgradient
MW-401B	336	16.2	Downgradient
MW-402B	160	1.9	Downgradient
P-04-04	176	1.8	Downgradient
MW04-102	226	1.8	Downgradient
MW04-105	322	Not Analyzed	Downgradient
MW04-109R	407	8.1	Downgradient
MW09-901	266	2.7	Downgradient

6.1.2.2 Downgradient Overburden Groundwater Monitoring Wells

Overburden groundwater downgradient of the landfill area was monitored at 11 monitoring well locations during 2014, including DP-4, MW-204, MW-223B, MW-227, MW-401B, MW-402B, P-04-04, MW04-102, MW04-105, MW04-109R, and MW09-901. Monitoring well P-04-02 was found to be damaged during the April 2013 sampling event and was not sampled during 2014; a replacement well for P-04-02 is planned to be installed during 2015, as recommended by MEDEP. Monitoring locations DP-4, MW-204, and MW04-105 are monitored only for field parameters during fall monitoring events.

Notable observations in downgradient overburden groundwater quality during 2014 are as follows:

- As shown above in Table 6-1, the 2014 annual maximum specific conductance values at the downgradient overburden monitoring locations remain low; all downgradient overburden monitoring locations have specific conductance values under 500 µmhos/cm. Chloride concentrations also remain relatively low at the downgradient monitoring locations, which is in contrast with the high chloride

concentrations in the site leachate (e.g., 13,950 mg/L at LT-C4LR in July 2014) and suggests that the subtle differences in overburden groundwater quality downgradient from the landfill compared to the upgradient locations are likely attributed to general site construction, development, and operational activities.

- Volatile organic compounds (VOCs) were analyzed at MW-401B in April of 2014. No VOCs were detected above the laboratory reporting limits at MW-401B in 2014.

- Parameter concentrations that were above MCLs or MEGs at downgradient overburden groundwater monitoring locations in 2014 are identified below:

  Arsenic was present above the MCL and MEG (0.010 mg/L) in 2014 at:

  - MW04-102 (0.012 mg/L in October 2014);
  - MW04-109R (0.019 mg/L in April 2014, 0.018 mg/L in July 2014, and 0.014 mg/L in October 2014);
  - MW09-901 (0.012 mg/L in July 2014);
  - MW-223B (0.011 mg/L in April 2014 and 0.014 mg/L in July 2014);
  - MW-227 (0.017 mg/L in April 2014, 0.019 mg/L in July 2014, and 0.021 mg/L in October 2014);
  - MW-401B (0.031 mg/L in April 2014, 0.023 mg/L in July 2014, and 0.026 mg/L in October 2014);
  - MW-402B (0.019 mg/L in April 2014, 0.023 mg/L in July 2014, and 0.021 mg/L in October 2014); and
  - P-04-04 (0.012 mg/L in April 2014 and 0.013 mg/L in October 2014).

  The downgradient overburden monitoring location arsenic exceedances at each of these locations are consistent with historical exceedances. As discussed earlier in Section 6.0, the occurrence of generally site-wide arsenic MCL and MEG exceedances in groundwater is likely attributed to reducing conditions associated with decreasing groundwater recharge from site development, and

not related to landfill liner system performance. There were no other parameters at concentrations above MCLs or MEGs at downgradient overburden groundwater locations in 2014 for the parameters analyzed.

- Five of the downgradient overburden monitoring locations have statistically significant increasing trends (95% confidence level) for multiple (four or more) parameters over the past three-year or five-year periods.

  At MW04-109R, Eh, manganese, total Kjeldahl nitrogen, and alkalinity (field) have five-year statistically significant increasing trends (95% confidence level), and Eh, calcium, manganese, and bicarbonate show increasing trends over the past three years. Eh and total Kjeldahl nitrogen values at MW04-109R are consistent with upgradient overburden groundwater values in MW-206. While alkalinity, calcium, and bicarbonate values at MW04-109R are higher than upgradient overburden groundwater values, visual assessment of their increasing trends show that these trends are gradual and that their 2014 values were within their respective historical ranges. Manganese concentrations at MW04-109R have historically remained below their MEG of 0.5 mg/L. Four parameters at MW04-109R have five-year statistically significant decreasing trends (95% confidence levels), including specific conductance, magnesium, sodium, and total organic carbon.

  At MW09-901, specific conductance, Eh, arsenic, calcium, magnesium, total dissolved solids, and bicarbonate have three-year statistically significant increasing trends (95% confidence level). The 2014 specific conductance, arsenic, and total dissolved solids values were within their historical ranges at MW09-901, and parameter values at MW09-901 remain similar to or marginally greater than at upgradient overburden values at MW-206. There were not multiple parameters (four or more) at MW09-901 with five-year statistically significant increasing trends.

At MW-227, arsenic, calcium, sulfate, and alkalinity (field) have five-year statistically significant increasing trends (95% confidence level). There were not multiple parameters (four or more) at MW-227 with three-year statistically significant increasing trends.

At MW-401B, arsenic, calcium, iron, and bicarbonate have three-year statistically significant increasing trends (95% confidence level), and arsenic, manganese, bicarbonate, and chloride over the past five years. Of these parameters, calcium, iron, bicarbonate, manganese, and chloride remain within their respective historical ranges and similar to or marginally greater than upgradient overburden values at MW-206. The increasing arsenic concentrations in this well are consistent with the discussion earlier in Section 6.0, which attributes generally site-wide increasing arsenic concentrations to reducing conditions associated with decreasing groundwater recharge from site development.

At MW-223B, there were statistically significant increasing trends (95% confidence level) for eight parameters (specific conductance, calcium, Eh, magnesium, sodium, total dissolved solids, bicarbonate, and chloride) over the past three years, and for eleven parameters (specific conductance, pH, Eh, calcium, magnesium, sodium, nitrate, total dissolved solids, sulfate, alkalinity (field), and chloride) over the past five years. Seven parameters (specific conductance, Eh, arsenic, calcium, magnesium, chloride, and bromide) were detected at new historical maximum concentrations in 2014 at MW-223B. These historic highs generally occurred during the April sampling event with parameter concentrations decreasing in subsequent monitoring events. It should be noted that, although the increasing trends for these multiple parameters are apparent, their concentrations still remain relatively low and that for the parameters analyzed, arsenic was the only parameter exceeding a MCL or MEG at MW-223B in 2014. Also of note is that while bromide was detected at an unusually high concentration of 4.13 mg/L at MW-223B in April 2014, bromide concentrations were 0.18 mg/L in July 2014 and 0.15 mg/L in October 2014.

Monitoring well MW-223B is located along the northwest perimeter of the landfill, and like MW-223A, groundwater quality at this location appears to be affected by infiltration of surface water runoff in the vicinity of the northwest corner of the landfill as well as the discolored soil uncovered during 2013 outside of the lined portion of the of the northwest corner of the landfill. As discussed above, NEWSME implemented multiple corrective actions during 2013 to address the recent historical groundwater quality changes that have been observed at the monitoring locations northwest of the landfill. While the noted increasing parameter trends for MW-223B are still current, several of the parameters at MW-223B were lower during the latter part of 2014 than during the April 2014 monitoring event (e.g., chloride, magnesium, calcium, and arsenic). This pattern of water quality in this well, (i.e., historic high values early in the year followed by lower values for the subsequent two sampling events) is suggestive that the corrective actions taken in 2013 will improve water quality in this well.

The complete Mann-Kendall statistical trend analyses for the downgradient overburden groundwater monitoring locations are included in Appendix C.

- Groundwater quality at MW04-102 and P-04-04 does not exhibit statistically significant increasing or decreasing trends (95% confidence level) for multiple parameters (four or more). Four parameters at MW-402B (magnesium, sulfate, alkalinity (field), and turbidity) have statistically significant decreasing trends (95% confidence level) over the past three years. Groundwater quality at MW-402B does not exhibit statistically significant increasing trends (95% confidence level) for multiple parameters (four or more).

- Dissolved methane was sampled for at monitoring well MW-223B during the April, July, and October 2014 sampling rounds as requested by MEDEP. Dissolved methane was not detected above the laboratory reporting limit of 20 µg/L in April and July, and was detected at low concentration of 30 µg/L in October. Given the location of this well adjacent to the large bog area associated with the unnamed tributary to Pushaw Stream, these relatively low one-time

concentration is interpreted to be related to natural sources. As recommended by MEDEP, dissolved methane will be sampled from pore-water sampling locations during 2015 to further assess this interpretation. These supplemental dissolved methane samples will be collected during the July 2015 and October 2015 sampling events.

6.2 Surface Water and Stormwater

Surface water at the site was monitored in 2014 at three locations on the southwest side of the landfill along an unnamed tributary to Pushaw Stream (SW-1, SW-2, and SW-3). Stormwater was monitored at three stormwater detention ponds (SW-DP1, SW-DP5, and SW-DP6) during 2014. Additionally, three pore-water sampling locations were monitored in 2014 at PWS10-1, PWS10-2, and PWS10-3, which are located along the landfill side of the bank of the unnamed tributary to Pushaw Stream. Parameter concentrations that exceeded historical minimum and maximum concentration values for these monitoring locations are identified on the individual water quality summary sheets contained in Appendix B. Notable observations in the surface water and stormwater sampling data for 2014 are as follows:

- Along the unnamed tributary to Pushaw Stream, surface water quality at SW-1, SW-2, and SW-3 has been very consistent since sampling began at these locations in the early 1990s. Parameter concentrations during the 2014 sampling events at downstream locations SW-1 and SW-3 were generally similar to those measured at SW-2, which is located upstream of the landfill. Parameters analyzed at SW-1 and SW-3, located downstream from the landfill, remain at relatively low values that do not indicate influence from landfill leachate. There were not statistically significant increasing or decreasing trends (95% confidence level) for multiple parameters (four or more) at SW-1, SW-2, or SW-3 for the past three-year or five-year periods.

  Iron concentrations exceeded their MFCCC standard of 1 mg/L at SW-2 during the July 2014 sampling round at a concentration of 1.52 mg/L. This exceedance is consistent with historical exceedances at this location. There were no other

MFCCC exceedances at SW-1, SW-2, or SW-3 for parameters analyzed during 2014.

- SW-DP1 is collected from a stormwater detention pond at the downstream western edge of the JRL site. SW-DP5 is collected from an outfall on the west side of Detention Pond #5. SW-DP6 is a stormwater detention pond sampling location at the southern end of the site.

  Parameter concentrations at SW-DP1 have generally been low since sampling began at this location in 2004 and have not indicated influences from landfill leachate or landfill operations. Parameter concentrations at SW-DP1 were lower during 2014 than during 2013 for multiple parameters. Six parameters had new historic minimum values at SW-DP1 during 2014, including specific conductance, calcium, magnesium, sodium, total dissolved solids, and alkalinity (field). The annual maximum specific conductance value and chloride concentration at SW-DP1 during 2014 were 83 µmhos/cm and 5.4 mg/L, respectively. There were six parameters with statistically significant decreasing trends (95% confidence level) at SW-DP1 for the past three years, including potassium, phosphorous, total dissolved solids, total suspended solids, sulfate, and alkalinity (field). There were five parameters with statistically significant decreasing trends (95% confidence level) at SW-DP1 for the past five years, including specific conductance, calcium, sodium, total dissolved solids, and alkalinity (field). There were no statistically significant increasing trends (95% confidence level) for multiple parameters (four or more) at SW-DP1 for the past three-year and five-year periods.

  Stormwater quality monitoring at SW-DP6 began in October 2009. The stormwater quality at SW-DP6 during 2014 is characterized by low parameter concentrations that do not indicate influences from landfill leachate or landfill operations. The annual maximum specific conductance value and chloride concentration at SW-DP6 were 107 µmhos/cm and 17.8 mg/L, respectively. Many parameter concentrations at SW-DP6 have been lower over the past three

years compared to previous historical data, which has resulted in statistically significant decreasing trends (95% confidence level) for ten parameters (specific conductance, calcium, magnesium, manganese, potassium, sodium, total dissolved solids, bicarbonate, alkalinity (field), and chloride) over the past five years.

Similar to stormwater quality at SW-DP1 and SW-DP6, the stormwater quality at SW-DP5 during 2014 is characterized by low parameter concentrations that do not indicate influences from landfill leachate or landfill operations. The annual maximum specific conductance value and chloride concentration at SW-DP5 were 194 µmhos/cm and 20.9 mg/L, respectively. There is currently insufficient data for three-year and five-year statistically significant trend analyses at SW-DP5.

Pore-water sample locations PWS10-1, PWS10-2, and PWS10-3, which are located along the landfill side of the bank of the unnamed tributary to Pushaw Stream, have been sampled since 2010. These sampling locations are intended to be representative of groundwater quality as it discharges to the stream. Groundwater quality has been generally consistent at all three pore-water sampling locations since sampling began at these locations in 2010 and does not indicate influences from landfill leachate. The Mann-Kendall analyses indicate that there are not three-year or five-year statistically significant increasing trends (95% confidence level) for multiple parameters (four or more) at PWS10-1 or PWS10-3. There were five parameters with statistically significant increasing trends (95% confidence level) at PWS10-2 for the past three years, including specific conductance, arsenic, calcium, magnesium, and bicarbonate; however, review of the specific conductance, calcium, magnesium, and bicarbonate data at PWS10-2 indicates that their values remain low. The increasing arsenic concentrations at PWS10-2 are consistent with the discussion earlier in Section 6.0, which attributes generally site-wide increasing arsenic concentrations to reducing conditions associated with decreasing groundwater recharge from site development. Four parameters at PWS10-3 have three-year statistically

significant decreasing trends, including specific conductance, calcium, magnesium, and alkalinity (field).

2014 pore-water sample quality at PWS10-1, PWS10-2, and PWS10-3 is generally similar to groundwater quality upgradient from the landfill; exceptions include higher pore-water concentrations of iron, organic carbon, and chemical oxygen demand, which is consistent with the local hydrology of the sample locations (i.e., shallow fluctuating water table with high natural organic matter associated with the wetland and stream).

While the pore-water sampling locations are grouped with surface monitoring locations, the samples are collected from soil and the sampling results from these locations are compared to MCL and MEG standards for groundwater. The MCL and MEG exceedances in 2014 at the pore-water sampling locations include:

- At PWS10-1, arsenic exceeded its MCL and MEG of 0.01 mg/L in April (0.015 mg/L);
- At PWS10-1, iron exceeded its MEG of 5 mg/L in April (6.52 mg/L);
- At PWS10-2, arsenic exceeded its MCL and MEG of 0.01 mg/L in July (0.014 mg/L) and October (0.012 mg/L);
- At PWS10-2, cadmium exceeded its MEG of 0.001 mg/L in April (0.0016 mg/L); and
- At PWS10-3, iron exceeded its MEG of 5 mg/L in April (9.29 mg/L) and July (5.45 mg/L).

All of these exceedances were consistent with periodic historical exceedances with the exception of the first time exceedances of the arsenic MCL and MEG standard at PWS10-2. There were no other MCL or MEG exceedances for analyzed parameters at PWS10-1, PWS10-2, or PWS10-3 during 2014. Given the location and setting of these sample locations, the exceedances are not interpreted to be related to the landfill.

6.3 Leachate

The landfill leachate is sampled and analyzed as part of the ongoing water quality monitoring program. Leachate samples were collected from the on-site leachate storage tank (i.e., LT-C4LR) during 2014. Leachate sampling location LT-C4LR replaced the former leachate sampling location in July 2013 in order to obtain leachate samples that are representative of leachate from all of the landfill cells. Leachate samples associated with compliance monitoring for off-site wastewater treatment are also collected at the leachate storage tank when transport tanker trucks are being loaded. During 2014, approximately 10.2 million gallons of leachate was loaded into tanker trucks and transported from JRL for off-site treatment.

The annual maximum parameter values were lower for multiple parameters in 2014 compared to 2013, including iron, magnesium, manganese, nickel, calcium, copper, total suspended solids, sulfate, biological oxygen demand, chemical oxygen demand, chloride, and tannins/lignin. The specific conductance values recorded at LT-C4LR in 2014 ranged from 15,370 µmhos/cm in April 2014 to 23,800 µmhos/cm in July 2014. Chloride concentrations at LT-C4LR in 2014 ranged from 7,070 mg/L in October 2014 to 13,950 mg/L in July 2014. Since LT-C4LR is a new monitoring location, which replaced LT-C4L in July 2013, there is currently insufficient data for three-year and five-year trend analyses.

Leachate was monitored for VOCs, SVOCs, herbicides, pesticides, and PCBs during the April 2014 monitoring event at LT-C4LR, and for VOCs during the July 2014 and October 2014 monitoring events at LT-C4LR. Appendix D summarizes the VOC, SVOC, herbicide, pesticide, and PCB detections above the laboratory reporting limits in 2014 at LT-C4LR. At LT-C4LR in April 2014, acetone (1,000 µg/L), methyl ethyl ketone (1,400 µg/L), phenol (160 µg/L), 2-methylphenol (12 µg/L), naphthalene (12 µg/L), 3&4-methylphenol (690 µg/L), and acetophenone (11 µg/L) were detected in LT-C4LR at levels above their respective laboratory detection limits. Acetone and methyl ethyl ketone were also detected above their respective laboratory reporting limits at LT-C4LR during the July 2014 and October 2014 monitoring events. Acetone was detected at concentrations of 60 µg/L in July 2014 and 400 µg/L in October 2014. Methyl ethyl ketone was detected at concentrations of 200 µg/L in July 2014 and

1,200 µg/L in October 2014. There were no detections of these VOC parameters in groundwater or underdrain samples collected during 2014. No herbicides, pesticides, or PCBs were detected above the laboratory detection limits in 2014 at LT-C4LR.

6.4 Underdrains

The water quality monitoring results from underdrain sampling locations are used to indicate whether the landfill liner systems are performing as designed. Historically, the landfill underdrain samples have had relatively low parameter concentrations and high dissolved oxygen levels, and monitoring results have been generally similar to upgradient groundwater monitoring locations. In general, the parameter concentrations at the landfill cell underdrain locations are likely influenced by the soil disturbances and cutoff of recharge from precipitation associated with the construction of Cell 5, Cell 6, Cell 7, and Cell 8 during the last five years, and the stormwater management associated with the construction of those cells. The 2014 monthly landfill and leachate pond underdrain field data and the 2014 and historical tri-annual underdrain water quality data are all included in Appendix A. Notable observations for the underdrain monitoring locations in 2014 are discussed below.

- Consistent with recent historical data, there was no flow at LF-UD-3A &B, LF-UD-7, and LP-UD-1 during 2014, and thus, no samples were collected at these locations during 2014.

- VOCs were analyzed at all sampled underdrain locations (both landfill and leachate pond underdrains) in April of 2014. There were no VOCs detected in 2014 at any of the sampled underdrain locations.

- During 2013, chloride concentrations were detected in several of the landfill underdrain monitoring locations at levels higher than recent historical concentrations during one or more of the monitoring events. Chloride was detected at annual maximum concentrations of 22.5 mg/L at LF-UD-1, 35.2 mg/L at LF-UD-2, 13.2 mg/L at LF-UD-4, and 18.2 mg/L at LF-UD-6 during 2013. During 2014, the chloride concentrations were lower than those detected during

2013. At LF-UD-1, the chloride concentrations declined consecutively to a concentration of 17.3 mg/L in July 2014 (there was no flow at LF-UD-1 in October 2014). Similarly, chloride concentrations at LF-UD-2 declined during the course of 2014, with an October 2014 chloride concentration of 7.7 mg/L, LF-UD-4 was dry (i.e., no flow) in July 2014 and October 2014, but had a chloride concentration of 8.9 mg/L in April 2014, which was lower than in 2013. At LF-UD-6, the chloride concentration also declined over the course of 2014 with an October 2014 chloride concentration of 9.4 mg/L. The chloride concentrations at all of the underdrain sampling locations remain extremely low in comparison to the concentration of chloride in the leachate, which ranged from 7,070 mg/L in October 2014 to 13,950 mg/L in July 2014 at LT-C4LR, and they are not interpreted to be related to the performance of the landfill liner systems. It is likely that the increasing chloride concentrations observed from samples collected from landfill underdrain locations, particularly LF-UD-1 and LF-UD-2, were attributed to the conditions that existed on the northwest side of the landfill prior to the removal of the discolored soils discovered outside of the lined portion of the landfill during 2013, and the paving of the surface water drainage ditches on the northwest side during 2013. Prior to these corrective actions, these conditions are also believed to have contributed to rising chloride concentrations (among other parameters) detected at several groundwater monitoring locations northwest of the landfill (e.g., MW-223A and MW-223B) over the past several years. The corrective actions appear to have resulted in lower chloride concentrations at the abovementioned underdrain locations in 2014, and it is anticipated that similar improvements will occur at affected downgradient monitoring wells northwest of the JRL over time.

Consistent with historical data, annual maximum chloride concentrations remained low at LF-UD-5 and 6 at 4.7 mg/L, LF-UD-8 at 3.7 mg/L, and LP-UD-2 at 8.3 mg/L during 2014.

- Multiple parameter concentrations at LF-UD-6, which has been sampled since 2011, generally have higher concentrations than other landfill underdrain

sampling locations and upgradient groundwater quality. Specific conductance values at LF-UD-6 ranged from 392 µmhos/cm in April 2014 to 847 µmhos/cm in September 2014 and December 2014; these values are within the historical range at this location. Sample collection from LF-UD-6 is unique from other sampling locations in that it is sampled from a stilling well in the underdrain line. It is suspected that recent higher parameter values, including chloride and specific conductance, may be due to constituents in the stilling well water becoming more concentrated over time due to settling and due to evaporation of water from the stilling well. This premise is supported by the lack of evidence of influence from LF-UD-6 on underdrain water quality at LF-UD-5 and 6, which is a combination of underdrain water from Cell 5 and Cell 6.

- The arsenic MCL concentrations in the underdrain monitoring locations were generally consistent with those at groundwater monitoring wells across the site, including multiple upgradient monitoring locations. Many of the underdrain monitoring locations have had generally increasing arsenic concentrations over the past several years. Annual maximum arsenic concentrations at underdrain locations in 2014 ranged from 0.005 mg/L in July 2014 at LF-UD-8 to 0.026 mg/L in July 2014 at LF-UD-6.

At locations with sufficient data, Mann-Kendall trend analyses were run to determine the presence of three-year and five-year statistically significant increasing and/or decreasing trends for parameters (95% confidence level) analyzed at the landfill and leachate pond underdrain locations. There was insufficient data for both three-year and five-year trend analyses for sample locations LF-UD-3A&B, LF-UD-7, LF-UD-8, LP-COMP, and LP-UD-1; and there was insufficient data for five-year trend analyses for LF-UD-6. Underdrain sampling locations with statistically significant increasing or decreasing trends for multiple parameters (four or more) include the following.

- Seven parameters have statistically significant increasing trends (95% confidence level) at LF-UD-2 over the past three years, including specific conductance, arsenic, calcium, magnesium, sodium, total dissolved solids, and

alkalinity (field). Visual assessment of the data indicates that these increases over the past three years remain within a range of low concentrations and are generally subtle trends. Specific conductance levels have been generally stable over the past three years at LF-UD-2, and at values only moderately greater than at upgradient overburden groundwater in areas developed for landfill operations (e.g., monthly specific conductance values for LF-UD-2 in 2014 ranged from 328 µmhos/cm in January 2014 to 417 µmhos/cm in August 2014). LF-UD-2 also has statistically significant increasing trends (95% confidence level) for eight parameters (Eh, dissolved oxygen, arsenic, temperature, magnesium, sodium, total dissolved solids, and chloride) over the past five years. As discussed above, the water quality changes at LF-UD-2 are believed to be influenced by the conditions that existed on the northwest side of the site, which were remediated in 2013 with the removal of the discolored soils discovered outside of the lined portion of the landfill during and the pavement of the stormwater ditches; they are not interpreted to be related to the performance of the landfill liner systems.

- Four parameters have statistically significant increasing trends (95% confidence level) at LF-UD-4 over the past three years, including pH, dissolved oxygen, sulfate, and turbidity. Visual assessment of the data indicates that these increases over the past three years remain within a range of values generally consistent with upgradient groundwater and are generally subtle trends. LF-UD-4 also has statistically significant increasing trends (95% confidence level) for five parameters (pH, Eh, dissolved oxygen, alkalinity (field), and turbidity) over the past five years.

- Four parameters have statistically significant decreasing trends (95% confidence level) at LF-UD-5 and 6 over the past five years, including potassium, total dissolved solids, sulfate, and total organic carbon.

- Five parameters have statistically significant increasing trends (95% confidence level) at LF-UD-6 over the past three years, including specific conductance, pH, dissolved oxygen, sodium, and alkalinity (field). Parameter concentrations at

LF-UD-6 are generally higher than at other underdrain monitoring locations. As discussed above, the water quality changes at LF-UD-6 are believed to be influenced by its collection method, which is a stilling well in the underdrain line.

- Seven parameters have statistically significant increasing trends (95% confidence level) at LP-UD-2 over the past five years, including temperature, Eh, dissolved oxygen, arsenic, bicarbonate, chemical oxygen demand, and turbidity. Review of the data for these locations shows that groundwater quality at LP-UD-2 is generally consistent with upgradient groundwater quality.

7.0 GAS MONITORING

As part of the 2014 environmental monitoring program, methane gas was measured during the collection of water quality samples at the site monitoring well standpipes, underdrain outfalls, leachate collection system, leak detection system, and JRL site property boundaries using a hand-held gas meter. During 2014, methane gas monitoring results were below the meter detection limit. Hydrogen sulfide (H_2S) was monitored at all of the abovementioned locations in 2014 and was not detected at any of the locations. Historical and 2014 gas monitoring results for the site are contained in Appendix E. The 2014 gas monitoring results indicate no landfill-related gases are present at the monitored locations.

8.0 SUMMARY AND RECOMMENDATIONS

8.1 Summary

In general, the 2014 water quality data for the JRL is consistent with the historical data for the site. With few exceptions, the downgradient groundwater quality is similar to or has parameter concentrations only slightly greater than that of the upgradient groundwater. Given that the upgradient groundwater is in close proximity to the recharge area and receives atmospheric water regularly in contrast to the downgradient wells, which represent groundwater that has traveled up to 2,000 feet through soil and rock, it is expected that the downgradient wells will have higher dissolved constituents present. Additionally, some differences exist in water quality downgradient from the JRL that are largely attributable to the changes in redox conditions, which occur as expected around the landfill due to the construction and operations of the landfill (e.g., from the cutoff of precipitation). The 2014 site water quality can be summarized as follows:

- In 2014, groundwater monitoring wells do not show adverse impacts from the landfill or leachate transport and storage systems. Three of the monitoring wells (i.e., MW-302R, MW-223A, and MW-223B) located along the northwest perimeter of the landfill continued to show influence of site activities. The water quality from those wells has been interpreted to have been influenced by site infrastructure in the vicinity of these wells (e.g., stormwater runoff and detention structures), and discolored soil located outside of the lined portion of the landfill that were discovered in 2013 as part of the corrective action implementation. The corrective actions that were implemented along the northwest perimeter of the landfill and at Detention Pond #5 during 2013 were completed in the summer/fall of 2013. While statistically significant increasing trends (95% confidence level) still currently remain for multiple parameters (four or more) at MW-223A and MW-223B over three-year and five-year periods, review of the 2014 water quality at both wells indicates that water quality may possibly be beginning to show some effects from the removal of the discolored soils and the infrastructure improvements made at the northwest corner of the landfill in 2013.

Many of the parameters with increasing trends appear to have values that visually appear to have begun to either stabilize from previous increasing rates, or decrease over the course of 2014. These parameters include specific conductance, calcium, magnesium, potassium, sodium, and chloride at MW-223A, and chloride, magnesium, calcium, and arsenic at MW-223B. Additional time is required to verify these potential improvements to water quality at MW-223A and MW-223B. The effects of the recent site improvements are not yet evident in the water quality at MW-302R; however, with additional time improvements are anticipated.

During 2014, the remainder of the overburden and bedrock monitoring wells and the pore-water sampling locations either: (1) had water quality consistent with groundwater quality monitoring wells located upgradient from the landfill and outside of the area of influence from landfill construction activities; or (2) recorded parameter concentrations and trends that suggest that water quality at these locations is consistent with water quality at a site effected by the various construction related activities associated with landfill cell construction. The latter are not interpreted to be indications of landfill leachate impacts to groundwater.

- Samples from the landfill underdrains generally have low overall parameter concentrations, indicating they are not influenced by landfill leachate thereby verifying that the landfill liner systems are performing as designed. Similar to monitoring wells located along the northwest perimeter of the landfill, the landfill underdrains for landfill cells located along the northwest perimeter of the landfill exhibited improvements in water quality in 2014. Following the previously discussed 2013 corrective actions to site infrastructure along the northwest perimeter of the landfill, chloride concentrations generally declined over the course of 2014 at underdrain locations (e.g., 7.7 mg/L versus 35.2 mg/L at LF-UD-2 in October 2012 and July 2013, respectively). It is anticipated that similar improvements will occur at affected downgradient monitoring wells over time.

Consistent with historical data, annual maximum chloride concentrations remained low at LF-UD-5 and 6, LF-UD-8, and LP-UD-2 during 2014.

At LF-UD-6, parameter values are generally higher than at other landfill underdrain monitoring locations. Sample collection from LF-UD-6 is unique from other sampling locations in that it is sampled from a stilling well in the underdrain line. It is suspected that higher parameter values, including chloride and specific conductance, may be due to constituents in the stilling well water becoming more concentrated over time due to settling and due to evaporation of water from the stilling well. This premise is supported by the lack of evidence of influence from LF-UD-6 on underdrain water quality at LF-UD-5 and 6, which is a combination of underdrain water from Cell 5 and Cell 6.

- Bromide was added to the monitoring program during 2013, beginning with the April 2013 monitoring event. Bromide concentrations during 2014 were low site-wide during 2014 with one exception. During the April 2014 sampling event, bromide was detected at a concentration of 4.13 mg/L at MW-223B. This value appears to be an aberration since the concentrations returned to more historical concentrations for the remaining two sampling rounds. The remainder of all bromide samples collected during 2014 (excluding the leachate samples) ranged from non-detect to low concentrations (i.e., up to 0.38 mg/L at MW12-303R) near the laboratory detection limit of 0.1 mg/L.

- A supplementary addition to the 2014 monitoring program included sampling and analyses for dissolved methane at MW-223B. Dissolved methane was sampled for at monitoring well MW-223B during the April, July, and October 2014 sampling rounds as requested by MEDEP. Dissolved methane was not detected above the laboratory reporting limit of 20 µg/L in April and July, and was detected at a low concentration of 30 µg/L in October. Given the location of this well adjacent to the large bog area associated with the unnamed tributary to Pushaw Stream, the low one-time concentration is interpreted to be related to natural sources. As recommended by MEDEP, dissolved methane will be sampled from

pore-water sampling locations during 2015 to assess this interpretation. These supplemental dissolved methane samples will be collected during the July 2015 and October 2015 sampling events.

- Surface water downstream of the site along the unnamed tributary to Pushaw Stream (SW-1, SW-2, and SW-3) and pore-water samples collected along the landfill side of the bank of the unnamed tributary to Pushaw Stream (PWS10-1, PWS10-2, and PWS10-3) appear to be un-affected by the landfill operations. Surface water at SW-1 and SW-3 has similar parameter concentrations as upstream location SW-2. Additionally, the 2014 stormwater samples from the SW-DP1, SW-DP5, and SW-DP6 do not show adverse impacts from the landfill.

8.2 Recommendations

Based on review of 2014 and recent historical water quality data, SME recommends that site water quality monitoring be continued in 2015 with the following modifications. There will be several changes to the detection monitoring program, as recommended by MEDEP in its December 16, 2014 Memorandum regarding the 2013 Annual Report for the JRL. Based on the MEDEP recommendations: (1) bicarbonate, cadmium, chemical oxygen demand, nickel, and tannins/lignin will be removed from the detection monitoring program; (2) total suspended solids will be removed for all monitoring locations except for surface water locations; (3) the field measurement of alkalinity will be replaced with an appropriate laboratory method; and (4) nitrate analysis will be replaced with the combined analysis for nitrate and nitrite.

As recommended by MEDEP, dissolved methane will be sampled from pore-water sampling locations during 2015. These supplemental dissolved methane samples will be collected during the July 2015 and October 2015 sampling events.

As requested by MEDEP in its December 16, 2014 Memorandum regarding the 2013 Annual Report for the JRL, monitoring well P-04-02 is planned to be replaced during 2015 and included in the monitoring program.

APPENDIX A

2014 AND HISTORICAL WATER QUALITY DATA

Groundwater, Surface Water, Pore Water, and Underdrain Locations

SUMMARY REPORT
Field Data

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(DP-4) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
DP-4															
5/9/2005	XX	GWXXXX13I	264	6.9	9.6	13.25	156.12		239	1	215	6			
8/1/2005	XX	GWXXXX176	295	6.7	15.8	13.8	155.57		295	2	175	16.8			
9/20/2005	XX	GWXXXX1A4	380	7.3	16.6	14.38	154.99	27.06	228	4	135	0.7			
5/22/2006	XX	GWXXXX1EJ	340	6.8	10.3	14.59	154.78		188	1	105	27.8			
7/24/2006	XX	GWXXXX1HG	270	7.1	19.6	14.52	154.85		251	1	150	3			
9/11/2006	XX	GWXXXX209	333	6.2	19.2	14.96	154.41	27.07	238	1	125	4.3			
5/14/2007	XX	GWXXXX23G	381	6.8	11.6	15	154.37		196	1	75	28			
7/23/2007	XX	GWXXXX280	274	6.4	7.2	15.28	154.09		233	6	175	18.6			
9/10/2007	XX	GWXXXX2AA	338	6.5	15.3	15.65	153.72	27.1	337	1	115	9.6			
5/19/2008	XX	GWXXXX2E4	356	6.6	9.5	14.4	154.97		-51	2	150	5.7			
7/29/2008	XX	GWXXXX2H8	362	6.4	17.4	17.19	152.18		64	1	105	5.9			
10/27/2008	XX	GWXXXX2JI	366	6.4	11.7	15.3	154.07	27.05	154	1	75	4.2			
4/13/2009	XX	GWXXXX336	442	6.3	7.1	14.55	154.82		279	4	70	8.5			
7/6/2009	XX	GWXXXX37A	380	6.7	15.3	14.59	154.78		308	5	130	12.1			
10/26/2009	XX	GWXXXX3F5	499	6.5	13.2	13.68	155.69	27.05	253	3	100	4.5			
4/26/2010	XX	GWXXXX404	271	6.3	13.2	14.8	154.57		216	3	100	3.3			
7/19/2010	XX	GWXXXX438	100	5.6	23.9	15.41	153.96		345	2	125	8.1			
10/18/2010	XX	GWXXXX46C	396	6.3	11.3	14.98	154.39	27.1	352	2	50	2.6			
4/25/2011	XX	GWXXXX4AD	277	6.4	12.2	13.9	155.47		282	1	70	2.5			
7/18/2011	XX	GWXXXX4EB	282	6.4	18.2	14.35	155.02		233	1	95	0.6			
10/24/2011	XX	GWXXXX4I6	256	6.7	13.8	16.95	152.42	27.06	312	0.8	70	1.6			
4/25/2012	XX	GWXXXX52G	334	6.3	9.1	14.1	155.27		232	1	120	5.9			
7/25/2012	XX	GWXXXX57F	313	6.2	13.8	15.3	154.07		25	0.6	120	3.7			
10/24/2012	XX	GWXXXX5E6	302	7.3	9.4	14.08	155.29	27.06	221	1	100	7.9			
4/24/2013	XX	GWXXXX5IH	293	6.5	7.2	14.38	154.99		240	1	70	10			
10/30/2013	XX	GWDP4X689	273	5.8	10.7	14.9	154.47	27.06	217	0.8	70	3.9			
10/21/2014	XX	GWDP4X72C	239	6.7	13.1	14.65	154.72	27.05	343	0.8	75	0.6			
LF-COMP															
5/25/2011	XX	LFCMPX4FE	405	6.8	23.3				352	5	100	0.07			
6/20/2011	XX	LFCMPX4G5	370	7	23.8				376	5	125	1			
7/19/2011	XX	LFXXXX4F1	368	6.8	24.7				404	4	113	0			
8/3/2011	XX	LFCMPX4JF	223	7.1	22.7				337	5	90	129.3			
10/8/2011	XX	LFCMPX4J4	371	7.1	24.8				370	6	80	0.6			
11/30/2011	XX	LFCMPX50I	351	7.1	20				382		90	24.9			
12/29/2011	XX	LFCMPX506	362	7.4	17.2				341	6	125	1.1			
1/26/2012	XX	LFCMPX58I	381	7.5	17				372	6	140	1.05			
2/24/2012	XX	LFCMPX599	366	7.5	13.7				371	5	145	0.91			
3/23/2012	XX	LFCMPX5A0	I	I	I				I	I	I	I			
4/16/2012	XX	LFCMPX5AB	I	I	I				I	I	I	I			
4/24/2012	XX	LFXXXX53B	314	7.2	17.8				403	6	85	4.4			
5/3/2012	XX	LFCMPX5B2	400	7	18.7				446	6	140	11.82			
6/29/2012	XX	LFCMPX5BD	394	6.9	22.5				444	5	125	0.07			
7/31/2012	XX	LFCMPX5C4	389	7.3	29.7				383	8	150	0.33			
8/31/2012	XX	LFCMPX5F5	421	6.9	22.1				384	6	150	0.27			
9/27/2012	XX	LFCMPX5FG	373	7.3	21.2				348	8	150	0.14			
11/13/2012	XX	LFCMPX5G7	307	7.6	17.7				355	6	135	3.91			
12/31/2012	XX	LFCMPX5GI	306	7.7	11.4				406	8	130	5.27			

SUMMARY REPORT
Field Data

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-COMP) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
1/30/2013	XX	LFCMPX60E	239	7.1	15.1				426	7	100	9.85			
2/15/2013	XX	LFCMPX602	306	7.5	13.5				407	6	145	3.75			
3/28/2013	XX	LFCMPX617	294	8	16.7				333	8	170	0.74			
4/24/2013	XX	LFCMPX61J	262	7.1	15.9				347	6	160	0.39			
5/30/2013	XX	LFCMPX62B	271	7.3	20.4				331	8	160	0.4			
6/26/2013	XX	LFCMPX633	311	7.8	20.2				397	8	150	1.48			
8/20/2013	XX	LFCMPX69D	397	7.1	25.3				383	6	150	0.44			
9/26/2013	XX	LFCMPX691	384	8.1	18.3				399	8	125	0.72			
11/25/2013	XX	LFCMPX6A6	370	8.4	7.2				371	8	160	0.32			
12/17/2013	XX	LFCMPX6D6	359	7.5	8.9				433	8	185	5.86			
1/24/2014	XX	LFCMPX6DI	360	7.4	7.2				342	8	170	2.17			
2/24/2014	XX	LFCMPX6HF	387	7.5	11.4				397	9 E2	200	1.46			
3/27/2014	XX	LFCMPX6H3	383	8.1	13.7				334	8	200	2.22			
4/29/2014	XX	LFCMPX6I7	354	7.9	17.5				333	8	180	0.76			
5/23/2014	XX	LFCMPX716	390	7.7	21.5				355	8	200	0.63			
6/24/2014	XX	LFCMPX71I	442	7.2	21.6				370	6	190	0.74			
8/26/2014	XX	LFCMPX74I	M7	M7	M7				M7	M7	M7	M7			
9/23/2014	XX	LFCMPX759	449	7.6	23.1				345		165	0.09			
11/28/2014	XX	LFCMPX761	366	7.3	15.6				366	6	150	M			
12/24/2014	XX	LFCMPX76E	398	7	17.3				438	6	150	0.89			
LF-UD-1															
1/26/2005	XX	LFUD1X119	317	7.9	5.2				300	6	115	0.1			
2/24/2005	XX	LFUD1X11G	D	D	D				D	D	D	D			
3/29/2005	XX	LFUD1X14H	182	6.3	8.6				337	6	75	0			
4/28/2005	XX	LFUD1X152	H2	H2	H2				H2	H2	H2	H2			
5/11/2005	XX	LFUD1X137	246	6.3	11.9				330	6	135	0			
6/22/2005	XX	LFUD1X17A	287	7.4	13.4				426	6	110	0			
7/27/2005	XX	LFUD1X16F	185	7.1	17.1				309	6	125	1.2			
8/29/2005	XX	LFUD1X1B0	238	7.4	16.6				259	6	100	4.6			
9/21/2005	XX	LFUD1X19D	155	7.6	16.2				294	6	100	1.1			
10/21/2005	XX	LFUD1X1BA	246	8.1	9.1				220	5	110	3.8			
11/21/2005	XX	LFUD1X1BH	218	7	13.2				231	2	100	2.6			
12/27/2005	XX	LFUD1X1C3	256	7.9	2.6				274	5	90	2.2			
1/23/2006	XX	LFUD1X1C8	246	7.5	8				428	6	80	1.2			
2/23/2006	XX	LFUD1X1CD	194	7	8.6				387	5	100	0.4	0.0033		
3/15/2006	XX	LFUD1X1D0	247	7.1	8.1				447	6	85	2.5	0.0033		
4/27/2006	XX	LFUD1X1G1	211	7.6	13.2				363	6	105	2.2	0.00446		
5/24/2006	XX	LFUD1X1E8	247	6.8	13.2				369	6	135	0.7	0.00223		
6/13/2006	XX	LFUD1X1IA	295	6.5	15.1				469	5	140	0	0.0033		
7/25/2006	XX	LFUD1X1H5	256	6.6	18.4				173	6	175	1.2	0.0056		
8/16/2006	XX	LFUD1X20H	248	7.2	16.9				348	4	90	0	0.0022		
9/11/2006	XX	LFUD1X1JI	211	7.2	14.7				279	6	100	1.2	0.0011		
10/19/2006	XX	LFUD1X213	280	7.5	14.3				236	6	150	0			
11/21/2006	XX	LFUD1X219	249	8	7.4				221	4	115	2	0.0045		
12/5/2006	XX	LFUD1X21E	266	8.3	7.2				312	3	100	4	0.0045		
1/24/2007	XX	LFUD1X247	373	6.3	7.5				295	2	105	1.3	0.0067		
2/22/2007	XX	LFUD1X255	340	7.2	6.8				217	6	75	0	0.0033		
3/21/2007	XX	LFUD1X25C	102	7.4	9.4				299	6	115	0.2	0.0022		
4/26/2007	XX	LFUD1X25J	375	7.4	12.8				229	5	135	1	0.0033		

SUMMARY REPORT

Field Data

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-UD-1)

Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs
5/16/2007	XX	LFUD1X235	302	6.7	10.2				335	5	140	1	0.0011
6/21/2007	XX	LFUD1X289	264	6.3	16.8				382	6	130	1.8	0.0022
7/25/2007	XX	LFUD1X279	353	7.6	18.6				302	6	195	2.6	0.0022
8/16/2007	XX	LFUD1X2AJ	305	6.9	17.3				289	6	140	0.2	0.0006
9/12/2007	XX	LFUD1X29J	I	I	I				I	I	I	I	I
10/24/2007	XX	LFUD1X2B5	611	7.9	12.1				235	6	150	0.8	0.0011
11/27/2007	XX	LFUD1X2BB	359	7.3	9.7				324	6	125	0.8	0.0022
12/18/2007	XX	LFUD1X2BH	360	7.9	7.4				294	6	110	1.2	0.0006
1/9/2008	XX	LFUD1X2C3	261	6.6	10.4				273	6	145	0.8	0.0022
2/25/2008	XX	LFUD1X2EF	317	6.8	5.1				374	5	120	3.6	0.0022
3/13/2008	XX	LFUD1X2F1	279	7.2	0.6				352	6	115	4.9	0.0022
4/17/2008	XX	LFUD1X2F7	459	7.3	13.6				305	5	115	1.1	0.0022
5/20/2008	XX	LFUD1X2DD	304	7.4	12.2				400	6	150	0.8	0.0022
6/9/2008	XX	LFUD1X2HH	336	7.2	16.1				293	5	100	1.2	0.0022
7/28/2008	XX	LFUD1X2GH	314	6.7	19.2				404	5	185	1.5	0.0022
8/28/2008	XX	LFUD1X307	438	7.3	21.9				376	5	160	1.2	0.0006
9/25/2008	XX	LFUD1X30D	295	6.7	16.7				239	6	100	0.9	0.0006
10/28/2008	XX	LFUD1X2J7	300	7.3	13.5				298	8	135	0	0.0004
11/17/2008	XX	LFUD1X30J	324	8.1	11.1				365	5	120	0.5	0.0017
12/23/2008	XX	LFUD1X315	328	7.3	8.7				208	6	175	0.5	0.0022
1/14/2009	XX	LFUD1X33G	280	7.9	5.3				247	6	95	1.2	0.0033
2/2/2009	XX	LFUD1X343	365	7.1	9.4				388	5	110	0.8	0.0011
3/11/2009	XX	LFUD1X34B	283	6.8	9				276	6	145	1.4	0.0017
4/15/2009	XX	LFUD1X32F	371	7.9	11.2				424	5	150	0.5	0.0022
5/28/2009	XX	LFUD1X34J	415	6.8	16.2				264	5	135	4	0.0011
6/23/2009	XX	LFUD1X357	H2	H2	H2				H2	H2	H2	H2	H6
7/8/2009	XX	LFUD1X36J	H2	H2	H2				H2	H2	H2	H2	H6
8/4/2009	XX	LFUD1X381	F6	F6	F6				F6	F6	F6	F6	F6
9/1/2009	XX	LFUD1X38A	H2	H2	H2				H2	H2	H2	H2	H6
10/27/2009	XX	LFUD1X3EE	H2	H2	H2				H2	H2	H2	H2	H6
11/11/2009	XX	LFUD1X3FH	F6	F6	F6				F6	F6	F6	F6	F6
12/8/2009	XX	LFUD1X3G7	F6	F6	F6				F6	F6	F6	F6	F6
1/21/2010	XX	LFUD1X3GJ	F6	F6	F6				F6	F6	F6	F6	F6
2/23/2010	XX	LFUD1X3HB	F6	F6	F6				F6	F6	F6	F6	F6
3/17/2010	XX	LFUD1X3I0	389	6.5	15.4				375	6	150	2.6	0.0006
4/27/2010	XX	LFUD1X3JD	356	7.5	13.4				245	6	160	0.2	0.0011
5/18/2010	XX	LFUD1X40G	F6	F6	F6				F6	F6	F6	F6	F6
6/22/2010	XX	LFUD1X415	F6	F6	F6				F6	F6	F6	F6	F6
7/20/2010	XX	LFUD1X42H	F6	F6	F6				F6	F6	F6	F6	F6
8/30/2010	XX	LFUD1X449	F6	F6	F6				F6	F6	F6	F6	F6
9/28/2010	XX	LFUD1X441	F6	F6	F6				F6	F6	F6	F6	F6
10/19/2010	XX	LFUD1X461	F6	F6	F6				F6	F6	F6	F6	F6
11/11/2010	XX	LFUD1X473	F6	F6	F6				F6	F6	F6	F6	F6
12/16/2010	XX	LFUD1X47J	H2	H2	H2				H2	H2	H2	H2	H2
1/24/2011	XX	LFUD1X47B	356	8	12.8				244	8	485	0	0.0006
2/24/2011	XX	LFUD1X4BG	483	7.1	13.6				310	5	345	2.3	0.0011
3/25/2011	XX	LFUD1X4C6	H2	H2	H2					H2	H2	H2	H2
4/26/2011	XX	LFUD1X4A2	331	7.4	15.4				360	5	240	0.5	0.0022
5/25/2011	XX	LFUD1X4F5	H2	H2	H2				H2	H2	H2	H2	H2
6/20/2011	XX	LFUD1X4FG	H2	H2	H2				H2	H2	H2	H2	H2

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-UD-1) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
7/19/2011	XX	LFUD1X4E0	347	6.7	24.4				290	4	125	0	0.0022		
8/3/2011	XX	LFUD1X4J6	H2	H2	H2				H2	H2	H2	H2	H2		
10/8/2011	XX	LFUD1X4IE	353	7	23.7				375	6	100	0.1	0.0006		
10/25/2011	XX	LFUD1X4HF	368	6.8	17.7				311	6	200	4.5	0.0006		
11/30/2011	XX	LFUD1X509	349	7.6	17.6				361	5	115	0.56	0.0006		
12/29/2011	XX	LFUD1X4JH	337	8	14.2				324	6	115	0.1	0.0011		
1/26/2012	XX	LFUD1X589	173	7.5	13.7				371	8	150	2.03	0.0006		
2/24/2012	XX	LFUD1X591	382	7.4	15.3				371	5	150	2.23	0.0006		
3/23/2012	XX	LFUD1X59C	349	7.2	16.7				399	6	150	0.22	0.0003		
4/16/2012	XX	LFUD1X5A3	359	7	17.3				387	6	150	0.04	0.0006		
4/24/2012	XX	LFUD1X525	H2	H2	H2				H2	H2	H2	H2	H2		
5/3/2012	XX	LFUD1X5AE	364	7	16.7				438	8	150	0.79	0.0006		
6/29/2012	XX	LFUD1X5B5	338	6.6	21.4				427	6	125	0.64	0.0006		
7/24/2012	XX	LFUD1X574	355	6.5	20.4				316	6	200	1.8	0.0022		
7/31/2012	XX	LFUD1X5BG	375	7.1	24.1				341	8	160	0.17	0.0003		
8/31/2012	XX	LFUD1X5EH	384	6.7	21.1				343	5	135	0.32	0.0003		
9/27/2012	XX	LFUD1X5F8	317	8.1	18.6				375	6	125	0.01	0.0003		
10/23/2012	XX	LFUD1X5DF	F6	F6	F6				F6	F6	F6	F6	F6		
11/13/2012	XX	LFUD1X5FJ	288	8	14.8				362	6	135	0.87			
12/31/2012	XX	LFUD1X5GA	290	7.7	10.6				409	8	120	0.72			
1/30/2013	XX	LFUD1X606	295	7.1	13.3				380	6	125	0.65	0.0002		
2/15/2013	XX	LFUD1X5JE	298	7.5	10				404	6	145	0.7	0.0002		
3/28/2013	XX	LFUD1X60J	291	8.1	14.1				359	8	150	0.41	0.0002		
4/23/2013	XX	LFUD1X5I6	358	7.5	16.1				270	5	100	1.1	0.0022		
4/24/2013	XX	LFUD1X61B	230	7.1	14.6				331	8	150	0.28	0.0002		
5/30/2013	XX	LFUD1X623	240	7.5	25.9				342	8	125	0.16	0.0003		
6/26/2013	XX	LFUD1X62F	308	7.8	19.5				366	8	175	0.81	0.0003		
7/30/2013	XX	LFUD1X64B	362	6.8	21.5				262	6	100	0.9	0.0022		
8/20/2013	XX	LFUD1X695	348	7	23.6				388	6	125	0.75	0.0001		
9/26/2013	XX	LFUD1X68D	334	7.9	18.1				420	8	125	0.65	0.0003		
10/29/2013	XX	LFUD1X674	F6	F6	F6				F6	F6	F6	F6	F6		
11/25/2013	XX	LFUD1X69I	H8	H8	H8				H8	H8	H8	H8	H8		
12/17/2013	XX	LFUD1X6CI	317	7.5	8.8				334	10	160	3.52	0.0002		
1/24/2014	XX	LFUD1X6DA	325	8	6.2				284	10	150	1.3	0.0003		
2/24/2014	XX	LFUD1X6H7	355	7.3	9.1				400	10	160	0.96	0.0003		
3/27/2014	XX	LFUD1X6GF	311	8.2	8.2				362	10	175	3.15	0.0004		
4/22/2014	XX	LFUD1X6F7	388	6.9	13.2				524	5	120	2.2	0.0017		
4/29/2014	XX	LFUD1X6HJ	310	8.1	15.7				324	10	175	1.78	0.0006		
5/23/2014	XX	LFUD1X70I	350	7.4	20				357	10	175	0.4	0.0003		
6/24/2014	XX	LFUD1X71A	369	7	20.6				371	8	170	0.27	0.0004		
7/29/2014	XX	LFUD1X6JE	368	7	21				337	5	40	8.1	0.0022		
8/26/2014	XX	LFUD1X74A	366	7.2	23.1				385	7	175	0.29	0.0006		
9/23/2014	XX	LFUD1X751	360	7.6	22.6				353		160	0.05	0.0001		
10/21/2014	XX	LFUD1X735	F6	F6	F6				F6	F6	F6	F6	F6		
11/28/2014	XX	LFUD1X75D	341	7	15.8				383	7	160	M	0.0006		
12/24/2014	XX	LFUD1X766	337	6.9	16.1				413	7	150	0.28	0.0007		
LF-UD-2															
1/26/2005	XX	LFUD2X11A	286	7.8	6.8				246	5	110	0			
2/24/2005	XX	LFUD2X11H	D	D	D				D	D	D	D			

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-UD-2)

Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
3/29/2005	XX	LFUD2X14I	182	6.3	8.6				337	6	75	0			
4/28/2005	XX	LFUD2X153	H2	H2	H2				H2	H2	H2	H2			
5/11/2005	XX	LFUD2X138	193	6.8	14.6				306	8	145	0			
6/22/2005	XX	LFUD2X17B	265	7.5	14.4				240	6	135	1.2			
7/27/2005	XX	LFUD2X16G	187	7.5	18				320	6	125	1.2			
8/29/2005	XX	LFUD2X1B1	221	7.2	15.4				256	6	105	0.9			
9/21/2005	XX	LFUD2X19E	291	7.7	16.5				287	6	110	1.2			
10/21/2005	XX	LFUD2X1B6	225	8.3	9.8				210	5	105	2.4			
11/21/2005	XX	LFUD2X1BD	209	7.1	12.9				298	3	125	1.8			
12/27/2005	XX	LFUD2X1BJ	235	7.8	2.4				287	5	100	2.1			
1/23/2006	XX	LFUD2X1C4	218	7.6	9.7				413	6	95	1.3			
2/23/2006	XX	LFUD2X1C9	237	7.6	10.2				377	5	105	0.2	0.0067		
3/15/2006	XX	LFUD2X1CG	232	7.5	10.3				423	5	110	1.3	0.0067		
4/27/2006	XX	LFUD2X1FH	234	7.1	10.5				366	6	125	2.2	0.00668		
5/24/2006	XX	LFUD2X1E9	204	7.1	15.2				403	6	120	0.8	0.00446		
6/13/2006	XX	LFUD2X1I6	231	6.9	16.4				485	6	125	0	0.0067		
7/25/2006	XX	LFUD2X1H6	235	7	19.3				187	6	160	1.4	0.0067		
8/16/2006	XX	LFUD2X20I	230	7.4	18.3				377	5	80	0	0.0056		
9/11/2006	XX	LFUD2X1JJ	134	7.3	16				255	6	115	0.8	0.0022		
10/19/2006	XX	LFUD2X214	301	7.4	14.7				244	6	130	0.2			
11/21/2006	XX	LFUD2X21A	246	8.3	11				208	2	100	0	0.0056		
12/5/2006	XX	LFUD2X21F	274	8.3	10.1				214	4	100	2	0.0067		
1/24/2007	XX	LFUD2X248	305	6	3.8				336	4	100	2	0.0056		
2/22/2007	XX	LFUD2X256	288	7.8	6.9				219	5	80	0	0.0056		
3/21/2007	XX	LFUD2X25D	154	6.8	10.6				297	5	85	0.3	0.0022		
4/26/2007	XX	LFUD2X260	250	7.9	16.7				202	6	110	0.6	0.0045		
5/16/2007	XX	LFUD2X236	246	7.6	12.6				380	6	120	0.3	0.0033		
6/21/2007	XX	LFUD2X28A	217	6.5	19.1				353	6	120	1.8	0.0045		
7/25/2007	XX	LFUD2X27A	274	7.5	18.7				221	6	155	1.2	0.0045		
8/16/2007	XX	LFUD2X2B0	252	7.2	18.3				315	6	140	0.5	0.0011		
9/12/2007	XX	LFUD2X2A0	272	8.3	17				265	5	120	1.8	0.0011		
10/24/2007	XX	LFUD2X2B6	377	8.3	12.9				221	6	140	1.2	0.0022		
11/27/2007	XX	LFUD2X2BC	319	7.5	12.3				252	6	140	0.6	0.0045		
12/18/2007	XX	LFUD2X2BI	248	8.1	6.2				302	6	75	1.4	0.0011		
1/9/2008	XX	LFUD2X2C4	174	6.6	11.4				241	6	130	0.9	0.0045		
2/25/2008	XX	LFUD2X2EG	249	7.7	9				344	5	105	1	0.0045		
3/13/2008	XX	LFUD2X2F2	243	8	2.2				316	5	80	1.5	0.0045		
4/17/2008	XX	LFUD2X2F8	246	7.3	15.4				311	5	90	0.3	0.0045		
5/20/2008	XX	LFUD2X2DE	253	7.9	14.3				377	6	140	1.2	0.0045		
6/9/2008	XX	LFUD2X2HI	257	7.5	17				294	5	75	0.1	0.0045		
7/28/2008	XX	LFUD2X2GI	254	6.9	20.1				410	5	170	1.1	0.0033		
8/28/2008	XX	LFUD2X308	430	7.9	19.9				353	5	140	1.4	0.0022		
9/25/2008	XX	LFUD2X30E	224	7.1	17.7				216	6	95	0.6	0.0011		
10/29/2008	XX	LFUD2X2J8	231	8.1	13.6				386	6	105	1	0.0022		
11/17/2008	XX	LFUD2X310	253	8	12.3				372	6	120	1	0.0022		
12/23/2008	XX	LFUD2X316	234	7.8	8.7				168	6	100	0.2	0.0045		
1/14/2009	XX	LFUD2X33H	215	8	7.9				303	5	75	1	0.0045 A6		
2/2/2009	XX	LFUD2X344	276	7.4	12.6				388	5	85	1.2	0.0022		
3/11/2009	XX	LFUD2X34C	233	6.8	10.2				308	5	95	1.1	0.0022		
4/15/2009	XX	LFUD2X32G	288	7.7	14.2				446	5	90	0.8	0.0045		

SEVEE & MAHER ENGINEERS, INC.
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CUMBERLAND CENTER, ME 04021

(LF-UD-2)

Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs
5/28/2009	XX	LFUD2X350	331	7.4	18.3				238	6	140	4.8	0.0022
6/23/2009	XX	LFUD2X358	H2	H2	H2				H2	H2	H2	H2	H6
7/8/2009	XX	LFUD2X370	H2	H2	H2				H2	H2	H2	H2	H6
8/4/2009	XX	LFUD2X382	432	6.9	20.2				335	5	220	0.6	0.0022
9/1/2009	XX	LFUD2X38B	H2	H2	H2				H2	H2	H2	H2	H6
10/27/2009	XX	LFUD2X3EF	H2	H2	H2				H2	H2	H2	H2	H6
11/11/2009	XX	LFUD2X3FI	457	7.4	18.7				375	6	120	0.5	0.0033
12/8/2009	XX	LFUD2X3G8	320	8.2	12.6				221	6	130	0.4	0.0045
1/21/2010	XX	LFUD2X3H0	335	7.1	11.2				264	6	110	8.2	0.0056
2/23/2010	XX	LFUD2X3HC	309	8.2	15.1				201	6	155	0.2	0.0056
3/17/2010	XX	LFUD2X3I1	296	6.7	17.6				358	5	145	5.2	0.0078
4/27/2010	XX	LFUD2X3JE	250	8	12.9				248	6	140	0.5	0.0045
5/18/2010	XX	LFUD2X40H	286	7.8	19.1				315	4	100	1.1	0.0056
6/22/2010	XX	LFUD2X416	309	7.8	21.1				305	6	130	0.4	0.0045
7/20/2010	XX	LFUD2X42I	352	8	22.1				343	5	245	2.4	0.0223
8/30/2010	XX	LFUD2X44A	455	7.6	24.2				303	5	220	8.5	0.0011
9/28/2010	XX	LFUD2X442	499	7.2	20.3				340	6	175	0	0.0022
10/19/2010	XX	LFUD2X462	709	6.8	11.7				438	5	160	0	0.0006
11/11/2010	XX	LFUD2X474	323	8.2	13.1				245	4	135	0.5	0.0033
12/16/2010	XX	LFUD2X480	H2	H2	H2				H2	H2	H2	H2	H2
1/24/2011	XX	LFUD2X47C	286	8	12				251	6	350	0	0.0011
2/24/2011	XX	LFUD2X4BH	328	7.6	16.1				321	6	260	0	0.0033
3/25/2011	XX	LFUD2X4C7	H2	H2	H2					H2	H2	H2	H2
4/26/2011	XX	LFUD2X4A3	273	7.7	17.2				325	5	35	0.8	0.0056
5/25/2011	XX	LFUD2X4F6	H2	H2	H2				H2	H2	H2	H2	H2
6/20/2011	XX	LFUD2X4FH	H2	H2	H2				H2	H2	H2	H2	H2
7/19/2011	XX	LFUD2X4E1	277	7.4	23.2				269	5	100	0	0.0045
8/3/2011	XX	LFUD2X4J7	H2	H2	H2				H2	H2	H2	H2	H2
10/8/2011	XX	LFUD2X4IF	291	7.4	24.5				364	6	100	0.1	0.0022
10/25/2011	XX	LFUD2X4HG	302	6.4	18.3				329	6	120	2.7	0.0045
11/30/2011	XX	LFUD2X50A	288	8	19.2				345		100	0.27	0.0022
12/29/2011	XX	LFUD2X4JI	288	8.2	16.3				318	9	110	0.2	0.0022
1/26/2012	XX	LFUD2X58A	297	8	16.8				357	8	115	0.37	0.0011
2/24/2012	XX	LFUD2X592	310	7.3	16.8				273	4	130	0.82	0.0011
3/23/2012	XX	LFUD2X59D	302	7.25	17.9				393	5	125	0.26	0.0011
4/16/2012	XX	LFUD2X5A4	311	7	20.9				391	6	130	0.18	0.0011
4/24/2012	XX	LFUD2X526	H2	H2	H2				H2	H2	H2	H2	H2
5/3/2012	XX	LFUD2X5AF	318	6.9	18.5				458	6	115	0.1	0.0011
6/29/2012	XX	LFUD2X5B6	305	6.8	22.8				444	6	100	0.21	0.0011
7/24/2012	XX	LFUD2X575	316	6.8	22.6				495	5	225	1.5	0.0056
7/31/2012	XX	LFUD2X5BH	345	7.1	28.4				364	8	120	0.01	0.0011
8/31/2012	XX	LFUD2X5EI	368	6.8	22.6				349	6	125	0	0.0011
9/27/2012	XX	LFUD2X5F9	321	8.1	21.3				360	6	150	0.01	0.0006
10/23/2012	XX	LFUD2X5DG	307	7.1	14.3				518	5	100	1.2	0.0045
11/13/2012	XX	LFUD2X5G0	276	8	17.5				346	6	115	0.63	0.0011
12/31/2012	XX	LFUD2X5GB	293	7.7	13.7				399	6	115	0.72	0.0003
1/30/2013	XX	LFUD2X607	186	7	16.4				404	6	85	4.1	0.0022
2/15/2013	XX	LFUD2X5JF	277	7.7	14.3				407	6	135	0.04	0.0022
3/28/2013	XX	LFUD2X610	284	8.2	18.2				352	8	140	0.35	0.0006
4/23/2013	XX	LFUD2X5I7	304	7.4	18.3				285	6	90	1	0.0045

SEVEE & MAHER ENGINEERS, INC.
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CUMBERLAND CENTER, ME 04021

(LF-UD-2) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs
4/24/2013	XX	LFUD2X61C	229	7.1	17.8				349	8	150	0.04	0.0006
5/30/2013	XX	LFUD2X624	234	7.4	24.1				329	8	150	0.32	0.0011
6/26/2013	XX	LFUD2X62G	298	8	21.2				366	8	125	0.58	0.0011
7/30/2013	XX	LFUD2X64C	320	7.1	22.9				196	6	105	0.5	0.0056
8/20/2013	XX	LFUD2X696	348	7	24.8				386	6	135	0.27	0.0011
9/26/2013	XX	LFUD2X68E	338	8.2	20				398	8	120	0.63	0.0022
10/29/2013	XX	LFUD2X675	404	7.3	17.3				260	6	120	0.5	0.0022
11/25/2013	XX	LFUD2X69J	332	8.4	13.4				343	8	125	1.48	0.0011
12/17/2013	XX	LFUD2X6CJ	327	7.4	9.1				366	8	150	0.46	0.0003
1/24/2014	XX	LFUD2X6DB	328	7.3	8.7				307	8	130	3.26	0.0013
2/24/2014	XX	LFUD2X6H8	363	7.5	13.3				387	8	155	0.52	0.0011
3/27/2014	XX	LFUD2X6GG	342	8.4	13.5				346	8	175	3.43	0.0011
4/22/2014	XX	LFUD2X6F8	353	7.2	12.5				514	5	110	2.6	0.0033
4/29/2014	XX	LFUD2X6I0	326	8.3	18.3				320	8	170	0.3	0.0011
5/23/2014	XX	LFUD2X70J	368	7.4	22.1				357	8	160	0.3	0.0011
6/24/2014	XX	LFUD2X71B	391	7.1	22.5				365	7	145	0.28	0.0022
7/29/2014	XX	LFUD2X6JF	361	7.6	21.5				300	6	40	2.6	0.0045
8/26/2014	XX	LFUD2X74B	417	7.2	23.1				386	6	185	0.37	0.0017
9/23/2014	XX	LFUD2X752	411	8	23.1				345		175	0	0.0011
10/21/2014	XX	LFUD2X736	382	7.4	14.4				304	5	70	0.4	0.0022
11/28/2014	XX	LFUD2X75E	382	7.2	14.7				369	5.5	155	M	0.0004
12/24/2014	XX	LFUD2X767	384	6.9	17.7				431	5	125	0.16	0.0022
LF-UD-3A,B													
1/24/2007	XX	LFUD3X24C	482	6.2	7.5				372	4	90	1.8	0.0045
2/22/2007	XX	LFUD3X25A	471	8.3	5				209	5	110	0	0.0022
3/21/2007	XX	LFUD3X25H	249	7	9.7				278	5	135	0.4	0.0017
4/26/2007	XX	LFUD3X264	339	8	14.2				335	6	125	0	0.0045
5/16/2007	XX	LFUD3X246	386	8	11.1				373	6	150	0.3	0.0011
6/21/2007	XX	LFUD3X28E	443	6.8	19.8				300	6	195	2.1	0.0022
7/25/2007	XX	LFUD3X288	F6	F6	F6				F6	F6	F6	F6	F6
8/16/2007	XX	LFUD3X2B4	F6	F6	F6				F6	F6	F6	F6	F6
9/12/2007	XX	LFUD3X2AI	F6	F6	F6				F6	F6	F6	F6	F6
10/24/2007	XX	LFUD3X2BA	F6	F6	F6				F6	F6	F6	F6	F6
11/27/2007	XX	LFUD3X2BG	329	7.7	11.7				247	6	90	0.5	0.0033
12/18/2007	XX	LFUD3X2C2	219	7.8	6.8				356	6	85	1	0.0022
1/9/2008	XX	LFUD3X2C8	126	6.5	9.3				249	6	90	0.6	0.0067
2/25/2008	XX	LFUD3X2F0	294	7.9	7.7				302	5	105	0.8	0.0045
3/13/2008	XX	LFUD3X2F6	236	8.2	7.7				311	5	90	0	0.0056
4/17/2008	XX	LFUD3X2FC	311	7.2	14.9				315	6	190	0.9	0.0022
5/20/2008	XX	LFUD3X2EE	314	8	13.3				337	6	160	1.8	0.0045
6/9/2008	XX	LFUD3X2I2	269	7.4	15.8				288	6	150	1	0.0033
7/28/2008	XX	LFUD3X2HG	D	D	D				D	D	D	D	D
8/28/2008	XX	LFUD3X30C	D	D	D				D	D	D	D	D
9/25/2008	XX	LFUD3X30I	D	D	D				D	D	D	D	D
10/29/2008	XX	LFUD3X306	F6	F6	F6				F6	F6	F6	F6	F6
11/17/2008	XX	LFUD3X314	F6	F6	F6				F6	F6	F6	F6	F6
12/23/2008	XX	LFUD3X31A	D	D	D				D	D	D	D	D
1/14/2009	XX	LFUD3X341	F6	F6	F6				F6	F6	F6	F6	F6
2/2/2009	XX	LFUD3X348	F6	F6	F6				F6	F6	F6	F6	F6

SUMMARY REPORT
Field Data

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-UD-3A,B)

Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs
3/11/2009	XX	LFXXXX34G	F6	F6	F6				F6	F6	F6	F6	F6
4/15/2009	XX	LFXXXX33F	411	8.1	14.8				447	5	200	0.5	0.0033
5/28/2009	XX	LFXXXX354	505	7.7	16.7				94	6	185	5	0.0003
6/23/2009	XX	LFXXXX35C	H2	H2	H2				H2	H2	H2	H2	H6
7/8/2009	XX	LFXXXX37I	H2	H2	H2				H2	H2	H2	H2	H6
8/4/2009	XX	LFXXXX386	401	6.9	19.7				274	6	275	1.8	0.0006
9/1/2009	XX	LFXXXX38F	H2	H2	H2				H2	H2	H2	H2	H6
10/27/2009	XX	LFXXXX3FC	H2	H2	H2				H2	H2	H2	H2	H6
11/11/2009	XX	LFXXXX3G2	F6	F6	F6				F6	F6	F6	F6	F6
12/8/2009	XX	LFUD3A3GC	439	8.4	10.3				215	5	170	0.5	0.0056
1/21/2010	XX	LFUD3A3H4	405	7.5	9.4				248	6	185	1.2	0.0033
2/23/2010	XX	LFUD3A3HG	402	8.2	13.6				215	5	190	0.1	0.0045
3/17/2010	XX	LFUD3A3I5	490	6.6	18.3				340	5	205	1.9	0.0067
4/27/2010	XX	LFXXXX40C	408	7.9	14.3				270	6	160	0.4	0.0045
5/18/2010	XX	LFUD3A411	400	7.9	19.1				315	5	160	0.5	0.0022
6/22/2010	XX	LFUD3A419	F6	F6	F6				F6	F6	F6	F6	F6
7/20/2010	XX	LFXXXX43G	F6	F6	F6				F6	F6	F6	F6	F6
8/30/2010	XX	LFUD3A44D	F6	F6	F6				F6	F6	F6	F6	F6
9/28/2010	XX	LFUD3A445	F6	F6	F6				F6	F6	F6	F6	F6
10/19/2010	XX	LFXXXX46J	F6	F6	F6				F6	F6	F6	F6	F6
11/11/2010	XX	LFUD3A477	565	8.2	14.7				201	5	200	0.6	0.0022
12/16/2010	XX	LFUD3A483	H2	H2	H2				H2	H2	H2	H2	H2
1/24/2011	XX	LFUD3A47F	385	8.1	14.2				255	8	475	0	0.0011
2/24/2011	XX	LFUD3A4C0	453	7.3	17.8				326	6	360	0	0.0022
3/25/2011	XX	LFUD3A4CA	H2	H2	H2					H2	H2	H2	H2
4/26/2011	XX	LFXXXX4B1	370	7.9	17.4				309	5	265	0.5	0.0045
5/25/2011	XX	LFUD3A4F9	H2	H2	H2				H2	H2	H2	H2	H2
6/20/2011	XX	LFUD3A4G0	H2	H2	H2				H2	H2	H2	H2	H2
7/19/2011	XX	LFXXXX4EJ	H2	H2	H2				H2	H2	H2	H2	H2
8/3/2011	XX	LFUD3A4JA	H2	H2	H2				H2	H2	H2	H2	H2
10/8/2011	XX	LFUD3A4II	H8	H8	H8				H8	H8	H8	H8	H8
10/25/2011	XX	LFXXXX4IC	F6	F6	F6				F6	F6	F6	F6	F6
11/30/2011	XX	LFUD3A50D	H8	H8	H8				H8	H8	H8	H8	H8
12/29/2011	XX	LFUD3A501	H8	H8	H8				H8	H8	H8	H8	H8
1/26/2012	XX	LFXXXX58D	H8	H8	H8				H8	H8	H8	H8	
2/24/2012	XX	LFXXXX595	H8	H8	H8				H8	H8	H8	H8	
3/23/2012	XX	LFXXXX59G	F6	F6	F6				F6	F6	F6	F6	
4/16/2012	XX	LFXXXX5A7	F6	F6	F6				F6	F6	F6	F6	
4/24/2012	XX	LFXXXX534	H2	H2	H2				H2	H2	H2	H2	
5/3/2012	XX	LFXXXX5AI	H8	H8	H8				H8	H8	H8	H8	
6/29/2012	XX	LFXXXX5B9	H8	H8	H8				H8	H8	H8	H8	
7/24/2012	XX	LFXXXX581	F6	F6	F6				F6	F6	F6	F6	
7/31/2012	XX	LFXXXX5C0	H8	H8	H8				H8	H8	H8	H8	
8/31/2012	XX	LFXXXX5F1	H8	H8	H8				H8	H8	H8	H8	
9/27/2012	XX	LFXXXX5FC	H8	H8	H8				H8	H8	H8	H8	
10/23/2012	XX	LFXXXX5EC	F6	F6	F6				F6	F6	F6	F6	
11/13/2012	XX	LFXXXX5G3	H8	H8	H8				H8	H8	H8	H8	
12/31/2012	XX	LFXXXX5GE	H8	H8	H8				H8	H8	H8	H8	
1/30/2013	XX	LFXXXX60A	H8	H8	H8				H8	H8	H8	H8	
2/15/2013	XX	LFXXXX5JI	H8	H8	H8				H8	H8	H8	H8	

SEVEE & MAHER ENGINEERS, INC.
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(LF-UD-3A,B) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
3/28/2013	XX	LFXXXX613	H8	H8	H8				H8	H8	H8	H8			
4/23/2013	XX	LFXXXX5J5	F6	F6	F6				F6	F6	F6	F6			
4/24/2013	XX	LFXXXX61F	H8	H8	H8				H8	H8	H8	H8			
5/30/2013	XX	LFXXXX627	H8	H8	H8				H8	H8	H8	H8			
6/26/2013	XX	LFXXXX62J	H8	H8	H8				H8	H8	H8	H8			
7/30/2013	XX	LFXXXX65A	F6	F6	F6				F6	F6	F6	F6			
8/20/2013	XX	LFXXXX699	H8	H8	H8				H8	H8	H8	H8			
9/26/2013	XX	LFXXXX68H	H8	H8	H8				H8	H8	H8	H8			
10/29/2013	XX	LFXXXX67J	F6	F6	F6				F6	F6	F6	F6			
11/25/2013	XX	LFXXXX6A2	H8	H8	H8				H8	H8	H8	H8			
12/17/2013	XX	LFXXXX6D2	H8	H8	H8				H8	H8	H8	H8			
1/24/2014	XX	LFXXXX6DE	H8	H8	H8				H8	H8	H8	H8			
2/24/2014	XX	LFXXXX6HB	H8	H8	H8				H8	H8	H8	H8			
3/27/2014	XX	LFXXXX6GJ	H8	H8	H8				H8	H8	H8	H8			
4/22/2014	XX	LFXXXX6G6	F6	F6	F6				F6	F6	F6	F6			
4/29/2014	XX	LFXXXX6I3	H8	H8	H8				H8	H8	H8	H8			
5/23/2014	XX	LFXXXX712	H8	H8	H8				H8	H8	H8	H8			
6/24/2014	XX	LFXXXX71E	H8	H8	H8				H8	H8	H8	H8			
7/29/2014	XX	LFXXXX708	F6	F6	F6				F6	F6	F6	F6			
8/26/2014	XX	LFXXXX74E	F6	F6	F6				F6	F6	F6	F6			
9/23/2014	XX	LFXXXX755	H8	H8	H8				H8	H8	H8	H8			
10/21/2014	XX	LFXXXX73H	F6	F6	F6				F6	F6	F6	F6			
11/28/2014	XX	LFXXXX75H	H8	H8	H8				H8	H8	H8	H8			
12/24/2014	XX	LFXXXX76A	H8	H8	H8				H8	H8	H8	H8			
LF-UD-4															
3/11/2009	XX	LFXXXX34I	F6	F6	F6				F6	F6	F6	F6	F6		
4/15/2009	XX	LFXXXX34A	366	7.2	13				491	6	120	0.8	0.0033		
5/28/2009	XX	LFXXXX356	F6	F6	F6				F6	F6	F6	F6	F6		
6/23/2009	XX	LFXXXX35E	H2	H2	H2				H2	H2	H2	H2	H6		
7/8/2009	XX	LFXXXX380	H2	H2	H2				H2	H2	H2	H2	H6		
8/4/2009	XX	LFXXXX388	F6	F6	F6				F6	F6	F6	F6	F6		
9/1/2009	XX	LFXXXX38H	H2	H2	H2				H2	H2	H2	H2	H6		
10/27/2009	XX	LFXXXX3FE	H2	H2	H2				H2	H2	H2	H2	H6		
11/11/2009	XX	LFXXXX3G4	562	7.2	20				418	6	110	1.1	0.0045		
12/8/2009	XX	LFUD4X3GE	470	8.3	12.1				218	5	115	0	0.0022		
1/21/2010	XX	LFUD4X3H6	473	7.4	11.1				263	6	125	0	0.0056		
2/23/2010	XX	LFUD4X3HI	406	7.8	14.1				212	5	170	0	0.0078		
3/17/2010	XX	LFUD4X3I7	427	6.9	17.1				322	5	145	2.6	0.0067		
4/27/2010	XX	LFXXXX40E	F6	F6	F6				F6	F6	F6	F6	F6		
5/18/2010	XX	LFUD4X413	371	7.1	18.8				325	4	125	1.1	H6		
6/22/2010	XX	LFUD4X41B	373	7	21.3				321	5	165	0	H6		
7/20/2010	XX	LFXXXX43I	F6	F6	F6				F6	F6	F6	F6	F6		
8/30/2010	XX	LFUD4X44F	464	7.4	23.8				303	6	215	9.1	0.0011		
9/28/2010	XX	LFUD4X447	F6	F6	F6				F6	F6	F6	F6	F6		
10/19/2010	XX	LFXXXX471	F6	F6	F6				F6	F6	F6	F6	F6		
11/11/2010	XX	LFUD4X479	459	7.3	14.7				233	4	125	0.2	H6		
12/16/2010	XX	LFUD4X485	H2	H2	H2				H2	H2	H2	H2	H2		
1/24/2011	XX	LFUD4X47H	H6	H6	H6				H6	H6	H6	H6	H6		
2/24/2011	XX	LFUD4X4C2	H8	H8	H8				H8	H8	H8	H8	H8		

SEVEE & MAHER ENGINEERS, INC.
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CUMBERLAND CENTER, ME 04021

(LF-UD-4)			Specific Conductance	pH	Temperature	Water Level Depth	Water Level Elevation	Well Depth	Corrected Eh	Dissolved Oxygen	Alkalinity (CaCO3) (field)	Turbidity (field)	Flow Rate
Date	Type	Sample ID	µmhos/cm @25°C	Standard Units	Degrees Celcius	Feet	Feet	Feet	mV	mg/L	mg/L	NTU	cfs
3/25/2011	XX	LFUD4X4CC	H2	H2	H2				H2	H2	H2	H2	H2
4/26/2011	XX	LFXXXX4B3	F12	F12	F12				F12	F12	F12	F12	F12
5/25/2011	XX	LFUD4X4FB	H2	H2	H2				H2	H2	H2	H2	H2
6/20/2011	XX	LFUD4X4G2	H2	H2	H2				H2	H2	H2	H2	H2
7/19/2011	XX	LFXXXXHG2	H2	H2	H2				H2	H2	H2	H2	H2
8/3/2011	XX	LFUD4X4JC	H2	H2	H2				H2	H2	H2	H2	H2
10/8/2011	XX	LFUD4X4J0	H2	H2	H2				H2	H2	H2	H2	H2
10/25/2011	XX	LFXXXX4GA	F6	F6	F6				F6	F6	F6	F6	F6
11/30/2011	XX	LFUD4X50F	H2	H2	H2				H2	H2	H2	H2	H2
12/29/2011	XX	LFUD4X503	H2	H2	H2				H2	H2	H2	H2	H2
1/26/2012	XX	LFUD4X58F	H2	H2	H2				H2	H2	H2	H2	H2
2/24/2012	XX	LFUD4X596	H8	H8	H8				H8	H8	H8	H8	H8
3/23/2012	XX	LFUD4X59H	444	7.3	17.3				395	5	200	0.29	0.0006
4/16/2012	XX	LFUD4X5A8	437	7.2	20.7				390	8	200	0.32	0.0011
4/24/2012	XX	LFXXXX536	H2	H2	H2				H2	H2	H2	H2	H2
5/3/2012	XX	LFUD4X5AJ	H2	H2	H2				H2	H2	H2	H2	H2
6/29/2012	XX	LFUD4X5BA	H8	H8	H8				H8	H8	H8	H8	H8
7/24/2012	XX	LFXXXX582	434	6.9	23.2				488	6	300	1.2	0.0045
7/31/2012	XX	LFUD4X5C1	457	7.3	30.7				403	8	140	0.19	0.0006
8/31/2012	XX	LFUD4X5F2	485	6.9	22.6				375	5	200	0.11	0.0006
9/27/2012	XX	LFUD4X5FD	447	7.9	21				375	6	170	0.03	0.0006
10/23/2012	XX	LFXXXX5CA	362	7	16.2				571	5	150	1.6	0.0022
11/13/2012	XX	LFUD4X5G4	387	7.8	17.3				355	6	200	0.85	0.0003
12/31/2012	XX	LFUD4X5GF	416	7.8	12.1				358	6	165	0.49	0.0003
1/30/2013	XX	LFUD4X60B	402	7.3	13.8				437	6	175	0.43	0.0003
2/15/2013	XX	LFUD4X5JJ	H2	H2	H2				H2	H2	H2	H2	H2
3/28/2013	XX	LFUD4X614	H2	H2	H2				H2	H2	H2	H2	H2
4/23/2013	XX	LFXXXX5J6	352	7.3	15.8				272	5	92	1.1	0.0022
4/24/2013	XX	LFUD4X61G	327	7.3	15.5				346	8	205	0.44	0.0006
5/30/2013	XX	LFUD4X628	H2	H2	H2				H2	H2	H2	H2	H2
6/26/2013	XX	LFUD4X630	H2	H2	H2				H2	H2	H2	H2	H2
7/30/2013	XX	LFXXXX65B	F6	F6	F6				F6	F6	F6	F6	F6
8/20/2013	XX	LFUD4X69A	H2	H2	H2				H2	H2	H2	H2	H2
9/26/2013	XX	LFUD4X68I	480	8	17.8				406	8	215	0.41	0.0011
10/29/2013	XX	LFXXXX680	424	7	17.8				322	5	110	0.3	0.0022
11/25/2013	XX	LFUD4X6A3	440	8.2	8.1				380	8	185	0.64	0.0006
12/17/2013	XX	LFUD4X6D3	424	7.5	8.4				413	8	210	1.67	0.0002
1/24/2014	XX	LFUD4X6DF	425	7.5	4.5				345	8	160	0.61	0.0007
2/24/2014	XX	LFUD4X6HC	H8	H8	H8				H8	H8	H8	H8	H8
3/27/2014	XX	LFUD4X6H0	431	8.2	13.7				337	10	250	0.86	0.0004
4/22/2014	XX	LFXXXX6G7	430	6.9	15.4				513	6	200	2.6	0.0022
4/29/2014	XX	LFUD4X6I4	411	8.12	17.2				331	10	250	0.62	0.0003
5/23/2014	XX	LFUD4X713	H2	H2	H2				H2	H2	H2	H2	H2
6/24/2014	XX	LFUD4X71F	H8	H8	H8				H8	H8	H8	H8	H8
7/29/2014	XX	LFXXXX709	F6	F6	F6				F6	F6	F6	F6	F6
8/26/2014	XX	LFUD4X74F	F6	F6	F6				F6	F6	F6	F6	F6
9/23/2014	XX	LFUD4X756	H8	H8	H8				H8	H8	H8	H8	H8
10/21/2014	XX	LFXXXX73I	F6	F6	F6				F6	F6	F6	F6	F6
11/28/2014	XX	LFUD4X75I	H2	H2	H2				H2	H2	H2	H2	H2
12/24/2014	XX	LFUD4X76B	H8	H8	H8				H8	H8	H8	H8	H8

SUMMARY REPORT

Field Data

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-UD-5) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
LF-UD-5															
12/8/2009	XX	LFUD5X3GI	395	8.3	4.2				264	6	125	0.1	0.0067		
1/21/2010	XX	LFUD5X3HA	350	7.6	6.1				309	5	120	0	0.0033		
2/23/2010	XX	LFUD5X3HJ	337	7.9	7				220	6	135	0.4	0.0078		
3/17/2010	XX	LFUD5X3I8	337	7.3	9.5				324	6	130	0.9	0.0056		
4/27/2010	XX	LFXXXX40F	345	7.4	10.1				285	5	130	0.4	0.0045		
5/18/2010	XX	LFUD5X414	349	7.6	12.3				285	5	105	0.2	0.0067		
LF-UD-5and6															
6/22/2010	XX	LFUD5X41C	355	7.7	18.9				328	6	140	6.5	0.0022		
7/20/2010	XX	LFXXXX43J	407	7	19.1				213	6	200	1.5	0.0002		
8/30/2010	XX	LFUD5X44G	470	7.8	23.3				324	6	245	8.1	0.0006		
9/28/2010	XX	LFUD5X448	428	7	18.2				332	6	160	0	0.0033		
10/19/2010	XX	LFXXXX472	652	6.9	10.9				434	5	150	4.2	0.0006		
11/11/2010	XX	LFUD5X47A	440	8.1	10.7				238	4	150	9	0.0022		
12/16/2010	XX	LFUD5X486	472	6.7	8.9				307	6	165	0	0.0022		
1/24/2011	XX	LFUD5X47I	414	8	13.4				275	6	435	0	0.0045		
2/24/2011	XX	LFUD5X4C3	515	7.3	16.1				354	5	375	1.2	0.0022		
3/25/2011	XX	LFUD5X4CD	440	7.6	13.7					8	150	1.5	0.0022		
4/26/2011	XX	LFXXXX4B4	450	6.9	16.8				281	5	415	1.5	0.0033		
5/25/2011	XX	LFUD5X4FC	510 G7	7.4 G7	20.7 G7				367 G7	8 G7	113 G7	18 G7			
6/20/2011	XX	LFUD5X4G3	469	7.2	22.6				382	8	125	15.3			
7/19/2011	XX	LFXXXX4F2	440	7.3	21.9				403	5	175	0	0.0022		
8/3/2011	XX	LFUD5X4JD	458	7.8	21.2				348	8	150	4.3			
10/8/2011	XX	LFUD5X4J1	447	7.7	20.3				358	8	150	11.6			
10/25/2011	XX	LFXXXX4G7	476	7.3	17.8				250	5	240	5.5	0.0028		
11/30/2011	XX	LFUD5X50G	443	7.6	15.7				347		150	6.14			
12/29/2011	XX	LFUD5X504	477	7.9	15.7				333	8	118	2.9			
1/26/2012	XX	LFXXXX58G	473	8.3	11.9				359	8	150	14.95			
2/24/2012	XX	LFXXXX597	460	8.1	15.2				348	5	175	3.16			
3/23/2012	XX	LFXXXX59I	486	7.8	16.6				382	6	190	1.58			
4/16/2012	XX	LFXXXX5A9	467	8	22.8				357	6	200	6.06			
4/24/2012	XX	LFXXXX537	389	7.4	18.8				427	6	95	4.6			
5/3/2012	XX	LFXXXX5B0	491	8	17.4				370	8	160	1.16			
6/29/2012	XX	LFXXXX5BB	473	7.2	23.1				416	6	175	0.55			
7/24/2012	XX	LFXXXX584	482	7.3	22.4				417	6	260	3			
7/31/2012	XX	LFXXXX5C2	500	7.5	23.6				355	6	200	0.13			
8/31/2012	XX	LFXXXX5F3	514	7.3	21.5				317	6	200	0.12			
9/27/2012	XX	LFXXXX5FE	407	7.9	18				354	6	170	30.88			
10/23/2012	XX	LFXXXX5C7	498	7.3	14.5				423	4	160	6.7			
11/13/2012	XX	LFXXXX5G5	378	7.3	16.8				390	7	175	0.2			
12/31/2012	XX	LFXXXX5GG	368	8.3	10.7				303	8	125	1.48	0.0003		
1/30/2013	XX	LFXXXX60C	177	7.5	7.1				447	10	75	9.79			
2/15/2013	XX	LFXXXX600	F	F	F				F	F	F	F	F		
3/28/2013	XX	LFXXXX615	356	8.2	10.3				311	8	170	0.66	0.0002		
4/23/2013	XX	LFXXXX5J7	353	7.8	10.9				237	6	145	2.6	0.0011		
4/24/2013	XX	LFXXXX61H	296	7.6	11.6				344	8	190	0	0.0002		
5/30/2013	XX	LFXXXX629	291	7.4	18.2				368	8	200	0.09	0.0022		
6/26/2013	XX	LFXXXX631	401	8	18.1				338	8	175	0.67	0.0006		

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(LF-UD-5and6)			Specific Conductance	pH	Temperature	Water Level Depth	Water Level Elevation	Well Depth	Corrected Eh	Dissolved Oxygen	Alkalinity (CaCO3) (field)	Turbidity (field)	Flow Rate		
Date	Type	Sample ID	µmhos/cm @25°C	Standard Units	Degrees Celcius	Feet	Feet	Feet	mV	mg/L	mg/L	NTU	cfs		
7/30/2013	XX	LFXXXX65C	319	7.5	20.9				240	6	115	1.7	0.0006		
8/20/2013	XX	LFXXXX69B	H8	H8	H8				H8	H8	H8	H8	H8		
9/26/2013	XX	LFXXXX68J	458	8.1	16				366	6	150	0.63	0.0004		
10/29/2013	XX	LFXXXX681	453	7.2	6.4				412	6	120	0.8	0.0011		
11/25/2013	XX	LFXXXX6A4	369	8.2	12.3				382	6	150	0.34	0.0022		
12/17/2013	XX	LFXXXX6D4	F12	F12	F12				F12	F12	F12	F12	F12		
1/24/2014	XX	LFXXXX6DG	337	7.9	5.7				219	12	175	0.53	0.0003		
2/24/2014	XX	LFXXXX6HD	379	7.6	11.4				365	10	200	0.71	0.0006		
3/27/2014	XX	LFXXXX6H1	348	7.8	10.7				380	10	200	0.33	0.0008		
4/22/2014	XX	LFXXXX6G8	386	7.1	14.5				70	4	145	1.2	0.0006		
4/29/2014	XX	LFXXXX6I5	374	7.7	12.6				343	10	225	0.44	0.0003		
5/23/2014	XX	LFXXXX714	435	7.9	15.9				342	10	250	0.29	0.0003		
6/24/2014	XX	LFXXXX71G	474	7.5	20.1				360	8	240	0.09	0.0004		
7/29/2014	XX	LFXXXX70A	413	7.9	20.7				393	6	35	0.5	0.0022		
8/26/2014	XX	LFXXXX74G	458	7.7	23.3				392	7	225	0.08			
9/23/2014	XX	LFXXXX757	435	8.1	23.4				340		180	0.35	0.0003		
10/21/2014	XX	LFXXXX73J	F6	F6	F6				F6	F6	F6	F6			
11/28/2014	XX	LFXXXX75J	357	7.9	14.1				358	7	180	M	0.0002		
12/24/2014	XX	LFXXXX76C	372	7.2	16.4				436	5.5	180	0.12	0.0003		
LF-UD-6															
2/3/2011	XX	LFXX6X48H	502	7.4	10.4				446	5	163	1	0.0006		
2/24/2011	XX	LFUD6X4C5	640	7.2	12				353	6	88	4.2	0.0045		
3/25/2011	XX	LFUD6X4CE	567	7.2	11.2					6	250	1.8			
4/26/2011	XX	LFUD6X4B6	611	6.9	11.6				191	6	490	1.2			
5/25/2011	XX	LFUD6X4FD	613	7.4	18				348	5	150	3.7			
6/20/2011	XX	LFUD6X4G4	559	7.3	19.4				383	6	125	3.8			
7/19/2011	XX	LFUD6X4F4	529	7	23.1				414	4	200	25.1	0.0022		
8/3/2011	XX	LFUD6X4JE	550	7.2	18.2				389	6	125	23.2			
10/8/2011	XX	LFUD6X4J2	555		18.9				385	6	125	3.2			
10/25/2011	XX	LFUD6X4G9	603	7.1	16.4				296	5	280	1.2	0.0022		
11/30/2011	XX	LFUD6X50H	567	7.2	16.3				367		145	1			
12/29/2011	XX	LFUD6X505	588	7.3	15.1				340	5	225	0.8			
1/26/2012	XX	LFUD6X58H	580	7.4	14.7				379	4	175	5.54			
2/24/2012	XX	LFUD6X598	559	7.3	15.3				375	5	250	27.87			
3/23/2012	XX	LFUD6X59J	556	7.5	16.4				387	5	205	13.84			
4/16/2012	XX	LFUD6X5AA	557	7.2	21.6				381	7	250	2.47			
4/24/2012	XX	LFUD6X539	431	7.4	16.8				490	4	105	4.2			
5/3/2012	XX	LFUD6X5B1	580	7.2	17.2				390	8	260	5.72			
6/29/2012	XX	LFUD6X5BC	611	7.1	19.7				415	6	250	11.23			
7/24/2012	XX	LFUD6X586	675	7	20.3				409	5	360	4	0.0022		
7/31/2012	XX	LFUD6X5C3	733	7.1	20.05				352	6	275	0.3			
8/31/2012	XX	LFUD6X5F4	773	7.1	19.3				329	4	175	0.98			
9/27/2012	XX	LFUD6X5FF	748	7.2	17.2				372	5	165	0.57			
10/23/2012	XX	LFUD6X5C9	762	7.1	13.7				443	5	240	0.8	0.0022		
11/13/2012	XX	LFUD6X5G6	748	7.2	16.8				377	5	250	1.5			
12/31/2012	XX	LFUD6X5GH	720	7.2	14.7				362	6	250	0.82			
1/30/2013	XX	LFUD6X60D	704	7.6	12.5				472	6	250	1.14			
2/15/2013	XX	LFUD6X601	281	7.6	10.6				374	6	110	5.3			
3/28/2013	XX	LFUD6X616	499	7.6	11				330	8	155	1.27			

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(LF-UD-6) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs
4/23/2013	XX	LFUD6X5J9	572	7.3	12.2				234	6	140	5	0.0022
4/24/2013	XX	LFUD6X61I	467	7.7	12.2				351	8	225	0.87	
5/30/2013	XX	LFUD6X62A	525	7.4	18.5				376	6	225	0.26	
6/26/2013	XX	LFUD6X632	809	7.3	16.6				361	6	275	0.26	
7/30/2013	XX	LFUD6X65E	823	7.3	19.5				140	5	235	10.3	0.0022
8/20/2013	XX	LFUD6X69C	919	7.4	21.4				374	6	250	0.65	
9/26/2013	XX	LFUD6X690	899	7.4	16.6				379	6	250	1.14	F14
10/29/2013	XX	LFUD6X683	913	7.7	16.1				422	4	265	2.2	0.0022
11/25/2013	XX	LFUD6X6A5	788	7.6	15.3				396	6	300	0.8	
12/17/2013	XX	LFUD6X6D5	785	7.7	7.6				403	6	225	1.55	
1/24/2014	XX	LFUD6X6DH	F6	F6	F6				F6	F6	F6	F6	
2/24/2014	XX	LFUD6X6HE	685	7.8	11.1				383	8	275	6.68	
3/27/2014	XX	LFUD6X6H2	672	7.7	14.9				339	8	250	13.75	
4/22/2014	XX	LFUD6X6GA	712	7	14.3				479	6	160	1.6	0.0022
4/23/2014	XX	LFXUDX6IA	749	7.43	16.4				369	8	350	8.27	
4/29/2014	XX	LFUD6X6I6	392	8.1	14.6				321	10	155	32.95	
5/23/2014	XX	LFUD6X715	774	7.6	19.6				361	8	350	0.94	
6/24/2014	XX	LFUD6X71H	841	7.7	19.5				353	8	350	0.87	
7/29/2014	XX	LFUD6X70C	803	7.5	19.7				386	5	90	0.7	
8/26/2014	XX	LFUD6X74H	842	7.6	23.1				414	7	385	0.37	
9/23/2014	XX	LFUD6X758	847	7.6	23.3				352		300	1	
10/21/2014	XX	LFUD6X740	767	7.5	16.6				357	6	240	0.4	0.0022
11/28/2014	XX	LFUD6X760	810	7.5	15.7				360	5	260	M	
12/24/2014	XX	LFUD6X76D	847	7.5	16				436	7	325	0.65	
LF-UD-7													
11/30/2011	XX	LFUD7X510	H2	H2	H2				H2	H2	H2	H2	
12/29/2011	XX	LFUD7X508	H2	H2	H2				H2	H2	H2	H2	
1/26/2012	XX	LFUD7X590	H8	H8	H8				H8	H8	H8	H8	
2/24/2012	XX	LFUD7X59B	H8	H8	H8				H8	H8	H8	H8	
3/23/2012	XX	LFUD7X5A2	F6	F6	F6				F6	F6	F6	F6	
4/16/2012	XX	LFUD7X5AD	F6	F6	F6				F6	F6	F6	F6	
4/24/2012	XX	LFUD7X53A	H2	H2	H2				H2	H2	H2	H2	
5/3/2012	XX	LFUD7X5B4	H2	H2	H2				H2	H2	H2	H2	
6/29/2012	XX	LFUD7X5BF	H8	H8	H8				H8	H8	H8	H8	
7/24/2012	XX	LFXXXX587	F6	F6	F6				F6	F6	F6	F6	
7/31/2012	XX	LFUD7X5C6	H8	H8	H8				H8	H8	H8	H8	
8/31/2012	XX	LFUD7X5F7	H8	H8	H8				H8	H8	H8	H8	
9/27/2012	XX	LFUD7X5FI	H8	H8	H8				H8	H8	H8	H8	
10/23/2012	XX	LFXXXX5EF	F6	F6	F6				F6	F6	F6	F6	
11/13/2012	XX	LFUD7X5G9	H8	H8	H8				H8	H8	H8	H8	
12/31/2012	XX	LFUD7X5GJ	H8	H8	H8				H8	H8	H8	H8	
1/30/2013	XX	LFUD7X60F	H8	H8	H8				H8	H8	H8	H8	
2/15/2013	XX	LFUD7X603	H8	H8	H8				H8	H8	H8	H8	
3/28/2013	XX	LFUD7X618	H8	H8	H8				H8	H8	H8	H8	
4/23/2013	XX	LFUD7X5JA	F6	F6	F6				F6	F6	F6	F6	
4/24/2013	XX	LFUD7X620	H8	H8	H8				H8	H8	H8	H8	
5/30/2013	XX	LFUD7X62C	H8	H8	H8				H8	H8	H8	H8	
6/26/2013	XX	LFUD7X634	H8	H8	H8				H8	H8	H8	H8	
7/30/2013	XX	LFUD7X65F	F6	F6	F6				F6	F6	F6	F6	

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(LF-UD-7) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity ($CaCO_3$) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs
8/20/2013	XX	LFUD7X69E	H8	H8	H8				H8	H8	H8	H8	
9/26/2013	XX	LFUD7X692	H8	H8	H8				H8	H8	H8	H8	
10/29/2013	XX	LFUD7X684	F6	F6	F6				F6	F6	F6	F6	
11/25/2013	XX	LFUD7X6A7	H8	H8	H8				H8	H8	H8	H8	
12/17/2013	XX	LFUD7X6D7	H8	H8	H8				H8	H8	H8	H8	
1/24/2014	XX	LFUD7X6DJ	H8	H8	H8				H8	H8	H8	H8	
2/24/2014	XX	LFUD7X6HG	H8	H8	H8				H8	H8	H8	H8	
3/27/2014	XX	LFUD7X6H4	H8	H8	H8				H8	H8	H8	H8	
4/22/2014	XX	LFUD7X6GB	F6	F6	F6				F6	F6	F6	F6	
4/29/2014	XX	LFUD7X6I8	H8	H8	H8				H8	H8	H8	H8	
5/23/2014	XX	LFUD7X717	H8	H8	H8				H8	H8	H8	H8	
6/24/2014	XX	LFUD7X71J	H8	H8	H8				H8	H8	H8	H8	
7/29/2014	XX	LFUD7X70D	F6	F6	F6				F6	F6	F6	F6	
8/26/2014	XX	LFUD7X74J	F6	F6	F6				F6	F6	F6	F6	
9/23/2014	XX	LFUD7X75A	H8	H8	H8				H8	H8	H8	H8	
10/21/2014	XX	LFUD7X741	F6	F6	F6				F6	F6	F6	F6	
11/28/2014	XX	LFUD7X762	H8	H8	H8				H8	H8	H8	H8	
12/24/2014	XX	LFUD7X76F	H8	H8	H8				H8	H8	H8	H8	
LF-UD-8													
1/30/2013	XX	LFUD8X60H	64	7.5	7.1				431	10	50 <	24.35	
2/15/2013	XX	LFUD8X605	F	F	F				F	F	F	F	F
3/28/2013	XX	LFUD8X61A	290	8.1	8.8				350	8	150	0.27	
4/23/2013	XX	LFUD8X5JD	319	7.1	9.9				235	5	145	1.2	0.0011
4/24/2013	XX	LFUD8X622	243	7.1	11.2				359	8	140	0.04	0.0002
5/30/2013	XX	LFUD8X62E	F12	F12	F12				F12	F12	F12	F12	F12
6/26/2013	XX	LFUD8X636	F12	F12	F12				F12	F12	F12	F12	F12
7/30/2013	XX	LFUD8X65G	355	6.8	17.9				269	5	140	0.8	0.0022
8/20/2013	XX	LFUD8X69G	H2	H2	H2				H2	H2	H2	H2	H2
9/26/2013	XX	LFUD8X694	363	7.1	16				568	8	135	0.8	0.0003
10/29/2013	XX	LFUD8X685	407	7	9.6				435	5	140	0.6	0.0011
11/25/2013	XX	LFUD8X6A9	374	7.2	9.9				401	10	165	0.42	0.00003
12/17/2013	XX	LFUD8X6D9	344	7.2	5.9				405	6	185	0.64	0.0002
1/24/2014	XX	LFUD8X6E1	F	F	F				F	F	F	F	F
2/24/2014	XX	LFUD8X6HH	F12	F12	F12				F12	F12	F12	F12	F12
3/27/2014	XX	LFUD8X6H5	F12	F12	F12				F12	F12	F12	F12	F12
4/22/2014	XX	LFUD8X6GC	F12	F12	F12				F12	F12	F12	F12	F12
4/29/2014	XX	LFUD8X6I9	F12	F12	F12				F12	F12	F12	F12	F12
5/23/2014	XX	LFUD8X718	F12	F12	F12				F12	F12	F12	F12	F12
6/24/2014	XX	LFUD8X720	F12	F12	F12				F12	F12	F12	F12	F12
7/29/2014	XX	LFUD8X70E	108	7.8	24				397	5	15	0.8	0.0022
8/26/2014	XX	LFUD8X750	F12	F12	F12				F12	F12	F12	F12	F12
9/23/2014	XX	LFUD8X75B	F6	F6	F6				F6	F6	F6	F6	F6
10/21/2014	XX	LFUD8X742	96	7.9	12.3				332	6	25	2.6	0.0022
11/28/2014	XX	LFUD8X763	F12	F12	F12				F12	F12	F12	F12	F12
12/24/2014	XX	LFUD8X76G	F12	F12	F12				F12	F12	F12	F12	F12
LP-COMP													
10/21/2005	XX	LPXXXX1BB	483	7.5	10.2				222	3	125	1.2	
2/23/2006	XX	LPXXXX1CE	377	7.3	6.5				375	6	125	1.9	

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(LP-COMP) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
6/13/2006	XX	LPCOMX1IB	260	7.3	16.2				371	5	175	1.2			
8/16/2006	XX	LPXXXX212	334	7.3	20.7				289	4	110	0			
12/5/2006	XX	LPXXXX21J	405	8.4	6.6				191	4	135	1.2			
1/24/2007	XX	LPXXXX24D	415	6.7	10.3				433	5	85	0.6			
2/22/2007	XX	LPXXXX25B	419	6.9	7.7				306	5	120	4			
8/1/2011	XX	LPCMPX4JG	315	7.1	21.4				346	6	83	0.1			
10/8/2011	XX	LPCMPX4J5	296	7.2	18.2				377	5	95	1.2			
11/30/2011	XX	LPCMPX50J	296	7.2	10.3				372		90	0.4			
12/29/2011	XX	LPCMPX507	315	7.6	8.3				374	10	110	3.1			
1/26/2012	XX	LPCMPX58J	315	7.6	9.1				371	6	110	1.47			
2/24/2012	XX	LPCMPX59A	323	7.8	13				354	8	125	1.74			
3/23/2012	XX	LPCMPX5A1	320	7.6	15.3				360	6	125	0.39			
4/16/2012	XX	LPCMPX5AC	331	7.3	13.2				377	6	150	0.48			
5/3/2012	XX	LPCMPX5B3	324	7.4	14.3				395	10	120	0.42			
7/31/2012	XX	LPCMPX5C5	355	7	22				363	8	125	0.79			
LP-UD-1															
1/26/2005	XX	LPUD1X11C	D	D	D				D	D	D	D			
2/24/2005	XX	LPUD1X11J	D	D	D				D	D	D	D			
3/29/2005	XX	LPUD1X150	517	6.8	8.3				368	5	125	0			
4/28/2005	XX	LPUD1X155	D	D	D				D	D	D	D			
5/11/2005	XX	LPUD1X139	D	D	D				D	D	D	D			
6/22/2005	XX	LPUD1X17D	D	D	D				D	D	D	D			
7/27/2005	XX	LPUD1X16H	D	D	D				D	D	D	D			
8/29/2005	XX	LPUD1X1B3	D	D	D				D	D	D	D			
9/21/2005	XX	LPUD1X19F	D	D	D				D	D	D	D			
11/21/2005	XX	LPUD1X1BF	D	D	D				D	D	D	D			
12/27/2005	XX	LPUD1X1C1	D	D	D				D	D	D	D			
1/23/2006	XX	LPUD1X1C6	F6	F6	F6				F6	F6	F6	F6			
3/15/2006	XX	LPUD1X1CI	D	D	D				D	D	D	D			
4/27/2006	XX	LPUD1X1FJ	D	D	D				D	D	D	D			
5/24/2006	XX	LPUD1X1EA	D	D	D				D	D	D	D			
6/13/2006	XX	LPUD1X1I8	H5	H5	H5				H5	H5	H5	H5			
7/26/2006	XX	LPUD1X1H7	F6	F6	F6				F6	F6	F6	F6			
8/16/2006	XX	LPUD1X210	H5	H5	H5				H5	H5	H5	H5			
9/11/2006	XX	LPUD1X200	F6	F6	F6				F6	F6	F6	F6			
10/19/2006	XX	LPUD1X216	F6	F6	F6				F6	F6	F6	F6			
11/21/2006	XX	LPUD1X21C	D	D	D				D	D	D	D			
12/5/2006	XX	LPUD1X21H	H5	H5	H5				H5	H5	H5	H5			
1/24/2007	XX	LPUD1X24A	H5	H5	H5				H5	H5	H5	H5			
2/22/2007	XX	LPUD1X258	H5	H5	H5				H5	H5	H5	H5			
3/21/2007	XX	LPUD1X25F	F6	F6	F6				F6	F6	F6	F6			
4/26/2007	XX	LPUD1X262	F6	F6	F6				F6	F6	F6	F6			
5/16/2007	XX	LPUD1X237	F6	F6	F6				F6	F6	F6	F6			
6/21/2007	XX	LPUD1X28C	F6	F6	F6				F6	F6	F6	F6			
7/25/2007	XX	LPUD1X27B	F6	F6	F6				F6	F6	F6	F6			
8/16/2007	XX	LPUD1X2B2	F6	F6	F6				F6	F6	F6	F6			
9/12/2007	XX	LPUD1X2A1	F6	F6	F6				F6	F6	F6	F6			
10/24/2007	XX	LPUD1X2B8	F6	F6	F6				F6	F6	F6	F6			
11/27/2007	XX	LPUD1X2BE	F6	F6	F6				F6	F6	F6	F6			

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(LP-UD-1) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
12/18/2007	XX	LPUD1X2C0	F6	F6	F6				F6	F6	F6	F6			
1/9/2008	XX	LPUD1X2C6	F6	F6	F6				F6	F6	F6	F6			
2/25/2008	XX	LPUD1X2EI	F6	F6	F6				F6	F6	F6	F6			
3/13/2008	XX	LPUD1X2F4	F6	F6	F6				F6	F6	F6	F6			
4/17/2008	XX	LPUD1X2FA	F6	F6	F6				F6	F6	F6	F6			
5/20/2008	XX	LPUD1X2DF	F6	F6	F6				F6	F6	F6	F6			
6/9/2008	XX	LPUD1X2I0	F6	F6	F6				F6	F6	F6	F6			
7/28/2008	XX	LPUD1X2GJ	D	D	D				D	D	D	D			
8/28/2008	XX	LPUD1X30A	D	D	D				D	D	D	D			
9/25/2008	XX	LPUD1X30G	F6	F6	F6				F6	F6	F6	F6			
10/29/2008	XX	LPUD1X2J9	F6	F6	F6				F6	F6	F6	F6			
11/17/2008	XX	LPUD1X312	F6	F6	F6				F6	F6	F6	F6			
12/23/2008	XX	LPUD1X318	D	D	D				D	D	D	D			
1/14/2009	XX	LPUD1X33J	F6	F6	F6				F6	F6	F6	F6			
2/2/2009	XX	LPUD1X346	F6	F6	F6				F6	F6	F6	F6			
3/11/2009	XX	LPUD1X34E	F6	F6	F6				F6	F6	F6	F6			
4/15/2009	XX	LPUD1X32H	F6	F6	F6				F6	F6	F6	F6			
5/28/2009	XX	LPUD1X352	F6	F6	F6				F6	F6	F6	F6			
6/23/2009	XX	LPUD1X35A	F6	F6	F6				F6	F6	F6	F6			
7/8/2009	XX	LPUD1X371	F6	F6	F6				F6	F6	F6	F6			
8/4/2009	XX	LPUD1X384	F6	F6	F6				F6	F6	F6	F6			
9/1/2009	XX	LPUD1X38D	F6	F6	F6				F6	F6	F6	F6			
10/27/2009	XX	LPUD1X3EG	F6	F6	F6				F6	F6	F6	F6			
11/11/2009	XX	LPUD1X3G0	F6	F6	F6				F6	F6	F6	F6			
12/8/2009	XX	LPUD1X3GA	F6	F6	F6				F6	F6	F6	F6			
1/21/2010	XX	LPUD1X3H2	F6	F6	F6				F6	F6	F6	F6			
2/23/2010	XX	LPUD1X3HE	F6	F6	F6				F6	F6	F6	F6			
3/17/2010	XX	LPUD1X3I3	F6	F6	F6				F6	F6	F6	F6			
4/27/2010	XX	LPUD1X3JF	F6	F6	F6				F6	F6	F6	F6			
5/18/2010	XX	LPUD1X40J	F6	F6	F6				F6	F6	F6	F6			
6/22/2010	XX	LPUD1X417	F6	F6	F6				F6	F6	F6	F6			
7/20/2010	XX	LPUD1X42J	F6	F6	F6				F6	F6	F6	F6			
8/30/2010	XX	LPUD1X44B	F6	F6	F6				F6	F6	F6	F6			
9/28/2010	XX	LPUD1X443	F6	F6	F6				F6	F6	F6	F6			
10/19/2010	XX	LPUD1X463	F6	F6	F6				F6	F6	F6	F6			
11/11/2010	XX	LPUD1X475	F6	F6	F6				F6	F6	F6	F6			
12/16/2010	XX	LPUD1X481	F6	F6	F6				F6	F6	F6	F6			
1/24/2011	XX	LPUD1X47D	F6	F6	F6				F6	F6	F6	F6			
2/24/2011	XX	LPUD1X4BI	F6	F6	F6				F6	F6	F6	F6			
3/25/2011	XX	LPUD1X4C8	F6	F6	F6				F6	F6	F6	F6			
4/26/2011	XX	LPUD1X4A4	F6	F6	F6				F6	F6	F6	F6			
5/25/2011	XX	LPUD1X4F7	F6	F6	F6				F6	F6	F6	F6			
6/20/2011	XX	LPUD1X4FI	F6	F6	F6				F6	F6	F6	F6			
7/19/2011	XX	LPUD1X4E2	F6	F6	F6				F6	F6	F6	F6			
8/1/2011	XX	LPUD1X4J8	H9	H9	H9				H9	H9	H9	H9			
10/8/2011	XX	LPUD1X4IG	H9	H9	H9				H9	H9	H9	H9			
10/25/2011	XX	LPUD1X4HH	F6	F6	F6				F6	F6	F6	F6			
11/30/2011	XX	LPUD1X50B	H9	H9	H9				H9	H9	H9	H9			
12/29/2011	XX	LPUD1X4JJ	H9	H9	H9				H9	H9	H9	H9			
1/26/2012	XX	LPUD1X58B	H9	H9	H9				H9	H9	H9	H9			

SUMMARY REPORT
Field Data

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(LP-UD-1) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
2/24/2012	XX	LPUD1X593	H9	H9	H9				H9	H9	H9	H9			
3/23/2012	XX	LPUD1X59E	H9	H9	H9				H9	H9	H9	H9			
4/16/2012	XX	LPUD1X5A5	H5	H5	H5				H5	H5	H5	H5			
4/24/2012	XX	LPUD1X527	F6	F6	F6				F6	F6	F6	F6			
5/3/2012	XX	LPUD1X5AG	H9	H9	H9				H9	H9	H9	H9			
6/29/2012	XX	LPUD1X5B7	F6	F6	F6				F6	F6	F6	F6			
7/24/2012	XX	LPUD1X576	F6	F6	F6				F6	F6	F6	F6			
7/31/2012	XX	LPUD1X5BI	H9	H9	H9				H9	H9	H9	H9			
8/31/2012	XX	LPUD1X5EJ	F6	F6	F6				F6	F6	F6	F6			
9/27/2012	XX	LPUD1X5FA	F6	F6	F6				F6	F6	F6	F6			
10/23/2012	XX	LPUD1X5DH	F6	F6	F6				F6	F6	F6	F6			
11/13/2012	XX	LPUD1X5G1	F6	F6	F6				F6	F6	F6	F6			
12/31/2012	XX	LPUD1X5GC	F6	F6	F6				F6	F6	F6	F6			
1/30/2013	XX	LPUD1X608	F6	F6	F6				F6	F6	F6	F6			
2/15/2013	XX	LPUD1X5JG	F6	F6	F6				F6	F6	F6	F6			
3/28/2013	XX	LPUD1X611	F6	F6	F6				F6	F6	F6	F6			
4/23/2013	XX	LPUD1X5I8	F6	F6	F6				F6	F6	F6	F6			
4/24/2013	XX	LPUD1X61D	F6	F6	F6				F6	F6	F6	F6			
5/30/2013	XX	LPUD1X625	F6	F6	F6				F6	F6	F6	F6			
6/26/2013	XX	LPUD1X62H	F6	F6	F6				F6	F6	F6	F6			
7/30/2013	XX	LPUD1X64D	F6	F6	F6				F6	F6	F6	F6			
8/20/2013	XX	LPUD1X697	F6	F6	F6				F6	F6	F6	F6			
9/26/2013	XX	LPUD1X68F	F6	F6	F6				F6	F6	F6	F6			
10/29/2013	XX	LPUD1X676	F6	F6	F6				F6	F6	F6	F6			
11/25/2013	XX	LPUD1X6A0	F6	F6	F6				F6	F6	F6	F6			
12/17/2013	XX	LPUD1X6D0	F6	F6	F6				F6	F6	F6	F6			
1/24/2014	XX	LPUD1X6DC	F6	F6	F6				F6	F6	F6	F6			
2/24/2014	XX	LPUD1X6H9	F6	F6	F6				F6	F6	F6	F6			
3/27/2014	XX	LPUD1X6GH	F6	F6	F6				F6	F6	F6	F6			
4/22/2014	XX	LPUD1X6F9	F6	F6	F6				F6	F6	F6	F6			
4/29/2014	XX	LPUD1X6I1	F6	F6	F6				F6	F6	F6	F6			
5/23/2014	XX	LPUD1X710	F6	F6	F6				F6	F6	F6	F6			
6/24/2014	XX	LPUD1X71C	F6	F6	F6				F6	F6	F6	F6			
7/29/2014	XX	LPUD1X6JG	F6	F6	F6				F6	F6	F6	F6			
8/26/2014	XX	LPUD1X74C	F6	F6	F6				F6	F6	F6	F6			
9/23/2014	XX	LPUD1X753	F6	F6	F6				F6	F6	F6	F6			
10/21/2014	XX	LPUD1X737	F6	F6	F6				F6	F6	F6	F6			
11/28/2014	XX	LPUD1X75F	F6	F6	F6				F6	F6	F6	F6			
12/24/2014	XX	LPUD1X768	F12	F12	F12				F12	F12	F12	F12			
LP-UD-2															
1/26/2005	XX	LPUD2X11D	580	7.2	6.2				262	5	165	0			
2/24/2005	XX	LPUD2X120	498	6.6	6.1				260	6	190	0.4			
3/29/2005	XX	LPUD2X151	517	6.8	8.3				368	5	125	0			
4/28/2005	XX	LPUD2X156	414	6.9	6.4				335	6	205	5.1			
5/11/2005	XX	LPUD2X13A	377	6.7	10.2				339	8	200	0			
6/22/2005	XX	LPUD2X17E	411	7.6	13.3				377	6	155	4.1			
7/27/2005	XX	LPUD2X16I	375	6.9	16.2				302	4		0.9			
8/29/2005	XX	LPUD2X1B4	396	6.7	15.6				253	4	125	60			
9/21/2005	XX	LPUD2X19G	374	7.1	15.3				245	6	190	0			

SUMMARY REPORT
Field Data

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LP-UD-2)

Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs
11/21/2005	XX	LPUD2X1BG	353	7.4	11.8				234	5	155	2.1	
12/27/2005	XX	LPUD2X1C2	430	7.1	4.7				273	6	150	2.5	
1/23/2006	XX	LPUD2X1C7	405	7.2	7.2				273	6	180	1.6	
3/15/2006	XX	LPUD2X1CJ	373	6.8	7.9				324	5	100	1.9	
4/27/2006	XX	LPUD2X1G0	332	7.4	7.2				329	6	130	4.6	
5/24/2006	XX	LPUD2X1EB	349	7.5	12.8				249	5	175	1.5	
6/13/2006	XX	LPUD2X1I9	H5	H5	H5				H5	H5	H5	H5	
7/25/2006	XX	LPUD2X1H8	342	6.4	20.8				231	6	165	1	
8/16/2006	XX	LPUD2X211	H5	H5	H5				H5	H5	H5	H5	
9/11/2006	XX	LPUD2X201	372	6.7	14.9				283	6	110	1.3	
10/19/2006	XX	LPUD2X217	352	7.1	13				246	5	130	2.2	
11/21/2006	XX	LPUD2X21D	289	6.9	10.6				224	1	125	0.8	
12/5/2006	XX	LPUD2X21I	H5	H5	H5				H5	H5	H5	H5	
1/24/2007	XX	LPUD2X24B	H5	H5	H5				H5	H5	H5	H5	
2/22/2007	XX	LPUD2X259	H5	H5	H5				H5	H5	H5	H5	
3/21/2007	XX	LPUD2X25G	210	6.9	8.3				357	5	90	0	
4/26/2007	XX	LPUD2X263	352	7	11.4				263	5	135	1.2	
5/16/2007	XX	LPUD2X238	350	6.6	8.9				423	5	170	0.3	
6/21/2007	XX	LPUD2X28D	289	5.9	12.6				330	6	165	2.8	0.0006
7/25/2007	XX	LPUD2X27C	250	7.4	16				359	6	165	3.4	0.0006
8/16/2007	XX	LPUD2X2B3	334	6.7	16				321	6	125	1.8	0.0006
9/12/2007	XX	LPUD2X2A2	350	6.8	16.1				414	6	140	0.8	0.0006
10/24/2007	XX	LPUD2X2B9	464	7	12.1				273	6	125	0.8	0.0006
11/27/2007	XX	LPUD2X2BF	335	7.4	9.7				259	6	110	0.8	0.0006
12/18/2007	XX	LPUD2X2C1	322	7.6	6.6				323	6	115	1.3	0.0006
1/9/2008	XX	LPUD2X2C7	226	6.8	8.6				244	6	135	1.2	0.0033
2/25/2008	XX	LPUD2X2EJ	333	6.9	6.7				368	6	115	1.5	H6
3/13/2008	XX	LPUD2X2F5	309	7.5	2.9				356	5	70	0	H6
4/17/2008	XX	LPUD2X2FB	302	7.3	9.4				311	5	125	0	H6
5/20/2008	XX	LPUD2X2DG	324	7.5	10.6				388	6	145	1.8	0.0033
6/9/2008	XX	LPUD2X2I1	308	7.1	13.6				373	5	100	0	H6
7/28/2008	XX	LPUD2X2H0	306	6.7	23.8				367	4	140	1	H6
8/28/2008	XX	LPUD2X30B	521	7.3	16.5				325	6	120	0.5	0.0006
9/25/2008	XX	LPUD2X30H	273	6.9	15.4				218	5	110	0.3	H6
10/29/2008	XX	LPUD2X2JA	284	7.6	10.1				511	6	115	1.6	0.0089
11/17/2008	XX	LPUD2X313	282	7.6	9.8				342	5	100	1.3	0.0033
12/23/2008	XX	LPUD2X319	283	7.7	6				220	6	80	2	0.0022 A6
1/14/2009	XX	LPUD2X340	277	7.2	3.1				318	6	70	8.3	0.0022 A6
2/2/2009	XX	LPUD2X347	327	7.4	5.4				364	6	115	4.5	0.0011
3/11/2009	XX	LPUD2X34F	257	6.9	4.9				375	5	100	2.6	0.0033
4/15/2009	XX	LPUD2X32I	311	7.1	10.7				520	6	85	0.8	0.0045
5/28/2009	XX	LPUD2X353	380	7	11.6				307	6	135	4.8	0.0022
6/23/2009	XX	LPUD2X35B	296	7.2	13.1				277	5	115	0.6	0.0022
7/8/2009	XX	LPUD2X372	313	7.4	14.1				158	5	125	0	0.0045
8/4/2009	XX	LPUD2X385	311	6.6	18.3				371	6	225	0.9	0.0022
9/1/2009	XX	LPUD2X38E	279	6.6	18.8				319	6	135	0.8	0.0056
10/27/2009	XX	LPUD2X3EH	353	7	10				179	6	50	1.5	0.0045
11/11/2009	XX	LPUD2X3G1	439	7.3	13.6				377	5	100	0.5	0.0045
12/8/2009	XX	LPUD2X3GB	363	7.8	7				230	4	115	0.5	0.0045
1/21/2010	XX	LPUD2X3H3	370	7.5	6.6				301	5	120	0	0.0045

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LP-UD-2)

Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity ($CaCO_3$) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs
2/23/2010	XX	LPUD2X3HF	353	7.5	7.4				210	5	150	0.2	0.0033
3/17/2010	XX	LPUD2X3I4	324	7.3	9.5				291	6	110	0.9	0.0056
4/27/2010	XX	LPUD2X3JG	324	6.7	8.8				274	6	110	0	0.0045
5/18/2010	XX	LPUD2X410	318	7.3	12				336	5	80	0.2	0.0022
6/22/2010	XX	LPUD2X418	379	7.1	14.9				358	5	110	0	0.0045
7/20/2010	XX	LPUD2X430	315	7.2	19.5				385	6	160	5.9	0.0022
8/30/2010	XX	LPUD2X44C	355	7.2	18.5				271	5	165	0.2	0.0006
9/28/2010	XX	LPUD2X444	312	6.9	17.7				295	6	155	0	0.0022
10/19/2010	XX	LPUD2X464	480	7	10.1				407	6	110	0.1	0.0067
11/11/2010	XX	LPUD2X476	317	7.7	8.9				231	4	125	0	0.0045
12/16/2010	XX	LPUD2X482	331	6.9	7.7				307	5	115	0	0.0045
1/24/2011	XX	LPUD2X47E	302	8	10				273	10	350	0	0.0056
2/24/2011	XX	LPUD2X4BJ	341	7.3	8.4				358	6	260	0	0.0056
3/25/2011	XX	LPUD2X4C9	300	7.3	7.5					8	115	0.2	0.0056
4/26/2011	XX	LPUD2X4A5	325	6.9	9.6				337	6	250	1.2	
5/25/2011	XX	LPUD2X4F8	333	7	13				361	8	72.5	0.03	
6/20/2011	XX	LPUD2X4FJ	304	7	18.1				382	8	100	0.6	
7/19/2011	XX	LPUD2X4E3	250	6.7	18.3				294	5	100	0	0.0033
8/1/2011	XX	LPUD2X4J9	F12	F12	F12				F12	F12	F12	F12	F12
10/8/2011	XX	LPUD2X4IH	H5	H5	H5				H5	H5	H5	H5	H5
10/25/2011	XX	LPUD2X4HI	319	7.3	14.9				284	6	140	0	0.0045
11/30/2011	XX	LPUD2X50C	H5	H5	H5				H5	H5	H5	H5	H5
12/29/2011	XX	LPUD2X500	H5	H5	H5				H5	H5	H5	H5	H5
1/26/2012	XX	LPUD2X58C	H5	H5	H5				H5	H5	H5	H5	H5
2/24/2012	XX	LPUD2X594	H5	H5	H5				H5	H5	H5	H5	H5
3/23/2012	XX	LPUD2X59F	H5	H5	H5				H5	H5	H5	H5	H5
4/16/2012	XX	LPUD2X5A6	F6	F6	F6				F6	F6	F6	F6	F6
4/24/2012	XX	LPUD2X528	200	6.9	10.3				409	6	100	2.5	
5/3/2012	XX	LPUD2X5AH	322	7.6	16.6				373	8	130	0.27	
6/29/2012	XX	LPUD2X5B8	287	7	17.21				422	6	100	1.23	0.0006
7/24/2012	XX	LPUD2X577	110	6.7	18.9				468	6	185	3	0.0033
7/31/2012	XX	LPUD2X5BJ	338	7	20.3				360	6	130	0.14	0.0011
8/31/2012	XX	LPUD2X5F0	342	6.6	19				298	7	125	0.23	0.0003
9/27/2012	XX	LPUD2X5FB	196	6.8	17.6				368	6	115	0.39	0.0003
10/23/2012	XX	LPUD2X5DI	272	6.8	14.1				453	4	105	1.3	0.0033
11/13/2012	XX	LPUD2X5G2	272	7.2	12.5				364	6	125	0.36	0.0003
12/31/2012	XX	LPUD2X5GD	286	7.4	7.6				350	8	110	0.64	0.0006
1/30/2013	XX	LPUD2X609	289	7.7	8.7				463	10	125	0.35	0.0003
2/15/2013	XX	LPUD2X5JH	272	7.6	9.6				393	6	130	0.04	0.0003
3/28/2013	XX	LPUD2X612	270	7.9	8.5				300	10	110	0.47	0.0003
4/23/2013	XX	LPUD2X5I9	299	7.1	7.9				238	6	85	1	0.0033
4/24/2013	XX	LPUD2X61E	231	7.6	11.1				343	10	137	0.02	0.0006
5/30/2013	XX	LPUD2X626	216	7.2	18.6				324	10	115	0.19	0.005
6/26/2013	XX	LPUD2X62I	302	7.1	13.5				409	8	150	0.32	0.0045
7/30/2013	XX	LPUD2X64E	304	6.8	18.1				261	6	105	1.1	0.0033
8/20/2013	XX	LPUD2X698	335	6.9	21.3				372	6	125	0.41	0.0045
9/26/2013	XX	LPUD2X68G	337	7.2	15.9				377	8	110	1.08	0.0011
10/29/2013	XX	LPUD2X677	361	7	10.8				366	6	125	0.6	0.0022
11/25/2013	XX	LPUD2X6A1	315	7.4	10.9				381	8	125	0.62	0.0022
12/17/2013	XX	LPUD2X6D1	288	7.6	9.2				357	10		0.44	

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LP-UD-2) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs
1/24/2014	XX	LPUD2X6DD	290	7.5	6.7				343	10	130	0.51	0.0003
2/24/2014	XX	LPUD2X6HA	297	7.6	8				207	10	140	1.91	0.0011
3/27/2014	XX	LPUD2X6GI	296	7.7	10.9				363	12	170	0.48	0.0003
4/22/2014	XX	LPUD2X6FA	305	7.2	9.8				518	5	90	1.2	0.0033
4/29/2014	XX	LPUD2X6I2	298	7.4	11.4				326	11	165	1.84	0.0003
5/23/2014	XX	LPUD2X711	318	7.3	13.9				353	10	140	0.58	0.0006
6/24/2014	XX	LPUD2X71D	369	7.3	20.8				368	8	160	0.39	0.0003
7/29/2014	XX	LPUD2X6JH	300	7	18.3				437	5	30	0.8	0.0056
8/26/2014	XX	LPUD2X74D	329	7	24.9				379	7	200	0.27	0.0003
9/23/2014	XX	LPUD2X754	336	7.3	22.2				367	8	155	0.1	0.0011
10/21/2014	XX	LPUD2X738	280	7.2	13.3				360	5	75	0.4	0.0033
11/28/2014	XX	LPUD2X75G	308	7.3	13				373	7	135	M	0.0007
12/24/2014	XX	LPUD2X769	316	7.3	12.1				374	8	135	0.14	0.0015
MW04-102													
1/18/2005	XX	GW102X10C	240	8.1	4	5.45	164.77		241	6	110	1.2	
3/21/2005	XX	GW102X144	202	7.3	7.8	4.9	165.32		292	5	100	1.4	
7/25/2005	XX	GW102X17I	248	7.7	16.4	6.7	163.52		307	4	125	1.2	
9/20/2005	XX	GW102X1A9	205	7.1	13.7	5.52	164.7	18.02	273	2	105	0.4	
5/23/2006	XX	GW102X1F4	219	7.8	11.9	4.8	165.42		366	3	170	0	
7/25/2006	XX	GW102X1I0	215	7.7	20.1	5.13	165.09		343	3	165	0.8	
9/12/2006	XX	GW102X20D	204	7.9	18.3	5.54	164.68	18.04	351	2	75	0	
5/15/2007	XX	GW102X240	236	7.7	9.8	5.67	164.55		341	4	40	1.5	
7/24/2007	XX	GW102X284	217	8.1	19.4	6.3	163.92		371	2	90	0	
9/11/2007	XX	GW102X2AE	215	7.9	12.9	7.42	162.8	18	271	3	90	0.5	
5/20/2008	XX	GW102X2E8	223	7.3	11	6.05	164.17		287	4	130	0.1	
7/29/2008	XX	GW102X2HC	193	7.9	15.7	5.81	164.41		283	3	95	0.6	
10/27/2008	XX	GW102X302	198	7.8	13.7	5.5	164.72	18	151	3	115	0	
4/14/2009	XX	GW102X339	234	7.7	9	5.47	164.75		353	4	75	0	
7/7/2009	XX	GW102X37D	234	8.1	11.8	5	165.22		310	2	75	0	
10/27/2009	XX	GW102X3F8	236	8.2	10.8	5.27	164.95	17.84	354	4	70	0	
4/27/2010	XX	GW102X407	234	7.8	7.3	5.97	164.25		380	3	60	0.8	
7/21/2010	XX	GW102X43B	245	7.6	18.1	7.58	162.64		180	2	135	2	
10/19/2010	XX	GW102X46F	232	7.9	12.8	5.85	164.37	17.97	231	3	75	0	
4/25/2011	XX	GW102X4AG	249	7.9	11.2	5.02	165.2		335	4	80	0.2	
7/19/2011	XX	GW102X4EE	239	8.1	17.4	6.65	163.57		294	2	85	0.8	
10/25/2011	XX	GW102X4I9	209	8.2	13.1	6.5	163.72	17.85	305	5	95	3.8	
4/24/2012	XX	GW102X52J	227	8.1	9.8	6	164.22		-8	3	120	3.2	
7/24/2012	XX	GW102X57I	230	7.9	15.8	8	162.22		38	3	100	1.4	
10/22/2012	XX	GW102X5E9	221	7.7	14.1	5.78	164.44	17.98	178	3	45	1.5	
4/23/2013	XX	GW102X5J0	220	8.4	7	5.8	164.42		396	3	85	0.9	
7/31/2013	XX	GW102X655	227	7.8	16.1	6.5	163.72		334	3	100	0.8	
10/28/2013	XX	GW102X67F	207	8.3	12.7	7.1	163.12	18.05	306	1	100	1.2	
4/23/2014	XX	GW102X6G1	226	6.2	8.5	5.6	164.62		476	5	75	1.1	
7/30/2014	XX	GW102X704	226	7.6	15.8	6.3	163.92		429	3	105	0.9	
10/21/2014	XX	GW102X73F	196	8.1	12.9	6.58	163.64	18.05	431	2	90	1.6	
MW04-105													
1/17/2005	XX	GW105X10F	435	7.6	7.4	7.31	158.28		170	4	125	0	
3/21/2005	XX	GW105X147	703	6.4	6.7	6.85	158.74		404	2	145	0	

SEVEE & MAHER ENGINEERS, INC.
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CUMBERLAND CENTER, ME 04021

(MW04-105) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity ($CaCO_3$) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
7/25/2005	XX	GW105X181	531	7.3	16.1	8.08	157.51		223	2	230	1.3			
9/20/2005	XX	GW105X1AC	531	6.9	14.4	7.69	157.9	22.83	293	1	145	1.7			
5/23/2006	XX	GW105X1F7	361	6.5	13.8	7.08	158.51		299	1	220	0			
7/25/2006	XX	GW105X1I1	370	6.4	23.8	7.05	158.54		333	2	205	0.9			
9/12/2006	XX	GW105X20E	447	6.1	12.2	6.85	158.74	22.85	344	1	150	1.5			
5/14/2007	XX	GW105X241	343	7	13.3	7.8	157.79		365	3	175	0			
7/24/2007	XX	GW105X285	483	7.2	17.3	8.02	157.57		404	1	135	0			
9/10/2007	XX	GW105X2AF	472	6.8	12.1	8.48	157.11	22.76	213	0.6	240	0			
5/19/2008	XX	GW105X2E9	447	6.8	9.1	8.13	157.46		256	4	210	0.1			
7/29/2008	XX	GW105X2HD	429	6.6	14.6	7.32	158.27		322	1	185	1.2			
10/27/2008	XX	GW105X303	338	7	12.1	7	158.59	22.78	289	0.8	175	0.5			
4/15/2009	XX	GW105X33A	274	6.6	7.7	7.67	157.92		295	2	85	0.9			
7/7/2009	XX	GW105X37E	345	7.3	10.4	5.91	159.68		313	0.8	185	0.2			
10/26/2009	XX	GW105X3F9	528	6.8	10.6	5.8	159.79	22.75	412	3	100	0.6			
4/27/2010	XX	GW105X408	304	6.7	7.7	7.32	158.27		322	0.8	70	0.7			
7/19/2010	XX	GW105X43C	348	6.5	15.6	7.5	158.09		302	0.8	150	0.3			
10/18/2010	XX	GW105X46G	306	7.2	11.5	6.9	158.69	22.75	270	0.6	105	0			
4/26/2011	XX	GW105X4AH	312	7.1	9.6	6.46	159.13		322	1	75	0			
7/18/2011	XX	GW105X4EF	325	6.7	16.7	7.1	158.49		275	0.8	100	0.3			
10/25/2011	XX	GW105X4IA	217	7.7	11.9	6.9	158.69	22.75	339	0.8	85	1.8			
4/23/2012	XX	GW105X530	240	7.4	8.7	7.6	157.99		325	3	160	1.7			
7/24/2012	XX	GW105X57J	299	7.1	13.6	8.6	156.99		-7	0.4	160	1.1			
10/22/2012	XX	GW105X5EA	252	7.2	11.9	6.6	158.99	22.75	281	0.4	70	1.3			
4/24/2013	XX	GW105X5J1	249	6.8	7.1	7.55	158.04		381	1	90	3			
10/29/2013	XX	GW105X68B	286	6.7	11.2	8.43	157.16	22.83	324	0.6	125	1.2			
10/22/2014	XX	GW105X747	322	6.6	10.5	7.28	158.31	22.83	447	0.4	110	0.2			
MW04-109															
1/19/2005	XX	GW109X10I	572	7.8	4.7	10.95	153.64		323	2	260	0			
3/23/2005	XX	GW109X14A	662	7.1	7.8	10.8	153.79		343	2	200	0			
7/26/2005	XX	GW109X184	416	5.5	11.3	11.65	152.94		273	0.8	225	0			
9/20/2005	XX	GW109X1AF	454	7.2	16.2	11.72	152.87	22.9	168	1	165	0			
5/23/2006	XX	GW109X1FA	349	7.1	9.5	10.17	154.42		300	1	138	0			
7/25/2006	XX	GW109X1I2	370	7.1	13.6	10.15	154.44		297	1	150	0			
9/12/2006	XX	GW109X20F	357	6.2	15.9	10.53	154.06	22.92	200	1	150	0			
5/15/2007	XX	GW109X242	385	7.1	6.9	9.8	154.79		207	1	125	0			
7/24/2007	XX	GW109X286	314	6.9	15	10.45	154.14		375	0.4	125	0			
9/10/2007	XX	GW109X2AG	283	7	12.2	11.47	153.12	22.85	200	0.3	88	0			
5/19/2008	XX	GW109X2EA	645	6.8	7.1	9.52	155.07		7	0.3	190	0			
7/29/2008	XX	GW109X2HE	613	6.8	14.6	9.61	154.98		72	0.3	285	0			
10/28/2008	XX	GW109X304	494	7.2	12.8	9.9	154.69	22.9	229	2	260	0.2			
4/15/2009	XX	GW109X33B	551	7.2	6.8	10	154.59		262	0.6	240	0.7			
7/7/2009	XX	GW109X37F	DE	DE	DE	DE			DE	DE	DE	DE			
MW04-109R															
12/8/2009	XX	GW109X3GF	550	7.9	7.9	6.15	153.98	22.98	269	1	210	0			
4/27/2010	XX	GW109X409	402	6.7	9.2	6.35	153.78		286	0.6	125	0			
7/20/2010	XX	GW109X43D	450	6.5	17.2	7.49	152.64		220	0.4	155	0.5			
10/19/2010	XX	GW109X46H	489	7	12.1	6.6	153.53	22.92	209	0.6	155	0			
4/26/2011	XX	GW109X4AI	446	6.6	10.9	6.25	153.88		281	0.6	105	0			

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(MW04-109R) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
7/19/2011	XX	GW109X4EG	423	6.5	21.1	7.25	152.88		259	0.3	130	0.2			
10/25/2011	XX	GW109X4IB	416	7	12.2	6.62	153.51	22.95	360	0.3	145	1.4			
4/24/2012	XX	GW109X531	382	6.6	10.4	6.36	153.77		-478	0.4	240	2.9			
7/24/2012	XX	GW109X580	408	6.5	19.1	7.27	152.86		-155	0.3	140	1			
10/23/2012	XX	GW109X5EB	404	6.6	9.3	6.4	153.73	22.92	241	0.8	160	1.1			
4/23/2013	XX	GW109X5J2	390	6.8	10.2	6.68	153.45		341	1	165	0.3			
7/30/2013	XX	GW109X657	414	6.6	19	6.92	153.21		278	0.6	180	0.2			
10/29/2013	XX	GW109X67G	397	6.3	5.9	7.41	152.72	22.97	327	0.6	220	0.2			
4/22/2014	XX	GW109X6G3	377	6.5	11	6.22	153.91		418	0.8	200	0			
7/29/2014	XX	GW109X705	407	6.6	17.7	6.79	153.34		361	0.3	220	0.9			
10/21/2014	XX	GW109X73G	389	6.7	12.5	7.07	153.06	22.98	412	0.4	220	0			
MW09-901															
12/8/2009	XX	GW901X3GH	300	8.2	5.3	7.95	157.15	22.8	260	2	90	10.1			
4/27/2010	XX	GW901X3J7	241	7.6	10.6	8.86	156.24		328	3	60	2.1			
7/20/2010	XX	GW901X42B	275	7.4	17.5	10.8	154.3		321	0.8	105	2.7			
10/19/2010	XX	GW901X45F	300	7.5	12.8	9.25	155.85	22.75	235	0.6	80	0.3			
4/26/2011	XX	GW901X49G	254	8	9.7	8.6	156.5		355	2	50	1.6			
7/19/2011	XX	GW901X4DE	219	7.9	19.2	10.5	154.6		329	2	75	0.3			
10/25/2011	XX	GW901X4H9	192	8.2	11.7	9.35	155.75	22.75	206	1	70	3.1			
4/24/2012	XX	GW901X51J	189	8.4	11.9	8.6	156.5		183	3	100	3.3			
7/24/2012	XX	GW901X56I	194	7.9	17.2	10.6	154.5		20	2	120	1			
10/23/2012	XX	GW901X5D9	197	7.6	12.2	8.8	156.3	22.73	215	2	100	1.4			
4/23/2013	XX	GW901X5I0	178	8.4	9.8	9.42	155.68		382	4	65	0.1			
7/30/2013	XX	GW901X645	197	7.7	14.3	9.94	155.16		352	4	80	0.4			
10/29/2013	XX	GW901X66I	195	7.3	8.9	10.63	154.47	22.8	312	2	85	1.4			
4/22/2014	XX	GW901X6F1	231	7.4	13.1	8.07	157.03		464	5	85	1.5			
7/29/2014	XX	GW901X6J8	208	7.7	15.8	9.31	155.79		408	4	95	0.8			
10/21/2014	XX	GW901X72J	266	7.6	12.3	9.7	155.4	22.8	401	1	120	0			
MW11-207R															
7/20/2011	XX	GW207X4CH	87	7.9	11.8	12	203.13		337	5	35	1.6			
10/24/2011	XX	GW207X4GC	83	8	11.7	11.5	203.63	44.2	360	5	30	1.7			
4/23/2012	XX	GW207X512	103	8.1	8.1	11.7			313	6	40	3			
7/23/2012	XX	GW207X561	85	7.7	12.7	12.1	203.03		314	5	40	2.5			
10/22/2012	XX	GW207X5CC	88	7.7	12.2	6.57	208.56	44.2	139	6	25	1.7			
4/22/2013	XX	GW207X5H3	83	8	8.4	8.2	206.93		212	6	40	0.5			
7/29/2013	XX	GW207X638	88	7.9	12.8	11.97	203.16		444	8	45	0.2			
10/28/2013	XX	GW207X661	82	8.2	9.9	14.54	200.59	44.11	278	6	40	1.6			
4/21/2014	XX	GW207X6E4	86	8.5	7.8	6.1	209.03		458	6	40	0.4			
7/28/2014	XX	GW207X6IC	89	7.6	11.4	12.3	202.83		460	6	40	1.1			
10/20/2014	XX	GW207X722	89	7.9	9.9	18.6	196.53	44.12	487	5	40	0.7			
MW-204															
5/9/2005	XX	GW204X13E	160	6.8	9.3	8.35	156.4		273	2	100	0			
8/1/2005	XX	GW204X172	211	6.7	14.2	9.23	155.52		302	1	95	0			
9/20/2005	XX	GW204X1A0	325	6.9	16.4	9.68	155.07	24.41	268	3	75	1.5			
5/23/2006	XX	GW204X1EF	235	7	8	9.05	155.7		334	1	135	0.4			
7/24/2006	XX	GW204X1HC	205	6.7	16.7	8.92	155.83		245	1	120	0			
9/11/2006	XX	GW204X205	199	5.7	13.5	9.2	155.55	24.4	223	1	100	0			
5/14/2007	XX	GW204X23C	214	7.1	12.4	9.5	155.25		479	2	100	0.4			

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(MW-204) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
7/23/2007	XX	GW204X27G	254	6.3	16	9.71	155.04		390	2	85	6.7			
9/10/2007	XX	GW204X2A6	301	6.4	14.2	10.65	154.1	24.45	300	1	125	0.4			
5/21/2008	XX	GW204X2E0	340	6.5	9.2	9.72	155.03		309	1	120	0			
7/30/2008	XX	GW204X2H4	220	6.9	15.2	9.52	155.23		358	2	85	0.1			
10/28/2008	XX	GW204X2JE	188	7.4	12.5	9.12	155.63	24.45	437	1	100	4.3			
4/13/2009	XX	GW204X332	214	6.3	8.8	9.1	155.65		442	3	95	0.9			
7/6/2009	XX	GW204X376	223	7.1	13.6	8.4	156.35		334	1	95	1			
10/26/2009	XX	GW204X3F1	309	6.6	10.8	8.7	156.05	24.42	491	5	70	0.8			
4/28/2010	XX	GW204X400	216	6.6	7	9.22	155.53		357	0.6	60	1.6			
7/19/2010	XX	GW204X434	175	6.6	18	9.82	154.93		379	2	110	2			
10/19/2010	XX	GW204X468	200	7.5	12.1	9.32	155.43	24.45	306	0.6	70	0			
4/26/2011	XX	GW204X4A9	193	7.3	9.4	8.74	156.01		328	0.8	50	0.4			
7/19/2011	XX	GW204X4E7	176	6.9	15.1	9.43	155.32		355	1	100	0			
10/26/2011	XX	GW204X4I2	180	7	10.6	9.1	155.65	24.45	328	0.8	55	2.6			
4/24/2012	XX	GW204X52C	192	6.5	9.4	9	155.75		255	1	100	2.7			
7/23/2012	XX	GW204X57B	189	7.2	16	10.15	154.6		258	0.6	80	1.3			
10/24/2012	XX	GW204X5E2	193	7	10.9	9.05	155.7	24.45	228	0.4	100	4.6			
4/24/2013	XX	GW204X5ID	185	6.7	7.2	9.22	155.53		339	1	60	5.5			
10/30/2013	XX	GW204X68A	185	6	10.8	9.95	154.8	24.43	210	0.6	80	1.7			
10/22/2014	XX	GW204X746	192	6.3	11.1	9.45	155.3	24.48	428	0.4	75	0.4			
MW-207															
1/25/2005	XX	GW207X115	143	6.3	4.4	4.92	213.04		307	1		9.2			
5/12/2005	XX	GW207X124	149	7.4	7.7	3.7	214.26		191	1	110	0.7			
8/1/2005	XX	GW207X15C	157	7.5	15.2	4.6	213.36		226	1	75	0			
9/19/2005	XX	GW207X18A	164	7.9	18.8	4.35	213.61	32.83	269	5	120	0			
5/22/2006	XX	GW207X1D5	141	7.5	12.8	3.91	214.05		211	3	100	0			
7/25/2006	XX	GW207X1G2	176	7.7	15.1	4	213.96		176	1	65	0.8			
9/11/2006	XX	GW207X1IF	160	6.6	16	6.59	211.37	32.82	240	1	95	0.6			
5/14/2007	XX	GW207X222	183	7.1	13	6.15	211.81		386	1	85	0.8			
7/25/2007	XX	GW207X266	238	7.5	16.8	8.85	209.11		237	1	95	0			
9/10/2007	XX	GW207X28G	273	6.7	13.6	13.11	204.85	32.6	178	2	115	0			
5/19/2008	XX	GW207X2CA	232	7.4	10.7	5.6	212.36		352	1	130	2			
7/29/2008	XX	GW207X2FE	231	6.8	19.4	6.7	211.26		-23	1	140	0.6			
10/28/2008	XX	GW207X2I4	288	6.3	12.4	6.25	211.71	32.55	174	0.8	160	0.4			
4/13/2009	XX	GW207X31C	508	7.1	8.1	5.25	212.71		87	0.4	155	1			
7/6/2009	XX	GW207X35G	601	6.7	18.2	4.82	213.14		72	1	310	12			
10/26/2009	XX	GW207X3DB	151	6.3	9.2	8.27	209.69	20.1	304	1	130	1.2			
4/26/2010	XX	GW207X3IA	490	6.3	15.3	5.75	212.21		172	1	205	7.9			
7/19/2010	XX	GW207X41E	522	6.3	16.8	14.1	203.86		-15	0.6	275	2.5			
10/18/2010	XX	GW207X44I	538	6.7	9.3	12.87	205.09	32.8	44	0.3	175	0.3			
4/25/2011	XX	GW207X48J	453	6.6	12.7	5.5	212.46		223	0.6	170	3.6			
MW-206															
5/11/2005	XX	GW206X123	129	7.8	14.7	4.13	200.54		332	6	100	0			
7/28/2005	XX	GW206X15B	89	8.6	13.6	5.06	199.61		290	5	85	0.1			
9/19/2005	XX	GW206X189	120	7.1	14	5.8	198.87	23.02	208	6	70	0			
5/24/2006	XX	GW206X1D4	140	6.4	11.8	4.43	200.24		400	6	60	0			
7/25/2006	XX	GW206X1G1	134	7.2	17.5	4.3	200.37		329	6	100	0.9			
9/12/2006	XX	GW206X1IE	146	7.4	14.9	6.92	197.75	23.13	320	6	85	0			

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(MW-206) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
5/14/2007	XX	GW206X221	150	7.5	12.2	5.45	199.22		366	6	90	0			
7/25/2007	XX	GW206X265	156	8	14.7	9.77	194.9		335	6	50	0			
9/11/2007	XX	GW206X28F	137	8.3	11.7	13.5	191.17	23.12	263	6	70	0			
5/20/2008	XX	GW206X2C9	134	8.4	10.7	5.83	198.84		293	5	80	0.5			
7/29/2008	XX	GW206X2FD	129	8.3	15.8	5.84	198.83		212	5	85	0			
10/27/2008	XX	GW206X2I3	129	8	11.6	4.8	199.87	23.08	262	5	85	0			
4/13/2009	XX	GW206X31B	151	8.1	7.3	5.11	199.56		371	6	70	0.4			
7/6/2009	XX	GW206X35F	158	8.4	13.4	5.49	199.18		308	5	60	0.5			
10/28/2009	XX	GW206X3DA	141	8.3	8.5	6.05	198.62	23.08	342	5	30	0.8			
4/26/2010	XX	GW206X3I9	135	7.4	11.2	5.3	199.37		302	5	60	0.3			
7/19/2010	XX	GW206X41D	160	7.4	14	10.4	194.27		227	4	70	1			
10/18/2010	XX	GW206X44H	187	7.7	9.9	6.85	197.82	23.08	20	3	70	1.9			
4/25/2011	XX	GW206X48I	179	7.8	10.7	4.56	200.11		350	3	60	1.4			
7/18/2011	XX	GW206X4CG	169	7.8	16.1	8	196.67		105	2	125	2.9			
10/24/2011	XX	GW206X4GB	148	7.4	12.7	4.67	200	23.1	208	4	105	2.7			
4/23/2012	XX	GW206X511	153	7	8.6	4.41	200.26		-334	4	100	2.7			
7/23/2012	XX	GW206X560	155	7.9	15.7	8.35	196.32		329	6	80	1.3			
10/22/2012	XX	GW206X5CB	157	8.4	11.2	4.55	200.12	23.09	312	6	60	1.8			
4/22/2013	XX	GW206X5H2	141	8.1	8.6	4.8	199.87		317	6	65	0.9			
7/29/2013	XX	GW206X637	146	7.7	12.3	6.78	197.89		464	8	65	0.9			
10/28/2013	XX	GW206X660	135	7.9	10.3	8.05	196.62	23.15	164	6	60	1.5			
4/21/2014	XX	GW206X6E3	135	8.4	11	4.7	199.97		441	5	60	0.4			
7/28/2014	XX	GW206X6IB	170	7.3	14.4	6.95	197.72		366	5	70	0.9			
10/20/2014	XX	GW206X721	142	8.3	9.5	7.8	196.87	23.15	295	6	65	0.9			
P-206A															
7/31/2013	XX	GW206A64I	120	7.6	14.9	21.7	182.81		352	4	50	8.1			
10/28/2013	XX	GW206A67B	126	7.3	9.4	22.9	181.61	93.5	63	3	50	9.3			
4/21/2014	XX	GW206A6FJ	129	7.9	10.9	19.9	184.61		276	3	60	8.6			
7/28/2014	XX	GW206A702	131	7.3	16.3	21.8	182.71		268	2	60	5.4			
10/20/2014	XX	GW206A73B	128	8.1	9.2	25.7	178.81	93.48	325	3	55	1.2			
MW-223A															
5/10/2005	XX	GW223A126	132	7.7	13.8	0.6	175.94		254	3	90	0			
7/26/2005	XX	GW223A15E	167	7.7	11.9	2.04	174.5		258	4	65	0			
9/21/2005	XX	GW223A18C	79	7.5	13.2	1.59	174.95	35.55	405	2	75	0			
5/24/2006	XX	GW223A1D7	200	7.4	9.5	1.1	175.44		300	3	180	0			
7/26/2006	XX	GW223A1G4	174	7.7	13.7	1.25	175.29		367	3	150	0			
9/13/2006	XX	GW223A1IH	191	6.9	12	1.6	174.94	35.65	356	3	85	0			
5/15/2007	XX	GW223A224	208	7.6	6.9	1.57	174.97		369	2	80	0			
7/24/2007	XX	GW223A268	197	7.1	16.2	2.05	174.49		445	3	75	0			
9/11/2007	XX	GW223A28I	190	7.8	10.6	3.5	173.04	35.45	286	2	80	0			
5/20/2008	XX	GW223A2CC	193	7.7	8.5	1.85	174.69		121	2	100	0.1			
7/30/2008	XX	GW223A2FG	198	7.3	14.9	1.87	174.67		388	3	110	0			
10/28/2008	XX	GW223A2I6	189	7.5	13.7	1.35	175.19	35.57	165	2	85	0			
4/14/2009	XX	GW223A31E	355	7	5.6	0.9	175.64		298	1	130	0.5			
7/7/2009	XX	GW223A35I	260	6.7	12	0.71	175.83		319	1	85	0.1			
10/27/2009	XX	GW223A3DD	271	7.3	8.6	1.35	175.19	35.44	360	1	85	0			
4/27/2010	XX	GW223A3IC	297	7.4	7	1.35	175.19		332	1	70	0.9			
7/20/2010	XX	GW223A41G	309	7.1	14.8	3.9	172.64		350	1	125	0.2			

SEVEE & MAHER ENGINEERS, INC.
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CUMBERLAND CENTER, ME 04021

(MW-223A) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
10/19/2010	XX	GW223A450	324	7.5	9	2.2	174.34	35.42	253	2	100	0			
4/26/2011	XX	GW223A491	361	7.4	8.8	0.75	175.79		309	2	115	0.4			
7/19/2011	XX	GW223A4CJ	375	7.5	14.2	2.25	174.29		422	2	110	0.2			
10/25/2011	XX	GW223A4GE	367	7.5	10.8	0.7	175.84	35.56	271	1	95	1.7			
4/24/2012	XX	GW223A514	378	7.8	8	0.4	176.14		-345	1	200	2.2			
7/24/2012	XX	GW223A563	400	7.3	13.4	2.1	174.44		323	1	160	0.6			
10/23/2012	XX	GW223A5CE	390	7.5	8.5	0.5	176.04	35.48	207	1	125	0.8			
4/23/2013	XX	GW223A5H5	439	7.6	4.8	0.31	176.23		255	1	180	0.5			
7/30/2013	XX	GW223A63A	454	7.6	13.4	1.09	175.45		322	1	180	0.1			
10/29/2013	XX	GW223A663	420	7.6	9.3	1.95	174.59	35.56	237	0.8	180	0.3			
4/22/2014	XX	GW223A6E6	453	7.8	6	0.4	176.14		436	0.6	200	0.3			
7/29/2014	XX	GW223A6ID	460	7.5	10.4	1.15	175.39		404	0.4	200	0.5			
10/21/2014	XX	GW223A723	435	7.6	9	2.43	174.11	35.57	367	0.8	200	0.8			
MW-223B															
5/10/2005	XX	GW223B13F	158	7.6	13.3	2	173.93		280	2	130	0.8			
7/26/2005	XX	GW223B173	186	7.7	15.4	4.03	171.9		265	2	60	0.6			
9/21/2005	XX	GW223B1A1	187	7.4	13.7	2.85	173.08	20.1	388	2	105	0			
5/24/2006	XX	GW223B1EG	196	7.4	9.2	2.41	173.52		378	2	120	0.2			
7/26/2006	XX	GW223B1HD	189	7.8	17.7	2.52	173.41		372	2	140	0			
9/13/2006	XX	GW223B206	196	7.3	17.5	2.92	173.01	20.1	373	2	60	0			
5/15/2007	XX	GW223B23D	240	7.4	6.8	2.8	173.13		391	1	70	0.4			
7/24/2007	XX	GW223B27H	224	7.3	14	3.28	172.65		435	1	60	0			
9/11/2007	XX	GW223B2A7	217	7.3	11.8	4.46	171.47	19.93	273	1	100	0.4			
5/20/2008	XX	GW223B2E1	245	7.4	7.9	3.2	172.73		247	1	115	0			
7/30/2008	XX	GW223B2H5	251	7.2	15.3	3.17	172.76		381	0.8	125	1			
10/28/2008	XX	GW223B2JF	242	7.2	13.8	2.6	173.33	20.1	235	1	115	0.6			
4/14/2009	XX	GW223B333	234	7	7	2.5	173.43		271	1	90	0.4			
7/7/2009	XX	GW223B377	281	6.8	10.8	2	173.93		353	1	105	1			
10/27/2009	XX	GW223B3F2	331	7.5	9.7	2.65	173.28	19.95	387	1	90	0			
4/27/2010	XX	GW223B401	306	7.1	6.8	2.67	173.26		393	1	80	1.8			
7/20/2010	XX	GW223B435	343	7	13.1	4.92	171.01		-113	1	120	0.8			
10/19/2010	XX	GW223B469	316	7.4	10	3.45	172.48	20	108	0.8	70	0			
4/26/2011	XX	GW223B4AA	320	7.2	8.5	2.2	173.73		328	1	70	0.2			
7/19/2011	XX	GW223B4E8	336	7.4	13.7	3.7	172.23		357	0.8	75	0.6			
10/25/2011	XX	GW223B4I3	327	7.5	11.3	2.2	173.73	19.93	144	0.4	80	2.5			
4/24/2012	XX	GW223B52D	316	7.1	6.7	1.95	173.98		-402	0.8	180	3.6			
7/24/2012	XX	GW223B57C	338	6.9	12.9	3.8	172.13		173	1	140	1.2			
10/23/2012	XX	GW223B5E3	333	7.5	10.3	2.1	173.83	20.05	238	1	90	0.9			
4/23/2013	XX	GW223B5IE	344	7.3	5.5	2.18	173.75		244	1	95	0.2			
7/30/2013	XX	GW223B64J	363	7.8	13.8	2.77	173.16		318	2	125	0.4			
10/29/2013	XX	GW223B67C	336	7.5	10.8	3.3	172.63	20.07	267	0.8	140	0.1			
4/22/2014	XX	GW223B6FF	370	7.5	6.4	2	173.93		446	1	160	0.6			
7/29/2014	XX	GW223B700	377	7.6	13.3	2.7	173.23		355	0.6	160	0.7			
10/21/2014	XX	GW223B73C	350	7.5	10.4	3.5	172.43	20.07	388	1	160	1.1			
MW-227															
5/9/2005	XX	GW227X127	122	8.2	8.9	3.9	160.33		263	1	100	0			
7/27/2005	XX	GW227X15F	162	7.8	15.4	7.14	157.09		298	1	95	0.3			
9/21/2005	XX	GW227X18D	160	8.7	12.3	4.34	159.89	22.34	239	1	75	1.9			

SUMMARY REPORT
Field Data

SEVEE & MAHER ENGINEERS, INC.
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CUMBERLAND CENTER, ME 04021

(MW-227) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
5/24/2006	XX	GW227X1D8	163	8.3	9.4	4.25	159.98		354	0.8	150	0			
7/26/2006	XX	GW227X1G5	161	8.1	16.8	4.33	159.9		347	1	125	0.3			
9/13/2006	XX	GW227X1II	185	7.7	13.9	4.9	159.33	22.35	341	1	75	0			
5/15/2007	XX	GW227X225	200	7.4	6.4	4.21	160.02		334	1	60	0.2			
7/24/2007	XX	GW227X269	182	7.7	12.6	4.6	159.63		366	0.8	60	0			
9/11/2007	XX	GW227X28J	181	8.4	11.6	6.04	158.19	22.33	262	0.8	70	0.2			
5/20/2008	XX	GW227X2CD	179	7.4	8.3	4.38	159.85		175	2	90	0.3			
7/30/2008	XX	GW227X2FH	187	8.2	15.9	4.36	159.87		310	1	75	0			
10/27/2008	XX	GW227X2I7	174	7.5	11.8	4	160.23	22.33	205	2	100	0			
4/14/2009	XX	GW227X31F	186	7.9	6.2	4.12	160.11		252	2	60	0.6			
7/7/2009	XX	GW227X35J	185	8.3	11.1	3.85	160.38		329	1	70	0.2			
10/27/2009	XX	GW227X3DE	182	8.1	9.7	4.1	160.13	22.2	411	2	55	2.3			
4/27/2010	XX	GW227X3ID	183	7.8	6.3	4.23	160		364	1	50	3.5			
7/20/2010	XX	GW227X41H	185	7.7	13.8	6.65	157.58		180	0.6	70	2.6			
10/19/2010	XX	GW227X451	189	7.9	10.4	4.42	159.81	22.3	191	0.8	50	0.7			
4/26/2011	XX	GW227X492	194	8.1	9.8	4.1	160.13		339	2	70	1.6			
7/19/2011	XX	GW227X4D0	199	8.5	15.6	5.75	158.48		356	1	60	0.2			
10/25/2011	XX	GW227X4GF	188	8.3	11.3	4.05	160.18	22.28	346	0.6	65	3.3			
4/24/2012	XX	GW227X515	186	8.5	6.8	3.64	160.59		-455	2	120	3			
7/24/2012	XX	GW227X564	191	7.8	13.9	6.45	157.78		43	1	80	1.3			
10/23/2012	XX	GW227X5CF	201	7.8	11	4.23	160	22.3	213	0.3	100	1.3			
4/23/2013	XX	GW227X5H6	189	8.5	5.8	4.33	159.9		281	1	85	0.2			
7/30/2013	XX	GW227X63B	192	8.9	15	4.39	159.84		227	0.8	85	0.3			
10/29/2013	XX	GW227X664	177	8.4	10.5	4.65	159.58	22.28	305	1	80	0.7			
4/22/2014	XX	GW227X6E7	187	8.2	8.3	4.2	160.03		388	2	70	0.2			
7/29/2014	XX	GW227X6IE	180	8.3	14.2	4.43	159.8		306	0.8	75	1.3			
10/21/2014	XX	GW227X724	181	8.3	10.7	4.6	159.63	22.3	376	0.8	85	1.2			
MW-301															
5/9/2005	XX	GW301X128	82	8	9	0.6	165.76		236	1	90	0.2			
8/1/2005	XX	GW301X15G	162	7.7	14.6	2.32	164.04		284	2	90	0			
9/22/2005	XX	GW301X18E	152	7.1	16.2	2.73	163.63	184.4	213	2	45	0			
5/22/2006	XX	GW301X1D9	230	8	9.2	4.25	162.11		207	1	120	1			
7/24/2006	XX	GW301X1G6	165	7.4	17.8	4.03	162.33		282	1	105	0.9			
9/11/2006	XX	GW301X1IJ	175	7.2	14.3	3.93	162.43	184.05	285	1	70	3.1			
5/14/2007	XX	GW301X226	187	8.1	12.4	4.7	161.66		386	1	70	1.5			
7/23/2007	XX	GW301X26A	151	7.6	16.8	4.3	162.06		166	2	95	17.8			
9/10/2007	XX	GW301X290	186	7.9	13.9	4.76	161.6	183.75	236	5	75	0.8			
5/19/2008	XX	GW301X2CE	188	8.2	7.4	4.53	161.83		105	1	75	2.4			
7/30/2008	XX	GW301X2FI	178	7.9	16.3	4.4	161.96		339	1	55	0.7			
10/28/2008	XX	GW301X2I8	200	7.8	13.4	4.3	162.06	185.05	200	1	60	0.5			
4/15/2009	XX	GW301X31G	248	7.1	7.4	4.84	161.52		317	1	70	1.3			
7/7/2009	XX	GW301X360	203	8.3	11.4	4.1	162.26		337	1	75	1.4			
10/26/2009	XX	GW301X3DF	276	8.2	9.3	4.25	162.11	185.15	471	4	65	2.6			
4/26/2010	XX	GW301X3IE	183	7.9	14.5	5.2	161.16		284	4	100	4.2			
7/19/2010	XX	GW301X41I	137	7	17.8	5.16	161.2		266	1	105	2.6			
10/19/2010	XX	GW301X452	340	7.3	11.7	4.96	161.4	182.45	427	1	60	0			
4/27/2011	XX	GW301X493	210	8.2	9.3	4.31	162.05		354	1	60	3			
7/20/2011	XX	GW301X4D1	193	8.1	15.7	5.1	161.26		267	1	60	1.1			
10/26/2011	XX	GW301X4GG	204	7.3	9.4	4.11	162.25	185.1	265	0.6	55	5.5			

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CUMBERLAND CENTER, ME 04021

(MW-301) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
4/25/2012	XX	GW301X516	194	8.1	9.5	3.93	162.43		290	0.6	100	7.6			
7/25/2012	XX	GW301X565	202	7.4	13.3	5	161.36		307	0.8	120	1.5			
10/24/2012	XX	GW301X5CG	171	7.2	15.5	4.56	161.8	179.61	448	1	55	8.5			
4/22/2013	XX	GW301X5H7	!	!	!	!			!	!	!	!			
7/31/2013	XX	GW301X63C	209	6.3	16.9	0.04	165.87		367	0.4	60	6.2			
10/30/2013	XX	GW301X665	198	7	7.9	0.1	165.81	184.1	339	0.6	70	3.2			
4/23/2014	XX	GW301X6E8	197	6.2	9.3	F1	165.91		438	1	60	3.1			
7/30/2014	XX	GW301X6IF	201	7.7	14.3	F1	165.91		377	0.4	80	4.3			
10/22/2014	XX	GW301X725	299	6.2	10	0.3	165.61	184.1	397	0.6	75	0.9			
MW-302															
5/10/2005	XX	GW302X13D	149	7.7	14.1	3.78	201.44		232	3	180	0.9			
7/27/2005	XX	GW302X171	324	6.9	17.5	7.76	197.46		196	4	140	2.6			
9/19/2005	XX	GW302X19J	245	6.9	17.7	8.16	197.06	30.35	403	2	140	2.9			
5/23/2006	XX	GW302X1EE	342	7.3	14.5	4.47	200.83		366	3	180	4.5			
7/24/2006	XX	GW302X1HB	336	6.7	16.6	4.89	200.41		220	5	230	1.2			
9/12/2006	XX	GW302X204	351	6.5	11.1	7.27	198.03	30.28	355	2	75	0.4			
5/14/2007	XX	GW302X23B	299	7.1	11.9	5.9	199.4		443	3	100	0.6			
7/25/2007	XX	GW302X27F	505	9.2	14.4	8.41	196.89		344	4	90	0			
9/10/2007	XX	GW302X2A5	DE	DE	DE	DE	DE	DE	DE	DE	DE	DE			
MW-302R															
5/20/2008	XX	GW302X2DJ	246	6.9	8.2	7.3	199.56		223	4	140	3.1			
7/29/2008	XX	GW302X2H3	238	6.6	12.3	8.27	198.59		256	3	140	0.9			
10/27/2008	XX	GW302X2JD	261	6.8	10.9	7.72	199.14	32.25	271	2	75	1.9			
4/13/2009	XX	GW302X331	184	6.2	7.5	5.75	201.11		302	4	80	0.4			
7/6/2009	XX	GW302X375	220	6.2	12	5	201.86		315	3	100	0.9			
10/27/2009	XX	GW302X3F0	470	6.1	9.8	8.46	198.4	32.25	360	1	115	0			
4/26/2010	XX	GW302X3JJ	167	6.4	8.8	7.53	199.33		349	4	135	1.2			
7/19/2010	XX	GW302X433	475	6	13.6	15.91	190.95		291	2	165	0.4			
10/18/2010	XX	GW302X467	502	6.5	11.1	8.05	198.81	32.22	347	1	130	0			
4/25/2011	XX	GW302X4A8	301	6.4	7.8	5.3	201.56		291	1	130	0			
7/18/2011	XX	GW302X4E6	382	6.7	13.3	11.2	195.66		304	2	345	0.2			
10/24/2011	XX	GW302X4I1	400	6.9	11.4	6.6	200.26	32.2	362	2	270	1.5			
4/23/2012	XX	GW302X52B	249	6.7	7.2	9.02	197.84		315	3	220	1.9			
7/23/2012	XX	GW302X57A	355	6.6	12.2	11.25	195.61		241	3	60	1.7			
10/22/2012	XX	GW302X5E1	463	6.8	12.3	4.12	202.74	32.2	319	3	70	1.9			
4/22/2013	XX	GW302X5IC	205	6.7	7.7	7.15	199.71		299	4	180	2.5			
7/29/2013	XX	GW302X64H	350	6.5	11.8	8.39	198.47		546	5	80	0.4			
10/28/2013	XX	GW302X67A	341	6.5	10.9	14.15	192.71	32.22	374	2	180	1.3			
4/21/2014	XX	GW302X6FD	336	6.7	7.1	5.55	201.31		505	3	180	1			
7/28/2014	XX	GW302X6JJ	445	6.6	13.3	9.48	197.38		475	4	180	0.7			
10/20/2014	XX	GW302X73A	500	6.6	11.8	15.75	191.11	32.22	476	1	180	1.4			
MW-303															
5/11/2005	XX	GW303X13H	38	7.2	13	19.75	188.12		290	4	25	0			
8/1/2005	XX	GW303X175	33	7.1	17.5	23.2	184.67		287	5	25	0			
9/19/2005	XX	GW303X1A3	56	7.2	15.2	25.3	182.57	46.93	280	6	35	0			
5/23/2006	XX	GW303X1EI	48	7	9.4	22.5	185.37		426	5	45	0			
7/24/2006	XX	GW303X1HF	53	6.6	12.2	22.45	185.42		239	4	40	0			
9/12/2006	XX	GW303X208	60	7	16.4	23.36	184.51	46.9	302	6	30	0			

SUMMARY REPORT
Field Data

SEVEE & MAHER ENGINEERS, INC.
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CUMBERLAND CENTER, ME 04021

(MW-303) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs	
5/14/2007	XX	GW303X23F	59	7.1	11.3	21.48	186.39		300	5	40	0		
7/25/2007	XX	GW303X27J	67	7	16.6	25.9	181.97		497	5	25	0		
9/11/2007	XX	GW303X2A9	63	6.9	10.5	28.7	179.17	46.85	452	5	20	0		
5/19/2008	XX	GW303X2E3	91	6.7	9	21.18	186.69		381	4	40	0		
7/29/2008	XX	GW303X2H7	97	6.4	13.9	24.82	183.05		329	4	70	0.2		
10/27/2008	XX	GW303X2JH	104	6.6	10.5	26.2	181.67	46.9	303	2	45	0.3		
4/13/2009	XX	GW303X335	158	6.3	7.5	21	186.87		330	3	60	0.2		
7/6/2009	XX	GW303X379	163	6.1	12	21.6	186.27		305	1	85	0.3		
10/28/2009	XX	GW303X3F4	161	6.6	7.8	26.45	181.42	46.8	314	2	40	0		
4/26/2010	XX	GW303X403	196	6.3	13.3	21.6	186.27		340	2	55	0.8		
7/19/2010	XX	GW303X437	201	5.8	14.8	26.8	181.07		245	0.8	75	0.5		
10/18/2010	XX	GW303X46B	175	6.7	10.7	30.9	176.97	46.76	334	2	50	1.5		
4/25/2011	XX	GW303X4AC	223	6	10.9	21.1	186.77		218	1	70	1		
7/18/2011	XX	GW303X4EA	223	6.2	13.3	24.35	183.52		133	0.4	200	1		
10/24/2011	XX	GW303X4I5	222	6.6	10.9	26.4	181.47	46.82	1	0.6	190	3.4		
4/23/2012	XX	GW303X52F	243	6.1	7.1	24.95	182.92		294	0.8	180	5.6		
7/24/2012	XX	GW303X57E	!	!	!	!			!	!	!	!		
MW12-303R														
10/23/2012	XX	GW303X5EG	189	7	10.6	27.47		43.32	236	2	80	9.3		
4/22/2013	XX	GW303X5IG	254	6.7	9.4	25.63	183.37		311	2	110	2		
7/29/2013	XX	GW303X651	253	6.6	12.4	25.98			418	1	105	0.9		
10/28/2013	XX	GW303X67D	223	6.5	10.2	27.43		43.38	353	1	140	2.4		
4/21/2014	XX	GW303X6FH	274	6.6	9.5	24.35			401	1	120	0.6		
7/28/2014	XX	GW303X701	263	6.6	11.7	26.08			411	0.8	160	0.6		
10/20/2014	XX	GW303X73D	440	6.8	10.5	30.08		43.38	447	0.8	180	1		
MW-304A														
5/11/2005	XX	GW304A13C	58	7.3	14.2	23	194.32		297	4	70	0		
7/28/2005	XX	GW304A170	76	7.2	13.8	26.95	190.37		193	4	40	0		
9/19/2005	XX	GW304A19I	80	7	8.7	26.45	190.87	42.45	403	4	45	0		
5/24/2006	XX	GW304A1ED	100	7.8	8.2	27.1	190.21		427	4	80	0		
7/25/2006	XX	GW304A1HA	104	6.8	11	26.95	190.36		311	5	70	2		
9/12/2006	XX	GW304A203	111	6.9	11.9	27.7	189.61	42.4	370	5	60	0		
5/15/2007	XX	GW304A23A	110	7.1	7.9	25.8	191.51		324	5	20	1.3		
7/24/2007	XX	GW304A27E	129	6.8	14.9	29.25	188.06		512	5	45	0.6		
9/11/2007	XX	GW304A2A4	118	7	8.5	30.74	186.57	42.4	468	4	55	0.8		
5/20/2008	XX	GW304A2DI	90	6.9	8	25.3	192.01		286	5	70	0.5		
7/29/2008	XX	GW304A2H2	116	6.5	10.6	28.76	188.55		259	4	45	0.6		
10/27/2008	XX	GW304A2JC	131	6.9	9.2	29.2	188.11	42.26	314	4	40	0.4		
4/13/2009	XX	GW304A330	122	6.9	8.3	25.62	191.69		359	4	50	0.7		
7/6/2009	XX	GW304A374	107	6.3	9.9	26.42	190.89		301	5	40	1		
10/27/2009	XX	GW304A3EJ	122	7.7	8.9	30.08	187.23	42.25	331	3	30	0		
4/26/2010	XX	GW304A3JI	97	6.5	9.9	26.1	191.21		324	4	40	0.4		
7/19/2010	XX	GW304A432	122	6.4	11.6	29.9	187.41		190	4	50	0.4		
10/18/2010	XX	GW304A466	116	7.4	9	32.81	184.5	42.23	250	5	50	9.2		
4/25/2011	XX	GW304A4A7	100	7	9	24.65	192.66		326	4	45	0.5		
7/18/2011	XX	GW304A4E5	106	7.1	11.1	28	189.31		329	6	75	0.4		
10/24/2011	XX	GW304A4I0	125	7.4	9.4	29.65	187.66	42.28	365	4	75	1.3		
4/23/2012	XX	GW304A52A	122	7	7.8	29.3	188.01		200	4	60	1.6		

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(MW-304A) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
7/23/2012	XX	GW304A579	141	7	11.6	28.85	188.46		331	4	60	1			
10/22/2012	XX	GW304A5E0	114	7.3	9.2	29.75	187.56	42.28	260	5	45	1.2			
4/22/2013	XX	GW304A5IB	131	7	8.1	29.65	187.66		307	4	50	0.2			
7/29/2013	XX	GW304A64G	138	6.9	10.7	29.46	187.85		505	5	55	0.3			
10/28/2013	XX	GW304A679	123	7	8.4	30.15	187.16	42.45	357	4	50	1.9			
4/21/2014	XX	GW304A6FC	133	7.6	7.7	28.65	188.66		384	3	60	4.9			
7/28/2014	XX	GW304A6JI	125	6.9	9.6	29.65	187.66		317	4	55	0.7			
10/20/2014	XX	GW304A739	183	7.5	7	32.2	185.11	42.45	343	5	50	1.5			
MW-401A															
5/10/2005	XX	GW401A132	98	8.3	13.3	0.87	155.96		305	5	75	0			
7/28/2005	XX	GW401A16A	108	8.4	11.6	5.85	150.98		375	4	55	0			
9/21/2005	XX	GW401A198	93	8.5	10.3	5.84	150.99	111.92	256	6	85	0			
5/23/2006	XX	GW401A1E3	109	8.5	7.7	1.95	154.88		243	4	70	1.5			
7/25/2006	XX	GW401A1H0	109	8.2	12.7	3.15	153.68		329	3	80	0			
9/12/2006	XX	GW401A1JD	128	8.2	9.1	5.16	151.67	112.05	229	4	45	0			
5/14/2007	XX	GW401A230	118	8.2	7.3	3.57	153.26		341	4	90	0			
7/24/2007	XX	GW401A274	129	7.9	8.9	6.71	150.12		338	5	75	1.2			
9/11/2007	XX	GW401A29E	130	8.1	9.8	8.23	148.6	111.99	245	5	70	0			
5/20/2008	XX	GW401A2D8	123	8.3	7.8	4.15	152.68		243	6	80	0			
7/28/2008	XX	GW401A2GC	123	7.7	11.1	5.7	151.13		321	6	60	0			
10/27/2008	XX	GW401A2J2	112	7.6	9.1	4.75	152.08	112.02	233	5	80	0			
4/13/2009	XX	GW401A32A	73	7.9	7.3	1.3	155.53		470	3	70	0.4			
7/7/2009	XX	GW401A36E	121	7.7	9.3	1.55	155.28		356	6	75	0			
10/28/2009	XX	GW401A3E9	165	8.1	8.1	4.12	152.71	111.98	516	6	100	0			
4/27/2010	XX	GW401A3J8	122	8.3	8.1	4.45	152.38		456	6	45	0			
7/20/2010	XX	GW401A42C	125	7.9	10.3	7.78	149.05		375	4	70	2			
10/20/2010	XX	GW401A45G	191	7.8	8.1	5.52	151.31	112.1	462	5	50	0			
4/25/2011	XX	GW401A49H	132	7.6	8.6	1.6	155.23		320	3	115	0			
7/18/2011	XX	GW401A4DF	142	7.5	11.5	6.15	150.68		403	5	140	0			
10/24/2011	XX	GW401A4HA	128	8.2	10.2	3.62	153.21	112.02	309	6	50	0			
4/23/2012	XX	GW401A520	123	8.3	8.6	4.42	152.41		422	5	50	2.4			
7/23/2012	XX	GW401A56J	126	7.8	12.7	6.03	150.8		394	6	100	4.9			
10/22/2012	XX	GW401A5DA	119	7.1	9.9	0.93	155.9	112.02	452	5	75	0.7			
4/22/2013	XX	GW401A5I1	123	7.9	7.8	2.9	153.93		233	5	45	1.4			
7/29/2013	XX	GW401A646	124	7.2	12.3	5.6	151.23		330	6	45	1.6			
10/28/2013	XX	GW401A66J	140	6.8	9.3	6.1	150.73	112.04	209	5	45	0.2			
4/21/2014	XX	GW401A6F2	131	7.9	8.4	1.14	155.69		396	6	55	1.1			
7/28/2014	XX	GW401A6J9	129	8.2	11.2	5.1	151.73		384	4	25	2.1			
10/20/2014	XX	GW401A730	118	6.6	9.5	7.15	149.68	112.04	370	5	25	0.4			
MW-401B															
5/10/2005	XX	GW401B133	470	7.1	11.5	6.94	150.38		72	2	310	2			
7/27/2005	XX	GW401B16B	533	6.9	10.8	8.85	148.47		5	1	320	1			
9/21/2005	XX	GW401B199	699	6.7	16.1	7.55	149.77	23.1	408	0.8	235	0.9			
5/23/2006	XX	GW401B1E4	489	6.7	6.2	6.67	150.65		75	1	235	2.2			
7/25/2006	XX	GW401B1H1	444	6.4	11.8	6.38	150.94		34	2	200	1.8			
9/12/2006	XX	GW401B1JE	539	6.6	9.7	6.82	150.5	23.12	42	1	85	0			
5/14/2007	XX	GW401B231	350	6.8	7.8	6.83	150.49		122	1	210	4.5			
7/24/2007	XX	GW401B275	451	5.9	8.9	7.14	150.18		100	0.3	180	1.7			

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(MW-401B) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
9/11/2007	XX	GW401B29F	485	6.3	10.4	7.73	149.59	23.12	125	1	180	0			
5/20/2008	XX	GW401B2D9	340	7	7.4	6.8	150.52		-33	1	160	1.4			
7/28/2008	XX	GW401B2GD	384	6.2	11.2	6.68	150.64		80	0.4	135	2.3			
10/27/2008	XX	GW401B2J3	366	6.6	10.2	6.5	150.82	23.1	97	1	120	0			
4/13/2009	XX	GW401B32B	180	6.7	6.7	6.4	150.92		355	1	80	3.5			
7/7/2009	XX	GW401B36F	290	6.6	8.9	6.35	150.97		130	1	140	0.5			
10/28/2009	XX	GW401B3EA	520	6.4	9.2	6.6	150.72	23.2	239	1	85	0			
4/27/2010	XX	GW401B3J9	237	7.3	7.4	6.7	150.62		266	0.8	100	0			
7/20/2010	XX	GW401B42D	339	6.6	11	7.55	149.77		141	0.6	180	2.2			
10/20/2010	XX	GW401B45H	514	6	9.4	6.82	150.5	23.1	241	0.3	100	0			
4/25/2011	XX	GW401B49I	248	6.5	7.8	6.56	150.76		239	1	225	3.4			
7/18/2011	XX	GW401B4DG	313	6.3	11.1	7.33	149.99		183	1	275	0			
10/24/2011	XX	GW401B4HB	319	6.6	11.1	6.63	150.69	23.12	152	1	115	0			
4/23/2012	XX	GW401B521	235	7.5	7.5	6.63	150.69		338	5	60	2.2			
7/23/2012	XX	GW401B570	276	6.9	11.9	7.4	149.92		181	0.3	140	2.8			
10/22/2012	XX	GW401B5DB	310	6.7	11.1	6.35	150.97	23.13	227	0.4	110	1.2			
4/22/2013	XX	GW401B5I2	262	6.8	6.9	6.7	150.62		234	0.8	90	1.1			
7/29/2013	XX	GW401B647	238	7.1	12.2	6.94	150.38		158	0.4	95	1.4			
10/28/2013	XX	GW401B670	376	6.5	10	7.2	150.12	23.11	172	0.6	100	0.3			
4/21/2014	XX	GW401B6F3	265	7	7.1	6.39	150.93		264	1	55	1.1			
7/28/2014	XX	GW401B6JA	324	6.9	11.3	6.92	150.4		173	0.3	30	2.4			
10/20/2014	XX	GW401B731	336	6.5	10.1	7.14	150.18	23.12	217	1	25	0.3			
MW-402A															
5/11/2005	XX	GW402A134	113	7.5	10.7	0	152.2		283	4	50	0.2			
8/1/2005	XX	GW402A16C	104	7.6	12.1	F1			231	5	50	0.1			
9/21/2005	XX	GW402A19A	110	7.4	11.2	F1		108.19	219	4	40	0			
5/23/2006	XX	GW402A1E5	106	8.7	9.6	F1			291	4	55	0			
7/26/2006	XX	GW402A1H2	121	8.3	14.4	F1			451	4	70	0.7			
9/12/2006	XX	GW402A1JF	130	8.1	12.1	F1		108.35	412	6	75	0			
5/15/2007	XX	GW402A232	132	9.5	8.8	F1			106	5	35	0			
7/25/2007	XX	GW402A276	130	8.7	12.3	F1			223	5	55	0			
9/12/2007	XX	GW402A29G	126	8.4	12.9	F1		108.25	285	6	55	0.6			
5/20/2008	XX	GW402A2DA	122	8.4	8.8	F1			345	6	75	0			
7/28/2008	XX	GW402A2GE	124	8.6	14.4	0	152.2		187	3	55	0.1			
10/27/2008	XX	GW402A2J4	111	8.1	10.6	F1		108.3	199	4	30	0			
4/14/2009	XX	GW402A32C	129	7.6	5.2	F1			425	5	40	0			
7/8/2009	XX	GW402A36G	125	8.4	9.9	F1			429	4	60	0			
10/28/2009	XX	GW402A3EB	183	8.9	7.6	F1		108.45	413	5	35	0			
4/27/2010	XX	GW402A3JA	120	8.5	9.9	F1			336	6	45	0			
7/21/2010	XX	GW402A42E	123	7.8	14.7	F1			256	4	70	2.2			
10/20/2010	XX	GW402A45I	197	7.3	8.8	F1		108.35	390	5	35	0			
4/27/2011	XX	GW402A49J	130	7.8	8	F1			287	3	135	0			
7/20/2011	XX	GW402A4DH	114	7.8	14.7	F1			361	3	50	0.9			
10/26/2011	XX	GW402A4HC	130	7.8	7.6	F1		108.35	215	5	50	0			
4/24/2012	XX	GW402A522	121	7.5	9.3	F1			353	4	60	0.7			
7/25/2012	XX	GW402A571	125	8.4	13.4	F1			392	4	70	1.9			
10/24/2012	XX	GW402A5DC	116	7.4	7.9	F1		108.35	405	4	60	0.8			
4/22/2013	XX	GW402A5I3	138	9.2	10.4	0.13	152.07		339	3	50	0.5			
7/31/2013	XX	GW402A648	125	8.3	14.4	0.05	152.15		139	5	25	0.6			

SUMMARY REPORT
Field Data

SEVEE & MAHER ENGINEERS, INC.
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CUMBERLAND CENTER, ME 04021

(MW-402A) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
10/30/2013	XX	GW402A671	141	8.1	7.7	F1		108.35	348	5	30	0.3			
4/23/2014	XX	GW402A6F4	130	8.4	8.6	F1	152.2		390	2	45	0.2			
7/30/2014	XX	GW402A6JB	126	8.5	11.7	0.2	152		427	4	15	0.3			
10/22/2014	XX	GW402A732	58	8.6	8.3	0.25	151.95	108.3	370	4	30	0.4			
MW-402B															
5/11/2005	XX	GW402B135	118	8.3	12.3	2.18	150.56		248	2	65	0			
8/1/2005	XX	GW402B16D	151	7	10.8	3.12	149.62		255	2	65	1.4			
9/21/2005	XX	GW402B19B	141	7.3	12.8	3.07	149.67	25.15	200	1	70	0			
5/23/2006	XX	GW402B1E6	145	8.7	8.4	2.88	149.86		46	1	90	0			
7/26/2006	XX	GW402B1H3	145	8.5	9.5	3.24	149.5		293	1	100	0			
9/12/2006	XX	GW402B1JG	165	8.6	11.3	3.8	148.94	25.2	306	0.3	65	0			
5/15/2007	XX	GW402B233	151	9.1	6.9	3.05	149.69		81	1	50	0			
7/25/2007	XX	GW402B277	163	9	9.6	4.22	148.52		106	1	45	0			
9/12/2007	XX	GW402B29H	160	8.6	11.4	5.3	147.44	25.18	198	1	75	0			
5/20/2008	XX	GW402B2DB	157	8.6	8.2	3.3	149.44		11	1	75	0			
7/28/2008	XX	GW402B2GF	148	8.7	12.5	3.6	149.14		143	0.3	70	0			
10/27/2008	XX	GW402B2J5	142	8.1	10.1	3	149.74	25.18	112	1	40	0			
4/14/2009	XX	GW402B32D	96	8.1	5.4	2.9	149.84		317	1	45	0			
7/8/2009	XX	GW402B36H	154	8.4	9.6	2.9	149.84		274	0.4	70	0			
10/28/2009	XX	GW402B3EC	215	8.9	8.7	2.98	149.76	25.2	416	1	35	0			
4/27/2010	XX	GW402B3JB	150	8.7	7.7	3	149.74		154	0.6	75	0			
7/21/2010	XX	GW402B42F	154	8	12.5	5.11	147.63		153	0.3	70	2.8			
10/20/2010	XX	GW402B45J	246	7.2	9.5	3.4	149.34	25.18	323	0.4	60	0			
4/27/2011	XX	GW402B4A0	164	8.1	7.1	2.72	150.02		226	1	135	0			
7/20/2011	XX	GW402B4DI	141	8.1	11.7	4.55	148.19		223	1	63	3.5			
10/26/2011	XX	GW402B4HD	160	7.9	8	2.95	149.79	25.18	107	1	100	0			
4/24/2012	XX	GW402B523	149	8.4	7.1	2.65	150.09		264	0.2	75	0.8			
7/25/2012	XX	GW402B572	157	8.5	10.8	4.62	148.12		279	0.3	90	2.2			
10/24/2012	XX	GW402B5DD	141	7.6	8.9	2.9	149.84	25.2	323	0.4	50	3.2			
4/22/2013	XX	GW402B5I4	152	9.2	7.3	3	149.74		242	0.3	60	0.9			
7/31/2013	XX	GW402B649	147	8.2	11.6	3.92	148.82		76	0.3	40	0.4			
10/30/2013	XX	GW402B672	174	8.7	9	3.8	148.94	25.18	195	0.3	35	0.3			
4/23/2014	XX	GW402B6F5	160	8.3	6.9	2.62	150.12		297	0.6	45	0.3			
7/30/2014	XX	GW402B6JC	152	8.6	11	3.71	149.03		307	1	15	0.2			
10/22/2014	XX	GW402B733	147	8.7	9.6	3.87	148.87	25.13	321	1	35	0.3			
P-04-02															
5/9/2005	XX	GWXXXX13J	243	7.1	9.2	7.02	161.72		273	1	135	0.5			
7/27/2005	XX	GWXXXX177	166	7.4	17.1	9.11	159.63		295	1	105	0.9			
9/22/2005	XX	GWXXXX1A5	250	7	11.8	9.16	159.58	27.9	270	1	110	0			
5/22/2006	XX	GWXXXX1F0	205	7.4	12.2	7.8	160.94		181	2	135	0.5			
7/24/2006	XX	GWXXXX1HH	208	7.3	17.2	8.55	160.19		270	1	125	0			
9/11/2006	XX	GWXXXX20A	237	7.5	15.8	8.38	160.36	37.18	230	3	75	1.4			
5/14/2007	XX	GWXXXX23H	233	7.4	11.9	8	160.74		367	2	95	1			
7/23/2007	XX	GWXXXX281	183	7.6	16.1	9.25	159.49		247	2	105	8			
9/10/2007	XX	GWXXXX2AB	222	7.8	13.8	9.8	158.94	37.2	270	1	95	0.7			
5/21/2008	XX	GWXXXX2E5	215	7.7	10.8	7.98	160.76		301	3	110	0.05			
7/30/2008	XX	GWXXXX2H9	213	7.6	15.3	9.63	159.11		166	3	80	0			
10/29/2008	XX	GWXXXX2JJ	197	8	9.3	8.73	160.01	37.2	50	1	75	0			

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(P-04-02) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
4/13/2009	XX	GWXXXX337	198	8	8.9	8.25	160.49		461	5	105	0			
7/6/2009	XX	GWXXXX37B	215	7.1	16.4	7.95	160.79		279	4	115	0			
10/27/2009	XX	GWXXXX3F6	242	7.9	10.9	7.55	161.19	37.2	393	1	60	0			
4/26/2010	XX	GWXXXX405	222	7.1	12.9	7.81	160.93		303	4	50	0.6			
7/21/2010	XX	GWXXXX439	213	7.4	16.2	8.25	160.49		322	3	115	2.5			
10/20/2010	XX	GWXXXX46D	214	7.9	10.3	8.5	160.24	37.15	282	1	55	0			
4/27/2011	XX	GWXXXX4AE	227	7.8	10.8	7.28	161.46		483	5	175	0.4			
7/20/2011	XX	GWXXXX4EC	201	7.4	18.8	7.81	160.93		381	3	75	0			
10/26/2011	XX	GWXXXX4I7	!	!	!	!		!	!	!	!	!			
4/25/2012	XX	GWXXXX52H	193	6.3	10.7	10.55	158.19		263	1	100	64.4			
7/25/2012	XX	GWXXXX57G	283	7.3	4.9	11.56	157.18		346	1	85	19.1			
10/24/2012	XX	GWXXXX5E7	245	6.8	13.3	6.65	162.09	39.98	340	1	60	16.2			
4/22/2013	XX	GWXXXX5II	!	!	!	!			!	!	!	!			
P-04-04															
5/9/2005	XX	GWXXXX140	179	7.3	9.2	7.5	161.85		283	3	110	0			
7/27/2005	XX	GWXXXX178	174	8.2	17.7	9.71	159.64		291	3	115	1.1			
9/22/2005	XX	GWXXXX1A6	174	7	12.6	9.6	159.75	32.32	290	1	50	0			
5/22/2006	XX	GWXXXX1F1	161	7.4	13.9	8.28	161.07		189	3	120	1.5			
7/24/2006	XX	GWXXXX1HI	191	7.9	15.3	8.88	160.47		202	2	130	0			
9/11/2006	XX	GWXXXX20B	201	7.2	16.5	8.85	160.5	32.35	151	4	60	1.6			
5/14/2007	XX	GWXXXX23I	182	7.9	12.1	8.47	160.88		415	4	65	0.6			
7/23/2007	XX	GWXXXX282	148	7.7	16.4	9.52	159.83		250	5	100	7.6			
9/10/2007	XX	GWXXXX2AC	178	7.8	14.1	10.03	159.32	32.33	275	6	75	0.2			
5/21/2008	XX	GWXXXX2E6	173	7.5	9.8	8.41	160.94		274	4	105	0			
7/30/2008	XX	GWXXXX2HA	162	7.9	15	9.34	160.01		337	4	55	0.2			
10/29/2008	XX	GWXXXX300	159	8	9.7	9.1	160.25	32.3	171	2	50	0.2			
4/13/2009	XX	GWXXXX338	178	7.9	9	8.8	160.55		484	5	40	0.2			
7/6/2009	XX	GWXXXX37C	175	7.6	19.5	8.4	160.95		239	6	80	0.6			
10/27/2009	XX	GWXXXX3F7	175	8	10.4	7.96	161.39	32.21	376	2	45	0			
4/26/2010	XX	GWXXXX406	177	7.5	12.3	8.45	160.9		325	4	60	0.6			
7/21/2010	XX	GWXXXX43A	173	7.5	16.3	8.9	160.45		288	4	95	2			
10/20/2010	XX	GWXXXX46E	177	7.9	10.5	9	160.35	32.25	238	2	50	0			
4/27/2011	XX	GWXXXX4AF	188	7.8	9.8	7.82	161.53		520	6	150	0			
7/20/2011	XX	GWXXXX4ED	166	7.6	18.7	8.44	160.91		362	3	75	0			
10/26/2011	XX	GWXXXX4I8	181	8.4	11.2	9.3	160.05	32.3	185	1	60	1.6			
4/25/2012	XX	GWXXXX52I	185	7.1	11.9	9.62	159.73		290	3	100	2.9			
7/25/2012	XX	GWXXXX57H	177	7.7	18.7	10.05	159.3		396	4	100	2.7			
10/24/2012	XX	GWXXXX5E8	158	7.4	16.1	8.9	160.45	32.33	388	3	50	3			
4/24/2013	XX	GWXXXX5IJ	178	8.3	8.1	9.05	160.3		307	5	90	0.4			
7/31/2013	XX	GWXXXX654	175	8.1	17.3	9.12	160.13		274	4	50	1.2			
10/30/2013	XX	GWXXXX67E	194	7.9	11	10.01	159.24	32.26	346	3	35	0.8			
4/23/2014	XX	GWXXXX6G0	176	6.6	11.1	8.4	160.85		461	5	50	1.8			
7/30/2014	XX	GWXXXX703	175	7.9	14.3	8.96	160.29		335	3	45	0.6			
10/22/2014	XX	GWXXXX73E	165	8.1	10.9	9.35	159.9	32.28	390	3	50	1.1			
PWS10-1															
4/26/2010	XX	GWPWS13IJ	223	6.1	11.7				23	1	70	8.8			
7/19/2010	XX	GWPWS1423	314	6.1	19.9				192	3	25	7.6			
10/18/2010	XX	GWPWS1457	438	6.5	8.8				232	5	10	2.7			

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(PWS10-1) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
4/25/2011	XX	GWPWS1498	154	6.4	8.3				134	1	170	3			
7/18/2011	XX	GWPWS14D6	265	5.9	19.7				142	1	200	20			
10/24/2011	XX	GWPWS14H1	150	5.8	11.4				106	1	70	2.5			
4/23/2012	XX	GWPWS151B	162	6	9.9				127	1	55	2.1			
7/23/2012	XX	GWPWS156A	104	6	23.5				213	2	50	14			
10/22/2012	XX	GWPWS15D1	138	5.8	11.6				228	0.3	35	3.7			
4/22/2013	XX	GWPWS15HC	278	5.7	7.2				228	1	50	3.2			
7/29/2013	XX	GWPWS163H	207	5.5	17.8				-38	1	75	12.6			
10/28/2013	XX	GWPWS166A	119	6.3	7.1				101	4	25	5.7			
4/21/2014	XX	GWPWS16ED	342	6.5	7.3				100	2	100	2.6			
7/28/2014	XX	GWPWS16J0	277	6.2	18.4				86	1	35	4.2			
10/20/2014	XX	GWPWS172A	76	5.4	11.1				407	4	20	1.8			
PWS10-2															
4/26/2010	XX	GWPWS23J0	82	6	9.3				102	4	20	2.3			
7/19/2010	XX	GWPWS2424	110	5.6	21.1				-5	1	45	3.4			
10/18/2010	XX	GWPWS2458	150	6.6	8.7				302	1	20	5.5			
4/25/2011	XX	GWPWS2499	66	5.6	9.4				67	5	40	2.1			
7/18/2011	XX	GWPWS24D7	157	5.8	24.6				248	1	135	4.4			
10/24/2011	XX	GWPWS24H2	105	5.6	10.6				145	4	30	2.5			
4/23/2012	XX	GWPWS251C	73	5.7	6.4				104	1	35	3.2			
7/23/2012	XX	GWPWS256B	86	6.3	26.7				293	8	50	6.5			
10/22/2012	XX	GWPWS25D2	74	6	12.3				278	5	15	1.6			
4/22/2013	XX	GWPWS25HD	100	5.5	7.8				221	3	15	2.5			
7/29/2013	XX	GWPWS263I	127	5.4	16.2				-1	1	30	3.1			
10/28/2013	XX	GWPWS266B	107	6.7	9.6				133	5	15	6.2			
4/21/2014	XX	GWPWS26EE	63	7.3	9.9				52	1	40	2.2			
7/28/2014	XX	GWPWS26J1	140	5.7	15.4				108	0.4	25	1.5			
10/20/2014	XX	GWPWS272B	131	5.7	10.6				233	1	15	2.2			
PWS10-3															
4/26/2010	XX	GWPWS33J1	175	7	11.8				39	2	80	6.3			
7/19/2010	XX	GWPWS3425	211	5.5	17.9				79	2	105	7.1			
10/18/2010	XX	GWPWS3459	131	6.2	7.8				400	4	20	4.1			
4/25/2011	XX	GWPWS349A	222	5.9	9				118	1	145	3.5			
7/18/2011	XX	GWPWS34D8	148	5.8	23.1				203	3	125	18.3			
10/24/2011	XX	GWPWS34H3	111	5.3	11.1				164	1	35	4.5			
4/23/2012	XX	GWPWS351D	63	6.5	20.7				307	3	50	4.2			
7/23/2012	XX	GWPWS356C	73	5.8	26.8				155	4	25	6.6			
10/22/2012	XX	GWPWS35D3	59	5.4	11.9				284	0.8	15	4.3			
4/22/2013	XX	GWPWS35HE	62	5	7.3				223	5	15	5.6			
7/29/2013	XX	GWPWS363J	180	5.5	18.9				-7	1	90	5.9			
10/28/2013	XX	GWPWS366C	80	6.6	7.6				152	4	20	8.1			
4/21/2014	XX	GWPWS36EF	76	6.3	6.7				263	3	35	3.1			
7/28/2014	XX	GWPWS36J2	116	5.6	20.4				136	2	20	4.2			
10/20/2014	XX	GWPWS372D	42	5	10.1				423	4	20	2.1			
SW-1															
5/10/2005	XX	SWXX1X12A	57	6.7	25				442	5	95	1.4			
7/28/2005	XX	SWXX1X15I	62	6.1	22.9				267	6	80	20.1			
9/20/2005	XX	SWXX1X18G	106	8	16.9				267	6	30	9.2			

SUMMARY REPORT

Field Data

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(SW-1) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs
5/24/2006	XX	SWXX1X1DB	181	6.5	14.6				430	6	70	3.8	
7/26/2006	XX	SWXX1X1G8	120	6	26.3				228	4	30	1.8	
9/13/2006	XX	SWXX1X1J1	345	6.6	17.6				244	5		2.4	
5/15/2007	XX	SWXX1X228	84	5.9	10.9				273	5	35	1.6	
7/24/2007	XX	SWXX1X26C	101	6.7	25.1				366	6	60	3.1	
9/11/2007	XX	SWXX1X292	101	6.7	15.9				275	5	30	2.9	
5/21/2008	XX	SWXX1X2CG	96	6.9	13.7				279	6	50	1.3	
7/29/2008	XX	SWXX1X2G0	I	I	I				I	I	I	I	
10/28/2008	XX	SWXX1X2IA	68	7.7	11.2				207	5	20	4.7	
4/14/2009	XX	SWXX1X31I	109	7	7.7				475	6	15	3.6	
7/7/2009	XX	SWXX1X362	59	6.7	16.9				383	5	30	0.8	
10/27/2009	XX	SWXX1X3DH	86	6.5	5.6				336	3	10	1	
4/28/2010	XX	SWXX1X3IG	186	6.2	7.9				404	5	15	1.7	
7/20/2010	XX	SWXX1X420	293	6.3	21.3				100	2	135	15.5	
10/19/2010	XX	SWXX1X454	142	7.3	6.2				450	4	20	3.2	
4/26/2011	XX	SWXX1X495	76	5.9	10.9				404	5	30	1.4	
7/19/2011	XX	SWXX1X4D3	235	6.4	21.9				273	4	100	0.4	
10/25/2011	XX	SWXX1X4GI	78	7.5	11.6				234	6	30	0.6	
4/24/2012	XX	SWXX1X518	78	6.7	11.6				549	6	35	2	
7/24/2012	XX	SWXX1X567	108	6.9	22.1				299	5	60	9.6	
10/23/2012	XX	SWXX1X5CI	98	7.2	10.1				475	5	50	1.6	
4/23/2013	XX	SWXX1X5H9	80	6.6	9.6				237	6	15	3.6	
7/30/2013	XX	SWXX1X63E	83	6.5	23.2				310	6	25	2.3	
10/29/2013	XX	SWXX1X667	99	7.2	5.6				325	6	20	1.5	
4/22/2014	XX	SWXX1X6EA	154	7	9.9				455	6	35	3.4	
7/29/2014	XX	SWXX1X6IH	75	7.1	22.8				424	4	20	2.7	
10/21/2014	XX	SWXX1X727	83	7.5	9.7				350	6	20	3.1	
SW-2													
5/10/2005	XX	SWXX2X12B	66	6.4	15.7				364	6	30	0.9	2.82
7/28/2005	XX	SWXX2X15J	49	6.3	22.1				210	6	25	1.5	5.6
9/20/2005	XX	SWXX2X18H	64	7	16.6				267	5	30	2.4	3.4
5/24/2006	XX	SWXX2X1DC	65	6.4	13				284	6	25	2.8	2
7/26/2006	XX	SWXX2X1G9	66	6	25.3				240	3	30	0.6	1.3
9/13/2006	XX	SWXX2X1J2	80	6.4	16.3				304	4	25	1.8	1
5/15/2007	XX	SWXX2X229	74	6.1	11.7				310	4	30	1.1	0.5
7/24/2007	XX	SWXX2X26D	101	6.3	26.3				260	6	45	3.5	2.5
9/11/2007	XX	SWXX2X293	99	6.6	16.8				203	5	40	2.4	0.6
5/21/2008	XX	SWXX2X2CH	83	6.7	13.3				282	6	45	2.7	3
7/29/2008	XX	SWXX2X2G1	81	6.8	27.7				340	4	20	0.7	1
10/28/2008	XX	SWXX2X2IB	54	7.4	14.4				432	6	50	2.6	3.5
4/14/2009	XX	SWXX2X31J	62	6.7	6.8				516	3	35	3.2	1.9
7/7/2009	XX	SWXX2X363	62	7.1	16.2				453	5	25	2.6	6.5
10/27/2009	XX	SWXX2X3DI	122	5.8	6.9				445	5	15	3.6	3
4/28/2010	XX	SWXX2X3IH	78	6.2	7.6				422	2	20	1.1	1.8
7/20/2010	XX	SWXX2X421	83	7.1	28.2				288	8	25	3.7	0.5
10/19/2010	XX	SWXX2X455	130	7.2	9.5				444	6	20	3.2	2
4/26/2011	XX	SWXX2X496	71	5.9	12.3				367	5	30	1.2	2.5
7/19/2011	XX	SWXX2X4D4	46	7.1	29.6				332	6	38	0	0.1
10/25/2011	XX	SWXX2X4GJ	72	7.6	11.7				337	5	25	1.2	1.5

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(SW-2) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
4/24/2012	XX	SWXX2X519	87	6.9	10.6				454	5	30	2.4	14		
7/24/2012	XX	SWXX2X568	65	6.9	25.9				449	6	25	3.1	1.75		
10/23/2012	XX	SWXX2X5CJ	54	7.2	12.2				472	5	15	1.7	2.75		
4/23/2013	XX	SWXX2X5HA	77	6.4	10.6				236	5	15	4.1	1.5		
7/30/2013	XX	SWXX2X63F	65	7	26.2				274	6	20	2.2	1		
10/29/2013	XX	SWXX2X668	82	8	10.1				469	5	20	1.2	0.1		
4/22/2014	XX	SWXX2X6EB	76	7	10.4				407	6	25	2.6	5.25		
7/29/2014	XX	SWXX2X6II	66	7.8	25.6				423	6	15	2.8	0.6		
10/21/2014	XX	SWXX2X728	74	7	10.2				384	5	15	2.5	0.3		
SW-3															
5/10/2005	XX	SWXX3X12C	149	6.5	14.7				363	4	15	1	5.42		
7/28/2005	XX	SWXX3X160	66	6.3	21.2				318	4	15	2.1	2.35		
9/20/2005	XX	SWXX3X18I	74	6.9	17.3				316	5	35	4	5.4		
5/24/2006	XX	SWXX3X1DD	73	6.4	14.4				271	6	25	2	6		
7/26/2006	XX	SWXX3X1GA	65	6.4	23.9				237	6	40	0.4	6.1		
9/13/2006	XX	SWXX3X1J3	88	6.8	13.9				354	6	25	1.4			
5/15/2007	XX	SWXX3X22A	68	6.4	12.2				300	4	25	1.8	5.76		
7/24/2007	XX	SWXX3X26E	84	6.7	21.4				259	5	40	2.1	5.08		
9/11/2007	XX	SWXX3X294	98	6.9	16				258	5	45	1.8	4.67		
5/21/2008	XX	SWXX3X2CI	84	6.9	12.3				346	6	30	2.3	5		
7/29/2008	XX	SWXX3X2G2	103	7	27.4				260	4	45	3.1	5		
10/28/2008	XX	SWXX3X2IC	63	7.3	12.9				452	4	20	2.6	7		
4/14/2009	XX	SWXX3X320	71	6.5	3.8				495	6	20	1.6	12		
7/7/2009	XX	SWXX3X364	58	6.6	16				421	4	30	2.6	8		
10/27/2009	XX	SWXX3X3DJ	82	6.1	4.7				461	5	20	1.7	10		
4/28/2010	XX	SWXX3X3II	81	6.8	8.9				368	2	20	1.7	9		
7/20/2010	XX	SWXX3X422	110	7	22.3				287	4	60	9.6	3.5		
10/19/2010	XX	SWXX3X456	137	7.5	6.2				437	6	15	0.6	8		
4/26/2011	XX	SWXX3X497	73	6.3	11.2				438	6	35	1.6	8		
7/19/2011	XX	SWXX3X4D5	93	6.8	23.3				338	5	38	0	2.5		
10/25/2011	XX	SWXX3X4H0	78	6.6	10.5				257	5	25	1.2	7.5		
4/24/2012	XX	SWXX3X51A	54	7.4	9.8				449	6	25	2.4	19		
7/24/2012	XX	SWXX3X569	103	7.5	22.9				326	4	100	2.5	3.75		
10/23/2012	XX	SWXX3X5D0	46	7.4	11.5				422	6	50	2.1	5		
4/23/2013	XX	SWXX3X5HB	71	6.5	9.7				234	6	20	1.5	8		
7/30/2013	XX	SWXX3X63G	81	7.9	23				170	6	25	1.2	6		
10/29/2013	XX	SWXX3X669	108	7.7	6.7				365	4	15	1.2	6.5		
4/22/2014	XX	SWXX3X6EC	71	7.3	9.9				444	6	30	0.8	10		
7/29/2014	XX	SWXX3X6IJ	81	7.9	20.9				328	5	15	0.5	8		
10/21/2014	XX	SWXX3X729	78	7.7	8.4				386	5	15	1.2	7		
SW-DP1															
5/10/2005	XX	SWDP1X12I	118	6.9	19				350	5	65	15			
7/28/2005	XX	SWDP1X166	101	6.4	26.9				282	6	80	28.1			
9/20/2005	XX	SWDP1X194	147	7.1	16				296	5	30	15.2			
5/24/2006	XX	SWDP1X1DJ	206	7	14.9				402	6	50	3.2			
7/26/2006	XX	SWDP1X1GG	196	8.5	31.1				308	5	40	0.6			
9/13/2006	XX	SWDP1X1J9	177	7	18.7				258	6	70	2.4			
5/15/2007	XX	SWDP1X22G	190	7.3	14.8				264	6	85	3.1			

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(SW-DP1) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU	Flow Rate cfs		
7/24/2007	XX	SWDP1X270	142	8.9	24.3				281	6	40	1.6			
9/11/2007	XX	SWDP1X29A	112	9.1	18.4				211	6	40	0.2			
5/21/2008	XX	SWDP1X2D4	156	8.2	15.4				277	6	75	1.6			
7/29/2008	XX	SWDP1X2G8	111	9.4	26.5				261	5	30	2.5			
10/28/2008	XX	SWDP1X2II	152	7.4	14.4				285	6	50	3.6			
4/14/2009	XX	SWDP1X326	223	8.6	13.7				442	6	70	16.5			
7/7/2009	XX	SWDP1X36A	111	6.7	18.1				368	6	50	1.7			
10/27/2009	XX	SWDP1X3E5	186	6.3	7.8				319	5	25	0.8			
4/28/2010	XX	SWDP1X3J4	201	6.6	10.9				335	5	55	3.1			
7/20/2010	XX	SWDP1X428	106	8.2	26.5				200	5	25	3.9			
10/19/2010	XX	SWDP1X45C	197	7.3	8.6				419	6	35	0.5			
4/26/2011	XX	SWDP1X49D	139	6.6	12.6				374	6	80	3.6			
7/19/2011	XX	SWDP1X4DB	154	7.6	27.1				328	5	63	0			
10/25/2011	XX	SWDP1X4H6	117	7.7	14.2				324	6	35	0			
4/24/2012	XX	SWDP1X51G	107	6.9	12.8				466	6	75	6.8			
7/24/2012	XX	SWDP1X56F	167	7.4	25.6				395	6	80	7.5			
10/23/2012	XX	SWDP1X5D6	66	7.2	11.7				477	6	25	2.1			
4/23/2013	XX	SWDP1X5HH	195	7.3	12.1				236	6	20	3.1			
7/30/2013	XX	SWDP1X642	82	6.7	26.8				285	6	30	0.7			
10/29/2013	XX	SWDP1X66F	204	7.4	7.4				311	6	20	1.6			
4/22/2014	XX	SWDP1X6EI	83	7.7	14.5				452	6	30	3.6			
7/29/2014	XX	SWDP1X6J5	47	7.1	25.1				448	6	10	0.8			
10/21/2014	XX	SWDP1X72G	54	7.4	11.4				368	6	15	0.8			
SW-DP5															
4/23/2013	XX	SWDP5X60I	162	7.6	12.8				236	6	20	2.6			
7/30/2013	XX	SWDP5X65H	150	8	30.7				241	6	50	1.5			
10/29/2013	XX	SWDP5X686	D	D	D				D	D	D	D			
4/22/2014	XX	SWDP5X6GD	194	6.9	16.9				408	6	30	9.8			
7/29/2014	XX	SWDP5X70F	99	7.9	27.5				392	6	15	2.6			
10/21/2014	XX	SWDP5X743	113	7.6	10.7				422	5	15	1.2			
SW-DP6															
10/27/2009	XX	SWDP6X3G6	148	6.3	7.5				385	5	15	3.7			
4/28/2010	XX	SWDP6X3J5	271	6.5	7.3				369	6	50	4.2			
7/20/2010	XX	SWDP6X429	260	7	27				280	5	90	7.9			
10/19/2010	XX	SWDP6X45D	297	7.4	8.8				396	6	35	2.6			
4/26/2011	XX	SWDP6X49E	192	6.3	12.8				365	6		6.8			
7/19/2011	XX	SWDP6X4DC	427	7.5	28.4				346	6	75	0			
10/25/2011	XX	SWDP6X4H7	307	7.5	12.7				212	6	80	0.5	0.0022		
4/24/2012	XX	SWDP6X51H	172	6.7	15.1				547	6	100	2.5			
7/24/2012	XX	SWDP6X56G	97	7.2	25.1				396	5	40	12	0.0045		
10/23/2012	XX	SWDP6X5D7	65	7.5	11.7				439	5	15	5.1			
4/23/2013	XX	SWDP6X5HI	62	6.6	15.2				235	6	15	3.2			
7/30/2013	XX	SWDP6X643	87	7	27.8				313	6	25	0.8			
10/29/2013	XX	SWDP6X66G	113	7.3	8.3				333	5	25	0.6			
4/22/2014	XX	SWDP6X6EJ	107	7.6	16.8				413	6	40	3.7			
7/29/2014	XX	SWDP6X6J6	72	7.3	24.7				442	5	10	1.2			
10/21/2014	XX	SWDP6X72H	75	7.7	11.5				394	6	15	2.6			

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(SW-DP6)			Specific Conductance	pH	Temperature	Water Level Depth	Water Level Elevation	Well Depth	Corrected Eh	Dissolved Oxygen	Alkalinity (CaCO3) (field)	Turbidity (field)	Flow Rate
Date	Type	Sample ID	µmhos/cm @25°C	Standard Units	Degrees Celcius	Feet	Feet	Feet	mV	mg/L	mg/L	NTU	cfs

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

! - The sampling location was damaged or destroyed.
< - Less than specified amount
A6 - Approximate value.
D - The sampling location was dry.
DE - Decommissioned Location
E2 - Estimated Field Value
F - The sampling location was frozen.
F1 - Well was flowing
F12 - Pipe under water, no sample taken.
F14 - Unable to measure flow.
F6 - No flow. Sample not taken.
G7 - Field measurements elevated due to recent cleaning of underdrain pipe.
H2 - Waterlevel higher than pipes. See LF-COMP for readings
H5 - Waterlevel higher than pipes. See LP-COMP for readings
H6 - Pipe under water, could not measure flow.
H8 - No flow from pipe. See LF-COMP for readings
H9 - No flow from pipe. See LP-COMP for readings
I - The sampling location yielded insufficient quantity to collect a sample.
M - Results are missing or not reliable due to a meter malfunction.
M7 - No reading taken at this location.

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(LF-COMP) Date	Type	Sample ID	Total Kjeldahl Nitrogen mg/L	Biochemical Oxygen Demand mg/L	Ammonia (N) mg/L	Bicarbonate (CaCO3) mg/L	Chloride mg/L	Chemical Oxygen Demand mg/L	Nitrate (N) mg/L	Phosphate Phosphorus mg/L	Sulfate mg/L	Total Dissolved Solids mg/L	Bromide mg/L	Organic Carbon mg/L	Total Suspended Solids mg/L	Tannin & Lignins (Tannic Acid) mg/L
LF-COMP																
7/19/2011	XX	LFXXXX4F1			0.1 U	175	5.4	3 U	0.1 J	0.02 J	7.2	233		0.7 U	4 U	0.2 U
4/24/2012	XX	LFXXXX53B			0.5 U	143	7	10 U	0.3 U	0.04 U	6	195		2 U	4 U	0.2 U
LF-UD-1																
5/11/2005	XX	LFUD1X137			0.1 U	115	3.9	3 U	0.3	0.01 J	7.7	162		2	4 U	0.2 U
7/27/2005	XX	LFUD1X16F			0.1 U	113	2.6	3 U	0.2 J	0.01 U	4.4	154		0.8 J	4 U	0.2 U
9/21/2005	XX	LFUD1X19D			0.1 U	110	3.3	3 U	0.4	0.01 J	8	155		1.1 J	4 U	0.2 U
5/24/2006	XX	LFUD1X1E8			0.1 U	118	5.3	4 J	0.6	0.01 J	11	170		3.8	4 U	0.2 U
7/25/2006	XX	LFUD1X1H5			0.1 U	117	3.6	4 J	0.4	0.01 J	7.6	151		1.6	4 U	0.2 U
9/11/2006	XX	LFUD1X1JI			0.1 U	130	3.3	3 J	0.4	0.03 J	7	169		1 J	4	0.2 U
5/16/2007	XX	LFUD1X235			0.1 U	148	3.8	3 U	0.1 J	0.01 J	6.7	181		2.3	4 U	0.21
7/25/2007	XX	LFUD1X279			0.1 U	157	3.3	4 J	0.2 J	0.02 J	6	190		6.4	4 U	0.2 U
9/12/2007	XX	LFUD1X29J			I	I	I	I	I	I	I	I		I	I	I
5/20/2008	XX	LFUD1X2DD			0.1 U	143	3.7	3 U	0.3	0.01 J	7.6	178		1.8 J	4 U	0.2 U
7/28/2008	XX	LFUD1X2GH			0.1 U	164	2.3	14	0.3	0.01 J	7.4	218		1.7 J	4 U	0.2 U
10/28/2008	XX	LFUD1X2J7			0.1 U	155	1.9	3 U	0.3	0.01 J	9	202		1.1 J	4 U	0.2 U
4/15/2009	XX	LFUD1X32F			0.1 U	175	4	9 J	0.3	0.01 U	6.4	211		1.8 J	4 U	0.2 U
7/8/2009	XX	LFUD1X36J			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
10/27/2009	XX	LFUD1X3EE			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
4/27/2010	XX	LFUD1X3JD			0.1 U	174	3.5	3 J	0.3	0.02 J	6.6	191		2.3	4 U	0.2 U
7/20/2010	XX	LFUD1X42H			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
10/19/2010	XX	LFUD1X461			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/26/2011	XX	LFUD1X4A2			0.1 U	149	7.7	3 U	0.2 J	0.02 J	6.9	211		1.6 J	4 U	0.2 U
7/19/2011	XX	LFUD1X4E0			0.1 J	171	5.1	7 J	0.1 J	0.02 J	10	232		0.7 J	8	0.2 U
10/25/2011	XX	LFUD1X4HF			0.1 U	173	3.3	3 U	0.5	0.03 J	8.2	205		1 J	40	1 U
4/24/2012	XX	LFUD1X525			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
7/24/2012	XX	LFUD1X574			0.5 U	168	3	10 U	0.3	0.05	4.1	208		2 U	10	0.2 U
10/23/2012	XX	LFUD1X5DF			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/23/2013	XX	LFUD1X5I6			0.5 U	164	11.5	10 U	0.3 U	0.04 U	7.8	230	0.16	2 U	4	0.2 U
7/30/2013	XX	LFUD1X64B				156	22.5	10 U	0.4	0.04 U	9.9	232	0.14	2 U	4 U	0.2 U
10/29/2013	XX	LFUD1X674				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LFUD1X6F7				177	19.1	10 U	0.3 U	0.04	10.4	235	0.1 U	2 U	35	0.2 U
7/29/2014	XX	LFUD1X6JE				155	17.3	11	0.4	0.33	5	231	0.14	2 U	394	0.2 U
10/21/2014	XX	LFUD1X735				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LF-UD-2																
5/11/2005	XX	LFUD2X138			0.1 U	92	2.4	3 U	0.3	0.02 J	2.3	132		2	4 U	0.2 U
7/27/2005	XX	LFUD2X16G			0.1 U	116	2.4	3 U	0.3	0.01 J	2.8	145		0.9 J	4 U	0.2 U
9/21/2005	XX	LFUD2X19E			0.1 U	112	2.7	3 U	0.3	0.02 J	4.1	143		0.7 J	4 U	0.2 U
5/24/2006	XX	LFUD2X1E9			0.1 U	105	2.9	3 J	0.4	0.02 J	3.8	145		12	4 U	0.2 U
7/25/2006	XX	LFUD2X1H6			0.1 U	107	2.1	3 U	0.3	0.02 J	2.7	139		1.2 J	4 U	0.2 U
9/11/2006	XX	LFUD2X1JJ			0.1 U	155	7	3 U	0.3	0.02 J	15.2	208		2.4	4 U	0.2 U
5/16/2007	XX	LFUD2X236			0.1 U	123	2.1	3 U	0.1 U	0.01 J	2.2	160		1 J	4 U	0.2 U
7/25/2007	XX	LFUD2X27A			0.1 U	125	3.2	6 J	0.2 J	0.02 J	3	158		1.4 J	4 U	0.2 U
9/12/2007	XX	LFUD2X2A0			0.1 U	120	3.1	3 U	0.2 J	0.01 J	3.3	176		0.6 J	4 U	0.2 U
5/20/2008	XX	LFUD2X2DE			0.1 U	125	2.5	3 U	0.3	0.02 J	3.7	157		2	4 U	0.2 U
7/28/2008	XX	LFUD2X2GI			0.1 U	134	2.3	7 J	0.2 J	0.01 J	3.8	186		1.3 J	4 U	0.2 U
10/29/2008	XX	LFUD2X2J8			0.1 U	123	1.7	3 J	0.3	0.01 J	3.5	159		0.8 J	4 U	0.2 U
4/15/2009	XX	LFUD2X32G			0.1 U	123	6	6 J	0.2 J	0.01 U	5.4	171		1.7 J	4 U	0.2 U

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(LF-UD-2)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
7/8/2009	XX	LFUD2X370			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
10/27/2009	XX	LFUD2X3EF			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
4/27/2010	XX	LFUD2X3JE			0.1 U	134	3.8	4 J	0.2 J	0.02 J	3.8	152		1.9 J	4 U	0.2 U
7/20/2010	XX	LFUD2X42I			0.1 U	185	2.4	4 J	0.3	0.66	3.2	229		0.7 U	4 U	0.2 U
10/19/2010	XX	LFUD2X462			0.1 U	213	3.2	3 U	0.1 J	0.05	17.5	290		0.7 U	39	0.2 U
4/26/2011	XX	LFUD2X4A3			0.1 U	117	6.6	3 U	0.1 J	0.02 J	3.1	172		0.7 U	4 U	0.2 U
7/19/2011	XX	LFUD2X4E1			0.1 U	135	5.7	3 J	0.1 J	0.02 J	4.4	191		0.7 U	4 U	0.2 U
10/25/2011	XX	LFUD2X4HG			0.1 U	133	7.1	3 U	0.2 J	0.02 J	3.3	173		0.7 J	36	0.3
4/24/2012	XX	LFUD2X526			H2	H2	H2	H2	H2	H2 .	H2	H2		H2	H2	H2
7/24/2012	XX	LFUD2X575			0.5 U	135	9.5	10 U	0.3 U	0.04 U	2 U	188		2 U	4 U	0.2 U
10/23/2012	XX	LFUD2X5DG			0.5 U	133	12.6	10 U	0.3 U	0.04 U	5.4	211		2 U	4 U	0.2 U
4/23/2013	XX	LFUD2X5I7			0.5 U	134	18.5	10 U	0.3 U	0.04 U	4.6	207	0.19	2 U	4 U	0.2 U
7/30/2013	XX	LFUD2X64C				127	35.2	10 U	0.4	0.04 U	4.8	208	0.12	2 U	4 U	0.2 U
10/29/2013	XX	LFUD2X675				162	15.3	10 U	0.4	0.04 U	9.9	228	0.18	2 U	12	0.2 U
4/22/2014	XX	LFUD2X6F8				147	33.6	10 U	0.3 U	0.04 U	4.8	218	0.11	2 U	4 U	0.2 U
7/29/2014	XX	LFUD2X6JF				152	21.6	10 U	0.3	0.04 U	2	220	0.17	2 U	45	0.2 U
10/21/2014	XX	LFUD2X736				220	7.7	10 U	0.3 U	0.04 U	7.2	279	0.1 U	2 U	25	0.2 U
LF-UD-3A,B																
5/16/2007	XX	LFUD3X246			0.1 U	201	2.4	3 U	0.1 J	0.01 J	8.3	249		4.8	4 U	0.24
7/25/2007	XX	LFUD3X288			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
9/12/2007	XX	LFUD3X2AI			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
5/20/2008	XX	LFUD3X2EE			0.1 U	130	6.5	9 J	1.3	0.01 J	16.3	163		4.3	4 U	0.2 U
7/28/2008	XX	LFUD3X2HG			D	D	D	D	D	D	D	D		D	D	D
10/29/2008	XX	LFUD3X306			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/15/2009	XX	LFXXXX33F			0.1 U	123	10	10	0.7	0.01 U	13.3	263		2.6	4 U	0.2 U
7/8/2009	XX	LFXXXX37I			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
10/27/2009	XX	LFXXXX3FC			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
4/27/2010	XX	LFXXXX40C			0.1 U	181	12.6	3 U	0.3	0.01 J	13.6	236		4	4 U	0.2 U
7/20/2010	XX	LFXXXX43G			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
10/19/2010	XX	LFXXXX46J			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/26/2011	XX	LFXXXX4B1			0.1 U	148	7.4	3 U	0.6	0.01 J	13.4	229		1.2 J	4 U	0.2 U
7/19/2011	XX	LFXXXX4EJ			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
10/25/2011	XX	LFXXXX4IC			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/24/2012	XX	LFXXXX534			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
7/24/2012	XX	LFXXXX581			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
10/23/2012	XX	LFXXXX5EC			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/23/2013	XX	LFXXXX5J5			F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/30/2013	XX	LFXXXX65A				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/29/2013	XX	LFXXXX67J				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LFXXXX6G6				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/29/2014	XX	LFXXXX708				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/21/2014	XX	LFXXXX73H				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LF-UD-4																
4/15/2009	XX	LFXXXX34A			0.1 U	136	9	6 J	0.6	0.01 U	14.8	206		5.1	5	0.2 U
7/8/2009	XX	LFXXXX380			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
10/27/2009	XX	LFXXXX3FE			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
4/27/2010	XX	LFXXXX40E			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
7/20/2010	XX	LFXXXX43I			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6

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(LF-UD-4) Date	Type	Sample ID	Total Kjeldahl Nitrogen mg/L	Biochemical Oxygen Demand mg/L	Ammonia (N) mg/L	Bicarbonate (CaCO3) mg/L	Chloride mg/L	Chemical Oxygen Demand mg/L	Nitrate (N) mg/L	Phosphate Phosphorus mg/L	Sulfate mg/L	Total Dissolved Solids mg/L	Bromide mg/L	Organic Carbon mg/L	Total Suspended Solids mg/L	Tannin & Lignins (Tannic Acid) mg/L
10/19/2010	XX	LFXXXX471			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/26/2011	XX	LFXXXX4B3			F12	F12	F12	F12	F12	F12	F12	F12		F12	F12	F12
7/19/2011	XX	LFXXXXHG2			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
10/25/2011	XX	LFXXXX4GA			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/24/2012	XX	LFXXXX536			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
7/24/2012	XX	LFXXXX582			0.5 U	207	3.1	10 U	0.3 U	0.04 U	2 U	263		2 U	4 U	0.2 U
10/23/2012	XX	LFXXXX5CA			0.5 U	180	8.1	10 U	0.3 U	0.04 U	7.9	252		2 U	4 U	0.2 U
4/23/2013	XX	LFXXXX5J6			0.5 U	166	11.8	10 U	0.3 U	0.04 U	8.8	235	0.14	2 U	4 U	0.2 U
7/30/2013	XX	LFXXXX65B				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/29/2013	XX	LFXXXX680				168	13.2	10 U	0.4	0.04 U	11.1	234	0.1 U	2 U	4 U	0.2 U
4/22/2014	XX	LFXXXX6G7				206	8.9	10 U	0.3	0.04 U	14.2	252	0.1	2 U	4 U	0.2 U
7/29/2014	XX	LFXXXX709				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/21/2014	XX	LFXXXX73I				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LF-UD-5																
4/27/2010	XX	LFXXXX40F			0.1 U	153	3.3	3 J	0.7	0.01 J	16.1	197		1.4 J	4 U	0.2 U
LF-UD-5and6																
7/20/2010	XX	LFXXXX43J			0.1 U	180	6.2	5 J	1.1	0.03 J	22	272		2.5	7	0.2 U
10/19/2010	XX	LFXXXX472			0.1 U	184	3.6	3 J	0.2 J	0.06	19.6	277		1.6 J	42	0.2 U
4/26/2011	XX	LFXXXX4B4			0.1 U	224	2.7	3 U	0.2 J	0.01 J	15.9	287		1.5 J	4 U	0.2 U
7/19/2011	XX	LFXXXX4F2			0.1 U	238	2.5	4 J	0.1 J	0.02 J	15.3	293		1.9 J	14	0.2 U
10/25/2011	XX	LFXXXX4G7			0.1 U	224	3.2	3 U	0.2 J	0.16	16.6	332		2.5	154	3.2
4/24/2012	XX	LFXXXX537			0.5 U	232	3.2	10 U	0.3 U	0.05	14.9	272		2 U	26	0.2 U
7/24/2012	XX	LFXXXX584			0.5 U	232	2.5	10 U	0.3 U	0.04 U	11.9	279		2 U	4 U	0.2 U
10/23/2012	XX	LFXXXX5C7			0.5 U	201	3.3	10 U	0.3 U	0.07	14.6	268		2 U	128	0.2 U
4/23/2013	XX	LFXXXX5J7			0.5 U	157	3.6	10 U	0.3 U	0.04 U	11.5	200	0.11	2 U	8	0.2 U
7/30/2013	XX	LFXXXX65C				163	3.4	10 U	0.3 U	0.04 U	10.8	202	0.1 U	2 U	4 U	0.2 U
10/29/2013	XX	LFXXXX681				200	3.3	10 U	0.4	0.04 U	11.8	244	0.1 U	2 U	7	0.2 U
4/22/2014	XX	LFXXXX6G8				181	4.7	10 U	0.3	0.04 U	14.7	222	0.1 U	2 U	18	0.2 U
7/29/2014	XX	LFXXXX70A				207	2.2	10 U	0.3	0.04 U	8.7	269	0.1	2 U	4 U	0.2 U
10/21/2014	XX	LFXXXX73J				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LF-UD-6																
4/26/2011	XX	LFUD6X4B6			0.1 U	263	2.6	7 J	1	0.02 J	30.8	366		3.6	4 U	0.2 U
7/19/2011	XX	LFUD6X4F4			0.1 U	272	2.4	3 U	0.8	0.17	24.6	368		3.6	102	0.2 U
10/25/2011	XX	LFUD6X4G9			0.1 U	307	2.1	8 J	0.4	0.01 J	14.8	344		3.5	4 U	0.33
4/24/2012	XX	LFUD6X539			0.5 U	278	2.7	10 U	0.3	0.04 U	10.6	309		2 U	4 U	0.2 U
7/24/2012	XX	LFUD6X586			0.5 U	326	3.1	10 U	0.3 U	0.04 U	2 U	414		2.8	4 U	0.2 U
10/23/2012	XX	LFUD6X5C9			0.5 U	359	11.6	10	0.5	0.04 U	107	563		3.1	4 U	0.2 U
4/23/2013	XX	LFUD6X5J9			0.5 U	222	8.9	10 U	0.6	0.05	84.9	357	0.1	2 U	4 U	0.2 U
7/30/2013	XX	LFUD6X65E				338	18.2	10 U	1	0.04 U	143	554	0.1 U	3.3	4 U	0.2 U
10/29/2013	XX	LFUD6X683				343	14.1	14	1.2	0.04 U	116	552	0.12	3.1	4 U	0.2 U
4/22/2014	XX	LFUD6X6GA				275	15	11	13.9	0.11	128	464	0.1 U	2.9	4 U	0.2 U
7/29/2014	XX	LFUD6X70C				332	11.5	10 U	0.8	0.04	52.6	522	0.11	2.9	4 U	0.28
10/21/2014	XX	LFUD6X740				343	9.4	10 U	0.4	0.06	88.7	536	0.11	3	4 U	0.37
LF-UD-7																
4/24/2012	XX	LFUD7X53A			H2	H2	H2	H2	H2	H2	H2	H2		H2	H2	H2
7/24/2012	XX	LFXXXX587			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
10/23/2012	XX	LFXXXX5EF			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6

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(LF-UD-7) Date	Type	Sample ID	Total Kjeldahl Nitrogen mg/L	Biochemical Oxygen Demand mg/L	Ammonia (N) mg/L	Bicarbonate (CaCO3) mg/L	Chloride mg/L	Chemical Oxygen Demand mg/L	Nitrate (N) mg/L	Phosphate Phosphorus mg/L	Sulfate mg/L	Total Dissolved Solids mg/L	Bromide mg/L	Organic Carbon mg/L	Total Suspended Solids mg/L	Tannin & Lignins (Tannic Acid) mg/L
4/23/2013	XX	LFUD7X5JA			F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/30/2013	XX	LFUD7X65F				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/29/2013	XX	LFUD7X684				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LFUD7X6GB				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/29/2014	XX	LFUD7X70D				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/21/2014	XX	LFUD7X741				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LF-UD-8																
4/23/2013	XX	LFUD8X5JD			0.5 U	152	3.5	10 U	0.9	0.04 U	7.3	195	0.1 U	2 U	4 U	0.2 U
7/30/2013	XX	LFUD8X65G				172	4	10 U	1.4	0.04 U	9.6	216	0.1 U	2 U	4 U	0.2 U
10/29/2013	XX	LFUD8X685				180	3.5	10 U	0.8	0.04 U	8.2	222	0.1 U	2 U	4 U	0.2 U
4/22/2014	XX	LFUD8X6GC				F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12
7/29/2014	XX	LFUD8X70E				38	3.3	10	0.3 U	0.05	4.6	74	0.1 U	5.7	4 U	0.59
10/21/2014	XX	LFUD8X742				12.4	3.7	11	0.3 U	0.04 U	12.9	69	0.1 U	5.4	4	0.61
LP-UD-1																
5/11/2005	XX	LPUD1X139			D	D	D	D	D	D	D	D		D	D	D
7/27/2005	XX	LPUD1X16H			D	D	D	D	D	D	D	D		D	D	D
9/21/2005	XX	LPUD1X19F			D	D	D	D	D	D	D	D		D	D	D
5/24/2006	XX	LPUD1X1EA			D	D	D	D	D	D	D	D		D	D	D
7/26/2006	XX	LPUD1X1H7			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
9/11/2006	XX	LPUD1X200			D	D	D	D	D	D	D	D		D	D	D
5/16/2007	XX	LPUD1X237			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
7/25/2007	XX	LPUD1X27B			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
9/12/2007	XX	LPUD1X2A1			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
5/20/2008	XX	LPUD1X2DF			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
7/28/2008	XX	LPUD1X2GJ			D	D	D	D	D	D	D	D		D	D	D
10/29/2008	XX	LPUD1X2J9			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/15/2009	XX	LPUD1X32H			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
7/8/2009	XX	LPUD1X371			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
10/27/2009	XX	LPUD1X3EG			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/27/2010	XX	LPUD1X3JF			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
7/20/2010	XX	LPUD1X42J			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
10/19/2010	XX	LPUD1X463			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/26/2011	XX	LPUD1X4A4			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
7/19/2011	XX	LPUD1X4E2			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
10/25/2011	XX	LPUD1X4HH			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/24/2012	XX	LPUD1X527			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
7/24/2012	XX	LPUD1X576			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
10/23/2012	XX	LPUD1X5DH			F6	F6	F6	F6	F6	F6	F6	F6		F6	F6	F6
4/23/2013	XX	LPUD1X5I8			F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/30/2013	XX	LPUD1X64D				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/29/2013	XX	LPUD1X676				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LPUD1X6F9				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/29/2014	XX	LPUD1X6JG				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/21/2014	XX	LPUD1X737				F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LP-UD-2																
5/11/2005	XX	LPUD2X13A			0.1 U	155	9.9	3 J	0.7	0.01 J	34.3	258		3.1	4 U	0.2 U
7/27/2005	XX	LPUD2X16I			0.1 U	168	8.7	3 U	0.4	0.01 U	21.4	236		1.5	4 U	0.2 U
9/21/2005	XX	LPUD2X19G			0.1 U	172	8.3	3 U	0.4	0.01 J	22.4	246		1.4 J	4 U	0.2 U

(LP-UD-2) Date	Type	Sample ID	Total Kjeldahl Nitrogen mg/L	Biochemical Oxygen Demand mg/L	Ammonia (N) mg/L	Bicarbonate (CaCO3) mg/L	Chloride mg/L	Chemical Oxygen Demand mg/L	Nitrate (N) mg/L	Phosphate Phosphorus mg/L	Sulfate mg/L	Total Dissolved Solids mg/L	Bromide mg/L	Organic Carbon mg/L	Total Suspended Solids mg/L	Tannin & Lignins (Tannic Acid) mg/L
5/24/2006	XX	LPUD2X1EB			0.1 U	147	8.6	5 J	0.7	0.01 J	21.4	212		4	4 U	0.2 U
7/25/2006	XX	LPUD2X1H8			0.1 U	143	6.9	3 U	0.4	0.01 J	16.5	209		1.8	4 U	0.2 U
9/11/2006	XX	LPUD2X201			0.1 U	120	2.3	3 U	0.2 J	0.02 J	2.7	153		1.5	4 U	0.2 U
5/16/2007	XX	LPUD2X238			0.1 U	151	8.1	6 J	0.2 J	0.01 J	12.7	211		2.4	4	0.29
7/25/2007	XX	LPUD2X27C			0.1 U	142	8.2	7 J	0.1 J	0.01 J	14.2	206		2.5	4 U	0.2 U
9/12/2007	XX	LPUD2X2A2			0.1 U	139	8.4	3 J	0.3	0.01 U	14.3	210		1 J	4 U	0.2 U
5/20/2008	XX	LPUD2X2DG			0.1 U	126	16.5	3 U	0.4	0.01 J	14.5	180		1.6 J	4 U	0.2 U
7/28/2008	XX	LPUD2X2H0			0.1 U	123	14	3 J	0.4	0.01 J	13.6	215		2	4 U	0.2 U
10/29/2008	XX	LPUD2X2JA			0.1 U	121	12.1	3 U	0.3	0.01 J	13.4	191		1.3 J	4 U	0.2 U
4/15/2009	XX	LPUD2X32I			0.1 U	123	9.1	6 J	0.3	0.01 U	9.8	187		2.8	4 U	0.2 U
7/8/2009	XX	LPUD2X372			0.1 U	132	7.6	3 U	0.3	0.01 U	10.4	185		2	4 U	0.2 U
10/27/2009	XX	LPUD2X3EH			0.1 U	90	11.1	11	0.2 J	0.07	7.7	151		1.4 J	4 U	0.2 U
4/27/2010	XX	LPUD2X3JG			0.1 U	129	12.5	3 J	0.2 J	0.01 J	9.7	187		1.3 J	4	0.2 U
7/20/2010	XX	LPUD2X430			0.1 U	137	8.6	3 J	0.2 J	0.01 J	9.2	206		0.7 U	4 U	0.2 U
10/19/2010	XX	LPUD2X464			0.1 U	125	7.2	3 U	0.1 J	0.01 J	8	197		0.7 U	4 U	0.2 U
4/26/2011	XX	LPUD2X4A5			0.1 U	133	6.7	3 U	0.2 J	0.01 U	8.5	187		0.7 U	4 U	0.2 U
7/19/2011	XX	LPUD2X4E3			0.1 U	135	6.3	18	0.1 J	0.06	8.6	193		0.8 J	73	0.2 U
10/25/2011	XX	LPUD2X4HI			0.1 U	135	5.3	4 J	0.2 J	0.11	9.7	181		0.9 J	11	0.2 U
4/24/2012	XX	LPUD2X528			0.5 U	123	5.2	10 U	0.3 U	0.04 U	9.9	165		2 U	4 U	0.2 U
7/24/2012	XX	LPUD2X577			0.5 U	143	5.1	10 U	0.3 U	0.04 U	8.5	192		2 U	4 U	0.2 U
10/23/2012	XX	LPUD2X5DI			0.5 U	128	5.6	10 U	0.3 U	0.04 U	8.6	287		2 U	4 U	0.2 U
4/23/2013	XX	LPUD2X5I9			0.5 U	137	6.7	10 U	0.4	0.04 U	12.2	185	0.11	2 U	4 U	0.2 U
7/30/2013	XX	LPUD2X64E				136	7.2	10 U	0.6	0.04 U	12.1	182	0.1 U	2 U	4 U	0.2 U
10/29/2013	XX	LPUD2X677				153	6.2	10 U	0.5	0.04 U	10.4	194	0.11	2 U	4 U	0.2 U
4/22/2014	XX	LPUD2X6FA				140	8.3	10 U	0.3	0.04 U	13.9	183	0.1 U	2 U	4 U	0.2 U
7/29/2014	XX	LPUD2X6JH				139	3.9	10 U	0.4	0.04 U	4.7	193	0.1 U	2 U	4 U	0.2 U
10/21/2014	XX	LPUD2X738				137	3.9	10 U	0.3 U	0.04 U	8.1	189	0.1 U	2 U	4 U	0.2 U
MW04-102																
1/18/2005	XX	GW102X10C	0.3 U	6 U	0.1 U	103	2	3 U	0.1 U		7.6	129	0.03 U	1.6	4 U	
3/21/2005	XX	GW102X144	0.3 U	6 U	0.1 U	101	1.7	3 U	0.2 J		7.3	121	0.03 U	2.3	4 U	
7/25/2005	XX	GW102X17I	0.44	6 U	0.1 U	109	1.9	3 U	0.2 J		7.6	142	0.03 U	0.7 J	5	
9/20/2005	XX	GW102X1A9	0.3 U	6 U	0.1 U	108	2.1	3 U	0.2 J		7.8	126	0.03 U	0.5 J	4 U	
5/23/2006	XX	GW102X1F4	0.3 U		0.1 U	100	2.9	3 U	0.2 J		11.4	148		3.1	4 U	0.2 U
7/25/2006	XX	GW102X1I0	1.3		0.1 U	100	1.5	3 U	0.2 J		8.1	123		2.2	4 U	0.2 U
9/12/2006	XX	GW102X20D	0.3 U		0.1 U	102	1.6	3 U	0.1 U		7.9	125		3.3	4 U	0.2 U
5/15/2007	XX	GW102X240	0.5 U		0.1 U	100	1.7	3 J	0.1 U		10.1	116		5.3	4	0.25
7/24/2007	XX	GW102X284	0.3 U		0.1 U	95	2.5	9 J	0.1 J		10.6	136		2.7	4 U	0.2 U
9/11/2007	XX	GW102X2AE	0.5 U		0.1 U	96	2.7	3 U	0.1 J		9.5	131		1.4 J	4 U	0.2 U
5/20/2008	XX	GW102X2E8	0.3 U		0.1 U	73	1.9	3 U	0.2 J		12.5	122		1.3 J	4 U	0.2 U
7/29/2008	XX	GW102X2HC	1.2		0.1 U	96	2.7	3 J	0.2 J		14	121		1.2 J	4 U	0.2 U
10/27/2008	XX	GW102X302	0.5 U		0.1 U	98	1.3	3 U	0.1 J		10.8	120		2.1	4 U	0.2 U
4/14/2009	XX	GW102X339	0.5 U		0.1 U	95	3.5	3 U	0.1 J		9.1	147		0.9 J	4 U	0.2 U
7/7/2009	XX	GW102X37D	0.5 U		0.1 U	101	1.7	5 J	0.1 J		9.4	131		0.7 U	4 U	0.2 U
10/27/2009	XX	GW102X3F8	0.3 U		0.1 U	100	2.4	6 J	0.1 U		8.5	136		0.7 U	4 U	0.2 U
4/27/2010	XX	GW102X407	0.3 U		0.1 U	104	2.7	3 U	0.1 U		10.2	141		1.2 J	4 U	0.2 U
7/21/2010	XX	GW102X43B	0.3 U		0.1 U	100	1.3	4 J	0.3		8.5	134		0.7 U	4 U	0.2 U
10/19/2010	XX	GW102X46F	0.3 U		0.1 U	102	1	3 U	0.2 J		8.1	139		0.7 U	4 U	0.2 U
4/25/2011	XX	GW102X4AG	0.3 U		0.1 U	102	1.1	3 U	0.1 U		8.5	136		0.7 U	4 U	0.2 U
7/19/2011	XX	GW102X4EE	0.3 U		0.1 U	101	1	3 U	0.1 U		9.1	137		0.7 U	4 U	0.2 U

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(MW04-102) Date	Type	Sample ID	Total Kjeldahl Nitrogen mg/L	Biochemical Oxygen Demand mg/L	Ammonia (N) mg/L	Bicarbonate (CaCO3) mg/L	Chloride mg/L	Chemical Oxygen Demand mg/L	Nitrate (N) mg/L	Phosphate Phosphorus mg/L	Sulfate mg/L	Total Dissolved Solids mg/L	Bromide mg/L	Organic Carbon mg/L	Total Suspended Solids mg/L	Tannin & Lignins (Tannic Acid) mg/L
10/25/2011	XX	GW102X4I9	0.3 U		0.1 U	105	2	3 U	0.1 J		8.8	126		0.7 U	4 U	0.2 U
4/24/2012	XX	GW102X52J	0.35		0.5 U	102	2	10 U	0.3 U		11.4	119		2 U	4 U	0.2 U
7/24/2012	XX	GW102X57I	3.8		0.5 U	101	1 U	10 U	0.3 U		11.4	122		2 U	4 U	0.2 U
10/22/2012	XX	GW102X5E9	0.98		0.5 U	107	1.1	10 U	0.3 U		6.7	141		2 U	4 U	0.2 U
4/23/2013	XX	GW102X5J0	0.3 U		0.5 U	100	2.4	10 U	0.3 U		13.2	143	0.1 U	2 U	4 U	0.2 U
7/31/2013	XX	GW102X655	0.646			102	1.2	10 U	0.3 U		9.1	134	0.1 U	2 U	4 U	0.2 U
10/28/2013	XX	GW102X67F	0.5 U			101	2.5	10 U	0.3 U		9.1	137	0.1 U	2 U	4 U	0.2 U
4/23/2014	XX	GW102X6G1	0.5 U			103	1.8	10 U	0.3 U		11.2	127	0.1 U	2 U	4 U	0.2 U
7/30/2014	XX	GW102X704	0.5 U			99	1.4	10 U	0.3 U		8.7	132	0.1 U	2 U	4 U	0.2 U
10/21/2014	XX	GW102X73F	0.5 U			103	1.5	10 U	0.3 U		10.2	143	0.1 U	2 U	4 U	0.2 U
MW04-109																
1/19/2005	XX	GW109X10I	0.37	6 U	0.1 U	276	11.2	15	0.1 U		49.6	408	0.03 U	8.2	4 U	
1/19/2005	XD	GWDP1X110	0.35	6 U	0.1 U	276	11.1	15	0.1 U		50.1	409	0.03 U	6.8	4 U	
3/23/2005	XX	GW109X14A	0.36	6 U	0.1 U	240	9.9	15	0.1 U		54.6	372	0.04 J	5.3	4 U	
7/26/2005	XX	GW109X184	0.3	6 U	0.1 U	222	5.1	7 J	0.1 U		22.4	298	0.03 U	3.5	4 U	
7/26/2005	XD	GWDP5X186	0.32	6 U	0.1 U	218	5	4 J	0.1 U		22.4	302	0.03 U	3.5	4 U	
9/20/2005	XX	GW109X1AF	0.36	6 U	0.1 U	264	3.3	8 J	0.1 U		13.7	316	0.03 U	4.1	4 U	
9/20/2005	XD	GWDP5X1AH	0.44	6 U	0.1 U	266	3.2	3 U	0.1 U		13	316	0.03 U	4.3	4 U	
5/23/2006	XX	GW109X1FA	0.32		0.1 U	220	7.4	6 J	0.1 U		8.9	279		4.4	4 U	0.2 U
5/23/2006	XD	GWDP3X1E1	0.75		0.1 U	226	7.5	6 J	0.1 U		8.8	286		5.1	4 U	0.2 U
7/25/2006	XX	GW109X1I2	0.58		0.1 U	193	4.1	3 J	0.1 U		7.3	242		3.5	4 U	0.2 U
9/12/2006	XX	GW109X20F	0.32		0.1 U	200	4.1	7 J	0.1 U		7.3	227		6.3	4 U	0.2 U
9/12/2006	XD	GWDP1X1J0	0.37		0.1 U	195	4	3 U	0.1 U		7.4	234		4.3	4 U	0.2 U
5/15/2007	XX	GW109X242	0.5 U		0.1 U	178	4.4	4 J	0.1 U		5.5	215		4.3	4 U	0.35
7/24/2007	XX	GW109X286	0.3 U		0.1 U	140	5.3	10	0.1 U		6.6	194		4.3	4 U	0.2 U
9/10/2007	XX	GW109X2AG	0.3 U		0.1 U	147	5.8	8 J	0.1 U		5.7	196		3.6	4 U	0.2 U
9/10/2007	XD	GWDP5X2AH	0.3 U		0.1 U	145	6.1	13	0.1 U		5.4	189		4.8	4 U	0.2 U
5/19/2008	XX	GW109X2EA	1 U		0.1 U	181	92.8	13	0.1 U		3.6	412		3.5	4 U	0.2 U
7/29/2008	XX	GW109X2HE	0.5 U		0.1 U	240	61.9	11	0.2 J		4.3	371		4.6	4 U	0.32
10/28/2008	XX	GW109X304	0.5 U		0.1 U	236	36.8	7 J	0.1 U		3.4	330		3.8	4 U	0.2 U
4/15/2009	XX	GW109X33B	0.5 U		0.1 U	246	19.3	12	0.1 J		2.2	305		4.4	4 U	0.2 U
7/7/2009	XX	GW109X37F	DE		DE	DE	DE	DE	DE		DE	DE		DE	DE	DE
MW04-109R																
12/8/2009	XX	GW109X3GF	0.3 U		0.1 U	220	15.9	3 U	0.1 U		15.2	310		2.9	4 U	0.2 U
4/27/2010	XX	GW109X409	0.3 U		0.1 U	185	12.3	4 J	0.1 U		12	258		2.2	4 U	0.2 U
7/20/2010	XX	GW109X43D	0.3 U		0.1 U	224	6.6	3 J	0.1 U		7.9	262		1.3 J	4 U	0.2 U
10/19/2010	XX	GW109X46H	0.3 U		0.1 U	233	6.3	3 U	0.1 U		7.1	303		1.3 J	4 U	0.2 U
4/26/2011	XX	GW109X4AI	0.3 U		0.1 U	220	4.6	3 J	0.1 U		5.3	267		1.2 J	4 U	0.2 U
7/19/2011	XX	GW109X4EG	0.3 U		0.1 U	195	8.5	3 J	0.1 U		5.8	258		1.4 J	4 U	0.2 U
10/25/2011	XX	GW109X4IB	0.3 U		0.1 J	202	7.7	5 J	0.1 U		6.2	253		1.8 J	4 U	0.2 U
4/24/2012	XX	GW109X531	0.3 U		0.5 U	186	5.7	10 U	0.3 U		6.9	230		2 U	4 U	0.2 U
7/24/2012	XX	GW109X580	0.59		0.5 U	184	2.3	10 U	0.3 U		6.4	227		2 U	4 U	0.2 U
10/23/2012	XX	GW109X5EB	0.32		0.5 U	203	5.8	10 U	0.3 U		2.6	271		2 U	4 U	0.2 U
4/23/2013	XX	GW109X5J2	0.3 U		0.5 U	190	6.5	10 U	0.3 U		8.7	245	0.17	2 U	4 U	0.2 U
7/30/2013	XX	GW109X657	0.444			195	7.7	10 U	0.3 U		8.6	242	0.14	2 U	4 U	0.2 U
10/29/2013	XX	GW109X67G	0.5 U			206	6.3	10 U	0.3 U		7.7	259	0.16	2 U	4 U	0.2 U
4/22/2014	XX	GW109X6G3	0.5 U			196	8.1	10 U	0.3 U		8.7	236	0.25	2 U	4 U	0.2 U
7/29/2014	XX	GW109X705	0.5 U			198	6.6	10 U	0.3 U		4	248	0.13	2 U	4 U	0.2 U

(MW04-109R) Date	Type	Sample ID	Total Kjeldahl Nitrogen mg/L	Biochemical Oxygen Demand mg/L	Ammonia (N) mg/L	Bicarbonate (CaCO3) mg/L	Chloride mg/L	Chemical Oxygen Demand mg/L	Nitrate (N) mg/L	Phosphate Phosphorus mg/L	Sulfate mg/L	Total Dissolved Solids mg/L	Bromide mg/L	Organic Carbon mg/L	Total Suspended Solids mg/L	Tannin & Lignins (Tannic Acid) mg/L
10/21/2014	XX	GW109X73G	0.5 U			209	4.9	10 U	0.3 U		5.8	260	0.14	2 U	4 U	0.2 U
MW09-901																
12/8/2009	XX	GW901X3GH	0.3 U		0.1 U	108	5.1	3 U	0.1 U		15.4	165		1.8 J	4	0.2 U
4/27/2010	XX	GW901X3J7	0.3 U		0.1 U	101	4.2	3 J	0.1 U		13.2	124		1.9 J	4 U	0.2 U
7/20/2010	XX	GW901X42B	0.3 U		0.1 U	104	2.6	3 U	0.1 U		13.7	154		0.9 J	4	0.2 U
10/19/2010	XX	GW901X45F	0.3 U		0.1 U	110	2.7	4 J	0.1 U		27.4	193		0.7 U	4 U	0.2 U
4/26/2011	XX	GW901X49G	0.3 U		0.1 U	90	1.3	3 U	0.1 U		8.4	126		0.7 U	4 U	0.2 U
7/19/2011	XX	GW901X4DE	0.3 U		0.1 U	86	1.3	3 U	0.1 U		8.3	125		0.7 U	4 U	0.2 U
10/25/2011	XX	GW901X4H9	0.3 U		0.1 U	87	1.2	3 J	0.1 U		7	109		1.2 J	4 U	0.2 U
4/24/2012	XX	GW901X51J	0.3 U		0.5 U	75	2.2	10 U	0.3 U		8.3	103		2 U	4 U	0.2 U
7/24/2012	XX	GW901X56I	0.3 U		0.5 U	77	1 U	10 U	0.3 U		9.5	108		2 U	4 U	0.2 U
10/23/2012	XX	GW901X5D9	0.3 U		0.5 U	82	2.5	12	0.3 U		9	118		2 U	4 U	0.2 U
4/23/2013	XX	GW901X5I0	0.3 U		0.5 U	81	2.5	10 U	0.3 U		10.8	116	0.1 U	2 U	4 U	0.2 U
7/30/2013	XX	GW901X645	0.52			80	2	10 U	0.3 U		10.7	110	0.1 U	2 U	4 U	0.2 U
10/29/2013	XX	GW901X66I	0.5 U			85	2.7	10 U	0.3 U		9.2	116	0.1 U	2 U	4 U	0.2 U
4/22/2014	XX	GW901X6F1	0.5 U			83	2.7	10 U	0.3 U		12.1	110	0.1 U	2 U	4 U	0.2 U
7/29/2014	XX	GW901X6J8	0.5 U			96	1.8	10 U	0.3 U		4.6	128	0.1 U	2 U	4 U	0.2 U
10/21/2014	XX	GW901X72J	0.5 U			132	3	10 U	0.3 U		8.1	170	0.1 U	2 U	4 U	0.2 U
MW11-207R																
7/20/2011	XX	GW207X4CH	0.48		0.1 U	37	1.4	3 U	0.2 J		1.3 J	70		0.7 U	4 U	0.2 U
10/24/2011	XX	GW207X4GC	0.3 U		0.1 U	36	2.1	3 U	0.2 J		1 J	61		0.7 U	4 U	0.2 U
4/23/2012	XX	GW207X512	0.3 U		0.5 U	40	2.1	10 U	0.3 U		2 U	69		2 U	4 U	0.2 U
7/23/2012	XX	GW207X561	0.3 U		0.5 U	42	1.3	10 U	0.3 U		2 U	72		2 U	4 U	0.2 U
10/22/2012	XX	GW207X5CC	0.93		0.5 U	39	2	10 U	0.3 U		2 U	69		2 U	4 U	0.2 U
4/22/2013	XX	GW207X5H3	0.3 U		0.5 U	39	2.8	10 U	0.3 U		2.1	70	0.1 U	2 U	4 U	0.2 U
7/29/2013	XX	GW207X638	0.551			40	2.6	10 U	0.3 U		2 U	69	0.1 U	2 U	4 U	0.2 U
10/28/2013	XX	GW207X661	0.5 U			39	3.8	10 U	0.3 U		2 U	75	0.1 U	2 U	4 U	0.2 U
4/21/2014	XX	GW207X6E4	0.5 U			41	4.4	10 U	0.3 U		2 U	65	0.1 U	2 U	4 U	0.2 U
7/28/2014	XX	GW207X6IC	0.5 U			40	2.6	10 U	0.3 U		2 U	61	0.1 U	2 U	4 U	0.2 U
10/20/2014	XX	GW207X722	0.5 U			44	3.2	10 U	0.3 U		2 U	65	0.1 U	2 U	4 U	0.2 U
MW-206																
5/11/2005	XX	GW206X123	0.3 U		0.1 U	69	1.6	3 U	0.1 U		0.6 J	97		0.8 J	4 U	0.2 U
7/28/2005	XX	GW206X15B	0.3 U		0.1 U	67	1.7	3 U	0.1 U		0.9 J	89		1.3 J	4 U	0.2 U
9/19/2005	XX	GW206X189	0.3 U		0.1 U	73	1.9	3 U	0.1 U		1.1 J	81		1.1 J	4 U	0.2 U
5/24/2006	XX	GW206X1D4	0.44		0.1 U	71	1.9	3 J	0.1 J		1.8 J	98		1.7	4 U	0.2 U
7/25/2006	XX	GW206X1G1	1.2		0.1 U	71	1.5	3 U	0.1 U		1 J	88		2.2	4 U	0.2 U
9/12/2006	XX	GW206X1IE	0.3 U		0.1 U	68	0.9 J	3 U	0.1 U		1.1 J	66		0.8 J	4 U	0.2 U
5/14/2007	XX	GW206X221	0.5 U		0.1 U	68	1.2	3 U	0.1 U		0.8 J	97		2.7	4 U	0.2 U
7/25/2007	XX	GW206X265	0.3 U		0.1 U	62	2.5	10	0.1 U		2.5	85		2.1	4 U	0.2 U
9/11/2007	XX	GW206X28F	0.5 U		0.1 U	58	2.6	3 U	0.1 U		1.2 J	95		2.6	4 U	0.2 U
5/20/2008	XX	GW206X2C9	0.3 U		0.1 U	67	1.5	3 U	0.1 J		1.6 J	74		1.5 J	4 U	0.2 U
7/29/2008	XX	GW206X2FD	0.5 U		0.1 U	69	1.5	3 J	0.2 J		2	83		1.4 J	4 U	0.2 U
10/27/2008	XX	GW206X2I3	0.5 U		0.5	69	0.9 J	3 U	0.1 U		4.1	90		1.2 J	4 U	0.2 U
4/13/2009	XX	GW206X31B	0.5 U		0.1 U	68	1.6	4 J	0.2 J		1.4 J	97		1.2 J	4 U	0.2 U
7/6/2009	XX	GW206X35F	2 U		0.1 U	68	1.3	3 U	0.1 J		1.9 J	86		0.7 U	4 U	0.2 U
10/28/2009	XX	GW206X3DA	0.3 U		0.1 U	71	1.7	3 U	0.1 U		1.2 J	86		0.8 J	4 U	0.2 U
4/26/2010	XX	GW206X3I9	0.3 U		0.3 J	67	2.7	3 U	0.1 U		1.6 J	69		0.7 J	4 U	0.2 U
7/19/2010	XX	GW206X41D	2.4		0.6	70	1.8	8 J	0.1 U		1.7 J	81		1.4 J	4 U	0.2 U

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(MW-206) Date	Type	Sample ID	Total Kjeldahl Nitrogen mg/L	Biochemical Oxygen Demand mg/L	Ammonia (N) mg/L	Bicarbonate (CaCO3) mg/L	Chloride mg/L	Chemical Oxygen Demand mg/L	Nitrate (N) mg/L	Phosphate Phosphorus mg/L	Sulfate mg/L	Total Dissolved Solids mg/L	Bromide mg/L	Organic Carbon mg/L	Total Suspended Solids mg/L	Tannin & Lignins (Tannic Acid) mg/L	
10/18/2010	XX	GW206X44H	2.4		2	80	1.2	5 J	0.1 U		0.6 U	98		1.5 J	10	0.2 U	
4/25/2011	XX	GW206X48I	0.3 U		0.1 U	65	1.1	3 J	0.1 U		1 J	97		0.7 U	8	0.2 U	
7/18/2011	XX	GW206X4CG	1.2		0.1 U	73	1.8	14	0.1 U		0.8 J	92		2.2	12	0.2 U	
10/24/2011	XX	GW206X4GB	0.3 U		0.1 U	69	1.8	6 J	0.1 J		1.1 J	91		1.1 J	5	0.2 U	
4/23/2012	XX	GW206X511	0.3 U		0.5 U	70	1.8	10 U	0.3 U		2.7	91		2 U	4 U	0.2 U	
7/23/2012	XX	GW206X560	0.35		0.5 U	69	1.2	10 U	0.3 U		2 U	99		2 U	4 U	0.2 U	
7/23/2012	XD	GWDP4X573	0.3 U		0.5 U	68	1.4	10 U	0.3 U		2.1	86		2 U	6	0.2 U	
10/22/2012	XX	GW206X5CB	0.94		0.5 U	70	1.2	10 U	0.3 U		2 U	95		2 U	4	0.2 U	
4/22/2013	XX	GW206X5H2	0.311		0.5 U	66	2.4	10 U	0.3 U		2.8	88	0.1 U	2 U	4 U	0.2 U	
7/29/2013	XX	GW206X637	0.684			66	2	10 U	0.3 U		2.2	88	0.1 U	2 U	4 U	0.2 U	
7/29/2013	XD	GWDP4X64A	0.492			63	1.8	10 U	0.3 U		2.2	90	0.1 U	2 U	4 U	0.2 U	
10/28/2013	XX	GW206X660	0.5 U			70	2.4	10 U	0.3 U		2.3	95	0.1 U	2 U	4 U	0.2 U	
4/21/2014	XX	GW206X6E3	0.5 U			71	2.6	10 U	0.3 U		2 U	83	0.1 U	2 U	4 U	0.2 U	
7/28/2014	XX	GW206X6IB	0.5 U			68	1.3	10 U	0.3 U		2 U	83	0.1 U	2 U	4 U	0.2 U	
7/28/2014	XD	GWDP1X6IG	0.8			67	1.1	10 U	0.3 U		2 U	87	0.1 U	2 U	4 U	0.2 U	
10/20/2014	XX	GW206X721	0.5 U			74	1.6	10 U	0.3 U		2 U	91	0.1 U	2 U	4 U	0.2 U	
MW-207																	
5/12/2005	XX	GW207X124	0.59		0.1 U	68	1.9	3 U	0.1 U		0.6 U	104		2	6	0.51	
8/1/2005	XX	GW207X15C	0.6		0.1 U	78	2.1	3 U	0.1 U		0.6 U	101		1 J	5	0.3	
9/19/2005	XX	GW207X18A	0.3		0.1 U	73	1.7	3 U	0.1 U		1.2 J	93		3.1	4 U	0.25	
9/19/2005	XD	GWDP1X18F	0.31		0.1 U	62	2.3	3 U	0.1 U		1.2 J	90		1.1 J	4 U	0.24	
5/22/2006	XX	GW207X1D5	0.42		0.1 U	72	3.6	7 J	0.1 U		5.8	114		4.6	4 U	0.29	
7/25/2006	XX	GW207X1G2	0.58		0.1 U	73	1.8	4 J	0.1 U		2.1	117		4.8	4 U	0.2 U	
9/11/2006	XX	GW207X1IF	0.55		0.1 U	71	2.3	11	0.1 U		1.6 J	105		4.7	4 U	0.2 U	
5/14/2007	XX	GW207X222	0.5 U		0.1 U	80	3.6	8 J	0.1 U		4	130		2.5	10	0.28	
7/25/2007	XX	GW207X266	0.3		0.1 U	89	5.5	17	0.1 U		7.8	136		4.5	4	0.2 U	
9/10/2007	XX	GW207X28G	0.39		0.1 U	90	4.9	12	0.1 J		6.8	143		6.8	4 U	0.2 U	
5/19/2008	XX	GW207X2CA	0.54		0.1 U	100	2.2	9 J	0.1 U		7.6	144		3.7	4 U	0.2 U	
7/29/2008	XX	GW207X2FE	0.5 U		0.1 U	115	2.6	11	0.1 J		8.7	162		5.2	4 U	0.27	
10/28/2008	XX	GW207X2I4	0.58		0.1 U	142	2	20	0.1 U		7.7	210		6.4	8	0.36	
4/13/2009	XX	GW207X31C	25		15.7	230	4.8	44	0.3		0.8 J	195		17.1	20	1.8	
7/6/2009	XX	GW207X35G	22		20.7	284	4.9	55	0.1 U		0.7 J	213		22.3	38	2.1	
10/26/2009	XX	GW207X3DB	12		9	195	5.9	35	2.9		9.4	265		9.2	17	1	
4/26/2010	XX	GW207X3IA	3.8		2.2	238	5.2	14	0.1 J		6.1	259		6.5	46	0.74	
7/19/2010	XX	GW207X41E	4.4		2.5	228	4.9	18	0.6		6.6	244		5.3	29	0.78	
10/18/2010	XX	GW207X44I	5.1		4.1	213	4	18	0.1 U		5.2	286		6.2	14	2.3	
4/25/2011	XX	GW207X48J	1.9		1.5	207	3.6	11	0.1 U		7	266		4.4	4 U	0.4 U	
MW-223A																	
5/10/2005	XX	GW223A126	0.3 U		0.1 U	87	2.2	3 U	0.1 J		4.7	112		0.5 J	4 U	0.2 U	
5/10/2005	XD	GWDP3X130	0.3 U		0.1 U	90	2.2	3 U	0.1 J		4.7	114		0.5 U	4 U	0.2 U	
7/26/2005	XX	GW223A15E	0.3 U		0.1 U	88	2.3	3 U	0.1 J		4.3	117		0.5 U	4 U	0.2 U	
9/21/2005	XX	GW223A18C	0.3 U		0.1 U	87	2.5	3 U	0.1 J		4.8	123		3.4	4 U	0.2 U	
5/24/2006	XX	GW223A1D7	0.34		0.1 U	91	3	3 U	0.3		6.4	136		1.9	4 U	0.2 U	
5/24/2006	XD	GWDP1X1DA	0.59		0.1 U	90	3	3 J	0.3		7	126		1.2 J	4 U	0.2 U	
7/26/2006	XX	GW223A1G4	0.45		0.1 U	90	1.9	6 J	0.2 J		4.4	128		2	4 U	0.2 U	
7/26/2006	XD	GWDP5X1I3	0.34		0.1 U	88	2	5 J	0.2 J		4.3	133		1.3 J	4 U	0.2 U	
9/13/2006	XX	GW223A1IH	0.3 U		0.1 U	104	2.2	3 J	0.1 U		4.2	99		2.2	4 U	0.2 U	
9/13/2006	XD	GWDP5X20G	0.36		0.1 U	91	2.2	3 U	0.1 U		4.4	90		0.6 J	4 U	0.2 U	

(MW-223A)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)	
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
5/15/2007	XX	GW223A224	0.5 U		0.1 U	93	2.7	3 U	0.1 U		4.1	110		3.2	4 U	0.25	
5/15/2007	XD	GWDP1X227	0.5 U		0.1 U	91	2.8	3 U	0.1 U		4	117		1.1 J	4 U	0.31	
7/24/2007	XX	GW223A268	0.3 U		0.1 U	86	3.2	3 U	0.1 J		4.9	36		2.6	4 U	0.2 U	
7/24/2007	XD	GWDP5X287	0.3 U		0.1 J	76	3.2	5 J	0.1 J		4.8	127		1.7	4 U	0.2 U	
9/11/2007	XX	GW223A28I	0.5 U		0.1 U	88	3.6	3 U	0.2 J		4.7	128		0.8 J	4 U	0.2 U	
5/20/2008	XX	GW223A2CC	0.3 U		0.1 U	92	2.8	3 U	0.2 J		5.4	125		1.3 J	4 U	0.2 U	
5/20/2008	XD	GWDP1X2CF	0.3 U		0.1 U	95	2.8	4 J	0.2 J		5.4	121		1.4 J	4 U	0.2 U	
7/30/2008	XX	GW223A2FG	0.5 U		0.1 U	99	2.9	3 J	0.3		6	146		0.7 U	4 U	0.2 U	
7/30/2008	XD	GWDP5X2HF	1.3		0.1 U	95	3.2	3 U	0.3		5.7	121		0.7 J	4 U	0.2 U	
10/28/2008	XX	GW223A2I6	0.5 U		0.1 J	98	2.6	3 U	0.2 J		6.4	137		0.7 U	4 U	0.2 U	
4/14/2009	XX	GW223A31E	0.5 U		0.1 U	155	14	3 U	0.1 U		3.7	229		1.2 J	4 U	0.2 U	
4/14/2009	XD	GWDP1X31H	0.5 U		0.1 U	165	14.1	3 U	0.1 J		4.4	226		1.2 J	4 U	0.2 U	
7/7/2009	XX	GW223A35I	0.5 U		0.1 U	108	8.9	3 U	0.2 J		4.8	162		0.7 U	4 U	0.2 U	
10/27/2009	XX	GW223A3DD	0.3 U		0.1 U	112	10.6	3 U	0.1 J		4.2	165		0.7 U	4 U	0.2 U	
10/27/2009	XD	GWDP4X3ED	0.3 U		0.1 U	113	11	3 U	0.1 J		4.2	171		0.9 J	4 U	0.2 U	
4/27/2010	XX	GW223A3IC	0.3 U		0.1 U	124	14.2	3 U	0.2 J		4.5	189		2.1	4 U	0.2 U	
4/27/2010	XD	GWDP1X3IF	0.3 U		0.1 U	121	14.2	3 J	0.1 J		4.5	169		1.4 J	4 U	0.2 U	
7/20/2010	XX	GW223A41G	0.56		0.1 U	127	12.7	3 U	0.2 J		4.2	176		0.7 U	4 U	0.2 U	
10/19/2010	XX	GW223A450	0.3 U		0.1 U	120	16.5	3 U	0.1 J		3.9	229		0.7 U	4 U	0.2 U	
10/19/2010	XD	GWDP1X453	0.35		0.1 U	125	14.9	3 U	0.1 J		3.7	214		0.7 U	4 U	0.2 U	
4/26/2011	XX	GW223A491	0.3 U		0.1 J	137	20.3	3 U	0.2 J		3.8	224		0.7 U	4 U	0.2 U	
4/26/2011	XD	GWDP1X494	0.3 U		0.1 U	135	19.5	3 U	0.2 J		3.7	230		0.7 U	4 U	0.2 U	
7/19/2011	XX	GW223A4CJ	0.3 U		0.1 J	138	21.3	3 U	0.1 J		4.7	241		0.7 U	4 U	0.2 U	
10/25/2011	XX	GW223A4GE	0.3 U		0.1 U	143	21.8	3 U	0.4		6.3	231		0.7 U	4 U	0.2 U	
10/25/2011	XD	GWDP3X4H8	0.3 U		0.1 U	139	22.8	3 U	0.4		6.6	235		0.7 U	4 U	0.2 U	
4/24/2012	XX	GW223A514	0.3 U		0.5 U	149	24.1	10 U	0.3 U		7.4	244		2 U	4 U	0.2 U	
4/24/2012	XD	GWDP1X517	0.3 U		0.5 U	147	24.1	10 U	0.3 U		7.5	231		2 U	4 U	0.2 U	
7/24/2012	XX	GW223A563	0.31		0.5 U	144	23.9	10 U	0.3 U		7.8	229		2 U	4 U	0.2 U	
10/23/2012	XX	GW223A5CE	0.31		0.5 U	153	25.4	10 U	0.3 U		4	262		2 U	4 U	0.2 U	
10/23/2012	XD	GWDP3X5D8	0.3 U		0.5 U	149	24.4	10 U	0.3 U		7	266		2 U	4 U	0.2 U	
4/23/2013	XX	GW223A5H5	0.323		0.5 U	168	34.9	10 U	0.3 U		9	275	0.2	2 U	4 U	0.2 U	
4/23/2013	XD	GWDP1X5H8	0.3 U		0.5 U	168	35.2	10 U	0.3 U		9.8	275	0.18	2 U	4 U	0.2 U	
7/30/2013	XX	GW223A63A	0.556			168	45.2	10 U	0.5		9.3	266	0.15	2 U	4 U	0.2 U	
10/29/2013	XX	GW223A663	0.5 U			176	36.8	10 U	0.4		8.6	278	0.22	2 U	4 U	0.2 U	
10/29/2013	XD	GWDP3X66H	0.5 U			170	36.6	10 U	0.5		8.6	278	0.22	2 U	4 U	0.2 U	
4/22/2014	XX	GW223A6E6	0.5 U			186	57.6	10 U	0.4		12.1	288	0.1 U	2 U	4 U	0.2 U	
4/22/2014	XD	GWDP1X6E9	0.5 U			185	56.3	10 U	0.4		12.3	282	0.1 U	2 U	4 U	0.2 U	
7/29/2014	XX	GW223A6ID	0.5			176	36	10 U	0.4		4.4	288	0.15	2 U	4 U	0.2 U	
10/21/2014	XX	GW223A723	0.5 U			178	32	10 U	0.3 U		8	296	0.16	2 U	4 U	0.2 U	
10/21/2014	XD	GWDP3X72I	0.5 U			177	31.9	10 U	0.3 U		7.8	313	0.17	2 U	4 U	0.2 U	
MW-223B																	
5/10/2005	XX	GW223B13F	0.3 U		0.1 U	98	3.1	3 U	0.2 J		3.5	120		5.7	4 U	0.2 U	
7/26/2005	XX	GW223B173	0.3 U		0.1 U	95	3	3 U	0.2 J		3.7	127		0.5 U	4 U	0.2 U	
9/21/2005	XX	GW223B1A1	0.3 U		0.1 U	96	3.2	3 U	0.2 J		3.6	129		1.3 J	4 U	0.2 U	
5/24/2006	XX	GW223B1EG	0.34		0.1 U	100	3.8	3 U	0.4		5.2	137		1.6	4 U	0.2 U	
7/26/2006	XX	GW223B1HD	0.53		0.1 U	99	2.1	6 J	0.3		3.5	142		1.7	4 U	0.2 U	
9/13/2006	XX	GW223B206	0.33		0.1 U	104	2.7	3 U	0.1 U		4.2	93		2.2	4 U	0.2 U	
5/15/2007	XX	GW223B23D	0.5 U		0.1 U	103	3.6	3 U	0.1 U		3.2	117		3.3	4 U	0.37	
7/24/2007	XX	GW223B27H	0.3 U		0.1 U	98	4.3	3 J	0.2 J		5.6	147		2.7	4 U	0.2 U	

(MW-223B)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)	
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
9/11/2007	XX	GW223B2A7	2.5 U		0.1 U	100	5.7	3 U	0.2 J		3.8	141		0.5 J	4 U	0.2 U	
5/20/2008	XX	GW223B2E1	0.3 U		0.1 U	111	5.4	3 U	0.2 J		4.4	150		2.2	4 U	0.2 U	
7/30/2008	XX	GW223B2H5	0.5 U		0.1 U	124	5.8	4 J	0.3		4.9	158		0.7 U	4 U	0.2 U	
10/28/2008	XX	GW223B2JF	0.5 U		0.1 U	120	5.5	3 J	0.2 J		5.6	163		0.8 J	4 U	0.2 U	
4/14/2009	XX	GW223B333	0.5 U		0.1 U	103	6.8	3 U	0.1 U		3	145		3.4	4 U	0.2 U	
7/7/2009	XX	GW223B377	0.5 U		0.1 U	129	9.6	3 U	0.1 U		4	176		0.7 U	4 U	0.2 U	
7/7/2009	XD	GWDP4X36I	0.5 U		0.1 U	128	8.7	3 U	0.1 U		3.9	171		0.7 U	4 U	0.2 U	
10/27/2009	XX	GW223B3F2	0.3 U		0.1 U	128	10.9	3 J	0.2 J		3.5	166		0.8 J	4 U	0.2 U	
4/27/2010	XX	GW223B401	0.3 U		0.1 U	133	12.6	3 J	0.1 J		3.8	185		0.8 J	4 U	0.2 U	
7/20/2010	XX	GW223B435	1.5		1.3	140	11.8	12	0.1 U		2.2	173		2.6	4 U	0.2 U	
7/20/2010	XD	GWDP1X41J	1.7		1.1	136	12	5 J	0.1 U		2.3	173		2.7	4 U	0.2 U	
10/19/2010	XX	GW223B469	0.33		0.3 J	128	12	3 U	0.1 U		3.1	195		0.8 J	4 U	0.2 U	
4/26/2011	XX	GW223B4AA	0.3 U		0.1 U	124	15.6	3 U	0.1 U		2.5	185		0.7 U	4 U	0.2 U	
7/19/2011	XX	GW223B4E8	1.1		0.3 J	122	18.1	3 J	0.1 J		3.6	198		1.9 J	4 U	0.2 U	
7/19/2011	XD	GWDP3X4DD	1.2		0.3 J	127	18	4 J	0.1 J		2.6	189		1.9 J	4 U	0.31	
10/25/2011	XX	GW223B4I3	1		0.6	128	17.9	9 J	0.1 U		3.3	199		1.8 J	4	0.27	
4/24/2012	XX	GW223B52D	0.57		0.5 U	118	22.3	10 U	0.3 U		5.1	190		2 U	4 U	0.2 U	
7/24/2012	XX	GW223B57C	0.79		0.5 U	115	24.4	10 U	0.3 U		4.6	205		2 U	4 U	0.2 U	
7/24/2012	XD	GWDP3X56H	0.45		0.5 U	117	23.7	10 U	0.3 U		4.6	191		2 U	4 U	0.2 U	
10/23/2012	XX	GW223B5E3	0.3 U		0.5 U	121	24.1	10 U	0.3 U		5	216		2 U	4 U	0.2 U	
4/23/2013	XX	GW223B5IE	0.597		0.5 U	124	32.6	10 U	0.3 U		5.6	201	0.16	2 U	4 U	0.2 U	
7/30/2013	XX	GW223B64J	0.493			119	42.9	10 U	0.5		5.7	185	0.16	2 U	4 U	0.2 U	
10/29/2013	XX	GW223B67C	0.5 U			125	34.3	10 U	0.4		5.5	202	0.2	2 U	4 U	0.2 U	
4/22/2014	XX	GW223B6FF	0.5 U			135	55.7	10 U	0.3		7.6	225	4.13	2 U	4 U	0.2 U	
7/29/2014	XX	GW223B700	1.2			133	34.8	10 U	0.4		3	225	0.18	2 U	4 U	0.2 U	
10/21/2014	XX	GW223B73C	0.5 U			135	31.6	10 U	0.3 U		5.2	239	0.15	2 U	4 U	0.2 U	
MW-227																	
5/9/2005	XX	GW227X127	0.3 U		0.1 U	81	1.5	3 U	0.1 U		10.5	113		0.5 J	4 U	0.2 U	
7/27/2005	XX	GW227X15F	0.3 U		0.1 U	79	1.7	3 U	0.1 U		8.3	113		0.7 J	4 U	0.2 U	
9/21/2005	XX	GW227X18D	0.3 U		0.1 U	79	1.8	3 U	0.1 U		9.3	108		1.3 J	4 U	0.2 U	
5/24/2006	XX	GW227X1D8	0.42		0.1 U	81	2	3 U	0.1 J		12.8	116		2.2	4 U	0.2 U	
7/26/2006	XX	GW227X1G5	0.37		0.1 U	76	1.6	5 J	0.1 U		9.7	115		1.5	4 U	0.2 U	
9/13/2006	XX	GW227X1II	0.55		0.1 U	84	1.4	3 J	0.1 U		9.2	74		0.5 J	4 U	0.2 U	
5/15/2007	XX	GW227X225	0.5 U		0.1 U	79	1.7	3 U	0.1 U		8.8	95		2.2	4 U	0.45	
7/24/2007	XX	GW227X269	0.3 U		0.1 U	75	2.4	6 J	0.1 U		9.9	120		3.7	4 U	0.2 U	
9/11/2007	XX	GW227X28J	0.5 U		0.1 U	77	2.6	5 J	0.1 U		10.5	112		1.1 J	4 U	0.2 U	
5/20/2008	XX	GW227X2CD	0.3 U		0.1 U	80	1.5	3 U	0.1 J		11	104		2.9	4	0.2 U	
7/30/2008	XX	GW227X2FH	0.5 U		0.1 U	82	1.5	3 J	0.2 J		11.3	116		1.2 J	4 U	0.2 U	
10/27/2008	XX	GW227X2I7	0.5 U		0.1 U	75	1.3	3 U	0.1 U		14.4	98		1.6 J	4 U	0.2 U	
4/14/2009	XX	GW227X31F	0.5 U		0.1 U	80	3	3 U	0.1 U		8.9	122		2.8	4 U	0.2 U	
7/7/2009	XX	GW227X35J	0.5 U		0.1 U	75	2	3 U	0.1 U		10.4	111		0.7 U	4 U	0.2 U	
10/27/2009	XX	GW227X3DE	0.3 U		0.1 U	80	2.3	3 U	0.1 U		9.2	105		1.7 J	4 U	0.2 U	
4/27/2010	XX	GW227X3ID	0.3 U		0.1 U	81	22.9	3 U	0.1 J		1.6 J	99		6.9	4 U	0.2 U	
7/20/2010	XX	GW227X41H	0.3 U		0.1 J	79	1.1	3 U	0.1 U		8.6	100		0.7 U	4 U	0.2 U	
10/19/2010	XX	GW227X451	0.3 U		0.1 U	77	1.7	3 U	0.1 U		8.1	115		0.7 U	4 U	0.2 U	
4/26/2011	XX	GW227X492	0.3 U		0.1 U	76	1.1	3 U	0.1 U		7.5	114		0.7 U	4 U	0.2 U	
7/19/2011	XX	GW227X4D0	0.3 U		0.1 U	80	1	3 U	0.1 U		9.7	115		0.7 U	4 U	0.2 U	
10/25/2011	XX	GW227X4GF	0.3 U		0.1 U	78	2.2	3 U	0.1 U		11.2	107		0.7 U	4 U	0.2 U	
4/24/2012	XX	GW227X515	0.3 U		0.5 U	79	1.6	10 U	0.3 U		12	108		2 U	4 U	0.2 U	

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(MW-227) Date	Type	Sample ID	Total Kjeldahl Nitrogen mg/L	Biochemical Oxygen Demand mg/L	Ammonia (N) mg/L	Bicarbonate (CaCO3) mg/L	Chloride mg/L	Chemical Oxygen Demand mg/L	Nitrate (N) mg/L	Phosphate Phosphorus mg/L	Sulfate mg/L	Total Dissolved Solids mg/L	Bromide mg/L	Organic Carbon mg/L	Total Suspended Solids mg/L	Tannin & Lignins (Tannic Acid) mg/L
7/24/2012	XX	GW227X564	0.3 U		0.5 U	75	1 U	10 U	0.3 U		13.4	109		2 U	4 U	0.2 U
10/23/2012	XX	GW227X5CF	0.31		0.5 U	78	2.6	10 U	0.3 U		11.2	222		2 U	4 U	0.2 U
4/23/2013	XX	GW227X5H6	0.3 U		0.5 U	81	2.4	10 U	0.3 U		14.4	118	0.1 U	2 U	4 U	0.2 U
7/30/2013	XX	GW227X63B	0.635			77	2	10 U	0.3 U		11.5	103	0.1 U	2 U	4 U	0.2 U
7/30/2013	XD	GWDP3X644	0.59			77	2.1	10 U	0.3 U		12.9	104	0.1 U	2 U	4 U	0.2 U
10/29/2013	XX	GW227X664	0.5 U			79	2.5	10 U	0.3 U		11	114	0.1 U	2 U	4 U	0.2 U
4/22/2014	XX	GW227X6E7	0.5 U			84	2	10 U	0.3 U		17.3	111	0.1 U	2 U	4 U	0.2 U
4/22/2014	XD	GWDP3X6F0	0.5 U			84	2.1	10 U	0.3 U		17.3	110	0.1 U	2 U	4 U	0.2 U
7/29/2014	XX	GW227X6IE	0.5 U			84	1.3	10 U	0.3 U		5.7	107	0.1 U	2 U	4 U	0.2 U
7/29/2014	XD	GWDP3X6J7	0.5 U			78	1.2	10 U	0.3 U		5.7	109	0.1 U	2 U	4 U	0.2 U
10/21/2014	XX	GW227X724	0.5 U			81	1.4	10 U	0.3 U		10.2	116	0.16	2 U	4 U	0.2 U
MW-301																
5/9/2005	XX	GW301X128	0.3 U		0.1 U	75	1.8	3 U	0.1 U		12.2	113		4.2	4 U	0.2 U
8/1/2005	XX	GW301X15G	0.34		0.1 U	76	1.9	3 U	0.1 U		8	108		0.5 U	4 U	0.2 U
9/22/2005	XX	GW301X18E	0.3 U		0.1 U	75	2	3 U	0.1 U		10.9	115		1.4 J	4 U	0.2 U
5/22/2006	XX	GW301X1D9	0.39		0.1 U	78	3.4	3 U	0.1 U		14.3	122		1.9	5	0.2 U
7/24/2006	XX	GW301X1G6	0.6		0.1 U	76	1.5	3 U	0.1 U		11.5	109		1.3 J	4 U	0.2 U
9/11/2006	XX	GW301X1IJ	0.37		0.1 U	77	1.5	3 U	0.1 U		11.5	104		2.1	6	0.2 U
5/14/2007	XX	GW301X226	0.5 U		0.1 U	73	1.7	3 U	0.1 U		9.8	124		1.3 J	4	0.2 U
7/23/2007	XX	GW301X26A	0.3 U		0.1 U	72	2	9 J	0.1 U		11.8	110		1.7	18	0.2 U
9/10/2007	XX	GW301X290	0.3 U		0.1 U	74	1.8	3 J	0.1 U		14.1	144		0.9 J	4 U	0.2 U
5/19/2008	XX	GW301X2CE	0.5 U		0.1 U	75	1.2	3 U	0.1 U		14.4	114		2	4 U	0.2 U
7/30/2008	XX	GW301X2FI	0.5 U		0.1 U	75	1.7	3 J	0.1 J		14.8	121		1.3 J	5	0.2 U
10/28/2008	XX	GW301X2I8	0.5 U		0.1 U	75	1.1	3 J	0.1 U		14.8	125		0.7 U	4 U	0.21
4/15/2009	XX	GW301X31G	0.5 U		0.1 U	91	6	12	0.7		14.4	160		5.7	4 U	0.2 U
7/7/2009	XX	GW301X360	0.5 U		0.1 U	76	1.9	4 J	0.1 U		13.6	118		1.2 J	6	0.2 U
10/26/2009	XX	GW301X3DF	0.3 U		0.1 U	82	1.9	3 U	0.1 U		12.5	123		0.7 U	7	0.2 U
4/26/2010	XX	GW301X3IE	0.3 U		0.1 U	72	2.6	3 U	0.1 U		12.4	117		1.9 J	21	0.2 U
7/19/2010	XX	GW301X41I	0.3 U		0.1 U	73	1.4	3 U	0.1 U		11.7	109		0.7 U	8	0.2 U
10/19/2010	XX	GW301X452	0.3 U		0.1 U	76	1.5	3 U	0.1 U		12.3	133		0.7 U	4 U	0.2 U
4/27/2011	XX	GW301X493	0.34		0.1 U	76	1.3	3 U	0.1 U		10.3	126		0.7 U	4 U	0.2 U
7/20/2011	XX	GW301X4D1	0.41		0.1 U	73	1.4	3 U	0.1 U		11.7	118		0.7 U	4 U	0.2 U
10/26/2011	XX	GW301X4GG	0.3 U		0.1 U	72	1.9	3 J	0.1 U		11.3	127		0.7 U	6	0.2 U
4/25/2012	XX	GW301X516	0.3 U		0.5 U	76	2.3	10 U	0.3 U		15	123		2 U	13	0.2 U
7/25/2012	XX	GW301X565	0.3 U		0.5 U	74	2.3	10 U	0.3 U		14.3	118		2 U	4 U	0.2 U
10/24/2012	XX	GW301X5CG	0.3 U		0.5 U	77	2.3	10 U	0.3 U		15.1	130		2 U	20	0.2 U
10/24/2012	XD	GWDP4X5DE	0.31		0.5 U	75	2.3	10 U	0.3 U		15.2	118		2 U	15	0.2 U
4/22/2013	XX	GW301X5H7	!		!	!	!	!	!		!	!	!	!	!	!
7/31/2013	XX	GW301X63C	0.543			76	2.3	10 U	0.3 U		14.6	136	0.1 U	2 U	11	1 U
10/30/2013	XX	GW301X665	0.5 U			76	3.1	10 U	0.3 U		11.9	130	0.1 U	2 U	4	0.2 U
10/30/2013	XD	GWDP1X666	0.5 U			75	3.1	10 U	0.3 U		14.5	129	0.1 U	2 U	4 U	0.2 U
4/23/2014	XX	GW301X6E8	0.5 U			76	3.9	10 U	0.3 U		15.4	119	0.1 U	2 U	9	0.2 U
7/30/2014	XX	GW301X6IF	0.5 U			78	3.7	10 U	0.3 U		13.4	129	0.1 U	2 U	4	0.2 U
10/22/2014	XX	GW301X725	0.5 U			79	3.6	10 U	0.3 U		14.2	118	0.1 U	2 U	4 U	0.2 U
10/22/2014	XD	GWDP1X726	0.5 U			79	3.5	10 U	0.3 U		14.2	120	0.1 U	2 U	4 U	0.2 U
MW-302																
5/10/2005	XX	GW302X13D	0.3 U		0.1 U	139	14.3	3 U	0.4		10.2	192		2.7	5	0.2 U
7/27/2005	XX	GW302X171	0.3 U		0.1 U	121	12.9	3 U	0.4		7	199		1.3 J	4	0.2 U

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(MW-302) Date	Type	Sample ID	Total Kjeldahl Nitrogen mg/L	Biochemical Oxygen Demand mg/L	Ammonia (N) mg/L	Bicarbonate (CaCO3) mg/L	Chloride mg/L	Chemical Oxygen Demand mg/L	Nitrate (N) mg/L	Phosphate Phosphorus mg/L	Sulfate mg/L	Total Dissolved Solids mg/L	Bromide mg/L	Organic Carbon mg/L	Total Suspended Solids mg/L	Tannin & Lignins (Tannic Acid) mg/L
9/19/2005	XX	GW302X19J	0.3 U		0.1 U	159	14.6	3 U	0.5		9.4	227		2.3	60	0.2 U
5/23/2006	XX	GW302X1EE	0.85		0.1 U	112	18.4	3 J	0.6		11.7	208		3.3	18	0.2 U
7/24/2006	XX	GW302X1HB	0.37		0.1 U	110	26.6	3 U	0.2 J		8.5	261		1.7	21	0.2 U
9/12/2006	XX	GW302X204	0.49		0.1 U	115	34.4	3 U	0.1 J		9.5	258		1.1 J	4 U	0.2 U
5/14/2007	XX	GW302X23B	0.5 U		0.1 U	100	19.3	3 J	0.1 J		7.2	198		3.4	4 U	0.2 U
7/25/2007	XX	GW302X27F	0.3 U		0.1 U	100	18	9 J	0.1 U		9.5	190		1 J	4 U	0.2 U
9/10/2007	XX	GW302X2A5	DE		DE	DE	DE	DE	DE		DE	DE		DE	DE	DE
MW-302R																
5/20/2008	XX	GW302X2DJ	0.3 U		0.1 U	66	26.2	3 U	0.2 J		7	148		2.1	4	0.2 U
7/29/2008	XX	GW302X2H3	0.5 U		0.1 U	75	22.2	3 J	0.3		9	176		1.2 J	4 U	0.2 U
10/27/2008	XX	GW302X2JD	0.5 U		0.1 U	91	22.5	3 U	0.2 J		10.5	201		1.3 J	4 U	0.2 U
4/13/2009	XX	GW302X331	0.5 U		0.1 U	44	20.8	5 J	0.3		5.6	145		3.1	4 U	0.2 U
7/6/2009	XX	GW302X375	0.5 U		0.1 U	46	25.4	3 J	0.1 U		8.8	144		1.2 J	4 U	0.2 U
10/27/2009	XX	GW302X3F0	0.3 U		0.1 U	116	55.9	3 J	0.7		22.9	306		1.5 J	4 U	0.2 U
4/26/2010	XX	GW302X3JJ	0.3 U		0.1 U	46	12.8	3 U	0.1 J		6.9	78		1 J	4 U	0.2 U
7/19/2010	XX	GW302X433	0.3 U		0.1 U	106	56.1	3 U	1.4		18	318		0.8 J	4 U	0.2 U
10/18/2010	XX	GW302X467	0.3 U		0.1 U	96	60.8	3 U	1.6		21.7	327		0.9 J	4 U	0.2 U
4/25/2011	XX	GW302X4A8	0.3 U		0.1 U	44	51.2	3 U	0.2 J		8.9	196		0.7 U	4 U	0.2 U
7/18/2011	XX	GW302X4E6	0.3 U		0.1 U	58	61.5	3 U	0.2 J		13.3	239		0.7 J	4 U	0.2 U
10/24/2011	XX	GW302X4I1	0.3 U		0.1 U	80	49.3	3 U	0.4		15.8	236		0.7 J	4 U	0.2 U
4/23/2012	XX	GW302X52B	0.3 U		0.5 U	51	28.2	10 U	0.3 U		10.8	150		2 U	4 U	0.2 U
7/23/2012	XX	GW302X57A	0.3		0.5 U	57	52.4	10 U	0.3 U		21.1	223		2 U	4 U	0.2 U
10/22/2012	XX	GW302X5E1	0.64		0.5 U	78	66.1	10 U	0.8		28.8	287		2 U	4 U	0.2 U
4/22/2013	XX	GW302X5IC	0.3 U		0.5 U	46	24.5	10 U	0.3 U		11.7	120	0.1 U	2 U	4 U	0.2 U
7/29/2013	XX	GW302X64H	0.68			53	77.1	10 U	0.6		17.9	234	0.1 U	2 U	4 U	0.2 U
10/28/2013	XX	GW302X67A	0.5 U			57	55.8	10 U	0.6		16	199	0.1 U	2 U	4 U	0.2 U
4/21/2014	XX	GW302X6FD	0.5 U			61	91.3	10 U	0.3 U		17.6	202	0.1 U	2 U	4 U	0.2 U
7/28/2014	XX	GW302X6JJ	0.6			70	89.7	10 U	0.6 U		6	315	0.2 U	2 U	4 U	0.2 U
10/20/2014	XX	GW302X73A	0.5 U			105	63.1	16	0.5		32.2	300	0.11	2 U	4 U	0.2 U
MW-303																
5/11/2005	XX	GW303X13H	0.3 U		0.1 U	25	1.6	3 U	0.1 J		2.6	59		0.8 J	4 U	0.2 U
8/1/2005	XX	GW303X175	0.3 U		0.1 U	24	1.8	3 U	0.1 U		1.4 J	40		0.5 U	4 U	0.2 U
8/1/2005	XD	GWDP1X15H	0.3 U		0.1 U	24	1.8	3 U	0.1 U		1 J	45		0.7 J	4 U	0.2 U
9/19/2005	XX	GW303X1A3	0.3 U		0.1 U	25	2.1	3 U	0.1 U		1.7 J	44		1.1 J	4 U	0.2 U
5/23/2006	XX	GW303X1EI	0.3 U		0.1 U	25	2.8	4 J	0.1 J		2	68		1.4 J	4 U	0.2 U
7/24/2006	XX	GW303X1HF	0.37		0.1 U	24	1.5	3 U	0.1 J		1.6 J	47		1 J	4 U	0.2 U
7/24/2006	XD	GWDP4X1H4	0.34		0.1 U	23	1.5	3 U	0.1 J		1.6 J	51		1.5	4 U	0.2 U
9/12/2006	XX	GW303X208	0.3 U		0.1 U	24	1.6	3 U	0.1 U		1.8 J	35		1 J	4 U	0.2 U
5/14/2007	XX	GW303X23F	0.66		0.1 U	26	1.6	3 U	0.1 U		1.5 J	67		1.8	4 U	0.2 U
7/25/2007	XX	GW303X27J	0.3 U		0.1 U	22	2.4	6 J	0.1 U		1.9 J	49		1.3 J	4 U	0.2 U
7/25/2007	XD	GWDP4X278	0.3 U		0.1 U	24	2.5	13	0.1 U		1.9 J	55		0.9 J	4 U	0.2 U
9/11/2007	XX	GW303X2A9	0.5 U		0.1 U	28	2.8	3 U	0.1 U		1 J	67		2.2	4 U	0.2 U
9/11/2007	XD	GWDP1X291	0.5 U		0.1 U	27	2.5	13	0.1 U		1 J	57		2.2	4 U	0.2 U
5/19/2008	XX	GW303X2E3	0.5 U		0.1 U	41	1.3	3 U	0.1 U		1.7 J	65		1.1 J	4 U	0.2 U
7/29/2008	XX	GW303X2H7	0.66		0.1 U	49	1.7	4 J	0.1 J		2.2	65		0.7 J	4 U	0.2 U
7/29/2008	XD	GWDP4X2GG	0.5 U		0.1 U	50	1.7	3 J	0.2 J		2	67		1.4 J	4 U	0.2 U
10/27/2008	XX	GW303X2JH	0.5 U		0.1 U	54	1.6	3 U	0.1 U		1.8 J	81		1 J	4 U	0.2 U
10/27/2008	XD	GWDP3X2J0	0.5 U		0.1 U	52	1.8	3 U	0.1 U		2.5	71		1 J	4 U	0.2 U

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(MW-303)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)	
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
4/13/2009	XX	GW303X335	1 U		0.1 U	72	3.2	6 J	0.2 J		2.1	120		1.8 J	4 U	0.2 U	
7/6/2009	XX	GW303X379	2 U		0.1 U	86	4.1	3 U	0.1 U		1.8 J	115		1.9 J	4 U	0.2 U	
7/6/2009	XD	GWDP3X36C	1 U		0.1 U	87	4.3	3 U	0.1 U		1.8 J	115		2.1	4 U	0.2 U	
10/28/2009	XX	GW303X3F4	0.3 U		0.1 U	77	3.7	3 U	0.1 U		1.3 J	103		1.1 J	4 U	0.2 U	
4/26/2010	XX	GW303X403	0.3 U		0.1 J	89	8.3	3 U	0.1 U		1.5 J	108		1.7 J	4 U	0.2 U	
7/19/2010	XX	GW303X437	0.3 U		0.1 U	91	4.5	3 U	0.1 U		1.2 J	115		0.7 U	4 U	0.2 U	
7/19/2010	XD	GWDP4X42G	0.51		0.1 U	92	4.6	3 U	0.1 U		1.2 J	117		0.7 U	4 U	0.2 U	
10/18/2010	XX	GW303X46B	0.3 U		0.1 U	82	3.5	3 U	0.1 U		0.8 J	111		0.7 U	6	0.2 U	
4/25/2011	XX	GW303X4AC	0.3 U		0.1 U	96	6.8	3 U	0.1 U		1.9 J	139		0.7 U	4 U	0.2 U	
7/18/2011	XX	GW303X4EA	0.34		0.1 U	101	5.8	3 U	0.1 U		0.9 J	135		0.8 J	4 U	0.2 U	
7/18/2011	XD	GWDP4X4DJ	0.36		0.1 U	101	5.3	3 U	0.1 U		0.8 J	138		0.7 J	4 U	0.2 U	
10/24/2011	XX	GW303X4I5	0.3 U		0.1 U	105	5.9	3 U	0.1 U		1.1 J	132		0.8 J	4 U	0.2 U	
10/24/2011	XD	GWDP4X4HE	0.3 U		0.1 U	106	5.9	3 U	0.1 U		1.1 J	135		0.9 J	4 U	0.2 U	
4/23/2012	XX	GW303X52F	0.3 U		0.5 U	113	7.5	10 U	0.3 U		2.1	162		2 U	5	0.2 U	
7/24/2012	XX	GW303X57E	!		!	!	!	!	!		!	!		!	!	!	
MW12-303R																	
10/23/2012	XX	GW303X5EG	0.3 U		0.5 U	92	4.9	10 U	0.3 U		4.2	143		2 U	4 U	0.2 U	
4/22/2013	XX	GW303X5IG	0.3 U		0.5 U	114	6.6	10 U	0.3 U		7.6	159	0.22	2 U	4 U	0.2 U	
7/29/2013	XX	GW303X651	0.673			113	8	10 U	0.5		4.2	195	0.3	2 U	4 U	0.2 U	
10/28/2013	XX	GW303X67D	0.5 U			111	8.4	10 U	0.5		2.8	158	0.42	2 U	4 U	0.2 U	
4/21/2014	XX	GW303X6FH	0.5 U			126	15.1	10 U	0.3 U		6.3	162	0.38	2 U	4 U	0.2 U	
7/28/2014	XX	GW303X701	0.9			115	9.6	12	0.3		2 U	157	0.15	2 U	4 U	0.2 U	
10/20/2014	XX	GW303X73D	0.5 U			162	48.3	10 U	0.3 U		5.5	266	0.21	2 U	4 U	0.2 U	
MW-304A																	
5/11/2005	XX	GW304A13C	0.3 U		0.1 U	37	1	3 U	0.1 U		1.5 J	63		0.5 J	4 U	0.2 U	
7/28/2005	XX	GW304A170	0.3 U		0.1 U	39	1.8	3 U	0.1 U		2.2	61		0.7 J	4 U	0.2 U	
9/19/2005	XX	GW304A19I	0.32		0.1 U	54	2.1	3 U	0.1 U		4	75		0.7 J	4 U	0.2 U	
5/24/2006	XX	GW304A1ED	0.44		0.1 U	54	1.3	3 U	0.1 J		4.7	92		1.2 J	4 U	0.2 U	
7/25/2006	XX	GW304A1HA	0.41		0.1 U	48	1.6	5 J	0.1 J		2.9	79		1.2 J	12	0.2 U	
9/12/2006	XX	GW304A203	0.3 U		0.1 U	54	1.6	3 U	0.1 U		2.8	70		0.9 J	4 U	0.2 U	
5/15/2007	XX	GW304A23A	0.5 U		0.1 U	48	2	10	0.1 J		3	59		1.5	17	0.45	
7/24/2007	XX	GW304A27E	0.3 U		0.1 U	55	2.5	8 J	0.2 J		3.9	91		3.3	4 U	0.2 U	
9/11/2007	XX	GW304A2A4	0.5 U		0.1 U	49	2.6	7 J	0.1 J		3	89		0.9 J	4 U	0.2 U	
5/20/2008	XX	GW304A2DI	0.3 U		0.1 U	39	1.7	3 J	0.2 J		2.7	55		2.3	4 U	0.2 U	
7/29/2008	XX	GW304A2H2	1 U		0.1 U	53	1.7	3 J	0.2 J		4.3	75		2	4 U	0.2 U	
10/27/2008	XX	GW304A2JC	0.5 U		0.1 U	60	2.5	3 U	0.1 J		8.8	93		1.1 J	4 U	0.2 U	
4/13/2009	XX	GW304A330	1 U		0.1 U	43	2	3 U	0.2 J		3.2	83		1.2 J	4 U	0.2 U	
7/6/2009	XX	GW304A374	2 U		0.1 U	49	2.1	3 U	0.1 J		3.4	68		0.7 U	4 U	0.2 U	
10/27/2009	XX	GW304A3EJ	0.3 U		0.1 U	51	3.3	3 U	0.1 U		2.7	83		1.8 J	4 U	0.2 U	
4/26/2010	XX	GW304A3JI	0.3 U		0.1 U	41	3.5	3 U	0.1 U		2.6	54		0.7 U	4 U	0.2 U	
7/19/2010	XX	GW304A432	0.3 U		0.1 U	49	3.2	3 U	0.1 U		2.5	68		0.7 U	4 U	0.2 U	
10/18/2010	XX	GW304A466	0.3 U		0.1 J	45	2.3	3 U	0.1 U		2.4	70		0.7 U	259	0.2 U	
4/25/2011	XX	GW304A4A7	0.59		0.1 U	37	2.1	3 U	0.1 U		1.6 J	63		0.7 U	4 U	0.2 U	
7/18/2011	XX	GW304A4E5	0.3		0.1 U	44	3	3 U	0.1 U		2.1	72		0.7 U	4 U	0.2 U	
10/24/2011	XX	GW304A4I0	0.3 U		0.1 U	46	3.3	3 U	0.1 U		3.5	73		0.7 U	4 U	0.2 U	
4/23/2012	XX	GW304A52A	0.3 U		0.5 U	56	3	10 U	0.3 U		5.7	94		2 U	4 U	0.2 U	
7/23/2012	XX	GW304A579	0.3 U		0.5 U	55	1.9	10 U	0.3 U		2.4	95		2 U	4 U	0.2 U	
10/22/2012	XX	GW304A5E0	1.2		0.5 U	43	1.8	10 U	0.3 U		2 U	74		2 U	4 U	0.2 U	

(MW-304A)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)	
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
4/22/2013	XX	GW304A5IB	0.3 U		0.5 U	52	3.1	10 U	0.3 U		6.7	82	0.1 U	2 U	4 U	0.2 U	
7/29/2013	XX	GW304A64G	0.685			57	2.9	10 U	0.3 U		6.3	87	0.1 U	2 U	4 U	0.2 U	
10/28/2013	XX	GW304A679	0.5 U			52	3.2	10 U	0.3 U		5.4	85	0.1 U	2 U	5	0.2 U	
4/21/2014	XX	GW304A6FC	0.5 U			56	4	10 U	0.3 U		6.9	81	0.1 U	2 U	5	0.2 U	
7/28/2014	XX	GW304A6JI	0.5 U			54	2	10 U	0.3 U		2.5	79	0.1 U	2 U	4 U	0.2 U	
10/20/2014	XX	GW304A739	0.5 U			52	2.2	10 U	0.3 U		3.7	76	0.1 U	2 U	12	0.2 U	
MW-401A																	
5/10/2005	XX	GW401A132	0.3 U		0.1 U	53	1.8	3 U	0.1 U		2.5	75		0.5 U	4 U	0.2 U	
7/28/2005	XX	GW401A16A	0.3 U		0.1 U	59	1.8	3 U	0.1 U		2.4	82		1 J	4 U	0.2 U	
7/28/2005	XD	GWDP4X16E	0.3 U		0.1 U	58	1.7	3 U	0.1 U		2	81		0.5 U	4 U	0.2 U	
9/21/2005	XX	GW401A198	0.3 U		0.1 U	51	1.8	3 U	0.1 U		2.6	80		2.1	4 U	0.2 U	
5/23/2006	XX	GW401A1E3	0.39		0.1 U	60	3.2	3 U	0.1 U		3.3	100		0.8 J	4 U	0.2 U	
7/25/2006	XX	GW401A1H0	0.43		0.1 U	55	1.6	3 U	0.1 U		2.6	79		1.1 J	4 U	0.2 U	
9/12/2006	XX	GW401A1JD	0.34		0.1 U	59	1.6	3 U	0.1 U		2.6	74		6.3	4 U	0.2 U	
5/14/2007	XX	GW401A230	0.5 U		0.1 U	57	1.5	3 U	0.1 U		2.3	89		6.1	4 U	0.2 U	
7/24/2007	XX	GW401A274	0.3 U		0.1 U	55	2.4	6 J	0.1 U		3.3	104		2.3	4 U	0.2 U	
9/11/2007	XX	GW401A29E	0.5 U		0.1 U	51	2.7	3 J	0.1 U		3.1	86		0.5 U	4 U	0.2 U	
5/20/2008	XX	GW401A2D8	0.49		0.1 U	54	1.6	9 J	0.2 J		3.5	116		3.3	4 U	0.2 U	
7/28/2008	XX	GW401A2GC	0.5 U		0.1 U	58	1.8	3 J	0.1 J		4.7	95		2.1	4 U	0.41	
10/27/2008	XX	GW401A2J2	0.5 U		0.1 U	56	1.5	3 U	0.1 U		3.4	88		0.8 J	4 U	0.2 U	
4/13/2009	XX	GW401A32A	1 U		0.1 U	52	1.6	3 U	0.2 J		3.2	97		3.5	4 U	0.2 U	
7/7/2009	XX	GW401A36E	0.5 U		0.1 U	57	1.7	3 U	0.1 U		3.5	85		1.5 J	4 U	0.2 U	
10/28/2009	XX	GW401A3E9	0.3 U		0.1 U	58	1.8	3 U	0.1 U		2.8	91		1.1 J	4 U	0.2 U	
4/27/2010	XX	GW401A3J8	0.3 U		0.1 J	57	2.4	3 U	0.1 U		3	79		2.1	4 U	0.2 U	
7/20/2010	XX	GW401A42C	0.4		0.1 U	60	1	3 U	0.1 U		2.6	88		0.7 U	4 U	0.2 U	
10/20/2010	XX	GW401A45G	0.3 U		0.1 U	56	1.5	3 U	0.1 U		2.2	89		0.7 U	4 U	0.2 U	
4/25/2011	XX	GW401A49H	0.3 U		0.1 U	58	1.1	3 U	0.1 U		2.1	83		0.7 U	4 U	0.2 U	
7/18/2011	XX	GW401A4DF	0.3 U		0.1 U	56	1.3	3 U	0.1 U		2.4	89		0.7 U	4 U	0.2 U	
10/24/2011	XX	GW401A4HA	0.3 U		0.2 J	58	2	3 U	0.1 U		2.7	76		0.7 U	4 U	0.2 U	
4/23/2012	XX	GW401A520	0.3 U		0.5 U	56	1.9	10 U	0.3 U		4.4	89		2 U	4 U	0.2 U	
7/23/2012	XX	GW401A56J	0.36		0.5 U	57	1.2	10 U	0.3 U		4.2	97		2 U	4 U	0.2 U	
10/22/2012	XX	GW401A5DA	1.1		0.5 U	55	1.2	10 U	0.3		2 U	94		2 U	4 U	0.2 U	
4/22/2013	XX	GW401A5I1	0.3 U		0.5 U	58	2.4	10 U	0.3 U		4.9	85	0.1 U	2 U	4 U	0.2 U	
7/29/2013	XX	GW401A646	0.572			57	2.2	10 U	0.3 U		4.3	86	0.1 U	2 U	4 U	0.2 U	
10/28/2013	XX	GW401A66J	0.5 U			57	2.8	10 U	0.3 U		4.3	87	0.1 U	2 U	4 U	0.2 U	
4/21/2014	XX	GW401A6F2	0.5 U			62	2.9	10 U	0.3 U		4.8	81	0.1 U	2 U	4 U	0.2 U	
7/28/2014	XX	GW401A6J9	0.5 U			61	1.5	10 U	0.3 U		2	89	0.1 U	2 U	4 U	0.2 U	
10/20/2014	XX	GW401A730	0.5 U			62	1.8	10 U	0.3 U		3.3	83	0.1 U	2 U	4 U	0.2 U	
MW-401B																	
5/10/2005	XX	GW401B133	0.3 U		0.1 U	211	31.9	8 J	0.1 U		36.4	307		3.2	36	3.6	
5/10/2005	XD	GWDP4X136	0.3 U		0.1 U	205	32.9	8 J	0.1 U		41.5	327		3	35	3.6	
7/27/2005	XX	GW401B16B	0.3 U		0.1 U	218	9.7	8 J	0.1 U		44.7	387		3.3	12	0.65	
9/21/2005	XX	GW401B199	0.36		0.1 U	229	40.5	6 J	0.1 U		69.2	488		4.6	14	0.81	
9/21/2005	XD	GWDP4X19C	0.3 U		0.1 U	233	38.9	6 J	0.1 U		70.9	471		4.9	15	0.76	
5/23/2006	XX	GW401B1E4	0.48		0.1 U	192	20.4	8 J	0.1 U		40.5	312		2.7	4 U	0.2 U	
5/23/2006	XD	GWDP4X1E7	0.4		0.1 U	195	18.1	5 J	0.1 U		40.1	307		4	6	0.2 U	
7/25/2006	XX	GW401B1H1	0.68		0.1 U	192	18.6	3 J	0.1 U		32.6	305		3	4 U	0.2 U	
9/12/2006	XX	GW401B1JE	0.45		0.1 U	196	19.3	4 J	0.1 U		32.3	295		4.4	4 U	2	

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(MW-401B)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)	
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
9/12/2006	XD	GWDP3X1JB	0.38		0.1 U	194	19.8	3 U	0.1 U		32.8	292		2.6	4 U	1.7	
5/14/2007	XX	GW401B231	0.5 U		0.1 U	152	9.4	5 J	0.1 U		17.4	233		3.4	5	0.2	
5/14/2007	XD	GWDP4X234	0.5 U		0.1 U	152	9.1	4 J	0.1 U		17.2	231		2.2	4	0.22	
7/24/2007	XX	GW401B275	0.3 U		0.1 U	156	21.2	4 J	0.1 U		28.3	275		4.3	4 U	0.2 U	
9/11/2007	XX	GW401B29F	0.5 U		0.1 U	177	19.9	6 J	0.1 U		36.5	292		3.3	5	0.2 U	
9/11/2007	XD	GWDP4X29I	0.5 U		0.1 U	166	19.9	3 J	0.1 U		36.6	299		2	4	0.28	
5/20/2008	XX	GW401B2D9	0.3 U		0.1 U	130	18.4	3 U	0.1 J		15.8	197		1.6 J	4 U	0.2 U	
5/20/2008	XD	GWDP4X2DC	0.3 U		0.1 U	130	19.3	3 J	0.1 J		16.1	193		1.5 J	4 U	0.2 U	
7/28/2008	XX	GW401B2GD	0.5 U		0.1 U	143	30	4 J	0.1 U		20.9	257		2.8	4 U	0.2 U	
10/27/2008	XX	GW401B2J3	0.5 U		0.1 U	152	22.6	3 U	0.1 U		22.2	243		3.7	4 U	0.2 U	
10/27/2008	XD	GWDP4X2J6	0.5 U		0.1 U	153	22.6	3 U	0.1 U		22.4	250		3.8	4 U	0.2 U	
4/13/2009	XX	GW401B32B	3.2		0.1 U	118	9.2	5 J	0.2 J		11.3	178		2.2	4 U	0.2 U	
4/13/2009	XD	GWDP4X32E	0.5 U		0.1 U	119	10.4	6 J	0.2 J		12.2	188		4.8	4 U	0.2 U	
7/7/2009	XX	GW401B36F	0.5 U		0.1 U	121	11.6	3 U	0.1 U		12.9	185		3.6	4 U	0.2 U	
10/28/2009	XX	GW401B3EA	0.34		0.1 U	145	12.6	3 U	0.1 U		17	220		2.4	4 U	0.2 U	
10/28/2009	XD	GWDP3X3E7	0.3 U		0.1 U	145	13.2	4 J	0.1 U		17.1	222		1.8 J	4 U	0.2 U	
4/27/2010	XX	GW401B3J9	0.3 U		0.1 U	116	8	4 J	0.1 U		10.6	142		1.3 J	4 U	0.2 U	
4/27/2010	XD	GWDP4X3JC	0.3 U		0.1 U	121	8.4	5 J	0.1 U		11	150		2.4	4 U	0.2 U	
7/20/2010	XX	GW401B42D	0.57		0.1 U	137	10.8	3 U	0.1 U		12.5	208		0.8 J	4 U	0.22	
7/20/2010	XD	GWDP3X42A	0.3 U		0.1 U	136	11.5	4 J	0.1 U		12.8	212		0.8 J	4 U	0.2 U	
10/20/2010	XX	GW401B45H	0.3 U		0.1 U	132	7.2	3 U	0.1 U		13.5	204		0.7 J	4 U	0.47	
10/20/2010	XD	GWDP4X460	0.3 U		0.1 U	133	7.2	3 U	0.1 U		13.6	209		0.7 J	4 U	0.25	
4/25/2011	XX	GW401B49I	0.3 U		0.1 U	116	7.1	3 U	0.1 U		8	165		0.7 U	4 U	0.2 U	
4/25/2011	XD	GWDP4X4A1	0.3 U		0.1 U	119	6.8	3 U	0.1 U		7.8	164		0.7 U	4 U	0.2 U	
7/18/2011	XX	GW401B4DG	0.45		0.1 U	126	11.9	3 U	0.1 U		10.6	184		0.7 J	4 U	0.2 U	
7/18/2011	XD	GWDP1X4D2	0.3 U		0.1 U	122	11.3	3 U	0.1 U		10.3	188		0.7 J	4 U	0.2 U	
10/24/2011	XX	GW401B4HB	0.3 U		0.1 U	131	10.5	3 U	0.1 U		9.1	183		1.1 J	4 U	0.4 U	
4/23/2012	XX	GW401B521	0.3 U		0.5 U	117	9.4	10 U	0.3 U		11	173		2 U	4 U	0.2 U	
4/23/2012	XD	GWDP4X524	0.3 U		0.5 U	116	9.8	10 U	0.3 U		11	177		2 U	4 U	0.2 U	
7/23/2012	XX	GW401B570	0.3 U		0.5 U	117	12	10 U	0.3 U		13.4	181		2 U	4 U	0.2 U	
7/23/2012	XD	GWDP1X566	0.3 U		0.5 U	116	10.7	10 U	0.3 U		12.5	172		2 U	4 U	0.2 U	
10/22/2012	XX	GW401B5DB	0.94		0.5 U	133	8.3	10 U	0.3 U		9.8	201		2 U	4 U	0.2 U	
4/22/2013	XX	GW401B5I2	0.3 U		0.5 U	122	12.5	10 U	0.3 U		13.2	172	0.1	2 U	4 U	0.2 U	
4/22/2013	XD	GWDP4X5I5	0.3 U		0.5 U	121	12.5	10 U	0.3 U		13	186	0.13	2 U	4 U	0.2 U	
7/29/2013	XX	GW401B647	0.528			108	13	10 U	0.3 U		11.4	156	0.1 U	2 U	4 U	0.2 U	
7/29/2013	XD	GWDP1X63D	0.512			116	16.6	10 U	0.3 U		12.8	175	0.1 U	2 U	4 U	0.2 U	
10/28/2013	XX	GW401B670	0.5 U			139	16.3	10 U	0.3 U		13	212	0.22	2 U	4 U	0.2 U	
10/28/2013	XD	GWDP4X673	0.5 U			138	15.8	10 U	0.3 U		13	206	0.21	2 U	4 U	0.2 U	
4/21/2014	XX	GW401B6F3	0.5 U			135	16.2	10 U	0.3 U		13.7	170	0.21	2 U	4 U	0.2 U	
4/21/2014	XD	GWDP4X6F6	0.5 U			128	15.1	10 U	0.3 U		13.7	160	0.23	2 U	4 U	0.2 U	
7/28/2014	XX	GW401B6JA	0.7			139	12.5	10 U	0.3 U		5.3	198	0.15	2 U	4 U	0.2 U	
7/28/2014	XD	GWDP4X6JD	0.5 U			141	12	10 U	0.3 U		5.3	195	0.16	2 U	4 U	0.2 U	
10/20/2014	XX	GW401B731	0.5 U			156	11.5	10 U	0.3 U		9.6	212	0.2	8.9	4 U	0.2 U	
10/20/2014	XD	GWDP4X734	0.5 U			163	11.5	10 U	0.3 U		9.6	217	0.2	2 U	4 U	0.2 U	
MW-402A																	
5/11/2005	XX	GW402A134	0.3		0.1 U	52	1.8	3 U	0.1 U		3.5	81		2	4 U	0.2 U	
8/1/2005	XX	GW402A16C	1		0.1 U	55	1.8	3 U	0.1 U		3	78		0.5 U	4 U	0.2 U	
9/21/2005	XX	GW402A19A	0.3 U		0.1 U	48	1.9	3 U	0.1 U		3.5	78		2.2	4 U	0.2 U	
5/23/2006	XX	GW402A1E5	0.3 U		0.1 U	53	3	3 U	0.1 U		4.8	89		2.2	4 U	0.2 U	

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(MW-402A)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)	
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
7/26/2006	XX	GW402A1H2	0.3 U		0.1 U	51	1.4	5 J	0.1 U		4.6	80		1.6	4 U	0.2 U	
9/12/2006	XX	GW402A1JF	0.82		0.1 U	52	1.4	3 U	0.1 U		4.3	66		1.6	4 U	0.2 U	
5/15/2007	XX	GW402A232	0.5 U		0.1 U	52	1.6	3 U	0.1 U		4.4	73		5	4 U	0.24	
7/25/2007	XX	GW402A276	0.3 U		0.1 U	46	2.4	7 J	0.1 U		5.8	76		1.3 J	4 U	0.2 U	
9/12/2007	XX	GW402A29G	0.3 U		0.1 U	48	2.4	3 J	0.1 U		5.8	90		0.5 U	4 U	0.2 U	
5/20/2008	XX	GW402A2DA	0.3 U		0.1 J	56	1.6	3 U	0.1 J		6.1	76		1.9 J	4 U	0.2 U	
7/28/2008	XX	GW402A2GE	0.5 U		0.1 U	53	1.5	3 U	0.1 U		7.4	87		1.8 J	4 U	0.2 U	
10/27/2008	XX	GW402A2J4	0.5 U		0.1 U	47	1.5	3 U	0.1 U		6.3	83		1.4 J	4 U	0.2 U	
4/14/2009	XX	GW402A32C	0.5 U		0.1 U	54	3.1	3 U	0.1 U		5	94		8.1	4 U	0.2 U	
7/8/2009	XX	GW402A36G	0.5 U		0.1 U	52	1.7	3 U	0.1 J		6	77		0.7 U	4 U	0.2 U	
10/28/2009	XX	GW402A3EB	0.3 U		0.1 U	54	1.7	4 J	0.1 U		5.3	85		1.5 J	4 U	0.2 U	
4/27/2010	XX	GW402A3JA	0.3 U		0.1 J	53	2.3	3 U	0.1 U		5.6	58		1.6 J	4 U	0.2 U	
7/21/2010	XX	GW402A42E	0.34		0.1 U	54	1.2	3 U	0.1 U		4.7	87		0.7 U	4 U	0.2 U	
10/20/2010	XX	GW402A45I	0.3 U		0.1 U	53	1.5	3 U	0.1 U		4.2	89		0.7 U	4 U	0.2 U	
4/27/2011	XX	GW402A49J	0.3 U		0.1 U	52	1.2	3 U	0.1 U		4.1	78		0.7 U	4 U	0.2 U	
7/20/2011	XX	GW402A4DH	0.54		0.1 U	51	1.6	3 U	0.1 U		4.2	80		0.7 U	4 U	0.2 U	
10/26/2011	XX	GW402A4HC	0.3 U		0.1 U	54	0.8 J	5 J	0.1 U		4.4	86		0.7 U	4 U	0.2 U	
4/24/2012	XX	GW402A522	0.3 U		0.5 U	52	2	10 U	0.3 U		7	70		2 U	4 U	0.2 U	
7/25/2012	XX	GW402A571	0.3 U		0.5 U	52	1.6	10 U	0.3 U		6.4	80		2 U	4 U	0.2 U	
10/24/2012	XX	GW402A5DC	0.31		0.5 U	51	2.3	10 U	0.3 U		7.3	83		2 U	4 U	0.2 U	
4/22/2013	XX	GW402A5I3	0.3 U		0.5 U	51	2.5	10 U	0.3 U		9.3	99	0.1 U	2 U	4 U	0.2 U	
7/31/2013	XX	GW402A648	0.3 U			53	1.3	10 U	0.3 U		7	81	0.1 U	2 U	4 U	0.2 U	
10/30/2013	XX	GW402A671	0.5 U			51	1.8	10 U	0.3 U		7.2	89	0.1 U	2 U	4 U	0.2 U	
4/23/2014	XX	GW402A6F4	0.5 U			56	1.7	10 U	0.3 U		8.1	76	0.1 U	2 U	4 U	0.2 U	
7/30/2014	XX	GW402A6JB	0.5 U			52	1.5	10 U	0.3 U		6.9	87	0.1 U	2 U	4 U	0.2 U	
10/22/2014	XX	GW402A732	0.5 U			58	1.4	10 U	0.3 U		7	76	0.1 U	2 U	4 U	0.2 U	
MW-402B																	
5/11/2005	XX	GW402B135	0.4		0.1 U	68	1.7	3 U	0.1 U		8.6	101		0.9 J	4 U	0.2 U	
8/1/2005	XX	GW402B16D	0.3 U		0.1 U	71	1.9	3 U	0.1 U		5.6	88		1 J	4 U	0.2 U	
9/21/2005	XX	GW402B19B	0.3 U		0.1 U	66	2.1	3 U	0.1 U		7.7	95		2.1	4 U	0.2 U	
9/21/2005	XD	GWDP3X196	0.3 U		0.1 U	66	2	3 U	0.1 U		7.8	94		2.2	4 U	0.2 U	
5/23/2006	XX	GW402B1E6	0.45		0.1 U	67	2.9	3 U	0.1 U		8.9	116		0.8 J	4 U	0.2 U	
7/26/2006	XX	GW402B1H3	0.3 U		0.1 U	68	1.4	4 J	0.1 U		7.5	97		0.9 J	4 U	0.2 U	
9/12/2006	XX	GW402B1JG	0.3 U		0.1 U	69	1.5	3 U	0.1 U		7.8	84		0.5 J	4 U	0.2 U	
5/15/2007	XX	GW402B233	0.5 U		0.1 U	66	1.5	3 U	0.1 U		7.3	82		5.2	4 U	0.26	
7/25/2007	XX	GW402B277	0.3 U		0.1 U	63	3.1	6 J	0.1 U		8.6	90		1.6	4 U	0.2 U	
9/12/2007	XX	GW402B29H	0.3 U		0.1 U	65	2.8	3 U	0.1 U		9.1	101		0.7 J	4 U	0.2 U	
5/20/2008	XX	GW402B2DB	0.3 U		0.1 U	57	1.7	3 U	0.1 J		9	93		4.4	4 U	0.2 U	
7/28/2008	XX	GW402B2GF	0.5 U		0.1 U	34	2.2	3 U	0.1 U		44.9	124		0.8 J	4 U	0.2 U	
10/27/2008	XX	GW402B2J5	0.5 U		0.5	65	1.8	3 U	0.1 U		9.2	89		0.9 J	4 U	0.2 U	
4/14/2009	XX	GW402B32D	0.5 U		0.1 U	66	26.5	3 U	0.1 U		2.3	98		2.5	4 U	0.2 U	
7/8/2009	XX	GW402B36H	0.5 U		0.1 U	65	1.7	3 U	0.1 U		8.5	89		0.8 J	4 U	0.2 U	
10/28/2009	XX	GW402B3EC	0.3 U		0.1 U	70	1.8	3 U	0.1 U		7.3	93		1.7 J	4 U	0.2 U	
4/27/2010	XX	GW402B3JB	0.3 U		0.1 U	68	2.5	3 U	0.1 U		8	64		3.5	4 U	0.2 U	
7/21/2010	XX	GW402B42F	0.38		0.1 U	69	1	3 U	0.1 U		6.9	93		0.7 U	4 U	0.2 U	
10/20/2010	XX	GW402B45J	0.3 U		0.1 U	65	1.5	3 U	0.1 U		6.3	102		0.7 U	4 U	0.2 U	
4/27/2011	XX	GW402B4A0	0.3 U		0.1 U	68	1.1	3 U	0.1 U		6.6	92		0.7 U	4 U	0.2 U	
7/20/2011	XX	GW402B4DI	0.61		0.1 U	65	1.2	3 U	0.1 U		6.6	92		0.7 U	4 U	0.2 U	
10/26/2011	XX	GW402B4HD	0.3 U		0.1 U	69	1.1	3 U	0.1 U		6.3	100		0.7 U	4 U	0.2 U	

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(MW-402B) Date	Type	Sample ID	Total Kjeldahl Nitrogen mg/L	Biochemical Oxygen Demand mg/L	Ammonia (N) mg/L	Bicarbonate (CaCO3) mg/L	Chloride mg/L	Chemical Oxygen Demand mg/L	Nitrate (N) mg/L	Phosphate Phosphorus mg/L	Sulfate mg/L	Total Dissolved Solids mg/L	Bromide mg/L	Organic Carbon mg/L	Total Suspended Solids mg/L	Tannin & Lignins (Tannic Acid) mg/L
4/24/2012	XX	GW402B523	0.3 U		0.5 U	64	2.2	10 U	0.3 U		9	88		2 U	4 U	0.2 U
7/25/2012	XX	GW402B572	0.3 U		0.5 U	68	1.9	10 U	0.3 U		9.9	91		2 U	4 U	0.2 U
10/24/2012	XX	GW402B5DD	0.3 U		0.5 U	65	2.5	10 U	0.3 U		9.5	97		2 U	4 U	0.2 U
4/22/2013	XX	GW402B5I4	0.3 U		0.5 U	60	2.5	10 U	0.3 U		9	100	0.1 U	2 U	4 U	0.2 U
7/31/2013	XX	GW402B649	0.3 U			68	1.4	10 U	0.3 U		8.6	92	0.1 U	2 U	4 U	0.2 U
10/30/2013	XX	GW402B672	0.5 U			67	1.9	10 U	0.3 U		8.4	102	0.1 U	2 U	4 U	0.2 U
4/23/2014	XX	GW402B6F5	0.5 U			68	1.9	10 U	0.3 U		9	81	0.1 U	2 U	4 U	0.2 U
7/30/2014	XX	GW402B6JC	0.5 U			66	1.6	10 U	0.3 U		8.1	100	0.1 U	2 U	4 U	0.2 U
10/22/2014	XX	GW402B733	0.5 U			71	1.6	10 U	0.3 U		8.2	89	0.1 U	2 U	4 U	0.2 U
P-04-02																
5/9/2005	XX	GWXXXX13J	0.3 U		0.1 U	108	2	3 U	0.1 J		14.5	138		0.8 J	4 U	0.2 U
7/27/2005	XX	GWXXXX177	0.67		0.1 U	107	1.9	4 J	0.1 U		11.9	145		2	4 U	0.2 U
9/22/2005	XX	GWXXXX1A5	0.36		0.1 U	104	2.2	3 U	0.1 U		11.6	135		1.9	4 U	0.2 U
5/22/2006	XX	GWXXXX1F0	0.42		0.1 U	95	3	3 U	0.3		14.5	129		4.8	4 U	0.2 U
7/24/2006	XX	GWXXXX1HH	0.48		0.1 U	95	1.5	3 U	0.3		11	133		1.3 J	4 U	0.2 U
9/11/2006	XX	GWXXXX20A	0.39		0.1 U	98	2	3 U	0.1 U		11.2	124		1.5	4 U	0.2 U
5/14/2007	XX	GWXXXX23H	0.5 U		0.1 U	98	1.5	3 J	0.1 U		9.2	138		2.3	4 U	0.2 U
7/23/2007	XX	GWXXXX281	0.3 U		0.1 U	91	2	4 J	0.1 J		11.6	124		1.2 J	4 U	0.2 U
9/10/2007	XX	GWXXXX2AB	0.3 U		0.1 U	92	1.8	3 J	0.2 J		13.5	131		0.5 U	4 U	0.2 U
5/21/2008	XX	GWXXXX2E5	0.3 U		0.1 U	96	2.1	3 U	0.3		12.6	118		1.8 J	4 U	0.2 U
7/30/2008	XX	GWXXXX2H9	0.5 U		0.1 U	95	1.6	7 J	0.3		13.8	138		1.2 J	4 U	0.2 U
10/29/2008	XX	GWXXXX2JJ	0.5 U		0.1 U	93	1.2	4 J	0.2 J		13.7	124		0.7 J	4 U	0.2 U
4/13/2009	XX	GWXXXX337	1 U		0.1 U	93	1.6	3 J	0.3		11.4	134		5.1	4 U	0.2 U
7/6/2009	XX	GWXXXX37B	0.5 U		0.1 U	93	1.6	3 U	0.2 J		13	128		1.8 J	4 U	0.2 U
10/27/2009	XX	GWXXXX3F6	0.3 U		0.1 U	93	2	3 U	0.1 U		11.1	114		3.7	4 U	0.2 U
4/26/2010	XX	GWXXXX405	0.3 U		0.1 J	95	3.1	3 J	0.1 J		11.2	113		0.8 J	4 U	0.2 U
7/21/2010	XX	GWXXXX439	0.3 U		0.1 U	93	1	3 U	0.1 J		10.5	121		0.7 U	4 U	0.2 U
10/20/2010	XX	GWXXXX46D	0.3 U		0.1 U	90	1.3	3 U	0.1 U		10.7	130		0.7 U	4 U	0.2 U
4/27/2011	XX	GWXXXX4AE	0.3 U		0.1 U	90	1.1	3 U	0.1 U		8.9	129		0.7 U	4 U	0.2 U
7/20/2011	XX	GWXXXX4EC	0.38		0.1 U	93	1.1	3 U	0.1 U		12.2	138		0.7 U	4 U	0.2 U
10/26/2011	XX	GWXXXX4I7	!		!	!	!	!	!		!	!		!	!	!
4/25/2012	XX	GWXXXX52H	0.6		0.5 U	63	8.8	19	0.3 U		11.3	211		11.9	11	1.7
7/25/2012	XX	GWXXXX57G	0.35		0.5 U	94	7.8	10 U	0.3 U		25.2	205		5.2	9	0.76
10/24/2012	XX	GWXXXX5E7	0.62		0.5 U	85	4.9	15	0.3 U		25.1	198		5.7	13	1 U
4/22/2013	XX	GWXXXX5II	!		!	!	!	!	!		!	!	!	!	!	!
P-04-04																
5/9/2005	XX	GWXXXX140	0.3 U		0.1 U	93	1.7	3 U	0.2 J		9.5	118		1.7	4 U	0.2 U
7/27/2005	XX	GWXXXX178	0.3 U		0.1 U	86	1.8	3 U	0.2 J		6.2	124		0.5 J	4 U	0.2 U
9/22/2005	XX	GWXXXX1A6	0.56		0.1 U	84	2	3 U	0.4		7.5	117		2	4 U	0.2 U
5/22/2006	XX	GWXXXX1F1	0.61		0.1 U	84	2.9	3 U	0.4		8.9	110		1.9	4	0.2 U
7/24/2006	XX	GWXXXX1HI	0.33		0.1 U	80	1.4	3 J	0.3		7.2	111		1.7	4 U	0.2 U
9/11/2006	XX	GWXXXX20B	0.36		0.1 U	80	1.9	3 U	0.1 J		6.7	98		0.5 U	7	0.2 U
5/14/2007	XX	GWXXXX23I	0.5 U		0.1 U	79	1.6	3 U	0.1 U		5.7	116		2.4	4 U	0.2 U
7/23/2007	XX	GWXXXX282	0.3 U		0.1 U	73	2	5 J	0.1 J		7.1	106		0.9 J	4 U	0.2 U
9/10/2007	XX	GWXXXX2AC	0.3 U		0.1 U	74	2.7	3 U	0.1 J		7.1	111		0.7 J	4 U	0.2 U
5/21/2008	XX	GWXXXX2E6	0.3 U		0.1 U	80	1.7	3 U	0.2 J		8.3	105		1.5 J	4 U	0.2 U
7/30/2008	XX	GWXXXX2HA	0.5 U		0.1 U	80	1.5	3 U	0.2 J		9.4	114		0.8 J	4 U	0.2 U
10/29/2008	XX	GWXXXX300	0.5 U		0.2 J	78	1.1	3 U	0.1 U		8.5	108		2	4 U	0.2 U

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(P-04-04)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)	
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
4/13/2009	XX	GWXXXX338	0.5 U		0.1 U	77	1.6	4 J	0.1 J		7.3	118		3.8	4 U	0.2 U	
7/6/2009	XX	GWXXXX37C	0.5 U		0.1 U	77	1.4	3 U	0.1 U		8.2	108		0.9 J	4 U	0.2 U	
10/27/2009	XX	GWXXXX3F7	0.3 U		0.1 U	80	1	3 U	2.5		6.7	92		1.8 J	4 U	0.2 U	
4/26/2010	XX	GWXXXX406	0.3 U		0.4 J	79	2.7	3 U	0.1 U		7.9	95		1.2 J	4 U	0.2 U	
7/21/2010	XX	GWXXXX43A	0.3 U		0.1 U	78	0.9 J	3 J	0.1 U		6.5	104		0.7 U	4 U	0.2 U	
10/20/2010	XX	GWXXXX46E	0.3 U		0.1 U	72	1.4	3 U	0.1 U		5.9	119		0.7 U	4 U	0.2 U	
4/27/2011	XX	GWXXXX4AF	0.3 U		0.1 U	80	1	3 U	0.1 U		5.5	104		0.7 U	4 U	0.2 U	
7/20/2011	XX	GWXXXX4ED	0.36		0.1 U	76	1.1	3 U	0.1 J		9	112		0.7 U	4 U	0.2 U	
10/26/2011	XX	GWXXXX4I8	0.7		0.1 U	78	1.8	3 U	0.2 J		6.8	122		0.8 J	4 U	0.2 U	
4/25/2012	XX	GWXXXX52I	0.3 U		0.5 U	75	1.8	10 U	0.3 U		8.5	114		2 U	4 U	0.2 U	
7/25/2012	XX	GWXXXX57H	0.3 U		0.5 U	76	1.8	10 U	0.3 U		28.8	95		2 U	4 U	0.2 U	
10/24/2012	XX	GWXXXX5E8	0.3 U		0.5 U	78	2	10 U	0.3 U		8.1	111		2 U	4 U	0.2 U	
4/24/2013	XX	GWXXXX5IJ	0.479		0.5 U	80	1.3	10 U	0.3 U		9.2	115	0.1 U	2 U	4 U	0.2 U	
7/31/2013	XX	GWXXXX654	0.613			76	1.4	10 U	0.3 U		7.8	100	0.1 U	2 U	4 U	0.2 U	
10/30/2013	XX	GWXXXX67E	0.5 U			76	1.8	10 U	0.3 U		7.7	115	0.1 U	2 U	4 U	0.2 U	
4/23/2014	XX	GWXXXX6G0	0.5 U			79	1.8	10 U	0.3 U		8.2	112	0.1 U	2 U	4 U	0.2 U	
7/30/2014	XX	GWXXXX703	0.5 U			78	1.5	10 U	0.3 U		7.2	113	0.1 U	2 U	4 U	0.2 U	
10/22/2014	XX	GWXXXX73E	0.5 U			80	1.5	10 U	0.3 U		7.4	102	0.1 U	2 U	4 U	0.2 U	
P-206A																	
7/31/2013	XX	GW206A64I	I			I	I	I	I		I	I	I	I	I	I	
10/28/2013	XX	GW206A67B					4.3		0.3 U		2 U						
4/21/2014	XX	GW206A6FJ					6.2		0.3 U		2 U						
7/28/2014	XX	GW206A702					3.3		0.3 U		2 U						
10/20/2014	XX	GW206A73B					3.6		0.3 U		2 U						
PWS10-1																	
4/26/2010	XX	GWPWS13IJ			1.1	74	14.6	33	0.1 U	0.14	1 J	148		9.9	4 U	2.3	
7/19/2010	XX	GWPWS1423			1.1	125	10.1	31	0.1 U	0.26	2.1	154		8.3	786	1.4	
10/18/2010	XX	GWPWS1457			0.1 U	100	10.6	29	0.1 U	0.05	10	176		7.5	12	1	
4/25/2011	XX	GWPWS1498			0.1 J	73	14.2	20	0.1 U	0.03 J	1.3 J	154		7.5	4 U	1.4	
7/18/2011	XX	GWPWS14D6			0.1 U	110	7.3	31	0.1 U	0.14	2.9	171		8.4	42	1.1	
10/24/2011	XX	GWPWS14H1			0.2 J	70	10.8	40	0.1 U	0.08	1.6 J	134		19.7	16	5	
4/23/2012	XX	GWPWS151B			0.5 U	63	8.4	26	0.3 U	0.04 U	6.3	132		10.5	8	1.2	
7/23/2012	XX	GWPWS156A			0.5 U	41	3.5	58	0.5	0.16	2 U	104		13.7	32	3.4	
10/22/2012	XX	GWPWS15D1			0.5 U	48	8.2	38	0.3 U	0.09	2.7	130		13.3	25	1.8	
4/22/2013	XX	GWPWS15HC			0.5 U	113	16.4	20	0.3 U	0.06	3.1	177	0.1	4.5	4 U	0.75	
7/29/2013	XX	GWPWS163H				82	8.9	46	0.3 U	0.32	2 U	148	0.1 U	12.6	95	2.6	
10/28/2013	XX	GWPWS166A				45	7	33	0.3 U	0.06	2.5	90	0.1 U	9.8	25	5 U	
4/21/2014	XX	GWPWS16ED				130	22.9	27	0.3 U	0.16	2.2	197	0.1 U	8.4	34	0.99	
7/28/2014	XX	GWPWS16J0				106	7.5	41	0.3 U	0.37	2 U	171	0.12	13.8	4 U	2.7	
10/20/2014	XX	GWPWS172A				21	8.8	54	0.3 U	0.04 U	3.3	87	0.1 U	17.4	4 U	3.3	
PWS10-2																	
4/26/2010	XX	GWPWS23J0			0.2 J	16.3	9.5	19	0.1 U	0.02 J	3.1	59		8.2	7	1.4	
7/19/2010	XX	GWPWS2424			0.7	35	12.6	26	0.2 J	0.08	4.2	81		9.2	182	2	
10/18/2010	XX	GWPWS2458			0.1 J	16.4	5.7	40	0.1 U	0.03 J	6.9	88		14.7	4 U	2.6	
4/25/2011	XX	GWPWS2499			0.1 U	12.1	5.8	18	0.1 U	0.02 J	1.7 J	60		7.3	4 U	1 U	
7/18/2011	XX	GWPWS24D7			0.1 J	62	4.1	25	0.1 U	0.03 J	1.6 J	107		9.9	4 U	1.2	
10/24/2011	XX	GWPWS24H2			0.1 U	36	3.8	27	0.1 U	0.03 J	2.9	76		10.2	78	1.7	
4/23/2012	XX	GWPWS251C			0.5 U	10.6	8.3	33	0.3 U	0.04 U	7.7	79		11.5	4 U	1.9	

(PWS10-2)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)	
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
7/23/2012	XX	GWPWS256B			0.5 U	35	3.2	40	0.4	0.05	2 U	90		13	4 U	5.1	
10/22/2012	XX	GWPWS25D2			0.5 U	9.3	4.4	29	0.3 U	0.04 U	8.4	75		10.2	4	1 U	
4/22/2013	XX	GWPWS25HD			0.5 U	30	8.4	26	0.3 U	0.04 U	3.8	82	0.1 U	6.4	5	1.1	
7/29/2013	XX	GWPWS263I				28	19.8	55	0.3 U	0.05	2 U	111	0.1 U	11.8	62	1.8	
10/28/2013	XX	GWPWS266B				28	5.1	29	0.3 U	0.1	4.3	78	0.1 U	5.5	43	2.5 U	
4/21/2014	XX	GWPWS26EE				36	8.4	30	0.3 U	0.05	2.5	38	0.1 U	4.7	34	0.86	
7/28/2014	XX	GWPWS26J1				55	8.3	25	0.3 U	0.04	2 U	119	0.1 U	10.4	7	1.5	
10/20/2014	XX	GWPWS272B				38	9.8	48	0.3 U	0.05	8.8	113	0.1 U	13.6	4 U	2.4	
PWS10-3																	
4/26/2010	XX	GWPWS33J1			0.1 U	87	2.5	11	0.1 U	0.05	3.3	113		2.1	5	0.45	
7/19/2010	XX	GWPWS3425			1.9	70	1.7	251	0.1 U	0.48	1.8 J	124		10.4	36	1.9	
10/18/2010	XX	GWPWS3459			0.1 U	12.5	7.7	105	0.1 U	0.22	4.6	103		19.3	34	4.6	
4/25/2011	XX	GWPWS349A			0.1 U	64	2.3	18	0.1 U	0.03 J	0.6 U	105		4	4 U	1.1	
7/18/2011	XX	GWPWS34D8			1.2	56	3.2	60	0.1 U	0.15	1.2 J	112		14.9	101	2.3	
10/24/2011	XX	GWPWS34H3			0.1 U	37	3.4	56	0.1 U	0.07	0.6 U	95		13.4	10	3.7	
4/23/2012	XX	GWPWS351D			0.5 U	16.4	4.5	25	0.4	0.06	6.3	66		7.5	60	1.1	
7/23/2012	XX	GWPWS356C			0.5 U	26	3	47	0.5	0.07	2 U	89		13.8	18	3.1	
10/22/2012	XX	GWPWS35D3			0.5 U	11.8	2.6	79	0.3 U	0.06	2 U	83		19	15	3.1	
4/22/2013	XX	GWPWS35HE			0.5 U	21	4.1	46	0.3 U	0.08	2	72	0.1 U	11	8	1.6	
7/29/2013	XX	GWPWS363J				56	5.4	62	0.3 U	0.5	2 U	141	0.1 U	21.6	39	5.2	
10/28/2013	XX	GWPWS366C				22	6.2	43	0.3 U	0.08	2 U	73	0.1 U	11.9	29	2.5 U	
4/21/2014	XX	GWPWS36EF				35	6.3	51	0.3 U	0.2	5	107	0.1 U	17	489	2	
7/28/2014	XX	GWPWS36J2				32	5.2	46	0.3 U	0.27	2 U	92	0.1 U	14.8	57	3	
10/20/2014	XX	GWPWS372D				24	8.9	60	0.3 U	0.06	2.5	89	0.1 U	18.4	19	3.5	
SW-1																	
5/10/2005	XX	SWXX1X12A		6 U	0.1 U	13.9	7.5	28	0.1 U	0.02 J	0.6 J	61		10.1	4 U	2.2	
7/28/2005	XX	SWXX1X15I		12	0.1 U	22	4.9	229	0.1 U	0.11	0.6 U	67		14.3	13	3.5	
9/20/2005	XX	SWXX1X18G		6 U	0.1 U	41	3.1	33	0.1 U	0.26	6	159		9.8	55	1.1	
5/24/2006	XX	SWXX1X1DB		6 U	0.1 U	86	22.7	31	0.1 U	0.03 J	11.3	184		10.2	22	0.94	
7/26/2006	XX	SWXX1X1G8		6 U	0.1 U	23	4.4	71	0.1 U	0.06	0.6 U	90		20.6	17	2.5	
7/26/2006	XD	SWDP2X1GE		6 U	0.1 U	23	4.1	64	0.1 U	0.07	0.6 U	85		20.4	6	3	
9/13/2006	XX	SWXX1X1J1		6 U	0.1 U	148	13.3	15	0.1 U	0.06	9.3	181		11.4	28	0.31	
5/15/2007	XX	SWXX1X228		6 U	0.1 U	29	6.5	24	0.1 U	0.06	0.6 J	59		7.9	4 U	2	
5/15/2007	XD	SWDP2X22E		6 U	0.1 U	25	6.5	24	0.1 U	0.02 J	0.6 J	58		8.3	4 U	1.9	
7/24/2007	XX	SWXX1X26C		6 U	0.1 U	30	8.4	43	0.1 U	0.04	0.6 U	93		16.6	4 U	2.4	
7/24/2007	XD	SWDP2X26I		6 U	0.1 U	31	8.7	44	0.1 U	0.05	0.6 U	98		17.3	4 U	2.7	
9/11/2007	XX	SWXX1X292		7	0.1 U	33	8.4	67	0.1 J	0.11	0.6 U	90		15.6	11	2.2	
5/21/2008	XX	SWXX1X2CG		6 U	0.1 U	28	9.4	26	0.1 J	0.06	1.2 J	71		12.5	14	2.1	
5/21/2008	XD	SWDP2X2D2		6 U	0.1 U	28	9.4	26	0.1 J	0.07	1.2 J	67		9.5	14	2.1	
7/29/2008	XX	SWXX1X2G0		I	I	I	I	I	I	I	I	I		I	I	I	
10/28/2008	XX	SWXX1X2IA		5 U	0.1 U	23	4.8	36	0.1 U	0.02 J	1.2 J	70		12.5	4 U	2.1	
4/14/2009	XX	SWXX1X31I		4 U	0.1 U	20	11.6	20	0.1 U	0.01 U	2.2	85		9.8	4 U	1.4	
7/7/2009	XX	SWXX1X362		5 U	0.2 U	17.2	4.7	45	0.1 U	0.03 J	0.9 J	85		15	4 U	3.9	
10/27/2009	XX	SWXX1X3DH		5 U	0.1 U	10.6	6.3	36	0.1 U	0.02 J	2.2	69		12.5	39	2.6	
4/28/2010	XX	SWXX1X3IG		2 U	0.1 U	23	8.9	29	0.1 U	0.02 J	1.4 J	61		9.1	4 U	2.5	
7/20/2010	XX	SWXX1X420		3 U	0.6	126	8.5	752	0.1 U	0.81	3.5	230		7.3	1490	1	
10/19/2010	XX	SWXX1X454		5 U	0.1 U	11.6	7.3	55	0.1 U	0.02 J	4.4	101		18.8	4 U	0.87	
4/26/2011	XX	SWXX1X495		3 U	0.1 U	16.7	6.8	22	0.1 U	0.02 J	1.6 J	70		8	5	1.7	

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(SW-1) Date	Type	Sample ID	Total Kjeldahl Nitrogen mg/L	Biochemical Oxygen Demand mg/L	Ammonia (N) mg/L	Bicarbonate (CaCO3) mg/L	Chloride mg/L	Chemical Oxygen Demand mg/L	Nitrate (N) mg/L	Phosphate Phosphorus mg/L	Sulfate mg/L	Total Dissolved Solids mg/L	Bromide mg/L	Organic Carbon mg/L	Total Suspended Solids mg/L	Tannin & Lignins (Tannic Acid) mg/L
7/19/2011	XX	SWXX1X4D3		4	0.1 J	107	6.9	48	0.1 U	0.21	2.6	157		8.4	144	0.89
10/25/2011	XX	SWXX1X4GI		4 U	0.1 U	19	5.8	37	0.1 U	0.02 J	2.4	64		13.4	11	3.8
4/24/2012	XX	SWXX1X518		5 U	0.5 U	13.9	9.3	33	0.3 U	0.04 U	3.6	65		10.8	4 U	2.2
7/24/2012	XX	SWXX1X567		4 U	0.5 U	40	3.8	50	0.3	0.11	2 U	89		13.8	15	4
10/23/2012	XX	SWXX1X5CI		2 U	0.5 U	35	6	29	0.3 U	0.04 U	5.6	104		9.6	13	1.7
4/23/2013	XX	SWXX1X5H9		4 U	0.5 U	15.3	12.7	23	0.3 U	0.04 U	3.1	60	0.1 U	7.4	4 U	1.4
7/30/2013	XX	SWXX1X63E		3 U		34	5.1	46	0.3 U	0.05	2 U	81	0.1 U	16.8	41	3.2
10/29/2013	XX	SWXX1X667		1 U		30	6.2	38	0.3 U	0.04 U	2.2	73	0.1 U	10.1	4 U	2.5 U
4/22/2014	XX	SWXX1X6EA		2 U		41	27.6	24	0.3 U	0.04	6.2	98	0.1 U	5.7	4 U	0.75
7/29/2014	XX	SWXX1X6IH		3 U		27	5.1	41	0.3 U	0.04 U	2 U	80	0.1 U	14.6	4 U	2.7
10/21/2014	XX	SWXX1X727		2 U		20	8.4	45	0.3 U	0.04 U	2.8	97	0.1 U	16.5	15	2.9
SW-2																
5/10/2005	XX	SWXX2X12B		6 U	0.1 U	11	8.8	30	0.1 U	0.02 J	0.6 U	62		11.9	4 U	2.6
5/10/2005	XD	SWDP2X12G		6 U	0.1 U	13.8	8.9	32	0.1 U	0.01 J	0.6 U	58		12	4 U	2.5
7/28/2005	XX	SWXX2X15J		6 U	0.1 U	18.2	3.4	43	0.1 U	0.02 J	0.6 U	60		15	4 U	3.7
9/20/2005	XX	SWXX2X18H		6 U	0.1 U	20	5.2	56	0.1 U	0.02 J	0.6 U	77		19	14	5.4
5/24/2006	XX	SWXX2X1DC		6 U	0.1 U	15.2	9.6	36	0.1 U	0.01 J	0.6 J	80		12.4	4 U	2.4
5/24/2006	XD	SWDP2X1DH		6 U	0.1 U	14.3	10.3	37	0.1 U	0.01 J	0.6 J	76		12	4 U	2.6
7/26/2006	XX	SWXX2X1G9		6 U	0.1 U	14.1	3.2	74	0.1 U	0.07	0.6 U	94		21.6	89	2.8
9/13/2006	XX	SWXX2X1J2		6 U	0.1 U	28	4.5	46	0.1 U	0.04	0.6 U	58		19.8	8	2.9
9/13/2006	XD	SWDP2X1J7		6 U	0.1 U	28	4.5	42	0.1 U	0.03 J	0.6 U	58		4.4	5	2.6
5/15/2007	XX	SWXX2X229		6 U	0.1 U	17.3	8.8	30	0.1 U	0.03 J	0.6 U	53		10.3	4 U	2.3
7/24/2007	XX	SWXX2X26D		6 U	0.1 U	27	7.9	48	0.1 U	0.03 J	0.6 U	78		17.9	8	2.8
9/11/2007	XX	SWXX2X293		6 U	0.1 U	31	7.1	57	0.1 J	0.02 J	0.6 U	84		15.3	6	2.9
9/11/2007	XD	SWDP2X298		6 U	0.1 U	30	7.1	50	0.1 J	0.01 J	0.6 U	86		15.5	6	2.7
5/21/2008	XX	SWXX2X2CH		6 U	0.1 U	18.1	9.6	21	0.1 J	0.04	1.1 J	68		13.9	23	2.3
7/29/2008	XX	SWXX2X2G1		6 U	0.1 U	26	8.6	50	0.1 J	0.04	1 J	119		16.7	12	3.6
10/28/2008	XX	SWXX2X2IB		5 U	0.2 J	16.1	4	32	0.1 U	0.02 J	0.9 J	70		17	4 U	2.5
10/28/2008	XD	SWDP2X2IG		5 U	0.1 U	15.8	4.1	34	0.1 U	0.27	1 J	66		13.9	4 U	2.9
4/14/2009	XX	SWXX2X31J		4 U	0.1 U	8.5	8.7	27	0.1 U	0.02 J	1.4 J	69		8.2	4 U	2
7/7/2009	XX	SWXX2X363		5 U	1.4 J	13	5.1	47	0.1 U	0.02 J	1.1 J	78		15.8	4 U	4.4
7/7/2009	XD	SWDP2X368		5 U	0.2 U	13.5	4.9	46	0.1 U	0.02 J	1 J	82		15.2	4 U	4.1
10/27/2009	XX	SWXX2X3DI		5 U	0.1 U	21	6.4	31	0.1 U	0.02 J	3.2	69		8.3	4 U	2
4/28/2010	XX	SWXX2X3IH		2 U	0.1 J	14.6	9.8	33	0.1 U	0.02 J	0.9 J	59		9.7	4 U	2.8
4/28/2010	XD	SWDP2X3J2		2 U	0.1 U	14.5	9.8	33	0.1 U	0.02 J	1.1 J	52		10.5	4 U	2.7
7/20/2010	XX	SWXX2X421		4	0.1 U	25	3.8	72	0.1 U	0.05	0.6 U	86		21.2	9	2.9
7/20/2010	XD	SWDP2X426		4	0.1 U	23	3.7	72	0.1 U	0.04	1.9 J	88		21.4	8	2.4
10/19/2010	XX	SWXX2X455		5 U	0.1 U	10.1	8	58	0.1 U	0.02 J	4.8	98		19.3	4 U	4.8
10/19/2010	XD	SWDP2X45A		5 U	0.1 U	10	8.2	57	0.1 U	0.02 J	4.2	102		19.5	4 U	5
4/26/2011	XX	SWXX2X496		3 U	0.1 U	11.5	6.7	24	0.1 U	0.01 J	0.9 J	57		8.3	4 U	1.9
4/26/2011	XD	SWDP2X49B		3 U	0.1 U	11.4	7.1	21	0.1 U	0.01 J	1 J	62		8.5	4 U	1.7
7/19/2011	XX	SWXX2X4D4		4 U	0.1 J	35	2.9	43	0.1 U	0.06	1.6 J	83		12.6	15	2.1
7/19/2011	XD	SWDP2X4D9		4 U	0.1 J	33	2.8	36	0.1 U	0.06	1.5 J	82		13.3	6	2
10/25/2011	XX	SWXX2X4GJ		4 U	0.1 U	12.6	7.4	42	0.1 U	0.01 J	2.6	76		14	4 U	5 U
10/25/2011	XD	SWDP2X4H4		4 U	0.1 J	13	6.3	43	0.1 U	0.01 J	2.3	75		14.4	4 U	5 U
4/24/2012	XX	SWXX2X519		5 U	0.5 U	15.1	21.6	35	0.3 U	0.04 U	2.6	89		12	4 U	2.3
4/24/2012	XD	SWDP2X51E		5 U	0.5 U	15.4	21.6	35	0.3 U	0.04 U	2.6	90		11.7	4 U	2.3
7/24/2012	XX	SWXX2X568		4 U	0.5 U	17.6	3.3	65	0.3	0.08	2 U	71		18	17	4
10/23/2012	XX	SWXX2X5CJ		2 U	0.5 U	13	4.2	32	0.3 U	0.04 U	3	72		10.7	4 U	1.8

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(SW-2)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)	
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
10/23/2012	XD	SWDP2X5D4		2 U	0.5 U	13.8	4	31	0.3 U	0.04 U	3	72		10.9	4 U	2.3	
4/23/2013	XX	SWXX2X5HA		4 U	0.5 U	13	13.6	29	0.3 U	0.04 U	2 U	66	0.1 U	7.6	4 U	1.5	
4/23/2013	XD	SWDP2X5HF		4 U	0.5 U	12.8	14.2	28	0.3 U	0.04 U	2 U	62	0.1 U	7.8	4 U	1.5	
7/30/2013	XX	SWXX2X63F		3 U		25	4.5	54	0.3 U	0.04 U	2 U	74	0.1 U	24.1	4	5 U	
10/29/2013	XX	SWXX2X668		1 U		22	6.6	40	0.3 U	0.04 U	2 U	65	0.1 U	11.8	4 U	2.5 U	
10/29/2013	XD	SWDP2X66D		1 U		21	6.6	39	0.3 U	0.04	2 U	68	0.1 U	11.9	6	2.5 U	
4/22/2014	XX	SWXX2X6EB		2 U		13.6	16.1	20	0.3 U	0.04 U	2.6	56	0.1 U	6.6	4 U	1.2	
4/22/2014	XD	SWDP2X6EG		2 U		13.4	16.4	20	0.3 U	0.04 U	2.7	58	0.1 U	6.5	4 U	1.2	
7/29/2014	XX	SWXX2X6II		5		26	5.3	52	0.3 U	0.1	2 U	76	0.1 U	15.1	42	2.9	
10/21/2014	XX	SWXX2X728		2 U		13.7	9	51	0.3 U	0.04 U	2.2	95	0.1 U	17.6	4 U	3.7	
10/21/2014	XD	SWDP2X72E		2 U		14.1	9	46	0.3 U	0.04 U	2.4	95	0.1 U	17.9	4 U	3.8	
SW-3																	
5/10/2005	XX	SWXX3X12C		6 U	0.1 U	10	5	30	0.1 U	0.02 J	1.1 J	46		9.6	4 U	2	
7/28/2005	XX	SWXX3X160		6 U	0.1 U	25	3.5	41	0.1 U	0.02 J	0.6 U	71		13.3	4	2.6	
7/28/2005	XD	SWDP2X164		6 U	0.1 U	25	3.5	47	0.1 U	0.03 J	0.6 U	73		14.5	4	2.7	
9/20/2005	XX	SWXX3X18I		6 U	0.1 U	25	4.5	38	0.1 U	0.03 J	1.3 J	65		14.2	10	2.9	
9/20/2005	XD	SWDP2X192		6 U	0.1 U	25	4.6	38	0.1 U	0.04	1.3 J	74		12.4	5	2.9	
5/24/2006	XX	SWXX3X1DD		6 U	0.1 U	15	8.1	33	0.1 U	0.02 J	2.3	70		10.4	4 U	1.7	
7/26/2006	XX	SWXX3X1GA		6 U	0.1 U	17	2.5	45	0.1 U	0.02 J	0.8 J	74		15.6	4 U	2	
9/13/2006	XX	SWXX3X1J3		6 U	0.1 U	27	4.2	30	0.1 U	0.02 J	0.6 J	36		13.2	4	1.3	
5/15/2007	XX	SWXX3X22A		6 U	0.1 U	21	6.4	30	0.1 U	0.02 J	1 J	51		8.5	4 U	1.8	
7/24/2007	XX	SWXX3X26E		6 U	0.1 U	26	5.9	43	0.1 J	0.03 J	1.8 J	83		13.1	4 U	1.7	
9/11/2007	XX	SWXX3X294		6 U	0.1 U	31	7.5	38	0.1 J	0.02 J	1.3 J	74		12.6	4 U	1.3	
5/21/2008	XX	SWXX3X2CI		6 U	0.1 U	23	8.4	29	0.1 J	0.03 J	1.9 J	66		10.9	7	1.8	
7/29/2008	XX	SWXX3X2G2		6 U	0.1 U	26	6.4	37	0.2 J	0.03 J	2.5	121		14.8	4 U	3.1	
10/28/2008	XX	SWXX3X2IC		5 U	0.1 U	15.9	6.7	32	0.1 U	0.02 J	2.9	76		12.9	4 U	1.9	
4/14/2009	XX	SWXX3X320		4 U	0.1 U	10.5	9.8	19	0.1 U	0.01 U	1.5 J	63		9.2	4 U	1.6	
7/7/2009	XX	SWXX3X364		5 U	0.2 U	16.6	4.5	42	0.1 U	0.03 J	1.5 J	80		16.6	4 U	2.9	
10/27/2009	XX	SWXX3X3DJ		5 U	0.1 U	10.7	4.8	35	0.1 U	0.02 J	2.5	74		11.4	4 U	2.3	
4/28/2010	XX	SWXX3X3II		2 U	0.1 U	21	8.1	27	0.1 U	0.03 J	1.8 J	50		8.5	4	2	
7/20/2010	XX	SWXX3X422		3 U	0.3 J	40	5	27	0.1 U	0.06	1.8 J	86		8.9	16	1.2	
10/19/2010	XX	SWXX3X456		5 U	0.1 U	12.5	6.4	49	0.1 U	0.02 J	5.5	97		17.2	4 U	4.1	
4/26/2011	XX	SWXX3X497		3 U	0.1 U	12.3	5.8	20	0.1 U	0.01 J	1.4 J	57		7.3	4 U	1.4	
7/19/2011	XX	SWXX3X4D5		4 U	0.1 U	36	5	29	0.1 U	0.04	0.6 J	85		11.8	4 U	1.3	
10/25/2011	XX	SWXX3X4H0			0.1 U	18.5	5.6	35	0.1 U	0.02 J	1.9 J	72		12.9	4 U	2.5 U	
10/26/2011	XX	SWXX3XHBB		4 U													
4/24/2012	XX	SWXX3X51A		5 U	0.5 U	10.9	4.6	32	0.3 U	0.04 U	3.5	58		11.3	4 U	2.2	
7/24/2012	XX	SWXX3X569		4 U	0.5 U	33	2	31	0.3 U	0.05	2 U	79		11.1	4	2.5 U	
7/24/2012	XD	SWDP2X56D		4 U	0.5 U	33	1.9	33	0.3 U	0.05	2 U	76		11	4 U	2.5 U	
10/23/2012	XX	SWXX3X5D0		2 U	0.5 U	13.6	3.8	35	0.3 U	0.04 U	2.3	74		12.1	4 U	2.5 U	
4/23/2013	XX	SWXX3X5HB		4 U	0.5 U	14.8	9.8	27	0.3 U	0.04 U	3.1	56	0.1 U	7	4 U	1.3	
7/30/2013	XX	SWXX3X63G		3 U		28	5.2	39	0.3 U	0.04 U	2.4	67	0.1 U	13.7	5	1.6	
7/30/2013	XD	SWDP2X640		3 U		28	5.1	37	0.3 U	0.04 U	2.3	72	0.1 U	13.7	4 U	1.8	
10/29/2013	XX	SWXX3X669		1 U		29	7.7	26	0.3 U	0.04 U	2.7	74	0.1 U	7.8	4 U	1.5	
4/22/2014	XX	SWXX3X6EC		2 U		12	13.8	22	0.3 U	0.04 U	3.3	53	0.1 U	6.4	4 U	0.98	
7/29/2014	XX	SWXX3X6IJ		3 U		27	5.3	24	0.3 U	0.04 U	2 U	75	0.1 U	10	4 U	1.5	
7/29/2014	XD	SWDP2X6J3		3 U		25	5.1	28	0.3 U	0.04 U	2 U	76	0.1 U	10.1	4 U	1.5	
10/21/2014	XX	SWXX3X729		2 U		15.1	7	51	0.3 U	0.04 U	5.7	90	0.1 U	15.4	4 U	1.2	

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(SW-DP1)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)	
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
SW-DP1																	
5/10/2005	XX	SWDP1X12I			0.1 U	42	3.4	38	0.1 U	0.09	4.7	87		11.4	6	2	
7/28/2005	XX	SWDP1X166			0.1 U	47	2.1	15	0.1 U	0.07	3.7	83		4.7	14	0.55	
9/20/2005	XX	SWDP1X194			0.1 U	81	5.5	9 J	0.1 U	0.15	12	172		3.4	13	1.1	
5/24/2006	XX	SWDP1X1DJ			0.1 U	91	9.7	13	0.1 U	0.04	22	162		4.5	5	0.2 U	
7/26/2006	XX	SWDP1X1GG		6 U	0.1 U	52	8.3	45	0.1 U	0.12	30	149		12.9	115	0.48	
9/13/2006	XX	SWDP1X1J9			0.1 U	69	3.6	9 J	0.1 U	0.03 J	9.2	95		4.4	4 U	0.2	
5/15/2007	XX	SWDP1X22G			0.1 U	74	6.9	3 J	0.1 U	0.01 J	11.4	115		4.2	4 U	0.53	
7/24/2007	XX	SWDP1X270			0.1 U	42	5.2	14	0.1 U	0.02 J	11.9	90		4.5	4 U	0.2 U	
9/11/2007	XX	SWDP1X29A			0.1 U	33	5.1	13	0.1 U	0.01 U	12.8	73		3.7	4 U	0.2 U	
5/21/2008	XX	SWDP1X2D4			0.1 U	30	11.3	9 J	0.1 J	0.02 J	8.8	102		3.6	4 U	0.2 U	
7/29/2008	XX	SWDP1X2G8			0.1 U	26	8.8	9 J	0.1 J	0.03 J	6.5	94		8.4	5	0.21	
10/28/2008	XX	SWDP1X2II			0.1 U	56	8.2	11	0.1 J	0.05	12.9	139		3	13	0.2 U	
4/14/2009	XX	SWDP1X326			0.1 U	69	11.7	10	0.1 U	0.05	11.7	145		3.6	12	0.29	
7/7/2009	XX	SWDP1X36A			0.5 U	39	4.1	9 J	0.1 J	0.02 J	7.5	81		4.5	4 U	0.26	
10/27/2009	XX	SWDP1X3E5			0.1 U	37	5.5	10	0.1 U	0.04	11	83		3.5	6	0.47	
4/28/2010	XX	SWDP1X3J4			0.1 U	62	10.2	8 J	0.1 U	0.02 J	12.1	116		2.9	5	0.2 U	
7/20/2010	XX	SWDP1X428			0.1 U	16	4.1	15	0.1 U	0.02 J	6.5	68		3.7	4 U	0.2 U	
10/19/2010	XX	SWDP1X45C			0.1 U	37	5.2	6 J	0.1 U	0.02 J	9.7	102		2.2	4 U	0.3	
4/26/2011	XX	SWDP1X49D			0.1 U	46	4.1	7 J	0.1 U	0.03 J	4	85		2.3	6	0.5 U	
7/19/2011	XX	SWDP1X4DB			0.1 U	69	2.4	8 J	0.1 U	0.02 J	4.5	92		4.1	4 U	0.2 U	
10/25/2011	XX	SWDP1X4H6			0.1 U	43	3.4	5 J	0.1 U	0.03 J	6.1	51		3	5	0.3	
4/24/2012	XX	SWDP1X51G			0.5 U	28	4.1	10 U	0.3 U	0.1	11.2	90		2.4	65	1.2	
7/24/2012	XX	SWDP1X56F			0.5 U	63	4.1	16	0.3 U	0.14	8.1	97		3.3	6	0.4 U	
10/23/2012	XX	SWDP1X5D6			0.5 U	23	3	10 U	0.3 U	0.08	5.5	90		2.2	46	1 U	
4/23/2013	XX	SWDP1X5HH			0.5 U	57	15.2	10 U	0.3 U	0.06	27.4	118	0.13	2 U	12	0.4 U	
7/30/2013	XX	SWDP1X642				27	4.4	10 U	0.3 U	0.04 U	7.2	55	0.1 U	2.6	4 U	0.4 U	
10/29/2013	XX	SWDP1X66F				69	5.5	13	0.3 U	0.04	9.1	90	0.1 U	2.8	12	0.2 U	
4/22/2014	XX	SWDP1X6EI				32	5.4	11	0.3 U	0.05	5.3	58	0.1 U	2 U	10	0.23	
7/29/2014	XX	SWDP1X6J5				16.2	1.8	10 U	0.3 U	0.07	2.3	44	0.1 U	2.4	6	0.2 U	
10/21/2014	XX	SWDP1X72G				17	1.9	10 U	0.3 U	0.04 U	4.9	47	0.1 U	2.2	4 U	0.25	
SW-DP5																	
4/23/2013	XX	SWDP5X60I			0.5 U	37	10.7	10 U	0.3 U	0.06	32.1	110	0.1 U	2 U	7	0.4 U	
7/30/2013	XX	SWDP5X65H				9	2.3	21	0.3 U	0.05	12.3	71	0.1 U	4.8	5	0.5 U	
10/29/2013	XX	SWDP5X686				D	D	D	D	D	D	D	D	D	D	D	
4/22/2014	XX	SWDP5X6GD				29	20.9	13	0.3 U	0.07	38	110	0.1 U	3.1	15	0.3	
7/29/2014	XX	SWDP5X70F				26	3.9	10 U	0.3 U	0.1	7.5	81	0.1 U	2.9	29	0.32	
10/21/2014	XX	SWDP5X743				23	4.1	10 U	0.3 U	0.05	22.9	90	0.1 U	2 U	9	0.2 U	
SW-DP6																	
10/27/2009	XX	SWDP6X3G6			0.1 U	29	5.4	14	0.1 J	0.12	5.5	94		5.3	31	0.45	
4/28/2010	XX	SWDP6X3J5			0.1 U	66	22.3	29	0.1 U	0.11	18.5	179		11.8	54	0.49	
7/20/2010	XX	SWDP6X429			0.1 U	71	22.1	36	0.1 U	0.07	10.4	196		11.9	5	0.86	
10/19/2010	XX	SWDP6X45D			0.1 U	39	10.7	17	0.1 U	0.03 J	20.8	149		5.6	4	0.93	
4/26/2011	XX	SWDP6X49E			0.1 U	23	17.7	13	0.1 U	0.04	22.2	127		4.5	7	0.54	
7/19/2011	XX	SWDP6X4DC			0.1 U	75	8.7	14	0.2 U	0.05	155	323		4.6	5	0.31	
10/25/2011	XX	SWDP6X4H7			0.1 U	59	16.3	8 J	0.1 U	0.03 J	42.2	168		3.1	4 U	0.4	
4/24/2012	XX	SWDP6X51H			0.5 U	16.8	10.3	13	0.3 U	0.04 U	21.3	91		4.4	5	0.42	
7/24/2012	XX	SWDP6X56G			0.5 U	30	1.1	37	0.3 U	0.14	5.5	81		8.7	16	2.5 U	

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(SW-DP6)			Total Kjeldahl Nitrogen	Biochemical Oxygen Demand	Ammonia (N)	Bicarbonate (CaCO3)	Chloride	Chemical Oxygen Demand	Nitrate (N)	Phosphate Phosphorus	Sulfate	Total Dissolved Solids	Bromide	Organic Carbon	Total Suspended Solids	Tannin & Lignins (Tannic Acid)	
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
10/23/2012	XX	SWDP6X5D7			0.5 U	22	3.5	14	0.3 U	0.07	3.9	89		4.6	11	0.91	
4/23/2013	XX	SWDP6X5HI			0.5 U	7.8	7	16	0.3 U	0.07	10.7	60	0.1 U	4.4	35	0.4	
7/30/2013	XX	SWDP6X643				13.1	4.6	15	0.3 U	0.04 U	20.4	73	0.1 U	4.9	4	0.5 U	
10/29/2013	XX	SWDP6X66G				12.6	4.9	15	0.3 U	0.04	23.2	71	0.1 U	3.8	4 U	0.4 U	
4/22/2014	XX	SWDP6X6EJ				13.1	17.8	23	0.3 U	0.1	21.8	70	0.1 U	4.3	6	0.58	
7/29/2014	XX	SWDP6X6J6				18.3	4.7	16	0.3 U	0.04 U	4.5	65	0.1 U	6.9	4 U	0.73	
10/21/2014	XX	SWDP6X72H				13.7	3.6	11	0.3 U	0.04 U	12.9	62	0.1 U	4.7	4 U	0.52	

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

! - The sampling location was damaged or destroyed.
D - The sampling location was dry.
DE - Decommissioned Location
F12 - Pipe under water, no sample taken.
F6 - No flow. Sample not taken.
H2 - Waterlevel higher than pipes. See LF-COMP for readings
I - The sampling location yielded insufficient quantity to collect a sample.
J - Analyte was positively identified/Associated value is an estimate below reporting limit.
U - Not Detected above the reported sample detection limit.

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(LF-COMP) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
LF-COMP												
7/19/2011	XX	LFXXXX4F1	0.002 U	4.3	0.014	9	0.0002 U	44.3	0.02 U	10	0.02 U	0.001 U
4/24/2012	XX	LFXXXX53B	0.005 U	3.4	0.008	6.9	0.0006 U	41.4	0.1	9.2	0.05 U	0.006
LF-UD-1												
5/11/2005	XX	LFUD1X137	0.01	1.9	0.001 J	6.8	0.0002 U	29	0.03 J	8.1	0.02 U	0.01 J
7/27/2005	XX	LFUD1X16F	0.002 U	1.8	0.002 J	6.4	0.0002 U	29	0.02 J	7.9	0.02 J	0.001 J
9/21/2005	XX	LFUD1X19D	0.002 U	1.8	0.001 J	7.1	0.0002 U	32	0.02 J	7.9	0.02 U	0.003
5/24/2006	XX	LFUD1X1E8	0.002 U	2	0.004	7.6	0.0004 J	30	0.02 J	8.5	0.02 U	0.001 U
7/25/2006	XX	LFUD1X1H5	0.002 U	2.4	0.001 J	8.6	0.0002 U	29	0.02 J	8.5	0.02 U	0.002 J
9/11/2006	XX	LFUD1X1JI	0.003 J	2	0.002 J	9.1	0.0006	33	0.3	9.5	0.02 J	0.001 U
5/16/2007	XX	LFUD1X235	0.002 U	4	0.002 J	9.4	0.001	36	0.02 U	10.5	0.02 J	0.003
7/25/2007	XX	LFUD1X279	0.002 U	2.5	0.001 J	8	0.0002 U	39	0.1	9.9	0.02 U	0.002 J
9/12/2007	XX	LFUD1X29J	I	I	I	I	I	I	I	I	I	I
5/20/2008	XX	LFUD1X2DD	0.003 U	2.3	0.005 J	8.3	0.001 U	40.4	0.02 J	10.4	0.02 U	0.003 U
7/28/2008	XX	LFUD1X2GH	0.002 U	2.2	0.002 U	6.8	0.0002 U	41.8	0.02 J	9.6	0.02 U	0.001 U
10/28/2008	XX	LFUD1X2J7	0.002 U	2.4	0.002 U	7.8	0.0002 U	45.1	0.02 U	10.6	0.02 U	0.01 U
4/15/2009	XX	LFUD1X32F	0.002 U	2.8	0.002 U	8.2	0.0002 U	53.6	0.02 U	11.3	0.02 U	0.001 U
7/8/2009	XX	LFUD1X36J	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
10/27/2009	XX	LFUD1X3EE	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/27/2010	XX	LFUD1X3JD	0.002 U	3.1	0.007	7.6	0.0002 U	47	0.02 J	10.6	0.02 U	0.001 U
7/20/2010	XX	LFUD1X42H	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/19/2010	XX	LFUD1X461	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/26/2011	XX	LFUD1X4A2	0.002 U	3.3	0.014	8	0.0004 J	42.8	0.02 U	9.3	0.02 U	0.001 U
7/19/2011	XX	LFUD1X4E0	0.002 U	4.1	0.014	9.1	0.0002 U	45.2	0.03 J	9.8	0.02 U	0.001 U
10/25/2011	XX	LFUD1X4HF	0.002 U	3.1	0.002 U	8.4	0.0002 U	43.2	0.03 J	11.4	0.02 U	0.001 U
4/24/2012	XX	LFUD1X525	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
7/24/2012	XX	LFUD1X574	0.005 U	3.5	0.007	8.7	0.0006 U	44.3	0.13	12.2	0.05 U	0.004
10/23/2012	XX	LFUD1X5DF	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/23/2013	XX	LFUD1X5I6	0.005 U	3.7	0.012	7.9	0.0006 U	44.4	0.05 U	10.5	0.05 U	0.003 U
7/30/2013	XX	LFUD1X64B	0.005 U	3.2	0.015	7.1	0.0006 U	49.7	0.05 U	10.8	0.05 U	
10/29/2013	XX	LFUD1X674	F6	F6	F6	F6	F6	F6	F6	F6	F6	
4/22/2014	XX	LFUD1X6F7	0.005 U	3.8	0.015	8.2	0.0006 U	54.1	0.05	11.4	0.05 U	
7/29/2014	XX	LFUD1X6JE	0.005 U	4	0.006	7.5	0.0006 U	47.3	4.57	12.1	0.1	
10/21/2014	XX	LFUD1X735	F6	F6	F6	F6	F6	F6	F6	F6	F6	
LF-UD-2												
5/11/2005	XX	LFUD2X138	0.002 J	2	0.002 J	5.7	0.0002 U	20	0.04 J	6.1	0.02 U	0.01 U
7/27/2005	XX	LFUD2X16G	0.002 U	2	0.001 J	6.9	0.0002 U	29	0.02 J	8.1	0.02 J	0.001 U
9/21/2005	XX	LFUD2X19E	0.002 U	1.9	0.002 J	6.1	0.0002 U	30	0.02 J	7	0.02 U	0.003
5/24/2006	XX	LFUD2X1E9	0.002 U	2.1	0.004	5.7	0.0005 J	23	0.05 J	6.6	0.02 U	0.001 U
7/25/2006	XX	LFUD2X1H6	0.002 U	2.4	0.001 J	6	0.0002 J	26	0.02 J	7.1	0.02 U	0.001 J
9/11/2006	XX	LFUD2X1JJ	0.002 J	3.2	0.003 J	18.1	0.0004 J	38	0.18	11	0.02 U	0.001 U
5/16/2007	XX	LFUD2X236	0.002 J	3.6	0.004	6.4	0.0003 J	30	0.02 U	8.2	0.02 J	0.001 J
7/25/2007	XX	LFUD2X27A	0.002 U	2.5	0.001 U	5.9	0.0002 U	30	0.05 J	8.1	0.02 U	0.001 J
9/12/2007	XX	LFUD2X2A0	0.002 U	2.3	0.001 U	5.8	0.0002 U	35	0.02 U	8	0.02 J	0.001 U
5/20/2008	XX	LFUD2X2DE	0.003 U	2.4	0.003 J	5.5	0.001 U	34.1	0.02 U	8.2	0.02 U	0.003 U
7/28/2008	XX	LFUD2X2GI	0.002 U	2.3	0.002 U	5.4	0.0002 U	33.5	0.02 J	7.9	0.02 U	0.001 U
10/29/2008	XX	LFUD2X2J8	0.002 U	2.3	0.002 U	5.2	0.0002 U	33.9	0.02 U	7.8	0.02 U	0.01 U
4/15/2009	XX	LFUD2X32G	0.002 U	2.9	0.004 J	6.1	0.0002 U	38.8	0.02 U	8.8	0.02 U	0.001 U

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(LF-UD-2) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
7/8/2009	XX	LFUD2X370	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
10/27/2009	XX	LFUD2X3EF	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/27/2010	XX	LFUD2X3JE	0.002 U	3.3	0.005	6.6	0.0002 U	44.8	0.03 J	9.8	0.02 U	0.001 U
7/20/2010	XX	LFUD2X42I	0.002 U	3.3	0.013	6.2	0.0002 U	50.5	0.02 U	10.9	0.02 U	0.001 U
10/19/2010	XX	LFUD2X462	0.002 U	5	0.01	9.9	0.0002 U	64.3	0.13	12.3	0.02 J	0.001 U
4/26/2011	XX	LFUD2X4A3	0.002 U	2.6	0.009	5.2	0.0003 J	30.7	0.02 U	8	0.02 U	0.001 U
7/19/2011	XX	LFUD2X4E1	0.002 U	2.6	0.014	6.1	0.0002 U	33.6	0.02 U	8.9	0.02 U	0.001 U
10/25/2011	XX	LFUD2X4HG	0.002 U	2.7	0.002 U	5.9	0.0002 U	34.2	0.02 U	8.9	0.02 U	0.001 J
4/24/2012	XX	LFUD2X526	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
7/24/2012	XX	LFUD2X575	0.005 U	3.1	0.005 U	6.7	0.0006 U	39	0.05 U	10.4	0.05 U	0.003 U
10/23/2012	XX	LFUD2X5DG	0.005 U	2.7	0.01	6.3	0.0006 U	35.6	0.05 U	9.9	0.05 U	0.003 U
4/23/2013	XX	LFUD2X5I7	0.005 U	3	0.011	6.8	0.0006 U	36.3	0.05 U	9.6	0.05 U	0.003 U
7/30/2013	XX	LFUD2X64C	0.005 U	2.6	0.012	6.2	0.0006 U	40.3	0.05 U	10.3	0.05 U	
10/29/2013	XX	LFUD2X675	0.005 U	3.4	0.008	7.3	0.0006 U	50.5	0.05 U	10.7	0.05 U	
4/22/2014	XX	LFUD2X6F8	0.005 U	3.2	0.012	7.4	0.0006 U	46	0.05 U	11.4	0.05 U	
7/29/2014	XX	LFUD2X6JF	0.005 U	3	0.018	7	0.0006 U	46.3	0.05 U	10.8	0.05 U	
10/21/2014	XX	LFUD2X736	0.005 U	4.5	0.016	9.2	0.0006 U	71.5	0.05 U	12.3	0.05 U	
LF-UD-3A,B												
5/16/2007	XX	LFUD3X246	0.002 U	3.3	0.003 J	8.9	0.0004 J	60	0.02 U	11.5	0.02 U	0.002 J
7/25/2007	XX	LFUD3X288	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
9/12/2007	XX	LFUD3X2AI	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
5/20/2008	XX	LFUD3X2EE	0.003 U	2.9	0.003 U	6	0.001 U	46.4	0.02 U	8.2	0.12	0.003 U
7/28/2008	XX	LFUD3X2HG	D	D	D	D	D	D	D	D	D	D
10/29/2008	XX	LFUD3X306	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/15/2009	XX	LFXXXX33F	0.002 U	2	0.003 J	8.4	0.0002 U	69.9	0.02 U	12.5	0.02 U	0.001 U
7/8/2009	XX	LFXXXX37I	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
10/27/2009	XX	LFXXXX3FC	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/27/2010	XX	LFXXXX40C	0.002 U	1.8	0.005	9.5	0.0002 U	57.4	0.02 U	10.7	0.02 U	0.001 U
7/20/2010	XX	LFXXXX43G	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/19/2010	XX	LFXXXX46J	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/26/2011	XX	LFXXXX4B1	0.002 U	1.8	0.01	7.2	0.0004 J	47.2	0.02 U	8.8	0.06	0.001 U
7/19/2011	XX	LFXXXX4EJ	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
10/25/2011	XX	LFXXXX4IC	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/24/2012	XX	LFXXXX534	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
7/24/2012	XX	LFXXXX581	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/23/2012	XX	LFXXXX5EC	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/23/2013	XX	LFXXXX5J5	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/30/2013	XX	LFXXXX65A	F6	F6	F6	F6	F6	F6	F6	F6	F6	
10/29/2013	XX	LFXXXX67J	F6	F6	F6	F6	F6	F6	F6	F6	F6	
4/22/2014	XX	LFXXXX6G6	F6	F6	F6	F6	F6	F6	F6	F6	F6	
7/29/2014	XX	LFXXXX708	F6	F6	F6	F6	F6	F6	F6	F6	F6	
10/21/2014	XX	LFXXXX73H	F6	F6	F6	F6	F6	F6	F6	F6	F6	
LF-UD-4												
4/15/2009	XX	LFXXXX34A	0.002 U	4.9	0.002 J	10.2	0.0002 U	51.9	0.02 U	11.8	0.02 U	0.001 U
7/8/2009	XX	LFXXXX380	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
10/27/2009	XX	LFXXXX3FE	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/27/2010	XX	LFXXXX40E	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/20/2010	XX	LFXXXX43I	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6

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(LF-UD-4) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
10/19/2010	XX	LFXXXX471	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/26/2011	XX	LFXXXX4B3	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12
7/19/2011	XX	LFXXXXHG2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
10/25/2011	XX	LFXXXX4GA	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/24/2012	XX	LFXXXX536	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
7/24/2012	XX	LFXXXX582	0.005 U	5.8	0.007	10.6	0.0006 U	63.5	0.05 U	12.1	0.05 U	0.003 U
10/23/2012	XX	LFXXXX5CA	0.005 U	3.8	0.011	8.4	0.0006 U	48.6	0.05 U	11.1	0.05 U	0.003 U
4/23/2013	XX	LFXXXX5J6	0.005 U	3.7	0.012	8.2	0.0006 U	44.8	0.05 U	10.6	0.05 U	0.003 U
7/30/2013	XX	LFXXXX65B	F6	F6	F6	F6	F6	F6	F6	F6	F6	
10/29/2013	XX	LFXXXX680	0.005 U	3.4	0.009	7.4	0.0006 U	49.4	0.05 U	10.9	0.05 U	
4/22/2014	XX	LFXXXX6G7	0.005 U	4.7	0.014	9	0.0006 U	62.6	0.05 U	11.3	0.05 U	
7/29/2014	XX	LFXXXX709	F6	F6	F6	F6	F6	F6	F6	F6	F6	
10/21/2014	XX	LFXXXX73I	F6	F6	F6	F6	F6	F6	F6	F6	F6	
LF-UD-5												
4/27/2010	XX	LFXXXX40F	0.002 U	3.9	0.004 J	6	0.0002 U	46	0.02 U	9.6	0.02 U	0.001 U
LF-UD-5and6												
7/20/2010	XX	LFXXXX43J	0.002 U	4.9	0.007	7.1	0.0002 U	58.1	0.05	11.7	0.02 U	0.001 U
10/19/2010	XX	LFXXXX472	0.002 U	4.8	0.007	8.1	0.0002 U	58.1	0.42	11.6	0.05	0.001 U
4/26/2011	XX	LFXXXX4B4	0.002 U	5.7	0.017	8.8	0.0004 J	64.6	0.02 U	13.3	0.02 U	0.001 U
7/19/2011	XX	LFXXXX4F2	0.002 U	5.5	0.012	10.2	0.0002 U	59.1	0.15	13.6	0.02 U	0.001 U
10/25/2011	XX	LFXXXX4G7	0.007	7	0.008	10	0.0002 U	71.3	11.3	15.4	0.25	0.003
4/24/2012	XX	LFXXXX537	0.005 U	5.3	0.008	9.8	0.0006 U	65.9	0.05	12.9	0.05 U	0.004
7/24/2012	XX	LFXXXX584	0.005 U	5.5	0.01	9.8	0.0006 U	68.3	0.05 U	14.1	0.05 U	0.003
10/23/2012	XX	LFXXXX5C7	0.005 U	4.8	0.014	8.7	0.0006 U	52.5	0.26	11.9	0.05	0.003 U
4/23/2013	XX	LFXXXX5J7	0.005 U	4	0.009	6.7	0.0006 U	42.8	0.05	8.4	0.05 U	0.003 U
7/30/2013	XX	LFXXXX65C	0.005 U	3.4	0.016	6.2	0.0006 U	48.5	0.08	9.4	0.05 U	
10/29/2013	XX	LFXXXX681	0.005 U	3.9	0.009	7.7	0.0006 U	56.1	0.05 U	11.4	0.05 U	
4/22/2014	XX	LFXXXX6G8	0.005 U	3.6	0.015	7.6	0.0006 U	55.5	0.05 U	10.9	0.05 U	
7/29/2014	XX	LFXXXX70A	0.005 U	4.2	0.014	8.3	0.0006 U	64.7	0.05 U	12	0.05 U	
10/21/2014	XX	LFXXXX73J	F6	F6	F6	F6	F6	F6	F6	F6	F6	
LF-UD-6												
4/26/2011	XX	LFUD6X4B6	0.002 U	5	0.02	11.3	0.0006	81.2	0.02 U	16.7	0.02 U	0.001 U
7/19/2011	XX	LFUD6X4F4	0.013	5.9	0.003 J	9.6	0.0002 U	83.1	6.28	17.6	0.17	0.007
10/25/2011	XX	LFUD6X4G9	0.007	5.1	0.006	8.7	0.0007	94.1	0.02 U	18.6	0.02 U	0.002 J
4/24/2012	XX	LFUD6X539	0.005 U	4.7	0.007	7.9	0.0006 U	75.7	0.05 U	15.9	0.05 U	0.004
7/24/2012	XX	LFUD6X586	0.005 U	5.3	0.011	26.5	0.0006 U	96.4	0.05 U	22.2	0.05 U	0.003
10/23/2012	XX	LFUD6X5C9	0.005 U	5.1	0.025	64.1	0.0006 U	83.7	0.05 U	23.7	0.05 U	0.003 U
4/23/2013	XX	LFUD6X5J9	0.005 U	3.3	0.015	39.7	0.0006 U	62	0.05 U	14.7	0.05 U	0.003 U
7/30/2013	XX	LFUD6X65E	0.005 U	4.3	0.023	74.3	0.0006 U	86.3	0.05 U	24.2	0.05 U	
10/29/2013	XX	LFUD6X683	0.005 U	4.4	0.019	73.6	0.0006 U	85.6	0.06	25.4	0.05 U	
4/22/2014	XX	LFUD6X6GA	0.005 U	4.6	0.019	57.3	0.0006 U	72.7	0.05 U	21	0.05 U	
7/29/2014	XX	LFUD6X70C	0.005 U	4.1	0.026	69.1	0.0006 U	80.5	0.05 U	22.5	0.05 U	
10/21/2014	XX	LFUD6X740	0.005 U	4.1	0.019	70.9	0.0006	87.9	0.05 U	23.3	0.05 U	
LF-UD-7												
4/24/2012	XX	LFUD7X53A	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
7/24/2012	XX	LFXXXX587	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/23/2012	XX	LFXXXX5EF	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6

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(LF-UD-7) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
4/23/2013	XX	LFUD7X5JA	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/30/2013	XX	LFUD7X65F	F6	F6	F6	F6	F6	F6	F6	F6	F6	
10/29/2013	XX	LFUD7X684	F6	F6	F6	F6	F6	F6	F6	F6	F6	
4/22/2014	XX	LFUD7X6GB	F6	F6	F6	F6	F6	F6	F6	F6	F6	
7/29/2014	XX	LFUD7X70D	F6	F6	F6	F6	F6	F6	F6	F6	F6	
10/21/2014	XX	LFUD7X741	F6	F6	F6	F6	F6	F6	F6	F6	F6	
LF-UD-8												
4/23/2013	XX	LFUD8X5JD	0.005 U	3.7	0.014	6.9	0.0006 U	39.3	0.05 U	9	0.05 U	0.003 U
7/30/2013	XX	LFUD8X65G	0.005 U	3.7	0.013	7.1	0.0006 U	50.1	0.05 U	10.7	0.05 U	
10/29/2013	XX	LFUD8X685	0.005 U	3.7	0.009	7.3	0.0006 U	49.1	0.05 U	11.1	0.05 U	
4/22/2014	XX	LFUD8X6GC	F12	F12	F12	F12	F12	F12	F12	F12	F12	
7/29/2014	XX	LFUD8X70E	0.005 U	1.2	0.005	2.4	0.0006 U	14.5	0.85	1.6	0.05 U	
10/21/2014	XX	LFUD8X742	0.005 U	1.1	0.005 U	2.1	0.0006 U	9.6	0.44	1.2	0.05 U	
LP-UD-1												
5/11/2005	XX	LPUD1X139	D	D	D	D	D	D	D	D	D	D
7/27/2005	XX	LPUD1X16H	D	D	D	D	D	D	D	D	D	D
9/21/2005	XX	LPUD1X19F	D	D	D	D	D	D	D	D	D	D
5/24/2006	XX	LPUD1X1EA	D	D	D	D	D	D	D	D	D	D
7/26/2006	XX	LPUD1X1H7	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
9/11/2006	XX	LPUD1X200	D	D	D	D	D	D	D	D	D	D
5/16/2007	XX	LPUD1X237	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/25/2007	XX	LPUD1X27B	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
9/12/2007	XX	LPUD1X2A1	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
5/20/2008	XX	LPUD1X2DF	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/28/2008	XX	LPUD1X2GJ	D	D	D	D	D	D	D	D	D	D
10/29/2008	XX	LPUD1X2J9	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/15/2009	XX	LPUD1X32H	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/8/2009	XX	LPUD1X371	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/27/2009	XX	LPUD1X3EG	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/27/2010	XX	LPUD1X3JF	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/20/2010	XX	LPUD1X42J	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/19/2010	XX	LPUD1X463	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/26/2011	XX	LPUD1X4A4	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/19/2011	XX	LPUD1X4E2	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/25/2011	XX	LPUD1X4HH	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/24/2012	XX	LPUD1X527	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/24/2012	XX	LPUD1X576	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
10/23/2012	XX	LPUD1X5DH	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/23/2013	XX	LPUD1X5I8	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
7/30/2013	XX	LPUD1X64D	F6	F6	F6	F6	F6	F6	F6	F6	F6	
10/29/2013	XX	LPUD1X676	F6	F6	F6	F6	F6	F6	F6	F6	F6	
4/22/2014	XX	LPUD1X6F9	F6	F6	F6	F6	F6	F6	F6	F6	F6	
7/29/2014	XX	LPUD1X6JG	F6	F6	F6	F6	F6	F6	F6	F6	F6	
10/21/2014	XX	LPUD1X737	F6	F6	F6	F6	F6	F6	F6	F6	F6	
LP-UD-2												
5/11/2005	XX	LPUD2X13A	0.007	8.4	0.002 J	23	0.0002 U	36	0.04 J	12.5	0.02 U	0.01 J
7/27/2005	XX	LPUD2X16I	0.002 U	3.7	0.002 J	21	0.0002 U	40	0.04 J	12.5	0.02 J	0.001 U
9/21/2005	XX	LPUD2X19G	0.002 J	5.3	0.002 J	25	0.0002 U	42	0.02 J	12	0.02 U	0.003

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(LP-UD-2) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
5/24/2006	XX	LPUD2X1EB	0.002 U	4.2	0.003 J	17	0.0002 J	34	0.13	10.5	0.05	0.003
7/25/2006	XX	LPUD2X1H8	0.002 J	4	0.002 J	17.6	0.0002 U	33	0.04 J	10.5	0.02 U	0.001 J
9/11/2006	XX	LPUD2X201	0.002 J	2.3	0.006	7	0.0016	31	0.02 J	8.1	0.02 U	0.001 U
5/16/2007	XX	LPUD2X238	0.002 J	4.3	0.002 J	15.9	0.0005 J	37	0.07	12.5	0.02 J	0.002 J
7/25/2007	XX	LPUD2X27C	0.002 U	4.2	0.001 J	14.5	0.0002 J	34	0.06	10.5	0.02 U	0.001 J
9/12/2007	XX	LPUD2X2A2	0.002 U	2.9	0.001 U	12.6	0.0002 U	38	0.02 U	10.5	0.02 U	0.001 J
5/20/2008	XX	LPUD2X2DG	0.003 U	3	0.003 J	12.1	0.001 U	36.9	0.02 U	10.9	0.02 U	0.003 U
7/28/2008	XX	LPUD2X2H0	0.002 U	3.1	0.002 U	10.6	0.0002 U	33.5	0.02 J	9.2	0.02 U	0.001 U
10/29/2008	XX	LPUD2X2JA	0.002 U	3.2	0.002 U	9.9	0.0002 U	34.4	0.02 U	9.9	0.02 U	0.01 U
4/15/2009	XX	LPUD2X32I	0.002 U	2.7	0.002 U	9.2	0.0002 U	36.8	0.02 U	10.2	0.02 U	0.001 U
7/8/2009	XX	LPUD2X372	0.002 J	3.1	0.005	10.4	0.0003 J	38.1	0.07	10.1	0.02 U	0.001 J
10/27/2009	XX	LPUD2X3EH	0.003 J	2.8	0.003 J	7.6	0.0007	28.8	0.02 U	7.7	0.03 J	0.001 J
4/27/2010	XX	LPUD2X3JG	0.002 U	2.3	0.004 J	8.5	0.0002 U	37.8	0.05	10.9	0.02 U	0.001 U
7/20/2010	XX	LPUD2X430	0.002 U	2.5	0.011	8.9	0.0002 U	37	0.06	10.3	0.02 U	0.001 U
10/19/2010	XX	LPUD2X464	0.002 U	2.3	0.005	8.7	0.0002 U	34.5	0.02 U	9.5	0.02 U	0.001 U
4/26/2011	XX	LPUD2X4A5	0.002 U	2.4	0.008	8.5	0.0003 J	32.6	0.02 U	10.6	0.02 U	0.001 U
7/19/2011	XX	LPUD2X4E3	0.004 J	2.7	0.002 J	9.3	0.0002 U	31.5	2.86	10.2	0.36	0.008
10/25/2011	XX	LPUD2X4HI	0.002 U	2.8	0.002 U	9.6	0.0002 U	33.1	0.88	10.7	0.08	0.006
4/24/2012	XX	LPUD2X528	0.005 U	2.9	0.006	8.5	0.0006 U	29.9	0.11	9.7	0.05 U	0.005
7/24/2012	XX	LPUD2X577	0.005 U	3.2	0.008	9.7	0.0006	40.5	0.05 U	11.7	0.05 U	0.003
10/23/2012	XX	LPUD2X5DI	0.005 U	2.4	0.012	9	0.0006 U	29.9	0.05 U	10	0.05 U	0.003 U
4/23/2013	XX	LPUD2X5I9	0.005 U	2.3	0.011	8	0.0006 U	33.9	0.05 U	10.4	0.05 U	0.003 U
7/30/2013	XX	LPUD2X64E	0.005 U	2.5	0.011	8.1	0.0006 U	37.1	0.05 U	10.8	0.05 U	
10/29/2013	XX	LPUD2X677	0.005 U	2.2	0.01	7.9	0.0006 U	36.4	0.05 U	11.4	0.05 U	
4/22/2014	XX	LPUD2X6FA	0.005 U	2.3	0.011	8	0.0006 U	37.7	0.05 U	11.5	0.05 U	
7/29/2014	XX	LPUD2X6JH	0.005 U	2.8	0.015	8.2	0.0006 U	36.5	0.05 U	10	0.05 U	
10/21/2014	XX	LPUD2X738	0.005 U	2.3	0.011	8	0.0006 U	40.1	0.05 U	10.5	0.05 U	
MW04-102												
1/18/2005	XX	GW102X10C	0.003 J	1.2	0.001 U	9.8	0.0002 J	25	0.1	6.6	0.08	0.001 J
3/21/2005	XX	GW102X144	0.002 U	1.5	0.001 U	11	0.0008	25	0.02 J	6.4	0.02 U	0.001 U
7/25/2005	XX	GW102X17I	0.002 U	2.5	0.003 J	9	0.0002 J	29	0.1	7.4	0.09	0.001 U
9/20/2005	XX	GW102X1A9	0.006	1.8	0.002 J	9.2	0.0002 U	27	0.03 J	6.7	0.02 U	0.001 J
5/23/2006	XX	GW102X1F4	0.002 U	2.3	0.001 U	8.7	0.0008	25	0.04 J	6.7	0.02 U	0.001 U
7/25/2006	XX	GW102X1I0	0.012	2.5	0.005	8.9	0.0002 U	25	0.02 U	7.1	0.02 U	0.002 J
9/12/2006	XX	GW102X20D	0.002 U	3.2	0.002 J	10.1	0.0002 U	28	0.13	7.3	0.02 U	0.001 U
5/15/2007	XX	GW102X240	0.003 J	2.6	0.004	8.7	0.001	25	0.06	7.2	0.03 J	0.004
7/24/2007	XX	GW102X284	0.002 J	2.4	0.001 U	8.1	0.0002 J	24	0.05 J	8	0.02 J	0.002 J
9/11/2007	XX	GW102X2AE	0.002 U	1.9	0.001 U	8.2	0.0004 J	27	0.04 J	6.9	0.02 J	0.001 J
5/20/2008	XX	GW102X2E8	0.003 U	1.8	0.003 J	7.5	0.001 U	27	0.02 U	7.2	0.02 U	0.003 U
7/29/2008	XX	GW102X2HC	0.002 U	1.7	0.002 U	6.8	0.0002 U	25.5	0.05	6.7	0.02 U	0.001 U
10/27/2008	XX	GW102X302	0.002 U	1.6	0.002 U	6.4	0.0002 U	24.1	0.04 J	6.5	0.02 U	0.01 U
4/14/2009	XX	GW102X339	0.002 U	1.7	0.002 U	7.3	0.0002 U	28.1	0.02 J	7.5	0.02 U	0.001 U
7/7/2009	XX	GW102X37D	0.002 U	1.7	0.002 U	7.2	0.0005 J	27.6	0.02 J	6.9	0.02 U	0.003
10/27/2009	XX	GW102X3F8	0.002 U	1.7	0.004 J	6.8	0.0002 U	26.7	0.02 U	7	0.02 U	0.001 U
4/27/2010	XX	GW102X407	0.002 U	1.6	0.004 J	6.9	0.0002 U	27.1	0.02 J	7	0.02 U	0.001 U
7/21/2010	XX	GW102X43B	0.002 U	1.7	0.006	6.6	0.0002 U	26.1	0.02 U	6.8	0.02 U	0.001 U
10/19/2010	XX	GW102X46F	0.002 U	1.8	0.003 J	7.3	0.0002 U	27.1	0.02 U	7	0.02 U	0.001 U
4/25/2011	XX	GW102X4AG	0.002 U	1.7	0.005	6.9	0.0002 U	26.3	0.02 J	7.5	0.02 U	0.001 U
7/19/2011	XX	GW102X4EE	0.002 U	1.7	0.002 U	7.1	0.0002 U	26.8	0.02 U	7.2	0.02 U	0.001 U

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(MW04-102) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L			
10/25/2011	XX	GW102X4I9	0.003 J	2	0.004 J	7.6	0.0002 U	25.4	0.02 U	7.5	0.02 U	0.001 U			
4/24/2012	XX	GW102X52J	0.005 U	1.7	0.005	6.9	0.0006 U	23.5	0.05 U	7.8	0.05 U	0.003 U			
7/24/2012	XX	GW102X57I	0.005 U	1.9	0.005 U	7.9	0.0006 U	25	0.05 U	7.6	0.05 U	0.003 U			
10/22/2012	XX	GW102X5E9	0.005 U	2	0.005 U	8.9	0.0006	31.2	0.05 U	8.1	0.05 U	0.003 U			
4/23/2013	XX	GW102X5J0	0.005 U	1.6	0.008	7.1	0.0006 U	24.2	0.05 U	7	0.05 U	0.003 U			
7/31/2013	XX	GW102X655	0.005 U	1.5	0.017	7	0.0008	27.5	0.05 U	7.4	0.05 U				
10/28/2013	XX	GW102X67F	0.005 U	2.1	0.013	8.2	0.0006 U	25.6	0.05 U	7.1	0.05 U				
4/23/2014	XX	GW102X6G1	0.005 U	1.5	0.01	7.2	0.0006 U	27.4	0.05 U	6.9	0.05 U				
7/30/2014	XX	GW102X704	0.005 U	1.8	0.01	7.9	0.0006 U	27.1	0.05 U	6.9	0.05 U				
10/21/2014	XX	GW102X73F	0.005 U	1.8	0.012	7.5	0.0006 U	27	0.05 U	7	0.05 U				
MW04-109															
1/19/2005	XX	GW109X10I	0.002 U	2.3	0.001 U	70	0.0002 U	54	0.02 J	17.5	0.22	0.002 J			
1/19/2005	XD	GWDP1X110	0.002 U	2.2	0.001 U	72	0.0002 U	52	0.02 J	17	0.21	0.002 J			
3/23/2005	XX	GW109X14A	0.002 U	2.1	0.003 J	55	0.0004 J	50	0.02 J	16.5	0.08	0.001 U			
7/26/2005	XX	GW109X184	0.002 U	2.4	0.002 J	45	0.0002 U	42	0.04 J	15.5	0.11	0.001 J			
7/26/2005	XD	GWDP5X186	0.002 U	2.4	0.002 J	44	0.0002 U	41	0.04 J	15	0.1	0.001 U			
9/20/2005	XX	GW109X1AF	0.002 U	2.1	0.003 J	40	0.0002 U	46	0.03 J	16.5	0.07	0.001 U			
9/20/2005	XD	GWDP5X1AH	0.002 J	1.9	0.002 J	43	0.0002 U	45	0.03 J	18	0.07	0.001 U			
5/23/2006	XX	GW109X1FA	0.002 U	2	0.003 J	22	0.0002 U	47	0.06	16.5	0.06	0.007			
5/23/2006	XD	GWDP3X1E1	0.002 J	2.1	0.002 J	23	0.0002 U	48	0.07	16	0.05	0.007			
7/25/2006	XX	GW109X1I2	0.002 J	2	0.006	19.2	0.0002 U	40	0.02 J	14	0.05	0.002 J			
9/12/2006	XX	GW109X20F	0.004 J	5.4	0.001 U	19.5	0.0002 U	42	0.06	14	0.06	0.001 U			
9/12/2006	XD	GWDP1X1J0	0.004 J	4.9	0.001 U	21	0.0003 J	42	0.05 J	13.5	0.06	0.001 U			
5/15/2007	XX	GW109X242	0.004 J	2.1	0.003 J	13.5	0.0002 J	40	0.06	14	0.07	0.001 J			
7/24/2007	XX	GW109X286	0.002 J	2	0.001 J	12.6	0.0002 J	32	0.03 J	16.5	0.04 J	0.002 J			
9/10/2007	XX	GW109X2AG	0.002 U	1.7	0.001 U	12	0.0004 J	38	0.06	10.5	0.04 J	0.001 U			
9/10/2007	XD	GWDP5X2AH	0.002 U	1.7	0.001 U	12.1	0.0002 J	39	0.05 J	10.5	0.05	0.001 U			
5/19/2008	XX	GW109X2EA	0.003 U	2.7	0.003 J	15.4	0.001 U	81.2	0.06	25.4	0.11	0.003 U			
7/29/2008	XX	GW109X2HE	0.002 J	3.1	0.002 U	21.6	0.0002 U	70.5	0.03 J	21.4	0.13	0.001 U			
10/28/2008	XX	GW109X304	0.002 U	3	0.002 U	22.9	0.0002 J	62.7	0.03 J	19.3	0.21	0.01 U			
4/15/2009	XX	GW109X33B	0.002 J	2.5	0.003 J	19.7	0.0002 U	76.3	0.06	19.3	0.2	0.001 U			
7/7/2009	XX	GW109X37F	DE	DE	DE	DE	DE	DE	DE	DE	DE	DE			
MW04-109R															
12/8/2009	XX	GW109X3GF	0.002 U	2.5	0.033	9	0.0006	77.2	0.03 J	14.3	0.15	0.001 J			
4/27/2010	XX	GW109X409	0.002 U	1.9	0.008	9.1	0.0002 U	54.9	0.02 U	12.4	0.03 J	0.001 U			
7/20/2010	XX	GW109X43D	0.002 U	2.1	0.023	9.5	0.0002 U	64.2	0.02 U	12.7	0.04 J	0.001 U			
10/19/2010	XX	GW109X46H	0.002 U	2.2	0.014	10.3	0.0002 U	69.1	0.02 U	13.6	0.04 J	0.001 U			
4/26/2011	XX	GW109X4AI	0.002 U	2.2	0.014	9.1	0.0002 U	62.7	0.02 U	11.8	0.02 J	0.001 U			
7/19/2011	XX	GW109X4EG	0.002 U	2.1	0.01	8.3	0.0002 U	55.7	0.02 U	10.7	0.03 J	0.001 U			
10/25/2011	XX	GW109X4IB	0.002 U	2.2	0.002 U	9.6	0.0006	57.7	0.02 U	11	0.03 J	0.001 U			
4/24/2012	XX	GW109X531	0.005 U	2.2	0.008	10.6	0.0006 U	50.3	0.05 U	10.1	0.05 U	0.003 U			
7/24/2012	XX	GW109X580	0.005 U	2.2	0.009	10	0.0006 U	52.8	0.05 U	10.9	0.05 U	0.003 U			
10/23/2012	XX	GW109X5EB	0.005 U	2	0.017	9.8	0.0006 U	54	0.05 U	11	0.06	0.003 U			
4/23/2013	XX	GW109X5J2	0.005 U	2	0.017	9	0.0006 U	54.1	0.05 U	9.7	0.05 U	0.003 U			
7/30/2013	XX	GW109X657	0.005 U	1.8	0.016	8.2	0.0006 U	62.5	0.05 U	10.8	0.1				
10/29/2013	XX	GW109X67G	0.005 U	1.9	0.015	8.4	0.0006 U	58.5	0.05 U	10.9	0.15				
4/22/2014	XX	GW109X6G3	0.005 U	2	0.019	7.5	0.0006 U	60.1	0.05 U	9.9	0.13				
7/29/2014	XX	GW109X705	0.005 U	1.9	0.018	7.7	0.0006 U	62.1	0.05 U	10.5	0.31				

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(MW04-109R) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L			
10/21/2014	XX	GW109X73G	0.005 U	2	0.014	7.2	0.0006 U	62.8	0.05 U	10.4	0.35				
MW09-901															
12/8/2009	XX	GW901X3GH	0.002 J	2.6	0.013	11.9	0.0003 J	29.6	0.18	7.1	0.39	0.001 J			
4/27/2010	XX	GW901X3J7	0.002 U	2.5	0.005	8.2	0.0002 U	27.4	0.03 J	6.9	0.1	0.001 U			
7/20/2010	XX	GW901X42B	0.002 U	2.3	0.01	7.7	0.0002 U	28.5	0.05	7.1	0.04 J	0.001 U			
10/19/2010	XX	GW901X45F	0.002 U	2.5	0.008	17.4	0.0002 U	29.4	0.02 U	8	0.09	0.001 U			
4/26/2011	XX	GW901X49G	0.002 U	2.1	0.007	6	0.0002 U	23.3	0.02 U	6.1	0.02 U	0.001 U			
7/19/2011	XX	GW901X4DE	0.002 U	1.8	0.002 J	5.9	0.0002 U	21.3	0.02 U	5.9	0.02 U	0.001 U			
10/25/2011	XX	GW901X4H9	0.003 J	2	0.002 U	6.2	0.0002 U	21	0.02 U	6.1	0.02 U	0.001 U			
4/24/2012	XX	GW901X51J	0.005 U	1.6	0.005	5.2	0.0006 U	18.8	0.05 U	5.4	0.05 U	0.003 U			
7/24/2012	XX	GW901X56I	0.005 U	1.8	0.005	5.5	0.0006	21.2	0.05 U	6	0.05 U	0.003			
10/23/2012	XX	GW901X5D9	0.005 U	1.8	0.008	6.4	0.0006 U	19.9	0.05 U	6	0.05 U	0.003 U			
4/23/2013	XX	GW901X5I0	0.005 U	1.7	0.009	5.1	0.0006 U	19.1	0.05 U	5.4	0.05 U	0.003			
7/30/2013	XX	GW901X645	0.005 U	1.5	0.01	4.9	0.0006 U	21.8	0.05 U	5.9	0.05 U				
10/29/2013	XX	GW901X66I	0.005 U	1.7	0.009	5.9	0.0006 U	22.5	0.05 U	6.1	0.05 U				
4/22/2014	XX	GW901X6F1	0.005 U	1.8	0.008	5.6	0.0006 U	21.8	0.05 U	6.2	0.05 U				
7/29/2014	XX	GW901X6J8	0.005 U	2.1	0.012	7.7	0.0006 U	28.5	0.05 U	7.7	0.05 U				
10/21/2014	XX	GW901X72J	0.005 U	2.3	0.009	13.1	0.0006 U	33.4	0.05 U	8.9	0.05 U				
MW11-207R															
7/20/2011	XX	GW207X4CH	0.002 U	0.5	0.008	3.6	0.0005 J	8.2	0.02 U	2.6	0.02 U	0.001 U			
10/24/2011	XX	GW207X4GC	0.002 U	0.5	0.004 J	3.6	0.0002 U	8.5	0.02 U	2.9	0.02 U	0.001 U			
4/23/2012	XX	GW207X512	0.005 U	0.5	0.005 U	3.7	0.0006 U	7.9	0.05 U	2.9	0.05 U	0.003 U			
7/23/2012	XX	GW207X561	0.005 U	0.4	0.005 U	3.3	0.0006 U	8.3	0.05 U	2.7	0.05 U	0.003 U			
10/22/2012	XX	GW207X5CC	0.005 U	0.5	0.005 U	3.9	0.0006 U	9.3	0.05 U	3.3	0.05 U	0.003 U			
4/22/2013	XX	GW207X5H3	0.005 U	0.5	0.005 U	3.8	0.0006 U	8.1	0.05 U	2.8	0.05 U	0.003 U			
7/29/2013	XX	GW207X638	0.005 U	0.4	0.005 U	3.1	0.0006 U	9	0.05 U	2.9	0.05 U				
10/28/2013	XX	GW207X661	0.005 U	0.5	0.007	3.7	0.0006 U	8.7	0.05 U	3	0.05 U				
4/21/2014	XX	GW207X6E4	0.005 U	0.5	0.005	3.6	0.0006 U	9.4	0.05 U	3.1	0.05 U				
7/28/2014	XX	GW207X6IC	0.005 U	0.4	0.005	3.7	0.0006 U	9.2	0.05 U	2.8	0.05 U				
10/20/2014	XX	GW207X722	0.005 U	0.4	0.007	3.4	0.0007	9.1	0.05 U	2.8	0.05 U				
MW-206															
5/11/2005	XX	GW206X123	0.003 J	0.8	0.005	7	0.0005 J	14	0.13	4.3	0.02 U	0.01 U			
7/28/2005	XX	GW206X15B	0.002 U	0.8	0.005	6.4	0.0002 U	15	0.12	4.6	0.03 J	0.001 U			
9/19/2005	XX	GW206X189	0.002 U	0.6	0.007	4.5	0.0002 U	15	0.03 J	4.8	0.02 J	0.002 J			
5/24/2006	XX	GW206X1D4	0.002 U	0.8	0.007	5.9	0.0008	13	0.03 J	4.4	0.02 U	0.001 J			
7/25/2006	XX	GW206X1G1	0.002 U	0.9	0.008	5.6	0.0002 U	14	0.04 J	4.6	0.02 U	0.001 J			
9/12/2006	XX	GW206X1IE	0.002 U	0.8	0.001 J	8	0.0002 U	14	0.03 J	4.5	0.02 U	0.001 U			
5/14/2007	XX	GW206X221	0.002 U	0.3	0.006	7.2	0.0006	16	0.06	4.6	0.02 J	0.011			
7/25/2007	XX	GW206X265	0.002 U	0.8	0.004	5.8	0.0006	14	0.06	4.6	0.02 U	0.001 U			
9/11/2007	XX	GW206X28F	0.002 U	1	0.001 J	5.2	0.0009	16	0.02 J	4.4	0.02 U	0.001 U			
5/20/2008	XX	GW206X2C9	0.003 U	0.7	0.006 J	4.9	0.001 U	16	0.02 U	4.6	0.02 U	0.003 U			
7/29/2008	XX	GW206X2FD	0.002 U	0.8	0.003 J	4.9	0.0002 U	15.3	0.08	4.5	0.02 U	0.001 J			
10/27/2008	XX	GW206X2I3	0.002 U	0.6	0.003 J	4.4	0.0002 U	14.5	0.05	4.2	0.02 U	0.01 U			
4/13/2009	XX	GW206X31B	0.002 U	0.8	0.004 J	5.1	0.0003 J	16.8	0.02 U	5.1	0.02 U	0.001 U			
7/6/2009	XX	GW206X35F	0.002 U	0.7	0.007	5.1	0.0002 U	16.1	0.02 J	4.7	0.02 U	0.001 U			
10/28/2009	XX	GW206X3DA	0.002 U	0.7	0.009	4.8	0.0002 U	17	0.02 U	4.7	0.02 U	0.001 U			
4/26/2010	XX	GW206X3I9	0.002 U	0.8	0.005	4.8	0.0002 U	14.5	0.02 U	4	0.02 U	0.001 U			
7/19/2010	XX	GW206X41D	0.002 U	2.5	0.01	4.9	0.0005 J	14.8	0.02 U	4.3	0.02 U	0.001 U			

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(MW-206) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
10/18/2010	XX	GW206X44H	0.002 U	1.5	0.015	6.5	0.0002 U	27.2	1.2	6.9	0.32	0.001 J
4/25/2011	XX	GW206X48I	0.002 U	0.9	0.009	5	0.0002 U	16.4	0.32	5.1	0.02 J	0.001 U
7/18/2011	XX	GW206X4CG	0.003 J	0.9	0.005	5.2	0.0011	16.3	0.91	4.9	0.04 J	0.004
10/24/2011	XX	GW206X4GB	0.002 U	0.8	0.005	5	0.0002 U	15.9	0.18	5	0.02 U	0.001 U
4/23/2012	XX	GW206X511	0.005 U	0.9	0.006	5.5	0.0006 U	15.2	0.29	5.2	0.05 U	0.003 U
7/23/2012	XX	GW206X560	0.005 U	0.8	0.006	4.6	0.0006 U	14.8	0.13	4.6	0.05 U	0.003 U
7/23/2012	XD	GWDP4X573	0.005 U	0.8	0.005	4.7	0.0006 U	14.7	0.24	4.6	0.05 U	0.003 U
10/22/2012	XX	GW206X5CB	0.005 U	0.8	0.01	5.3	0.0006 U	17.6	0.33	5.3	0.05 U	0.003 U
4/22/2013	XX	GW206X5H2	0.005 U	0.8	0.008	5.1	0.0006 U	14.5	0.05 U	4.8	0.05 U	0.003 U
7/29/2013	XX	GW206X637	0.005 U	0.6	0.008	4.1	0.0006 U	15.7	0.05 U	4.7	0.05 U	
7/29/2013	XD	GWDP4X64A	0.005 U	0.6	0.008	4.3	0.0006 U	15.4	0.05 U	4.7	0.05 U	
10/28/2013	XX	GW206X660	0.005 U	0.9	0.013	5.2	0.0006 U	16	0.05 U	4.9	0.05 U	
4/21/2014	XX	GW206X6E3	0.005 U	0.8	0.007	4.8	0.0006 U	16.3	0.08	4.8	0.05 U	
7/28/2014	XX	GW206X6IB	0.005 U	0.7	0.01	4.7	0.0006 U	16.2	0.05 U	4.5	0.05 U	
7/28/2014	XD	GWDP1X6IG	0.005 U	0.7	0.009	4.6	0.0006 U	16.1	0.05 U	4.5	0.05 U	
10/20/2014	XX	GW206X721	0.005 U	0.7	0.014	4.3	0.0006 U	16.3	0.05 U	4.3	0.05 U	
MW-207												
5/12/2005	XX	GW207X124	0.002 J	3.1	0.001 J	4.5	0.0002 J	13	2.2	5.4	1.44	0.01 U
8/1/2005	XX	GW207X15C	0.003 J	0.9	0.004	3.9	0.0002 U	15	2.2	5.6	1.34	0.001 J
9/19/2005	XX	GW207X18A	0.002 U	0.5	0.009	3.8	0.0003 J	17	2	5.4	1.38	0.001 J
9/19/2005	XD	GWDP1X18F	0.002 U	0.5	0.009	4	0.0002 U	17	1.98	5.4	1.36	0.002 J
5/22/2006	XX	GW207X1D5	0.003 J	1	0.01	3.8	0.0004 J	14	2.6	5.3	1.28	0.001 U
7/25/2006	XX	GW207X1G2	0.005	1.2	0.011	3.5	0.0002 J	16	2.3	6	1.38	0.002 J
9/11/2006	XX	GW207X1IF	0.003 J	0.9	0.01	4.3	0.0004 J	19	2.1	6.7	1.34	0.001 U
5/14/2007	XX	GW207X222	0.002 U	1.2	0.002 J	4.7	0.0005 J	20	0.34	6.9	0.46	0.006
7/25/2007	XX	GW207X266	0.002 U	1.3	0.001 J	4	0.0005 J	22	3	7.9	1.82	0.002 J
9/10/2007	XX	GW207X28G	0.004 J	3.9	0.003 J	4.7	0.0006	31	4.7	9.1	2	0.001 J
5/19/2008	XX	GW207X2CA	0.003 U	1.2	0.003 U	3.2	0.001 U	31.6	1.05	8.9	0.47	0.003 U
7/29/2008	XX	GW207X2FE	0.002 J	1.3	0.002 U	3.2	0.0002 U	29.6	1.73	7.9	1.9	0.001 U
10/28/2008	XX	GW207X2I4	0.002 J	1.3	0.003 J	2.9	0.0002 U	35.2	5.51	9.4	2.24	0.01 U
4/13/2009	XX	GW207X31C	0.002 J	6.1	0.007	3.7	0.0002 U	34	7.48	9.6	3.47	0.001 U
7/6/2009	XX	GW207X35G	0.002 J	5.8	0.021	4.4	0.0003 J	39.3	11.6	9.5	3.42	0.001 U
10/26/2009	XX	GW207X3DB	0.013	4.5	0.046	5.8	0.0002 J	43.7	17.6	14.1	4.02	0.001 J
4/26/2010	XX	GW207X3IA	0.003 J	2.4	0.012	5.5	0.0002 U	46.5	12.2	19.5	4.33	0.001 U
7/19/2010	XX	GW207X41E	0.002 U	0.9	0.011	4.9	0.0002 J	14.9	2.26	5.2	1.26	0.001 J
10/18/2010	XX	GW207X44I	0.002 U	3.7	0.041	6.4	0.0002 U	55.4	23.2	19.1	5.48	0.001 U
4/25/2011	XX	GW207X48J	0.005	3	0.043	5.6	0.0002 U	47.6	19.8	20.3	5.79	0.001 U
MW-223A												
5/10/2005	XX	GW223A126	0.008	0.6	0.002 J	3.8	0.0002 U	28	0.07	3.1	0.02 U	0.01 U
5/10/2005	XD	GWDP3X130	0.009	0.7	0.002 J	3.9	0.0002 U	29	0.06	3.2	0.02 U	0.01 U
7/26/2005	XX	GW223A15E	0.002 U	0.7	0.001 U	4	0.0002 U	28	0.05 J	3.3	0.02 U	0.002 J
9/21/2005	XX	GW223A18C	0.002 U	0.5	0.001 J	9.8	0.0002 U	29	0.02 J	3.1	0.02 U	0.003
5/24/2006	XX	GW223A1D7	0.004 J	1	0.011	3.6	0.0002 J	28	0.05 J	3.1	0.02 U	0.002 J
5/24/2006	XD	GWDP1X1DA	0.004 J	0.9	0.01	3.7	0.0003 J	29	0.05 J	3	0.02 U	0.001 J
7/26/2006	XX	GW223A1G4	0.002 U	0.8	0.003 J	3.6	0.0002 U	28	0.07	3.3	0.02 U	0.001 J
7/26/2006	XD	GWDP5X1I3	0.002 U	0.6	0.003 J	3.5	0.0002 U	27	0.07	3.2	0.02 U	0.001 J
9/13/2006	XX	GW223A1IH	0.002 J	0.7	0.001 J	3.7	0.0006	30	0.07	3.2	0.02 J	0.001 U
9/13/2006	XD	GWDP5X20G	0.003 J	0.5	0.001 U	3.9	0.0005 J	31	0.05 J	3.3	0.02 J	0.001 U

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(MW-223A)			Nickel	Potassium	Arsenic	Sodium	Cadmium	Calcium	Iron	Magnesium	Manganese	Copper			
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L			
Date	Type	Sample ID													
5/15/2007	XX	GW223A224	0.002 J	0.4	0.002 J	3.6	0.0003 J	29	0.03 J	3.5	0.02 J	0.004			
5/15/2007	XD	GWDP1X227	0.002 U	0.5	0.002 J	3.6	0.0003 J	30	0.02 J	3.5	0.02 J	0.002 J			
7/24/2007	XX	GW223A268	0.002 U	0.6	0.001 U	3.4	0.0005 J	28	0.02 J	3.7	0.02 U	0.001 J			
7/24/2007	XD	GWDP5X287	0.002 U	0.4	0.001 J	3.4	0.0003 J	27	0.02 J	3.5	0.02 U	0.001 J			
9/11/2007	XX	GW223A28I	0.003 J	0.6	0.001 U	2.7	0.0005 J	32	0.03 J	3.2	0.02 J	0.001 U			
5/20/2008	XX	GW223A2CC	0.003 U	0.4	0.003 U	2.7	0.001 U	34.8	0.02 U	3.9	0.02 U	0.003 U			
5/20/2008	XD	GWDP1X2CF	0.003 U	0.4	0.003 U	2.7	0.001 U	34.7	0.02 U	3.8	0.02 U	0.003 U			
7/30/2008	XX	GW223A2FG	0.002 U	0.5	0.002 U	2.9	0.0002 U	30.6	0.02 J	3.3	0.02 U	0.001 U			
7/30/2008	XD	GWDP5X2HF	0.002 U	0.5	0.002 U	3	0.0002 U	31.3	0.05	3.4	0.02 U	0.001 U			
10/28/2008	XX	GW223A2I6	0.002 U	0.6	0.002 U	2.9	0.0002 U	33.3	0.03 J	3.7	0.02 U	0.01 U			
4/14/2009	XX	GW223A31E	0.002 U	0.8	0.002 U	4.6	0.0002 U	60.9	0.02 U	8.2	0.02 U	0.001 U			
4/14/2009	XD	GWDP1X31H	0.002 U	0.8	0.002 U	4.8	0.0002 U	64.2	0.02 U	8.5	0.02 U	0.001 U			
7/7/2009	XX	GW223A35I	0.002 J	0.5	0.002 U	3.3	0.0002 U	43.1	0.08	4.7	0.02 U	0.001 J			
10/27/2009	XX	GW223A3DD	0.002 U	0.6	0.004 J	3.3	0.0002 U	43.9	0.02 J	4.8	0.02 U	0.001 U			
10/27/2009	XD	GWDP4X3ED	0.002 U	0.6	0.003 J	3.4	0.0002 U	44.1	0.02 U	4.9	0.02 U	0.001 U			
4/27/2010	XX	GW223A3IC	0.002 U	0.6	0.003 J	3.4	0.0002 U	48.6	0.02 U	5.2	0.02 U	0.001 U			
4/27/2010	XD	GWDP1X3IF	0.002 U	0.6	0.004 J	3.5	0.0002 U	46.8	0.02 J	5.1	0.02 U	0.001 U			
7/20/2010	XX	GW223A41G	0.002 U	0.6	0.006	3.5	0.0002 U	48.9	0.02 U	5.2	0.02 U	0.001 U			
10/19/2010	XX	GW223A450	0.002 U	0.7	0.006	3.4	0.0002 U	48.7	0.02 U	5.4	0.02 U	0.001 U			
10/19/2010	XD	GWDP1X453	0.002 U	0.6	0.006	3.5	0.0002 U	48.2	0.02 U	5.3	0.02 U	0.001 U			
4/26/2011	XX	GW223A491	0.002 U	0.7	0.011	3.7	0.0002 J	53.3	0.02 U	6	0.02 U	0.001 U			
4/26/2011	XD	GWDP1X494	0.002 U	0.7	0.012	3.9	0.0002 U	53.4	0.02 U	6	0.02 U	0.001 U			
7/19/2011	XX	GW223A4CJ	0.002 U	0.7	0.005	3.5	0.0002 U	58.4	0.02 U	6.1	0.02 U	0.001 U			
10/25/2011	XX	GW223A4GE	0.002 U	0.8	0.002 U	4.1	0.0002 U	55.9	0.02 U	6.4	0.02 U	0.001 U			
10/25/2011	XD	GWDP3X4H8	0.002 U	0.8	0.002 U	4.1	0.0002 U	56.8	0.02 U	6.6	0.02 U	0.001 J			
4/24/2012	XX	GW223A514	0.005 U	0.7	0.005	4	0.0006 U	54.4	0.05 U	6.5	0.05 U	0.003 U			
4/24/2012	XD	GWDP1X517	0.005 U	0.7	0.006	3.7	0.0006 U	57.9	0.05 U	6.5	0.05 U	0.003 U			
7/24/2012	XX	GW223A563	0.005 U	0.8	0.005 U	4.4	0.0006 U	60.7	0.05 U	7.2	0.05 U	0.003			
10/23/2012	XX	GW223A5CE	0.005 U	0.7	0.008	4.3	0.0006 U	61.5	0.05 U	7.2	0.05 U	0.003 U			
10/23/2012	XD	GWDP3X5D8	0.005 U	0.7	0.007	4.5	0.0006 U	57.4	0.05 U	7.1	0.05 U	0.003 U			
4/23/2013	XX	GW223A5H5	0.005 U	0.9	0.012	4.7	0.0006 U	68.1	0.05 U	8	0.05 U	0.003 U			
4/23/2013	XD	GWDP1X5H8	0.005 U	0.8	0.011	4.4	0.0006 U	65.3	0.05 U	7.8	0.05 U	0.003 U			
7/30/2013	XX	GW223A63A	0.005 U	0.7	0.01	4	0.0006 U	73.8	0.05 U	7.7	0.05 U				
10/29/2013	XX	GW223A663	0.005 U	0.8	0.013	4.7	0.0006 U	74.1	0.05 U	9.1	0.05 U				
10/29/2013	XD	GWDP3X66H	0.005 U	0.8	0.012	4.4	0.0006 U	67.5	0.05 U	8.2	0.05 U				
4/22/2014	XX	GW223A6E6	0.005 U	0.8	0.014	4.5	0.0006 U	78.7	0.05 U	8.5	0.05 U				
4/22/2014	XD	GWDP1X6E9	0.005 U	0.8	0.015	4.7	0.0006 U	80.3	0.05 U	8.7	0.05 U				
7/29/2014	XX	GW223A6ID	0.005 U	0.8	0.016	4.5	0.0006 U	77.2	0.05 U	8	0.05 U				
10/21/2014	XX	GW223A723	0.005 U	0.8	0.007	4.5	0.0006 U	73.2	0.05 U	7.8	0.05 U				
10/21/2014	XD	GWDP3X72I	0.005 U	0.8	0.009	4.3	0.0006 U	73.6	0.05 U	7.5	0.05 U				
MW-223B															
5/10/2005	XX	GW223B13F	0.004 J	0.6	0.003 J	4.5	0.0002 U	24	0.07	6.3	0.02 U	0.01 U			
7/26/2005	XX	GW223B173	0.002 U	0.7	0.001 U	5.2	0.0002 U	26	0.07	6.8	0.02 U	0.001 U			
9/21/2005	XX	GW223B1A1	0.002 J	0.5	0.001 J	4.5	0.0002 U	26	0.04 J	6.5	0.02 U	0.001 J			
5/24/2006	XX	GW223B1EG	0.002 U	0.6	0.009	4.6	0.0009	25	0.18	6.5	0.02 U	0.001 J			
7/26/2006	XX	GW223B1HD	0.002 U	0.9	0.003 J	4.5	0.0002 U	25	0.06	6.7	0.02 U	0.001 U			
9/13/2006	XX	GW223B206	0.002 U	0.7	0.001 J	4.9	0.0002 U	27	0.12	6.9	0.02 J	0.001 J			
5/15/2007	XX	GW223B23D	0.002 U	0.3	0.002 J	4.5	0.0002 J	27	0.08	7.2	0.02 J	0.002 J			
7/24/2007	XX	GW223B27H	0.002 U	0.6	0.001 U	4.1	0.0002 J	26	0.03 J	7.3	0.02 U	0.001 J			

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(MW-223B) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
9/11/2007	XX	GW223B2A7	0.002 U	0.8	0.001 U	3.8	0.0002 U	30	0.07	7	0.02 J	0.001 U
5/20/2008	XX	GW223B2E1	0.003 U	0.5	0.003 U	3.9	0.001 U	35.2	0.04 J	8.9	0.02 U	0.003 U
7/30/2008	XX	GW223B2H5	0.002 U	0.7	0.002 U	4.2	0.0002 U	32.9	0.02 J	7.8	0.02 U	0.001 U
10/28/2008	XX	GW223B2JF	0.002 U	0.7	0.002 U	4.2	0.0002 U	35.8	0.03 J	8.7	0.02 U	0.01 U
4/14/2009	XX	GW223B333	0.002 U	0.7	0.002 U	4.6	0.0002 U	33.5	0.14	8.5	0.02 U	0.001 U
7/7/2009	XX	GW223B377	0.002 U	0.5	0.002 U	4.8	0.0002 U	37.8	0.02 J	9.4	0.02 U	0.001 U
7/7/2009	XD	GWDP4X36I	0.002 U	0.6	0.002 U	4.5	0.0002 U	40	0.02 J	9.6	0.02 U	0.001 U
10/27/2009	XX	GW223B3F2	0.003 J	0.7	0.005	4.4	0.001	41.9	0.02 U	9.7	0.02 U	0.001 U
4/27/2010	XX	GW223B401	0.002 U	0.6	0.005	4.2	0.0002 U	39.3	0.35	9.1	0.02 U	0.001 U
7/20/2010	XX	GW223B435	0.002 U	0.8	0.011	4.6	0.0002 U	40.8	0.58	9.8	0.09	0.001 U
7/20/2010	XD	GWDP1X41J	0.002 U	0.8	0.011	4.6	0.0002 U	41.9	0.57	10	0.09	0.001 U
10/19/2010	XX	GW223B469	0.002 U	0.8	0.007	4.4	0.0002 U	40.1	0.11	9.5	0.04 J	0.001 U
4/26/2011	XX	GW223B4AA	0.002 U	0.7	0.013	4.3	0.0002 U	40.2	0.02 J	10.3	0.02 U	0.001 U
7/19/2011	XX	GW223B4E8	0.002 U	1.7	0.005	4.1	0.0002 U	37.8	0.04 J	9.5	0.04 J	0.001 U
7/19/2011	XD	GWDP3X4DD	0.002 U	1.9	0.006	4.3	0.0002 U	36.1	0.04 J	9.7	0.05	0.001 U
10/25/2011	XX	GW223B4I3	0.002 U	2	0.002 U	4.8	0.0025	38.5	0.49	10.6	0.07	0.001 U
4/24/2012	XX	GW223B52D	0.005 U	0.6	0.005 U	4.2	0.0006 U	37	0.24	9.8	0.05 U	0.003 U
7/24/2012	XX	GW223B57C	0.005 U	0.8	0.005 U	4.6	0.0006 U	40.5	0.1	11	0.05 U	0.003
7/24/2012	XD	GWDP3X56H	0.005 U	0.8	0.005	4.6	0.0006 U	43.1	0.08	10.9	0.05 U	0.003 U
10/23/2012	XX	GW223B5E3	0.005 U	0.7	0.011	4.6	0.0006 U	39	0.09	10.7	0.05 U	0.003 U
4/23/2013	XX	GW223B5IE	0.005 U	0.7	0.009	4.7	0.0006 U	41.3	0.06	11.1	0.05 U	0.003 U
7/30/2013	XX	GW223B64J	0.005 U	0.7	0.008	4.3	0.0006 U	46.2	0.12	11.3	0.05 U	
10/29/2013	XX	GW223B67C	0.005 U	0.8	0.008	4.9	0.0006 U	44.3	0.09	11.5	0.05 U	
4/22/2014	XX	GW223B6FF	0.005 U	0.8	0.011	4.8	0.0006 U	51.2	0.24	12.3	0.05 U	
7/29/2014	XX	GW223B700	0.005 U	0.8	0.014	4.9	0.0006 U	50.6	0.05 U	11.9	0.05 U	
10/21/2014	XX	GW223B73C	0.005 U	0.8	0.005 U	4.9	0.0006 U	49.2	0.06	11	0.05 U	
MW-227												
5/9/2005	XX	GW227X127	0.004 J	1.2	0.016	7.5	0.0002 U	20	0.08	5.1	0.02 U	0.01 U
7/27/2005	XX	GW227X15F	0.002 U	1.1	0.012	7.4	0.0002 U	22	0.02 J	5.3	0.05	0.001 U
9/21/2005	XX	GW227X18D	0.002 U	0.6	0.01	7.2	0.0002 U	22	0.05 J	5.1	0.06	0.001 U
5/24/2006	XX	GW227X1D8	0.002 U	1.1	0.018	6.9	0.0007	21	0.07	5.1	0.02 U	0.001 U
7/26/2006	XX	GW227X1G5	0.002 U	0.9	0.015	6.8	0.0002 U	20	0.04 J	5.2	0.02 U	0.001 J
9/13/2006	XX	GW227X1II	0.002 J	1.2	0.008	7.2	0.0002 U	23	0.06	5.3	0.02 J	0.001 U
5/15/2007	XX	GW227X225	0.002 U	0.7	0.009	6.8	0.0002 U	21	0.03 J	5.5	0.02 J	0.004
7/24/2007	XX	GW227X269	0.002 U	1.1	0.007	6.6	0.0003 J	21	0.02 J	5.5	0.02 U	0.004
9/11/2007	XX	GW227X28J	0.002 U	1.1	0.007	6	0.0002 U	22	0.05 J	5	0.02 J	0.001 U
5/20/2008	XX	GW227X2CD	0.003 U	0.9	0.009	5.6	0.001 U	23	0.05	5.6	0.02 U	0.003 U
7/30/2008	XX	GW227X2FH	0.002 U	1	0.009	5.5	0.0002 U	20.4	0.03 J	4.9	0.02 U	0.001 U
10/27/2008	XX	GW227X2I7	0.002 U	0.8	0.009	5.3	0.0002 U	20	0.03 J	4.9	0.02 U	0.01 U
4/14/2009	XX	GW227X31F	0.002 U	1	0.011	6.2	0.0002 U	24.3	0.02 J	5.9	0.02 U	0.001 U
7/7/2009	XX	GW227X35J	0.002 U	0.9	0.009	5.5	0.0002 U	23.6	0.02 J	5.1	0.02 U	0.001 U
10/27/2009	XX	GW227X3DE	0.002 J	1.1	0.013	5.6	0.0007	24.8	0.02 U	5.6	0.02 U	0.001 U
4/27/2010	XX	GW227X3ID	0.002 U	1.6	0.015	5.3	0.0002 U	21.7	0.05	5.1	0.02 U	0.001 U
7/20/2010	XX	GW227X41H	0.002 U	1	0.014	5.5	0.0002 U	21.2	0.08	5.2	0.02 U	0.001 U
10/19/2010	XX	GW227X451	0.002 U	1	0.014	5.2	0.0002 U	21.9	0.06	5.1	0.02 U	0.001 U
4/26/2011	XX	GW227X492	0.002 U	1	0.019	5.1	0.0002 U	21.4	0.02 U	5.5	0.02 U	0.001 U
7/19/2011	XX	GW227X4D0	0.002 U	0.9	0.012	5.3	0.0002 U	21.4	0.02 U	5.4	0.02 U	0.001 U
10/25/2011	XX	GW227X4GF	0.002 U	1.1	0.017	3.1	0.0026	20.5	0.06	5.6	0.02 U	0.001 U
4/24/2012	XX	GW227X515	0.005 U	1	0.012	5	0.0006 U	19.9	0.05 U	5.4	0.05 U	0.003 U

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(MW-227) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
7/24/2012	XX	GW227X564	0.005 U	1.1	0.011	5.3	0.0006 U	22	0.05 U	5.7	0.05 U	0.003 U
10/23/2012	XX	GW227X5CF	0.005 U	1	0.014	5.5	0.0006 U	22.4	0.05 U	5.6	0.05 U	0.003 U
4/23/2013	XX	GW227X5H6	0.005 U	1.1	0.018	5.4	0.0006 U	22.1	0.05 U	5.5	0.05 U	0.003 U
7/30/2013	XX	GW227X63B	0.005 U	0.8	0.017	4.7	0.0006 U	22.8	0.05 U	5.5	0.05 U	
7/30/2013	XD	GWDP3X644	0.005 U	0.8	0.016	4.8	0.0006 U	23	0.05 U	5.3	0.05 U	
10/29/2013	XX	GW227X664	0.005 U	1	0.017	5.5	0.0006 U	21	0.05 U	5.5	0.05 U	
4/22/2014	XX	GW227X6E7	0.005 U	1.2	0.017	5.6	0.0006 U	24.1	0.05 U	5.8	0.05 U	
4/22/2014	XD	GWDP3X6F0	0.005 U	1.1	0.018	5.5	0.0006	23.4	0.05 U	5.8	0.05 U	
7/29/2014	XX	GW227X6IE	0.005 U	1	0.019	5	0.0006 U	23.4	0.05 U	5.4	0.05 U	
7/29/2014	XD	GWDP3X6J7	0.005 U	1	0.019	5.2	0.0006 U	22.3	0.05 U	5.3	0.05 U	
10/21/2014	XX	GW227X724	0.005 U	1.1	0.021	5.4	0.0007	22.7	0.05 U	5.2	0.05 U	
MW-301												
5/9/2005	XX	GW301X128	0.002 U	0.5	0.005	14	0.0002 U	15	0.07	4.3	0.03 J	0.01 U
8/1/2005	XX	GW301X15G	0.002 U	0.7	0.003 J	11	0.0002 U	17	0.1	4.6	0.03 J	0.002 J
9/22/2005	XX	GW301X18E	0.002 U	0.9	0.003 J	14	0.0002 U	17	0.1	4.4	0.05	0.003
5/22/2006	XX	GW301X1D9	0.002 U	1	0.002 J	13	0.0005 J	15	0.32	4.4	0.03 J	0.001 U
7/24/2006	XX	GW301X1G6	0.002 U	0.7	0.002 J	12.5	0.0002 U	17	0.09	4.5	0.03 J	0.001 U
9/11/2006	XX	GW301X1IJ	0.002 J	0.9	0.003 J	12.9	0.0006	18	0.05 J	4.6	0.02 J	0.002 J
5/14/2007	XX	GW301X226	0.002 U	0.8	0.006	14.2	0.0002 U	18	0.32	4.6	0.05	0.001 J
7/23/2007	XX	GW301X26A	0.002 U	1	0.001 J	12.4	0.0002 U	16	1.59	4.5	0.02 U	0.001 J
9/10/2007	XX	GW301X290	0.002 U	1	0.002 J	12.5	0.0002 J	20	0.14	4.3	0.02 J	0.002 J
5/19/2008	XX	GW301X2CE	0.003 U	0.6	0.003 J	12.3	0.001 U	19.4	0.38	4.9	0.05	0.003 U
7/30/2008	XX	GW301X2FI	0.002 U	0.7	0.002 U	11.1	0.0002 U	16.7	0.21	4.1	0.02 U	0.001 U
10/28/2008	XX	GW301X2I8	0.002 U	0.8	0.003 J	11.3	0.0002 J	17.5	0.07	4.6	0.02 U	0.01 U
4/15/2009	XX	GW301X31G	0.002 U	1.2	0.003 J	11.8	0.0002 U	31.4	0.15	5.7	0.02 U	0.001 U
7/7/2009	XX	GW301X360	0.002 U	0.7	0.002 U	13.1	0.0002 J	20.8	0.4	4.9	0.02 J	0.001 J
10/26/2009	XX	GW301X3DF	0.002 U	0.7	0.008	11.5	0.0002 U	19.3	0.34	4.6	0.02 J	0.001 U
4/26/2010	XX	GW301X3IE	0.002 U	0.7	0.005	10.9	0.0002 U	16.9	0.46	3.9	0.03 J	0.001 U
7/19/2010	XX	GW301X41I	0.002 U	0.8	0.005	11.8	0.0002 J	19.4	0.86	4.7	0.02 J	0.001 U
10/19/2010	XX	GW301X452	0.002 U	0.7	0.007	10.7	0.0002 U	17.9	0.21	4.4	0.02 J	0.001 U
4/27/2011	XX	GW301X493	0.002 U	0.7	0.005	11.4	0.0004 J	18.1	0.24	4.5	0.02 J	0.001 U
7/20/2011	XX	GW301X4D1	0.002 U	0.7	0.012	10.6	0.0002 U	18.5	0.26	4.4	0.02 J	0.001 U
10/26/2011	XX	GW301X4GG	0.002 U	0.7	0.002 U	10.7	0.0002 U	18.7	0.27	4.3	0.02 J	0.001 U
4/25/2012	XX	GW301X516	0.005 U	0.7	0.009	11.1	0.0006 U	16.9	0.15	4.4	0.05 U	0.003 U
7/25/2012	XX	GW301X565	0.005 U	0.7	0.006	11.8	0.0006 U	14.9	0.05 U	4.5	0.05 U	0.003 U
10/24/2012	XX	GW301X5CG	0.005 U	0.6	0.006	10.3	0.0006 U	16.7	0.32	4.3	0.05 U	0.003 U
10/24/2012	XD	GWDP4X5DE	0.005 U	0.6	0.008	10	0.0006 U	17.1	0.31	4.4	0.05 U	0.003 U
4/22/2013	XX	GW301X5H7	!	!	!	!	!	!	!	!	!	!
7/31/2013	XX	GW301X63C	0.005 U	0.7	0.01	10.4	0.0006 U	19.2	0.54	4.8	0.05	
10/30/2013	XX	GW301X665	0.005 U	0.6	0.006	10.1	0.0006 U	19.3	0.13	4.7	0.05 U	
10/30/2013	XD	GWDP1X666	0.005 U	0.6	0.008	10.2	0.0006 U	18.7	0.15	4.7	0.05 U	
4/23/2014	XX	GW301X6E8	0.005 U	0.7	0.007	11.5	0.0006 U	20.7	0.22	4.7	0.05	
7/30/2014	XX	GW301X6IF	0.005 U	0.8	0.006	12.2	0.0006 U	19.6	0.1	4.8	0.05 U	
10/22/2014	XX	GW301X725	0.005 U	0.7	0.011	11.4	0.0006 U	19.9	0.05 U	4.6	0.05 U	
10/22/2014	XD	GWDP1X726	0.005 U	0.7	0.01	11.7	0.0006 U	20.3	0.05	4.8	0.05 U	
MW-302												
5/10/2005	XX	GW302X13D	0.004 J	0.9	0.004	5	0.0002 U	55	0.53	2.6	0.02 U	0.01 U
7/27/2005	XX	GW302X171	0.002 U	0.7	0.001 J	4.7	0.0002 U	48	0.09	2.7	0.03 J	0.001 U

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(MW-302) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
9/19/2005	XX	GW302X19J	0.004 J	0.6	0.001 J	5.6	0.0002 U	60	0.11	5	0.02 U	0.001 J
5/23/2006	XX	GW302X1EE	0.002 J	0.8	0.002 J	6	0.0009	46	0.23	2.6	0.02 U	0.002 J
7/24/2006	XX	GW302X1HB	0.002 U	0.4	0.001 U	5.2	0.0013	50	0.4	2.9	0.03 J	0.001 U
9/12/2006	XX	GW302X204	0.006	1	0.001 U	6.8	0.0003 J	60	0.13	3	0.02 J	0.001 U
5/14/2007	XX	GW302X23B	0.002 U	0.8	0.002 J	5.9	0.0002 U	50	0.26	4.4	0.02 J	0.001 J
7/25/2007	XX	GW302X27F	0.002 U	0.7	0.001 U	5.9	0.0002 J	44	0.13	2.5	0.02 J	0.001 J
9/10/2007	XX	GW302X2A5	DE	DE	DE	DE	DE	DE	DE	DE	DE	DE
MW-302R												
5/20/2008	XX	GW302X2DJ	0.003 U	1.2	0.004 J	7.5	0.001 U	36.1	0.19	2.4	0.06	0.003 U
7/29/2008	XX	GW302X2H3	0.002 U	2	0.002 U	7.1	0.0002 U	34.9	0.11	2.4	0.02 U	0.001 U
10/27/2008	XX	GW302X2JD	0.002 U	1	0.002 U	6.6	0.0002 U	39	0.04 J	2.9	0.02 J	0.01 U
4/13/2009	XX	GW302X331	0.002 U	0.7	0.002 U	6.6	0.0002 U	24.1	0.02 U	1.9	0.02 U	0.001 U
7/6/2009	XX	GW302X375	0.002 J	0.8	0.005	9.6	0.0002 U	26.7	0.04 J	1.9	0.02 U	0.001 U
10/27/2009	XX	GW302X3F0	0.002 U	1.4	0.008	22.9	0.0002 U	60.4	0.02 J	4.9	0.02 J	0.001 U
4/26/2010	XX	GW302X3JJ	0.002 U	0.5	0.002 J	6	0.0002 U	17.6	0.02 U	1.4	0.02 J	0.001 U
7/19/2010	XX	GW302X433	0.002 U	1.2	0.014	20.3	0.0002 J	58	0.02 U	4.5	0.02 U	0.001 U
10/18/2010	XX	GW302X467	0.002 U	1.6	0.008	22	0.0002 U	66.2	0.02 U	5.3	0.03 J	0.001 U
4/25/2011	XX	GW302X4A8	0.002 U	0.8	0.009	14.9	0.0002 U	29.4	0.02 U	2.6	0.02 U	0.001 U
7/18/2011	XX	GW302X4E6	0.002 U	1	0.009	20.6	0.0002 J	33.8	0.02 U	3.1	0.02 U	0.001 U
10/24/2011	XX	GW302X4I1	0.002 U	1.2	0.002 U	24.7	0.0006	42.2	0.02 U	3.7	0.02 U	0.002 J
4/23/2012	XX	GW302X52B	0.005 U	0.8	0.005 U	13.2	0.0006 U	26	0.05 U	2.3	0.05 U	0.003 U
7/23/2012	XX	GW302X57A	0.005 U	0.9	0.005 U	18.4	0.0006 U	32.6	0.05 U	2.8	0.05 U	0.003 U
10/22/2012	XX	GW302X5E1	0.005 U	1.2	0.009	28.6	0.0006 U	54.6	0.05 U	4.3	0.05 U	0.003 U
4/22/2013	XX	GW302X5IC	0.005 U	0.7	0.005	11	0.0006 U	21.1	0.05 U	1.8	0.05 U	0.003 U
7/29/2013	XX	GW302X64H	0.005 U	0.8	0.005 U	17.8	0.0006 U	33	0.05 U	3	0.05 U	
10/28/2013	XX	GW302X67A	0.005 U	1.1	0.008	20.3	0.0006 U	32.6	0.05 U	2.9	0.05 U	
4/21/2014	XX	GW302X6FD	0.005 U	0.9	0.006	16.7	0.0006 U	38.5	0.05 U	2.9	0.05 U	
7/28/2014	XX	GW302X6JJ	0.005 U	1	0.009	20.8	0.0006 U	50.2	0.05 U	3.6	0.05 U	
10/20/2014	XX	GW302X73A	0.005 U	1.2	0.015	26.7	0.0006 U	54.4	0.05 U	4.7	0.05 U	
MW-303												
5/11/2005	XX	GW303X13H	0.002 U	0.4	0.003 J	4.1	0.0002 U	2.8	0.05 J	1.84	0.02 U	0.01 U
8/1/2005	XX	GW303X175	0.002 U	0.4	0.001 J	4.3	0.0002 U	2.9	0.07	2	0.02 U	0.001 U
8/1/2005	XD	GWDP1X15H	0.002 U	0.4	0.002 J	4.5	0.0002 J	3	0.08	2	0.02 U	0.001 U
9/19/2005	XX	GW303X1A3	0.002 U	0.5	0.001 J	4	0.0002 J	4.1	0.02 J	1.78	0.02 U	0.002 J
5/23/2006	XX	GW303X1EI	0.002 U	0.6	0.001 U	4.3	0.0002 J	5.1	0.02 J	2	0.02 U	0.002 J
7/24/2006	XX	GW303X1HF	0.002 U	0.3	0.001 U	3.7	0.0002 U	4.9	0.02 J	2	0.02 U	0.001 U
7/24/2006	XD	GWDP4X1H4	0.002 U	0.3	0.001 U	3.9	0.0002 U	5.1	0.02 J	2	0.02 U	0.001 U
9/12/2006	XX	GW303X208	0.002 U	0.7	0.001 U	4.3	0.0002 U	2.8	0.03 J	2	0.02 U	0.001 U
5/14/2007	XX	GW303X23F	0.002 U	0.2 J	0.003 J	4.7	0.0002 U	3.7	0.02 J	2.2	0.02 U	0.001 J
7/25/2007	XX	GW303X27J	0.002 U	0.5	0.001 U	3.6	0.0002 U	6.8	0.04 J	2.1	0.02 U	0.001 J
7/25/2007	XD	GWDP4X278	0.002 U	0.4	0.001 U	3.8	0.0002 U	6.6	0.04 J	2.2	0.02 U	0.002 J
9/11/2007	XX	GW303X2A9	0.002 U	0.5	0.001 J	3.1	0.0006	6	0.07	2.1	0.02 J	0.002 J
9/11/2007	XD	GWDP1X291	0.002 U	0.5	0.001 U	3.2	0.0005 J	5.9	0.08	2.1	0.02 J	0.002 J
5/19/2008	XX	GW303X2E3	0.003 U	0.5	0.003 U	4.6	0.001 U	9.1	0.02 U	3.8	0.02 U	0.003 U
7/29/2008	XX	GW303X2H7	0.002 U	0.6	0.002 U	4.6	0.0002 U	9.1	0.02 U	3.9	0.02 U	0.001 J
7/29/2008	XD	GWDP4X2GG	0.002 U	0.5	0.002 U	4.4	0.0002 U	9	0.02 U	3.9	0.02 U	0.001 J
10/27/2008	XX	GW303X2JH	0.002 U	0.5	0.002 U	4.2	0.0002 U	10.1	0.02 J	4.4	0.02 U	0.01 U
10/27/2008	XD	GWDP3X2J0	0.002 U	0.4	0.002 U	4.2	0.0002 U	10.1	0.02 U	4.4	0.02 U	0.01 U

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(MW-303) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
4/13/2009	XX	GW303X335	0.002 U	0.9	0.002 U	5.8	0.0002 J	15.8	0.02 U	8.1	0.02 U	0.001 U
7/6/2009	XX	GW303X379	0.002 J	0.7	0.005	6.1	0.0002 U	18.2	0.02 U	7.9	0.02 U	0.007
7/6/2009	XD	GWDP3X36C	0.002 J	0.7	0.005	6	0.0002 J	17.1	0.02 U	7.8	0.02 U	0.006
10/28/2009	XX	GW303X3F4	0.002 U	0.7	0.007	5.8	0.0002 U	16.4	0.06	7.5	0.02 U	0.001 J
4/26/2010	XX	GW303X403	0.002 U	0.7	0.002 J	6	0.0002 U	17.6	0.02 U	7.9	0.02 U	0.001 U
7/19/2010	XX	GW303X437	0.002 U	0.8	0.007	6.5	0.0002 J	19.7	0.02 U	8.2	0.02 U	0.001 J
7/19/2010	XD	GWDP4X42G	0.002 U	0.8	0.01	6.3	0.0002 U	19.1	0.02 U	8.3	0.02 U	0.001 U
10/18/2010	XX	GW303X46B	0.002 U	0.7	0.006	6.8	0.0002 U	20	0.05	7.4	0.03 J	0.004
4/25/2011	XX	GW303X4AC	0.002 U	0.8	0.012	6.9	0.0002 U	21.1	0.07	9.7	0.02 U	0.001 U
7/18/2011	XX	GW303X4EA	0.002 U	0.8	0.017	6.7	0.0002 U	18.7	0.04 J	9.2	0.02 J	0.001 U
7/18/2011	XD	GWDP4X4DJ	0.002 U	0.8	0.02	6.8	0.0002 U	18.8	0.03 J	9.2	0.02 J	0.001 U
10/24/2011	XX	GW303X4I5	0.002 U	0.9	0.002 U	7.6	0.0002 U	23.3	0.02 U	10.9	0.02 U	0.001 U
10/24/2011	XD	GWDP4X4HE	0.002 U	0.8	0.002 U	7.2	0.0002 U	22.9	0.02 U	10.2	0.02 U	0.001 U
4/23/2012	XX	GW303X52F	0.005 U	1	0.005 U	8.5	0.0006 U	25.2	0.07	12.1	0.05 U	0.003 U
7/24/2012	XX	GW303X57E	!	!	!	!	!	!	!	!	!	!
MW12-303R												
10/23/2012	XX	GW303X5EG	0.005 U	1.5	0.005 U	10.4	0.0006 U	16.6	0.1	7.8	0.32	0.003 U
4/22/2013	XX	GW303X5IG	0.005 U	2.1	0.01	15.9	0.0006 U	21.3	0.05 U	9.5	0.06	0.003 U
7/29/2013	XX	GW303X651	0.005 U	1.5	0.008	8.8	0.0006 U	24.3	0.05 U	10	0.05 U	
10/28/2013	XX	GW303X67D	0.005 U	1.7	0.015	9.2	0.0006 U	23.7	0.05 U	10.3	0.05 U	
4/21/2014	XX	GW303X6FH	0.005 U	1.6	0.013	18.2	0.0006 U	26.5	0.05 U	10.3	0.05 U	
7/28/2014	XX	GW303X701	0.005 U	1.5	0.01	9.5	0.0006 U	26.4	0.05 U	10.3	0.05 U	
10/20/2014	XX	GW303X73D	0.005 U	1.4	0.013	46.8	0.0006 U	28	0.05 U	10.9	0.05 U	
MW-304A												
5/11/2005	XX	GW304A13C	0.002 U	1.2	0.002 J	3.6	0.0002 U	6.2	0.08	2.3	0.02 U	0.01 U
7/28/2005	XX	GW304A170	0.002 U	1	0.001 U	3.9	0.0002 U	10	0.02 J	2.5	0.03 J	0.001 U
9/19/2005	XX	GW304A19I	0.002 U	0.7	0.001 J	4.8	0.0002 U	13	0.04 J	3.3	0.03 J	0.001 U
5/24/2006	XX	GW304A1ED	0.002 U	0.6	0.001 J	4.5	0.0014	11	0.1	4.3	0.02 U	0.008
7/25/2006	XX	GW304A1HA	0.002 U	1	0.001 J	4.4	0.0002 U	12	0.09	4.8	0.02 J	0.002 J
9/12/2006	XX	GW304A203	0.002 U	1	0.001 U	5.6	0.0002 U	13	0.07	3.8	0.02 J	0.001 U
5/15/2007	XX	GW304A23A	0.006	0.3	0.003 J	5.8	0.007	6.7	0.08	2.3	0.03 J	0.009
7/24/2007	XX	GW304A27E	0.003 J	1.1	0.001 U	5.6	0.0002 U	12	0.02 J	4.3	0.02 U	0.001 U
9/11/2007	XX	GW304A2A4	0.004 J	0.9	0.001 U	4.6	0.0002 J	14	0.02 J	3.5	0.02 U	0.001 U
5/20/2008	XX	GW304A2DI	0.003 U	0.7	0.003 J	3.6	0.001 U	10.7	0.05	2.9	0.02 U	0.003 U
7/29/2008	XX	GW304A2H2	0.002 U	0.9	0.002 U	4.3	0.0002 U	12.9	0.03 J	3.5	0.02 U	0.001 U
10/27/2008	XX	GW304A2JC	0.002 U	0.8	0.002 U	6.1	0.0002 U	13.6	0.04 J	3.7	0.02 U	0.01 U
4/13/2009	XX	GW304A330	0.002 U	1	0.002 U	4.8	0.0002 J	13.8	0.03 J	4	0.02 U	0.001 U
7/6/2009	XX	GW304A374	0.002 U	0.7	0.003 J	4.2	0.0002 U	12.9	0.03 J	3	0.02 U	0.001 U
10/27/2009	XX	GW304A3EJ	0.002 U	0.7	0.002 J	3.3	0.0006	14.7	0.02 U	3.7	0.02 U	0.001 U
4/26/2010	XX	GW304A3JI	0.002 U	0.5	0.002 U	2.9	0.0002 U	9.5	0.02 U	2.4	0.02 U	0.001 U
7/19/2010	XX	GW304A432	0.002 U	0.7	0.005	3.4	0.0002 U	13.8	0.02 U	3.3	0.02 U	0.001 U
10/18/2010	XX	GW304A466	0.002 U	0.7	0.003 J	3.6	0.0002 U	14.5	0.26	3.4	0.09	0.004
4/25/2011	XX	GW304A4A7	0.002 U	0.7	0.004 J	3.2	0.0002 U	10.4	0.02 U	3.1	0.02 U	0.001 U
7/18/2011	XX	GW304A4E5	0.002 U	0.6	0.005	3.6	0.0007	9.7	0.02 U	2.9	0.02 U	0.001 U
10/24/2011	XX	GW304A4I0	0.002 U	0.8	0.002 J	5	0.0005 J	12.9	0.02 U	3.6	0.02 U	0.001 U
4/23/2012	XX	GW304A52A	0.005 U	0.9	0.006	7.1	0.0006 U	13.9	0.05 U	4	0.05 U	0.003 U
7/23/2012	XX	GW304A579	0.005 U	0.8	0.005 U	4.7	0.0006 U	14.3	0.05 U	3.8	0.05 U	0.003 U
10/22/2012	XX	GW304A5E0	0.005 U	0.7	0.006	3.7	0.0006 U	11.7	0.05 U	3.5	0.05 U	0.003 U

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(MW-304A) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
4/22/2013	XX	GW304A5IB	0.005 U	0.8	0.005 U	5	0.0006 U	13.8	0.05 U	3.7	0.05 U	0.003 U
7/29/2013	XX	GW304A64G	0.005 U	0.7	0.005 U	3.7	0.0006 U	14.3	0.05 U	3.8	0.05 U	
10/28/2013	XX	GW304A679	0.005 U	0.8	0.007	4.3	0.0006 U	13.9	0.05 U	3.8	0.05 U	
4/21/2014	XX	GW304A6FC	0.005 U	0.9	0.005	4.2	0.0006 U	15.2	0.22	4.4	0.05 U	
7/28/2014	XX	GW304A6JI	0.005 U	0.7	0.005	3.7	0.0006 U	13.6	0.05 U	3.3	0.05 U	
10/20/2014	XX	GW304A739	0.005 U	0.6	0.005	3.4	0.0006 U	11.8	0.08	3	0.05 U	
MW-401A												
5/10/2005	XX	GW401A132	0.003 J	0.7	0.004	4.7	0.0002 U	11	0.05 J	3.7	0.02 U	0.01 U
7/28/2005	XX	GW401A16A	0.002 U	0.8	0.002 J	5.2	0.0002 J	13	0.05 J	4	0.03 J	0.001 J
7/28/2005	XD	GWDP4X16E	0.002 U	0.6	0.003 J	5.1	0.0002 U	13	0.05 J	4.1	0.02 J	0.001 U
9/21/2005	XX	GW401A198	0.002 U	0.3	0.005	4.5	0.0002 U	13	0.02 J	3.8	0.02 U	0.001 U
5/23/2006	XX	GW401A1E3	0.002 U	1	0.009	4.6	0.0005 J	12	0.07	3.8	0.02 U	0.001 U
7/25/2006	XX	GW401A1H0	0.004 J	0.7	0.005	4.5	0.0006	13	0.03 J	4	0.02 J	0.001 U
9/12/2006	XX	GW401A1JD	0.002 U	0.8	0.001 U	4.9	0.0002 U	15	0.02 J	4.1	0.02 J	0.001 U
5/14/2007	XX	GW401A230	0.002 U	0.3	0.005	5.2	0.0023	15	0.05 J	4.1	0.02 J	0.002 J
7/24/2007	XX	GW401A274	0.002 U	1.3	0.001 J	4.8	0.0003 J	14	0.04 J	4.5	0.02 U	0.003
9/11/2007	XX	GW401A29E	0.003 J	0.8	0.001 U	3.8	0.0002 U	14	0.02 J	3.8	0.02 U	0.001 J
5/20/2008	XX	GW401A2D8	0.003 U	0.6	0.003 U	3.6	0.001 U	15.3	0.02 U	4.3	0.02 U	0.003 U
7/28/2008	XX	GW401A2GC	0.002 U	0.7	0.002 J	3.8	0.0002 U	13.7	0.02 U	3.8	0.02 U	0.001 U
10/27/2008	XX	GW401A2J2	0.002 U	0.6	0.003 J	3.5	0.0002 U	14.1	0.02 U	4	0.02 U	0.01 U
4/13/2009	XX	GW401A32A	0.002 U	0.8	0.004 J	3.9	0.0002 U	15.9	0.02 U	4.8	0.02 U	0.001 U
7/7/2009	XX	GW401A36E	0.002 U	0.6	0.002 U	3.9	0.0002 U	15.4	0.02 J	4.3	0.02 U	0.001 U
10/28/2009	XX	GW401A3E9	0.002 U	0.6	0.004 J	3.2	0.0005 J	14.5	0.02 U	3.8	0.02 U	0.001 U
4/27/2010	XX	GW401A3J8	0.002 U	0.7	0.002 J	3.5	0.0002 U	14.5	0.02 U	3.9	0.02 U	0.001 U
7/20/2010	XX	GW401A42C	0.002 U	0.7	0.006	3.6	0.0002 U	14.6	0.02 U	4	0.02 U	0.001 U
10/20/2010	XX	GW401A45G	0.002 U	0.7	0.004 J	4	0.0002 U	15.8	0.02 U	3.8	0.02 U	0.001 U
4/25/2011	XX	GW401A49H	0.002 U	0.8	0.005	4	0.0002 U	14.9	0.02 U	4.5	0.02 U	0.001 U
7/18/2011	XX	GW401A4DF	0.002 U	0.7	0.009	3.7	0.0015	14.3	0.02 U	4	0.02 U	0.001 U
10/24/2011	XX	GW401A4HA	0.002 U	0.7	0.005	3.8	0.0002 U	14.3	0.02 U	4.2	0.02 U	0.001 U
4/23/2012	XX	GW401A520	0.005 U	0.8	0.007	4	0.0006 U	12.9	0.05 U	4.3	0.05 U	0.003 U
7/23/2012	XX	GW401A56J	0.005 U	0.7	0.005 U	3.5	0.0006 U	12.1	0.05 U	3.9	0.05 U	0.003 U
10/22/2012	XX	GW401A5DA	0.005 U	0.7	0.005 U	4	0.0006 U	13	0.05 U	4.4	0.05 U	0.003 U
4/22/2013	XX	GW401A5I1	0.005 U	0.7	0.005	4	0.0006 U	13.7	0.05 U	3.9	0.05 U	0.003 U
7/29/2013	XX	GW401A646	0.005 U	0.6	0.005 U	3.3	0.0006 U	14.7	0.05 U	4.1	0.05 U	
10/28/2013	XX	GW401A66J	0.005 U	0.7	0.009	3.7	0.0006 U	14	0.05 U	4	0.05 U	
4/21/2014	XX	GW401A6F2	0.005 U	0.7	0.006	3.9	0.0006 U	15.4	0.05 U	4.2	0.05 U	
7/28/2014	XX	GW401A6J9	0.005 U	0.7	0.005	3.7	0.0006 U	14.7	0.05 U	3.9	0.05 U	
10/20/2014	XX	GW401A730	0.005 U	0.6	0.01	3.6	0.0009	14.5	0.05 U	4	0.05 U	
MW-401B												
5/10/2005	XX	GW401B133	0.004 J	2.1	0.004	23	0.0002 U	55	19	18	0.92	0.01 U
5/10/2005	XD	GWDP4X136	0.003 J	2	0.004	24	0.0002 U	60	19.5	17.5	0.93	0.01 U
7/27/2005	XX	GW401B16B	0.002 J	2	0.006	24	0.0002 U	75	10.5	23	0.8	0.001 J
9/21/2005	XX	GW401B199	0.003 J	1.9	0.004	33	0.0002 U	100	9.6	36	0.69	0.002 J
9/21/2005	XD	GWDP4X19C	0.003 J	1.7	0.005	30	0.0002 U	105	9.5	33	0.72	0.002 J
5/23/2006	XX	GW401B1E4	0.002 J	1.8	0.008	26	0.0002 J	50	7.1	15	0.29	0.001 U
5/23/2006	XD	GWDP4X1E7	0.002 J	1.9	0.01	25	0.0002 U	49	6.7	14.5	0.31	0.001 U
7/25/2006	XX	GW401B1H1	0.005	2.3	0.006	30	0.0002 U	50	3.8	15.5	0.32	0.005
9/12/2006	XX	GW401B1JE	0.002 J	2.1	0.005	29	0.0002 U	50	4	14	0.32	0.001 J

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(MW-401B) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
9/12/2006	XD	GWDP3X1JB	0.002 J	2.2	0.004	28	0.0002 U	50	4.1	14.5	0.33	0.001 U
5/14/2007	XX	GW401B231	0.002 J	0.9	0.009	19.6	0.0002 U	39	3.7	12	0.28	0.001 U
5/14/2007	XD	GWDP4X234	0.002 U	0.8	0.01	18.8	0.0002 J	36	3.8	11.5	0.29	0.001 U
7/24/2007	XX	GW401B275	0.002 U	1.8	0.002 J	21	0.0004 J	42	4	12	0.26	0.002 J
9/11/2007	XX	GW401B29F	0.002 J	1.8	0.006	27	0.0002 J	48	4.1	13.5	0.26	0.001 U
9/11/2007	XD	GWDP4X29I	0.003 J	1.8	0.005	26	0.0002 J	49	4	13.5	0.25	0.001 U
5/20/2008	XX	GW401B2D9	0.003 U	1.2	0.009	15.9	0.001 U	39.8	2.05	11.6	0.22	0.003 U
5/20/2008	XD	GWDP4X2DC	0.003 U	1.2	0.01	15.2	0.001 U	39.3	2.08	11.6	0.22	0.003 U
7/28/2008	XX	GW401B2GD	0.002 J	1.5	0.008	16.3	0.0002 U	41.3	2.63	11.5	0.22	0.001 U
10/27/2008	XX	GW401B2J3	0.002 U	1.5	0.005	16.1	0.0002 U	42	2.63	12.7	0.17	0.01 U
10/27/2008	XD	GWDP4X2J6	0.002 U	1.5	0.005	16.1	0.0002 U	42.7	2.62	12.6	0.17	0.01 U
4/13/2009	XX	GW401B32B	0.002 U	1.1	0.014	10.6	0.0002 J	31.1	1.08	9.6	0.14	0.001 U
4/13/2009	XD	GWDP4X32E	0.002 U	1.1	0.013	10.1	0.0002 U	30.3	0.89	9	0.12	0.001 U
7/7/2009	XX	GW401B36F	0.002 U	1.3	0.005	13.2	0.0002 U	37	1.23	10.6	0.19	0.001 U
10/28/2009	XX	GW401B3EA	0.003 J	1.4	0.016	13.6	0.0007	40.6	1.98	11.2	0.2	0.001 U
10/28/2009	XD	GWDP3X3E7	0.002 U	1.4	0.016	13.3	0.0004 J	39.6	2.21	10.9	0.2	0.001 U
4/27/2010	XX	GW401B3J9	0.002 U	1	0.012	9.8	0.0002 U	29	0.71	8	0.13	0.001 U
4/27/2010	XD	GWDP4X3JC	0.002 U	1	0.013	10.4	0.0002 U	30.3	0.71	8.5	0.13	0.001 U
7/20/2010	XX	GW401B42D	0.002 U	1.3	0.023	12.9	0.0002 U	37.2	1.91	10.2	0.18	0.001 U
7/20/2010	XD	GWDP3X42A	0.002 U	1.4	0.021	14.6	0.0002 U	40.4	1.92	11.2	0.19	0.001 U
10/20/2010	XX	GW401B45H	0.002 U	1.5	0.011	15.6	0.0002 U	38.5	2.09	10.8	0.17	0.001 U
10/20/2010	XD	GWDP4X460	0.002 U	1.5	0.012	15.3	0.0002 U	37.6	2.11	10.1	0.16	0.001 U
4/25/2011	XX	GW401B49I	0.002 U	1.1	0.016	10.5	0.0002 U	25.9	0.4	8.3	0.07	0.001 U
4/25/2011	XD	GWDP4X4A1	0.002 U	1.1	0.019	10.3	0.0002 U	25.2	0.41	8.1	0.07	0.001 U
7/18/2011	XX	GW401B4DG	0.002 U	1.1	0.021	11.5	0.0019	26.8	0.54	8.9	0.15	0.001 U
7/18/2011	XD	GWDP1X4D2	0.002 U	1.1	0.022	11.9	0.0022	27.2	0.54	8.8	0.15	0.001 U
10/24/2011	XX	GW401B4HB	0.002 U	1.3	0.006	13.4	0.0002 U	33.7	1.1	10.1	0.16	0.001 U
4/23/2012	XX	GW401B521	0.005 U	1.1	0.017	10.9	0.0006 U	25.3	0.19	8.3	0.05	0.003 U
4/23/2012	XD	GWDP4X524	0.005 U	1.2	0.015	11.7	0.0006 U	24.6	0.23	9	0.05	0.003 U
7/23/2012	XX	GW401B570	0.005 U	1.1	0.011	11.4	0.0006 U	29.9	0.63	8.8	0.16	0.003 U
7/23/2012	XD	GWDP1X566	0.005 U	1.1	0.014	10.8	0.0006 U	26.5	0.5	8.4	0.16	0.003 U
10/22/2012	XX	GW401B5DB	0.005 U	1.4	0.016	14.7	0.0006 U	34.5	0.99	11	0.2	0.003 U
4/22/2013	XX	GW401B5I2	0.005 U	1.1	0.013	12.9	0.0006 U	28.9	0.39	8.7	0.18	0.003 U
4/22/2013	XD	GWDP4X5I5	0.005 U	1.1	0.012	12.5	0.0006 U	29.4	0.36	8.7	0.17	0.003 U
7/29/2013	XX	GW401B647	0.005 U	0.9	0.022	10	0.0006 U	28.8	0.51	8.4	0.22	
7/29/2013	XD	GWDP1X63D	0.005 U	1	0.02	10.9	0.0006 U	31.4	0.59	9.4	0.21	
10/28/2013	XX	GW401B670	0.005 U	1.5	0.027	14.9	0.0006 U	35.1	1.72	10.8	0.28	
10/28/2013	XD	GWDP4X673	0.005 U	1.5	0.03	15.2	0.0006 U	37.4	1.61	10.3	0.28	
4/21/2014	XX	GW401B6F3	0.005 U	1.1	0.031	11.4	0.0006 U	30.2	1.45	8.8	0.2	
4/21/2014	XD	GWDP4X6F6	0.005 U	1.1	0.032	11.6	0.0006 U	29.3	1.65	9	0.22	
7/28/2014	XX	GW401B6JA	0.005 U	1.2	0.023	13.6	0.0006 U	36	1.63	9.6	0.18	
7/28/2014	XD	GWDP4X6JD	0.005 U	1.2	0.027	12.7	0.0006 U	35.9	1.68	9.8	0.18	
10/20/2014	XX	GW401B731	0.005 U	1.4	0.026	16.2	0.0006 U	38.8	1.95	10.9	0.16	
10/20/2014	XD	GWDP4X734	0.005 U	1.3	0.026	15.1	0.0006 U	37	1.89	10.4	0.15	
MW-402A												
5/11/2005	XX	GW402A134	0.002 J	0.7	0.012	11	0.0002 U	7.7	0.08	2.7	0.02 U	0.01 U
8/1/2005	XX	GW402A16C	0.002 U	0.7	0.015	9.7	0.0002 U	10	0.03 J	2.7	0.02 U	0.001 U
9/21/2005	XX	GW402A19A	0.002 U	0.5	0.015	9.2	0.0002 U	10	0.03 J	2.7	0.02 U	0.003
5/23/2006	XX	GW402A1E5	0.002 U	0.8	0.028	9.8	0.0002 U	8.9	0.02 J	2.7	0.02 U	0.001 U

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(MW-402A) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
7/26/2006	XX	GW402A1H2	0.002 U	0.8	0.02	9.4	0.0002 U	9	0.02 J	2.8	0.02 J	0.001 U
9/12/2006	XX	GW402A1JF	0.002 U	0.8	0.015	10.5	0.0002 U	10	0.02 J	2.9	0.02 J	0.001 U
5/15/2007	XX	GW402A232	0.003 J	0.3	0.015	9.9	0.0002 U	10	0.03 J	3	0.02 J	0.001 J
7/25/2007	XX	GW402A276	0.002 U	0.8	0.014	9.7	0.0002 J	10	0.05 J	2.9	0.02 U	0.001 U
9/12/2007	XX	GW402A29G	0.008	0.7	0.013	9.2	0.0002 U	11	0.02 J	2.7	0.02 U	0.001 U
5/20/2008	XX	GW402A2DA	0.003 U	0.5	0.016	8.7	0.001 U	12.2	0.02 U	3.2	0.02 U	0.003 U
7/28/2008	XX	GW402A2GE	0.002 U	0.6	0.015	7.9	0.0002 U	10.6	0.02 U	2.6	0.02 U	0.001 U
10/27/2008	XX	GW402A2J4	0.002 U	0.5	0.015	8	0.0002 U	10.8	0.02 U	2.9	0.02 U	0.01 U
4/14/2009	XX	GW402A32C	0.002 U	0.6	0.016	9.2	0.0002 U	12.3	0.02 U	3.2	0.02 U	0.001 U
7/8/2009	XX	GW402A36G	0.002 J	0.6	0.012	8.4	0.0002 U	11.4	0.02 U	2.8	0.02 U	0.001 U
10/28/2009	XX	GW402A3EB	0.002 J	0.6	0.019	8.2	0.0003 J	12.3	0.02 U	3.1	0.02 U	0.001 U
4/27/2010	XX	GW402A3JA	0.002 U	0.6	0.016	8	0.0002 U	11	0.02 U	2.8	0.02 U	0.001 U
7/21/2010	XX	GW402A42E	0.002 U	0.6	0.017	7.8	0.0002 U	10.8	0.02 U	2.8	0.02 U	0.001 U
10/20/2010	XX	GW402A45I	0.002 U	0.7	0.017	10.3	0.0002 U	13.8	0.02 U	3.2	0.02 U	0.001 U
4/27/2011	XX	GW402A49J	0.002 U	0.6	0.024	7.8	0.001	10.5	0.02 U	2.7	0.02 U	0.001 U
7/20/2011	XX	GW402A4DH	0.002 U	0.7	0.025	8.1	0.0017	10.7	0.02 U	2.8	0.02 U	0.001 U
10/26/2011	XX	GW402A4HC	0.002 J	0.6	0.023	8.2	0.0025	11	0.02 U	2.8	0.02 U	0.003
4/24/2012	XX	GW402A522	0.005 U	0.6	0.019	7.8	0.0006 U	10.7	0.05 U	2.9	0.05 U	0.003 U
7/25/2012	XX	GW402A571	0.005 U	0.6	0.021	8.6	0.0006 U	11.3	0.05 U	2.9	0.05 U	0.003 U
10/24/2012	XX	GW402A5DC	0.005 U	0.6	0.017	8.5	0.0006 U	11.1	0.05 U	3.1	0.05 U	0.003 U
4/22/2013	XX	GW402A5I3	0.005 U	0.7	0.021	9.1	0.0006 U	10.7	0.05 U	3	0.05 U	0.003 U
7/31/2013	XX	GW402A648	0.005 U	0.6	0.024	7.7	0.0006 U	11.8	0.05 U	3.1	0.05 U	
10/30/2013	XX	GW402A671	0.005 U	0.6	0.02	8.2	0.0006 U	12.1	0.05 U	3	0.05 U	
4/23/2014	XX	GW402A6F4	0.005 U	0.6	0.023	8.3	0.0006 U	11.9	0.05 U	2.9	0.05 U	
7/30/2014	XX	GW402A6JB	0.005 U	0.7	0.022	8.9	0.0006 U	12	0.05 U	3	0.05 U	
10/22/2014	XX	GW402A732	0.005 U	0.6	0.024	8.7	0.0009	12.5	0.05 U	3	0.05 U	
MW-402B												
5/11/2005	XX	GW402B135	0.002 J	0.9	0.014	12	0.0002 U	14	0.05 J	4.9	0.02 J	0.01 U
8/1/2005	XX	GW402B16D	0.002 U	0.7	0.014	9.8	0.0002 U	16	0.07	5.1	0.02 J	0.001 J
9/21/2005	XX	GW402B19B	0.002 U	0.5	0.014	11	0.0002 U	15	0.03 J	4.9	0.02 J	0.003
9/21/2005	XD	GWDP3X196	0.002 J	0.4	0.012	10	0.0002 U	15	0.02 J	4.9	0.02 J	0.004
5/23/2006	XX	GW402B1E6	0.002 U	0.8	0.02	9.2	0.0002 U	15	0.02 J	4.9	0.02 J	0.001 U
7/26/2006	XX	GW402B1H3	0.002 U	0.8	0.017	9.1	0.0002 U	15	0.02 J	5.2	0.02 J	0.001 U
9/12/2006	XX	GW402B1JG	0.002 J	0.7	0.016	10.3	0.0002 U	16	0.02 J	5.3	0.02 J	0.001 U
5/15/2007	XX	GW402B233	0.002 U	0.4	0.014	9.6	0.0002 U	14	0.02 J	5.2	0.04 J	0.001 J
7/25/2007	XX	GW402B277	0.002 U	0.8	0.013	9.3	0.0003 J	15	0.05 J	5.2	0.02 J	0.001 U
9/12/2007	XX	GW402B29H	0.002 U	2.2	0.01	9	0.0002 J	16	0.02 U	4.8	0.02 U	0.001 U
5/20/2008	XX	GW402B2DB	0.003 U	0.5	0.012	8.3	0.001 U	16.3	0.02 U	5.4	0.02 U	0.003 U
7/28/2008	XX	GW402B2GF	0.002 U	0.6	0.012	7.9	0.0002 U	14.5	0.02 J	4.7	0.02 J	0.001 U
10/27/2008	XX	GW402B2J5	0.002 U	0.6	0.014	7.8	0.0002 U	14.8	0.02 U	5.1	0.02 J	0.01 U
4/14/2009	XX	GW402B32D	0.002 U	0.6	0.015	8.4	0.0002 U	15.5	0.02 U	5.1	0.02 J	0.001 U
7/8/2009	XX	GW402B36H	0.002 U	0.7	0.013	8.7	0.0003 J	15.7	0.02 J	5.1	0.02 J	0.001 U
10/28/2009	XX	GW402B3EC	0.002 J	0.7	0.02	8.3	0.0005 J	16.9	0.03 J	5.5	0.02 J	0.001 U
4/27/2010	XX	GW402B3JB	0.002 U	0.6	0.017	7.8	0.0002 U	14.5	0.02 U	4.8	0.02 J	0.001 U
7/21/2010	XX	GW402B42F	0.002 U	0.7	0.018	7.6	0.0002 U	14.5	0.02 U	4.8	0.02 J	0.001 U
10/20/2010	XX	GW402B45J	0.002 U	0.8	0.018	9.2	0.0002 U	17.2	0.02 U	5.1	0.02 U	0.001 U
4/27/2011	XX	GW402B4A0	0.002 U	0.6	0.022	7.9	0.0006	14.2	0.02 U	4.8	0.02 J	0.001 U
7/20/2011	XX	GW402B4DI	0.002 U	0.7	0.023	7.8	0.0012	13.2	0.02 U	4.7	0.02 J	0.001 U
10/26/2011	XX	GW402B4HD	0.002 U	0.7	0.016	8.1	0.0007	15	0.02 U	4.8	0.02 U	0.001 U

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(MW-402B) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
4/24/2012	XX	GW402B523	0.005 U	0.7	0.018	8.1	0.001	13.6	0.05 U	4.9	0.05 U	0.003 U
7/25/2012	XX	GW402B572	0.005 U	0.7	0.017	8.1	0.0006 U	15	0.05 U	4.9	0.05 U	0.003 U
10/24/2012	XX	GW402B5DD	0.005 U	0.6	0.02	8.1	0.0006 U	13.9	0.05 U	5.1	0.05 U	0.003 U
4/22/2013	XX	GW402B5I4	0.005 U	0.6	0.019	8.4	0.0006 U	13.2	0.05 U	4.7	0.05 U	0.003 U
7/31/2013	XX	GW402B649	0.005 U	0.6	0.024	7.6	0.0006 U	14.9	0.05 U	5	0.05 U	
10/30/2013	XX	GW402B672	0.005 U	0.6	0.019	8.1	0.0006 U	15.5	0.05 U	4.9	0.05 U	
4/23/2014	XX	GW402B6F5	0.005 U	0.6	0.019	8	0.0006 U	15.1	0.05 U	4.7	0.05 U	
7/30/2014	XX	GW402B6JC	0.005 U	0.6	0.023	8.5	0.0006 U	14.8	0.05 U	4.7	0.05 U	
10/22/2014	XX	GW402B733	0.005 U	0.7	0.021	8.3	0.0006 U	14.7	0.05 U	4.6	0.05 U	
P-04-02												
5/9/2005	XX	GWXXXX13J	0.002 U	1.6	0.004	12	0.0005 J	25	0.04 J	7.3	0.02 J	0.01 U
7/27/2005	XX	GWXXXX177	0.002 U	1.3	0.005	12	0.0002 U	26	0.02 U	7.7	0.05	0.001 J
9/22/2005	XX	GWXXXX1A5	0.002 U	1.2	0.004	11	0.0002 U	26	0.09	7.4	0.1	0.003
5/22/2006	XX	GWXXXX1F0	0.002 U	1.4	0.005	9.7	0.0002 J	24	0.06	7.3	0.02 U	0.001 U
7/24/2006	XX	GWXXXX1HH	0.002 U	1.1	0.001 J	9.1	0.0002 U	24	0.05 J	7.5	0.04 J	0.001 U
9/11/2006	XX	GWXXXX20A	0.002 J	1.2	0.007	9.7	0.0002 J	26	0.09	7.8	0.02 U	0.003
5/14/2007	XX	GWXXXX23H	0.002 U	1.4	0.005	9.6	0.0002 U	27	0.02 U	7.8	0.02 J	0.001 U
7/23/2007	XX	GWXXXX281	0.002 U	1.5	0.001 U	8.3	0.0002 U	23	0.06	7.4	0.02 U	0.001 U
9/10/2007	XX	GWXXXX2AB	0.003 J	1.5	0.002 J	8.2	0.0003 J	28	0.02 J	7.2	0.02 U	0.002 J
5/21/2008	XX	GWXXXX2E5	0.003 U	1.5	0.006 J	7.8	0.001 U	25	0.07	7.6	0.02 U	0.004 J
7/30/2008	XX	GWXXXX2H9	0.002 U	1.3	0.002 U	7.1	0.0002 U	23	0.03 J	6.9	0.02 U	0.001 U
10/29/2008	XX	GWXXXX2JJ	0.002 U	1.4	0.003 J	6.7	0.0002 J	23.8	0.02 J	7.5	0.02 U	0.01 U
4/13/2009	XX	GWXXXX337	0.002 U	1.5	0.004 J	7.4	0.0002 J	26.2	0.02 U	8.3	0.02 U	0.001 U
7/6/2009	XX	GWXXXX37B	0.002 J	1.4	0.009	7.7	0.0006	25.9	0.07	7.5	0.02 U	0.001 J
10/27/2009	XX	GWXXXX3F6	0.002 U	1.3	0.005	7.1	0.0002 U	25.5	0.02 J	7.7	0.02 U	0.001 U
4/26/2010	XX	GWXXXX405	0.002 U	1.1	0.009	6.5	0.0002 U	22.6	0.02 U	6.5	0.02 U	0.002 J
7/21/2010	XX	GWXXXX439	0.002 U	1.3	0.009	6.6	0.0002 U	23.6	0.02 U	7	0.02 U	0.001 U
10/20/2010	XX	GWXXXX46D	0.002 U	1.4	0.009	7.6	0.0002 U	27	0.02 U	7.4	0.02 U	0.001 U
4/27/2011	XX	GWXXXX4AE	0.002 U	1.2	0.01	6.6	0.0005 J	22.4	0.02 U	6.7	0.02 U	0.001 U
7/20/2011	XX	GWXXXX4EC	0.002 U	1.3	0.012	6.7	0.0002 U	22.8	0.02 U	6.9	0.02 U	0.001 U
10/26/2011	XX	GWXXXX4I7	!	!	!	!	!	!	!	!	!	!
4/25/2012	XX	GWXXXX588	0.005 U	1.6	0.005	11.4	0.0006 U	16	0.27	4.6	0.05 U	0.003 U
4/25/2012	XX	GWXXXX52H	0.005 U	1.7	0.007	11.2	0.0006 U	16.3	1.43	5.1	0.07	0.003
7/25/2012	XX	GWXXXX57G	0.005 U	1.6	0.005 U	17.6	0.0006 U	23.8	0.52	6.9	0.05	0.004
10/24/2012	XX	GWXXXX5E7	0.005 U	1.7	0.005	25.8	0.0006 U	16.9	0.24	4.1	0.16	0.004
4/22/2013	XX	GWXXXX5II	!	!	!	!	!	!	!	!	!	!
P-04-04												
5/9/2005	XX	GWXXXX140	0.002 U	2	0.003 J	7.8	0.0002 U	24	0.04 J	5.5	0.02 U	0.01 U
7/27/2005	XX	GWXXXX178	0.002 U	1.4	0.003 J	6.7	0.0002 U	24	0.04 J	5.8	0.02 U	0.001 U
9/22/2005	XX	GWXXXX1A6	0.002 J	1.9	0.003 J	6.1	0.0002 U	23	0.04 J	5.4	0.02 J	0.003
5/22/2006	XX	GWXXXX1F1	0.002 U	1.7	0.004	6.3	0.0004 J	21	0.07	5.4	0.02 U	0.001 U
7/24/2006	XX	GWXXXX1HI	0.002 U	1.5	0.001 J	5.6	0.0002 U	22	0.02 J	5.5	0.02 J	0.001 U
9/11/2006	XX	GWXXXX20B	0.002 U	1.5	0.009	6.2	0.0002 J	23	0.11	5.6	0.02 J	0.001 U
5/14/2007	XX	GWXXXX23I	0.002 U	0.9	0.006	6	0.0002 U	24	0.02 J	5.6	0.02 U	0.015
7/23/2007	XX	GWXXXX282	0.002 U	1.5	0.002 J	4.7	0.0002 U	20	0.05 J	5.2	0.02 U	0.001 U
9/10/2007	XX	GWXXXX2AC	0.003 J	1.5	0.004	4.8	0.0002 J	24	0.02 J	5.1	0.02 U	0.001 J
5/21/2008	XX	GWXXXX2E6	0.003 U	1.5	0.006 J	4.6	0.001 U	22.7	0.02 J	5.6	0.02 U	0.003 U
7/30/2008	XX	GWXXXX2HA	0.002 U	1.4	0.002 J	4.1	0.0002 U	20.2	0.02 J	4.9	0.02 U	0.001 U

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(P-04-04) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
10/29/2008	XX	GWXXXX300	0.002 U	1.5	0.005	4.8	0.0004 J	58.1	0.02 J	5.8	0.02 U	0.01 U
4/13/2009	XX	GWXXXX338	0.002 U	1.6	0.005	4.2	0.0002 J	22.7	0.02 U	5.7	0.02 U	0.001 U
7/6/2009	XX	GWXXXX37C	0.002 U	1.4	0.008	4.2	0.0002 J	22.9	0.02 U	5.3	0.02 U	0.001 U
10/27/2009	XX	GWXXXX3F7	0.002 U	1.4	0.005	3.9	0.0002 U	22.2	0.02 U	5.4	0.02 U	0.001 U
4/26/2010	XX	GWXXXX406	0.002 U	1.3	0.007	3.9	0.0002 U	20.5	0.02 U	4.8	0.02 U	0.001 U
7/21/2010	XX	GWXXXX43A	0.002 U	1.4	0.008	3.9	0.0002 U	21.4	0.02 U	5.3	0.02 U	0.001 U
10/20/2010	XX	GWXXXX46E	0.002 U	1.6	0.008	4.5	0.0002 U	24	0.02 U	5.5	0.02 U	0.001 U
4/27/2011	XX	GWXXXX4AF	0.002 U	1.3	0.011	4	0.0005 J	20.9	0.02 U	5	0.02 U	0.001 U
7/20/2011	XX	GWXXXX4ED	0.002 U	1.3	0.01	3.7	0.0002 U	20.8	0.02 U	5.1	0.02 U	0.001 U
10/26/2011	XX	GWXXXX4I8	0.002 U	1.4	0.002 U	3.7	0.0002 U	22	0.02 U	5.2	0.02 U	0.001 U
4/25/2012	XX	GWXXXX52I	0.005 U	1.3	0.008	4.1	0.0006 U	18.3	0.05 U	5.1	0.05 U	0.003 U
7/25/2012	XX	GWXXXX57H	0.005 U	1.3	0.005	4.2	0.0006 U	21.2	0.05 U	5.2	0.05 U	0.003 U
10/24/2012	XX	GWXXXX5E8	0.005 U	1.3	0.01	4.2	0.0006 U	19.9	0.05 U	5.8	0.05 U	0.003 U
4/24/2013	XX	GWXXXX5IJ	0.005 U	1.4	0.011	4.1	0.0006 U	21.7	0.05 U	5.3	0.05 U	0.003
7/31/2013	XX	GWXXXX654	0.005 U	1.2	0.012	3.7	0.0006 U	22	0.05 U	5.5	0.05 U	
10/30/2013	XX	GWXXXX67E	0.005 U	1.2	0.008	3.6	0.0006 U	21.7	0.05 U	5.2	0.05 U	
4/23/2014	XX	GWXXXX6G0	0.005 U	1.4	0.012	4.1	0.0006 U	21.7	0.05 U	5.2	0.05 U	
7/30/2014	XX	GWXXXX703	0.005 U	1.4	0.008	4.3	0.0006 U	22.3	0.05 U	5.2	0.05 U	
10/22/2014	XX	GWXXXX73E	0.005 U	1.3	0.013	3.9	0.0006 U	21.1	0.05 U	5	0.05 U	
P-206A												
7/31/2013	XX	GW206A64I	I	I	I	I	I	I	I	I	I	
10/28/2013	XX	GW206A67B	0.005 U	1.3	0.01	8.4	0.0006 U	11.1	4.26	3.5	0.2	
4/21/2014	XX	GW206A6FJ	0.009	1.6	0.008	8.4	0.0015	11.7	10.3	3.8	0.25	
7/28/2014	XX	GW206A702	0.018	1.3	0.008	7.6	0.0058	13.2	16.8	4	0.31	
10/20/2014	XX	GW206A73B	0.005 U	0.9	0.009	7.3	0.0006 U	11.9	4.6	3.2	0.15	
PWS10-1												
4/26/2010	XX	GWPWS13IJ	0.034	1.9	0.008	7.6	0.0002 U	17	2.25	4.5	0.18	0.001 U
7/19/2010	XX	GWPWS1423	0.02	2.8	0.015	9.6	0.0002 U	35.2	30.3	12.2	0.72	0.009
10/18/2010	XX	GWPWS1457	0.002 U	1.5	0.009	9.1	0.0002 U	34.6	0.63	9	0.05	0.001 U
4/25/2011	XX	GWPWS1498	0.002 U	1	0.013	7.6	0.0002 U	18.4	2.97	7.5	0.1	0.001 U
7/18/2011	XX	GWPWS14D6	0.002 J	1.4	0.007	8.7	0.0016	23.9	5.09	7.7	0.56	0.003
10/24/2011	XX	GWPWS14H1	0.002 U	1.1	0.002 U	6.7	0.0002 U	20.7	4.27	6.9	0.35	0.006
4/23/2012	XX	GWPWS151B	0.005 U	0.6	0.007	7.9	0.0006 U	16.3	0.48	5.1	0.07	0.003 U
7/23/2012	XX	GWPWS156A	0.005 U	0.5	0.005 U	5.1	0.0006 U	9.8	3.47	3.2	0.4	0.003 U
10/22/2012	XX	GWPWS15D1	0.005 U	0.4	0.006	6.4	0.0006 U	13.2	2.61	5.3	0.1	0.003 U
4/22/2013	XX	GWPWS15HC	0.005 U	1.8	0.011	10	0.0006 U	30.9	1.35	9.3	0.09	0.003 U
7/29/2013	XX	GWPWS163H	0.005 U	1.3	0.005 U	7.2	0.0006 U	18.9	4.66	6.3	0.31	
10/28/2013	XX	GWPWS166A	0.005 U	0.7	0.005 U	5.6	0.0006 U	9.5	1.56	3.4	0.09	
4/21/2014	XX	GWPWS16ED	0.005 U	1.1	0.015	8.4	0.0006 U	30.3	6.52	12.7	0.19	
7/28/2014	XX	GWPWS16J0	0.005 U	2.1	0.005 U	8.1	0.0006 U	27.2	4.06	7.4	0.26	
10/20/2014	XX	GWPWS172A	0.005 U	0.7	0.005 U	5.1	0.0006 U	6.8	0.55	2.3	0.05 U	
PWS10-2												
4/26/2010	XX	GWPWS23J0	0.002 U	0.5	0.004 J	3.7	0.0002 U	6.9	1.03	1.5	0.02 U	0.001 U
7/19/2010	XX	GWPWS2424	0.002 U	0.4	0.005	4.5	0.0002 U	10.2	2.54	2.9	0.05	0.001 U
10/18/2010	XX	GWPWS2458	0.002 U	0.6	0.006	3.9	0.0002 U	9.7	0.35	2.4	0.02 U	0.001 U
4/25/2011	XX	GWPWS2499	0.007	1.1	0.002 U	3.2	0.0003 J	6.1	3.06	1.9	0.03 J	0.002 J
7/18/2011	XX	GWPWS24D7	0.002 U	0.7	0.003 J	5.1	0.0014	15.2	0.9	3.9	0.43	0.001 J
10/24/2011	XX	GWPWS24H2	0.003 J	1.1	0.002 U	2.8	0.0002 U	12.3	2.09	2.8	0.07	0.013

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(PWS10-2) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
4/23/2012	XX	GWPWS251C	0.005 U	0.3 U	0.005 U	4.2	0.0006 U	5.7	1.48	1.6	0.05 U	0.003 U
7/23/2012	XX	GWPWS256B	0.005 U	0.4	0.005 U	4.6	0.0006 U	8.1	1.55	2.7	0.07	0.003 U
10/22/2012	XX	GWPWS25D2	0.005 U	0.8	0.005 U	2.9	0.0006 U	6.6	0.32	1.4	0.05	0.003
4/22/2013	XX	GWPWS25HD	0.005 U	0.3 U	0.005 U	4.4	0.0006 U	9.2	2.34	3.1	0.05 U	0.003 U
7/29/2013	XX	GWPWS263I	0.005 U	0.5	0.005 U	5.1	0.0006 U	13.9	2.42	3.2	0.05 U	
10/28/2013	XX	GWPWS266B	0.005 U	0.8	0.005 U	3.2	0.0006 U	8.9	6.07	1.9	0.44	
4/21/2014	XX	GWPWS26EE	0.005 U	1.1	0.005	3.5	0.0016	10.1	4.83	3.4	0.17	
7/28/2014	XX	GWPWS26J1	0.005 U	0.3 U	0.014	5.8	0.0006 U	14.3	2.25	4	0.05 U	
10/20/2014	XX	GWPWS272B	0.005 U	0.6	0.012	5.5	0.0006 U	13.2	2.16	3	0.16	
PWS10-3												
4/26/2010	XX	GWPWS33J1	0.002 U	0.7	0.003 J	3.8	0.0002 U	25	0.34	3.6	0.02 J	0.001 U
7/19/2010	XX	GWPWS3425	0.002 U	0.9	0.004 J	4.2	0.0002 U	17	20.8	4.3	0.72	0.001 J
10/18/2010	XX	GWPWS3459	0.002 U	0.3	0.005	5.8	0.0002 U	7.4	2.26	2.4	0.11	0.001 U
4/25/2011	XX	GWPWS349A	0.002 U	0.2 J	0.011	3.9	0.0002 U	17.8	1.69	3.4	0.05	0.001 U
7/18/2011	XX	GWPWS34D8	0.002 U	1.3	0.004 J	4.6	0.001	12.9	3.85	3.5	1.48	0.002 J
10/24/2011	XX	GWPWS34H3	0.002 U	0.1 J	0.002 U	2.5	0.0002 U	10.6	4.95	2.4	0.09	0.007
4/23/2012	XX	GWPWS351D	0.005 U	0.3 U	0.005 U	3.5	0.0006 U	5.1	0.64	2.3	0.05 U	0.003 U
7/23/2012	XX	GWPWS356C	0.005 U	0.3	0.005 U	4.2	0.0006 U	6.2	1.54	2.3	0.12	0.003 U
10/22/2012	XX	GWPWS35D3	0.005 U	0.3 U	0.005 U	3.2	0.0006 U	4.4	3.07	1.7	0.15	0.003
4/22/2013	XX	GWPWS35HE	0.005 U	0.4	0.005 U	3.9	0.0006 U	4.9	1.42	1.8	0.05	0.003 U
7/29/2013	XX	GWPWS363J	0.005 U	1.1	0.005	5.6	0.0006 U	13.3	11.4	3.9	0.51	
10/28/2013	XX	GWPWS366C	0.005 U	0.5	0.006	4.5	0.0006 U	6.2	1.53	2.3	0.09	
4/21/2014	XX	GWPWS36EF	0.006	1.4	0.007	5.4	0.0006	9.9	9.29	4.5	0.35	
7/28/2014	XX	GWPWS36J2	0.005 U	0.7	0.005 U	5.3	0.0006 U	7.5	5.45	2.2	0.22	
10/20/2014	XX	GWPWS372D	0.005 U	0.6	0.006	5.2	0.0006 U	6.2	1.2	2.2	0.07	
SW-1												
5/10/2005	XX	SWXX1X12A	0.002 U	0.2 J	0.002 J	6.8	0.0002 U	3.1	0.21	1.19	0.02 U	0.01 U
7/28/2005	XX	SWXX1X15I	0.002 J	2.4	0.004	6.4	0.0002 U	6.8	5	2.4	0.4	0.001 J
9/20/2005	XX	SWXX1X18G	0.004 J	5	0.001 J	5.4	0.0002 U	11	3.5	2.9	0.23	0.001 J
5/24/2006	XX	SWXX1X1DB	0.003 J	1.4	0.004	8.4	0.0003 J	25	0.56	4.5	0.04 J	0.002 J
7/26/2006	XX	SWXX1X1G8	0.002 U	0.5	0.007	4.1	0.0002 U	7.6	2.5	2.3	0.33	0.003
7/26/2006	XD	SWDP2X1GE	0.002 U	0.6	0.007	4.2	0.0002 U	7.6	2.3	2.3	0.32	0.002 J
9/13/2006	XX	SWXX1X1J1	0.002 J	2.7	0.001 J	10.6	0.0002 U	48	1.16	8.7	0.16	0.002 J
5/15/2007	XX	SWXX1X228	0.002 J	0.5	0.004	6.5	0.0002 U	8.4	0.72	2.3	0.05	0.002 J
5/15/2007	XD	SWDP2X22E	0.002 U	0.5	0.004	7.1	0.0003 J	9.2	0.74	2.6	0.04 J	0.002 J
7/24/2007	XX	SWXX1X26C	0.002 U	0.6	0.001 J	7.6	0.0002 J	10	1.16	2.7	0.03 J	0.003
7/24/2007	XD	SWDP2X26I	0.002 U	0.5	0.001 U	7.5	0.0003 J	10	1.18	2.7	0.03 J	0.002 J
9/11/2007	XX	SWXX1X292	0.003 J	1	0.001 J	6.2	0.0004 J	11	1.27	2.7	0.06	0.001 J
5/21/2008	XX	SWXX1X2CG	0.003 U	0.6	0.003 J	6.7	0.001 U	8.6	1.97	2.3	0.1	0.003 U
5/21/2008	XD	SWDP2X2D2	0.003 U	0.6	0.003 J	6.8	0.001 U	8.5	1.96	2.3	0.09	0.003 U
7/29/2008	XX	SWXX1X2G0	I	I	I	I	I	I	I	I	I	I
10/28/2008	XX	SWXX1X2IA	0.002 U	0.4	0.002 U	3.8	0.0005 J	6.9	0.57	2.1	0.03 J	0.01 U
4/14/2009	XX	SWXX1X31I	0.002 U	0.8	0.002 U	7.1	0.00002 U	9.4	0.1	2.2	0.02 U	0.0001 U
7/7/2009	XX	SWXX1X362	0.002 U	0.1 J	0.002 U	5.3	0.00002 U	5.4	1.31	1.7	0.1	0.0001 U
10/27/2009	XX	SWXX1X3DH	0.002 U	0.2 J	0.002 U	3.6	0.00002 U	3.9	0.35	1.4	0.02 J	0.0001 U
4/28/2010	XX	SWXX1X3IG	0.002 U	0.5	0.002 U	5.3	0.00003 J	6.9	0.56	2.1	0.05	0.0001 J
7/20/2010	XX	SWXX1X420	0.01	2.9	0.008	8.4	0.00002 U	33.7	19.4	10.7	0.49	0.0075
10/19/2010	XX	SWXX1X454	0.002 U	0.2 J	0.002 U	5.4	0.00002 U	6.4	0.4	2.1	0.02 U	0.0001 U

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(SW-1) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
4/26/2011	XX	SWXX1X495	0.004 J	0.5	0.005	5	0.00002 U	5.4	0.32	1.7	0.02 U	0.0001 U
7/19/2011	XX	SWXX1X4D3	0.005	1.5	0.009	8.4	0.00002 U	26.2	10.9	7.4	1.1	0.0001 U
10/25/2011	XX	SWXX1X4GI	0.002 U	0.3	0.002 U	4.5	0.00002 J	7.5	0.53	2	0.02 J	0.0001 U
4/24/2012	XX	SWXX1X518	0.005 U	1	0.005 U	5.1	0.00006 U	5.4	0.23	1.8	0.05 U	0.0003 U
7/24/2012	XX	SWXX1X567	0.005 U	0.8	0.01	5	0.00006 U	10.6	2.32	3.6	0.25	0.0003 U
10/23/2012	XX	SWXX1X5CI	0.005 U	1.1	0.005 U	4.1	0.00019	11.6	0.3	2.6	0.05	0.0027
4/23/2013	XX	SWXX1X5H9	0.005 U	1	0.005 U	6.3	0.00006 U	5.2	0.24	1.9	0.05 U	0.0003 U
7/30/2013	XX	SWXX1X63E	0.005 U	0.4	0.005 U	3.6	0.00006	9.6	2.92	3.2	0.12	
10/29/2013	XX	SWXX1X667	0.005 U	0.4	0.005 U	4.3	0.00006 U	7.2	0.57	2.7	0.05 U	
4/22/2014	XX	SWXX1X6EA	0.005 U	1	0.005 U	8	0.00006 U	14.8	0.74	3.8	0.06	
7/29/2014	XX	SWXX1X6IH	0.005 U	0.3	0.005 U	4.3	0.00006 U	7.5	0.73	2.3	0.05 U	
10/21/2014	XX	SWXX1X727	0.005 U	0.6	0.007	5.5	0.00006 U	7.9	0.86	2.6	0.05 U	
SW-2												
5/10/2005	XX	SWXX2X12B	0.002 U	0.3	0.002 J	7.5	0.0002 U	3.2	0.2	1.33	0.02 U	0.01 J
5/10/2005	XD	SWDP2X12G	0.002 U	0.3	0.003 J	7.6	0.0002 U	3.1	0.21	1.32	0.02 U	0.01 U
7/28/2005	XX	SWXX2X15J	0.002 U	0.6	0.001 U	4.2	0.0002 U	5.3	0.47	2	0.07	0.001 U
9/20/2005	XX	SWXX2X18H	0.002 U	0.3	0.007	4.6	0.0002 U	5.8	0.75	1.92	0.08	0.003
5/24/2006	XX	SWXX2X1DC	0.002 U	0.3	0.003 J	7.1	0.0002 U	5.4	0.28	1.61	0.02 J	0.001 J
5/24/2006	XD	SWDP2X1DH	0.002 U	0.4	0.001 U	7.2	0.0002 U	5.5	0.27	1.6	0.02 J	0.001 J
7/26/2006	XX	SWXX2X1G9	0.002 U	0.5	0.007	3.9	0.0002 U	5.5	2.5	1.94	0.18	0.002 J
9/13/2006	XX	SWXX2X1J2	0.002 J	0.3	0.001 J	4.9	0.0002 U	4.5	1.63	2.8	0.17	0.001 U
9/13/2006	XD	SWDP2X1J7	0.002 U	0.4	0.001 U	5	0.0002 U	4.5	1.64	2.8	0.18	0.001 U
5/15/2007	XX	SWXX2X229	0.003 J	0.3	0.002 J	6.4	0.0002 U	5	0.68	1.71	0.05	0.002 J
7/24/2007	XX	SWXX2X26D	0.002 U	0.6	0.001 J	6.9	0.0003 J	10	1.26	2.4	0.12	0.001 J
9/11/2007	XX	SWXX2X293	0.002 U	1.4	0.001 J	5.3	0.0004 J	10	1.29	2.6	0.19	0.001 J
9/11/2007	XD	SWDP2X298	0.002 U	1.4	0.001 U	5.3	0.0003 J	10	1.28	2.6	0.2	0.002 J
5/21/2008	XX	SWXX2X2CH	0.003 U	0.8	0.003 J	7	0.001 U	5	1.51	1.8	0.09	0.003 U
7/29/2008	XX	SWXX2X2G1	0.002 U	0.6	0.002 U	5.5	0.0002 U	6.3	1.37	2.3	0.14	0.001 U
10/28/2008	XX	SWXX2X2IB	0.002 U	0.3	0.002 U	3.3	0.0002 U	4.6	0.38	1.9	0.02 J	0.01 U
10/28/2008	XD	SWDP2X2IG	0.002 U	0.4	0.002 U	3.4	0.0002 U	4.7	0.41	1.9	0.03 J	0.01 U
4/14/2009	XX	SWXX2X31J	0.002 U	0.6	0.002 U	5.7	0.00002 U	2.8	0.37	1.1	0.04 J	0.0001 U
7/7/2009	XX	SWXX2X363	0.002 U	0.1 U	0.004 J	5.2	0.00003 J	4.2	0.68	1.5	0.06	0.0001 U
7/7/2009	XD	SWDP2X368	0.002 U	0.1 J	0.002 J	4.8	0.00004 J	4.1	0.76	1.5	0.06	0.0001 U
10/27/2009	XX	SWXX2X3DI	0.006	0.3	0.002 U	3.5	0.00002 U	7	0.14	2.1	0.02 U	0.0024
4/28/2010	XX	SWXX2X3IH	0.002 U	0.5	0.003 J	5.3	0.00002 J	4.5	0.31	1.7	0.04 J	0.0001 U
4/28/2010	XD	SWDP2X3J2	0.002 U	0.5	0.005	5.4	0.00002 U	4.6	0.32	1.7	0.04 J	0.0001 U
7/20/2010	XX	SWXX2X421	0.002 U	0.6	0.002 J	4.1	0.00002 U	5.9	0.68	2.1	0.06	0.0001 J
7/20/2010	XD	SWDP2X426	0.002 U	0.5	0.002 J	4.1	0.00002 U	5.7	0.67	2.1	0.06	0.0001 J
10/19/2010	XX	SWXX2X455	0.002 U	0.1 J	0.002 U	5.6	0.00002 U	5.8	0.44	2.1	0.02 J	0.0001 U
10/19/2010	XD	SWDP2X45A	0.002 U	0.1 J	0.002 U	5.5	0.00002 U	5.7	0.44	2	0.02 J	0.0001 U
4/26/2011	XX	SWXX2X496	0.003 J	0.4	0.006	5.7	0.00002 U	3.8	0.17	1.4	0.02 U	0.0001 U
4/26/2011	XD	SWDP2X49B	0.002 J	0.3	0.006	5.4	0.00002 U	3.6	0.17	1.3	0.02 U	0.0001 U
7/19/2011	XX	SWXX2X4D4	0.003 J	0.6	0.002 U	4.4	0.00002 U	8.2	1.17	2.7	0.03 J	0.0001 U
7/19/2011	XD	SWDP2X4D9	0.003 J	0.6	0.002 J	4.2	0.00002 U	7.5	1.23	2.6	0.03 J	0.0001 U
10/25/2011	XX	SWXX2X4GJ	0.002 U	0.2 J	0.002 U	4.8	0.00002 U	5.3	0.32	1.7	0.02 U	0.0001 U
10/25/2011	XD	SWDP2X4H4	0.002 U	0.2 J	0.002 U	4.9	0.00002 U	5.4	0.31	1.8	0.02 U	0.0001 U
4/24/2012	XX	SWXX2X519	0.005 U	1.2	0.005 U	11.1	0.00006 U	6.1	0.26	2.5	0.05 U	0.0003 U
4/24/2012	XD	SWDP2X51E	0.005 U	1.2	0.005 U	11.3	0.00006 U	6.3	0.27	2.6	0.05 U	0.0003 U
7/24/2012	XX	SWXX2X568	0.005 U	0.3	0.005 U	4.1	0.00007	6.1	1.41	2.5	0.09	0.0004

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(SW-2) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L
10/23/2012	XX	SWXX2X5CJ	0.005 U	0.9	0.005 U	2.9	0.0002	3.9	0.31	1.6	0.05 U	0.0011
10/23/2012	XD	SWDP2X5D4	0.005 U	0.9	0.005 U	2.8	0.00017	4	0.34	1.6	0.05 U	0.001
4/23/2013	XX	SWXX2X5HA	0.005 U	1.2	0.005 U	6.7	0.00006 U	4.2	0.2	1.8	0.05 U	0.0003 U
4/23/2013	XD	SWDP2X5HF	0.005 U	1.1	0.005	6.4	0.00006 U	4.1	0.16	1.8	0.05 U	0.0003 U
7/30/2013	XX	SWXX2X63F	0.005 U	0.3 U	0.005 U	3.2	0.00006	6.6	1.1	2.3	0.05	
10/29/2013	XX	SWXX2X668	0.005 U	0.3	0.005 U	4.2	0.00006 U	5.3	0.32	2.2	0.05 U	
10/29/2013	XD	SWDP2X66D	0.005 U	0.3	0.005 U	3.8	0.00006 U	5	0.32	2.1	0.05 U	
4/22/2014	XX	SWXX2X6EB	0.005 U	0.8	0.005 U	5.5	0.00006 U	4.7	0.24	1.8	0.05 U	
4/22/2014	XD	SWDP2X6EG	0.005 U	0.8	0.005 U	5.5	0.00006 U	4.5	0.24	1.8	0.05 U	
7/29/2014	XX	SWXX2X6II	0.005 U	0.3 U	0.005 U	4.2	0.00006 U	5.9	1.52	2	0.12	
10/21/2014	XX	SWXX2X728	0.005 U	0.6	0.005 U	5.3	0.00006 U	6.3	0.5	2.2	0.05 U	
10/21/2014	XD	SWDP2X72E	0.005 U	0.5	0.005 U	5.6	0.00006 U	6.3	0.5	2.3	0.05 U	
SW-3												
5/10/2005	XX	SWXX3X12C	0.002 U	0.4	0.003 J	4.9	0.0002 U	3.2	0.3	0.97	0.02 J	0.01 U
7/28/2005	XX	SWXX3X160	0.002 U	1	0.002 J	5.2	0.0002 U	6.2	1.97	2	0.26	0.001 J
7/28/2005	XD	SWDP2X164	0.002 U	1	0.001 J	5.3	0.0002 U	6.4	1.95	1.9	0.25	0.001 J
9/20/2005	XX	SWXX3X18I	0.002 U	1.4	0.003 J	4	0.0002 U	7.8	1.78	1.8	0.17	0.003
9/20/2005	XD	SWDP2X192	0.002 U	1.2	0.002 J	4.3	0.0002 U	8.1	1.82	1.82	0.17	0.002 J
5/24/2006	XX	SWXX3X1DD	0.002 U	0.8	0.001 U	5.1	0.0002 U	5.6	0.54	1.24	0.07	0.001 U
7/26/2006	XX	SWXX3X1GA	0.002 U	0.6	0.003 J	3.2	0.0002 U	5.9	1.36	1.44	0.17	0.002 J
9/13/2006	XX	SWXX3X1J3	0.002 U	0.7	0.001 J	4.4	0.0002 U	5.2	1.53	2	0.12	0.001 U
5/15/2007	XX	SWXX3X22A	0.002 J	0.8	0.002 J	2.9	0.0002 U	6.3	0.69	1.65	0.17	0.003
7/24/2007	XX	SWXX3X26E	0.002 U	0.7	0.002 J	5	0.0003 J	10	1.75	2.1	0.23	0.001 J
9/11/2007	XX	SWXX3X294	0.002 U	1.5	0.001 U	5.2	0.0002 J	11	1.3	2.3	0.2	0.001 U
5/21/2008	XX	SWXX3X2CI	0.003 J	0.6	0.003 U	5.8	0.001 U	7.3	0.99	2.1	0.2	0.003 U
7/29/2008	XX	SWXX3X2G2	0.002 U	0.4	0.002 U	4.8	0.0002 U	9	1.12	2.4	0.06	0.001 U
10/28/2008	XX	SWXX3X2IC	0.002 U	0.5	0.002 U	3.8	0.0002 U	6.6	0.48	1.9	0.02 J	0.01 U
4/14/2009	XX	SWXX3X32D	0.002 U	0.5	0.002 J	6.3	0.00005 J	3.8	0.2	1.2	0.02 U	0.0001 U
7/7/2009	XX	SWXX3X364	0.002 U	0.2 J	0.002 U	3.9	0.00002 U	6	1.14	1.5	0.07	0.0001 U
10/27/2009	XX	SWXX3X3DJ	0.002 U	0.4	0.002 U	2.9	0.00002 U	4.1	0.39	1.2	0.02 J	0.0001 U
4/28/2010	XX	SWXX3X3II	0.002 U	0.5	0.002 U	4.9	0.00002 U	6.4	0.6	1.7	0.08	0.0001 U
7/20/2010	XX	SWXX3X422	0.002 U	0.4	0.004 J	3.6	0.00002 U	11.2	1.34	2.7	0.28	0.0001 J
10/19/2010	XX	SWXX3X456	0.002 U	0.4	0.002 U	4.4	0.00002 U	7.8	0.28	1.9	0.02 U	0.0001 U
4/26/2011	XX	SWXX3X497	0.003 J	0.4	0.003 J	5.5	0.00002 U	4.7	0.21	1.3	0.02 J	0.0001 U
7/19/2011	XX	SWXX3X4D5	0.003 J	0.2 J	0.003 J	4.3	0.00002 U	10.1	1.03	2.6	0.21	0.0001 U
10/25/2011	XX	SWXX3X4H0	0.002 U	0.4	0.002 U	4.1	0.00002 U	6.8	0.54	1.7	0.03 J	0.0001 U
4/24/2012	XX	SWXX3X51A	0.005 U	0.7	0.005 U	2.9	0.00006 U	4.3	0.26	1.2	0.05 U	0.0003 U
7/24/2012	XX	SWXX3X569	0.005 U	0.5	0.005	5.4	0.00006 U	10.1	1.34	3	0.46	0.0003 U
7/24/2012	XD	SWDP2X56D	0.005 U	0.5	0.005 U	5.2	0.00006 U	7.5	1.17	3	0.42	0.0003 U
10/23/2012	XX	SWXX3X5D0	0.005 U	0.7	0.005 U	2.4	0.00006 U	4.3	0.36	1.2	0.05 U	0.0003 U
4/23/2013	XX	SWXX3X5HB	0.005 U	0.7	0.005 U	4.7	0.00006 U	4.8	0.17	1.6	0.05 U	0.0003 U
7/30/2013	XX	SWXX3X63G	0.005 U	0.3 U	0.005 U	3.1	0.00006 U	8.4	0.8	2.2	0.07	
7/30/2013	XD	SWDP2X640	0.005 U	0.3 U	0.005 U	3.1	0.00006 U	8.6	0.79	2.2	0.07	
10/29/2013	XX	SWXX3X669	0.005 U	0.5	0.005 U	4.5	0.00006 U	7.5	0.46	2.6	0.05	
4/22/2014	XX	SWXX3X6EC	0.005 U	0.6	0.005 U	4.9	0.00006 U	4.4	0.19	1.3	0.05 U	
7/29/2014	XX	SWXX3X6IJ	0.005 U	0.6	0.005 U	3.4	0.00006 U	7.7	0.49	1.9	0.05 U	
7/29/2014	XD	SWDP2X6J3	0.005 U	0.6	0.005 U	3.8	0.00006 U	8.3	0.52	2	0.05 U	
10/21/2014	XX	SWXX3X729	0.005 U	0.9	0.005 U	4.7	0.00006 U	8	0.46	2.2	0.05 U	

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(SW-DP1) Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L		
SW-DP1														
5/10/2005	XX	SWDP1X12I	0.003 J	3.7	0.003 J	3.7	0.0002 U	13	0.85	2.2	0.06	0.01 U		
7/28/2005	XX	SWDP1X166	0.002 U	2.7	0.001 U	3.1	0.0002 U	15	0.72	2.8	0.09	0.001 J		
9/20/2005	XX	SWDP1X194	0.002 J	3.7	0.003 J	4.5	0.0005 J	29	1.37	2.9	0.12	0.001 U		
5/24/2006	XX	SWDP1X1DJ	0.002 J	3.8	0.004	6.7	0.0002 J	33	0.37	4	0.19	0.001 J		
7/26/2006	XX	SWDP1X1GG	0.003 J	3.1	0.012	9	0.0002 J	27	1.4	4.1	0.88	0.003		
9/13/2006	XX	SWDP1X1J9	0.002 U	2.6	0.001 J	5.3	0.0002 U	24	0.64	4.4	0.05	0.001 U		
5/15/2007	XX	SWDP1X22G	0.002 J	2.8	0.002 J	6.5	0.0002 J	28	0.18	4.4	0.03 J	0.003		
7/24/2007	XX	SWDP1X270	0.002 U	2.1	0.002 J	4.2	0.0004 J	18	0.38	2.5	0.09	0.012		
9/11/2007	XX	SWDP1X29A	0.002 U	1.7	0.001 U	3.3	0.0008	14	0.1	1.8	0.02 J	0.001 U		
5/21/2008	XX	SWDP1X2D4	0.003 U	1.2	0.003 U	6.6	0.001 U	17.2	0.26	4.9	0.05	0.003 U		
7/29/2008	XX	SWDP1X2G8	0.002 U	1.5	0.002 U	3.5	0.0002 U	12.1	0.18	1.9	0.02 J	0.001 J		
10/28/2008	XX	SWDP1X2II	0.002 U	1.8	0.002 U	4.4	0.0002 J	20.7	0.49	4	0.04 J	0.01 U		
4/14/2009	XX	SWDP1X326	0.002 U	1.9	0.002 U	5.6	0.00002 U	26.9	0.36	4.7	0.08	0.0019		
7/7/2009	XX	SWDP1X36A	0.002 U	1.1	0.002 U	2.6	0.00002 U	15.9	0.14	2	0.04 J	0.0001 U		
10/27/2009	XX	SWDP1X3E5	0.002 U	1.8	0.002 U	2.9	0.00002 U	17.7	0.33	1.9	0.02 J	0.0022		
4/28/2010	XX	SWDP1X3J4	0.002 U	1.7	0.002 U	5.4	0.00002 U	22.4	0.1	3.3	0.06	0.0001 J		
7/20/2010	XX	SWDP1X428	0.002 U	0.4	0.002 U	2.3	0.00002 U	12.5	0.18	1.6	0.05	0.0001 J		
10/19/2010	XX	SWDP1X45C	0.002 U	1.4	0.002 U	2.8	0.00002 U	15.9	0.15	1.4	0.02 J	0.0001 U		
4/26/2011	XX	SWDP1X49D	0.003 J	1.4	0.005	3.1	0.00002 U	15.5	0.16	2.5	0.03 J	0.0001 U		
7/19/2011	XX	SWDP1X4DB	0.002 U	1.7	0.009	3	0.00002 U	21.8	0.06	2.8	0.09	0.0001 U		
10/25/2011	XX	SWDP1X4H6	0.002 U	1.5	0.002 U	1.9	0.00002 U	15.5	0.25	1.9	0.03 J	0.016		
4/24/2012	XX	SWDP1X51G	0.005	1.9	0.005 U	2.1	0.00006 U	13.9	2.94	2.3	0.13	0.0003 U		
7/24/2012	XX	SWDP1X56F	0.005 U	2.4	0.005	3.6	0.00006 U	20.6	0.17	4.2	0.11	0.0003 U		
10/23/2012	XX	SWDP1X5D6	0.005 U	1.3	0.005 U	1.2	0.00016	10.4	1.93	1.4	0.21	0.0082		
4/23/2013	XX	SWDP1X5HH	0.005 U	2.7	0.005	4.9	0.00006 U	27.8	0.42	3.4	0.13	0.0003 U		
7/30/2013	XX	SWDP1X642	0.005 U	0.9	0.007	1.4	0.00006	11	0.27	1.1	0.1			
10/29/2013	XX	SWDP1X66F	0.005 U	1.8	0.005	3.5	0.00006 U	24.2	0.24	3.6	0.21			
4/22/2014	XX	SWDP1X6EI	0.005 U	1.2	0.006	1.8	0.00006 U	10.8	0.31	1.5	0.05 U			
7/29/2014	XX	SWDP1X6J5	0.005 U	0.6	0.005 U	0.8	0.00006 U	6.7	0.29	0.7	0.05			
10/21/2014	XX	SWDP1X72G	0.005 U	0.8	0.005	1	0.00006 U	8	0.1	0.8	0.05 U			
SW-DP5														
4/23/2013	XX	SWDP5X60I	0.005 U	1.9	0.005 U	4.7	0.00006 U	22.4	0.32	1.8	0.06	0.0003 U		
7/30/2013	XX	SWDP5X65H	0.005 U	1	0.006	1.9	0.00007	14.4	0.33	0.8	0.05 U			
10/29/2013	XX	SWDP5X686	D	D	D	D	D	D	D	D	D			
4/22/2014	XX	SWDP5X6GD	0.005 U	2.2	0.005 U	5.4	0.00006 U	19.7	1.34	1.6	0.17			
7/29/2014	XX	SWDP5X70F	0.005 U	1.6	0.006	1.9	0.00006 U	14.2	0.4	0.8	0.09			
10/21/2014	XX	SWDP5X743	0.005 U	1.3	0.01	1.5	0.00006 U	18.4	0.27	0.8	0.05 U			
SW-DP6														
10/27/2009	XX	SWDP6X3G6	0.003 J	2.1	0.002 J	2.5	0.00002 U	11.3	3.05	2.2	0.07	0.005		
4/28/2010	XX	SWDP6X3J5	0.002 U	1.5	0.011	6.3	0.00002 J	29.8	1.52	3.8	0.96	0.0018		
7/20/2010	XX	SWDP6X429	0.002 U	2.9	0.006	6.7	0.00002 U	31	1.02	3.5	0.36	0.0001 U		
10/19/2010	XX	SWDP6X45D	0.002 U	2.3	0.002 U	3.4	0.00002 U	24.6	0.42	2.5	0.08	0.0001 U		
4/26/2011	XX	SWDP6X49E	0.003 J	1.9	0.003 J	6.4	0.00002 U	19.1	0.28	1.9	0.06	0.0001 U		
7/19/2011	XX	SWDP6X4DC	0.002 U	3.2	0.009	7.5	0.00002 U	63.3	0.12	7.3	0.09	0.0001 U		
10/25/2011	XX	SWDP6X4H7	0.002 U	2.4	0.002 U	6	0.00002 U	39.4	0.17	4	0.06	0.0022		
4/24/2012	XX	SWDP6X51H	0.005 U	1.6	0.005 U	3.8	0.00006 U	14.1	0.1	1.9	0.05 U	0.0003 U		
7/24/2012	XX	SWDP6X56G	0.005 U	3.4	0.006	2.2	0.00006 U	11	1.32	2.5	0.79	0.0003 U		

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(SW-DP6)

Date	Type	Sample ID	Nickel mg/L	Potassium mg/L	Arsenic mg/L	Sodium mg/L	Cadmium mg/L	Calcium mg/L	Iron mg/L	Magnesium mg/L	Manganese mg/L	Copper mg/L			
10/23/2012	XX	SWDP6X5D7	0.005	1.9	0.005 U	1.4	0.00006 U	6.6	2.63	1.9	0.16	0.006			
4/23/2013	XX	SWDP6X5HI	0.005 U	1.6	0.005 U	3	0.00006 U	5.6	1.39	1.3	0.05	0.0003 U			
7/30/2013	XX	SWDP6X643	0.005 U	1.1	0.005 U	1.8	0.00006 U	10.2	0.31	1.4	0.05				
10/29/2013	XX	SWDP6X66G	0.005 U	1.1	0.005 U	1.9	0.00006 U	10.6	0.23	1.6	0.05 U				
4/22/2014	XX	SWDP6X6EJ	0.005 U	1.3	0.005 U	5.4	0.00006 U	10.4	0.99	1.1	0.24				
7/29/2014	XX	SWDP6X6J6	0.005 U	1	0.005 U	2.6	0.00006 U	7.7	1.29	1	0.05 U				
10/21/2014	XX	SWDP6X72H	0.005 U	1	0.005 U	2	0.00006 U	9.6	0.36	1.1	0.05 U				

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

- ! - The sampling location was damaged or destroyed.
- D - The sampling location was dry.
- DE - Decommissioned Location
- F12 - Pipe under water, no sample taken.
- F6 - No flow. Sample not taken.
- H2 - Waterlevel higher than pipes. See LF-COMP for readings
- I - The sampling location yielded insufficient quantity to collect a sample.
- J - Analyte was positively identified/Associated value is an estimate below reporting limit.
- U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 16:09

FOR: Juniper Ridge Landfill

SUMMARY REPORT

VOA (part 1 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-COMP)			Dibromomethane	Dibromochloromethane	Chloromethane	Chloroform	Chloroethane	Chlorobenzene	Carbon Tetrachloride	Bromomethane	Bromoform	Bromodichloromethane	Bromochloromethane	Benzene	1,2-Dichlorobenzene (SVOC)	1,2-Dibromoethane	1,2-Dibromo-3-Chloropropane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
LF-COMP																	
4/24/2012	XX	LFXXXX53B	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
LF-UD-1																	
9/21/2005	XX	LFUD1X19D	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/24/2006	XX	LFUD1X1E8	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/16/2007	XX	LFUD1X235	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/20/2008	XX	LFUD1X2DD	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
4/15/2009	XX	LFUD1X32F	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
4/27/2010	XX	LFUD1X3JD	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/26/2011	XX	LFUD1X4A2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/24/2012	XX	LFUD1X525	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFUD1X5I6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/22/2014	XX	LFUD1X6F7	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
LF-UD-2																	
9/21/2005	XX	LFUD2X19E	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/24/2006	XX	LFUD2X1E9	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/16/2007	XX	LFUD2X236	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/20/2008	XX	LFUD2X2DE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
4/15/2009	XX	LFUD2X32G	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
4/27/2010	XX	LFUD2X3JE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/26/2011	XX	LFUD2X4A3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/24/2012	XX	LFUD2X526	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFUD2X5I7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/22/2014	XX	LFUD2X6F8	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
LF-UD-3A,B																	
5/16/2007	XX	LFUD3X246	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/20/2008	XX	LFUD3X2EE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
4/15/2009	XX	LFXXXX33F	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
4/27/2010	XX	LFXXXX40C	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/26/2011	XX	LFXXXX4B1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/24/2012	XX	LFXXXX534	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFXXXX5J5	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LFXXXX6G6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LF-UD-4																	
4/15/2009	XX	LFXXXX34A	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
4/27/2010	XX	LFXXXX40E	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/26/2011	XX	LFXXXX4B3	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12
4/24/2012	XX	LFXXXX536	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFXXXX5J6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/22/2014	XX	LFXXXX6G7	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
LF-UD-5and6																	
4/26/2011	XX	LFXXXX4B4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/24/2012	XX	LFXXXX537	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/23/2013	XX	LFXXXX5J7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/22/2014	XX	LFXXXX6G8	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U

(LF-UD-6)			Dibromomethane	Dibromochloromethane	Chloromethane	Chloroform	Chloroethane	Chlorobenzene	Carbon Tetrachloride	Bromomethane	Bromoform	Bromodichloromethane	Bromochloromethane	Benzene	1,2-Dichlorobenzene (SVOC)	1,2-Dibromoethane	1,2-Dibromo-3-Chloropropane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
LF-UD-6																	
4/26/2011	XX	LFUD6X4B6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/24/2012	XX	LFUD6X539	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/23/2013	XX	LFUD6X5J9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/22/2014	XX	LFUD6X6GA	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
LF-UD-7																	
4/24/2012	XX	LFUD7X53A	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFUD7X5JA	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LFUD7X6GB	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LF-UD-8																	
4/23/2013	XX	LFUD8X5JD	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/22/2014	XX	LFUD8X6GC	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12
LP-UD-1																	
9/21/2005	XX	LPUD1X19F	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
5/24/2006	XX	LPUD1X1EA	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
5/16/2007	XX	LPUD1X237	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
5/20/2008	XX	LPUD1X2DF	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/15/2009	XX	LPUD1X32H	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/27/2010	XX	LPUD1X3JF	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/26/2011	XX	LPUD1X4A4	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/24/2012	XX	LPUD1X527	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/23/2013	XX	LPUD1X5I8	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LPUD1X6F9	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LP-UD-2																	
9/21/2005	XX	LPUD2X19G	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/24/2006	XX	LPUD2X1EB	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/16/2007	XX	LPUD2X238	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/20/2008	XX	LPUD2X2DG	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
4/15/2009	XX	LPUD2X32I	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
4/27/2010	XX	LPUD2X3JG	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/26/2011	XX	LPUD2X4A5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/24/2012	XX	LPUD2X528	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/23/2013	XX	LPUD2X5I9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/22/2014	XX	LPUD2X6FA	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
MW-401B																	
9/21/2005	XX	GW401B199	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
9/21/2005	XD	GWDP4X19C	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/23/2006	XX	GW401B1E4	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/23/2006	XD	GWDP4X1E7	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/14/2007	XX	GW401B231	2 U	2 U	2 U	2 U	2	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/14/2007	XD	GWDP4X234	2 U	2 U	2 U	2 U	3	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/20/2008	XX	GW401B2D9	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/20/2008	XD	GWDP4X2DC	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
4/13/2009	XX	GW401B32B	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
4/13/2009	XD	GWDP4X32E	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
4/27/2010	XX	GW401B3J9	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U

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FOR: Juniper Ridge Landfill

SUMMARY REPORT

VOA (part 1 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(MW-401B)			Dibromomethane	Dibromochloromethane	Chloromethane	Chloroform	Chloroethane	Chlorobenzene	Carbon Tetrachloride	Bromomethane	Bromoform	Bromodichloromethane	Bromochloromethane	Benzene	1,2-Dichlorobenzene (SVOC)	1,2-Dibromoethane	1,2-Dibromo-3-Chloropropane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
4/27/2010	XD	GWDP4X3JC	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/25/2011	XX	GW401B49I	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/25/2011	XD	GWDP4X4A1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/23/2012	XX	GW401B521	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/23/2012	XD	GWDP4X524	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/22/2013	XX	GW401B5I2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/22/2013	XD	GWDP4X5I5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/21/2014	XX	GW401B6F3	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
4/21/2014	XD	GWDP4X6F6	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
P-04-02																	
9/22/2005	XX	GWXXXX1A5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/22/2006	XX	GWXXXX1F0	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/14/2007	XX	GWXXXX23H	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/21/2008	XX	GWXXXX2E5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
4/13/2009	XX	GWXXXX337	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
4/26/2010	XX	GWXXXX405	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/27/2011	XX	GWXXXX4AE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/25/2012	XX	GWXXXX52H	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/22/2013	XX	GWXXXX5II	!	!	!	!	!	!	!	!	!	!	!	!	!	!	!
QCBT																	
1/17/2005	XX	BTXXXX111	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
3/9/2005	XX	BTXXXX11E	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
3/21/2005	XX	BTXXXX142	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/11/2005	XX	BTXXXX121	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
7/25/2005	XX	BTXXXX17G	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
7/27/2005	XX	BTXXXX187	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
9/20/2005	XX	BTXXXX1A7	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
9/21/2005	XX	BTXXXX1AI	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
9/22/2005	XX	BTXXXX1AJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
4/19/2006	XX	BTXXXX1FE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/22/2006	XX	BTXXXX1F2	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/23/2006	XX	BTXXXX1FD	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/24/2006	XX	BTXXXX1ID	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
7/25/2006	XX	BTXXXX1HJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
9/13/2006	XX	BTXXXX20C	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/14/2007	XX	BTXXXX23J	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/15/2007	XX	BTXXXX244	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/16/2007	XX	BTXXXX245	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
7/24/2007	XX	BTXXXX283	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
9/11/2007	XX	BTXXXX2AD	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/19/2008	XX	BTXXXX2EC	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
5/21/2008	XX	BTXXXX2ED	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
7/29/2008	XX	BTXXXX2HB	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
10/29/2008	XX	BTXXXX301	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
4/13/2009	XX	BTXXXX33D	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
4/15/2009	XX	BTXXXX33E	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
7/7/2009	XX	BTXXXX37H	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
10/28/2009	XX	BTXXXX3AJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(QCBT)			Dibromomethane	Dibromochloromethane	Chloromethane	Chloroform	Chloroethane	Chlorobenzene	Carbon Tetrachloride	Bromomethane	Bromoform	Bromodichloromethane	Bromochloromethane	Benzene	1,2-Dichlorobenzene (SVOC)	1,2-Dibromoethane	1,2-Dibromo-3-Chloropropane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
4/26/2010	XX	BTXXXX40A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/27/2010	XX	BTXXXX40B	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/28/2010	XX	BTXXXXHG1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
7/20/2010	XX	BTXXXX43F	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
10/19/2010	XX	BTXXXX46I	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/25/2011	XX	BTXXXX4AJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/26/2011	XX	BTXXXX4B0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/27/2011	XX	BTXXXX4B5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
7/19/2011	XX	BTXXXX4F3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
10/26/2011	XX	BTXXXX4G8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
4/23/2012	XX	BTXXXX532	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/24/2012	XX	BTXXXX533	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/25/2012	XX	BTXXXX538	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
7/24/2012	XX	BTXXXX585	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
10/23/2012	XX	BTXXXX5C8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/22/2013	XX	BTXXXX5J3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/23/2013	XX	BTXXXX5J4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
4/24/2013	XX	BTXXXX5J8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U		1 U	1 U
7/30/2013	XX	BTXXXX65D	5 U	0.5 U	2.5 U	0.75 U	1 U	0.5 U	0.5 U	1 U	2 U	0.5 U	2.5 U	0.5 U		2 U	2.5 U
10/29/2013	XX	BTXXXX69H		2 U	5 U	2 U	5 U	2 U	2 U	2 U	2 U	2 U		1 U			
10/29/2013	XX	BTXXXX68C	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
4/21/2014	XX	BTXXXX6G4	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
4/22/2014	XX	BTXXXX6G5	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
7/30/2014	XX	BTXXXX70B	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
10/21/2014	XX	BTXXXX748	2 U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	0.5 U	2 U	1 U		2 U	2 U
10/21/2014	XX	BTXXXX749		2 U	5 U	2 U	5 U	2 U	2 U	2 U	2 U	2 U		1 U			

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

! - The sampling location was damaged or destroyed.
D - The sampling location was dry.
F12 - Pipe under water, no sample taken.
F6 - No flow. Sample not taken.
H2 - Waterlevel higher than pipes. See LF-COMP for readings
U - Not Detected above the reported sample detection limit.

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FOR: Juniper Ridge Landfill

SUMMARY REPORT

VOA (part 2 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-COMP)			trans-1,3-Dichloropropene	trans-1,2-Dichloroethene	Styrene	Methylene Chloride	Methyl Ethyl Ketone	Ethylbenzene	cis-1,3-Dichloropropene	cis-1,2-Dichloroethene	Carbon	Acetone	1,4-Dichlorobenzene (SVOC)	1,2-Dichloropropane	1,2-Dichloroethane	1,1-Dichloroethene	1,1-Dichloroethane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
LF-COMP																	
4/24/2012	XX	LFXXXX53B	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
LF-UD-1																	
9/21/2005	XX	LFUD1X19D	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/24/2006	XX	LFUD1X1E8	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/16/2007	XX	LFUD1X235	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/20/2008	XX	LFUD1X2DD	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
4/15/2009	XX	LFUD1X32F	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/27/2010	XX	LFUD1X3JD	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	LFUD1X4A2	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFUD1X525	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFUD1X5I6	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/22/2014	XX	LFUD1X6F7	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
LF-UD-2																	
9/21/2005	XX	LFUD2X19E	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/24/2006	XX	LFUD2X1E9	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/16/2007	XX	LFUD2X236	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/20/2008	XX	LFUD2X2DE	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
4/15/2009	XX	LFUD2X32G	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/27/2010	XX	LFUD2X3JE	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	LFUD2X4A3	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFUD2X526	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFUD2X5I7	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/22/2014	XX	LFUD2X6F8	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
LF-UD-3A,B																	
5/16/2007	XX	LFUD3X246	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/20/2008	XX	LFUD3X2EE	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
4/15/2009	XX	LFXXXX33F	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/27/2010	XX	LFXXXX40C	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	LFXXXX4B1	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFXXXX534	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFXXXX5J5	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LFXXXX6G6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LF-UD-4																	
4/15/2009	XX	LFXXXX34A	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/27/2010	XX	LFXXXX40E	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/26/2011	XX	LFXXXX4B3	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12
4/24/2012	XX	LFXXXX536	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFXXXX5J6	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/22/2014	XX	LFXXXX6G7	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
LF-UD-5and6																	
4/26/2011	XX	LFXXXX4B4	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFXXXX537	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/23/2013	XX	LFXXXX5J7	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/22/2014	XX	LFXXXX6G8	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U

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FOR: Juniper Ridge Landfill

SUMMARY REPORT

VOA (part 2 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-UD-6)			trans-1,3-Dichloropropene	trans-1,2-Dichloroethene	Styrene	Methylene Chloride	Methyl Ethyl Ketone	Ethylbenzene	cis-1,3-Dichloropropene	cis-1,2-Dichloroethene	Carbon	Acetone	1,4-Dichlorobenzene (SVOC)	1,2-Dichloropropane	1,2-Dichloroethane	1,1-Dichloroethene	1,1-Dichloroethane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
LF-UD-6																	
4/26/2011	XX	LFUD6X4B6	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFUD6X539	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/23/2013	XX	LFUD6X5J9	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/22/2014	XX	LFUD6X6GA	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
LF-UD-7																	
4/24/2012	XX	LFUD7X53A	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFUD7X5JA	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LFUD7X6GB	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LF-UD-8																	
4/23/2013	XX	LFUD8X5JD	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/22/2014	XX	LFUD8X6GC	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12
LP-UD-1																	
9/21/2005	XX	LPUD1X19F	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
5/24/2006	XX	LPUD1X1EA	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
5/16/2007	XX	LPUD1X237	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
5/20/2008	XX	LPUD1X2DF	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/15/2009	XX	LPUD1X32H	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/27/2010	XX	LPUD1X3JF	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/26/2011	XX	LPUD1X4A4	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/24/2012	XX	LPUD1X527	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/23/2013	XX	LPUD1X5I8	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LPUD1X6F9	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LP-UD-2																	
9/21/2005	XX	LPUD2X19G	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/24/2006	XX	LPUD2X1EB	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/16/2007	XX	LPUD2X238	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/20/2008	XX	LPUD2X2DG	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
4/15/2009	XX	LPUD2X32I	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/27/2010	XX	LPUD2X3JG	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	LPUD2X4A5	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LPUD2X528	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/23/2013	XX	LPUD2X5I9	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/22/2014	XX	LPUD2X6FA	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
MW-401B																	
9/21/2005	XX	GW401B199	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
9/21/2005	XD	GWDP4X19C	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/23/2006	XX	GW401B1E4	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/23/2006	XD	GWDP4X1E7	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/14/2007	XX	GW401B231	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/14/2007	XD	GWDP4X234	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/20/2008	XX	GW401B2D9	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/20/2008	XD	GWDP4X2DC	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
4/13/2009	XX	GW401B32B	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/13/2009	XD	GWDP4X32E	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/27/2010	XX	GW401B3J9	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U

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FOR: Juniper Ridge Landfill

SUMMARY REPORT

VOA (part 2 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(MW-401B)			trans-1,3-Dichloropropene	trans-1,2-Dichloroethene	Styrene	Methylene Chloride	Methyl Ethyl Ketone	Ethylbenzene	cis-1,3-Dichloropropene	cis-1,2-Dichloroethene	Carbon	Acetone	1,4-Dichlorobenzene (SVOC)	1,2-Dichloropropane	1,2-Dichloroethane	1,1-Dichloroethene	1,1-Dichloroethane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
4/27/2010	XD	GWDP4X3JC	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/25/2011	XX	GW401B49I	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/25/2011	XD	GWDP4X4A1	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/23/2012	XX	GW401B521	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/23/2012	XD	GWDP4X524	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/22/2013	XX	GW401B5I2	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/22/2013	XD	GWDP4X5I5	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/21/2014	XX	GW401B6F3	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
4/21/2014	XD	GWDP4X6F6	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
P-04-02																	
9/22/2005	XX	GWXXXX1A5	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/22/2006	XX	GWXXXX1F0	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/14/2007	XX	GWXXXX23H	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/21/2008	XX	GWXXXX2E5	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
4/13/2009	XX	GWXXXX337	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/26/2010	XX	GWXXXX405	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/27/2011	XX	GWXXXX4AE	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/25/2012	XX	GWXXXX52H	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/22/2013	XX	GWXXXX5II	!	!	!	!	!	!	!	!	!	!	!	!	!	!	!
QCBT																	
1/17/2005	XX	BTXXXX111	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
3/9/2005	XX	BTXXXX11E	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
3/21/2005	XX	BTXXXX142	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/11/2005	XX	BTXXXX121	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
7/25/2005	XX	BTXXXX17G	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
7/27/2005	XX	BTXXXX187	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
9/20/2005	XX	BTXXXX1A7	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
9/21/2005	XX	BTXXXX1AI	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
9/22/2005	XX	BTXXXX1AJ	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
4/19/2006	XX	BTXXXX1FE	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/22/2006	XX	BTXXXX1F2	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/23/2006	XX	BTXXXX1FD	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/24/2006	XX	BTXXXX1ID	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
7/25/2006	XX	BTXXXX1HJ	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
9/13/2006	XX	BTXXXX20C	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/14/2007	XX	BTXXXX23J	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/15/2007	XX	BTXXXX244	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/16/2007	XX	BTXXXX245	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
7/24/2007	XX	BTXXXX283	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
9/11/2007	XX	BTXXXX2AD	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/19/2008	XX	BTXXXX2EC	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
5/21/2008	XX	BTXXXX2ED	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
7/29/2008	XX	BTXXXX2HB	2 U	2 U	2 U	5 U	10 U	2 U	2 U	2 U	2 U	10 U		2 U	2 U	2 U	2 U
10/29/2008	XX	BTXXXX301	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/13/2009	XX	BTXXXX33D	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/15/2009	XX	BTXXXX33E	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
7/7/2009	XX	BTXXXX37H	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
10/28/2009	XX	BTXXXX3AJ	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U

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FOR: Juniper Ridge Landfill

SUMMARY REPORT

VOA (part 2 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(QCBT)			trans-1,3-Dichloropropene	trans-1,2-Dichloroethene	Styrene	Methylene Chloride	Methyl Ethyl Ketone	Ethylbenzene	cis-1,3-Dichloropropene	cis-1,2-Dichloroethene	Carbon	Acetone	1,4-Dichlorobenzene (SVOC)	1,2-Dichloropropane	1,2-Dichloroethane	1,1-Dichloroethene	1,1-Dichloroethane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
4/26/2010	XX	BTXXXX40A	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/27/2010	XX	BTXXXX40B	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/28/2010	XX	BTXXXXHG1	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
7/20/2010	XX	BTXXXX43F	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
10/19/2010	XX	BTXXXX46I	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/25/2011	XX	BTXXXX4AJ	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	BTXXXX4B0	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/27/2011	XX	BTXXXX4B5	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	14		0.5 U	0.5 U	0.5 U	0.5 U
7/19/2011	XX	BTXXXX4F3	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
10/26/2011	XX	BTXXXX4G8	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U		0.5 U	0.5 U	0.5 U	0.5 U
4/23/2012	XX	BTXXXX532	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/24/2012	XX	BTXXXX533	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/25/2012	XX	BTXXXX538	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
7/24/2012	XX	BTXXXX585	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
10/23/2012	XX	BTXXXX5C8	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/22/2013	XX	BTXXXX5J3	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/23/2013	XX	BTXXXX5J4	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
4/24/2013	XX	BTXXXX5J8	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U		1 U	1 U	1 U	1 U
7/30/2013	XX	BTXXXX65D	0.5 U	0.75 U	1 U	3 U	5 U	0.5 U	0.5 U	0.5 U	5 U	5 U		1.8 U	0.5 U	0.5 U	0.75 U
10/29/2013	XX	BTXXXX69H	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U		50 U		2 U	2 U	1 U	2 U
10/29/2013	XX	BTXXXX68C	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
4/21/2014	XX	BTXXXX6G4	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
4/22/2014	XX	BTXXXX6G5	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
7/30/2014	XX	BTXXXX70B	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
10/21/2014	XX	BTXXXX748	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U	5 U	10 U		2 U	2 U	1 U	2 U
10/21/2014	XX	BTXXXX749	2 U	2 U	1 U	5 U	10 U	1 U	2 U	2 U		50 U		2 U	2 U	1 U	2 U

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

! - The sampling location was damaged or destroyed.
D - The sampling location was dry.
F12 - Pipe under water, no sample taken.
F6 - No flow. Sample not taken.
H2 - Waterlevel higher than pipes. See LF-COMP for readings
U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 16:12
FOR: Juniper Ridge Landfill

SUMMARY REPORT
VOA (part 3 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-COMP)			Vinyl Chloride	Trichlorofluoromethane	Trichloroethene	Toluene	Tetrachloroethene	o-Xylene	m,p-Xylene	Acrylonitrile	4-Methyl-2-Pentanone	2-Hexanone	1,2,3-Trichloropropane	1,1,2-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,1,2-Tetrachloroethane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
LF-COMP																	
4/24/2012	XX	LFXXXX53B	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
LF-UD-1																	
9/21/2005	XX	LFUD1X19D	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/24/2006	XX	LFUD1X1E8	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/16/2007	XX	LFUD1X235	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/20/2008	XX	LFUD1X2DD	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/15/2009	XX	LFUD1X32F	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/27/2010	XX	LFUD1X3JD	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	LFUD1X4A2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFUD1X525	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFUD1X5I6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/22/2014	XX	LFUD1X6F7	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
LF-UD-2																	
9/21/2005	XX	LFUD2X19E	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/24/2006	XX	LFUD2X1E9	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/16/2007	XX	LFUD2X236	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/20/2008	XX	LFUD2X2DE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/15/2009	XX	LFUD2X32G	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/27/2010	XX	LFUD2X3JE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	LFUD2X4A3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFUD2X526	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFUD2X5I7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/22/2014	XX	LFUD2X6F8	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
LF-UD-3A,B																	
5/16/2007	XX	LFUD3X246	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/20/2008	XX	LFUD3X2EE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
4/15/2009	XX	LFXXXX33F	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/27/2010	XX	LFXXXX40C	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	LFXXXX4B1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFXXXX534	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFXXXX5J5	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LFXXXX6G6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LF-UD-4																	
4/15/2009	XX	LFXXXX34A	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/27/2010	XX	LFXXXX40E	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/26/2011	XX	LFXXXX4B3	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12
4/24/2012	XX	LFXXXX536	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFXXXX5J6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/22/2014	XX	LFXXXX6G7	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
LF-UD-5and6																	
4/26/2011	XX	LFXXXX4B4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFXXXX537	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/23/2013	XX	LFXXXX5J7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/22/2014	XX	LFXXXX6G8	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U

(LF-UD-6)			Vinyl Chloride	Trichlorofluoromethane	Trichloroethene	Toluene	Tetrachloroethene	o-Xylene	m,p-Xylene	Acrylonitrile	4-Methyl-2-Pentanone	2-Hexanone	1,2,3-Trichloropropane	1,1,2-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,1,2-Tetrachloroethane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
LF-UD-6																	
4/26/2011	XX	LFUD6X4B6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFUD6X539	1 U	1 U	1 U	1 U	1.5	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/23/2013	XX	LFUD6X5J9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/22/2014	XX	LFUD6X6GA	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
LF-UD-7																	
4/24/2012	XX	LFUD7X53A	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2	H2
4/23/2013	XX	LFUD7X5JA	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LFUD7X6GB	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LF-UD-8																	
4/23/2013	XX	LFUD8X5JD	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/22/2014	XX	LFUD8X6GC	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12	F12
LP-UD-1																	
9/21/2005	XX	LPUD1X19F	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
5/24/2006	XX	LPUD1X1EA	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
5/16/2007	XX	LPUD1X237	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
5/20/2008	XX	LPUD1X2DF	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/15/2009	XX	LPUD1X32H	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/27/2010	XX	LPUD1X3JF	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/26/2011	XX	LPUD1X4A4	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/24/2012	XX	LPUD1X527	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/23/2013	XX	LPUD1X5I8	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
4/22/2014	XX	LPUD1X6F9	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6
LP-UD-2																	
9/21/2005	XX	LPUD2X19G	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/24/2006	XX	LPUD2X1EB	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/16/2007	XX	LPUD2X238	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/20/2008	XX	LPUD2X2DG	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
4/15/2009	XX	LPUD2X32I	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/27/2010	XX	LPUD2X3JG	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	LPUD2X4A5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LPUD2X528	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/23/2013	XX	LPUD2X5I9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/22/2014	XX	LPUD2X6FA	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
MW-401B																	
9/21/2005	XX	GW401B199	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
9/21/2005	XD	GWDP4X19C	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/23/2006	XX	GW401B1E4	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/23/2006	XD	GWDP4X1E7	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/14/2007	XX	GW401B231	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/14/2007	XD	GWDP4X234	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/20/2008	XX	GW401B2D9	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/20/2008	XD	GWDP4X2DC	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
4/13/2009	XX	GW401B32B	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/13/2009	XD	GWDP4X32E	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/27/2010	XX	GW401B3J9	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

(MW-401B)			Vinyl Chloride	Trichlorofluoromethane	Trichloroethene	Toluene	Tetrachloroethene	o-Xylene	m,p-Xylene	Acrylonitrile	4-Methyl-2-Pentanone	2-Hexanone	1,2,3-Trichloropropane	1,1,2-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,1,2-Tetrachloroethane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
4/27/2010	XD	GWDP4X3JC	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/25/2011	XX	GW401B49I	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/25/2011	XD	GWDP4X4A1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/23/2012	XX	GW401B521	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/23/2012	XD	GWDP4X524	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/22/2013	XX	GW401B5I2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/22/2013	XD	GWDP4X5I5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/21/2014	XX	GW401B6F3	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
4/21/2014	XD	GWDP4X6F6	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
P-04-02																	
9/22/2005	XX	GWXXXX1A5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/22/2006	XX	GWXXXX1F0	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/14/2007	XX	GWXXXX23H	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/21/2008	XX	GWXXXX2E5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
4/13/2009	XX	GWXXXX337	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/26/2010	XX	GWXXXX405	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/27/2011	XX	GWXXXX4AE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/25/2012	XX	GWXXXX52H	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/22/2013	XX	GWXXXX5II	!	!	!	!	!	!	!	!	!	!	!	!	!	!	!
QCBT																	
1/17/2005	XX	BTXXXX111	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
3/9/2005	XX	BTXXXX11E	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
3/21/2005	XX	BTXXXX142	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/11/2005	XX	BTXXXX121	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
7/25/2005	XX	BTXXXX17G	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
7/27/2005	XX	BTXXXX187	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
9/20/2005	XX	BTXXXX1A7	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
9/21/2005	XX	BTXXXX1AI	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
9/22/2005	XX	BTXXXX1AJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
4/19/2006	XX	BTXXXX1FE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/22/2006	XX	BTXXXX1F2	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/23/2006	XX	BTXXXX1FD	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/24/2006	XX	BTXXXX1ID	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
7/25/2006	XX	BTXXXX1HJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
9/13/2006	XX	BTXXXX20C	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/14/2007	XX	BTXXXX23J	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/15/2007	XX	BTXXXX244	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/16/2007	XX	BTXXXX245	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
7/24/2007	XX	BTXXXX283	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
9/11/2007	XX	BTXXXX2AD	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/19/2008	XX	BTXXXX2EC	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
5/21/2008	XX	BTXXXX2ED	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
7/29/2008	XX	BTXXXX2HB	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
10/29/2008	XX	BTXXXX301	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/13/2009	XX	BTXXXX33D	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/15/2009	XX	BTXXXX33E	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
7/7/2009	XX	BTXXXX37H	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
10/28/2009	XX	BTXXXX3AJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U

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FOR: Juniper Ridge Landfill

SUMMARY REPORT
VOA (part 3 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(QCBT)			Vinyl Chloride	Trichlorofluoromethane	Trichloroethene	Toluene	Tetrachloroethene	o-Xylene	m,p-Xylene	Acrylonitrile	4-Methyl-2-Pentanone	2-Hexanone	1,2,3-Trichloropropane	1,1,2-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,1,2-Tetrachloroethane
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
4/26/2010	XX	BTXXXX40A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/27/2010	XX	BTXXXX40B	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/28/2010	XX	BTXXXXHG1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
7/20/2010	XX	BTXXXX43F	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
10/19/2010	XX	BTXXXX46I	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/25/2011	XX	BTXXXX4AJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	BTXXXX4B0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/27/2011	XX	BTXXXX4B5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
7/19/2011	XX	BTXXXX4F3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
10/26/2011	XX	BTXXXX4G8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/23/2012	XX	BTXXXX532	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/24/2012	XX	BTXXXX533	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/25/2012	XX	BTXXXX538	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
7/24/2012	XX	BTXXXX585	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
10/23/2012	XX	BTXXXX5C8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/22/2013	XX	BTXXXX5J3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/23/2013	XX	BTXXXX5J4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
4/24/2013	XX	BTXXXX5J8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U
7/30/2013	XX	BTXXXX65D	1 U	2.5 U	0.5 U	0.75 U	0.5 U	1 U	1 U	5 U	5 U	5 U	5 U	0.75 U	0.5 U	0.5 U	0.5 U
10/29/2013	XX	BTXXXX69H	2 U	5 U	2 U	1 U	2 U	1 U	1 U	50 U	10 U	10 U		2 U	2 U	2 U	
10/29/2013	XX	BTXXXX68C	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
4/21/2014	XX	BTXXXX6G4	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
4/22/2014	XX	BTXXXX6G5	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
7/30/2014	XX	BTXXXX70B	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
10/21/2014	XX	BTXXXX748	2 U	5 U	2 U	1 U	2 U	1 U	1 U	20 U	10 U	10 U	2 U	2 U	2 U	2 U	2 U
10/21/2014	XX	BTXXXX749	2 U	5 U	2 U	1 U	2 U	1 U	1 U	50 U	10 U	10 U		2 U	2 U	2 U	

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

! - The sampling location was damaged or destroyed.
D - The sampling location was dry.
F12 - Pipe under water, no sample taken.
F6 - No flow. Sample not taken.
H2 - Waterlevel higher than pipes. See LF-COMP for readings
U - Not Detected above the reported sample detection limit.

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FOR: Juniper Ridge Landfill

SUMMARY REPORT
VOA (part 4 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-COMP) Date	Type	Sample ID	Vinyl Acetate ug/L	trans-1,4-Dichloro-2-butene ug/L	Iodomethane ug/L
LF-COMP					
4/24/2012	XX	LFXXXX53B	1 U	1 U	1 U
LF-UD-1					
9/21/2005	XX	LFUD1X19D	15 U	2 U	2 U
5/24/2006	XX	LFUD1X1E8	15 U	2 U	2 U
5/16/2007	XX	LFUD1X235	15 U	2 U	2 U
5/20/2008	XX	LFUD1X2DD	15 U	2 U	2 U
4/15/2009	XX	LFUD1X32F	1 U	1 U	1 U
4/27/2010	XX	LFUD1X3JD	0.5 U	0.5 U	0.5 U
4/26/2011	XX	LFUD1X4A2	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFUD1X525	H2	H2	H2
4/23/2013	XX	LFUD1X5I6	1 U	1 U	1 U
4/22/2014	XX	LFUD1X6F7	10 U	5 U	5 U
LF-UD-2					
9/21/2005	XX	LFUD2X19E	15 U	2 U	2 U
5/24/2006	XX	LFUD2X1E9	15 U	2 U	2 U
5/16/2007	XX	LFUD2X236	15 U	2 U	2 U
5/20/2008	XX	LFUD2X2DE	15 U	2 U	2 U
4/15/2009	XX	LFUD2X32G	1 U	1 U	1 U
4/27/2010	XX	LFUD2X3JE	0.5 U	0.5 U	0.5 U
4/26/2011	XX	LFUD2X4A3	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFUD2X526	H2	H2	H2
4/23/2013	XX	LFUD2X5I7	1 U	1 U	1 U
4/22/2014	XX	LFUD2X6F8	10 U	5 U	5 U
LF-UD-3A,B					
5/16/2007	XX	LFUD3X246	15 U	2 U	2 U
5/20/2008	XX	LFUD3X2EE	15 U	2 U	2 U
4/15/2009	XX	LFXXXX33F	1 U	1 U	1 U
4/27/2010	XX	LFXXXX40C	0.5 U	0.5 U	0.5 U
4/26/2011	XX	LFXXXX4B1	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFXXXX534	H2	H2	H2
4/23/2013	XX	LFXXXX5J5	F6	F6	F6
4/22/2014	XX	LFXXXX6G6	F6	F6	F6
LF-UD-4					
4/15/2009	XX	LFXXXX34A	1 U	1 U	1 U
4/27/2010	XX	LFXXXX40E	F6	F6	F6
4/26/2011	XX	LFXXXX4B3	F12	F12	F12
4/24/2012	XX	LFXXXX536	H2	H2	H2
4/23/2013	XX	LFXXXX5J6	1 U	1 U	1 U
4/22/2014	XX	LFXXXX6G7	10 U	5 U	5 U
LF-UD-5and6					
4/26/2011	XX	LFXXXX4B4	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LFXXXX537	1 U	1 U	1 U
4/23/2013	XX	LFXXXX5J7	1 U	1 U	1 U
4/22/2014	XX	LFXXXX6G8	10 U	5 U	5 U

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LF-UD-6) Date	Type	Sample ID	Vinyl Acetate ug/L	trans-1,4-Dichloro-2-butene ug/L	Iodomethane ug/L								
LF-UD-6													
4/26/2011	XX	LFUD6X4B6	0.5 U	0.5 U	0.5 U								
4/24/2012	XX	LFUD6X539	1 U	1 U	1 U								
4/23/2013	XX	LFUD6X5J9	1 U	1 U	1 U								
4/22/2014	XX	LFUD6X6GA	10 U	5 U	5 U								
LF-UD-7													
4/24/2012	XX	LFUD7X53A	H2	H2	H2								
4/23/2013	XX	LFUD7X5JA	F6	F6	F6								
4/22/2014	XX	LFUD7X6GB	F6	F6	F6								
LF-UD-8													
4/23/2013	XX	LFUD8X5JD	1 U	1 U	1 U								
4/22/2014	XX	LFUD8X6GC	F12	F12	F12								
LP-UD-1													
9/21/2005	XX	LPUD1X19F	D	D	D								
5/24/2006	XX	LPUD1X1EA	D	D	D								
5/16/2007	XX	LPUD1X237	F6	F6	F6								
5/20/2008	XX	LPUD1X2DF	F6	F6	F6								
4/15/2009	XX	LPUD1X32H	F6	F6	F6								
4/27/2010	XX	LPUD1X3JF	F6	F6	F6								
4/26/2011	XX	LPUD1X4A4	F6	F6	F6								
4/24/2012	XX	LPUD1X527	F6	F6	F6								
4/23/2013	XX	LPUD1X5I8	F6	F6	F6								
4/22/2014	XX	LPUD1X6F9	F6	F6	F6								
LP-UD-2													
9/21/2005	XX	LPUD2X19G	15 U	2 U	2 U								
5/24/2006	XX	LPUD2X1EB	15 U	2 U	2 U								
5/16/2007	XX	LPUD2X238	15 U	2 U	2 U								
5/20/2008	XX	LPUD2X2DG	15 U	2 U	2 U								
4/15/2009	XX	LPUD2X32I	1 U	1 U	1 U								
4/27/2010	XX	LPUD2X3JG	0.5 U	0.5 U	0.5 U								
4/26/2011	XX	LPUD2X4A5	0.5 U	0.5 U	0.5 U								
4/24/2012	XX	LPUD2X528	2 U	1 U	1 U								
4/23/2013	XX	LPUD2X5I9	1 U	1 U	1 U								
4/22/2014	XX	LPUD2X6FA	10 U	5 U	5 U								
MW-401B													
9/21/2005	XX	GW401B199	15 U	2 U	2 U								
9/21/2005	XD	GWDP4X19C	15 U	2 U	2 U								
5/23/2006	XX	GW401B1E4	15 U	2 U	2 U								
5/23/2006	XD	GWDP4X1E7	15 U	2 U	2 U								
5/14/2007	XX	GW401B231	15 U	2 U	2 U								
5/14/2007	XD	GWDP4X234	15 U	2 U	2 U								
5/20/2008	XX	GW401B2D9	15 U	2 U	2 U								
5/20/2008	XD	GWDP4X2DC	15 U	2 U	2 U								
4/13/2009	XX	GW401B32B	1 U	1 U	1 U								
4/13/2009	XD	GWDP4X32E	1 U	1 U	1 U								
4/27/2010	XX	GW401B3J9	0.5 U	0.5 U	0.5 U								

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(MW-401B) Date	Type	Sample ID	Vinyl Acetate ug/L	trans-1,4-Dichloro-2-butene ug/L	Iodomethane ug/L
4/27/2010	XD	GWDP4X3JC	0.5 U	0.5 U	0.5 U
4/25/2011	XX	GW401B49I	0.5 U	0.5 U	0.5 U
4/25/2011	XD	GWDP4X4A1	0.5 U	0.5 U	0.5 U
4/23/2012	XX	GW401B521	2 U	1 U	1 U
4/23/2012	XD	GWDP4X524	2 U	1 U	1 U
4/22/2013	XX	GW401B5I2	1 U	1 U	1 U
4/22/2013	XD	GWDP4X5I5	1 U	1 U	1 U
4/21/2014	XX	GW401B6F3	10 U	5 U	5 U
4/21/2014	XD	GWDP4X6F6	10 U	5 U	5 U
P-04-02					
9/22/2005	XX	GWXXXX1A5	15 U	2 U	2 U
5/22/2006	XX	GWXXXX1F0	15 U	2 U	2 U
5/14/2007	XX	GWXXXX23H	15 U	2 U	2 U
5/21/2008	XX	GWXXXX2E5	15 U	2 U	2 U
4/13/2009	XX	GWXXXX337	1 U	1 U	1 U
4/26/2010	XX	GWXXXX405	0.5 U	0.5 U	0.5 U
4/27/2011	XX	GWXXXX4AE	0.5 U	0.5 U	0.5 U
4/25/2012	XX	GWXXXX52H	2 U	1 U	1 U
4/22/2013	XX	GWXXXX5II	!	!	!
QCBT					
1/17/2005	XX	BTXXXX111	15 U	2 U	2 U
3/9/2005	XX	BTXXXX11E	15 U	2 U	2 U
3/21/2005	XX	BTXXXX142	15 U	2 U	2 U
5/11/2005	XX	BTXXXX121	15 U	2 U	2 U
7/25/2005	XX	BTXXXX17G	15 U	2 U	2 U
7/27/2005	XX	BTXXXX187	15 U	2 U	2 U
9/20/2005	XX	BTXXXX1A7	15 U	2 U	2 U
9/21/2005	XX	BTXXXX1AI	15 U	2 U	2 U
9/22/2005	XX	BTXXXX1AJ	15 U	2 U	2 U
4/19/2006	XX	BTXXXX1FE	15 U	2 U	2 U
5/22/2006	XX	BTXXXX1F2	15 U	2 U	2 U
5/23/2006	XX	BTXXXX1FD	15 U	2 U	2 U
5/24/2006	XX	BTXXXX1ID	15 U	2 U	2 U
7/25/2006	XX	BTXXXX1HJ	15 U	2 U	2 U
9/13/2006	XX	BTXXXX20C	15 U	2 U	2 U
5/14/2007	XX	BTXXXX23J	15 U	2 U	2 U
5/15/2007	XX	BTXXXX244	15 U	2 U	2 U
5/16/2007	XX	BTXXXX245	15 U	2 U	2 U
7/24/2007	XX	BTXXXX283	15 U	2 U	2 U
9/11/2007	XX	BTXXXX2AD	15 U	2 U	2 U
5/19/2008	XX	BTXXXX2EC	15 U	2 U	2 U
5/21/2008	XX	BTXXXX2ED	15 U	2 U	2 U
7/29/2008	XX	BTXXXX2HB	15 U	2 U	2 U
10/29/2008	XX	BTXXXX301	1 U	1 U	1 U
4/13/2009	XX	BTXXXX33D	1 U	1 U	1 U
4/15/2009	XX	BTXXXX33E	1 U	1 U	1 U
7/7/2009	XX	BTXXXX37H	1 U	1 U	1 U
10/28/2009	XX	BTXXXX3AJ	1 U	1 U	1 U

SEVEE & MAHER ENGINEERS, INC.
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(QCBT)

Date	Type	Sample ID	Vinyl Acetate ug/L	trans-1,4-Dichloro-2-butene ug/L	Iodomethane ug/L								
4/26/2010	XX	BTXXXX40A	0.5 U	0.5 U	0.5 U								
4/27/2010	XX	BTXXXX40B	0.5 U	0.5 U	0.5 U								
4/28/2010	XX	BTXXXXHG1	0.5 U	0.5 U	0.5 U								
7/20/2010	XX	BTXXXX43F	0.5 U	0.5 U	0.5 U								
10/19/2010	XX	BTXXXX46I	0.5 U	0.5 U	0.5 U								
4/25/2011	XX	BTXXXX4AJ	0.5 U	0.5 U	0.5 U								
4/26/2011	XX	BTXXXX4B0	0.5 U	0.5 U	0.5 U								
4/27/2011	XX	BTXXXX4B5	0.5 U	0.5 U	0.5 U								
7/19/2011	XX	BTXXXX4F3	0.5 U	0.5 U	0.5 U								
10/26/2011	XX	BTXXXX4G8	0.5 U	0.5 U	0.5 U								
4/23/2012	XX	BTXXXX532	2 U	1 U	1 U								
4/24/2012	XX	BTXXXX533	2 U	1 U	1 U								
4/25/2012	XX	BTXXXX538	2 U	1 U	1 U								
7/24/2012	XX	BTXXXX585	1 U	1 U	1.5								
10/23/2012	XX	BTXXXX5C8	1 U	1 U	1 U								
4/22/2013	XX	BTXXXX5J3	1 U	1 U	1 U								
4/23/2013	XX	BTXXXX5J4	1 U	1 U	1 U								
4/24/2013	XX	BTXXXX5J8	1 U	1 U	1 U								
7/30/2013	XX	BTXXXX65D	5 U	2.5 U	5 U								
10/29/2013	XX	BTXXXX69H	10 U										
10/29/2013	XX	BTXXXX68C	10 U	5 U	5 U								
4/21/2014	XX	BTXXXX6G4	10 U	5 U	5 U								
4/22/2014	XX	BTXXXX6G5	10 U	5 U	5 U								
7/30/2014	XX	BTXXXX70B	10 U	5 U	5 U								
10/21/2014	XX	BTXXXX748	10 U	5 U	5 U								
10/21/2014	XX	BTXXXX749	10 U										

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

! - The sampling location was damaged or destroyed.
D - The sampling location was dry.
F12 - Pipe under water, no sample taken.
F6 - No flow. Sample not taken.
H2 - Waterlevel higher than pipes. See LF-COMP for readings
U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/10/2015 14:22
FOR: Juniper Ridge Landfill

SUMMARY REPORT
Methane

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(MW-223B)

Date	Type	Sample ID	Methane ug/L
MW-223B			
7/30/2013	XX	GW223B64J	40.6
10/29/2013	XX	GW223B67C	9.2
4/22/2014	XX	GW223B6FF	20 U
7/29/2014	XX	GW223B700	20 U
10/21/2014	XX	GW223B73C	30

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

U - Not Detected above the reported sample detection limit.

Leachate Location

REPORT PREPARED: 3/11/2015 07:54

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Leachate - Field Data

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	Specific Conductance µmhos/cm @25°C	pH Standard Units	Temperature Degrees Celcius	Corrected Eh mV	Dissolved Oxygen mg/L	Alkalinity (CaCO3) (field) mg/L	Turbidity (field) NTU
LT-C4L									
4/15/2009	XX	LTC4LX325	29800	7.1	18.6	95	D2	D3	1100 >
7/7/2009	XX	LTC4LX369	20000 >	7.6	17.8	217	8	D3	400
10/28/2009	XX	LTC4LX3E4	24300	7.3	17.6	102	D2	D3	230
4/28/2010	XX	LTC4LX3J3	23200	7.3	17.7	145	2	1813	170
7/20/2010	XX	LTC4LX427	23400	6.9	21.8	33	D2	D3	D3
10/19/2010	XX	LTC4LX45B	28300	7.1	19.6	113	2	1313	20
4/27/2011	XX	LTC4LX49C	18420	6.9	17.4	109		1563	8.4
7/19/2011	XX	LTC4LX4DA	30700	7	28.3	115	2	1688	44
10/26/2011	XX	LTC4LX4H5	15850	7.1	18.3	100	1	750	6.1
4/24/2012	XX	LTC4LX51F	11470	6.7	15.7	-27	2	688	14.9
7/24/2012	XX	LTC4LX56E	25300	6.8	24.8	-93	3	D3	D3
10/23/2012	XX	LTC4LX5D5	19800	6.9	17.3	-33	D2	D3	D3
4/23/2013	XX	LTC4LX5HG	18590	7.1	17.1	92	1	1500	18.9
LT-C4LR									
7/30/2013	XX	LTC4LX641	23400	6.7	23.6	44	D2	D3	D3
10/29/2013	XX	LTC4LX66E	24100	6.8	11.3	92	D2	D3	D3
4/22/2014	XX	LTC4LX6EH	15370	7.2	13.3	134	D2	D3	D3
7/30/2014	XX	LTC4LX6J4	23800	7.2	22.3	-30	D2	D3	D3
10/21/2014	XX	LTC4LX72F	21300	7.2	15.8	238	D2	D3	D3

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

D2 - Sample too dark to read D.O. reading.

D3 - Sample too dark to take reading.

REPORT PREPARED: 3/11/2015 07:55

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Leachate - Inorganics (part 1 of 2)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L)			Total Kjeldahl Nitrogen	Ammonia (N)	Nitrate (N)	Phosphate Phosphorus	Total Dissolved Solids	Total Suspended Solids	Sulfate	Sulfide	Ca-mg Hardness (CaCO3)	Bicarbonate (CaCO3)	Alkalinity (CaCO3)	Organic Carbon	Biochemical Oxygen Demand		
Date	Type	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
LT-C4L																	
4/15/2009	XX	LTC4LX325	630	318	10 U		19657	145	143 J	11	6212	3290	3290	1970	4050		
7/7/2009	XX	LTC4LX369	740	708	30 U	1.1	19816	230	342 J	7		2830		1670	2360		
10/28/2009	XX	LTC4LX3E4	810	624	20 U	0.88	14060	52	120 U	1.5		2750		475	677		
4/28/2010	XX	LTC4LX3J3	910	697	20 U		15180	59	120 U	0.44	2856	3210	3210	474	1000 U		
7/20/2010	XX	LTC4LX427	880	714	20 U	1.2	15250	38	120 U	2.5		3360		366	139		
10/19/2010	XX	LTC4LX45B	790	666	5.6 J	0.76	16940	44	63	1.1		2700		307	152		
4/27/2011	XX	LTC4LX49C	500	74	6 U		10570	5	72 J	0.18	1831	2280	2280	184	39		
7/19/2011	XX	LTC4LX4DA	810	666	10 U	0.92	14820	44	60 U	0.3		2800		270	45		
10/26/2011	XX	LTC4LX4H5	510	442	5 U	0.59	8250	11	64.6 J	3.7		1400		182	47		
4/24/2012	XX	LTC4LX51F	290	274	15 U		6080	108	133	1.6	1941	1370	1370	935	1120 G		
7/24/2012	XX	LTC4LX56E	710	742	6 U	0.77	15210	106	50.2	3		3630		2120	3090		
10/23/2012	XX	LTC4LX5D5	490	459	17.9	0.46	14570	36	213	16		2740		1740	3190		
4/23/2013	XX	LTC4LX5HG	697	574	30 U		10700	34	200 U	2.3	2424	2950	2950	935	1750		
LT-C4LR																	
7/30/2013	XX	LTC4LX641	742	630	1210	1.39	15050	625	400 U	78		3700		2560	4850		
10/29/2013	XX	LTC4LX66E	880	840	5	0.79	17400	140	10.4	5.6		3980		2450	855		
4/22/2014	XX	LTC4LX6EH	520	434	45 U		8600	28	300 U	4	1889	2010	2010	364	434		
7/30/2014	XX	LTC4LX6J4	850	708	348		12040	64	2250			3200		761			
10/21/2014	XX	LTC4LX72F	820	700	30 U	0.83	13280	44	200 U	6		2740		460	448		

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

G - Greater than specified amount.

J - Analyte was positively identified/Associated value is an estimate below reporting limit.

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 07:56

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Leachate - Inorganics (part 2 of 2)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	Chemical Oxygen Demand mg/L	Chloride mg/L	Bromide mg/L	Cyanide ug/L	Tannin & Lignins (Tannic Acid) mg/L
LT-C4L							
4/15/2009	XX	LTC4LX325	6640	10100	92.3	0.009	
7/7/2009	XX	LTC4LX369	4684	21500			97
10/28/2009	XX	LTC4LX3E4	2822	17400			44
4/28/2010	XX	LTC4LX3J3	2429	18000	188	0.007	
7/20/2010	XX	LTC4LX427	2108	19900			53
10/19/2010	XX	LTC4LX45B	2340	18700			52
4/27/2011	XX	LTC4LX49C	1740	5910	23.3	0.006	
7/19/2011	XX	LTC4LX4DA	959	10300			3.6
10/26/2011	XX	LTC4LX4H5	1420	4300			24
4/24/2012	XX	LTC4LX51F	2960	2560	32.7	5 U	
7/24/2012	XX	LTC4LX56E	6700	6350			67
10/23/2012	XX	LTC4LX5D5	5900	9880			84
4/23/2013	XX	LTC4LX5HG	3280	5610	73.3	5	
LT-C4LR							
7/30/2013	XX	LTC4LX641	8110	24300	38.8		480
10/29/2013	XX	LTC4LX66E	8080	5970	95		102
4/22/2014	XX	LTC4LX6EH	1620	7650	63.6	5 U	
7/30/2014	XX	LTC4LX6J4	2760	13950	39		75
10/21/2014	XX	LTC4LX72F	2320	7070	100		100

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 07:56

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Leachate - Metal (part 1 of 2)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	Aluminum mg/L	Antimony mg/L	Arsenic mg/L	Barium mg/L	Beryllium mg/L	Cadmium mg/L	Calcium mg/L	Chromium mg/L	Cobalt mg/L	Copper mg/L	Iron mg/L	Lead mg/L	Magnesium mg/L	Manganese mg/L
LT-C4L																
4/15/2009	XX	LTC4LX325	0.55	0.065	0.093	1.3	0.001 U	0.006	1759	0.072	0.02 J	0.036	42.8	0.024	442	8.5
7/7/2009	XX	LTC4LX369			0.112			0.001 U	1387			0.009	43.3		514	5
10/28/2009	XX	LTC4LX3E4			0.075			0.0015	687			0.022	26.3		386	2.77
4/28/2010	XX	LTC4LX3J3	0.429	0.005	0.107	1.873	0.0002 U	0.001	565	0.065	0.014	0.004	20.9	0.068	351	2.18
7/20/2010	XX	LTC4LX427			0.099			0.0009	520			0.007	11.9		378	2.08
10/19/2010	XX	LTC4LX45B			0.113			0.004	658			0.01 J	16.8		415	1.8
4/27/2011	XX	LTC4LX49C	0.201	0.018	0.085	1.469	0.0002 U	0.0032	344	0.024	0.012	0.011	9.61	0.002 J	236	2.45
7/19/2011	XX	LTC4LX4DA			0.121			0.012	469			0.005 U	12.7		372	2.3
10/26/2011	XX	LTC4LX4H5			0.059			0.0099	305			0.008	19.7		205	2.24
4/24/2012	XX	LTC4LX51F	0.25	0.025 U	0.07	0.915	0.003 U	0.005	482	0.025	0.05 U	0.015 U	63	0.015 U	179	23.6
7/24/2012	XX	LTC4LX56E			0.11			0.003 U	845			0.056	82		466	26
10/23/2012	XX	LTC4LX5D5			0.177			0.004	934			0.024	45.3		433	14
4/23/2013	XX	LTC4LX5HG	0.223	0.005 U	0.102	1.285	0.0006 U	0.0013	474	0.038	0.014	0.017	30.3	0.003 U	301	8.03
LT-C4LR																
7/30/2013	XX	LTC4LX641			0.137			0.0146	958			0.065	179		433	23.4
10/29/2013	XX	LTC4LX66E			0.16			0.004	860			0.018	100		532	16.7
4/22/2014	XX	LTC4LX6EH	0.22	0.005 U	0.131	1.222	0.0006 U	0.0061	329	0.049	0.016	0.033	13.2	0.022	259	2.73
7/30/2014	XX	LTC4LX6J4			0.143			0.0038	311			0.003 U	28.6		289	3.8
10/21/2014	XX	LTC4LX72F			0.186			0.009	406			0.005	27.3		355	4.23

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

J - Analyte was positively identified/Associated value is an estimate below reporting limit.

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 07:57
FOR: Juniper Ridge Landfill

SUMMARY REPORT

Leachate - Metal (part 2 of 2)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	Mercury mg/L	Nickel mg/L	Potassium mg/L	Selenium mg/L	Silver mg/L	Sodium mg/L	Thallium mg/L	Vanadium mg/L	Zinc mg/L	Tin mg/L					
LT-C4L																	
4/15/2009	XX	LTC4LX325	0.0002 U	0.153	1619	0.01 U	0.055	2212	0.005 U	0.02 U	0.604	0.12					
7/7/2009	XX	LTC4LX369		0.119	1801			2454									
10/28/2009	XX	LTC4LX3E4		0.091	1775			2612									
4/28/2010	XX	LTC4LX3J3	0.0002 U	0.106	1982	0.021	0.0003 J	2448	0.012	0.025	0.053	0.014 J					
7/20/2010	XX	LTC4LX427		0.101	1659			2130									
10/19/2010	XX	LTC4LX45B		0.078	1779			2265									
4/27/2011	XX	LTC4LX49C	0.0002 U	0.061	1135	0.016	0.0007 J	1520	0.001 U	0.017	0.011	0.005 U					
7/19/2011	XX	LTC4LX4DA		0.079	1806			2590									
10/26/2011	XX	LTC4LX4H5		0.03	1066			1580									
4/24/2012	XX	LTC4LX51F	0.0005 U	0.045	714	0.025	0.005 U	1024	0.02 U	0.05 U	0.155	0.075 U					
7/24/2012	XX	LTC4LX56E		0.122	1719			2337									
10/23/2012	XX	LTC4LX5D5		0.084	1100			1842									
4/23/2013	XX	LTC4LX5HG	0.0005 U	0.079	1237	0.01	0.001 U	1844	0.004 U	0.01	0.016	0.019					
LT-C4LR																	
7/30/2013	XX	LTC4LX641		0.304	1234			1910									
10/29/2013	XX	LTC4LX66E		0.23	1622			2290									
4/22/2014	XX	LTC4LX6EH	0.0005 U	0.073	941	0.035	0.001 U	1633	0.004 U	0.027	0.101	0.015 U					
7/30/2014	XX	LTC4LX6J4		0.146	1140			1948									
10/21/2014	XX	LTC4LX72F		0.094	1472			2316									

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

J - Analyte was positively identified/Associated value is an estimate below reporting limit.

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 16:26

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Leachate - VOAs Part 1 of 4

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	Chloromethane ug/L	Bromomethane ug/L	Vinyl Chloride ug/L	Chloroethane ug/L	Methylene Chloride ug/L	Acetone ug/L	Carbon Disulfide ug/L	1,1-Dichloroethene ug/L	1,1-Dichloroethane ug/L	trans-1,2-Dichloroethene ug/L	Chloroform ug/L	1,2-Dichloroethane ug/L	Methyl Ethyl Ketone ug/L	1,1,1-Trichloroethane ug/L	Carbon Tetrachloride ug/L
LT-C4L																	
4/15/2009	XX	LTC4LX325	50 U	50 U	50 U	50 U	250 U	3880	50 U	50 U	50 U	50 U	50 U	50 U	11700	50 U	50 U
7/7/2009	XX	LTC4LX369	25 U	25 U	25 U	25 U	125 U	4020	25 U	25 U	25 U	25 U	25 U	25 U	9080	25 U	25 U
10/28/2009	XX	LTC4LX3E4	10 U	10 U	10 U	10 U	50 U	764	10 U	10 U	10 U	10 U	10 U	10 U	2570	10 U	10 U
4/28/2010	XX	LTC4LX3J3	2.5 U	5 U	2.5 U	2.5 U	25 U	444	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	3.8 J	1360	2.5 U	2.5 U
7/20/2010	XX	LTC4LX427	2.5 U	5 U	2.5 U	2.5 U	25 U	365	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	5.8	25 U	2.5 U	2.5 U
10/19/2010	XX	LTC4LX45B	0.5 U	1 U	0.75 J	0.5 U	5 U	475	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	604	0.5 U	0.5 U
4/27/2011	XX	LTC4LX49C	5 U	10 U	5 U	5 U	50 U	100 U	5 U	5 U	5 U	5 U	5 U	5 U	50 U	5 U	5 U
7/19/2011	XX	LTC4LX4DA	0.5 U	1 U	0.5 U	0.5 U	5 U	136	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12	0.5 U	0.5 U
10/26/2011	XX	LTC4LX4H5	0.5 U	1 U	0.7 J	0.5 U	5 U	117	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	97	0.5 U	0.5 U
4/24/2012	XX	LTC4LX51F	5 U	10 U	5 U	5 U	25 U	974	5 U	5 U	5 U	5 U	5 U	10	3440	5 U	5 U
7/24/2012	XX	LTC4LX56E	5 U	10 U	5 U	5 U	25 U	2460	5 U	5 U	5 U	5 U	5 U	5 U	9540	5 U	5 U
10/23/2012	XX	LTC4LX5D5	25 U	50 U	25 U	25 U	125 U	2710	25 U	25 U	25 U	25 U	25 U	25 U	7490	25 U	25 U
4/23/2013	XX	LTC4LX5HG	25 U	50 U	25 U	25 U	125 U	1310	25 U	25 U	25 U	25 U	25 U	25 U	4110	25 U	25 U
LT-C4LR																	
7/30/2013	XX	LTC4LX641	250 U	100 U	100 U	100 U	300 U	4400	500 U	50 U	75 U	75 U	75 U	50 U	23000 E	50 U	50 U
10/29/2013	XX	LTC4LX66E	400 U	400 U	400 U	1000 U	1000 U	4000	400 U	200 U	200 U	200 U	200 U	200 U	20000	200 U	200 U
4/22/2014	XX	LTC4LX6EH	40 U	40 U	40 U	100 U	100 U	1000	40 U	20 U	20 U	20 U	20 U	20 U	1400	20 U	20 U
7/30/2014	XX	LTC4LX6J4	2 U	2 U	2 U	5 U	5 U	60	5 U	1 U	2 U	2 U	2 U	2 U	200	2 U	2 U
10/21/2014	XX	LTC4LX72F	20 U	20 U	20 U	50 U	50 U	400	20 U	10 U	10 U	10 U	10 U	10 U	1200	10 U	10 U
QCBT																	
4/13/2009	XX	BTXXXX33D	1 U	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
4/15/2009	XX	BTXXXX33E	1 U	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
7/7/2009	XX	BTXXXX37H	1 U	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
10/28/2009	XX	BTXXXX3AJ	1 U	1 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
4/26/2010	XX	BTXXXX40A	0.5 U	1 U	0.5 U	0.5 U	5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U
4/27/2010	XX	BTXXXX40B	0.5 U	1 U	0.5 U	0.5 U	5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U
4/28/2010	XX	BTXXXXHG1	0.5 U	1 U	0.5 U	0.5 U	5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U
7/20/2010	XX	BTXXXX43F	0.5 U	1 U	0.5 U	0.5 U	5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U
10/19/2010	XX	BTXXXX46I	0.5 U	1 U	0.5 U	0.5 U	5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U
4/25/2011	XX	BTXXXX4AJ	0.5 U	1 U	0.5 U	0.5 U	5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U
4/26/2011	XX	BTXXXX4B0	0.5 U	1 U	0.5 U	0.5 U	5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U
4/27/2011	XX	BTXXXX4B5	0.5 U	1 U	0.5 U	0.5 U	5 U	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U
7/19/2011	XX	BTXXXX4F3	0.5 U	1 U	0.5 U	0.5 U	5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U
10/26/2011	XX	BTXXXX4G8	0.5 U	1 U	0.5 U	0.5 U	5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U
4/23/2012	XX	BTXXXX532	1 U	2 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
4/24/2012	XX	BTXXXX533	1 U	2 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
4/25/2012	XX	BTXXXX538	1 U	2 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
7/24/2012	XX	BTXXXX585	1 U	2 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
10/23/2012	XX	BTXXXX5C8	1 U	2 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
4/22/2013	XX	BTXXXX5J3	1 U	2 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
4/23/2013	XX	BTXXXX5J4	1 U	2 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
4/24/2013	XX	BTXXXX5J8	1 U	2 U	1 U	1 U	5 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U
7/30/2013	XX	BTXXXX65D	2.5 U	1 U	1 U	1 U	3 U	5 U	5 U	0.5 U	0.75 U	0.75 U	0.75 U	0.5 U	5 U	0.5 U	0.5 U
10/29/2013	XX	BTXXXX68C	2 U	2 U	2 U	5 U	5 U	10 U	5 U	1 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U
10/29/2013	XX	BTXXXX69H	5 U	2 U	2 U	5 U	5 U	50 U		1 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U
4/21/2014	XX	BTXXXX6G4	2 U	2 U	2 U	5 U	5 U	10 U	5 U	1 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U
4/22/2014	XX	BTXXXX6G5	2 U	2 U	2 U	5 U	5 U	10 U	5 U	1 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U

REPORT PREPARED: 3/11/2015 16:26
FOR: Juniper Ridge Landfill

SUMMARY REPORT

Leachate - VOAs Part 1 of 4

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(QCBT) Date	Type	Sample ID	Chloromethane ug/L	Bromomethane ug/L	Vinyl Chloride ug/L	Chloroethane ug/L	Methylene Chloride ug/L	Acetone ug/L	Carbon Disulfide ug/L	1,1-Dichloroethene ug/L	1,1-Dichloroethane ug/L	trans-1,2-Dichloroethene ug/L	Chloroform ug/L	1,2-Dichloroethane ug/L	Methyl Ethyl Ketone ug/L	1,1,1-Trichloroethane ug/L	Carbon Tetrachloride ug/L
7/30/2014	XX	BTXXXX70B	2 U	2 U	2 U	5 U	5 U	10 U	5 U	1 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U
10/21/2014	XX	BTXXXX748	2 U	2 U	2 U	5 U	5 U	10 U	5 U	1 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U
10/21/2014	XX	BTXXXX749	5 U	2 U	2 U	5 U	5 U	50 U		1 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

E - Compound exceeded upper level of calibration range and required dilution.
J - Analyte was positively identified/Associated value is an estimate below reporting limit.
U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 16:26

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Leachate - VOAs Part 2 of 4

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L)			Vinyl Acetate	Bromodichloromethane	1,2-Dichloropropane	cis-1,3-Dichloropropene	Trichloroethene	Dibromochloromethane	1,1,2-Trichloroethane	Benzene	trans-1,3-Dichloropropene	Bromoform	4-Methyl-2-Pentanone	2-Hexanone	Tetrachloroethene	1,1,2,2-Tetrachloroethane	Toluene
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
LT-C4L																	
4/15/2009	XX	LTC4LX325	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	500 U	500 U	50 U	50 U	50 U
7/7/2009	XX	LTC4LX369	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	289	250 U	25 U	25 U	25 U
10/28/2009	XX	LTC4LX3E4	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	100 U	10 U	10 U	13
4/28/2010	XX	LTC4LX3J3	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	4.4 J	2.5 U	2.5 U	25 U	25 U	2.5 U	2.5 U	15
7/20/2010	XX	LTC4LX427	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	4.6 J	2.5 U	2.5 U	25 U	25 U	2.5 U	2.5 U	15
10/19/2010	XX	LTC4LX45B	0.5 U	0.5 U	0.81 J	0.5 U	0.5 U	0.5 U	0.5 U	5	0.5 U	0.72 J	38	5 U	0.5 U	0.5 U	18
4/27/2011	XX	LTC4LX49C	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	50 U	50 U	5 U	5 U	11
7/19/2011	XX	LTC4LX4DA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	3.2	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	7.4
10/26/2011	XX	LTC4LX4H5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	4.6	0.5 U	0.5 U	7.8 J	5 U	0.5 U	0.5 U	13
4/24/2012	XX	LTC4LX51F	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	50 U	50 U	5 U	5 U	13
7/24/2012	XX	LTC4LX56E	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	55	50 U	5 U	5 U	6.8
10/23/2012	XX	LTC4LX5D5	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	250 U	250 U	25 U	25 U	25 U
4/23/2013	XX	LTC4LX5HG	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	250 U	250 U	25 U	25 U	25 U
LT-C4LR																	
7/30/2013	XX	LTC4LX641	500 U	50 U	180 U	50 U	50 U	50 U	75 U	50 U	50 U	200 U	500 U	500 U	50 U	50 U	75 U
10/29/2013	XX	LTC4LX66E	2000 U	100 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	400 U	2000 U	2000 U	200 U	200 U	200 U
4/22/2014	XX	LTC4LX6EH	200 U	10 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	40 U	200 U	200 U	20 U	20 U	20 U
7/30/2014	XX	LTC4LX6J4	10 U	0.5 U	2 U	2 U	2 U	2 U	2 U	1 U	2 U	2 U	10 U	10 U	2 U	2 U	1 U
10/21/2014	XX	LTC4LX72F	100 U	5 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	100 U	100 U	10 U	10 U	10 U
QCBT																	
4/13/2009	XX	BTXXXX33D	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
4/15/2009	XX	BTXXXX33E	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
7/7/2009	XX	BTXXXX37H	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
10/28/2009	XX	BTXXXX3AJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
4/26/2010	XX	BTXXXX40A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
4/27/2010	XX	BTXXXX40B	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
4/28/2010	XX	BTXXXXHG1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
7/20/2010	XX	BTXXXX43F	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
10/19/2010	XX	BTXXXX46I	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
4/25/2011	XX	BTXXXX4AJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	BTXXXX4B0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
4/27/2011	XX	BTXXXX4B5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
7/19/2011	XX	BTXXXX4F3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
10/26/2011	XX	BTXXXX4G8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
4/23/2012	XX	BTXXXX532	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
4/24/2012	XX	BTXXXX533	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
4/25/2012	XX	BTXXXX538	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
7/24/2012	XX	BTXXXX585	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
10/23/2012	XX	BTXXXX5C8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
4/22/2013	XX	BTXXXX5J3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
4/23/2013	XX	BTXXXX5J4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
4/24/2013	XX	BTXXXX5J8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
7/30/2013	XX	BTXXXX65D	5 U	0.5 U	1.8 U	0.5 U	0.5 U	0.5 U	0.75 U	0.5 U	0.5 U	2 U	5 U	5 U	0.5 U	0.5 U	0.75 U
10/29/2013	XX	BTXXXX68C	10 U	0.5 U	2 U	2 U	2 U	2 U	2 U	1 U	2 U	2 U	10 U	10 U	2 U	2 U	1 U
10/29/2013	XX	BTXXXX69H	10 U	2 U	2 U	2 U	2 U	2 U	2 U	1 U	2 U	2 U	10 U	10 U	2 U	2 U	1 U
4/21/2014	XX	BTXXXX6G4	10 U	0.5 U	2 U	2 U	2 U	2 U	2 U	1 U	2 U	2 U	10 U	10 U	2 U	2 U	1 U
4/22/2014	XX	BTXXXX6G5	10 U	0.5 U	2 U	2 U	2 U	2 U	2 U	1 U	2 U	2 U	10 U	10 U	2 U	2 U	1 U

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SUMMARY REPORT

Leachate - VOAs Part 2 of 4

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(QCBT)			Vinyl Acetate	Bromodichloro methane	1,2-Dichloropropane	cis-1,3-Dichloropropene	Trichloroethene	Dibromochloro methane	1,1,2-Trichloroethane	Benzene	trans-1,3-Dichloropropene	Bromoform	4-Methyl-2-Pentanone	2-Hexanone	Tetrachloroethene	1,1,2,2-Tetrachloroethane	Toluene
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
7/30/2014	XX	BTXXXX70B	10 U	0.5 U	2 U	2 U	2 U	2 U	2 U	1 U	2 U	2 U	10 U	10 U	2 U	2 U	1 U
10/21/2014	XX	BTXXXX748	10 U	0.5 U	2 U	2 U	2 U	2 U	2 U	1 U	2 U	2 U	10 U	10 U	2 U	2 U	1 U
10/21/2014	XX	BTXXXX749	10 U	2 U	2 U	2 U	2 U	2 U	2 U	1 U	2 U	2 U	10 U	10 U	2 U	2 U	1 U

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

J - Analyte was positively identified/Associated value is an estimate below reporting limit.

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 16:26

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Leachate - VOAs Part 3 of 4

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L)			Chlorobenzene	Ethylbenzene	Styrene	o-Xylene	m,p-Xylene	Trichlorofluoromethane	cis-1,2-Dichloroethene	Bromochloromethane	Dibromomethane	1,2-Dibromoethane	1,1,1,2-Tetrachloroethane	1,2,3-Trichloropropane	1,2-Dibromo-3-Chloropropane	Acrylonitrile	trans-1,4-Dichloro-2-butene
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
LT-C4L																	
4/15/2009	XX	LTC4LX325	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
7/7/2009	XX	LTC4LX369	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
10/28/2009	XX	LTC4LX3E4	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4/28/2010	XX	LTC4LX3J3	2.5 U	5.9	2.5 U	3.1 J	7.2	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
7/20/2010	XX	LTC4LX427	2.5 U	5.5	2.5 U	3.7 J	8.5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
10/19/2010	XX	LTC4LX45B	0.5 U	7.9	1.4 J	5.3	12	0.5 U	1.1 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/27/2011	XX	LTC4LX49C	5 U	5 U	5 U	5 U	7.3 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
7/19/2011	XX	LTC4LX4DA	0.5 U	3.8	0.5 U	2.5	5.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
10/26/2011	XX	LTC4LX4H5	0.5 U	6.7	1	4.2	9.5	0.5 U	0.7 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/24/2012	XX	LTC4LX51F	5 U	5.8	5 U	5 U	6.9	6.4	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
7/24/2012	XX	LTC4LX56E	5 U	5 U	5 U	5 U	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
10/23/2012	XX	LTC4LX5D5	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4/23/2013	XX	LTC4LX5HG	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
LT-C4LR																	
7/30/2013	XX	LTC4LX641	50 U	50 U	100 U	100 U	100 U	250 U	50 U	250 U	500 U	200 U	50 U	500 U	250 U	500 U	250 U
10/29/2013	XX	LTC4LX66E	200 U	200 U	200 U	200 U	200 U	1000 U	200 U	200 U	200 U	400 U	200 U	200 U	400 U	4000 U	1000 U
4/22/2014	XX	LTC4LX6EH	20 U	20 U	20 U	20 U	20 U	100 U	20 U	20 U	20 U	40 U	20 U	20 U	40 U	400 U	100 U
7/30/2014	XX	LTC4LX6J4	2 U	1 U	1 U	1 U	1 U	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	20 U	5 U
10/21/2014	XX	LTC4LX72F	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	20 U	200 U	50 U
QCBT																	
4/13/2009	XX	BTXXXX33D	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4/15/2009	XX	BTXXXX33E	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
7/7/2009	XX	BTXXXX37H	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
10/28/2009	XX	BTXXXX3AJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4/26/2010	XX	BTXXXX40A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/27/2010	XX	BTXXXX40B	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/28/2010	XX	BTXXXXHG1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
7/20/2010	XX	BTXXXX43F	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
10/19/2010	XX	BTXXXX46I	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/25/2011	XX	BTXXXX4AJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/26/2011	XX	BTXXXX4B0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/27/2011	XX	BTXXXX4B5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
7/19/2011	XX	BTXXXX4F3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
10/26/2011	XX	BTXXXX4G8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4/23/2012	XX	BTXXXX532	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4/24/2012	XX	BTXXXX533	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4/25/2012	XX	BTXXXX538	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
7/24/2012	XX	BTXXXX585	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
10/23/2012	XX	BTXXXX5C8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4/22/2013	XX	BTXXXX5J3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4/23/2013	XX	BTXXXX5J4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4/24/2013	XX	BTXXXX5J8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
7/30/2013	XX	BTXXXX65D	0.5 U	0.5 U	1 U	1 U	1 U	2.5 U	0.5 U	2.5 U	5 U	2 U	0.5 U	5 U	2.5 U	5 U	2.5 U
10/29/2013	XX	BTXXXX68C	2 U	1 U	1 U	1 U	1 U	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	20 U	5 U
10/29/2013	XX	BTXXXX69H	2 U	1 U	1 U	1 U	1 U	5 U	2 U							50 U	
4/21/2014	XX	BTXXXX6G4	2 U	1 U	1 U	1 U	1 U	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	20 U	5 U
4/22/2014	XX	BTXXXX6G5	2 U	1 U	1 U	1 U	1 U	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	20 U	5 U

REPORT PREPARED: 3/11/2015 16:26

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Leachate - VOAs Part 3 of 4

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(QCBT)			Chlorobenzene	Ethylbenzene	Styrene	o-Xylene	m,p-Xylene	Trichlorofluoromethane	cis-1,2-Dichloroethene	Bromochloromethane	Dibromomethane	1,2-Dibromoethane	1,1,1,2-Tetrachloroethane	1,2,3-Trichloropropane	1,2-Dibromo-3-Chloropropane	Acrylonitrile	trans-1,4-Dichloro-2-butene
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
7/30/2014	XX	BTXXXX70B	2 U	1 U	1 U	1 U	1 U	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	20 U	5 U
10/21/2014	XX	BTXXXX748	2 U	1 U	1 U	1 U	1 U	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	20 U	5 U
10/21/2014	XX	BTXXXX749	2 U	1 U	1 U	1 U	1 U	5 U	2 U							50 U	

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

J - Analyte was positively identified/Associated value is an estimate below reporting limit.

U - Not Detected above the reported sample detection limit.

SUMMARY REPORT

Leachate - VOAs Part 4 of 4

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	Iodomethane ug/L	1,2-Dichlorobenzene ug/L	1,4-Dichlorobenzene ug/L
LT-C4L					
4/15/2009	XX	LTC4LX325	50 U		
7/7/2009	XX	LTC4LX369	25 U	25 U	25 U
10/28/2009	XX	LTC4LX3E4	10 U	10 U	10 U
4/28/2010	XX	LTC4LX3J3	2.5 U	2.5 U	2.5 U
7/20/2010	XX	LTC4LX427	2.5 U	2.5 U	2.5 U
10/19/2010	XX	LTC4LX45B	0.5 U	0.5 U	1.3
4/27/2011	XX	LTC4LX49C	5 U		
7/19/2011	XX	LTC4LX4DA	0.5 U	0.5 U	0.69 J
10/26/2011	XX	LTC4LX4H5	0.5 U	0.5 U	1.1
4/24/2012	XX	LTC4LX51F	5 U	5 U	5 U
7/24/2012	XX	LTC4LX56E	35	5 U	5 U
10/23/2012	XX	LTC4LX5D5	25 U	25 U	25 U
4/23/2013	XX	LTC4LX5HG	25 U	25 U	25 U
LT-C4LR					
7/30/2013	XX	LTC4LX641	500 U	250 U	250 U
10/29/2013	XX	LTC4LX66E	1000 U	200 U	200 U
4/22/2014	XX	LTC4LX6EH	100 U	9.6 U	9.6 U
7/30/2014	XX	LTC4LX6J4	5 U	1 U	1 U
10/21/2014	XX	LTC4LX72F	50 U	10 U	10 U
QCBT					
4/13/2009	XX	BTXXXX33D	1 U	1 U	1 U
4/15/2009	XX	BTXXXX33E	1 U	1 U	1 U
7/7/2009	XX	BTXXXX37H	1 U	1 U	1 U
10/28/2009	XX	BTXXXX3AJ	1 U	1 U	1 U
4/26/2010	XX	BTXXXX40A	0.5 U	0.5 U	0.5 U
4/27/2010	XX	BTXXXX40B	0.5 U	0.5 U	0.5 U
4/28/2010	XX	BTXXXXHG1	0.5 U	0.5 U	0.5 U
7/20/2010	XX	BTXXXX43F	0.5 U	0.5 U	0.5 U
10/19/2010	XX	BTXXXX46I	0.5 U	0.5 U	0.5 U
4/25/2011	XX	BTXXXX4AJ	0.5 U	0.5 U	0.5 U
4/26/2011	XX	BTXXXX4B0	0.5 U	0.5 U	0.5 U
4/27/2011	XX	BTXXXX4B5	0.5 U	0.5 U	0.5 U
7/19/2011	XX	BTXXXX4F3	0.5 U	0.5 U	0.5 U
10/26/2011	XX	BTXXXX4G8	0.5 U	0.5 U	0.5 U
4/23/2012	XX	BTXXXX532	1 U	1 U	1 U
4/24/2012	XX	BTXXXX533	1 U	1 U	1 U
4/25/2012	XX	BTXXXX538	1 U	1 U	1 U
7/24/2012	XX	BTXXXX585	1.5	1 U	1 U
10/23/2012	XX	BTXXXX5C8	1 U	1 U	1 U
4/22/2013	XX	BTXXXX5J3	1 U	1 U	1 U
4/23/2013	XX	BTXXXX5J4	1 U	1 U	1 U
4/24/2013	XX	BTXXXX5J8	1 U	1 U	1 U
7/30/2013	XX	BTXXXX65D	5 U	2.5 U	2.5 U
10/29/2013	XX	BTXXXX68C	5 U	1 U	1 U
10/29/2013	XX	BTXXXX69H		1 U	1 U
4/21/2014	XX	BTXXXX6G4	5 U	1 U	1 U
4/22/2014	XX	BTXXXX6G5	5 U	1 U	1 U

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(QCBT) Date	Type	Sample ID	Iodomethane ug/L	1,2-Dichlorobenzene ug/L	1,4-Dichlorobenzene ug/L												
7/30/2014	XX	BTXXXX70B	5 U	1 U	1 U												
10/21/2014	XX	BTXXXX748	5 U	1 U	1 U												
10/21/2014	XX	BTXXXX749		1 U	1 U												

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

J - Analyte was positively identified/Associated value is an estimate below reporting limit.

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 16:13

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Pesticides, Herbicides and PCB's (part 1 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	Aldrin ug/L	alpha-BHC ug/L	beta-BHC ug/L	delta-BHC ug/L	gamma-BHC (Lindane) ug/L	Chlordane (technical) ug/L	Chlorobenzilate ug/L	4,4'-DDD ug/L	4,4'-DDE ug/L	4,4'-DDT ug/L	Diallate ug/L	Dieldrin ug/L	Endosulfan I ug/L	Endosulfan II ug/L	Endosulfan Sulfate ug/L
LT-C4L																	
4/15/2009	XX	LTC4LX325	0.047 U	0.047 U	0.047 U	0.047 U	0.055	0.47 U	57 U	0.094 U	0.094 U	0.094 U	57 U	0.094 U	0.047 U	0.094 U	0.094 U
4/28/2010	XX	LTC4LX3J3	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.47 U	9 U	0.094 U	0.094 U	0.094 U	9 U	0.094 U	0.047 U	0.094 U	0.094 U
4/27/2011	XX	LTC4LX49C	0.007 U	0.0065 U	0.0059 U	0.012 U	0.0068 U			0.0085 U	0.0046 U	0.0084 U		0.0061 U	0.006 U	0.0054 U	0.0063 U
4/24/2012	XX	LTC4LX51F	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.47 U	9.5 U	0.094 U	0.094 U	0.094 U	9.5 U	0.094 U	0.047 U	0.094 U	0.094 U
4/23/2013	XX	LTC4LX5HG	0.048 U	0.048 U	0.048 U	0.048 U	0.048 U	0.48 U	110 U	0.097 U	0.097 U	0.097 U	110 U	0.097 U	0.048 U	0.097 U	0.097 U
LT-C4LR																	
4/22/2014	XX	LTC4LX6EH	0.048 U	0.048 U	0.048 U	0.048 U	0.048 U	0.48 U	9.6 U	0.095 U	0.095 U	0.095 U	9.6 U	0.095 U	0.048 U	0.095 U	0.095 U

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 08:20
FOR: Juniper Ridge Landfill

SUMMARY REPORT

Pesticides, Herbicides and PCB's (part 2 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	Endrin ug/L	Endrin Aldehyde ug/L	Heptachlor ug/L	Heptachlor Epoxide ug/L	Isodrin ug/L	Kepone ug/L	Methoxychlor ug/L	Toxaphene ug/L	Aroclor-1016 ug/L	Aroclor-1221 ug/L	Aroclor-1232 ug/L	Aroclor-1242 ug/L	Aroclor-1248 ug/L	Aroclor-1254 ug/L	Aroclor-1260 ug/L
LT-C4L																	
4/15/2009	XX	LTC4LX325	0.094 U	0.094 U	0.047 U	0.047 U	57 U	71 U	0.47 U	0.94 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
4/28/2010	XX	LTC4LX3J3	0.094 U	0.094 U	0.047 U	0.047 U	9 U	24 U	0.47 U	0.94 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
4/27/2011	XX	LTC4LX49C	0.0079 U	0.0058 U	0.0075 U	0.43			0.0079 U	0.16 U	0.14 U	0.19 U	0.085 U	0.17 U	0.19 U	0.075 U	0.16 U
4/24/2012	XX	LTC4LX51F	0.094 U	0.094 U	0.047 U	0.047 U	9.5 U	24 U	0.47 U	0.94 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
4/23/2013	XX	LTC4LX5HG	0.097 U	0.097 U	0.048 U	0.048 U	110 U	280 U	0.48 U	0.97 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
LT-C4LR																	
4/22/2014	XX	LTC4LX6EH	0.095 U	0.095 U	0.048 U	0.048 U	9.6 U	24 U	0.48 U	0.95 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 08:21

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Pesticides, Herbicides and PCB's (part 3 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	Dimethoate ug/L	Disulfoton ug/L	Famphur ug/L	Methyl Parathion ug/L	Parathion ug/L	Phorate ug/L	Thionazin ug/L	o,o,o-Triethylphosphorothioate ug/L	2,4-Dichlorophenoxyacetic Acid ug/L	2,4,5,-T ug/L	2,4,5-Trichlorophenoxypropionic Acid ug/L	alpha-Chlordane ug/L	gamma-Chlordane ug/L		
LT-C4L																	
4/15/2009	XX	LTC4LX325	28 U	28 U	71 U	28 U	71 U	28 U	57 U	57 U	14 U	14 U	14 U				
4/28/2010	XX	LTC4LX3J3	9 U	9 U	28 U	9 U	24 U	9 U	19 U	9 U	2.8 U	2.8 U	2.8 U				
4/27/2011	XX	LTC4LX49C									0.28 U	0.5 U	0.19 U	0.0072 U	0.0057 U		
4/24/2012	XX	LTC4LX51F	9.5 U	9.5 U	28 U	9.5 U	24 U	9.5 U		9.5 U	2.8 U	2.8 U	2.8 U				
4/23/2013	XX	LTC4LX5HG	110 U	110 U	340 U	110 U	280 U	110 U	230 U	110 U	2.9 U	2.9 U	2.9 U				
LT-C4LR																	
4/22/2014	XX	LTC4LX6EH	9.6 U	9.6 U	29 U	9.6 U	24 U	9.6 U	19 U	9.6 U	3.1 U	3.1 U	3.1 U				

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 08:21
FOR: Juniper Ridge Landfill

SUMMARY REPORT

Pesticides, Herbicides and PCB's (part 4 of 4)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L)			Dalapon ug/L	Dicamba ug/L	Dichloroprop ug/L	MCPA ug/L	MCPP ug/L	2,4-DB ug/L	Endrin Ketone ug/L								
Date	Type	Sample ID															
LT-C4L																	
4/27/2011	XX	LTC4LX49C	0.31 U	0.14 U	0.26 U	32 U	48 U	0.51 U	0.0074 U								

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 08:22
FOR: Juniper Ridge Landfill

SUMMARY REPORT

Semi-VOA (part 1 of 8)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L)			Acenaphthene	Acenaphthylene	Acetophenone	2-Acetylaminofluorene	4-Aminobiphenyl	Anthracene	Benzo(a)Anthracene	Benzo(b)Fluoranthene	Benzo(k)Fluoranthene	Benzo(g,h,i)perylene	Benzo(a)Pyrene	Benzyl Alcohol	4-Bromophenyl-phenylether		
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L		
LT-C4L																	
4/15/2009	XX	LTC4LX325	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	57 U	28 U		
4/28/2010	XX	LTC4LX3J3	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	19 U	9 U		
4/27/2011	XX	LTC4LX49C	2 J	1 U				2 U	1 U	1 U	2 U	1 U	1 U		2 U		
4/24/2012	XX	LTC4LX51F	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	19 U	9.5 U		
4/23/2013	XX	LTC4LX5HG	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	230 U	110 U		
LT-C4LR																	
4/22/2014	XX	LTC4LX6EH	9.6 U	9.6 U	11	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	19 U	9.6 U		

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

J - Analyte was positively identified/Associated value is an estimate below reporting limit.

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 08:22

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Semi-VOA (part 2 of 8)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L)			Butylbenzylphthalate	2-sec-Butyl-4-6-dinitrophenol (Dinoseb)	4-Chloroaniline	Bis(2-Chloroethoxy)methane	Bis(2-Chloroethyl)ether	Bis(2-Chloroisopropyl)ether	4-Chloro-3-Methylphenol	2-Chloronaphthalene	2-Chlorophenol	4-Chlorophenyl-phenylether	Chrysene	Dibenz(a,h)Anthracene	Dibenzofuran	Di-n-butylphthalate	1,2-Dichlorobenzene (SVOC)
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
LT-C4L																	
4/15/2009	XX	LTC4LX325	28 U	24 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U
4/28/2010	XX	LTC4LX3J3	9 U	4.7 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	
4/27/2011	XX	LTC4LX49C	2 U	0.21 U	2 U	2 U	2 U	2 U	4 J	3 U	3 U	2 U	2 U	2 U	2 U	2 U	2 U
4/24/2012	XX	LTC4LX51F	9.5 U	4.8 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	
4/23/2013	XX	LTC4LX5HG	110 U	4.8 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	
LT-C4LR																	
4/22/2014	XX	LTC4LX6EH	9.6 U	5.2 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

J - Analyte was positively identified/Associated value is an estimate below reporting limit.

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 08:22

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Semi-VOA (part 3 of 8)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	1,3-Dichlorobenzene (SVOC) ug/L	1,4-Dichlorobenzene (SVOC) ug/L	3,3-Dichlorobenzidine ug/L	2,4-Dichlorophenol ug/L	2,6-Dichlorophenol ug/L	Diethylphthalate ug/L	p-(Dimethylamino)azobenzene ug/L	7,12-Dimethylbenz(a)anthracene ug/L	3,3`-Dimethylbenzidine ug/L	2,4-Dimethylphenol ug/L	Dimethylpthalate ug/L	1,3-Dinitrobenzene (m-Dinitrobenzene) ug/L	4,6-Dinitro-2-methylphenol ug/L	2,4-Dinitrophenol ug/L
LT-C4L																
4/15/2009	XX	LTC4LX325	28 U	28 U	28 U	28 U	28 U	28 U	57 U	28 U	57 U	28 U	28 U	28 U	71 U	71 U
4/28/2010	XX	LTC4LX3J3	9 U		9 U	9 U	9 U	9 U	9 U	9 U	24 U	9 U	9 U	9 U	24 U	24 U
4/27/2011	XX	LTC4LX49C	2 U	2 U	1 U	3 U		2 J				4 U	2 U		2 U	1 U
4/24/2012	XX	LTC4LX51F	9.5 U		9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	24 U	9.5 U	9.5 U	9.5 U	24 U	24 U
4/23/2013	XX	LTC4LX5HG	110 U		110 U	110 U	110 U	110 U	110 U	110 U	280 U	110 U	110 U	110 U	280 U	280 U
LT-C4LR																
4/22/2014	XX	LTC4LX6EH	9.6 U		9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U		9.6 U	9.6 U	9.6 U	24 U	24 U

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

J - Analyte was positively identified/Associated value is an estimate below reporting limit.

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 08:23
FOR: Juniper Ridge Landfill

SUMMARY REPORT

Semi-VOA (part 4 of 8)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	2,4-Dinitrotoluene ug/L	2,6-Dinitrotoluene ug/L	Di-n-octylphthalate ug/L	Bis(2-Ethylhexyl)phthalate ug/L	Ethyl methanesulfonate ug/L	Fluoranthene ug/L	Fluorene ug/L	Hexachlorobenzene ug/L	Hexachlorobutadiene ug/L	Hexachlorocyclopentadiene ug/L	Hexachloroethane ug/L	Hexachloropropene ug/L	Indeno(1,2,3-c,d)Pyrene ug/L		
LT-C4L																	
4/15/2009	XX	LTC4LX325	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U	28 U		
4/28/2010	XX	LTC4LX3J3	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U		
4/27/2011	XX	LTC4LX49C	2 U	2 U	2 U	2 U		2 U	2 U	2 U	2 U	1 U	2 U		2 U		
4/24/2012	XX	LTC4LX51F	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U		
4/23/2013	XX	LTC4LX5HG	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U		
LT-C4LR																	
4/22/2014	XX	LTC4LX6EH	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U		

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

U - Not Detected above the reported sample detection limit.

SUMMARY REPORT

Semi-VOA (part 5 of 8)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	Isophorone ug/L	Isosafrole ug/L	Methapyrilene ug/L	3-Methylcholanthrene ug/L	Methyl methanesulfonate ug/L	2-Methylnaphthalene ug/L	2-Methylphenol ug/L	3&4-Methylphenol ug/L	Naphthalene ug/L	1-Naphthaleneamine (1-Naphthylamine) ug/L	2-Naphthaleneamine (2-Naphthylamine) ug/L	1,4-Naphthoquinone ug/L	2-Nitroaniline ug/L	Carbazole ug/L	
LT-C4L																	
4/15/2009	XX	LTC4LX325	28 U	57 U	71 U	28 U	57 U	28 U	28 U	2800	300	28 U	28 U	28 U	71 U		
4/28/2010	XX	LTC4LX3J3	9 U	9 U	9 U	9 U	9 U	9 U	9 U	450	10	9 U	9 U	9 U	24 U		
4/27/2011	XX	LTC4LX49C	2 U					3 U	10	23	6 J				2 U	2 U	
4/24/2012	XX	LTC4LX51F	9.5 U	9.5 U	24 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	24 U	24 U		
4/23/2013	XX	LTC4LX5HG	110 U	110 U	280 U	110 U	110 U	110 U	110 U	1000	110 U	110 U	110 U	280 U	280 U		
LT-C4LR																	
4/22/2014	XX	LTC4LX6EH	9.6 U	9.6 U	24 U	9.6 U	9.6 U	9.6 U	12	690	12	9.6 U	9.6 U	24 U	24 U		

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

J - Analyte was positively identified/Associated value is an estimate below reporting limit.

U - Not Detected above the reported sample detection limit.

SUMMARY REPORT

Semi-VOA (part 6 of 8)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	3-Nitroaniline ug/L	4-Nitroaniline ug/L	Nitrobenzene ug/L	2-Nitrophenol ug/L	4-Nitrophenol ug/L	5-Nitro-o-toluidine ug/L	N-Nitrosodiethylamine ug/L	N-Nitrosodimethylamine ug/L	N-Nitrosodi-n-butylamine ug/L	N-Nitroso-di-n-propylamine ug/L	N-Nitrosodiphenylamine ug/L	N-Nitrosomethylethylamine ug/L	N-Nitrosopiperidine ug/L		
LT-C4L																	
4/15/2009	XX	LTC4LX325	71 U	71 U	28 U	28 U	71 U	57 U	57 U	57 U	28 U	28 U	28 U	28 U	28 U		
4/28/2010	XX	LTC4LX3J3	24 U	24 U	9 U	9 U	24 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U		
4/27/2011	XX	LTC4LX49C	1 U	2 U	3 U	2 U	2 U					2 U	4 U				
4/24/2012	XX	LTC4LX51F	24 U	24 U	9.5 U	9.5 U	24 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U		
4/23/2013	XX	LTC4LX5HG	280 U	280 U	110 U	110 U	280 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U		
LT-C4LR																	
4/22/2014	XX	LTC4LX6EH	24 U	24 U	9.6 U	9.6 U	24 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U		

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

U - Not Detected above the reported sample detection limit.

REPORT PREPARED: 3/11/2015 08:23

FOR: Juniper Ridge Landfill

SUMMARY REPORT

Semi-VOA (part 7 of 8)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L)			N-Nitrosopyrrolidine	Pentachlorobenzene	Pentachloronitrobenzene	Pentachlorophenol	Phenacetin	Phenanthrene	Phenol	p-Phenylenediamine	Pronamide	Pyrene	1,2,4,5-Tetrachlorobenzene				
Date	Type	Sample ID	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L				
LT-C4L																	
4/15/2009	XX	LTC4LX325	28 U	28 U	28 U	71 U	28 U	28 U	410 E	28 U	28 U	28 U	28 U				
4/28/2010	XX	LTC4LX3J3	9 U	9 U	9 U	24 U	9 U	9 U	70	9 U	9 U	9 U	9 U				
4/27/2011	XX	LTC4LX49C				2 U		2 U	13			2 U					
4/24/2012	XX	LTC4LX51F	9.5 U	9.5 U	9.5 U	24 U	9.5 U	9.5 U	9.5 U	24 U	9.5 U	9.5 U	9.5 U				
4/23/2013	XX	LTC4LX5HG	110 U	110 U	110 U	280 U	110 U	110 U	140	280 U	110 U	110 U	110 U				
LT-C4LR																	
4/22/2014	XX	LTC4LX6EH	9.6 U	9.6 U	9.6 U	24 U	9.6 U	9.6 U	160	24 U	9.6 U	9.6 U	9.6 U				

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

E - Compound exceeded upper level of calibration range and required dilution.

U - Not Detected above the reported sample detection limit.

SUMMARY REPORT

Semi-VOA (part 8 of 8)

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

(LT-C4L) Date	Type	Sample ID	2,3,4,6-Tetrachlorophenol ug/L	O-Toluidine ug/L	1,2,4-Trichlorobenzene ug/L	2,4,5-Trichlorophenol ug/L	2,4,6-Trichlorophenol ug/L	1,3,5-Trinitrobenzene (sym-Trinitrobenzene) ug/L	Safrole ug/L								
LT-C4L																	
4/15/2009	XX	LTC4LX325	28 U	28 U	28 U	71 U	28 U	28 U	28 U								
4/28/2010	XX	LTC4LX3J3	9 U	24 U	9 U	24 U	9 U	9 U	9 U								
4/27/2011	XX	LTC4LX49C			2 U	3 U	3 U										
4/24/2012	XX	LTC4LX51F	9.5 U	24 U	9.5 U	24 U	9.5 U	9.5 U	9.5 U								
4/23/2013	XX	LTC4LX5HG	110 U	280 U	110 U	280 U	110 U	110 U	110 U								
LT-C4LR																	
4/22/2014	XX	LTC4LX6EH	9.6 U	24 U	9.6 U	24 U	9.6 U	9.6 U	9.6 U								

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Blank Cells appear when a parameter was not analyzed.

Concentration Qualifier Notes:

U - Not Detected above the reported sample detection limit.

APPENDIX B

2014 WATER QUALITY EVALUATION SHEETS AND BOX & WHISKER PLOTS

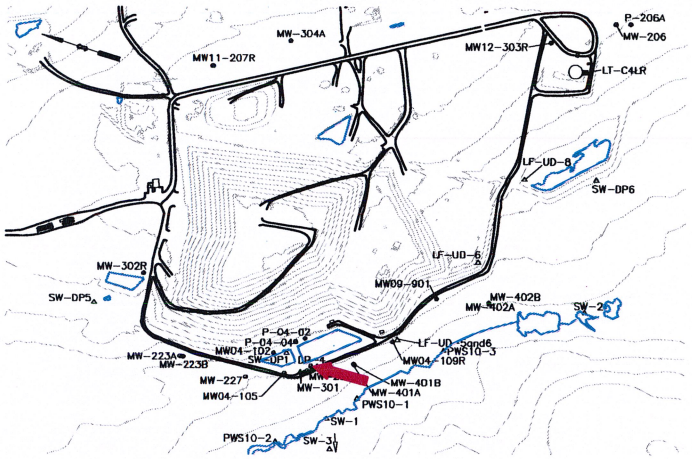
DP-4

Juniper Ridge Landfill

three wells field only 2014

Well Description

DP-4 is located downgradient of the landfill and leachate pond and monitors groundwater quality within the overburden.



Screen Interval:	**18.5 ft. to 24.5 ft.**
Sampled:	**1 Time Annually(field parameters only)**
Sampled Since:	**01/30/04**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

	2014				Historical				
Indicator Parameters	Q1	Q2	Q3	Q4	Min	Max	Mean	SE	n
Temperature (Degrees Celcius)				13.1	6	to 23.9	13	± 0.78	30
Water Level Elevation (Feet)				154.72	152.18	to 156.12	150	± 0.16	30
Corrected Eh (mV)				343	-51	to 352	230	± 17	29
Dissolved Oxygen (mg/L)				0.8	0.6	to 6	2	± 0.3	30
Alkalinity (CaCO3) (field) (mg/L)				75	50	to 290	130	± 11	29
Specific Conductance (µmhos/cm @25°C)				239	100	to 965	360	± 26	30
pH (Standard Units)				6.7	5.6	to 7.3	6.5	± 0.07	30
Turbidity (field) (NTU)				0.6	0.6	to 36.2	9.1	± 1.6	30

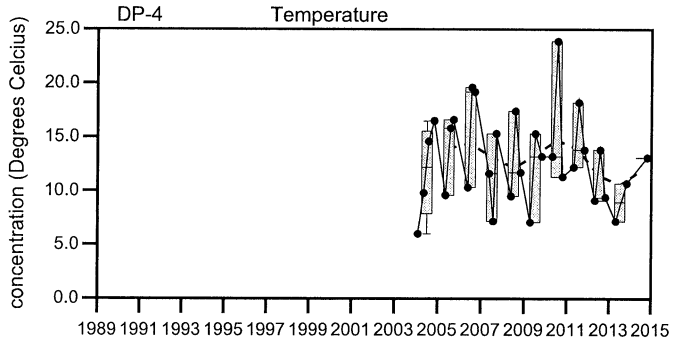
underlined/bold - values exceed a regulatory standard listed below.

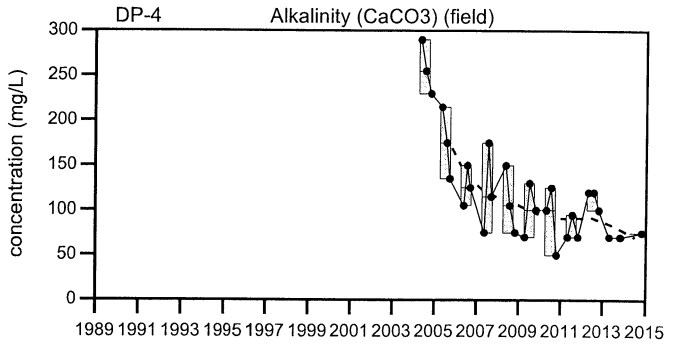
↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

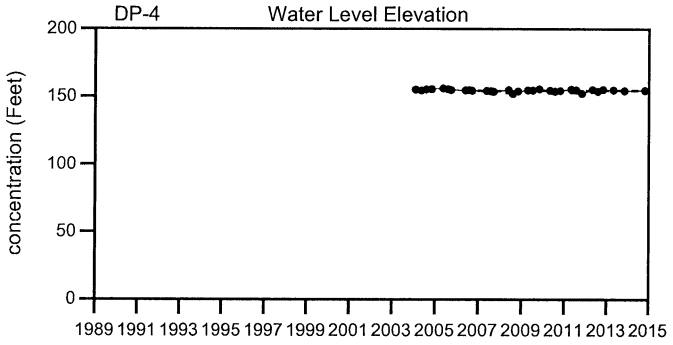
Comments

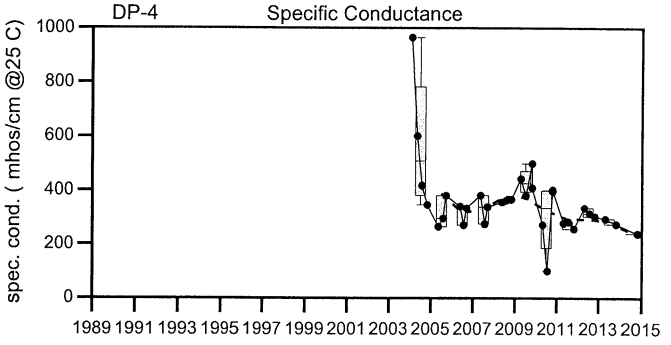
Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

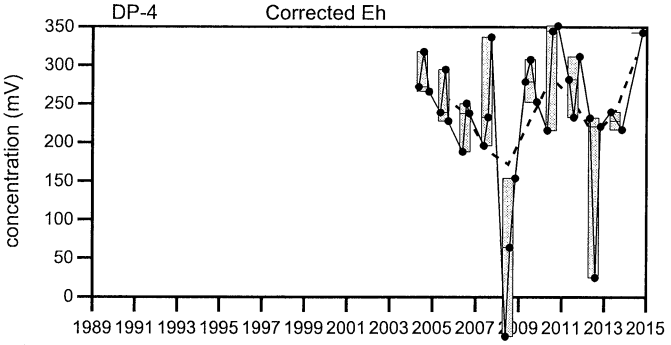
SME
Sevee & Maher Engineers, Inc.

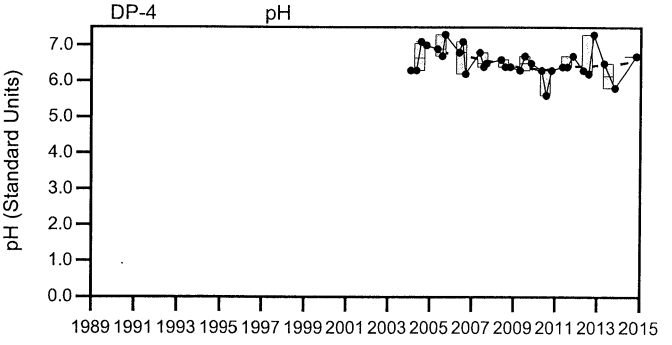


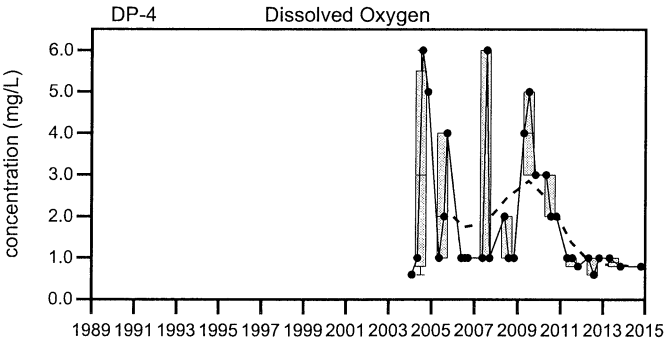


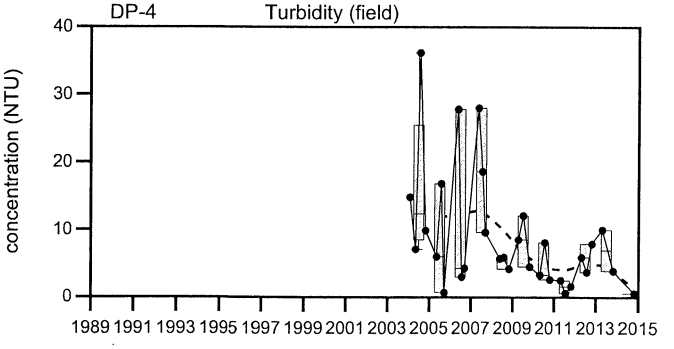


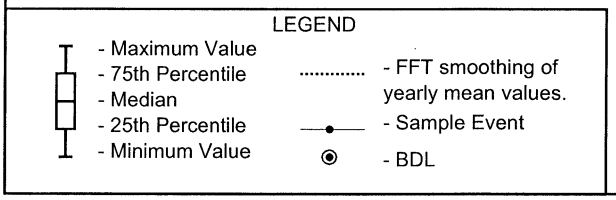












Juniper Ridge Landfill

DP-4

Sevee & Maher Engineers, Inc.

MW04-102

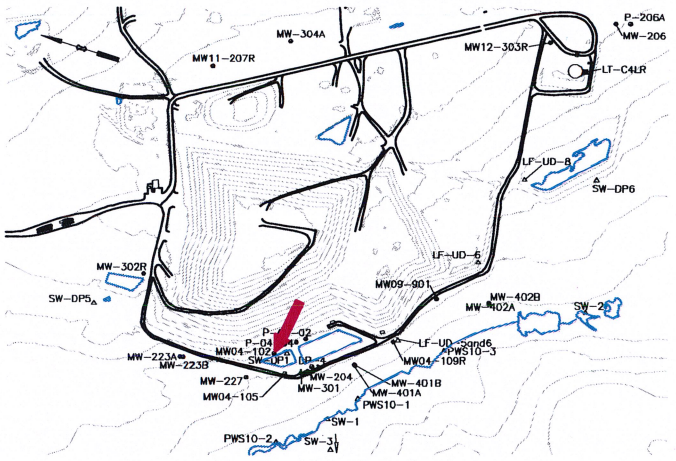
Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW04-102 monitors groundwater in the overburden downgradient of the landfill and upgradient of Stormwater Detention Pond-1.

Screen Interval:	**10 ft. to 15 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**01/18/2005**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**



Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Water Level Elevation (Feet)		164.62	163.92	163.64	162.22	165.42	160	0.16	28
Dissolved Oxygen (mg/L)		5	3	2	1	6	3.2	0.21	28
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.03 U	0.1 U	0.06	0.01	7
Specific Conductance (µmhos/cm @25°C)		226	226	196	193	249	220	2.9	28
pH (Standard Units)		↓ 6.2	7.6	8.1	7.1	8.4	7.9	0.06	28
Alkalinity (CaCO3) (field) (mg/L)		75	105	90	40	170	97	5.8	28
Arsenic (mg/L)		0.01	0.01	**0.012**	0.001 U	0.017	0.004	0.000	28
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	0.001	0.00041	5E-05	28
Calcium (mg/L)		27.4	27.1	27	23.5	31.2	26	0.32	28
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	0.13	0.042	0.005	28
Magnesium (mg/L)		6.9	6.9	7	6.4	8.1	7.1	0.08	28
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	0.09	0.031	0.004	28
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	0.012	0.0033	0.000	28
Potassium (mg/L)		1.5	1.8	1.8	1.2	3.2	1.9	0.08	28
Sodium (mg/L)		7.2	7.9	7.5	6.4	11	7.9	0.22	28
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.3 U	3.8	0.58	0.13	28
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.1 U	0.3	0.18	0.02	28
Total Dissolved Solids (mg/L)		127	132	143	116	148	130	1.7	28
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	5	4	0.04	28
Sulfate (mg/L)		11.2	8.7	10.2	6.7	14	9.5	0.35	28
Bicarbonate (CaCO3) (mg/L)		103	99	103	73	109	100	1.2	28
Organic Carbon (mg/L)		2 U	2 U	2 U	0.5	5.3	1.7	0.2	28
Chemical Oxygen Demand (mg/L)		↑ 10 U	↑ 10 U	↑ 10 U	3 U	9	4.9	0.56	28
Chloride (mg/L)		1.8	1.4	1.5	1 U	3.5	1.9	0.13	28
Turbidity (field) (NTU)		1.1	0.9	1.6	0	3.8	0.87	0.18	28
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	0.25	0.2	0.002	24

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

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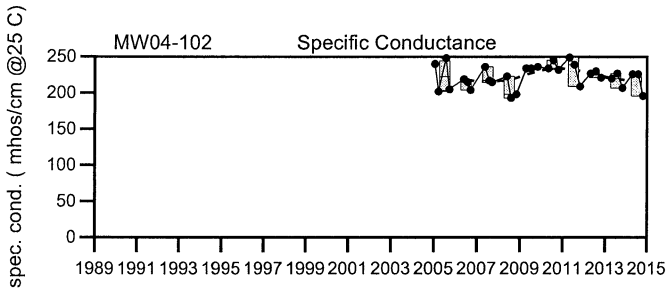
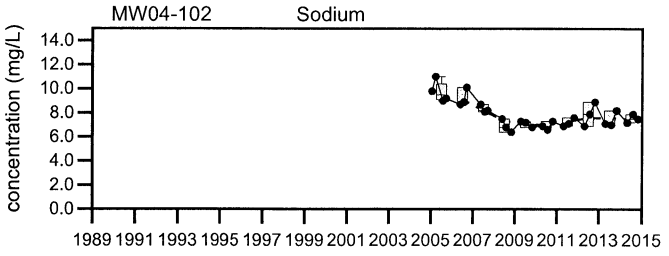
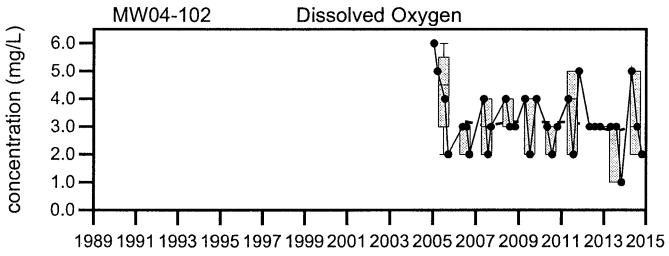
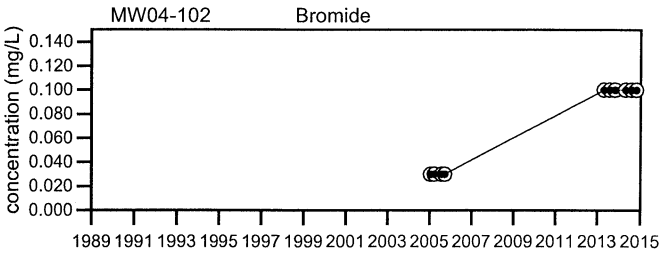
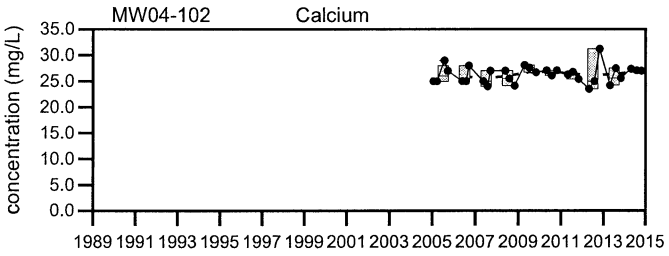
SME
Sevee & Maher Engineers, Inc.

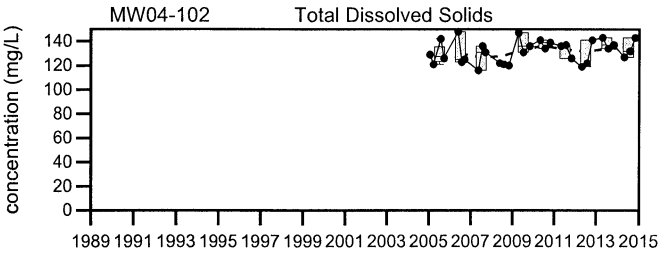


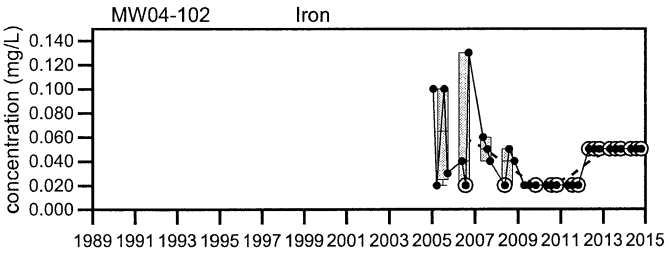


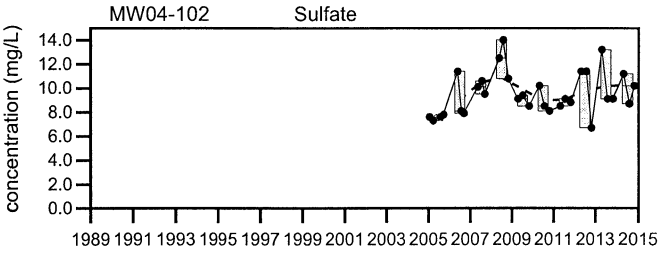


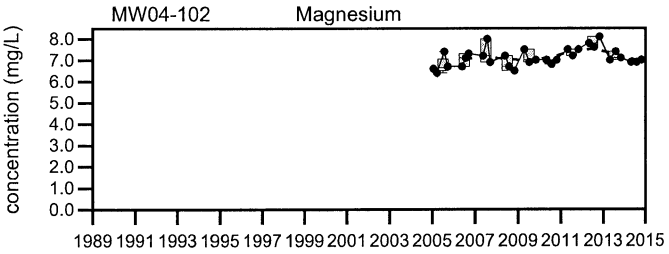


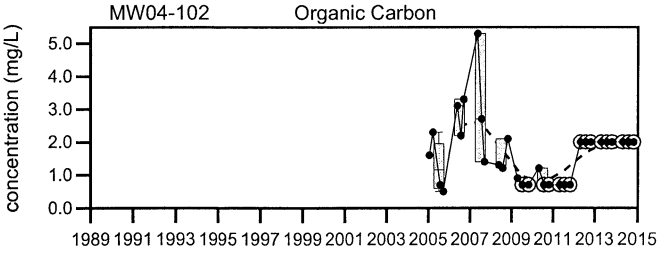


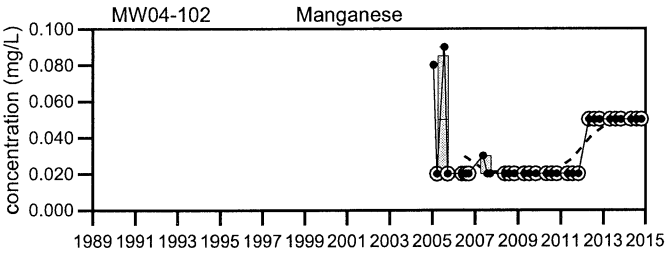


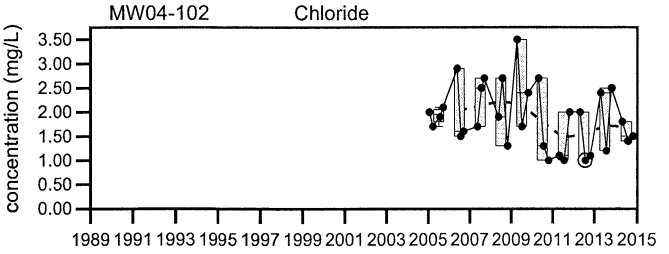


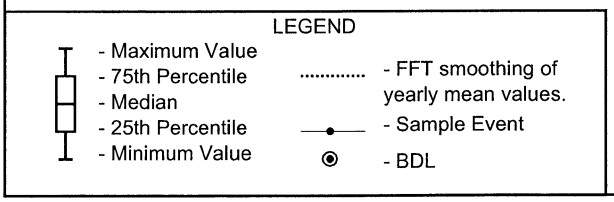












Juniper Ridge Landfill

MW04-102

Sevee & Maher Engineers, Inc.

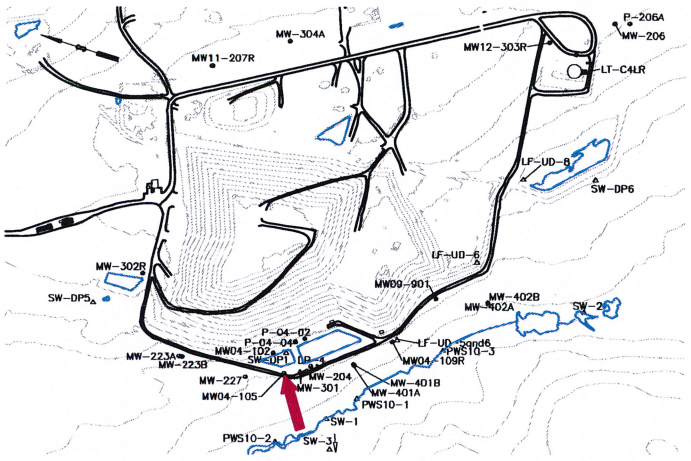
MW04-105

Juniper Ridge Landfill

three wells field only 2014

Well Description

MW04-105 monitors groundwater in the overburden downgradient of the landfill and Stormwater Detention Pond-1.



Screen Interval:	**14.8 ft. to 19.8 ft.**
Sampled:	**1 Time Annually(field parameters only)**
Sampled Since:	**01/17/2005**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

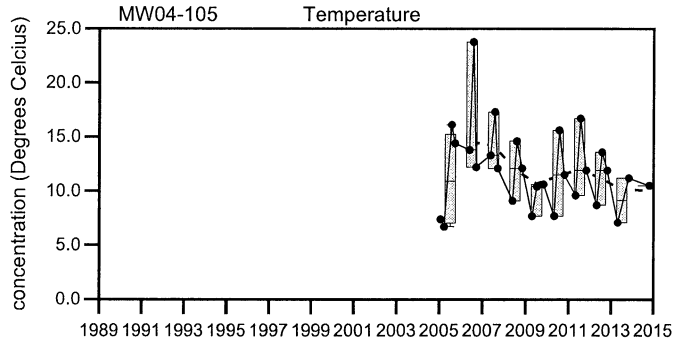
	2014				Historical			
Indicator Parameters	Q1	Q2	Q3	Q4	Min	Max	Mean	SE	n
Temperature (Degrees Celcius)				10.5	6.7	to 23.8	12	± 0.74	27
Water Level Elevation (Feet)				158.31	156.99	to 159.79	160	± 0.14	27
Corrected Eh (mV)				↑ 447	-7	to 412	300	± 16	27
Dissolved Oxygen (mg/L)				0.4	0.4	to 4	1.5	± 0.21	27
Alkalinity (CaCO3) (field) (mg/L)				110	70	to 240	140	± 9.9	27
Specific Conductance (µmhos/cm @25°C)				322	217	to 703	380	± 22	27
pH (Standard Units)				6.6	6.1	to 7.7	6.9	± 0.07	27
Turbidity (field) (NTU)				0.2	0	to 3	0.75	± 0.15	27

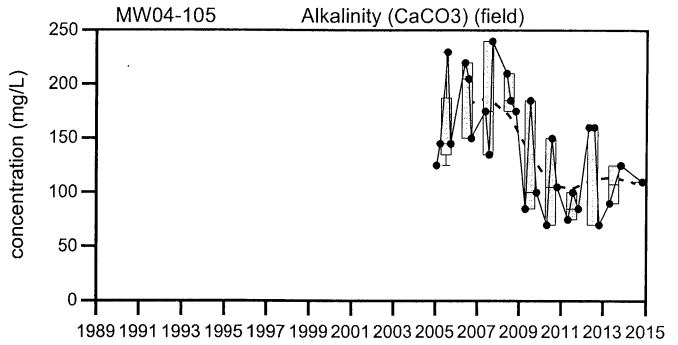
underlined/bold - values exceed a regulatory standard listed below.

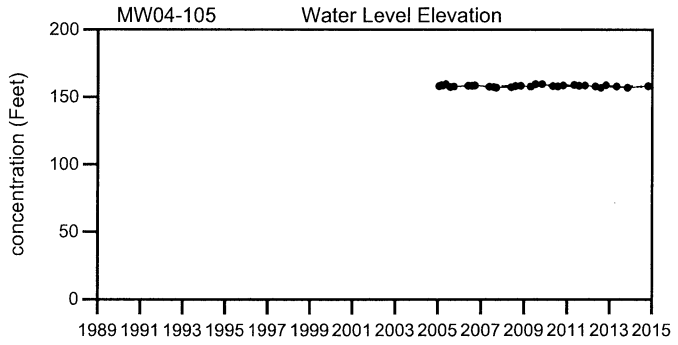
↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

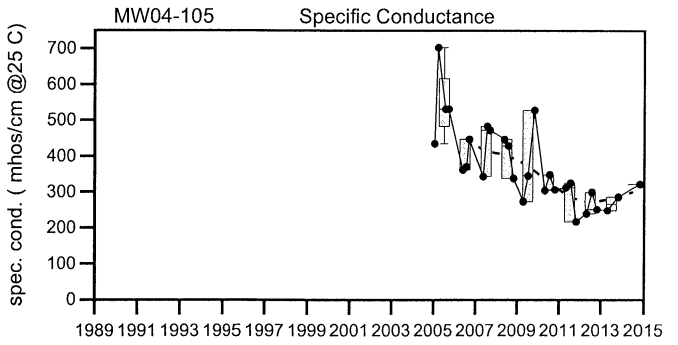
Comments

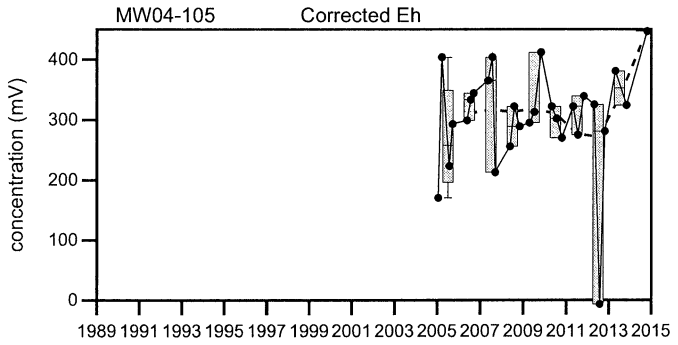
Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

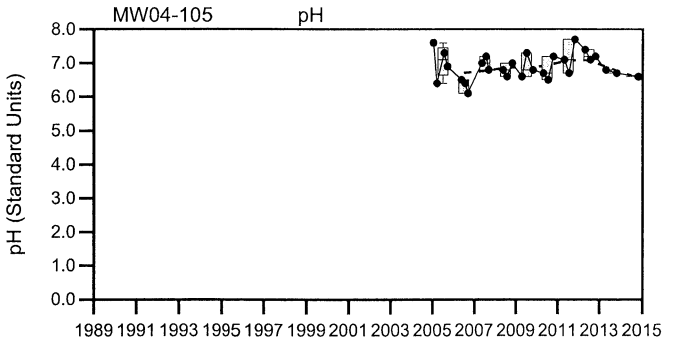


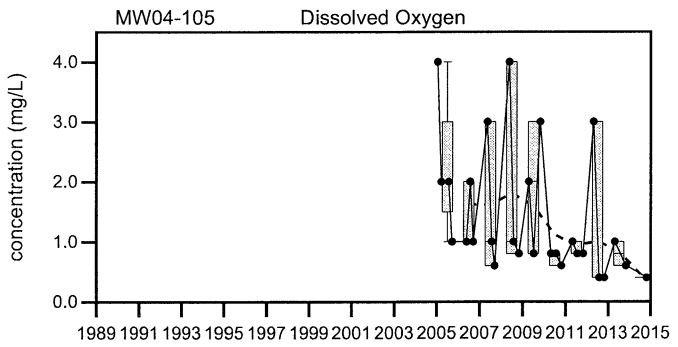


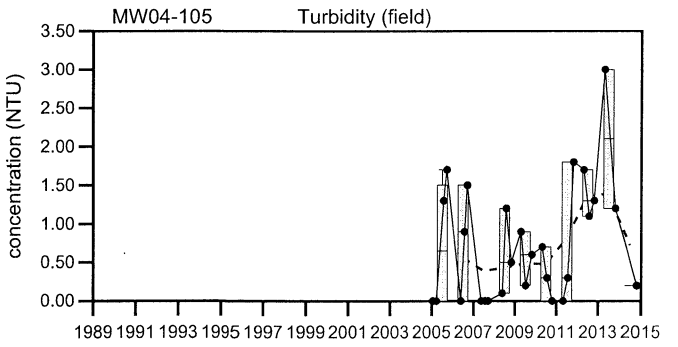


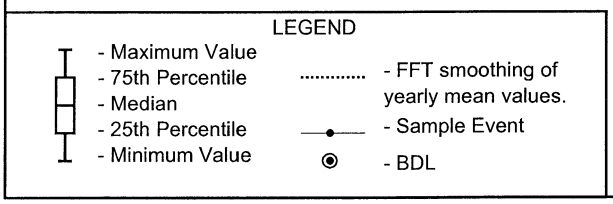












Juniper Ridge Landfill

MW04-105

Sevee & Maher Engineers, Inc.

MW04-109R

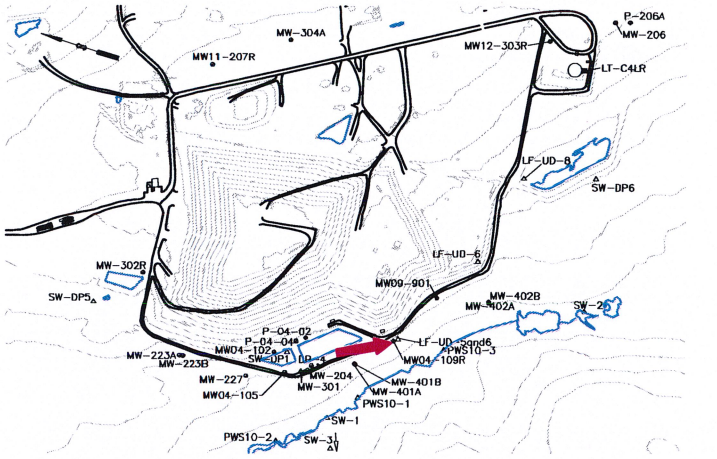
Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW04-109R is located to the south of Cell #5 of the expansion landfill and near Manhole #5. This well monitors water quality within the overburden downgradient of the landfill.

Screen Interval:	**15 ft. to 20 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**12/08/2009**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**



Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Water Level Elevation (Feet)		153.91	153.34	153.06	152.64	153.98	150	0.13	13
Dissolved Oxygen (mg/L)		0.8	0.3	0.4	0.3	1	0.58	0.07	13
Bromide (mg/L)		↑ 0.25	↓ 0.13	0.14	0.14	0.17	0.16	0.009	3
Specific Conductance (µmhos/cm @25°C)		↓ 377	407	389	382	550	430	13	13
pH (Standard Units)		6.5	6.6	6.7	6.3	7.9	6.7	0.11	13
Alkalinity (CaCO3) (field) (mg/L)		200	220	220	105	240	160	11	13
Arsenic (mg/L)		**0.019**	**0.018**	**0.014**	0.002 U	0.033	0.014	0.002	13
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	0.0006	0.00045	6E-05	13
Calcium (mg/L)		60.1	62.1	62.8	50.3	77.2	60	2.1	13
Iron (mg/L)		↑ 0.05 U	↑ 0.05 U	↑ 0.05 U	0.02 U	0.03	0.035	0.004	13
Magnesium (mg/L)		9.9	10.5	10.4	9.7	14.3	12	0.38	13
Manganese (mg/L)		0.13	↑ 0.31	↑ 0.35	0.02	0.15	0.062	0.01	13
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	0.005 U	0.0034	0.000	13
Potassium (mg/L)		2	1.9	2	1.8	2.5	2.1	0.05	13
Sodium (mg/L)		↓ 7.5	↓ 7.7	↓ 7.2	8.2	10.6	9.3	0.21	13
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.3 U	0.59	0.35	0.03	13
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.1 U	0.3 U	0.19	0.03	13
Total Dissolved Solids (mg/L)		236	248	260	227	310	260	6.8	13
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	4 U	4	0	13
Sulfate (mg/L)		8.7	4	5.8	2.6	15.2	7.7	0.87	13
Bicarbonate (CaCO3) (mg/L)		196	198	209	184	233	200	4.5	13
Organic Carbon (mg/L)		2 U	2 U	2 U	1.2	2.9	1.9	0.13	13
Chemical Oxygen Demand (mg/L)		↑ 10 U	↑ 10 U	↑ 10 U	3 U	5	6.5	0.96	13
Chloride (mg/L)		8.1	6.6	4.9	2.3	15.9	7.4	0.95	13
Turbidity (field) (NTU)		0	0.9	0	0	2.9	0.6	0.23	13
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2	1E-09	13

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

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Comments

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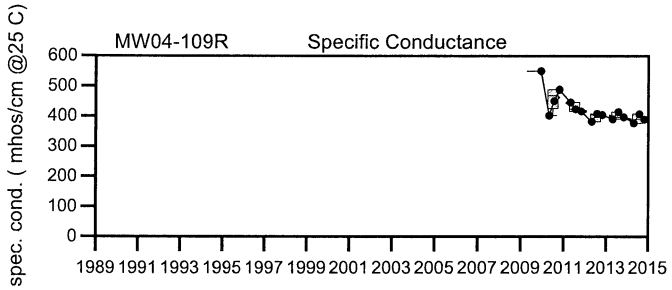
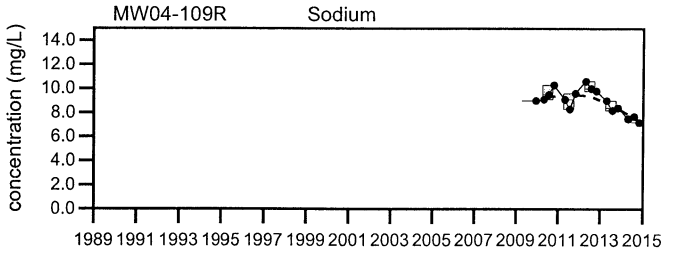
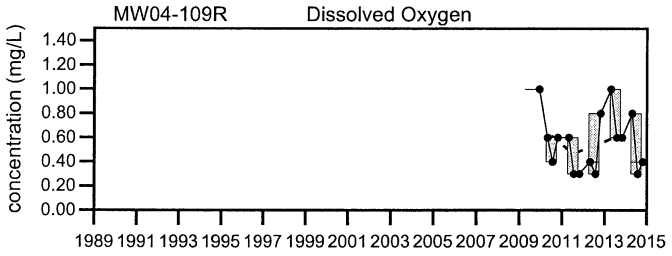
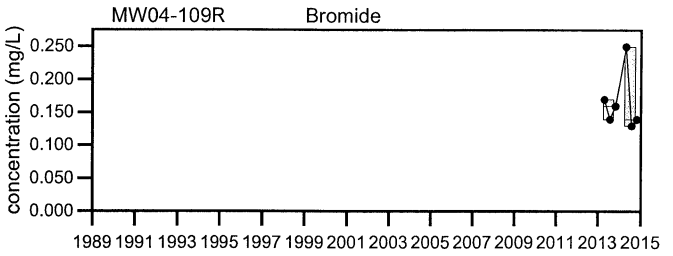
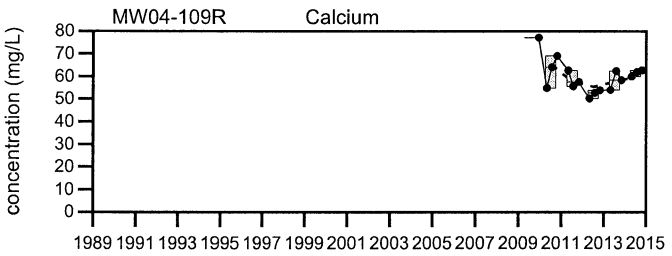
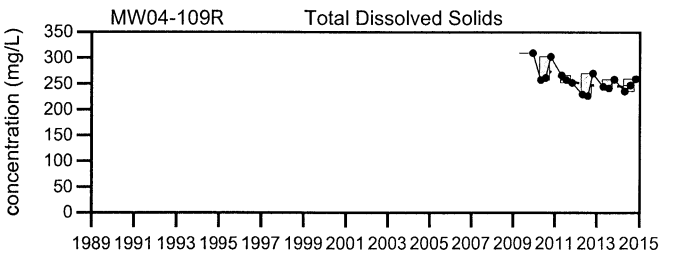


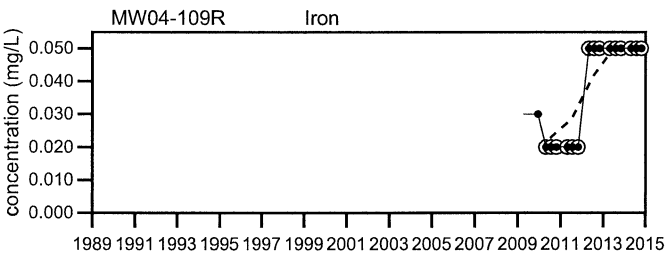


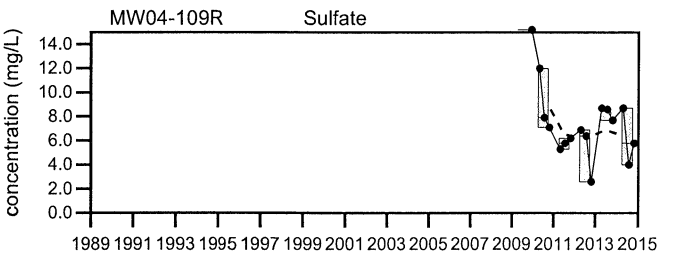


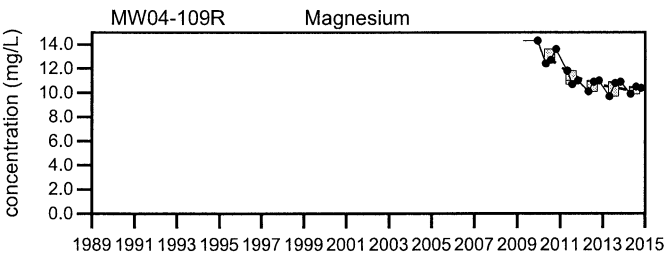


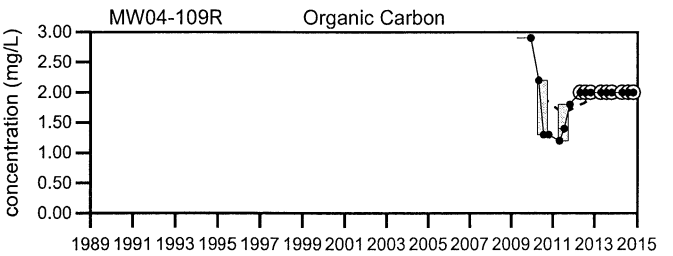


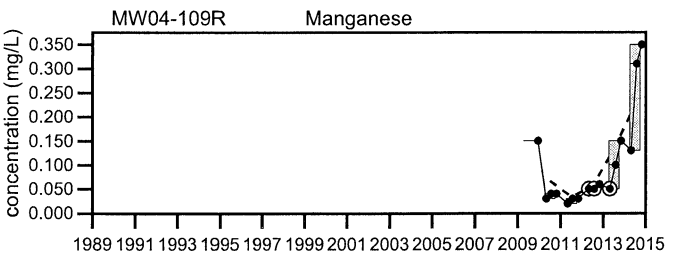


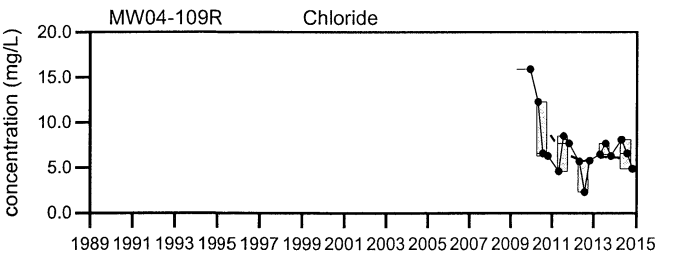


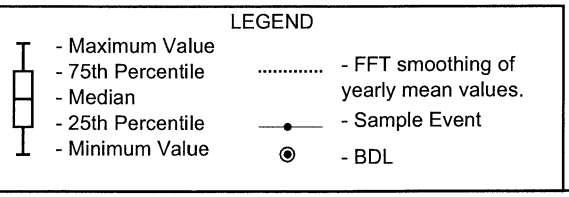












Juniper Ridge Landfill

MW04-109R

Sevee & Maher Engineers, Inc.

MW09-901

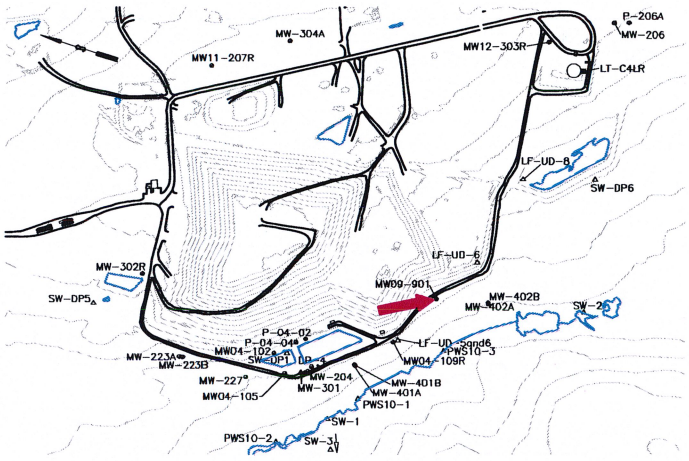
Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW09-901 is located to the south of Cell #5 and detention pond #2 of the expansion landfill. This well monitors water quality within the overburden downgradient of the landfill.

Screen Interval:	**15 ft. to 20 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**12/08/2009**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**



Chemical Summary

	2014				Historical			
Indicator Parameters	Q1	Q2	Q3	Q4	Min	Max	Mean	SE	n
Water Level Elevation (Feet)		157.03	155.79	155.4	154.3	to 157.15	160	± 0.26	13
Dissolved Oxygen (mg/L)		↑ 5	4	1	0.6	to 4	2.2	± 0.3	13
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to 0.1 U	0.1	± 0	3
Specific Conductance (µmhos/cm @25°C)		231	208	266	178	to 300	230	± 12	13
pH (Standard Units)		7.4	7.7	7.6	7.3	to 8.4	7.9	± 0.1	13
Alkalinity (CaCO3) (field) (mg/L)		85	95	120	50	to 120	83	± 5.5	13
Arsenic (mg/L)		0.008	**0.012**	0.009	0.002 U	to 0.013	0.0072	± 0.000	13
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	to 0.0006	0.00039	± 6E-05	13
Calcium (mg/L)		21.8	28.5	↑ 33.4	18.8	to 29.6	23	± 1.1	13
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	to 0.18	0.049	± 0.01	13
Magnesium (mg/L)		6.2	7.7	↑ 8.9	5.4	to 8	6.3	± 0.21	13
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	to 0.39	0.075	± 0.03	13
Nickel (mg/L)		↑ 0.005 U	↑ 0.005 U	↑ 0.005 U	0.002 U	to 0.003	0.0035	± 0.000	13
Potassium (mg/L)		1.8	2.1	2.3	1.5	to 2.6	2	± 0.1	13
Sodium (mg/L)		5.6	7.7	13.1	4.9	to 17.4	7.4	± 0.98	13
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.3 U	to 0.52	0.33	± 0.02	13
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.1 U	to 0.3 U	0.19	± 0.03	13
Total Dissolved Solids (mg/L)		110	128	170	103	to 193	130	± 7.3	13
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	to 4	4	± 0	13
Sulfate (mg/L)		12.1	↓ 4.6	8.1	7	to 27.4	12	± 1.5	13
Bicarbonate (CaCO3) (mg/L)		83	96	↑ 132	75	to 110	90	± 3.3	13
Organic Carbon (mg/L)		↑ 2 U	↑ 2 U	↑ 2 U	0.7 U	to 1.9	1.5	± 0.16	13
Chemical Oxygen Demand (mg/L)		10 U	10 U	10 U	3 U	to 12	6.5	± 1	13
Chloride (mg/L)		2.7	1.8	3	1 U	to 5.1	2.4	± 0.33	13
Turbidity (field) (NTU)		1.5	0.8	↓ 0	0.1	to 10.1	2.1	± 0.73	13
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to 0.2 U	0.2	± 1E-09	13

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

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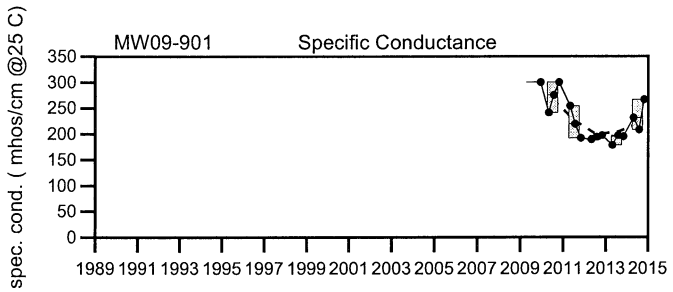
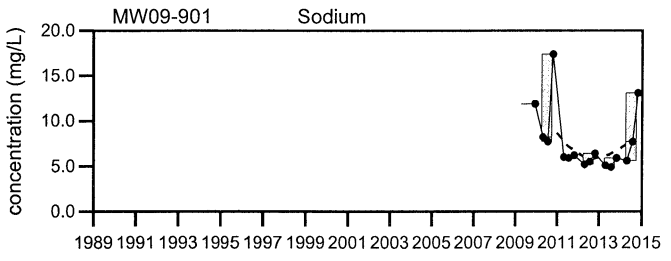
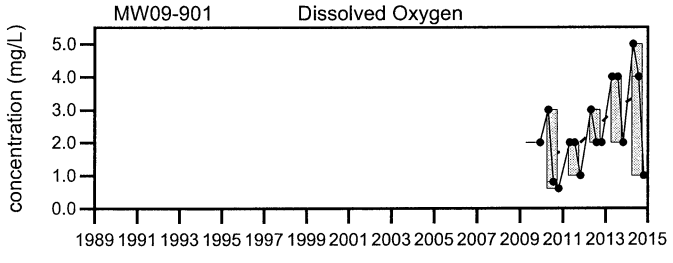
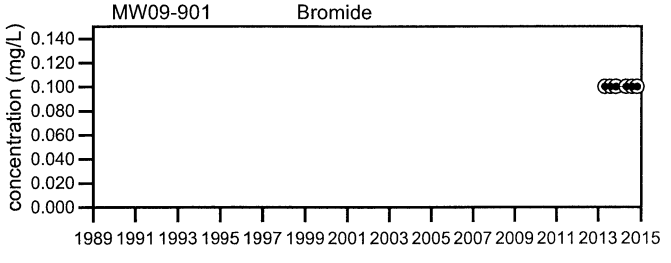
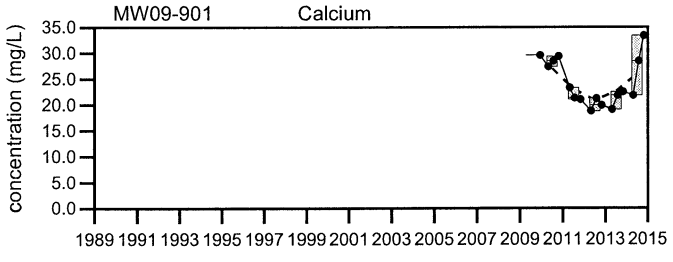
SME
Sevee & Maher Engineers, Inc.

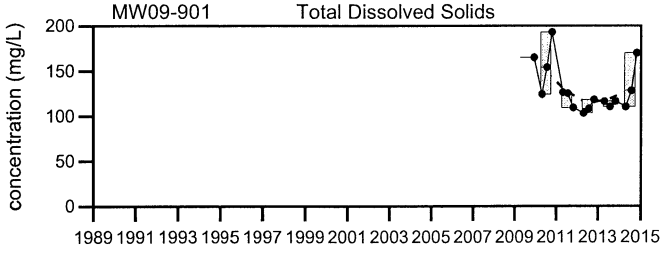


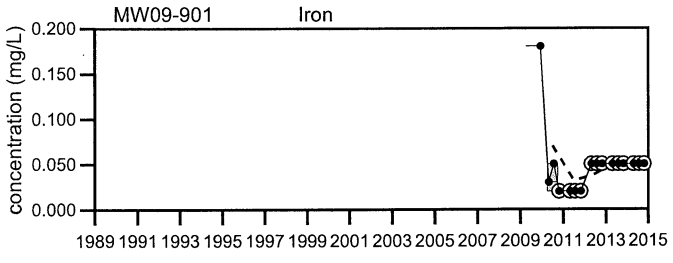


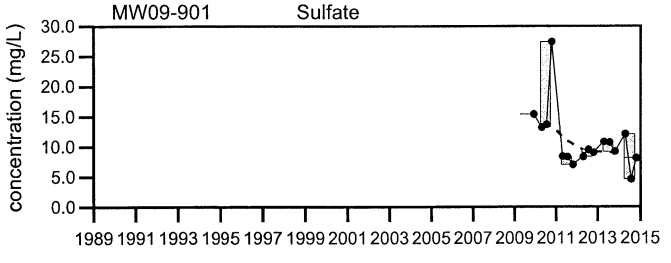


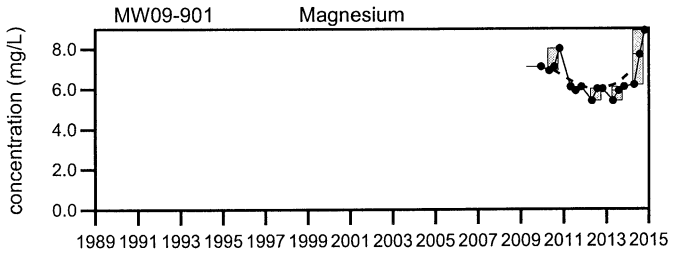


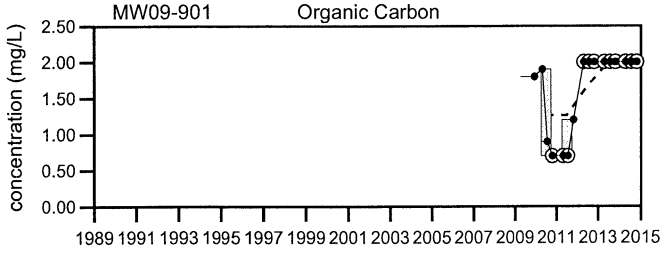


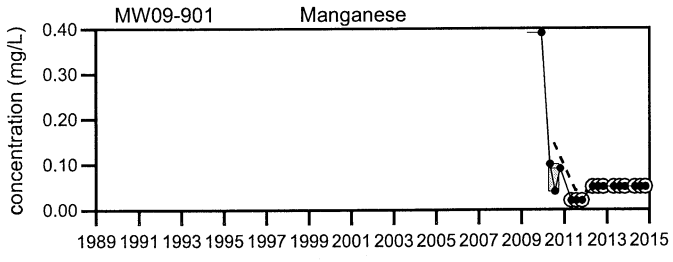


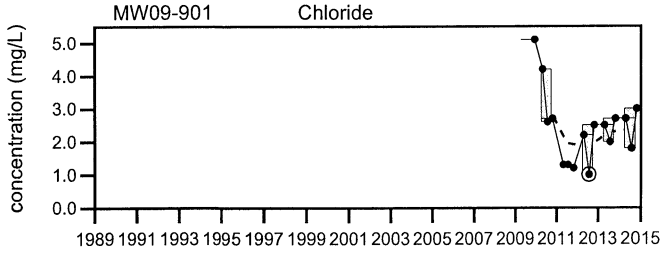


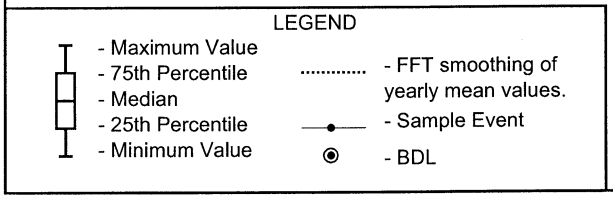












Juniper Ridge Landfill

MW09-901

Sevee & Maher Engineers, Inc.

MW11-207R

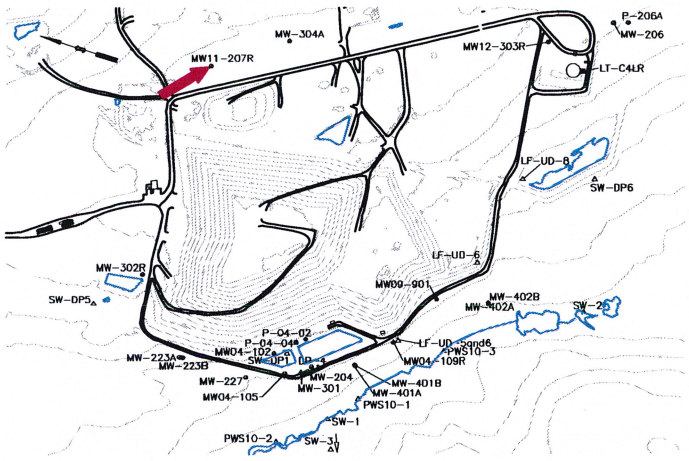
Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW11-207R monitors bedrock groundwater quality upgradient of the landfill. This well replaced MW-207.

Screen Interval:	**39.5 ft. to 44.5 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**07/20/2011**
Material Screened:	**Bedrock**
Well Condition:	**Good**
Sampling Method:	**Low Flow**



Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Water Level Elevation (Feet)		↑ 209.03	202.83	↓ 196.53	200.59	to 208.56	200	± 1	7
Dissolved Oxygen (mg/L)		6	6	5	5	to 8	5.9	± 0.35	8
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to 0.1 U	0.1	± 0	3
Specific Conductance (µmhos/cm @25°C)		86	89	89	82	to 103	87	± 2.4	8
pH (Standard Units)		↑ 8.5	↓ 7.6	7.9	7.7	to 8.2	7.9	± 0.06	8
Alkalinity (CaCO3) (field) (mg/L)		40	40	40	25	to 45	37	± 2.3	8
Arsenic (mg/L)		0.005	0.005	0.007	0.004	to 0.008	0.0055	± 0.000	8
Cadmium (mg/L)		↑ 0.0006 U	↑ 0.0006 U	↑ 0.0007	0.0002 U	to 0.0005	0.00054	± 5E-05	8
Calcium (mg/L)		↑ 9.4	9.2	9.1	7.9	to 9.3	8.5	± 0.17	8
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	to 0.05 U	0.043	± 0.005	8
Magnesium (mg/L)		3.1	2.8	2.8	2.6	to 3.3	2.9	± 0.07	8
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	to 0.05 U	0.043	± 0.005	8
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	to 0.005 U	0.0043	± 0.000	8
Potassium (mg/L)		0.5	0.4	0.4	0.4	to 0.5	0.48	± 0.02	8
Sodium (mg/L)		3.6	3.7	3.4	3.1	to 3.9	3.6	± 0.09	8
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.3 U	to 0.93	0.46	± 0.08	8
Nitrate (N) (mg/L)		↑ 0.3 U	↑ 0.3 U	↑ 0.3 U	0.2	to 0.2	0.28	± 0.02	8
Total Dissolved Solids (mg/L)		65	61	65	61	to 75	69	± 1.4	8
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	to 4 U	4	± 0	8
Sulfate (mg/L)		2 U	2 U	2 U	1	to 2.1	1.8	± 0.15	8
Bicarbonate (CaCO3) (mg/L)		41	40	↑ 44	36	to 42	39	± 0.65	8
Organic Carbon (mg/L)		2 U	2 U	2 U	0.7 U	to 2 U	1.7	± 0.21	8
Chemical Oxygen Demand (mg/L)		10 U	10 U	10 U	3 U	to 10 U	8.3	± 1.1	8
Chloride (mg/L)		↑ 4.4	2.6	3.2	1.3	to 3.8	2.3	± 0.29	8
Turbidity (field) (NTU)		0.4	1.1	0.7	0.2	to 3	1.6	± 0.33	8
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to 0.2 U	0.2	± 1E-09	8

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed !=the sampling location was damaged or destroyed.

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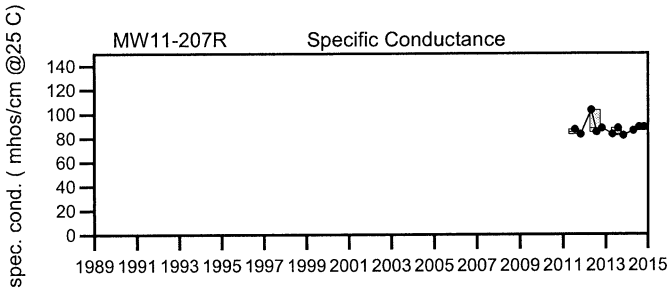
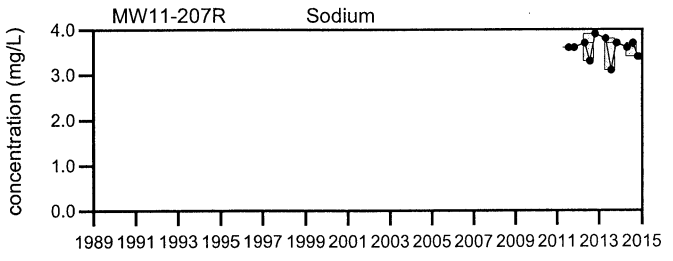
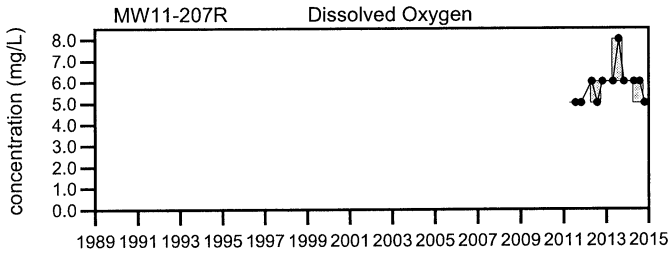
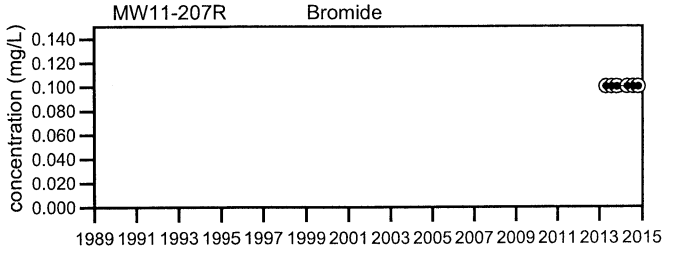
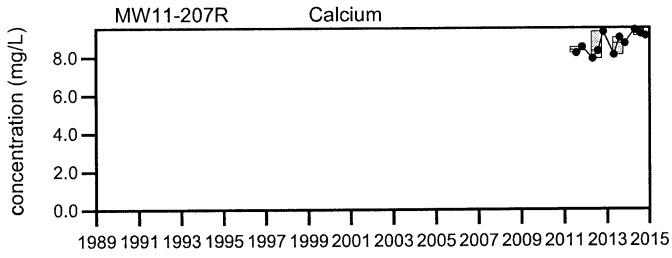
SME
Sowee & Maher Engineers, Inc.

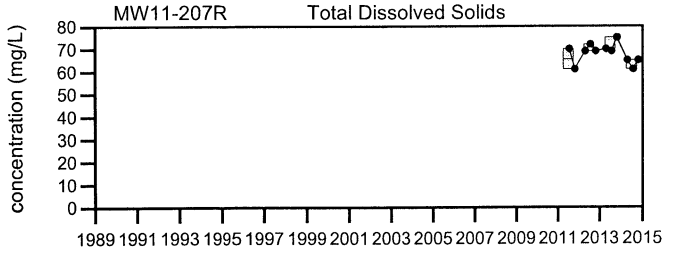


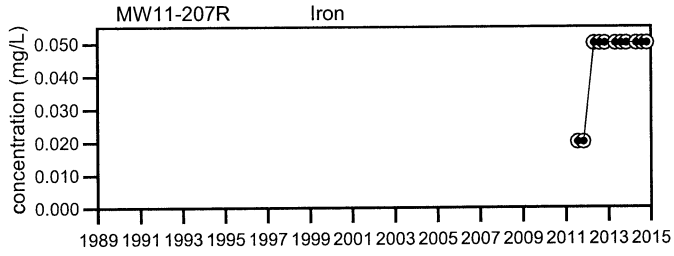


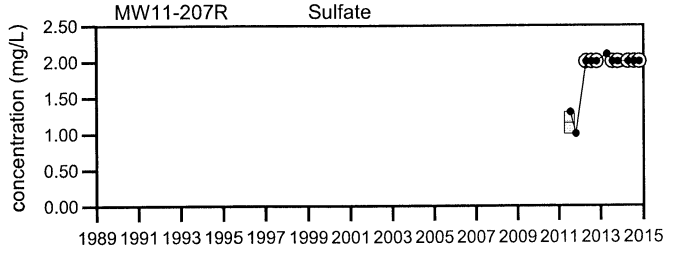


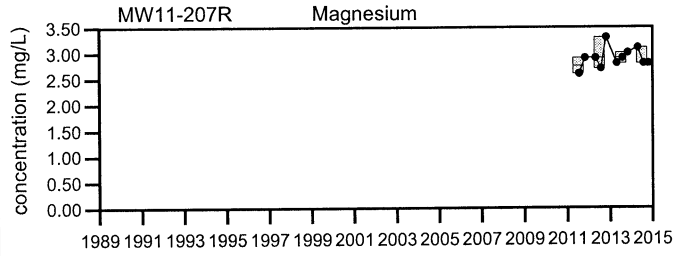


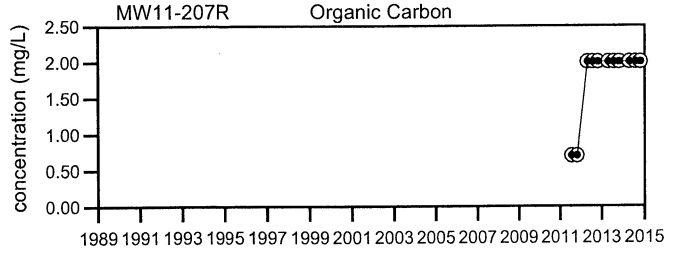


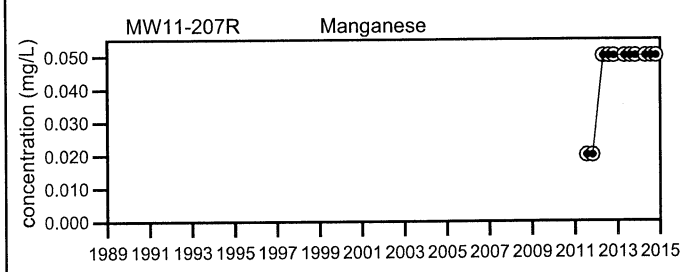


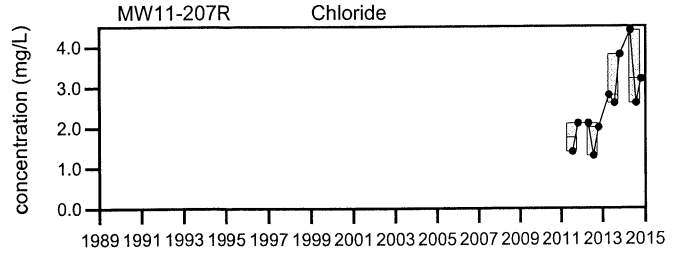


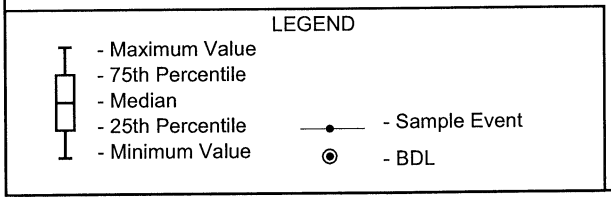












Juniper Ridge Landfill

MW11-207R

Sevee & Maher Engineers, Inc.

MW12-303R

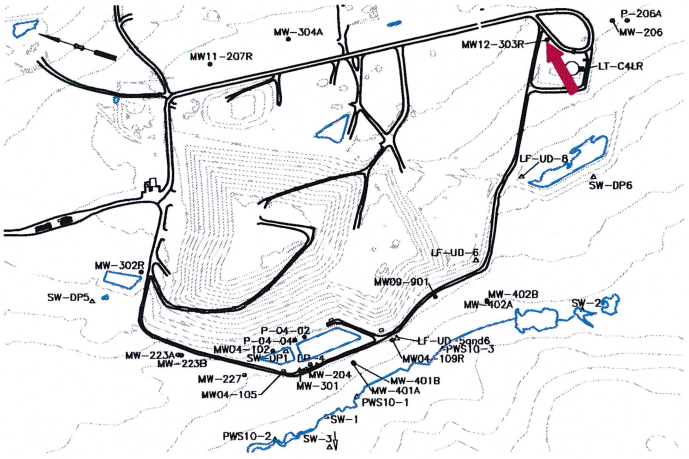
Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW12-303R was installed in September 2012 to replace MW-303. MW12-303R monitors the background water quality at the site upgradient of the landfill.

Screen Interval:	**30.4 ft. to 40.4 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**10/23/12**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**



Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Dissolved Oxygen (mg/L)		1	↓ 0.8	↓ 0.8	1	to 2	1.5	± 0.29	4
Bromide (mg/L)		0.38	↓ 0.15	↓ 0.21	0.22	to 0.42	0.31	± 0.06	3
Specific Conductance (µmhos/cm @25°C)		↑ 274	↑ 263	↑ 440	189	to 254	230	± 15	4
pH (Standard Units)		6.6	6.6	6.8	6.5	to 7	6.7	± 0.11	4
Alkalinity (CaCO3) (field) (mg/L)		120	↑ 160	↑ 180	80	to 140	110	± 12	4
Arsenic (mg/L)		**0.013**	0.01	**0.013**	0.005 U	to 0.015	0.0095	± 0.002	4
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0006 U	to 0.0006 U	0.0006	± 0	4
Calcium (mg/L)		↑ 26.5	↑ 26.4	↑ 28	16.6	to 24.3	21	± 1.7	4
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.05 U	to 0.1	0.063	± 0.01	4
Magnesium (mg/L)		10.3	10.3	↑ 10.9	7.8	to 10.3	9.4	± 0.56	4
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.05 U	to 0.32	0.12	± 0.07	4
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.005 U	to 0.005 U	0.005	± 0	4
Potassium (mg/L)		1.6	1.5	↓ 1.4	1.5	to 2.1	1.7	± 0.14	4
Sodium (mg/L)		↑ 18.2	9.5	↑ **46.8**	8.8	to 15.9	11	± 1.6	4
Total Kjeldahl Nitrogen (mg/L)		0.5 U	↑ 0.9	0.5 U	0.3 U	to 0.673	0.44	± 0.09	4
Nitrate (N) (mg/L)		0.3 U	0.3	0.3 U	0.3 U	to 0.5	0.4	± 0.06	4
Total Dissolved Solids (mg/L)		162	157	↑ 266	143	to 195	160	± 11	4
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	to 4 U	4	± 0	4
Sulfate (mg/L)		6.3	↓ 2 U	5.5	2.8	to 7.6	4.7	± 1	4
Bicarbonate (CaCO3) (mg/L)		↑ 126	↑ 115	↑ 162	92	to 114	110	± 5.2	4
Organic Carbon (mg/L)		2 U	2 U	2 U	2 U	to 2 U	2	± 0	4
Chemical Oxygen Demand (mg/L)		10 U	↑ 12	10 U	10 U	to 10 U	10	± 0	4
Chloride (mg/L)		↑ 15.1	↑ 9.6	↑ 48.3	4.9	to 8.4	7	± 0.79	4
Turbidity (field) (NTU)		↓ 0.6	↓ 0.6	1	0.9	to 9.3	3.7	± 1.9	4
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to 0.2 U	0.2	± 0	4

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed !!= the sampling location was damaged or destroyed.

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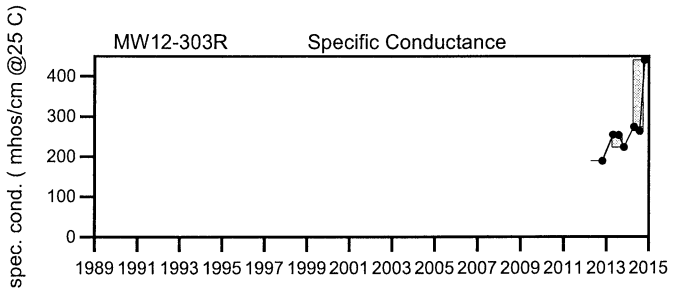
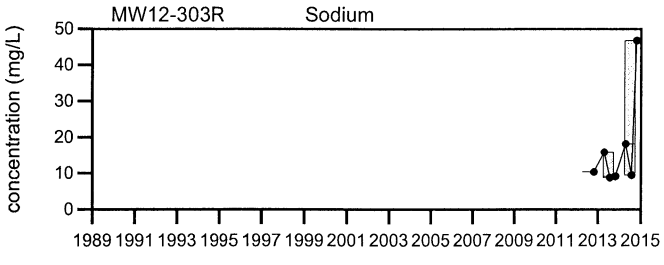
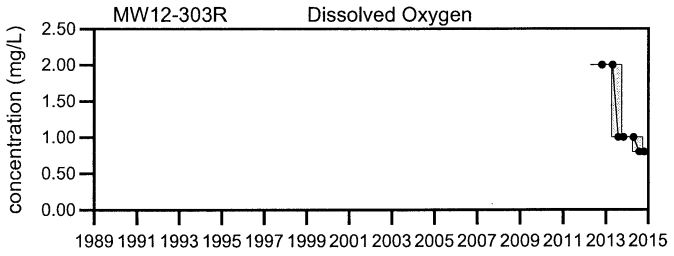
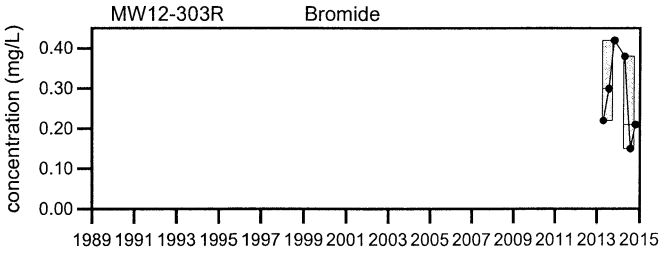
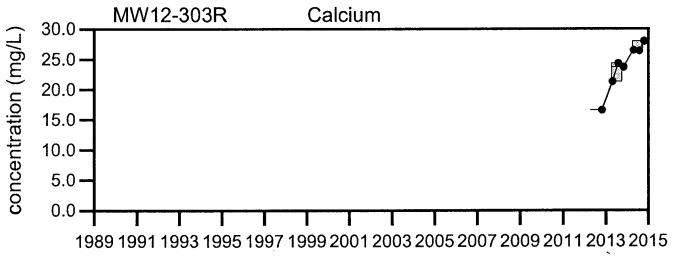
SME
Sevee & Maher Engineers, Inc.

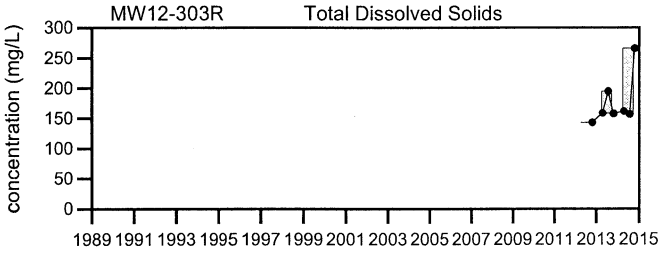


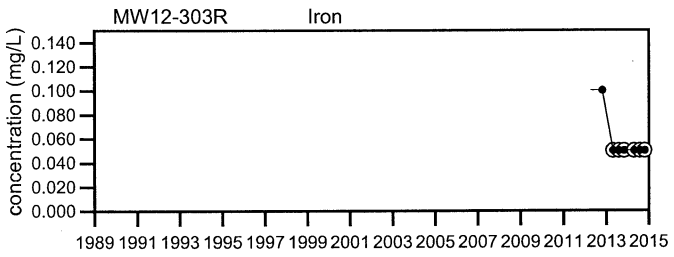


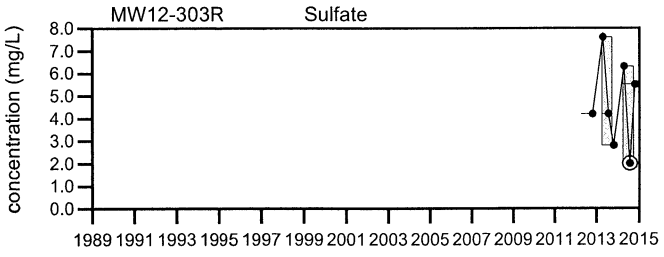


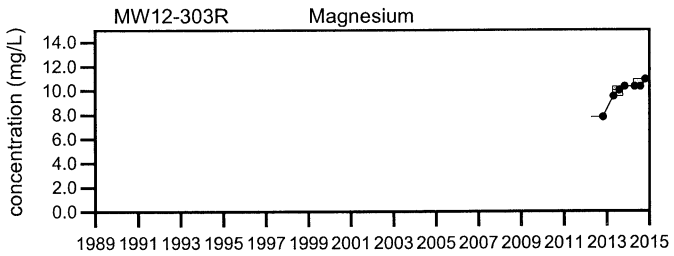


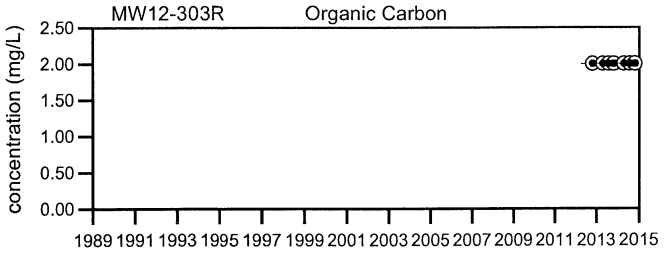


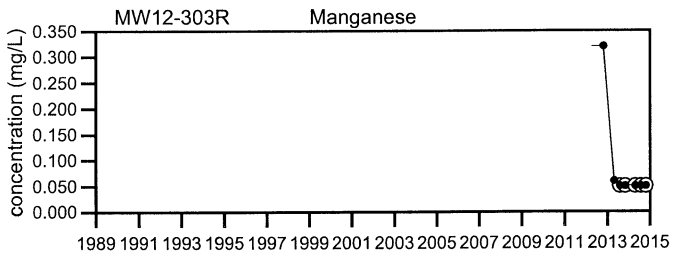


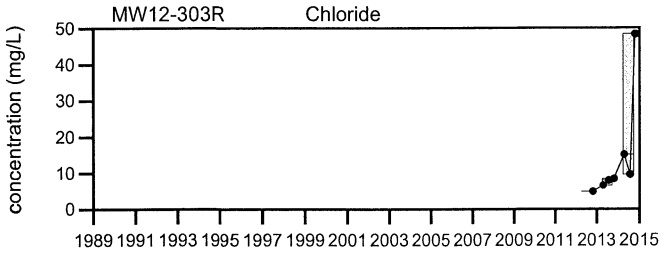


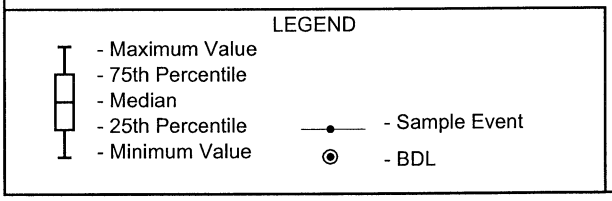












Juniper Ridge Landfill

MW12-303R

Sevee & Maher Engineers, Inc.

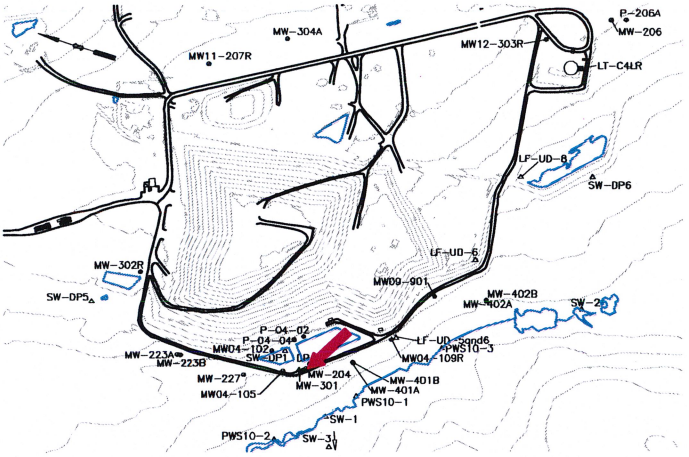
MW-204

Juniper Ridge Landfill

three wells field only 2014

Well Description

MW-204 monitors the overburden water quality downgradient from the landfill.



Screen Interval:	**13.8 ft. to 18.8 ft.**
Sampled:	**1 Time Annually(field parameters only)**
Sampled Since:	**11/13/90**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

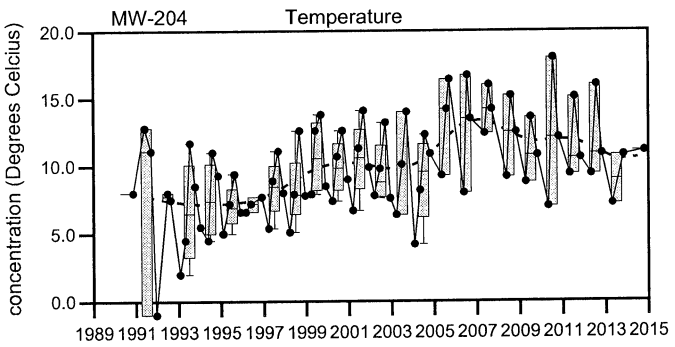
	2014				Historical				
Indicator Parameters	Q1	Q2	Q3	Q4	Min	Max	Mean	SE	n
Temperature (Degrees Celcius)				11.1	-1	to 18	9.8	± 0.4	78
Water Level Elevation (Feet)				155.3	150.53	to 161.5	160	± 0.23	75
Corrected Eh (mV)				428	35.2	to 491	280	± 17	40
Dissolved Oxygen (mg/L)				0.4	0.4	to 5.2	1.6	± 0.14	56
Alkalinity (CaCO3) (field) (mg/L)				75	50	to 140	94	± 4.4	29
Specific Conductance (µmhos/cm @25°C)				192	100	to 340	190	± 6	78
pH (Standard Units)				6.3	5.7	to 9.2	6.8	± 0.07	78
Turbidity (field) (NTU)				0.4	0	to 31	2.7	± 0.8	55

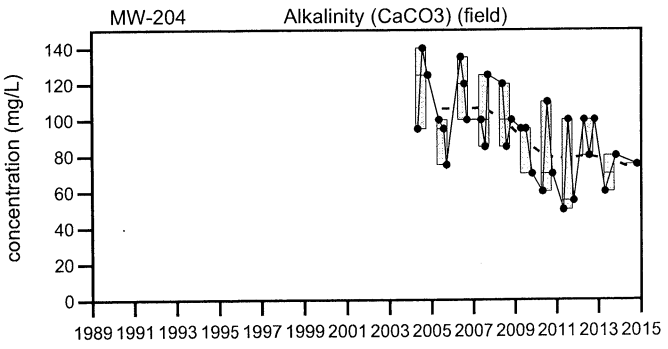
underlined/bold - values exceed a regulatory standard listed below.

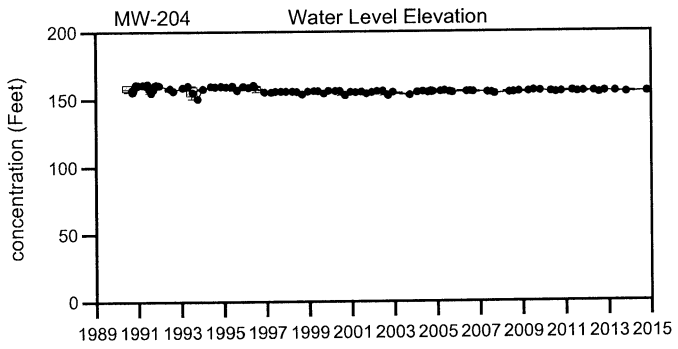
↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

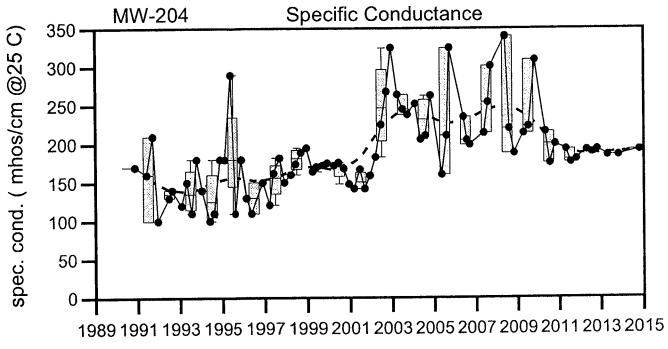
Comments

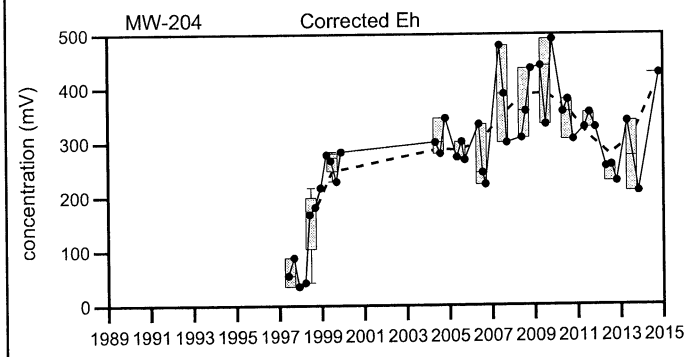
Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

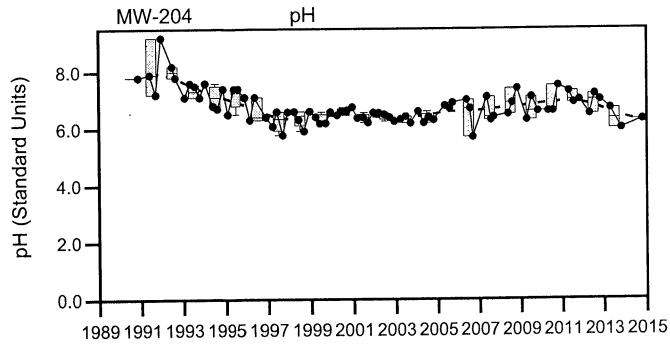


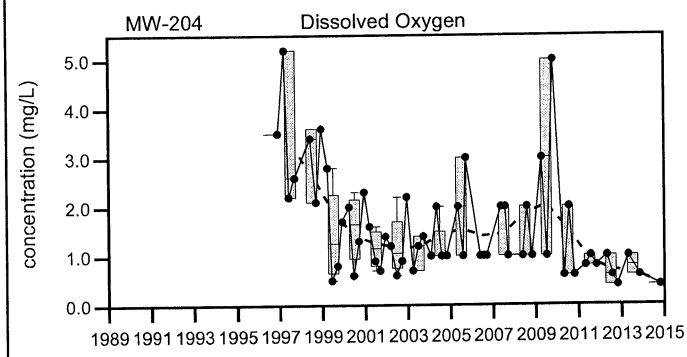


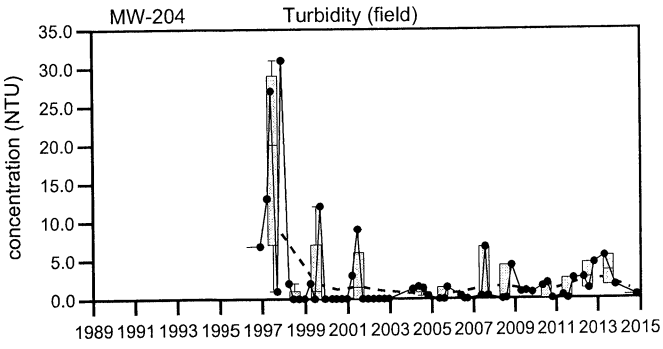


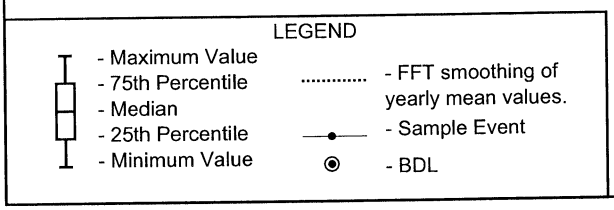












Juniper Ridge Landfill

MW-204

Sevee & Maher Engineers, Inc.

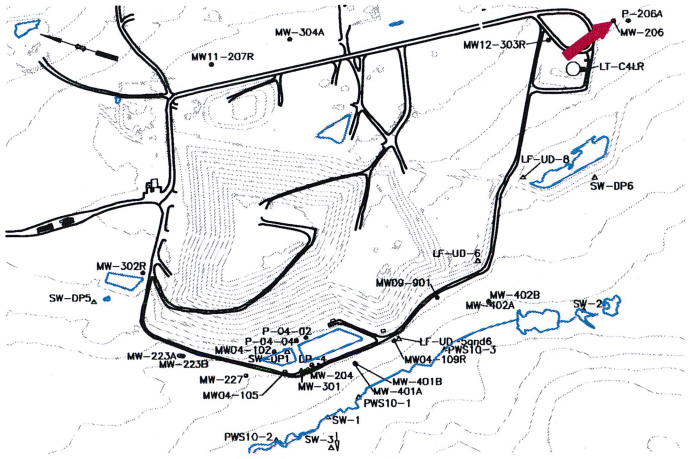
MW-206

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW-206 monitors overburden water quality upgradient of the landfill.



Screen Interval:	**15 ft. to 20 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**04/27/93**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Water Level Elevation (Feet)		199.97	197.72	196.87	186.1	201.59	200	0.43	67
Dissolved Oxygen (mg/L)		5	5	6	2	10.9	6.6	0.28	56
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1	0	3
Specific Conductance (µmhos/cm @25°C)		135	170	142	89	187	140	2.3	70
pH (Standard Units)		8.4	7.3	8.3	6.2	8.6	7.8	0.06	70
Alkalinity (CaCO3) (field) (mg/L)		60	70	65	30	125	76	3.5	30
Arsenic (mg/L)		0.007	0.01	**0.014**	0.001	0.015	0.0064	0.000	30
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	0.0011	0.001	0.000	32
Calcium (mg/L)		16.3	16.2	16.3	13	27.2	16	0.27	57
Iron (mg/L)		0.08	0.05 U	0.05 U	0.012	1.2	0.15	0.03	63
Magnesium (mg/L)		4.8	4.5	4.3	2.7	6.9	4.5	0.08	57
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.003	0.32	0.031	0.005	63
Nickel (mg/L)		↑ 0.005 U	↑ 0.005 U	↑ 0.005 U	0.002 U	0.003	0.0028	0.000	27
Potassium (mg/L)		0.8	0.7	0.7	0.3	2.5	0.9	0.07	30
Sodium (mg/L)		4.8	4.7	4.3	3.7	25	5.8	0.33	63
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.15 U	2.4	0.64	0.11	35
Nitrate (N) (mg/L)		↑ 0.3 U	↑ 0.3 U	↑ 0.3 U	0.05 U	0.27	0.14	0.01	35
Total Dissolved Solids (mg/L)		83	83	91	30	190	89	3.2	63
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	12	4.8	0.36	30
Sulfate (mg/L)		2 U	2 U	2 U	0.2	4.6	2	0.17	63
Bicarbonate (CaCO3) (mg/L)		71	68	74	58	80	69	0.67	30
Organic Carbon (mg/L)		2 U	2 U	2 U	0.5 U	9	1.6	0.18	63
Chemical Oxygen Demand (mg/L)		10 U	10 U	10 U	2 U	23	7.1	0.6	63
Chloride (mg/L)		2.6	1.3	1.6	0.8	2.7	2.9	0.4	63
Turbidity (field) (NTU)		0.4	0.9	0.9	0	40	2.1	0.81	55
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2	6E-10	35

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

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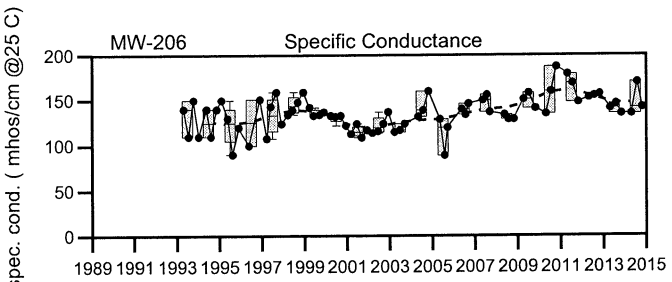
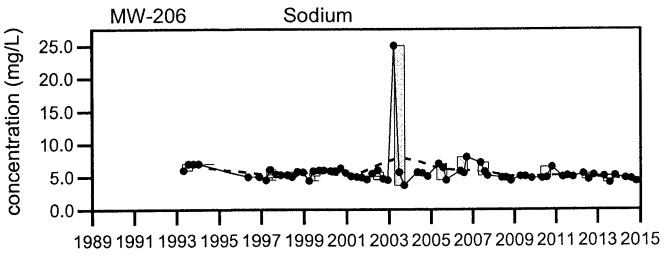
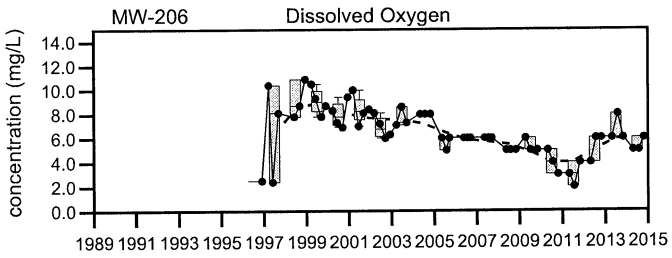
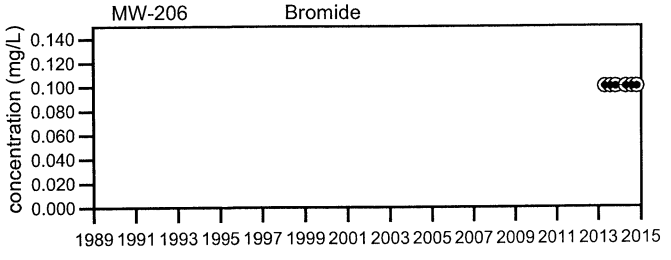
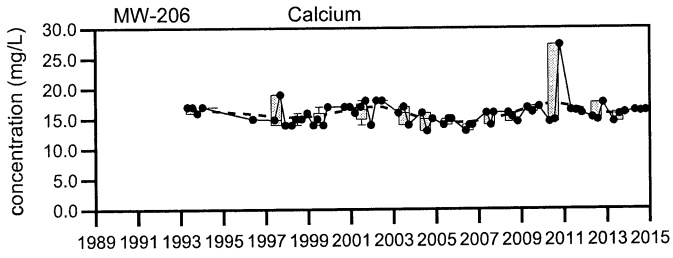
Sowee & Maher Engineers, Inc.

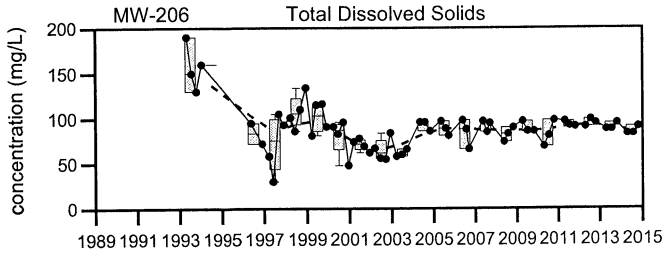


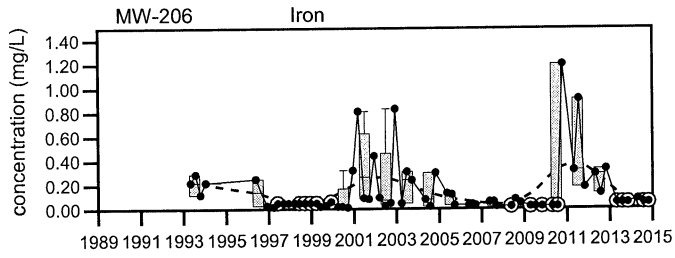


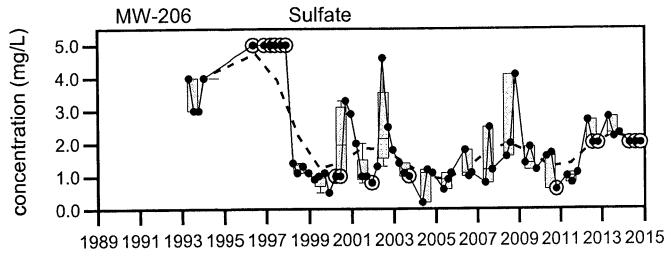


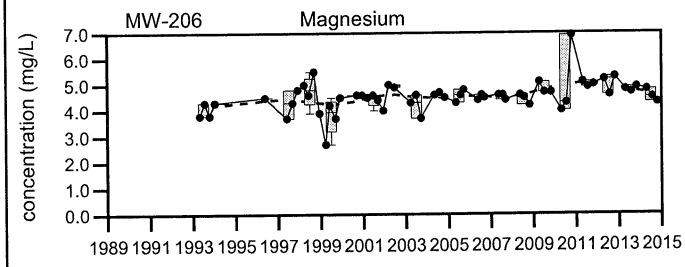


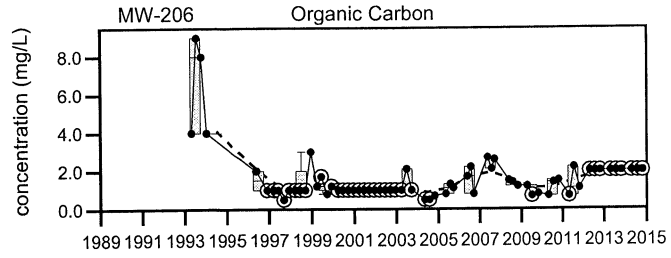


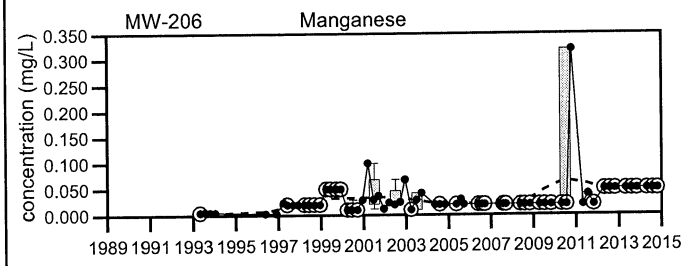


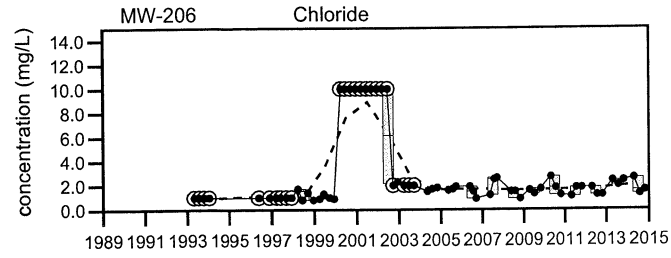












LEGEND

- Maximum Value
- 75th Percentile
- Median
- 25th Percentile
- Minimum Value
- FFT smoothing of yearly mean values.
- Sample Event
- BDL

Juniper Ridge Landfill

MW-206

Sevee & Maher Engineers, Inc.

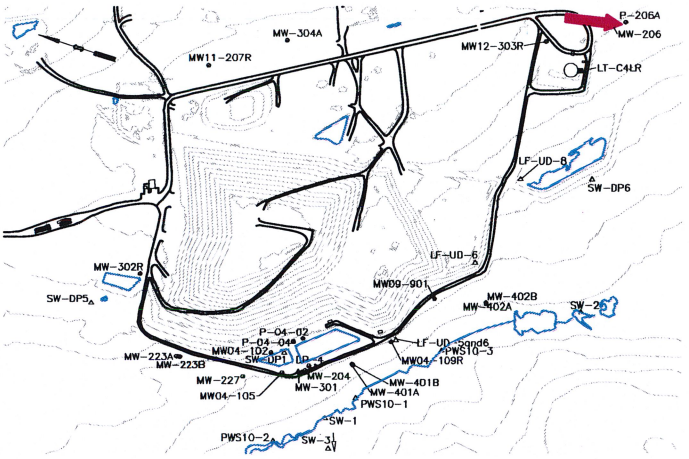
P-206A

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

P-206A monitors bedrock water quality upgradient of the landfill.



Screen Interval:	**85.5 ft. to 90.5 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**7/31/2013**
Material Screened:	**Bedrock**
Well Condition:	**Good**
Sampling Method:	**Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min		Historical Max	Historical Mean	±	SE	n
Water Level Elevation (Feet)		↑ 184.61	182.71	↓ 178.81	181.61	to	182.81	180	±	0.6	2
Dissolved Oxygen (mg/L)		3	↓ 2	3	3	to	4	3.5	±	0.5	2
Specific Conductance (µmhos/cm @25°C)		↑ 129	↑ 131	↑ 128	120	to	126	120	±	3	2
pH (Standard Units)		↑ 7.9	7.3	↑ 8.1	7.3	to	7.6	7.5	±	0.15	2
Alkalinity (CaCO3) (field) (mg/L)		↑ 60	↑ 60	↑ 55	50	to	50	50	±	0	2
Arsenic (mg/L)		↓ 0.008	↓ 0.008	↓ 0.009	0.01	to	0.01	0.01	±	0	1
Cadmium (mg/L)		↑ **0.0015**	↑ **0.0058**	0.0006 U	0.0006 U	to	0.0006 U	0.0006	±	0	1
Calcium (mg/L)		↑ 11.7	↑ 13.2	↑ 11.9	11.1	to	11.1	11	±	0	1
Iron (mg/L)		↑ **10.3**	↑ **16.8**	↑ 4.6	4.26	to	4.26	4.3	±	0	1
Magnesium (mg/L)		↑ 3.8	↑ 4	↓ 3.2	3.5	to	3.5	3.5	±	0	1
Manganese (mg/L)		↑ 0.25	↑ 0.31	↓ 0.15	0.2	to	0.2	0.2	±	0	1
Nickel (mg/L)		↑ 0.009	↑ 0.018	0.005 U	0.005 U	to	0.005 U	0.005	±	0	1
Potassium (mg/L)		↑ 1.6	1.3	↓ 0.9	1.3	to	1.3	1.3	±	0	1
Sodium (mg/L)		8.4	↓ 7.6	↓ 7.3	8.4	to	8.4	8.4	±	0	1
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.3 U	to	0.3 U	0.3	±	0	1
Sulfate (mg/L)		2 U	2 U	2 U	2 U	to	2 U	2	±	0	1
Chloride (mg/L)		↑ 6.2	↓ 3.3	↓ 3.6	4.3	to	4.3	4.3	±	0	1
Turbidity (field) (NTU)		8.6	↓ 5.4	↓ 1.2	8.1	to	9.3	8.7	±	0.6	2

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

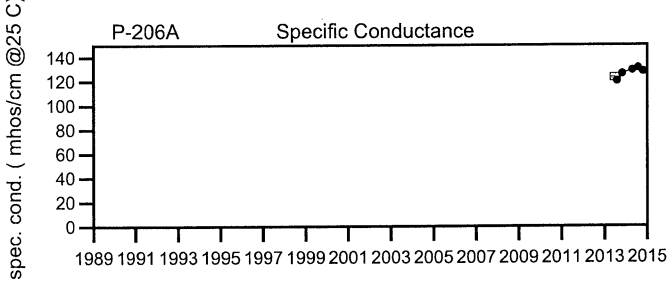
↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

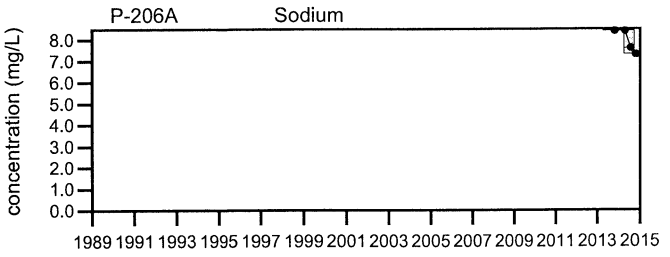
Comments

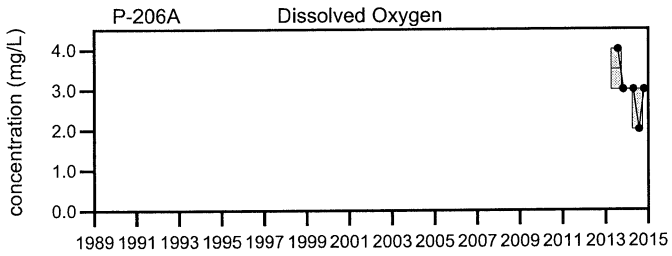
Q3= JULY Q4= OCTOBER

U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed HD= water above pipe invert

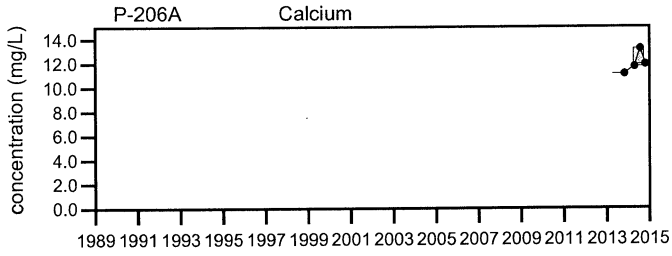
SME Sevee & Maher Engineers, Inc.







No data for Bromide at P-206A



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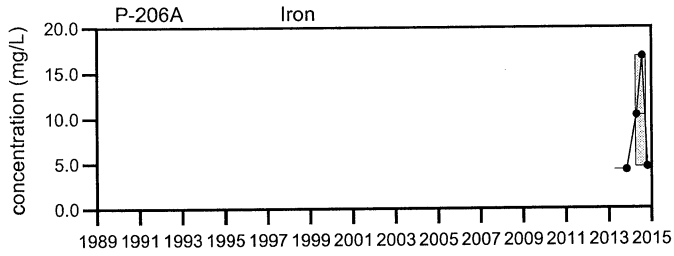
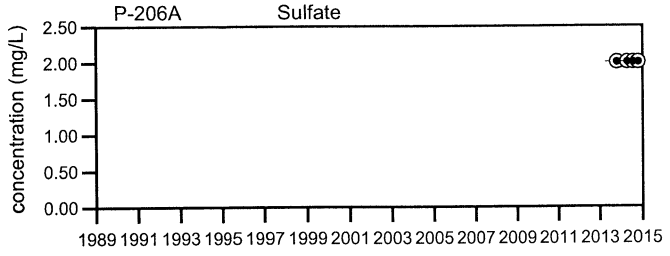
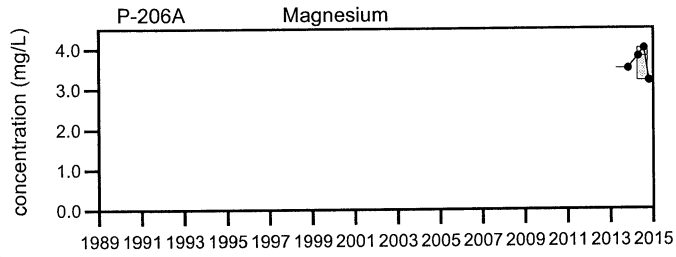
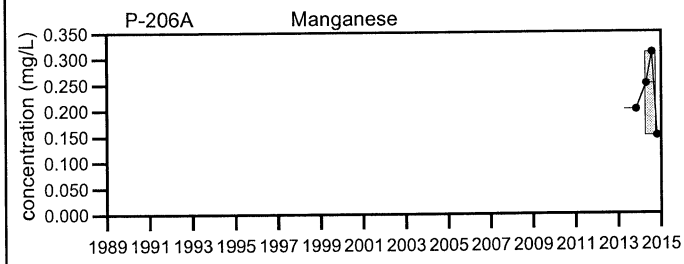
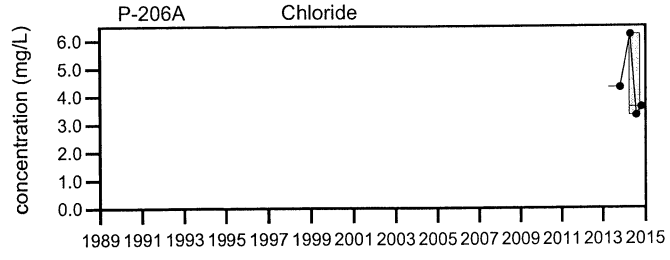


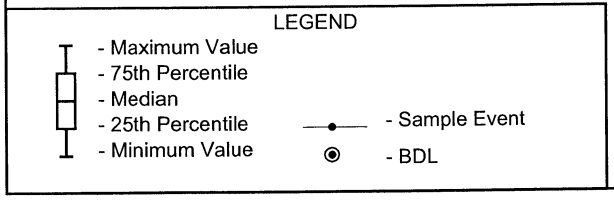




No data for Organic Carbon at P-206A







Juniper Ridge Landfill

P-206A

Sevee & Maher Engineers, Inc.

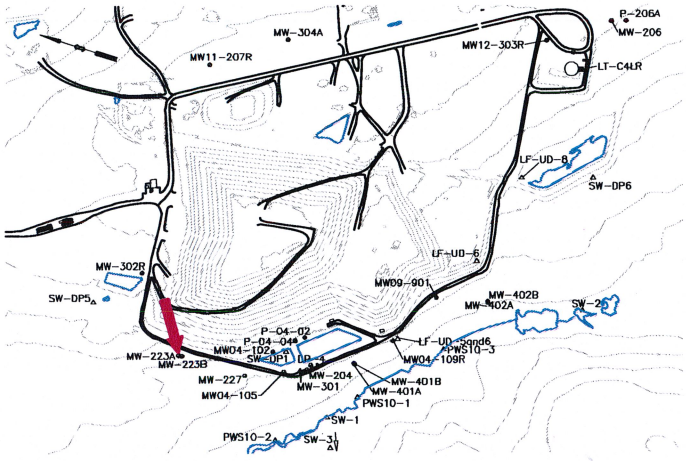
MW-223A

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW-223A monitors the bedrock water quality downgradient of the landfill.



Screen Interval:	**28 ft. to 33 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**11/12/90**
Material Screened:	**Bedrock**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min		Historical Max	Historical Mean	±	SE	n
Water Level Elevation (Feet)		176.14	175.39	174.11	169.83	to	176.31	170	±	0.14	69
Dissolved Oxygen (mg/L)		↓ 0.6	↓ 0.4	0.8	0.8	to	9.4	3.8	±	0.32	55
Bromide (mg/L)		↓ 0.1 U	0.15	0.16	0.15	to	0.22	0.19	±	0.02	3
Specific Conductance (µmhos/cm @25°C)		453	↑ 460	435	79	to	454	210	±	10	72
pH (Standard Units)		7.8	7.5	7.6	6.1	to	8.4	7.4	±	0.04	72
Alkalinity (CaCO3) (field) (mg/L)		200	200	200	65	to	200	110	±	6.9	31
Arsenic (mg/L)		↑ **0.014**	↑ **0.016**	0.007	0.001 U	to	0.013	0.0043	±	0.000	30
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	to	0.0006	0.0014	±	0.000	36
Calcium (mg/L)		↑ 78.7	↑ 77.2	73.2	23	to	74.1	35	±	1.8	60
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.005	to	120	1.9	±	1.9	64
Magnesium (mg/L)		8.5	8	7.8	2.3	to	9.1	4	±	0.21	60
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.001	to	4	0.083	±	0.06	64
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	to	0.008	0.003	±	0.000	27
Potassium (mg/L)		0.8	0.8	0.8	0.4	to	1.3	0.69	±	0.03	30
Sodium (mg/L)		4.5	4.5	4.5	1.8	to	9.8	3.5	±	0.12	64
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5	0.5 U	0.15 U	to	0.8	0.35	±	0.02	39
Nitrate (N) (mg/L)		0.4	0.4	0.3 U	0.05 U	to	0.5	0.17	±	0.02	39
Total Dissolved Solids (mg/L)		↑ 288	↑ 288	↑ 296	36	to	278	140	±	7.1	64
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	to	4 U	4	±	0	30
Sulfate (mg/L)		↑ 12.1	4.4	8	2.9	to	9.3	5.2	±	0.17	64
Bicarbonate (CaCO3) (mg/L)		↑ 186	176	↑ 178	86	to	176	120	±	5.4	30
Organic Carbon (mg/L)		2 U	2 U	2 U	0.5 U	to	3.4	1.2	±	0.08	64
Chemical Oxygen Demand (mg/L)		10 U	10 U	10 U	2 U	to	18	6.4	±	0.53	64
Chloride (mg/L)		↑ 57.6	36	32	1 U	to	45.2	8	±	1.2	64
Turbidity (field) (NTU)		0.3	0.5	0.8	0	to	999	23	±	19	53
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to	0.25	0.2	±	0.001	39

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

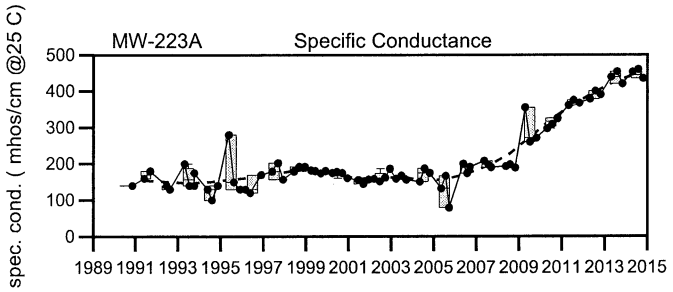
↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

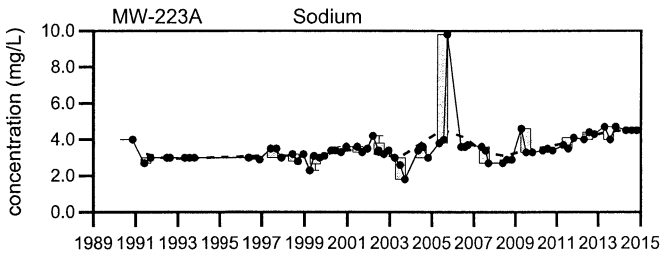
Comments

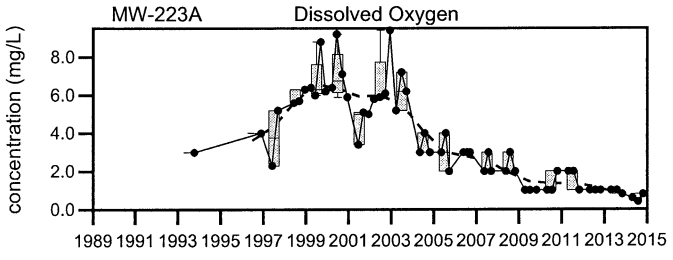
Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

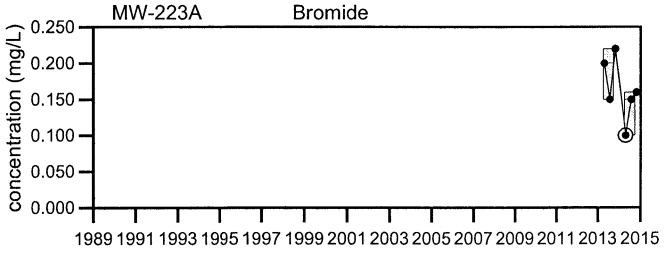
Data Group: 235
Printed: 3/24/2015 13:39

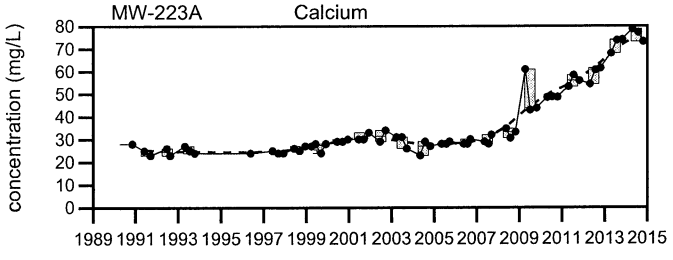
SME
Sevee & Maher Engineers, Inc.

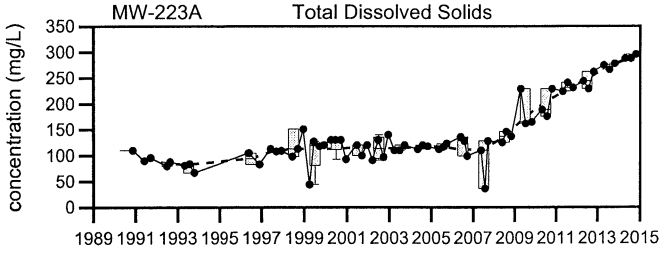


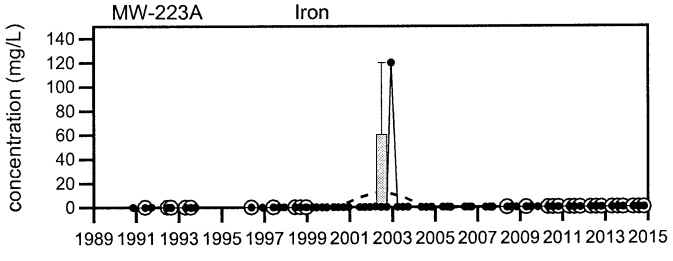


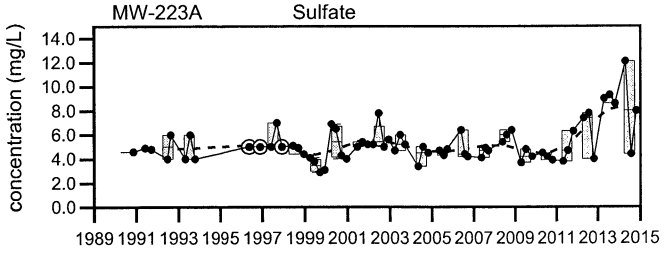


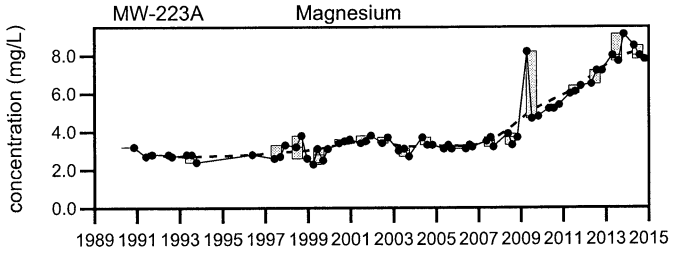


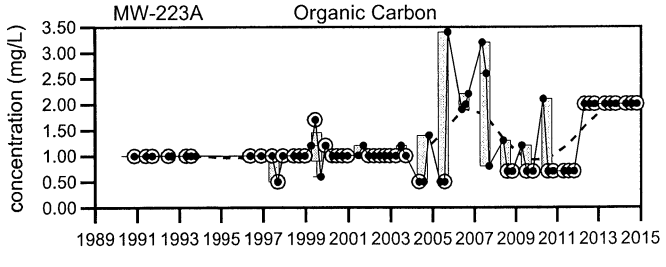


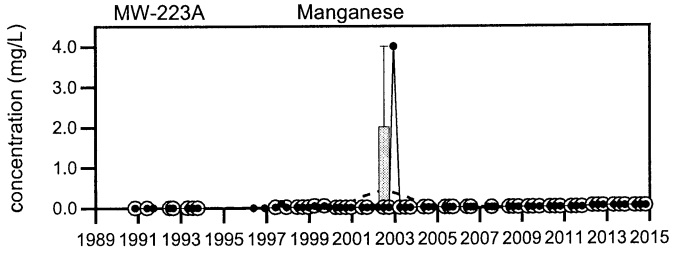


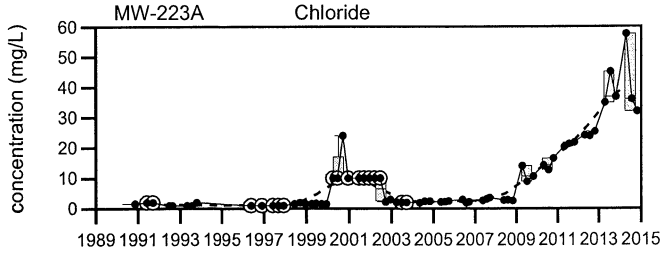


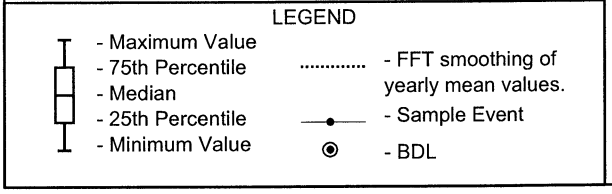












Juniper Ridge Landfill

MW-223A

Sevee & Maher Engineers, Inc.

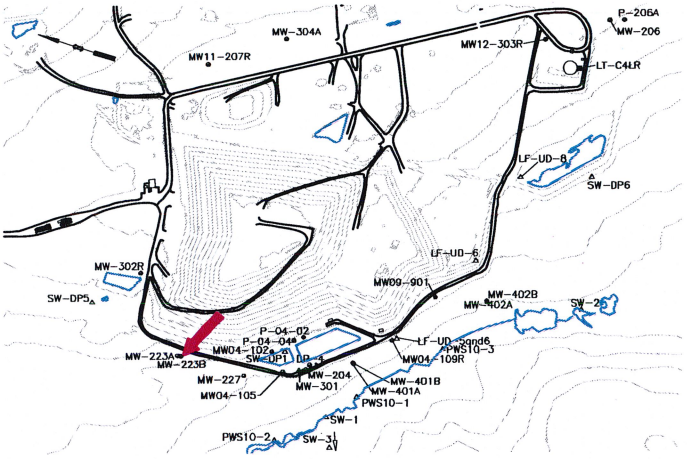
MW-223B

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW-223B monitors the overburden water quality downgradient of the landfill.



Screen Interval:	**12.6 ft. to 17.6 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**11/12/90**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min		Historical Max	Historical Mean	±	SE	n
Water Level Elevation (Feet)		173.93	173.23	172.43	169.03	to	175.24	170	±	0.13	68
Dissolved Oxygen (mg/L)		1	0.6	1	0.4	to	7.6	1.9	±	0.21	54
Bromide (mg/L)		↑ 4.13	0.18	0.15	0.03	to	0.2	0.12	±	0.03	5
Specific Conductance (µmhos/cm @25°C)		↑ 370	↑ 377	350	100	to	363	200	±	8.8	71
pH (Standard Units)		7.5	7.6	7.5	6.3	to	8.2	7.2	±	0.04	71
Alkalinity (CaCO3) (field) (mg/L)		160	160	160	60	to	180	100	±	5.3	30
Arsenic (mg/L)		**0.011**	↑ **0.014**	0.005 U	0.001 U	to	0.013	0.0044	±	0.000	30
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	to	0.0025	0.0014	±	0.000	38
Calcium (mg/L)		↑ 51.2	↑ 50.6	↑ 49.2	16	to	46.2	28	±	1.1	60
Iron (mg/L)		0.24	0.05 U	0.06	0.009	to	0.58	0.12	±	0.02	64
Magnesium (mg/L)		↑ 12.3	↑ 11.9	11	3.7	to	11.5	6.7	±	0.31	60
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.001 U	to	0.16	0.031	±	0.003	64
Nickel (mg/L)		↑ 0.005 U	↑ 0.005 U	↑ 0.005 U	0.002 U	to	0.004	0.0028	±	0.000	29
Potassium (mg/L)		0.8	0.8	0.8	0.3	to	2	0.77	±	0.06	30
Sodium (mg/L)		4.8	4.9	4.9	2.1	to	5.2	4	±	0.08	64
Total Kjeldahl Nitrogen (mg/L)		0.5 U	1.2	0.5 U	0.15 U	to	1.5	0.48	±	0.07	39
Nitrate (N) (mg/L)		0.3	0.4	0.3 U	0.05 U	to	0.5	0.18	±	0.02	39
Total Dissolved Solids (mg/L)		225	225	239	67	to	330	130	±	6.3	64
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	to	4	4	±	0	30
Sulfate (mg/L)		7.6	3	5.2	2.2	to	10	4.3	±	0.15	64
Bicarbonate (CaCO3) (mg/L)		135	133	135	92	to	140	110	±	2.6	30
Organic Carbon (mg/L)		2 U	2 U	2 U	0.5 U	to	8	1.6	±	0.15	64
Chemical Oxygen Demand (mg/L)		10 U	10 U	10 U	2 U	to	30	6.9	±	0.66	64
Chloride (mg/L)		↑ 55.7	34.8	31.6	1 U	to	50	8.2	±	1.3	64
Turbidity (field) (NTU)		0.6	0.7	1.1	0	to	83	2.5	±	1.6	52
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to	0.37	0.21	±	0.005	37

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

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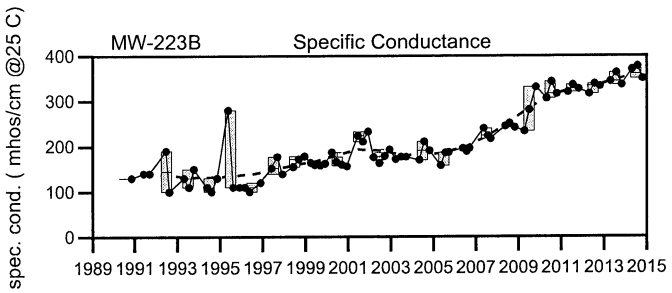
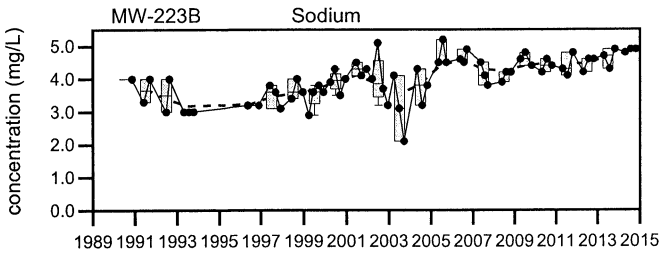
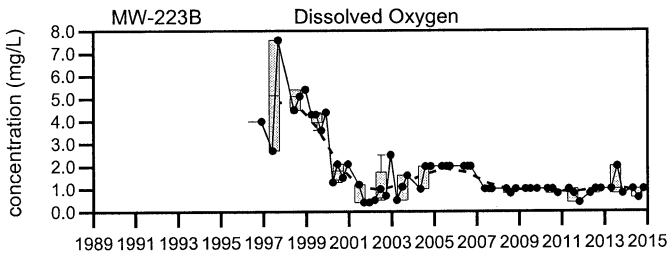
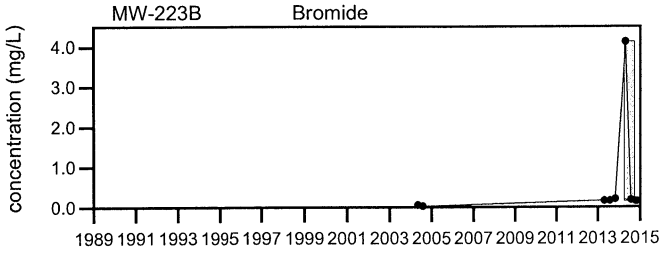
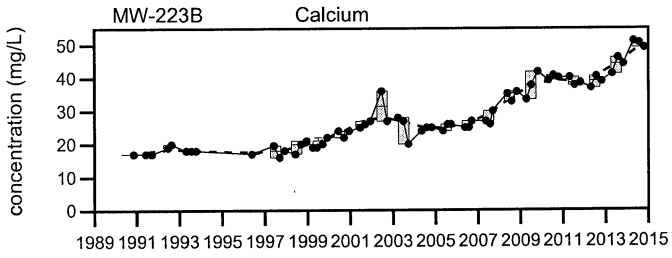
SME
Sewee & Maher Engineers, Inc.

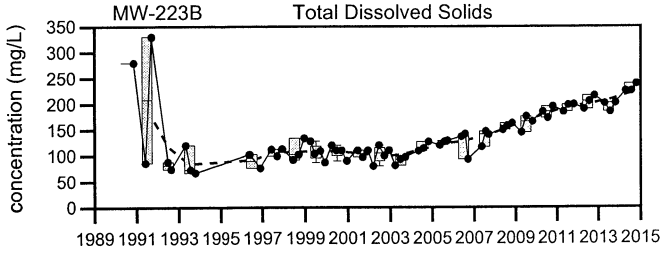


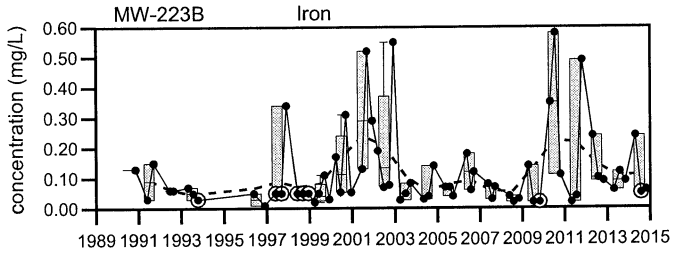


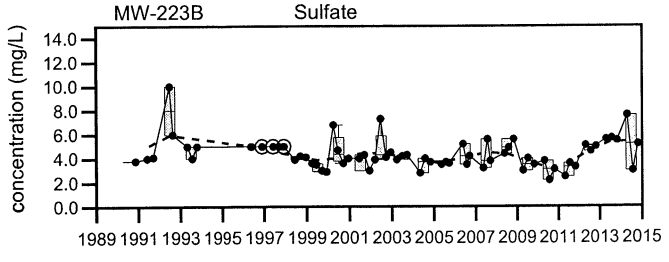


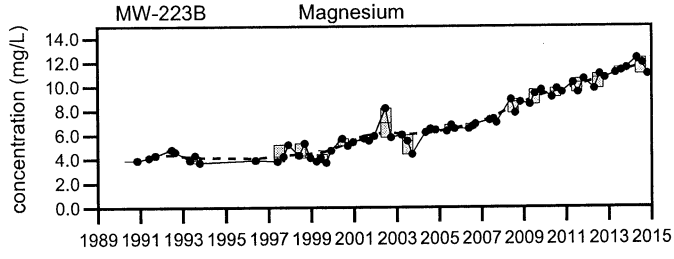


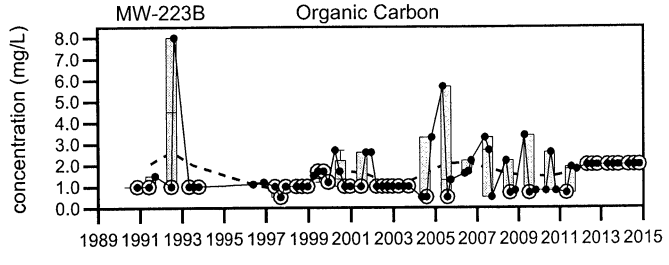


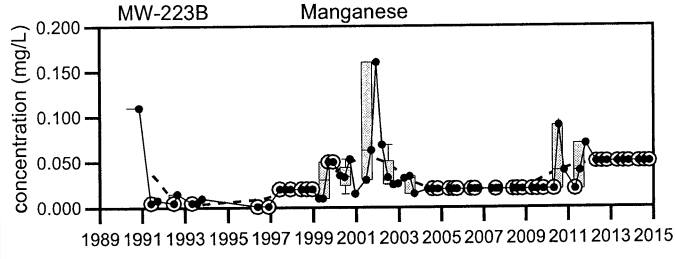


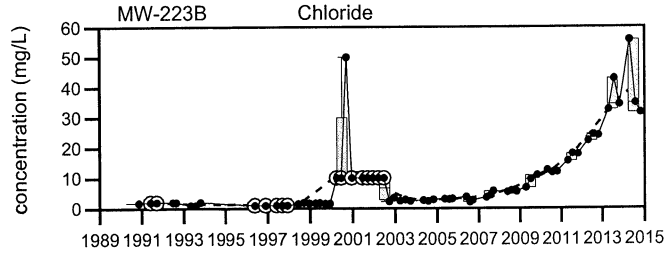


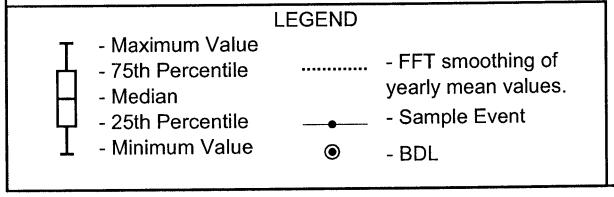












Juniper Ridge Landfill

MW-223B

Sevee & Maher Engineers, Inc.

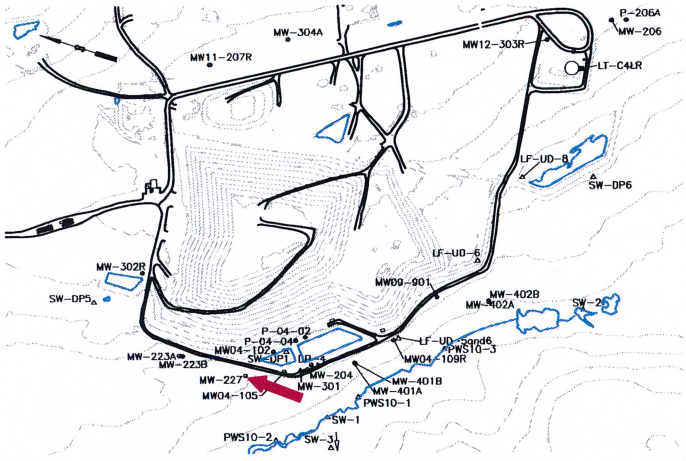
MW-227

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW-227 monitors water quality in the overburden downgradient of the landfill.



Screen Interval: **15 ft. to 20 ft.**

Sampled: **3 Times Annually**

Sampled Since: **11/13/90**

Material Screened: **Overburden**

Well Condition: **Good**

Sampling Method: **Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Mean	SE	n
Water Level Elevation (Feet)		160.03	159.8	159.63	149.5	161.09	160	± 0.27	70
Dissolved Oxygen (mg/L)		2	0.8	0.8	0.3	8.7	2.3	± 0.23	56
Bromide (mg/L)		0.1 U	0.1 U	↑ 0.16	0.1 U	0.1 U	0.1	± 0	3
Specific Conductance (µmhos/cm @25°C)		187	180	181	90	310	180	± 3.3	73
pH (Standard Units)		8.2	8.3	8.3	6.2	8.9	8	± 0.06	73
Alkalinity (CaCO3) (field) (mg/L)		70	75	85	50	150	83	± 4.4	30
Arsenic (mg/L)		**0.017**	**0.019**	↑ **0.021**	0.007	0.019	0.013	± 0.000	30
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0007	0.0002 U	0.0026	0.0016	± 0.000	37
Calcium (mg/L)		24.1	23.4	22.7	16	25	22	± 0.22	61
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.008	0.65	0.076	± 0.01	67
Magnesium (mg/L)		5.8	5.4	5.2	3.6	5.9	5.2	± 0.06	61
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.004	0.17	0.027	± 0.003	67
Nickel (mg/L)		↑ 0.005 U	↑ 0.005 U	↑ 0.005 U	0.002 U	0.004	0.0028	± 0.000	27
Potassium (mg/L)		1.2	1	1.1	0.6	1.6	1	± 0.03	30
Sodium (mg/L)		5.6	5	5.4	3.1	11	6.7	± 0.16	67
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.15 U	1	0.36	± 0.03	40
Nitrate (N) (mg/L)		↑ 0.3 U	↑ 0.3 U	↑ 0.3 U	0.05 U	0.2	0.12	± 0.01	40
Total Dissolved Solids (mg/L)		111	107	116	59	222	110	± 3.2	67
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	4	4	± 0	30
Sulfate (mg/L)		↑ 17.3	5.7	10.2	1.3	14.4	11	± 0.32	67
Bicarbonate (CaCO3) (mg/L)		84	84	81	75	89	79	± 0.54	30
Organic Carbon (mg/L)		2 U	2 U	2 U	0.5 U	42	2.4	± 0.65	67
Chemical Oxygen Demand (mg/L)		10 U	10 U	10 U	2 U	430	15	± 6.6	67
Chloride (mg/L)		2	1.3	1.4	1 U	22.9	3.2	± 0.47	67
Turbidity (field) (NTU)		0.2	1.3	1.2	0	962	19	± 18	54
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	0.45	0.21	± 0.007	40

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

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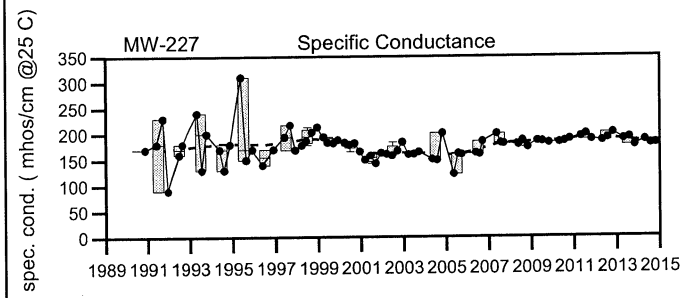
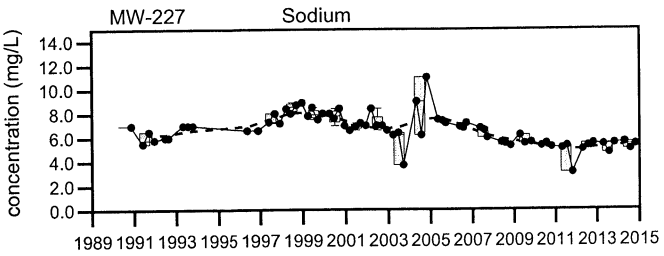
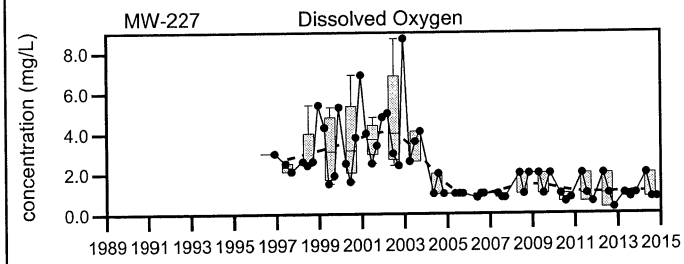
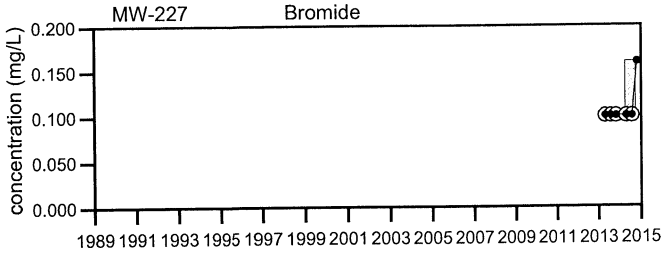
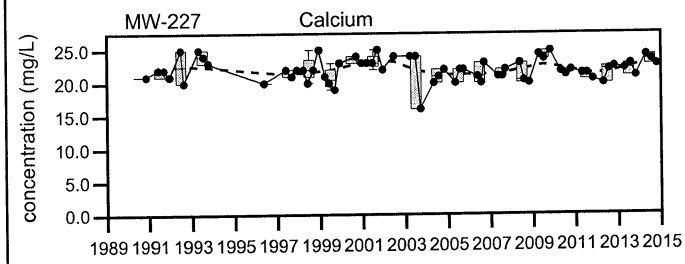
SME
Sevee & Maher Engineers, Inc.

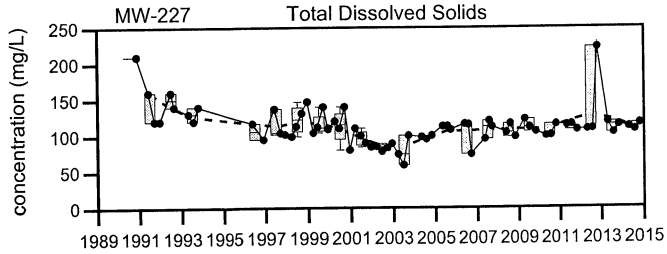


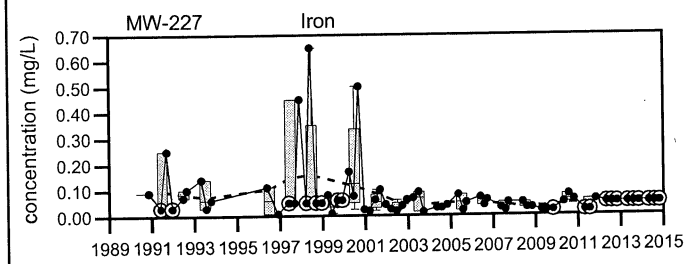


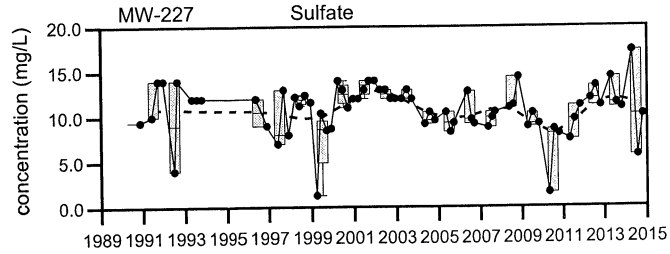


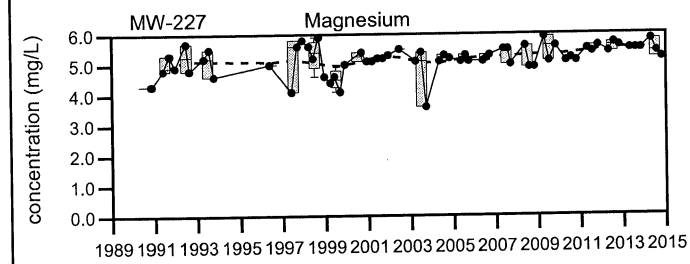


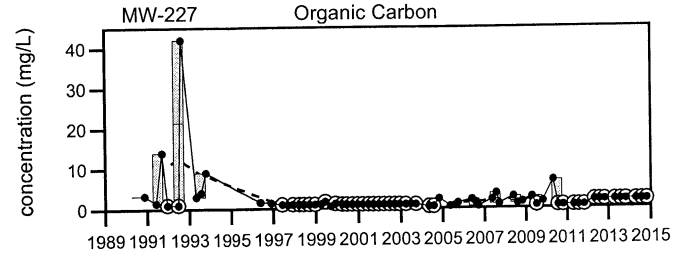


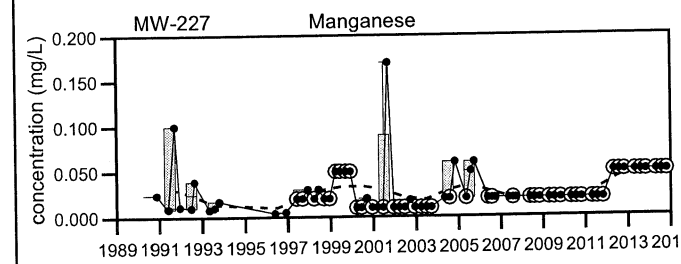


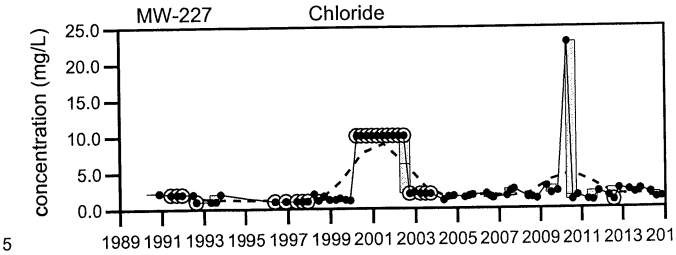












LEGEND

- Maximum Value
- 75th Percentile
- Median
- 25th Percentile
- Minimum Value
- FFT smoothing of yearly mean values.
- Sample Event
- BDL

Juniper Ridge Landfill

MW-227

Sevee & Maher Engineers, Inc.

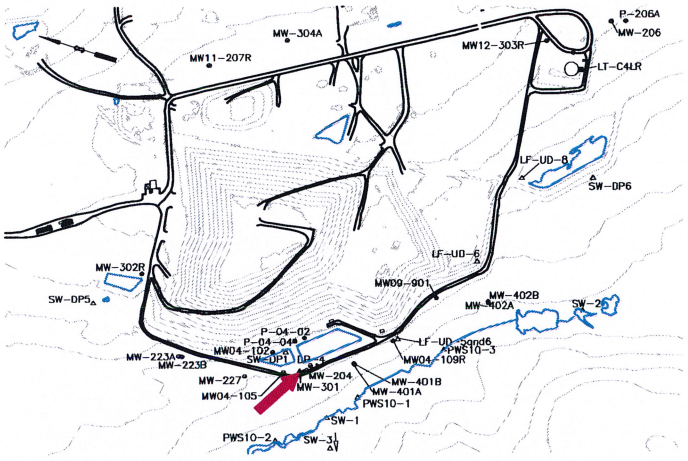
MW-301

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW-301 monitors the water quality within the bedrock downgradient of the landfill.



Screen Interval:	**162.7 ft. to 182.7 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**11/25/96**
Material Screened:	**Bedrock**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Water Level Elevation (Feet)		165.91	165.91	165.61	161.16	to 166.36	160	± 0.3	49
Dissolved Oxygen (mg/L)		1	0.4	0.6	0.4	to 5.5	2.6	± 0.23	51
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to 0.1 U	0.1	± 0	2
Specific Conductance (µmhos/cm @25°C)		197	201	299	82	to 340	180	± 5.2	53
pH (Standard Units)		↓ 6.2	7.7	↓ 6.2	6.3	to 8.36	7.8	± 0.06	53
Alkalinity (CaCO3) (field) (mg/L)		60	80	75	45	to 120	78	± 3.9	29
Arsenic (mg/L)		0.007	0.006	**0.011**	0.001	to 0.012	0.0048	± 0.000	29
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	to 0.0006	0.00034	± 4E-05	26
Calcium (mg/L)		20.7	19.6	19.9	14.9	to 31.4	18	± 0.36	49
Iron (mg/L)		0.22	0.1	0.05 U	0.011	to 1.59	0.17	± 0.04	53
Magnesium (mg/L)		4.7	4.8	4.6	2.5	to 5.7	4.3	± 0.07	49
Manganese (mg/L)		0.05	0.05 U	0.05 U	0.001	to 0.05	0.025	± 0.002	53
Nickel (mg/L)		↑ 0.005 U	↑ 0.005 U	↑ 0.005 U	0.002 U	to 0.002	0.0026	± 0.000	26
Potassium (mg/L)		0.7	0.8	0.7	0.5	to 1.2	0.77	± 0.03	29
Sodium (mg/L)		11.5	12.2	11.4	6.8	to 14.2	10	± 0.29	53
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.15 U	to 0.6	0.37	± 0.02	29
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.1 U	to 0.7	0.16	± 0.02	29
Total Dissolved Solids (mg/L)		119	129	118	66	to 160	110	± 2.6	53
Total Suspended Solids (mg/L)		9	4	4 U	4 U	to 21	6.7	± 0.93	29
Sulfate (mg/L)		↑ 15.4	13.4	14.2	4.9	to 15.1	11	± 0.38	53
Bicarbonate (CaCO3) (mg/L)		76	78	79	72	to 91	76	± 0.76	29
Organic Carbon (mg/L)		2 U	2 U	2 U	0.5 U	to 5.7	1.3	± 0.12	53
Chemical Oxygen Demand (mg/L)		10 U	10 U	10 U	2 U	to 12	6	± 0.53	53
Chloride (mg/L)		3.9	3.7	3.6	1 U	to 6	3.1	± 0.42	53
Turbidity (field) (NTU)		3.1	4.3	0.9	0	to 18	2.2	± 0.54	50
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to 0.21	0.23	± 0.03	29

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

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Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

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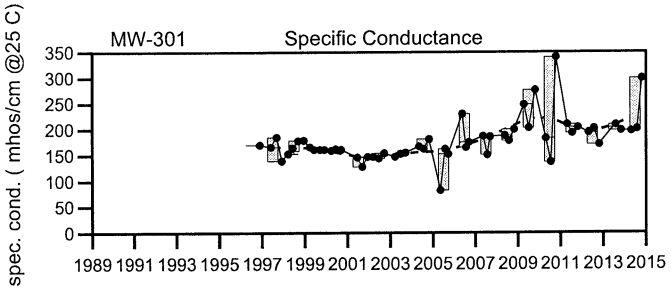
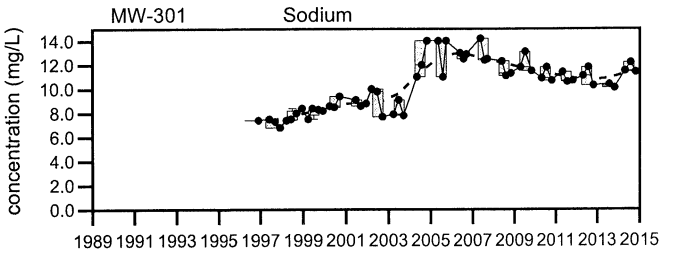
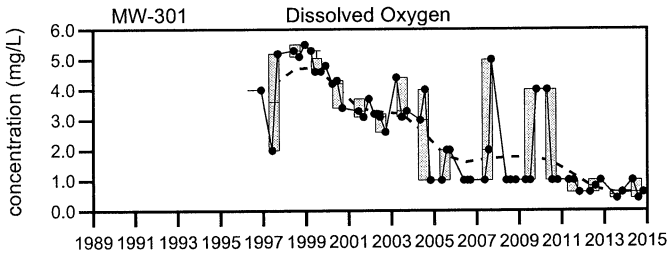
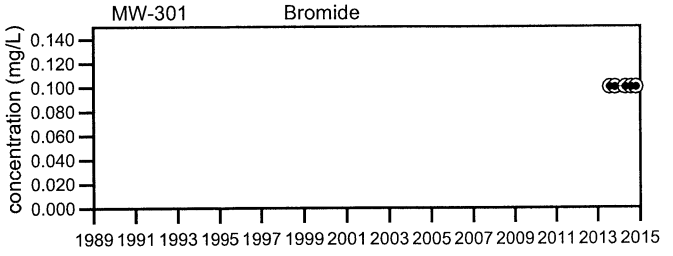
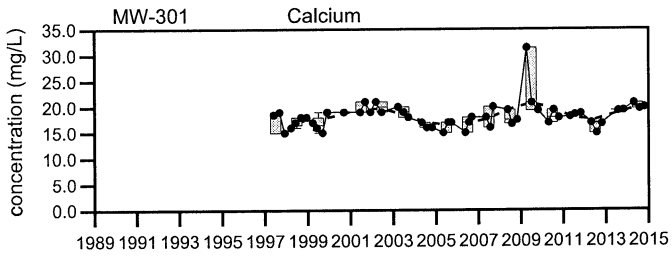
SME
Sowee & Maher Engineers, Inc.

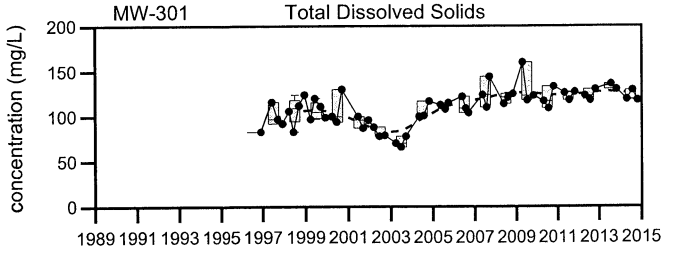


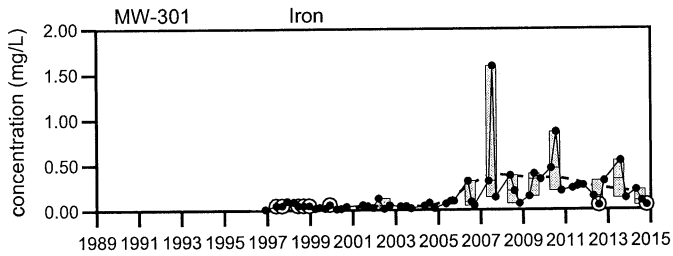


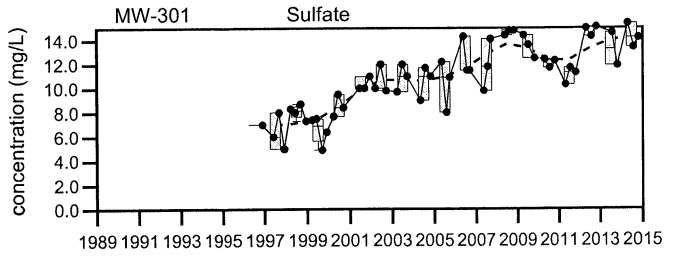


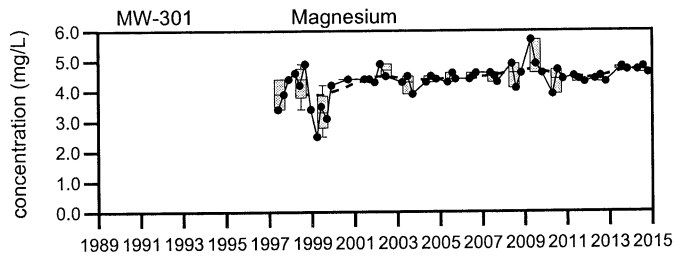


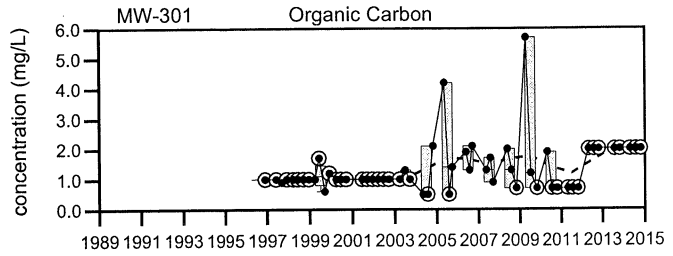


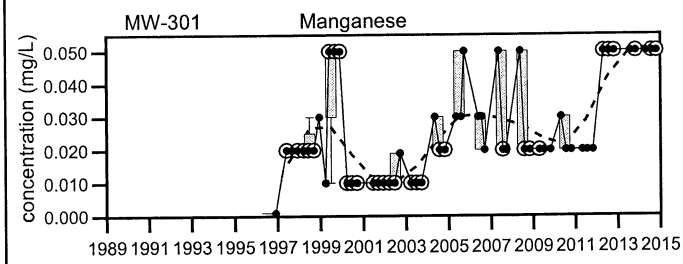


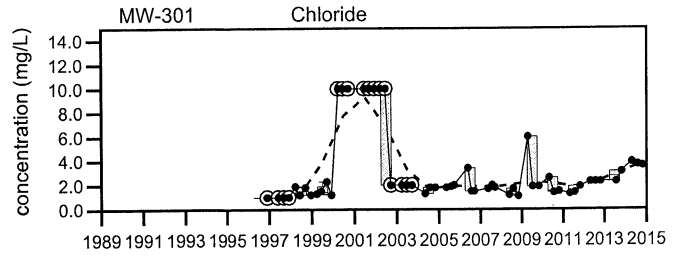


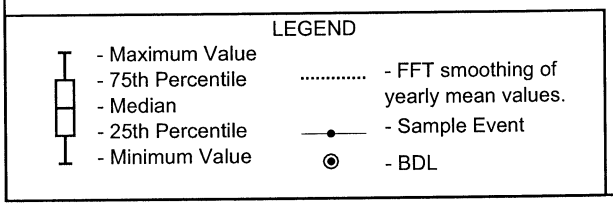












Juniper Ridge Landfill

MW-301

Sevee & Maher Engineers, Inc.

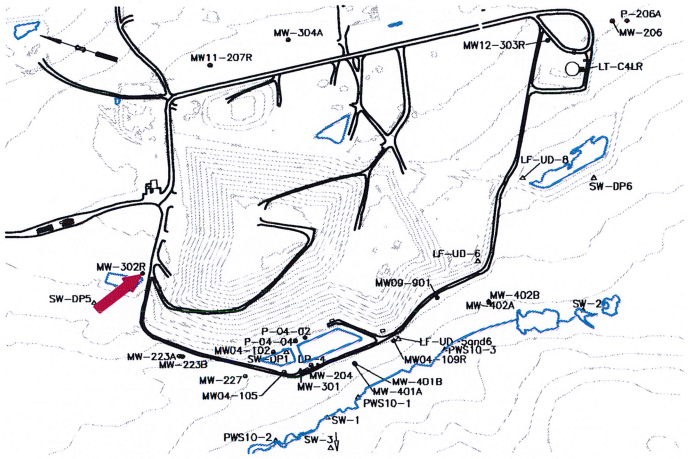
MW-302R

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW-302R monitors the water quality in the shallow bedrock beside the landfill, but not directly downgradient of the landfill.



Screen Interval:	**19.5 ft. to 29.5 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**05/20/2008**
Material Screened:	**Bedrock**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min		Historical Max	Historical Mean	±	SE	n
Water Level Elevation (Feet)		201.31	197.38	191.11	190.95	to	202.74	200	±	0.72	18
Dissolved Oxygen (mg/L)		3	4	1	1	to	5	2.7	±	0.28	18
Bromide (mg/L)		0.1 U	↑ 0.2 U	↑ 0.11	0.1 U	to	0.1 U	0.1	±	0	3
Specific Conductance (µmhos/cm @25°C)		336	445	500	167	to	502	320	±	26	18
pH (Standard Units)		6.7	6.6	6.6	6	to	6.9	6.5	±	0.06	18
Alkalinity (CaCO3) (field) (mg/L)		180	180	180	60	to	345	150	±	18	18
Arsenic (mg/L)		0.006	0.009	↑ **0.015**	0.002 U	to	0.014	0.0058	±	0.000	18
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	to	0.0006	0.0004	±	6E-05	18
Calcium (mg/L)		38.5	50.2	54.4	17.6	to	66.2	37	±	3.3	18
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	to	0.19	0.047	±	0.01	18
Magnesium (mg/L)		2.9	3.6	4.7	1.4	to	5.3	3	±	0.26	18
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	to	0.06	0.033	±	0.004	18
Nickel (mg/L)		↑ 0.005 U	↑ 0.005 U	↑ 0.005 U	0.002 U	to	0.002	0.0031	±	0.000	18
Potassium (mg/L)		0.9	1	1.2	0.5	to	2	1.1	±	0.09	18
Sodium (mg/L)		16.7	**20.8**	**26.7**	6	to	28.6	15	±	1.7	18
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.6	0.5 U	0.3 U	to	0.68	0.4	±	0.03	18
Nitrate (N) (mg/L)		0.3 U	0.6 U	0.5	0.1 U	to	1.6	0.48	±	0.1	18
Total Dissolved Solids (mg/L)		202	315	300	78	to	327	210	±	17	18
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	to	4	4	±	0	18
Sulfate (mg/L)		17.6	6	↑ 32.2	5.6	to	28.8	14	±	1.5	18
Bicarbonate (CaCO3) (mg/L)		61	70	105	44	to	116	67	±	5.4	18
Organic Carbon (mg/L)		2 U	2 U	2 U	0.7 U	to	3.1	1.5	±	0.16	18
Chemical Oxygen Demand (mg/L)		↑ 10 U	↑ 10 U	↑ 16	3 U	to	5	5.4	±	0.79	18
Chloride (mg/L)		↑ 91.3	↑ 89.7	63.1	12.8	to	77.1	43	±	4.6	18
Turbidity (field) (NTU)		1	0.7	1.4	0	to	3.1	1.1	±	0.22	18
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to	0.2 U	0.2	±	6E-10	18

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed !=the sampling location was damaged or destroyed.

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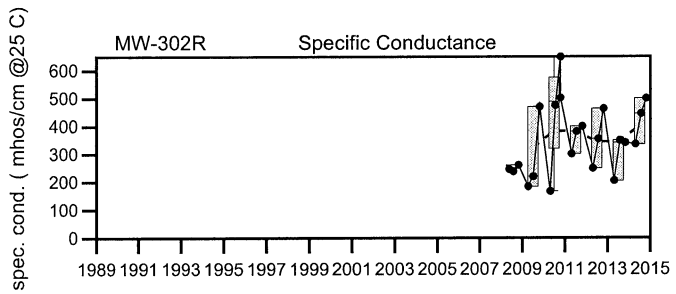
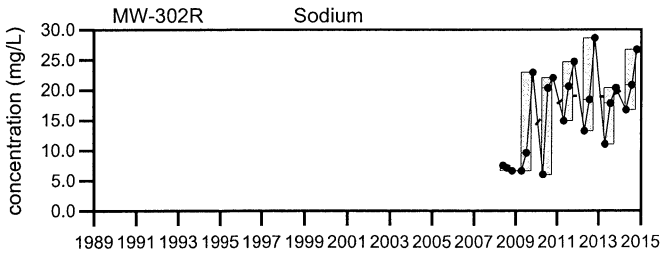
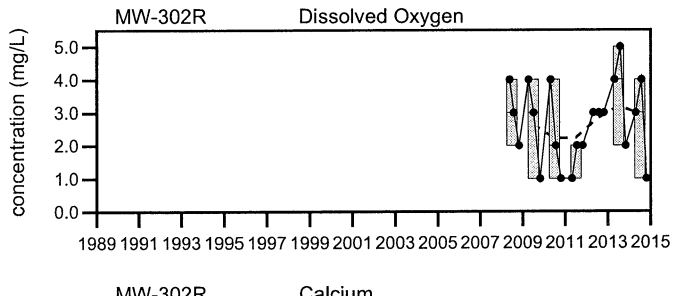
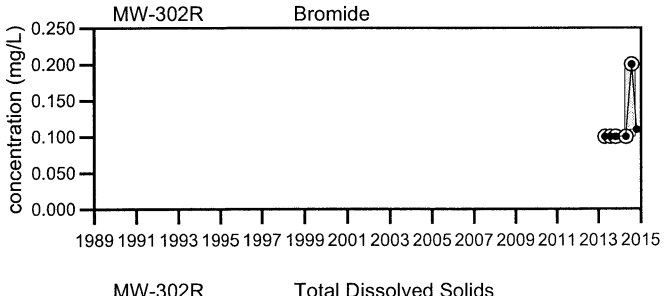
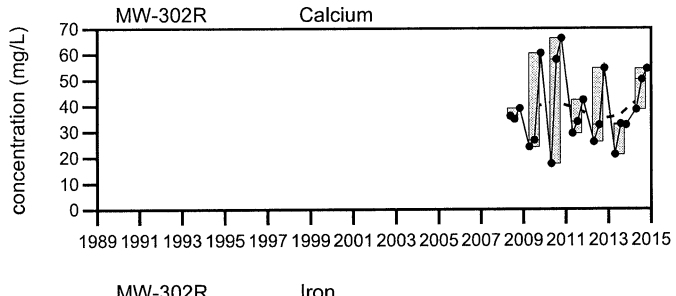
SME
Sevee & Maher Engineers, Inc.

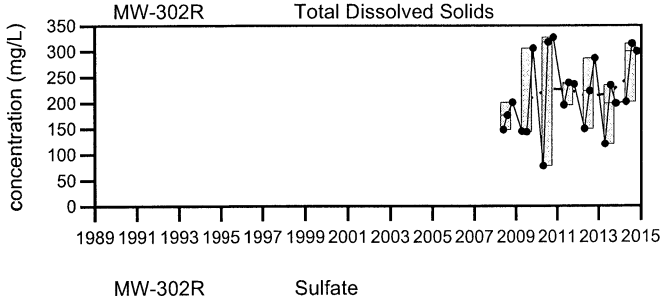


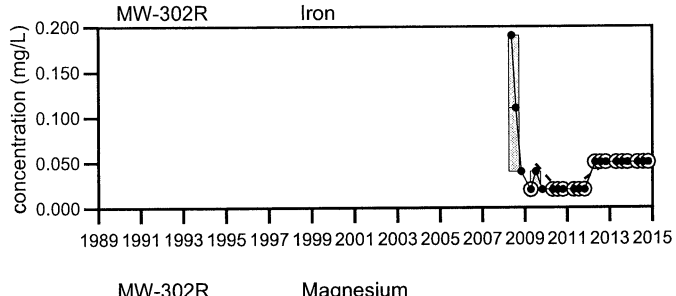


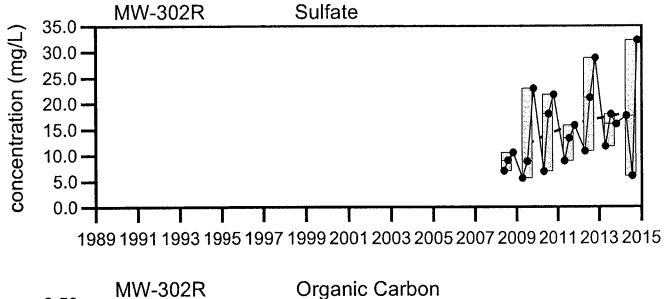


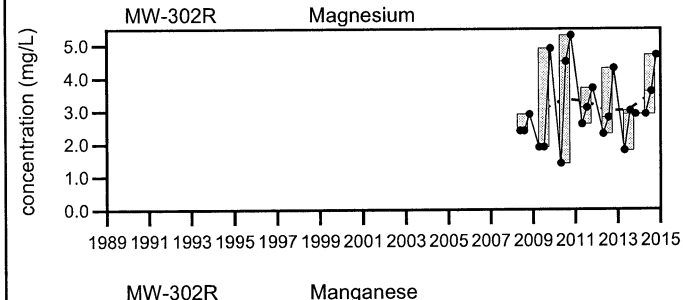


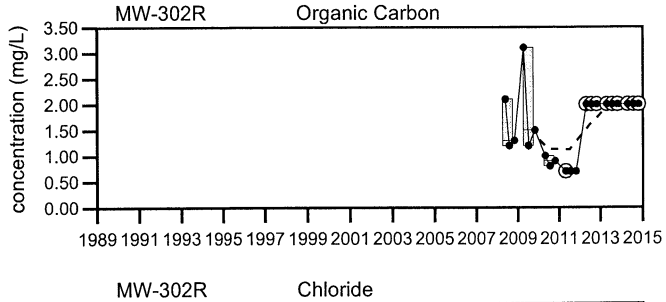


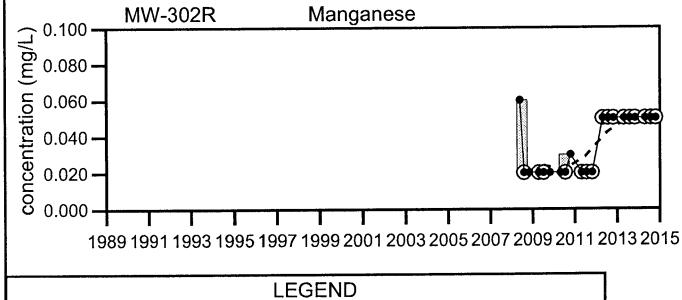


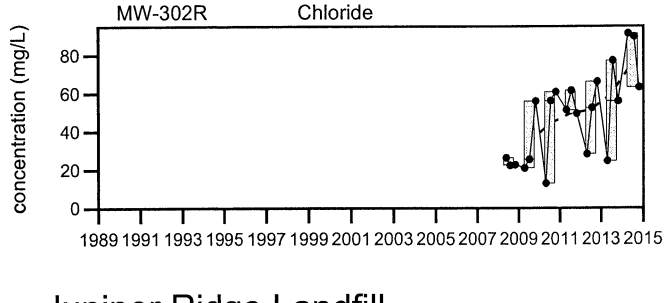


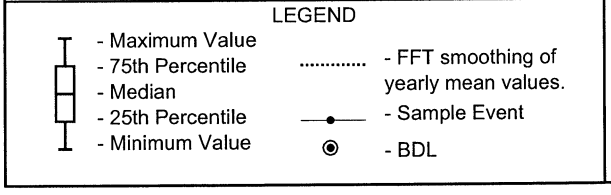












Juniper Ridge Landfill

MW-302R

Sevee & Maher Engineers, Inc.

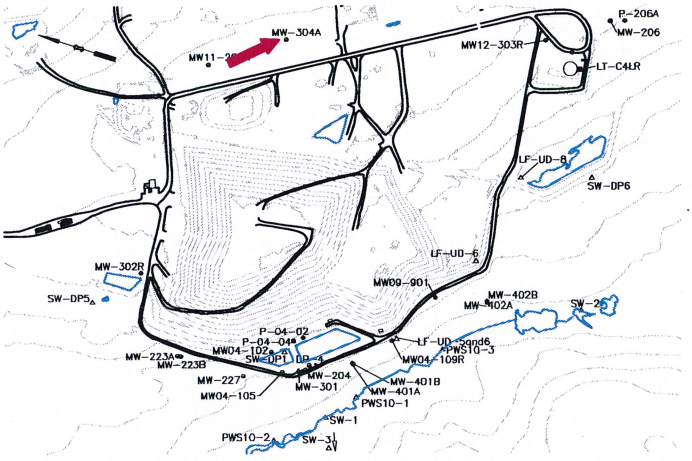
MW-304A

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW-304A monitors the water quality in the upper portion of the bedrock upgradient of the landfill.



Screen Interval:	**29.5 ft. to 39.5 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**07/29/04**
Material Screened:	**Bedrock**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Water Level Elevation (Feet)		188.66	187.66	185.11	184.5	194.32	190	0.4	29
Dissolved Oxygen (mg/L)		3	4	5	2	6	4.2	0.16	29
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1	0	3
Specific Conductance (µmhos/cm @25°C)		133	125	183	58	207	120	5.5	29
pH (Standard Units)		7.6	6.9	7.5	6.3	7.8	7	0.07	29
Alkalinity (CaCO3) (field) (mg/L)		60	55	50	20	100	56	3.4	29
Arsenic (mg/L)		0.005	0.005	0.005	0.001 U	0.007	0.0029	0.000	29
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	0.007	0.00063	0.000	29
Calcium (mg/L)		15.2	13.6	11.8	6.2	19	13	0.48	29
Iron (mg/L)		0.22	0.05 U	0.08	0.02 U	0.26	0.049	0.009	29
Magnesium (mg/L)		4.4	3.3	3	2.3	5.1	3.6	0.13	29
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	0.2	0.04	0.008	29
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	0.006	0.0029	0.000	29
Potassium (mg/L)		0.9	0.7	0.6	0.3	3.2	0.91	0.1	29
Sodium (mg/L)		4.2	3.7	3.4	2.9	23	5.5	0.78	29
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.15 U	1.2	0.49	0.07	29
Nitrate (N) (mg/L)		↑ 0.3 U	↑ 0.3 U	↑ 0.3 U	0.1 U	0.2	0.16	0.02	29
Total Dissolved Solids (mg/L)		81	79	76	54	130	79	2.9	29
Total Suspended Solids (mg/L)		5	4 U	12	4 U	259	14	8.8	29
Sulfate (mg/L)		6.9	2.5	3.7	1.5	8.8	3.6	0.31	29
Bicarbonate (CaCO3) (mg/L)		56	54	52	37	92	51	2.1	29
Organic Carbon (mg/L)		2 U	2 U	2 U	0.5 U	4	1.4	0.16	29
Chemical Oxygen Demand (mg/L)		10 U	10 U	10 U	3 U	10	5.1	0.56	29
Chloride (mg/L)		↑ 4	2	2.2	1	3.5	2.3	0.12	29
Turbidity (field) (NTU)		4.9	0.7	1.5	0	9.2	1.1	0.35	29
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	0.45	0.21	0.009	27

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

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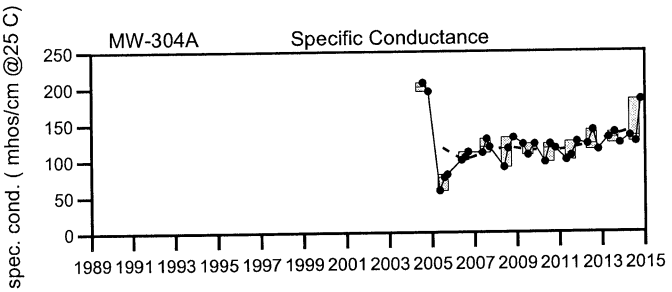
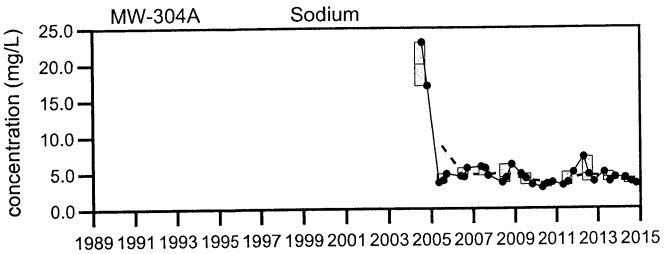
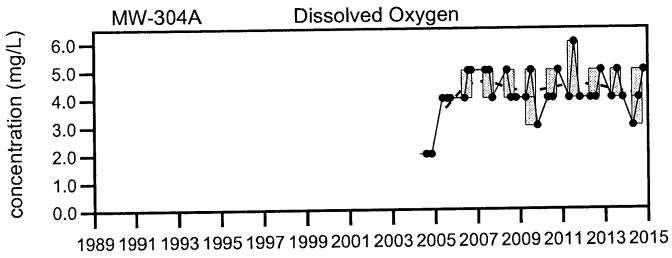
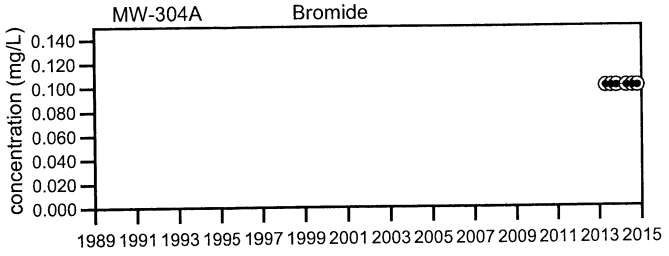
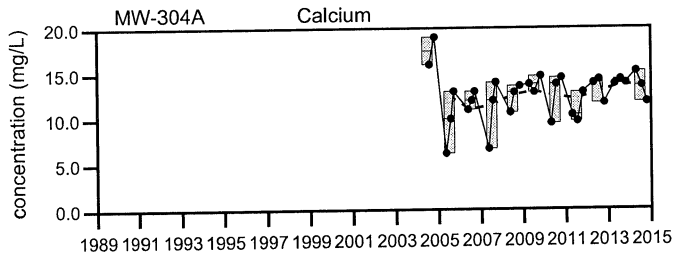
SME
Sewee & Maher Engineers, Inc.

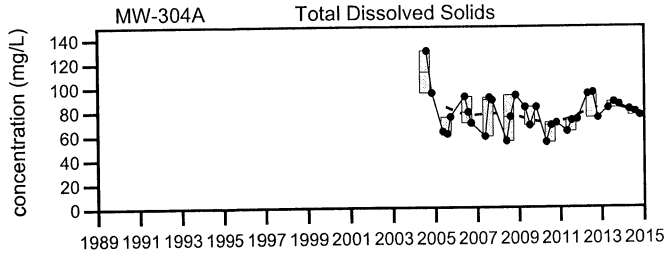


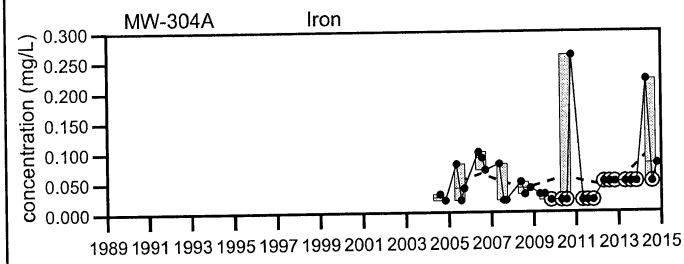


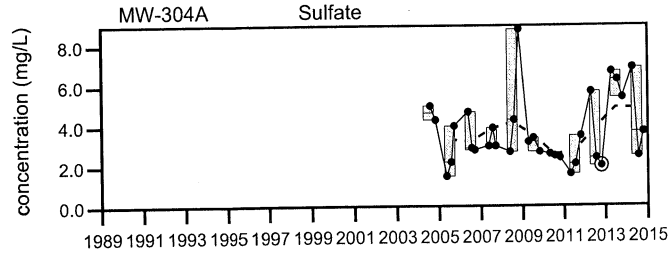


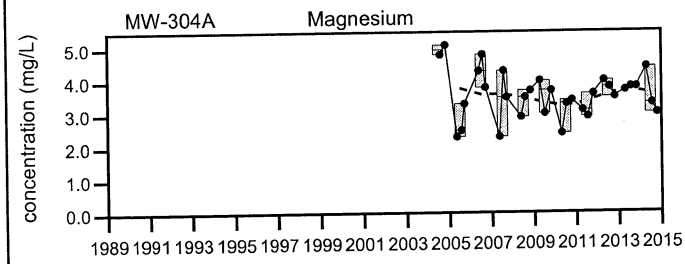


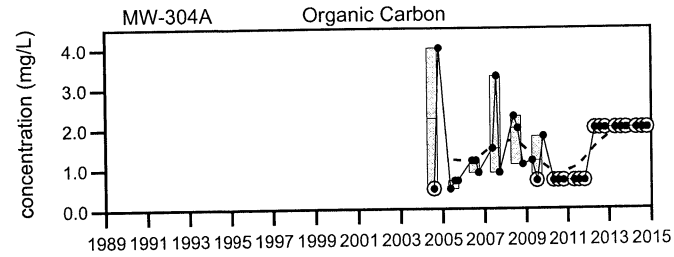


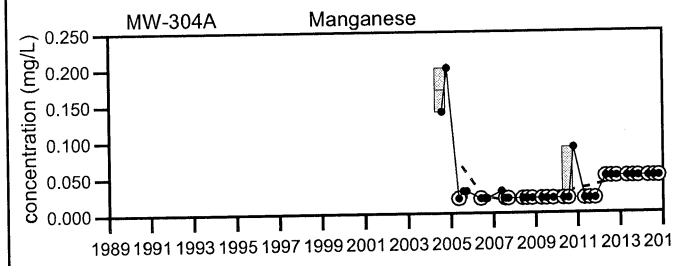


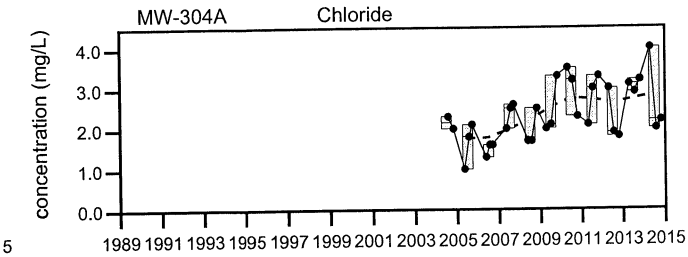












LEGEND

- Maximum Value
- 75th Percentile
- Median
- 25th Percentile
- Minimum Value
- FFT smoothing of yearly mean values.
- Sample Event
- BDL

Juniper Ridge Landfill

MW-304A

Sevee & Maher Engineers, Inc.

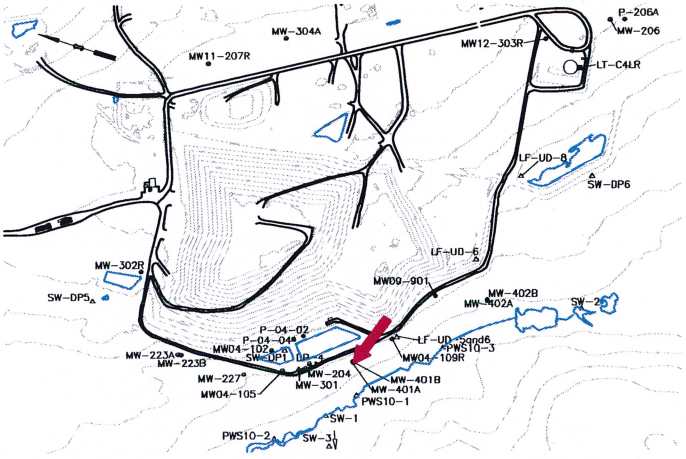
MW-401A

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW-401A monitors bedrock water quality downgradient of the landfill and leachate pond.



Screen Interval:	**98.8 ft. to 108.8 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**07/29/04**
Material Screened:	**Bedrock**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min		Historical Max	Historical Mean	±	SE	n
Water Level Elevation (Feet)		155.69	151.73	149.68	148.6	to	155.96	150	±	0.37	29
Dissolved Oxygen (mg/L)		6	4	5	3	to	6	5	±	0.19	29
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to	0.1 U	0.1	±	0	3
Specific Conductance (µmhos/cm @25°C)		131	129	118	73	to	191	120	±	3.9	29
pH (Standard Units)		7.9	8.2	↓ 6.6	6.8	to	8.5	7.9	±	0.08	29
Alkalinity (CaCO3) (field) (mg/L)		55	↓ 25	↓ 25	45	to	140	72	±	4.2	29
Arsenic (mg/L)		0.006	0.005	↑ 0.01	0.001 U	to	0.009	0.0044	±	0.000	29
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0009	0.0002 U	to	0.0023	0.00047	±	9E-05	29
Calcium (mg/L)		15.4	14.7	14.5	11	to	15.9	14	±	0.23	29
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	to	0.07	0.034	±	0.003	29
Magnesium (mg/L)		4.2	3.9	4	3.7	to	4.8	4.1	±	0.05	29
Manganese (mg/L)		↑ 0.05 U	↑ 0.05 U	↑ 0.05 U	0.02 U	to	0.03	0.027	±	0.002	29
Nickel (mg/L)		↑ 0.005 U	↑ 0.005 U	↑ 0.005 U	0.002 U	to	0.004	0.0028	±	0.000	29
Potassium (mg/L)		0.7	0.7	0.6	0.3	to	1.4	0.74	±	0.04	29
Sodium (mg/L)		3.9	3.7	3.6	3.2	to	5.2	4	±	0.1	29
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.3 U	to	1.1	0.43	±	0.04	29
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.1 U	to	0.3	0.15	±	0.02	29
Total Dissolved Solids (mg/L)		81	89	83	68	to	116	88	±	1.8	29
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	to	4 U	4	±	0	29
Sulfate (mg/L)		4.8	2	3.3	2 U	to	4.9	3.1	±	0.15	29
Bicarbonate (CaCO3) (mg/L)		62	61	62	51	to	64	57	±	0.51	29
Organic Carbon (mg/L)		2 U	2 U	2 U	0.5 U	to	6.3	1.8	±	0.27	29
Chemical Oxygen Demand (mg/L)		↑ 10 U	↑ 10 U	↑ 10 U	3 U	to	9	4.9	±	0.55	29
Chloride (mg/L)		2.9	1.5	1.8	1	to	3.2	1.8	±	0.1	29
Turbidity (field) (NTU)		1.1	2.1	0.4	0	to	4.9	0.6	±	0.2	29
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to	0.41	0.21	±	0.008	27

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed !=the sampling location was damaged or destroyed.

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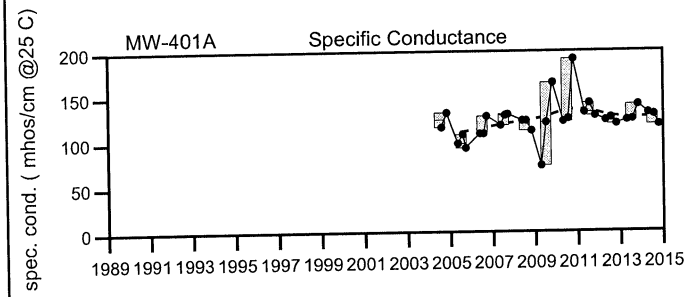
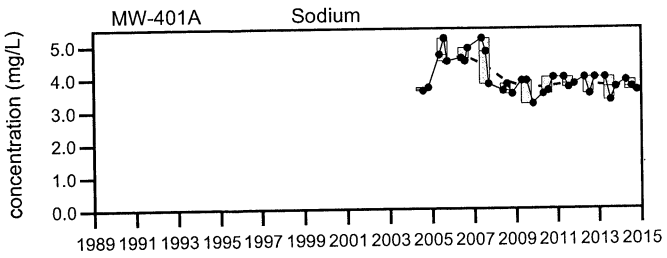
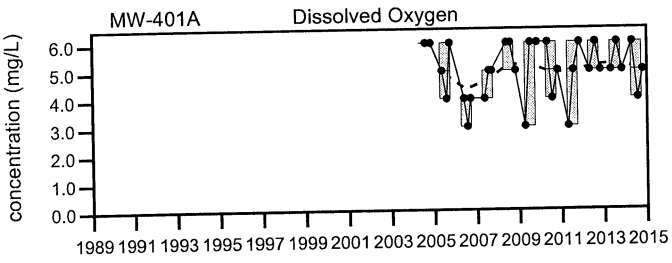
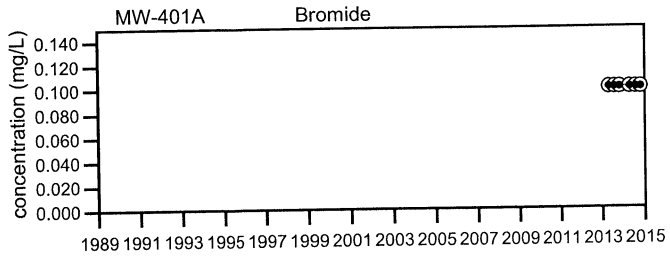
Printed: 3/24/2015 13:39

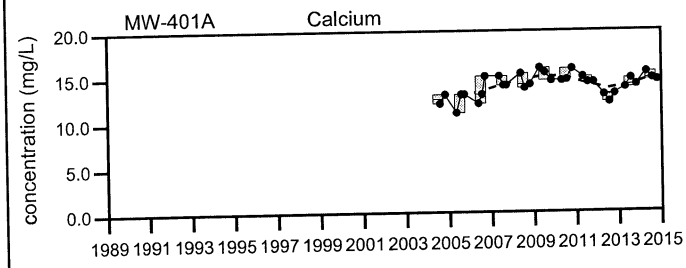
SME
Sowee & Maher Engineers, Inc.

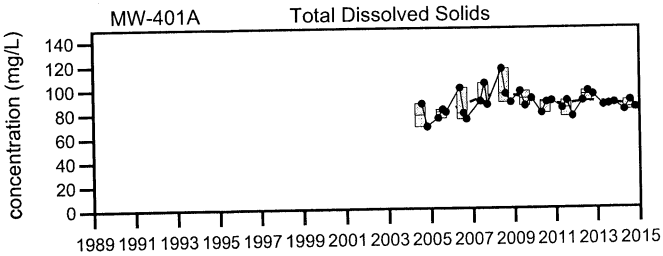


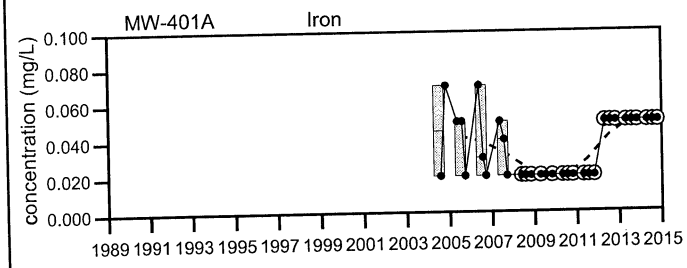


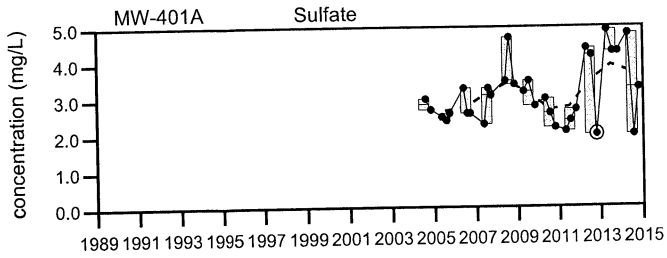


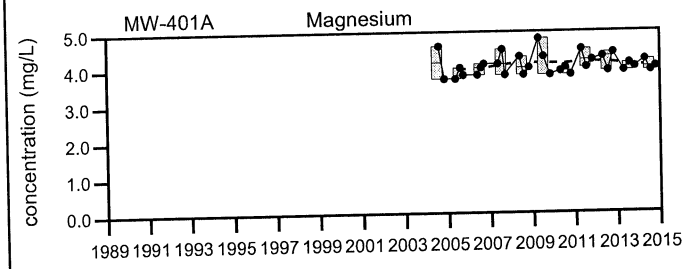


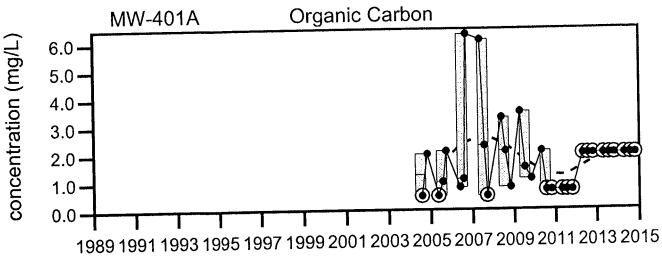


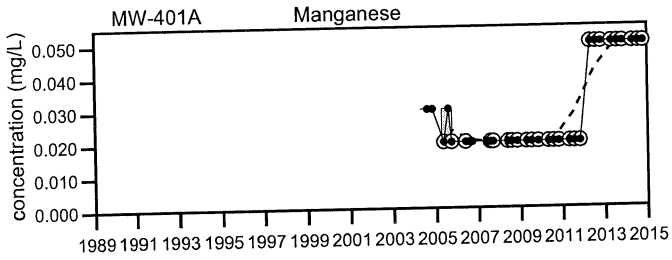


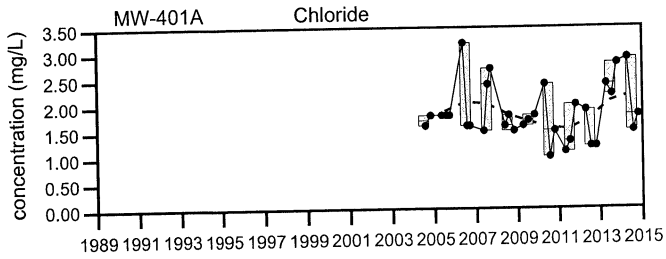


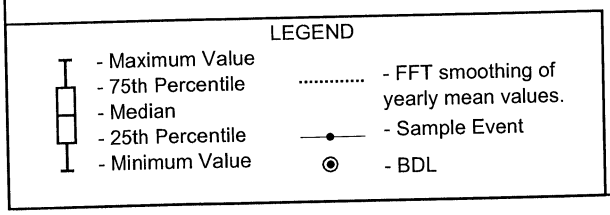












Juniper Ridge Landfill

MW-401A

Sevee & Maher Engineers, Inc.

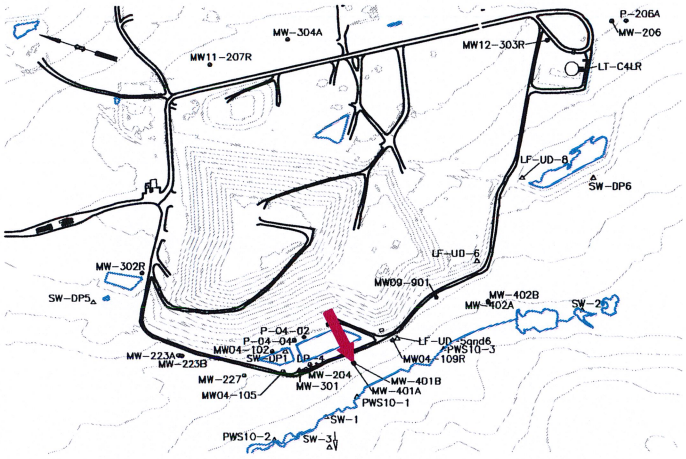
MW-401B

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW-401B is located downgradient of the landfill and leachate pond and monitors groundwater quality in the overburden.



Screen Interval:	**10 ft. to 20 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**07/29/04**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min		Historical Max	Historical Mean	±	SE	n
Water Level Elevation (Feet)		150.93	150.4	150.18	148.47	to	150.97	150	±	0.1	29
Dissolved Oxygen (mg/L)		1	0.3	1	0.3	to	5	1	±	0.16	29
Bromide (mg/L)		0.21	0.15	0.2	0.1 U	to	0.22	0.14	±	0.04	3
Specific Conductance (µmhos/cm @25°C)		265	324	336	180	to	699	390	±	24	29
pH (Standard Units)		7	6.9	6.5	5.9	to	7.5	6.7	±	0.07	29
Alkalinity (CaCO3) (field) (mg/L)		↓ 55	↓ 30	↓ 25	60	to	335	170	±	14	29
Arsenic (mg/L)		↑ **0.031**	**0.023**	**0.026**	0.002	to	0.027	0.011	±	0.001	29
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	to	0.0019	0.00039	±	7E-05	29
Calcium (mg/L)		30.2	36	38.8	25.3	to	100	44	±	3.4	29
Iron (mg/L)		1.45	1.63	1.95	0.19	to	19	3.4	±	0.76	29
Magnesium (mg/L)		8.8	9.6	10.9	8	to	36	13	±	1.1	29
Manganese (mg/L)		0.2	0.18	0.16	0.05	to	2.9	0.45	±	0.13	29
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	to	0.005	0.0029	±	0.000	29
Potassium (mg/L)		1.1	1.2	1.4	0.9	to	3.2	1.6	±	0.11	29
Sodium (mg/L)		11.4	13.6	16.2	9.8	to	33	18	±	1.2	29
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.7	0.5 U	0.24	to	3.2	0.51	±	0.1	29
Nitrate (N) (mg/L)		↑ 0.3 U	↑ 0.3 U	↑ 0.3 U	0.1 U	to	0.2	0.14	±	0.02	29
Total Dissolved Solids (mg/L)		170	198	212	142	to	488	250	±	16	29
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	to	36	6	±	1.2	29
Sulfate (mg/L)		13.7	↓ 5.3	9.6	8	to	69.2	22	±	2.8	29
Bicarbonate (CaCO3) (mg/L)		135	139	156	108	to	245	150	±	7.5	29
Organic Carbon (mg/L)		2 U	2 U	↑ 8.9	0.7 U	to	4.6	2.5	±	0.22	29
Chemical Oxygen Demand (mg/L)		10 U	10 U	10 U	3 U	to	17	6.2	±	0.67	29
Chloride (mg/L)		16.2	12.5	11.5	7.1	to	40.5	17	±	1.8	29
Turbidity (field) (NTU)		1.1	2.4	0.3	0	to	4.5	1.3	±	0.23	29
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to	3.6	0.45	±	0.14	27

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

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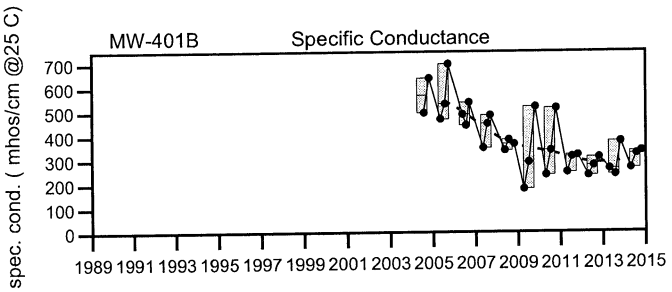
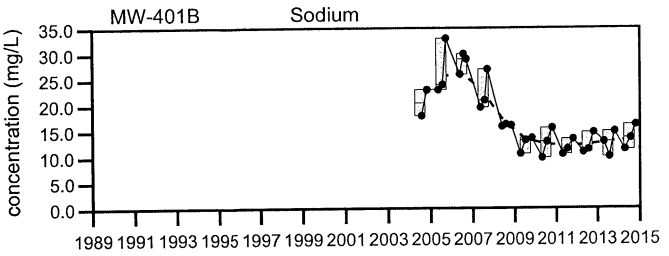
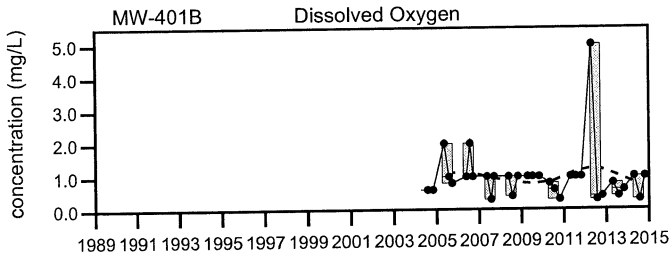
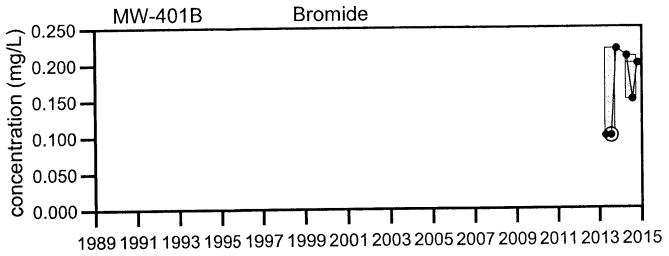
Printed: 3/24/2015 13:39

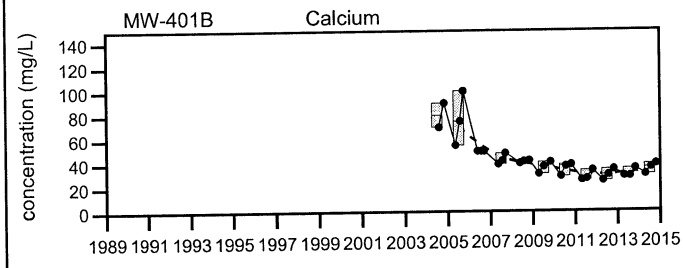
SME
Sovee & Maher Engineers, Inc.

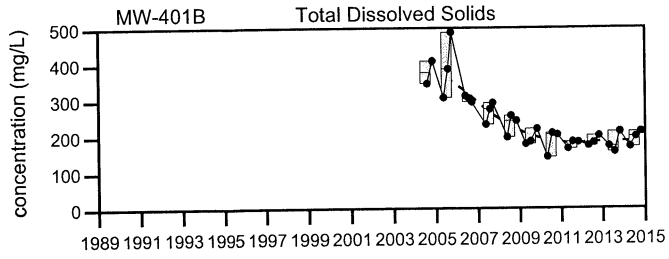


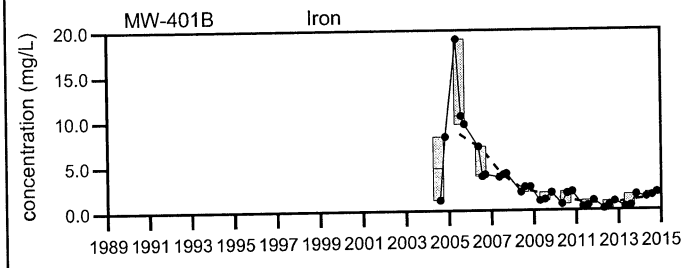


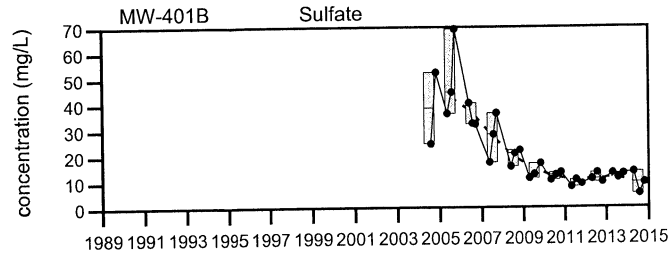


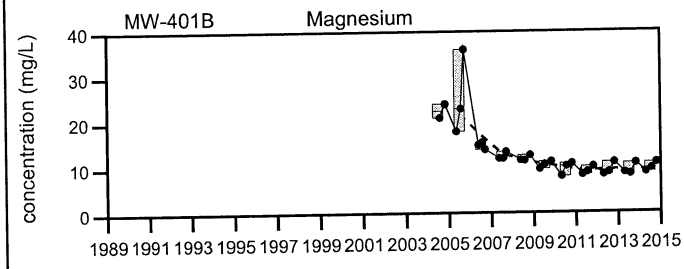


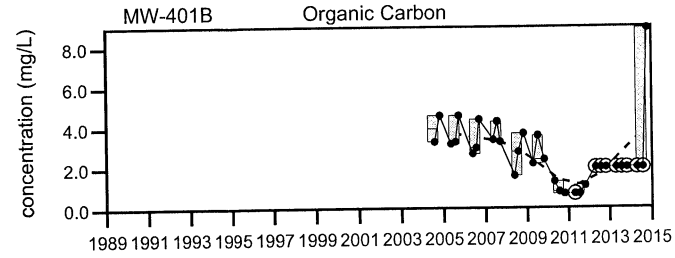


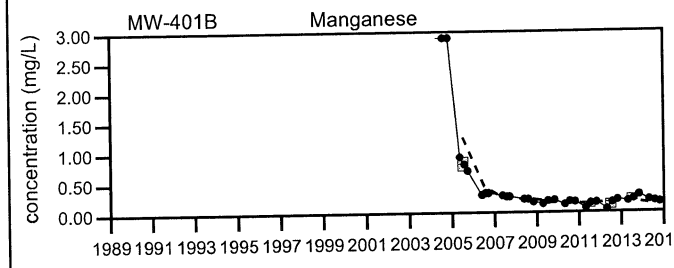


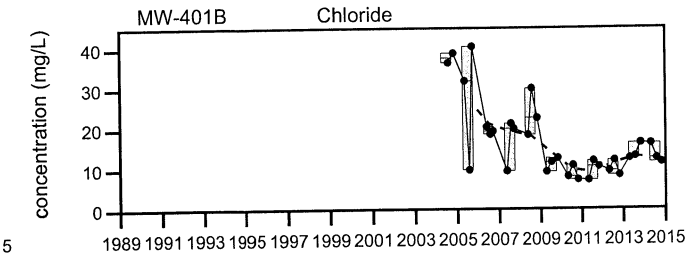












LEGEND

- Maximum Value
- 75th Percentile
- Median
- 25th Percentile
- Minimum Value
- FFT smoothing of yearly mean values.
- Sample Event
- BDL

Juniper Ridge Landfill

MW-401B

Sevee & Maher Engineers, Inc.

MW-402A

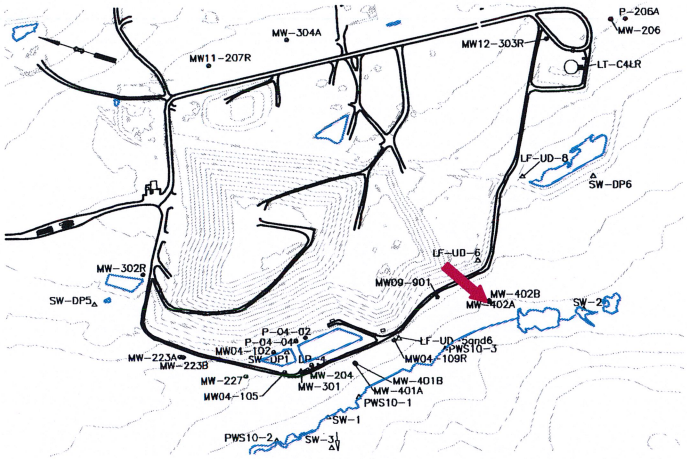
Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW-402A monitors water quality within the bedrock downgradient of the landfill.

Screen Interval:	**95.5 ft. to 105.5 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**07/29/04**
Material Screened:	**Bedrock**
Well Condition:	**Good**
Sampling Method:	**Low Flow**



Chemical Summary

Indicator Parameters	2014 Q1	Q2	Q3	Q4	Historical Min	Max	Mean	SE	n
Water Level Elevation (Feet)		152.2	↓ 152	↓ 151.95	152.07	to 152.2	150	± 0.02	5
Dissolved Oxygen (mg/L)		↓ 2	4	4	3	to 6	4.5	± 0.18	29
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to 0.1 U	0.1	± 0	3
Specific Conductance (µmhos/cm @25°C)		130	126	↓ 58	104	to 197	130	± 3.7	29
pH (Standard Units)		8.4	8.5	8.6	7.3	to 9.5	8.1	± 0.11	29
Alkalinity (CaCO3) (field) (mg/L)		45	↓ 15	30	25	to 135	55	± 3.9	29
Arsenic (mg/L)		**0.023**	**0.022**	**0.024**	0.012	to 0.028	0.018	± 0.000	29
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0009	0.0002 U	to 0.0025	0.00047	± 1E-04	29
Calcium (mg/L)		11.9	12	12.5	7.7	to 13.8	11	± 0.22	29
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	to 0.08	0.03	± 0.003	29
Magnesium (mg/L)		2.9	3	3	2.6	to 3.2	2.9	± 0.03	29
Manganese (mg/L)		↑ 0.05 U	↑ 0.05 U	↑ 0.05 U	0.02 U	to 0.03	0.027	± 0.002	29
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	to 0.008	0.0029	± 0.000	29
Potassium (mg/L)		0.6	0.7	0.6	0.3	to 1.3	0.65	± 0.03	29
Sodium (mg/L)		8.3	8.9	8.7	7.7	to 11	8.8	± 0.17	29
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.15 U	to 1	0.39	± 0.03	29
Nitrate (N) (mg/L)		↑ 0.3 U	↑ 0.3 U	↑ 0.3 U	0.1 U	to 0.1	0.14	± 0.02	29
Total Dissolved Solids (mg/L)		76	87	76	58	to 99	81	± 1.6	29
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	to 4 U	4	± 0	29
Sulfate (mg/L)		8.1	6.9	7	3	to 9.3	5.4	± 0.27	29
Bicarbonate (CaCO3) (mg/L)		56	52	↑ 58	46	to 56	52	± 0.43	29
Organic Carbon (mg/L)		2 U	2 U	2 U	0.5 U	to 8.1	1.7	± 0.28	29
Chemical Oxygen Demand (mg/L)		↑ 10 U	↑ 10 U	↑ 10 U	3 U	to 7	4.8	± 0.53	29
Chloride (mg/L)		1.7	1.5	1.4	0.8	to 3.1	1.8	± 0.1	29
Turbidity (field) (NTU)		0.2	0.3	0.4	0	to 3.7	0.46	± 0.16	29
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to 0.24	0.2	± 0.002	27

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

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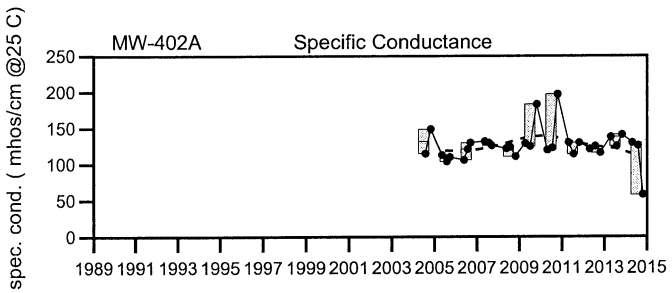
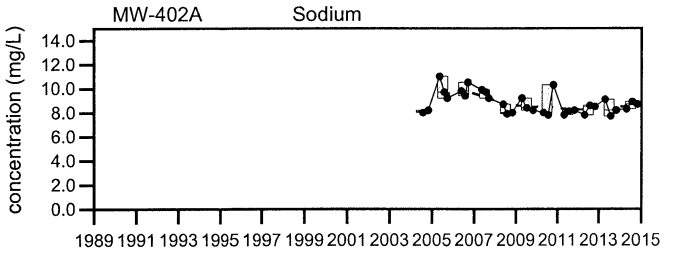
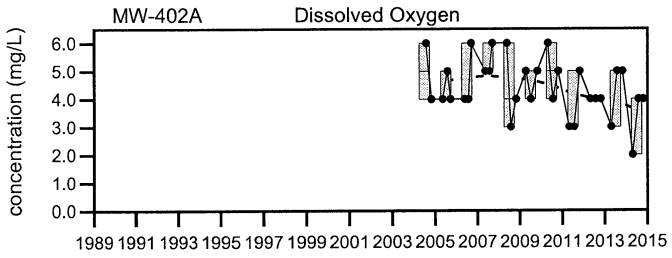
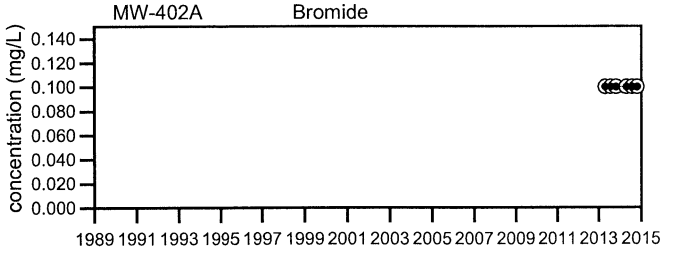
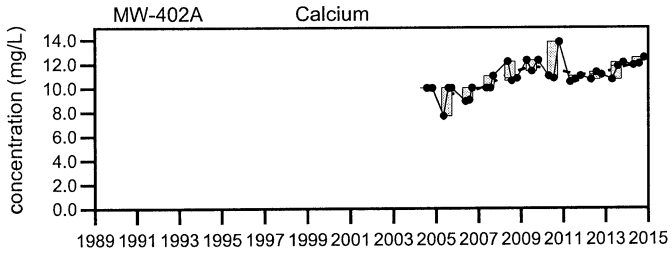
SME
Sevee & Maher Engineers, Inc.

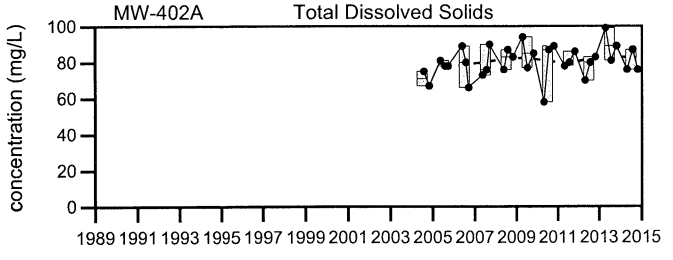


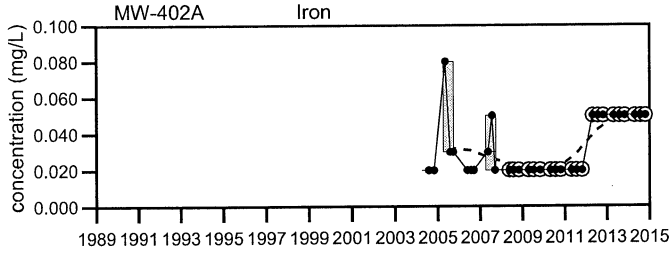


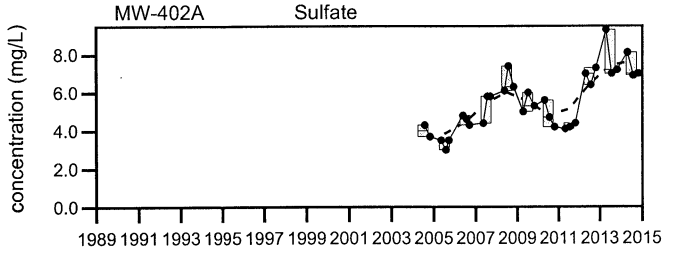


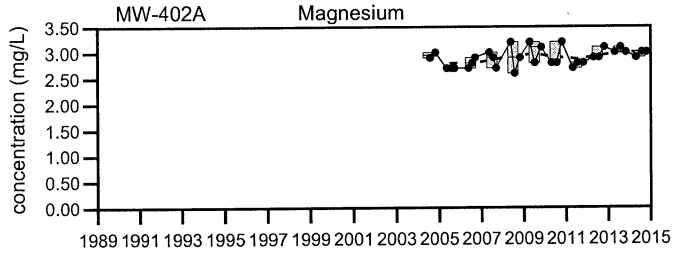


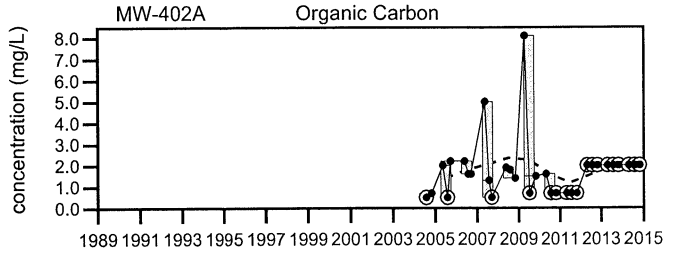


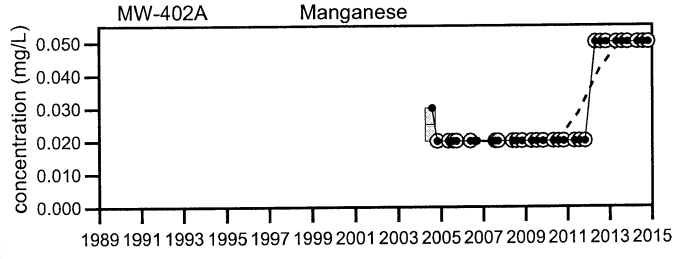


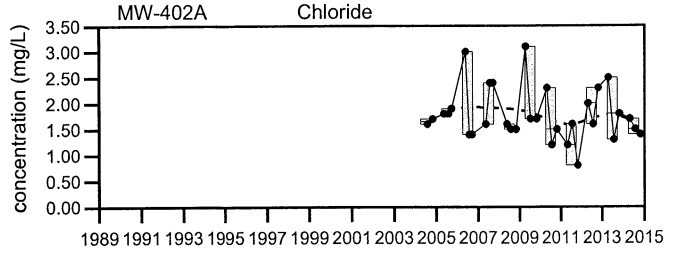


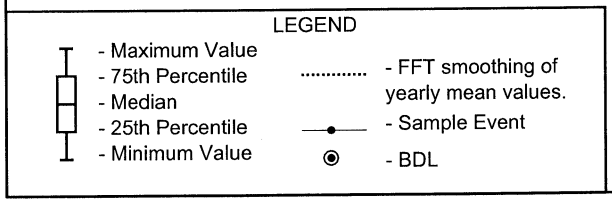












Juniper Ridge Landfill

MW-402A

Sevee & Maher Engineers, Inc.

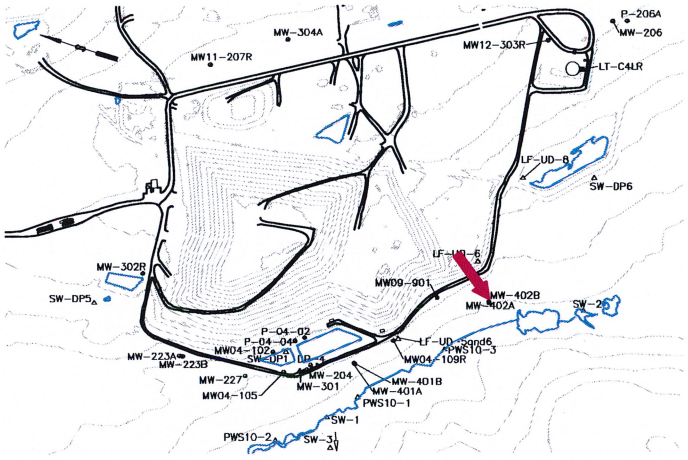
MW-402B

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

MW-402B monitors water quality within the overburden downgradient of the landfill.



Screen Interval:	**12 ft. to 22 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**07/29/04**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Water Level Elevation (Feet)		150.12	149.03	148.87	147.44	150.56	150	0.14	29
Dissolved Oxygen (mg/L)		0.6	1	1	0.2	2	0.8	0.09	29
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1	0	3
Specific Conductance (µmhos/cm @25°C)		160	152	147	96	246	160	4.8	29
pH (Standard Units)		8.3	8.6	8.7	7	9.2	8.3	0.1	29
Alkalinity (CaCO3) (field) (mg/L)		45	↓ 15	35	35	135	69	4.3	29
Arsenic (mg/L)		**0.019**	**0.023**	**0.021**	0.01	0.024	0.016	0.000	29
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	0.0012	0.00041	5E-05	29
Calcium (mg/L)		15.1	14.8	14.7	13.2	17.2	15	0.19	29
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	0.07	0.031	0.003	29
Magnesium (mg/L)		4.7	4.7	↓ 4.6	4.7	5.5	5	0.04	29
Manganese (mg/L)		↑ 0.05 U	↑ 0.05 U	↑ 0.05 U	0.02 U	0.04	0.028	0.002	29
Nickel (mg/L)		↑ 0.005 U	↑ 0.005 U	↑ 0.005 U	0.002 U	0.002	0.0027	0.000	29
Potassium (mg/L)		0.6	0.6	0.7	0.4	2.2	0.75	0.06	29
Sodium (mg/L)		8	8.5	8.3	7.6	12	8.7	0.2	29
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.21	0.61	0.36	0.02	29
Nitrate (N) (mg/L)		↑ 0.3 U	↑ 0.3 U	↑ 0.3 U	0.1 U	0.1	0.14	0.02	29
Total Dissolved Solids (mg/L)		81	100	89	64	124	94	2	29
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	5	4	0.03	29
Sulfate (mg/L)		9	8.1	8.2	2.3	44.9	9.1	1.3	29
Bicarbonate (CaCO3) (mg/L)		68	66	71	34	79	66	1.3	29
Organic Carbon (mg/L)		2 U	2 U	2 U	0.5 U	5.2	1.6	0.22	29
Chemical Oxygen Demand (mg/L)		↑ 10 U	↑ 10 U	↑ 10 U	3 U	6	4.7	0.53	29
Chloride (mg/L)		1.9	1.6	1.6	1	26.5	2.7	0.85	29
Turbidity (field) (NTU)		0.3	0.2	0.3	0	3.5	0.65	0.2	29
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	0.26	0.2	0.002	27

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

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SME
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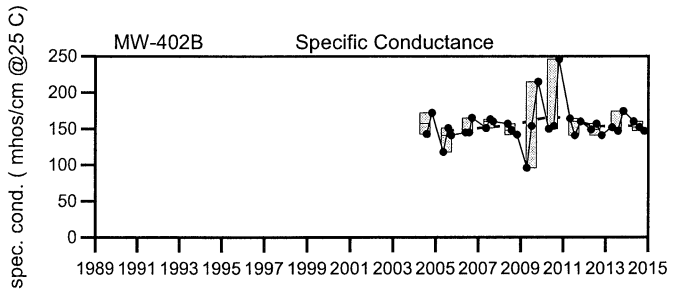
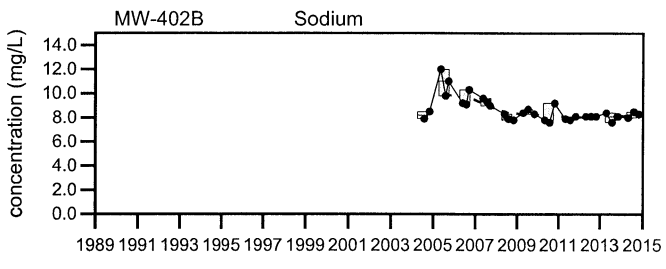
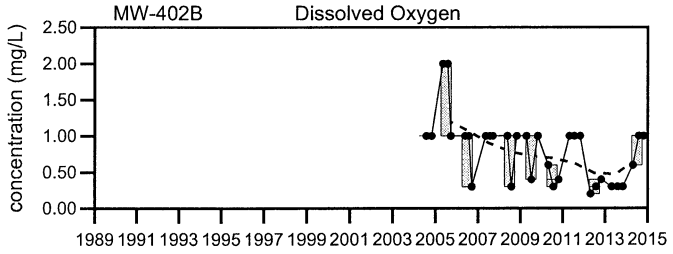
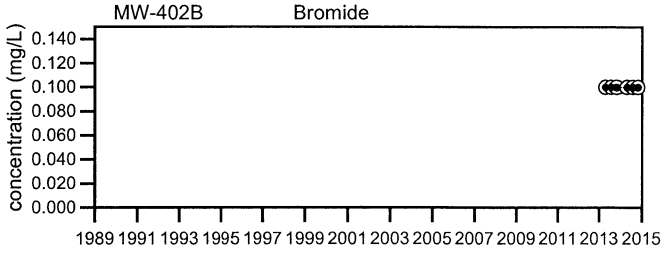
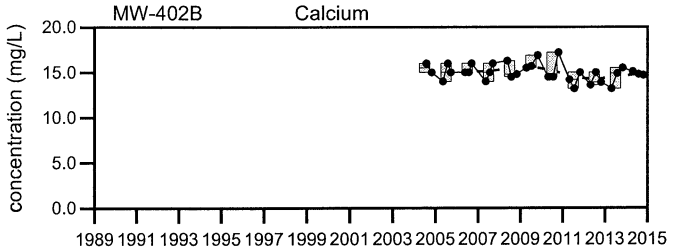
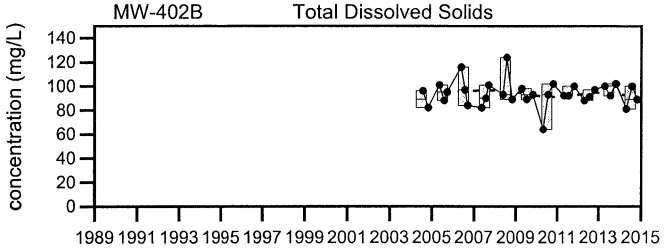


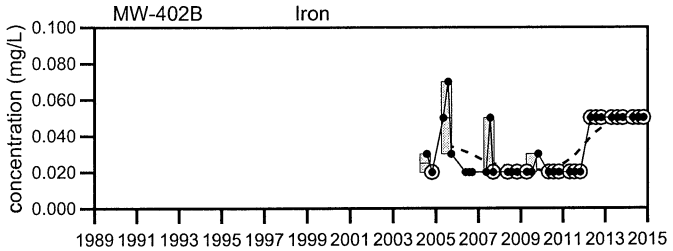


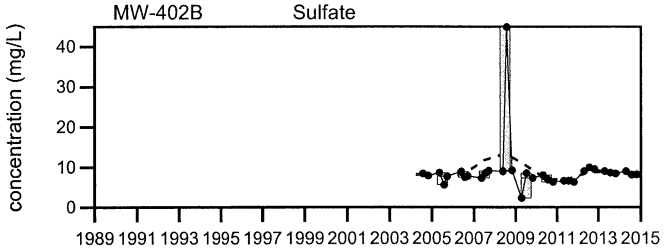


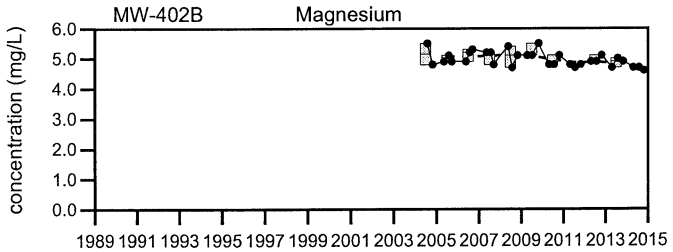


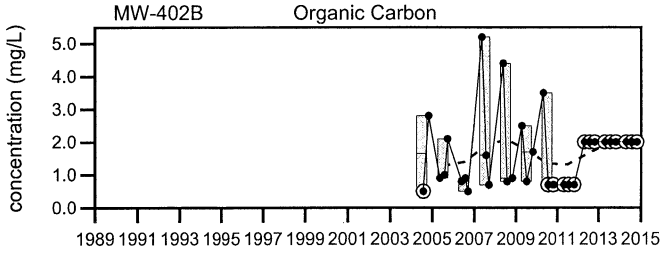


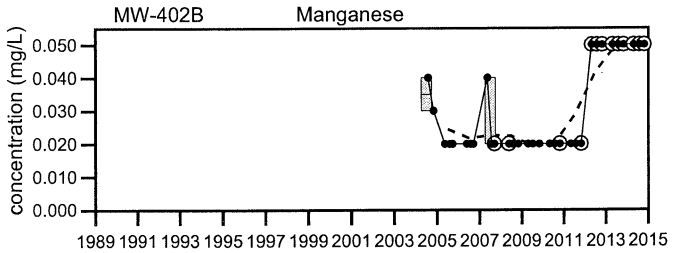


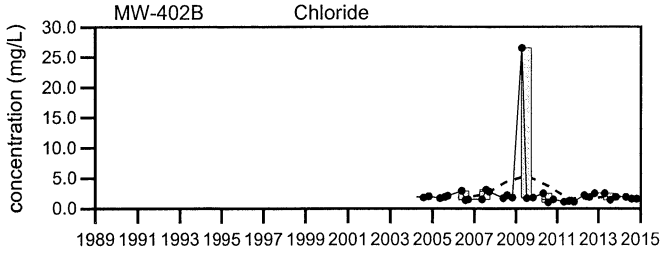


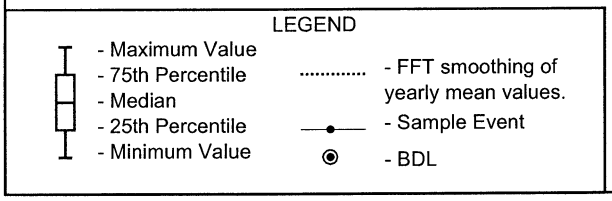












Juniper Ridge Landfill

MW-402B

Sevee & Maher Engineers, Inc.

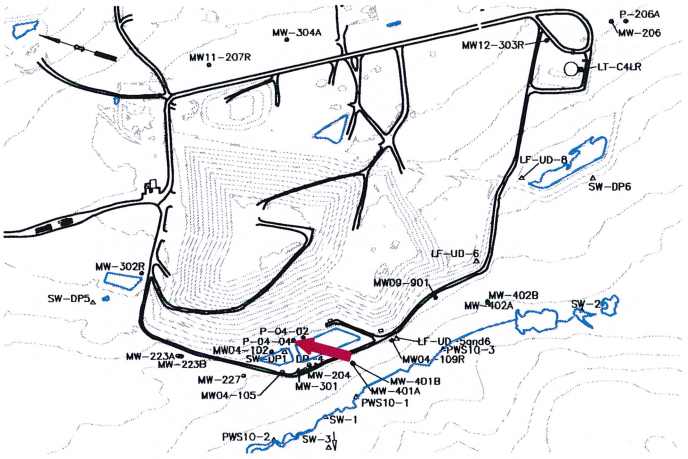
P-04-04

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

P-04-02 monitors the water quality in the overburden downgradient of the landfill, between the leachate pond and landfill toe.



Screen Interval:	**27.21 ft. to 32.21 ft.**
Sampled:	**3 Times Annually**
Sampled Since:	**02/05/04**
Material Screened:	**Overburden**
Well Condition:	**Good**
Sampling Method:	**Low Flow**

Chemical Summary

	2014				Historical			
Indicator Parameters	Q1	Q2	Q3	Q4	Min Max	Mean	SE	n
Water Level Elevation (Feet)		160.85	160.29	159.9	140.18 to 161.85	160	± 0.77	32
Dissolved Oxygen (mg/L)		5	3	3	1 to 6	3.5	± 0.26	32
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U to 0.1 U	0.1	± 0	3
Specific Conductance (µmhos/cm @25°C)		176	175	165	148 to 405	190	± 8.4	32
pH (Standard Units)		6.6	7.9	8.1	6.2 to 8.4	7.7	± 0.08	32
Alkalinity (CaCO3) (field) (mg/L)		50	45	50	35 to 150	81	± 5.6	30
Arsenic (mg/L)		**0.012**	0.008	↑ **0.013**	0.001 to 0.012	0.0058	± 0.000	32
Cadmium (mg/L)		↑ 0.0006 U	↑ 0.0006 U	↑ 0.0006 U	0.0002 U to 0.0005	0.00034	± 4E-05	27
Calcium (mg/L)		21.7	22.3	21.1	11 to 58.1	23	± 1.2	32
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U to 0.93	0.064	± 0.03	32
Magnesium (mg/L)		5.2	5.2	5	4.8 to 6.1	5.4	± 0.06	32
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U to 0.12	0.032	± 0.004	32
Nickel (mg/L)		↑ 0.005 U	↑ 0.005 U	↑ 0.005 U	0.002 U to 0.003	0.0027	± 0.000	27
Potassium (mg/L)		1.4	1.4	1.3	0.9 to 4.6	1.6	± 0.11	32
Sodium (mg/L)		4.1	4.3	3.9	3.6 to 73	8.2	± 2.2	32
Total Kjeldahl Nitrogen (mg/L)		0.5 U	0.5 U	0.5 U	0.17 to 0.7	0.41	± 0.03	30
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.1 U to 2.5	0.26	± 0.07	32
Total Dissolved Solids (mg/L)		112	113	102	92 to 287	120	± 5.8	32
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U to 21	4.6	± 0.54	32
Sulfate (mg/L)		8.2	7.2	7.4	5.5 to 28.8	9.8	± 0.95	32
Bicarbonate (CaCO3) (mg/L)		79	78	80	72 to 153	84	± 2.7	32
Organic Carbon (mg/L)		2 U	2 U	2 U	0.5 U to 3.8	1.4	± 0.13	32
Chemical Oxygen Demand (mg/L)		10 U	10 U	10 U	3 U to 13	4.7	± 0.55	32
Chloride (mg/L)		1.8	1.5	1.5	0.9 to 7.2	1.9	± 0.19	32
Turbidity (field) (NTU)		1.8	0.6	1.1	0 to 162	6.2	± 5	32
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U to 0.2 U	0.2	± 0	30

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Cadmium MCL=0.005 mg/L, MEG12=0.001 mg/L, Iron MEG12=5 mg/L, Manganese MEG12=0.5 mg/L, Nickel MEG12=0.02 mg/L, Sodium MEG12=20 mg/L, Nitrate (N) MCL=10 mg/L, MEG12=10 mg/L, Arsenic MCL=0.01 mg/L, MEG12=0.01 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

Data Group: 235
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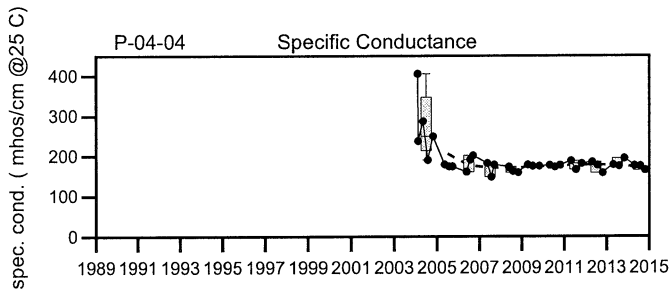
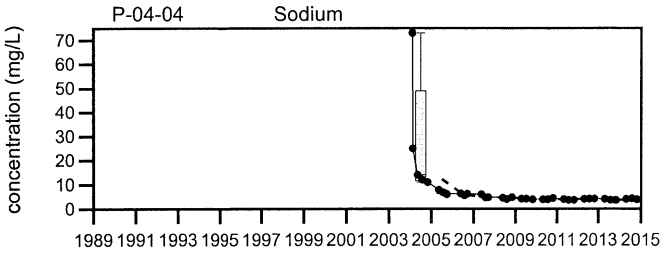
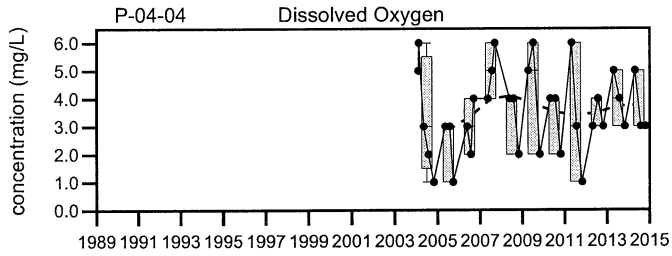
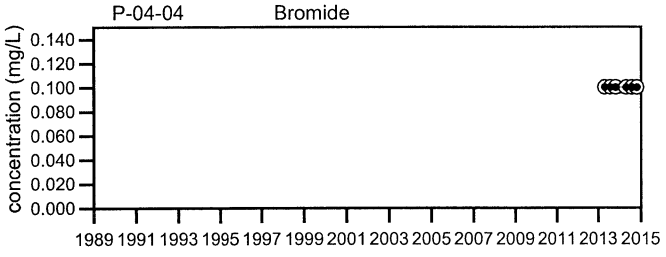
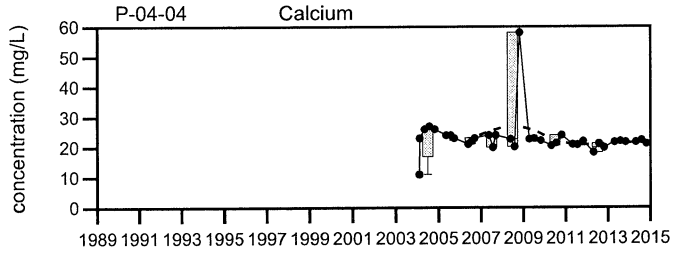
SME
Sowe & Maher Engineers, Inc.

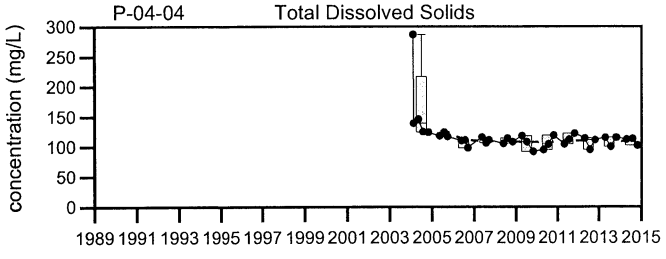


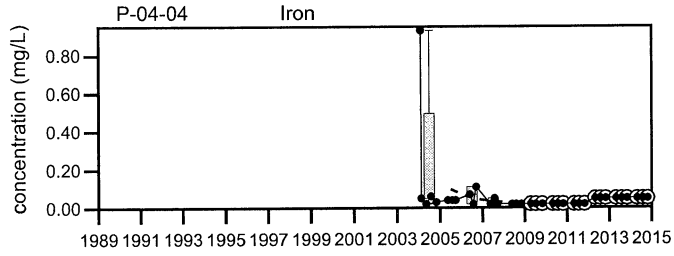


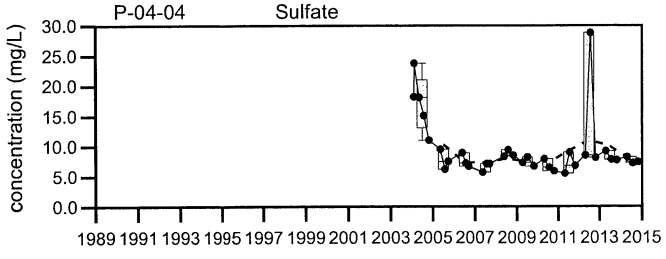


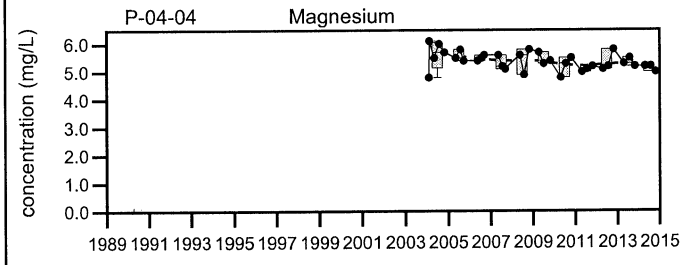


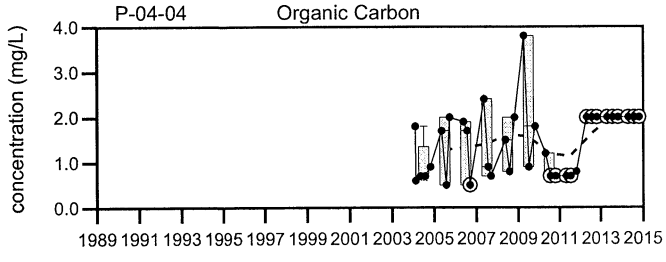


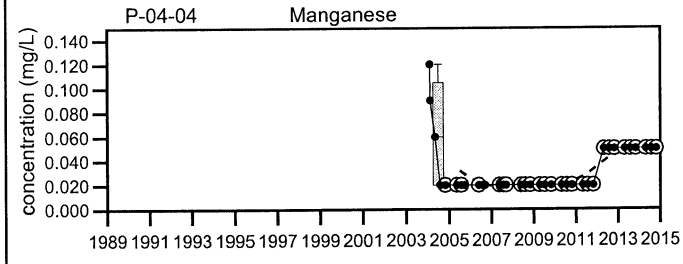


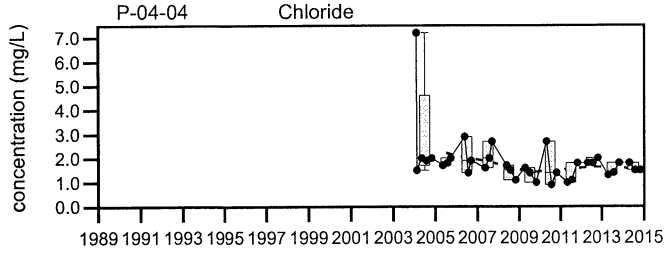


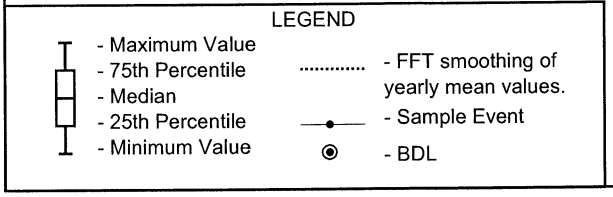












Juniper Ridge Landfill

P-04-04

Sevee & Maher Engineers, Inc.

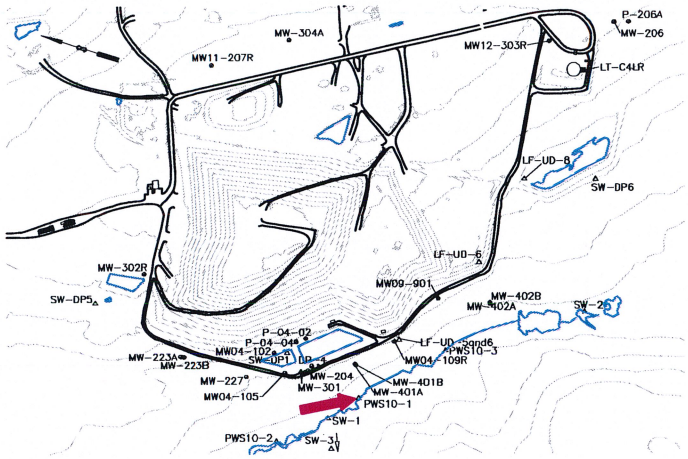
PWS10-1

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

PWS-1 is a pore water sampling location along the unnamed tributary to Pushaw stream. PWS-1 is downgradient of the landfill.



Sampled: **3 Times Annually**

Sampled Since: **04/26/2010**

Sampling Method: **Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	Q2	Q3	Q4	Historical Min	Max	Mean	SE	n
Dissolved Oxygen (mg/L)		2	1	4	0.3	to 5	1.8	± 0.42	12
Bromide (mg/L)		0.1 U	↑ 0.12	0.1 U	0.1 U	to 0.1	0.1	± 0	3
Specific Conductance (µmhos/cm @25°C)		342	277	↓ 76	104	to 438	210	± 28	12
pH (Standard Units)		6.5	6.2	↓ 5.4	5.5	to 6.5	6	± 0.09	12
Alkalinity (CaCO3) (field) (mg/L)		100	35	20	10	to 200	70	± 17	12
Arsenic (mg/L)		**0.015**	0.005 U	0.005 U	0.002 U	to 0.015	0.0078	± 0.001	12
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	to 0.0016	0.00052	± 0.000	12
Calcium (mg/L)		30.3	27.2	↓ 6.8	9.5	to 35.2	21	± 2.6	12
Iron (mg/L)		**6.52**	4.06	0.55	0.48	to 30.3	5	± 2.3	12
Magnesium (mg/L)		↑ 12.7	7.4	↓ 2.3	3.2	to 12.2	6.7	± 0.76	12
Manganese (mg/L)		0.19	0.26	0.05 U	0.05	to 0.72	0.25	± 0.06	12
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	to 0.034	0.0077	± 0.003	12
Potassium (mg/L)		1.1	2.1	0.7	0.4	to 2.8	1.3	± 0.2	12
Sodium (mg/L)		8.4	8.1	5.1	5.1	to 10	7.6	± 0.44	12
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.1 U	to 0.5	0.22	± 0.04	12
Phosphate Phosphorus (mg/L)		0.16	↑ 0.37	0.04 U	0.03	to 0.32	0.12	± 0.03	12
Total Dissolved Solids (mg/L)		↑ 197	171	↓ 87	90	to 177	140	± 7.8	12
Total Suspended Solids (mg/L)		34	4 U	4 U	4 U	to 786	88	± 64	12
Sulfate (mg/L)		2.2	2 U	3.3	1	to 10	3.1	± 0.74	12
Bicarbonate (CaCO3) (mg/L)		↑ 130	106	↓ 21	41	to 125	79	± 8.1	12
Organic Carbon (mg/L)		8.4	13.8	17.4	4.5	to 19.7	10	± 1.1	12
Chemical Oxygen Demand (mg/L)		27	41	54	20	to 58	34	± 3.1	12
Chloride (mg/L)		↑ 22.9	7.5	8.8	3.5	to 16.4	10	± 1.1	12
Turbidity (field) (NTU)		2.6	4.2	↓ 1.8	2.1	to 20	7.2	± 1.6	12
Tannin & Lignins (Tannic Acid) (mg/L)		0.99	2.7	3.3	0.75	to 5	2.2	± 0.43	12

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Manganese MEG12-p=0.5 mg/L, Arsenic MCL-pw=0.01 mg/L, MEG12-p=0.01 mg/L, Iron MEG12-p=5 mg/L, Nickel MEG12-p=0.02 mg/L, Sodium MEG12-p=20 mg/L, Nitrate (N) MCL-pw=10 mg/L, MEG12-p=10 mg/L, Cadmium MCL-pw=0.005 mg/L, MEG12-p=0.001 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

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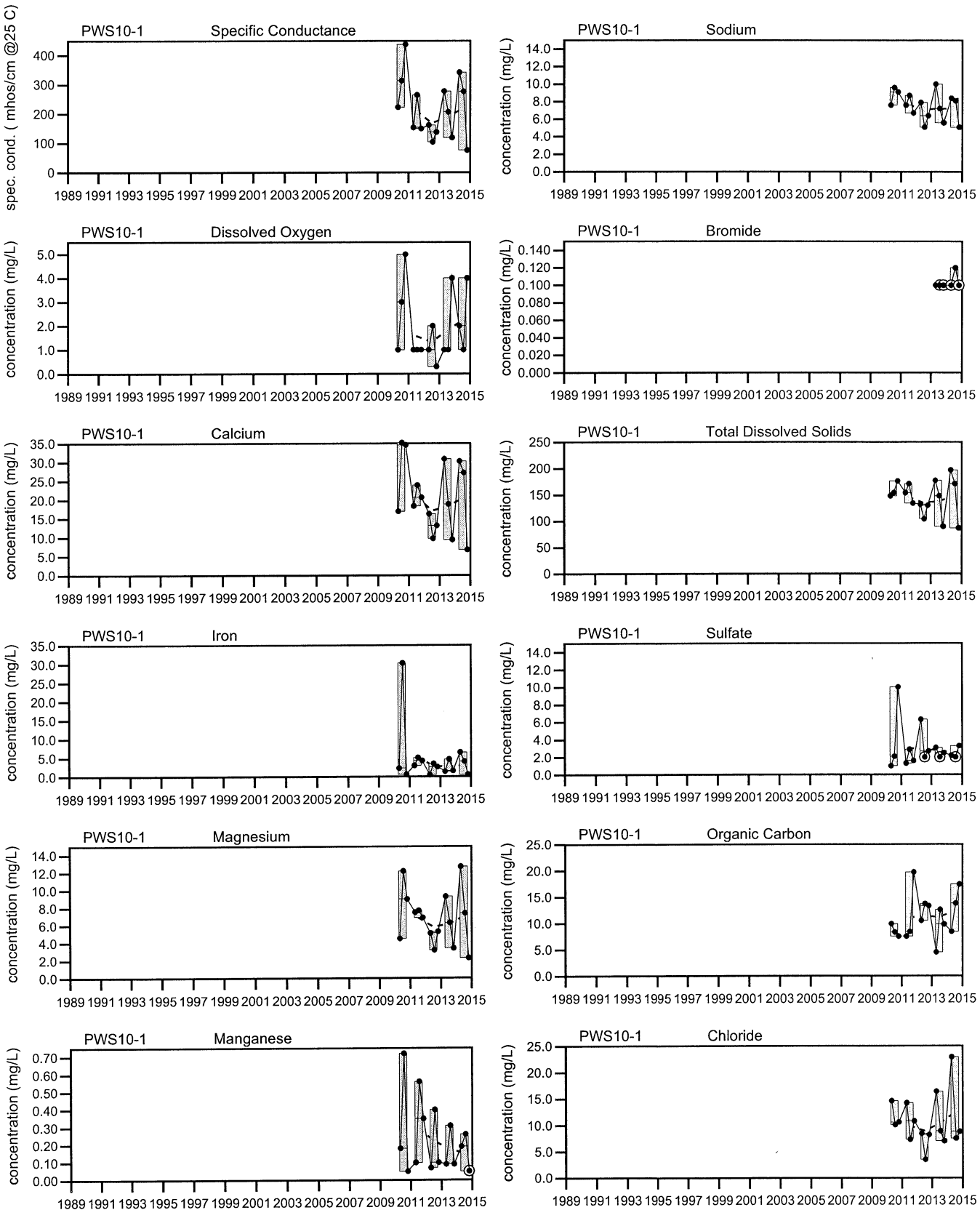
SME
Sewee & Maher Engineers, Inc.



LEGEND

- Maximum Value
- 75th Percentile
- Median
- 25th Percentile
- Minimum Value
- FFT smoothing of yearly mean values.
- Sample Event
- BDL

Juniper Ridge Landfill

PWS10-1

Sevee & Maher Engineers, Inc.

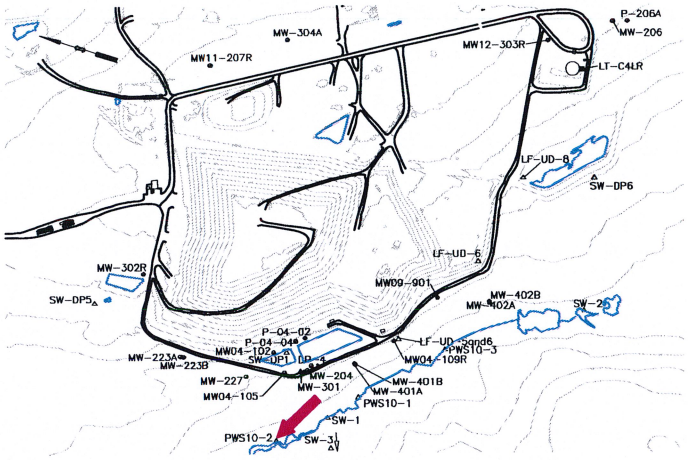
PWS10-2

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

PWS-2 is a pore water sampling location along the unnamed tributary to Pushaw stream. PWS-2 is downgradient of the landfill.



Sampled: **3 Times Annually**

Sampled Since: **04/26/2010**

Sampling Method: **Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	Q2	Q3	Q4	Historical Min	Max	Mean	SE	n
Dissolved Oxygen (mg/L)		1	↓ 0.4	1	1	to 8	3.3	± 0.66	12
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to 0.1 U	0.1	± 0	3
Specific Conductance (µmhos/cm @25°C)		↓ 63	140	131	66	to 157	100	± 8.5	12
pH (Standard Units)		↑ 7.3	5.7	5.7	5.4	to 6.7	5.9	± 0.12	12
Alkalinity (CaCO3) (field) (mg/L)		40	25	15	15	to 135	38	± 9.5	12
Arsenic (mg/L)		0.005	↑ **0.014**	↑ **0.012**	0.002 U	to 0.006	0.0043	± 0.000	12
Cadmium (mg/L)		↑ **0.0016**	0.0006 U	0.0006 U	0.0002 U	to 0.0014	0.00051	± 1E-04	12
Calcium (mg/L)		10.1	14.3	13.2	5.7	to 15.2	9.4	± 0.89	12
Iron (mg/L)		4.83	2.25	2.16	0.32	to 6.07	2	± 0.45	12
Magnesium (mg/L)		3.4	↑ 4	3	1.4	to 3.9	2.4	± 0.23	12
Manganese (mg/L)		0.17	0.05 U	0.16	0.02 U	to 0.44	0.11	± 0.04	12
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	to 0.007	0.004	± 0.000	12
Potassium (mg/L)		1.1	0.3 U	0.6	0.3 U	to 1.1	0.63	± 0.08	12
Sodium (mg/L)		3.5	↑ 5.8	↑ 5.5	2.8	to 5.1	4	± 0.23	12
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.1 U	to 0.4	0.22	± 0.03	12
Phosphate Phosphorus (mg/L)		0.05	0.04	0.05	0.02	to 0.1	0.044	± 0.007	12
Total Dissolved Solids (mg/L)		↓ 38	↑ 119	↑ 113	59	to 111	82	± 4.5	12
Total Suspended Solids (mg/L)		34	7	4 U	4 U	to 182	33	± 15	12
Sulfate (mg/L)		2.5	2 U	↑ 8.8	1.6	to 8.4	4.1	± 0.69	12
Bicarbonate (CaCO3) (mg/L)		36	55	38	9.3	to 62	27	± 4.3	12
Organic Carbon (mg/L)		↓ 4.7	10.4	13.6	5.5	to 14.7	9.8	± 0.78	12
Chemical Oxygen Demand (mg/L)		30	25	48	18	to 55	31	± 3	12
Chloride (mg/L)		8.4	8.3	9.8	3.2	to 19.8	7.6	± 1.4	12
Turbidity (field) (NTU)		2.2	↓ 1.5	2.2	1.6	to 6.5	3.6	± 0.48	12
Tannin & Lignins (Tannic Acid) (mg/L)		↓ 0.86	1.5	2.4	1 U	to 5.1	1.9	± 0.33	12

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Manganese MEG12-p=0.5 mg/L, Arsenic MCL-pw=0.01 mg/L, MEG12-p=0.01 mg/L, Iron MEG12-p=5 mg/L, Nickel MEG12-p=0.02 mg/L, Sodium MEG12-p=20 mg/L, Nitrate (N) MCL-pw=10 mg/L, MEG12-p=10 mg/L, Cadmium MCL-pw=0.005 mg/L, MEG12-p=0.001 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
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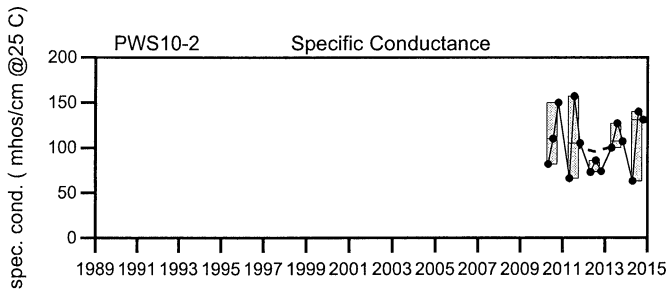
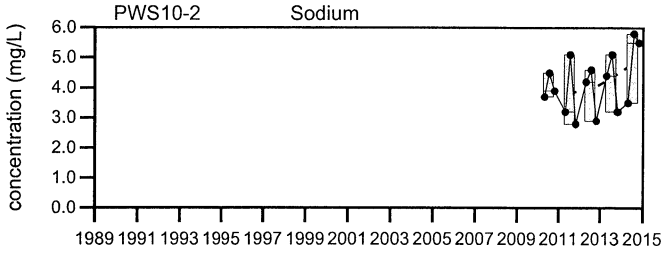
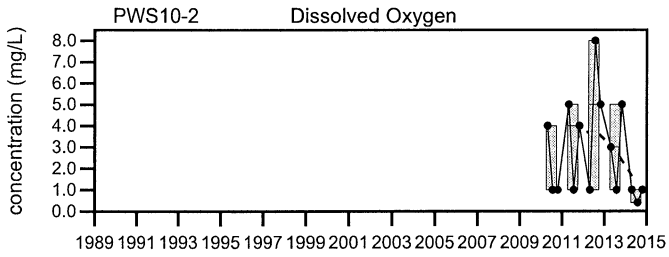
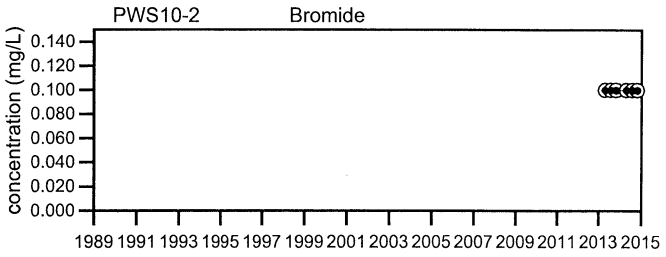
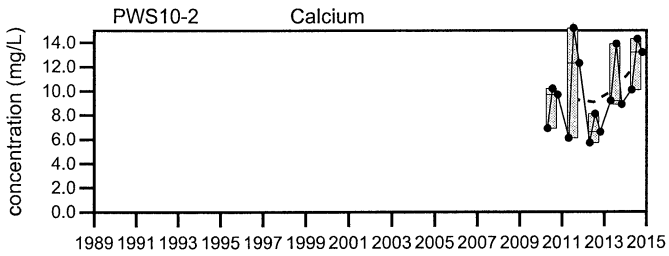
SME
Sewee & Maher Engineers, Inc.

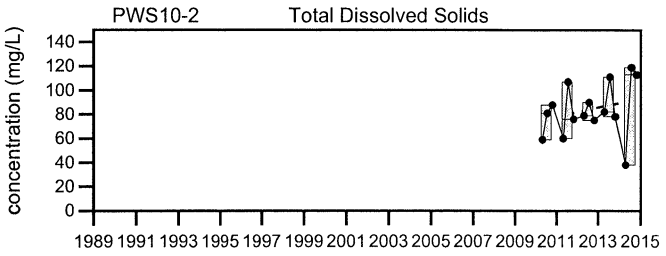


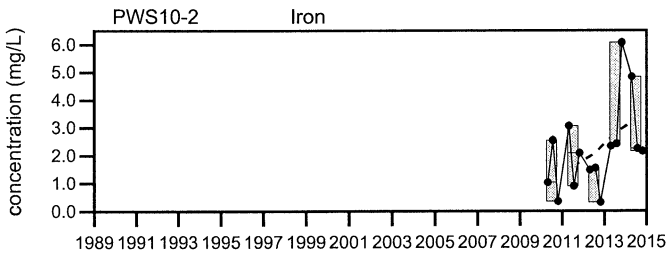


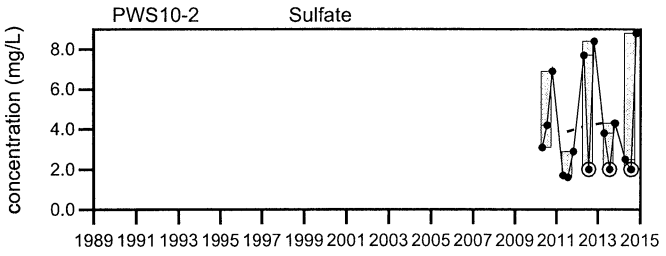


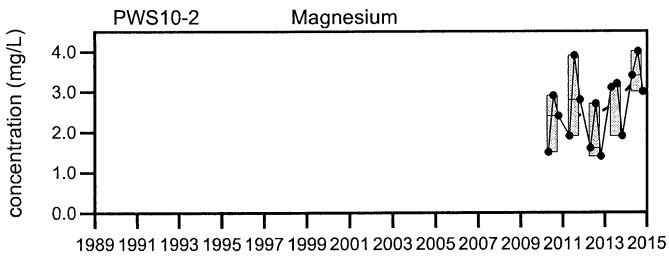


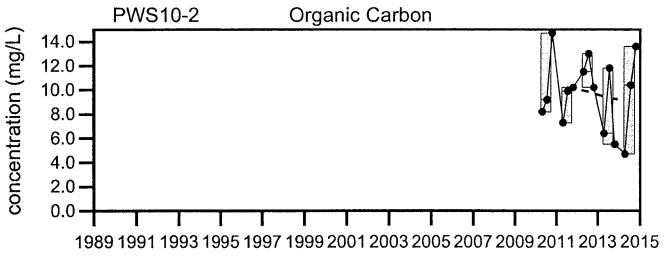


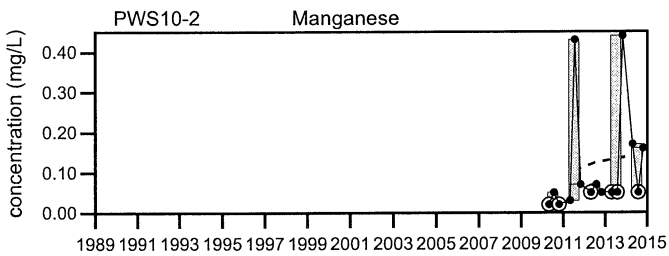


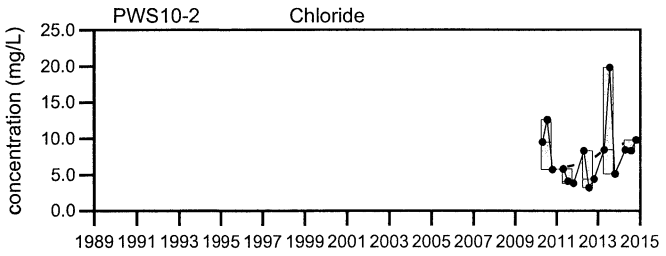


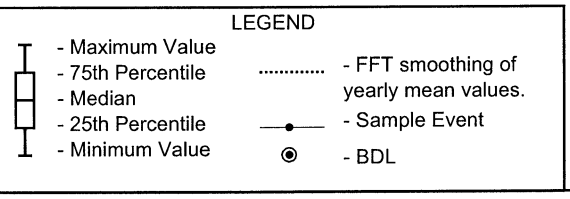












Juniper Ridge Landfill

PWS10-2

Sevee & Maher Engineers, Inc.

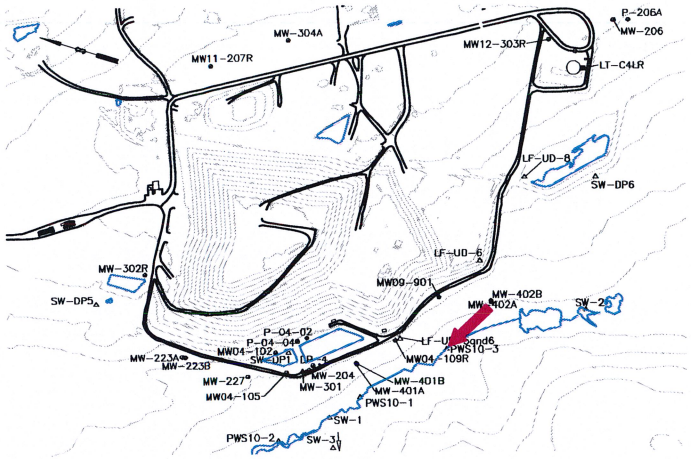
PWS10-3

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

PWS-3 is a pore water sampling location along the unnamed tributary to Pushaw stream. PWS-3 is downgradient of the landfill.



Sampled: **3 Times Annually**

Sampled Since: **04/26/2010**

Sampling Method: **Low Flow**

Chemical Summary

Indicator Parameters	2014 Q1	Q2	Q3	Q4	Historical Min	Max	Mean	SE	n
Dissolved Oxygen (mg/L)		3	2	4	0.8	to 5	2.6	± 0.42	12
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to 0.1 U	0.1	± 0	3
Specific Conductance (µmhos/cm @25°C)		76	116	↓ 42	59	to 222	130	± 17	12
pH (Standard Units)		6.3	5.6	5	5	to 7	5.9	± 0.17	12
Alkalinity (CaCO3) (field) (mg/L)		35	20	20	15	to 145	60	± 13	12
Arsenic (mg/L)		0.007	0.005 U	0.006	0.002 U	to 0.011	0.005	± 0.000	12
Cadmium (mg/L)		0.0006	0.0006 U	0.0006 U	0.0002 U	to 0.001	0.00047	± 8E-05	12
Calcium (mg/L)		9.9	7.5	6.2	4.4	to 25	11	± 1.9	12
Iron (mg/L)		**0.29**	**5.45**	1.2	0.34	to 20.8	4.5	± 1.7	12
Magnesium (mg/L)		↑ 4.5	2.2	2.2	1.7	to 4.3	2.8	± 0.25	12
Manganese (mg/L)		0.35	0.22	0.07	0.02	to 1.48	0.29	± 0.12	12
Nickel (mg/L)		↑ 0.006	0.005 U	0.005 U	0.002 U	to 0.005 U	0.0035	± 0.000	12
Potassium (mg/L)		↑ 1.4	0.7	0.6	0.1	to 1.3	0.53	± 0.11	12
Sodium (mg/L)		5.4	5.3	5.2	2.5	to 5.8	4.1	± 0.27	12
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.1 U	to 0.5	0.23	± 0.04	12
Phosphate Phosphorus (mg/L)		0.2	0.27	0.06	0.03	to 0.5	0.15	± 0.05	12
Total Dissolved Solids (mg/L)		107	92	89	66	to 141	98	± 6.5	12
Total Suspended Solids (mg/L)		↑ 489	57	19	4 U	to 101	30	± 8.1	12
Sulfate (mg/L)		5	2 U	2.5	0.6 U	to 6.3	2.4	± 0.48	12
Bicarbonate (CaCO3) (mg/L)		35	32	24	11.8	to 87	40	± 7.4	12
Organic Carbon (mg/L)		17	14.8	18.4	2.1	to 21.6	12	± 1.7	12
Chemical Oxygen Demand (mg/L)		51	46	60	11	to 251	67	± 18	12
Chloride (mg/L)		6.3	5.2	↑ 8.9	1.7	to 7.7	3.9	± 0.51	12
Turbidity (field) (NTU)		↓ 3.1	4.2	↓ 2.1	3.5	to 18.3	6.5	± 1.1	12
Tannin & Lignins (Tannic Acid) (mg/L)		2	3	3.5	0.45	to 5.2	2.6	± 0.42	12

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Manganese MEG12-p=0.5 mg/L, Arsenic MCL-pw=0.01 mg/L, MEG12-p=0.01 mg/L, Iron MEG12-p=5 mg/L, Nickel MEG12-p=0.02 mg/L, Sodium MEG12-p=20 mg/L, Nitrate (N) MCL-pw=10 mg/L, MEG12-p=10 mg/L, Cadmium MCL-pw=0.005 mg/L, MEG12-p=0.001 mg/L

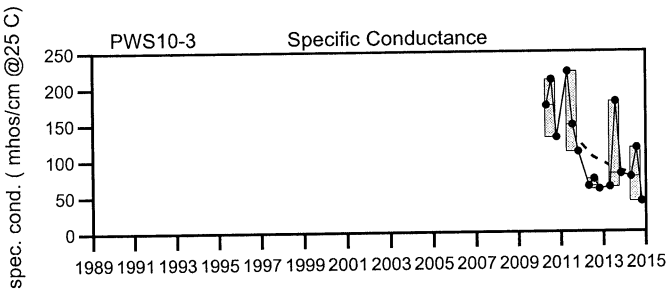
↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

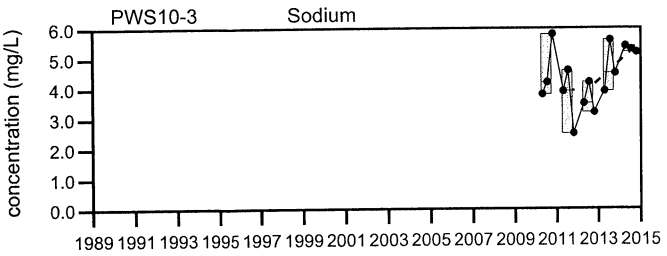
Comments

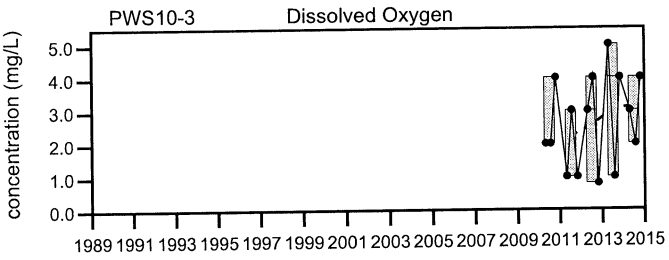
Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed.

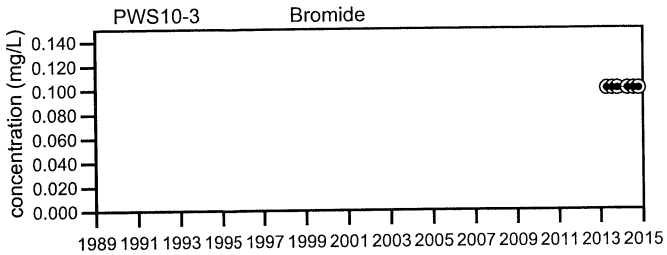
Data Group: 235
Printed: 3/24/2015 13:39

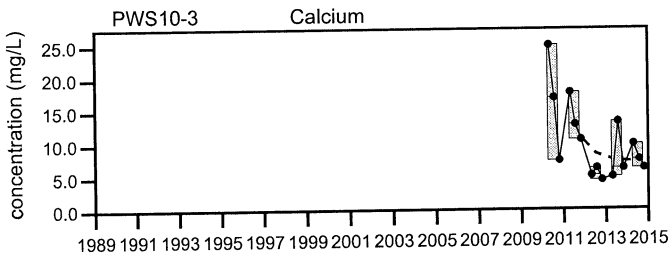
SME
Sevee & Maher Engineers, Inc.

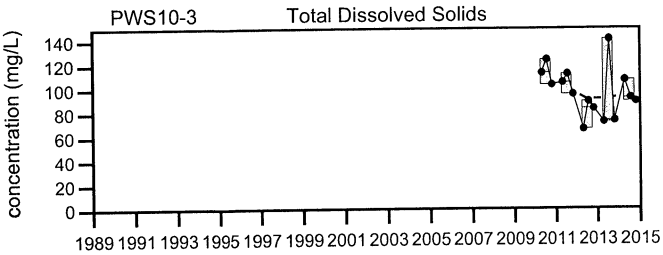


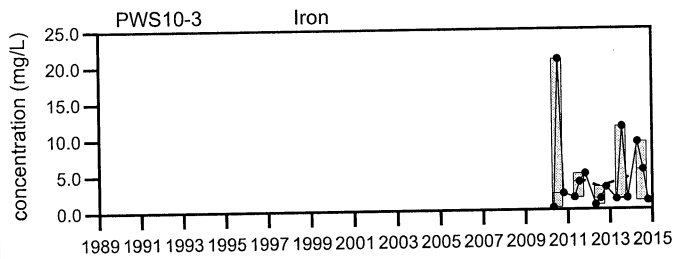


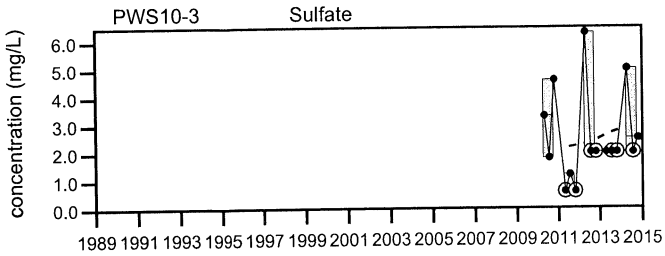


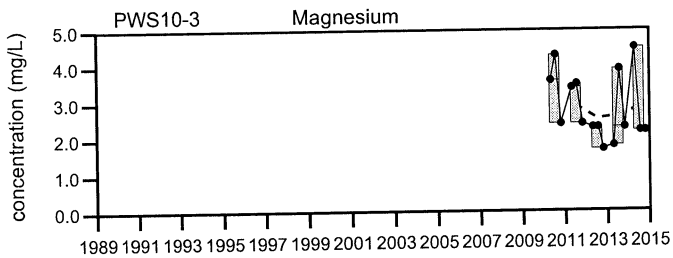


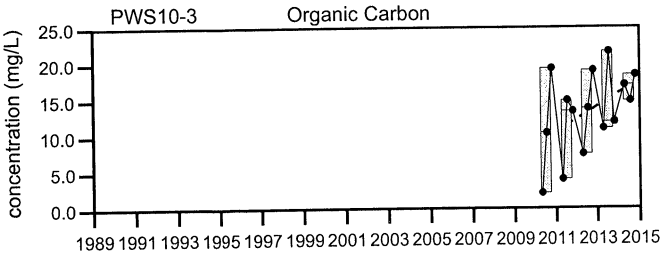


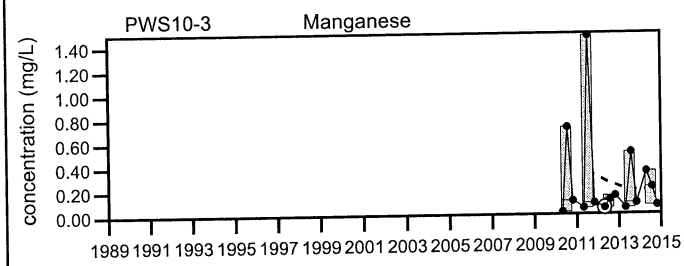


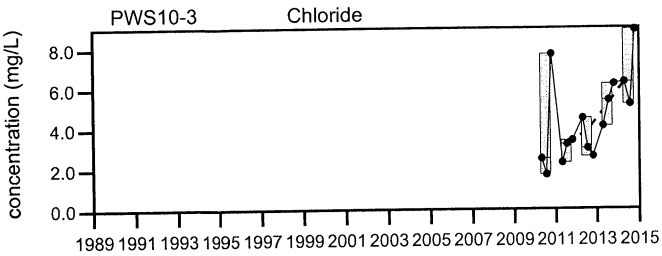


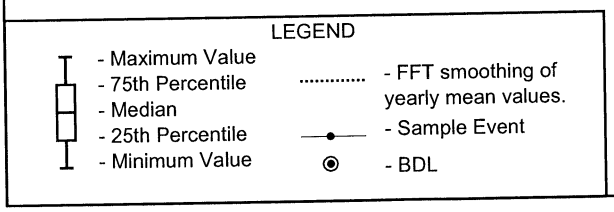












Juniper Ridge Landfill

PWS10-3

Sevee & Maher Engineers, Inc.

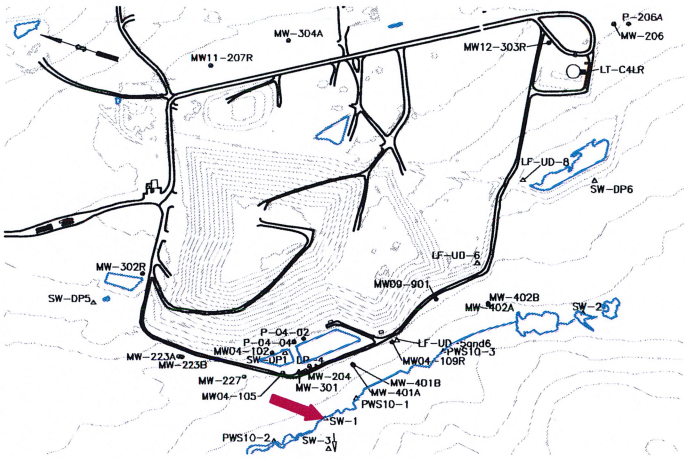
SW-1

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

SW-1 is located downgradient of the landfill and monitors surface water quality in an unnamed tributary to Pushaw Stream.



Sampled: **3 Times Annually**

Sampled Since: **11/13/90**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min		Historical Max	Historical Mean	±	SE	n
Dissolved Oxygen (mg/L)		6	4	6	0.6	to	13.2	4.8	±	0.31	69
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to	0.1 U	0.1	±	0	3
Specific Conductance (µmhos/cm @25°C)		154	75	83	10	to	345	95	±	6.7	71
pH (Standard Units)		7	7.1	7.5	5.8	to	8.1	6.9	±	0.07	71
Alkalinity (CaCO3) (field) (mg/L)		35	20	20	10	to	135	42	±	5.7	28
Arsenic (mg/L)		0.005 U	0.005 U	0.007	0.001	to	0.01	0.004	±	0.000	29
Cadmium (mg/L)		0.00006	0.00006	0.00006	0.00002 U	to	0.0005	0.0016	±	0.000	38
Calcium (mg/L)		14.8	7.5	7.9	3.1	to	48	9.6	±	0.96	59
Iron (mg/L)		0.74	0.73	0.86	0.1	to	19.4	2	±	0.39	64
Magnesium (mg/L)		3.8	2.3	2.6	0.21	to	10.7	2.7	±	0.21	59
Manganese (mg/L)		0.06	0.05 U	0.05 U	0.001	to	4.8	0.22	±	0.08	64
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	to	0.01	0.0034	±	0.000	26
Potassium (mg/L)		1	0.3	0.6	0.1	to	5	1.1	±	0.2	29
Sodium (mg/L)		8	4.3	5.5	2.9	to	12	5.6	±	0.23	64
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.05 U	to	0.3	0.11	±	0.01	41
Phosphate Phosphorus (mg/L)		0.04	0.04 U	0.04 U	0.01 U	to	0.81	0.083	±	0.02	41
Total Dissolved Solids (mg/L)		98	80	97	30	to	230	84	±	4.4	64
Total Suspended Solids (mg/L)		4 U	4 U	15	4 U	to	1490	68	±	51	29
Sulfate (mg/L)		6.2	2 U	2.8	0.2	to	17	3.1	±	0.34	64
Bicarbonate (CaCO3) (mg/L)		41	27	20	10.6	to	148	37	±	6.4	29
Organic Carbon (mg/L)		5.7	14.6	16.5	5.2	to	34	12	±	0.54	64
Biochemical Oxygen Demand (mg/L)		2 U	3 U	2 U	1 U	to	12	4.5	±	0.33	41
Chemical Oxygen Demand (mg/L)		24	41	45	15	to	752	59	±	13	64
Chloride (mg/L)		↑ 27.6	5.1	8.4	1 U	to	22.7	7.3	±	0.52	64
Turbidity (field) (NTU)		3.4	2.7	3.1	0	to	175	6.4	±	3.5	50
Tannin & Lignins (Tannic Acid) (mg/L)		0.75	2.7	2.9	0.2 U	to	4.5	2.3	±	0.12	64

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Chloride MFCCC=230 mg/L, Arsenic MFCCC=0.15 mg/L, Cadmium MFCCC=0.00008 mg/L, Iron MFCCC=1 mg/L, Nickel MFCCC=0.0134 mg/L

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed. April 2014, July 2014 and October 2014 Cadmium results are non-detect above the laboratory reporting limit (0.00006U mg/l).

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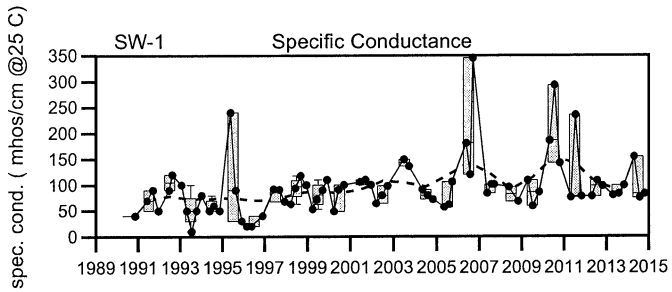
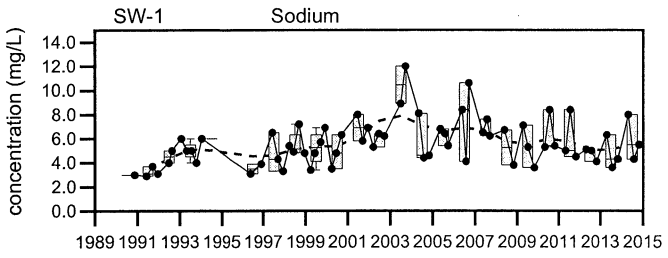
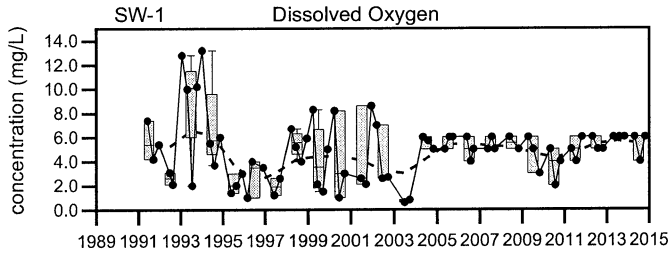
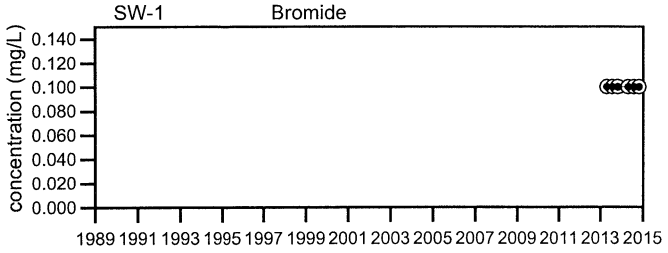
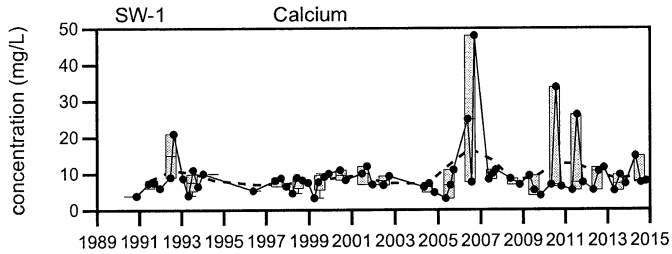
SME
Sewee & Maher Engineers, Inc.

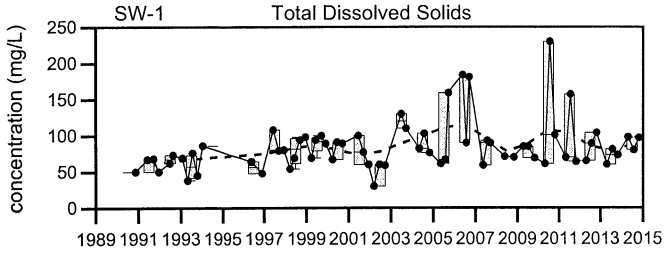


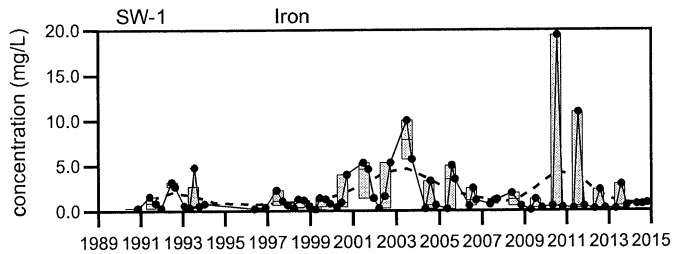


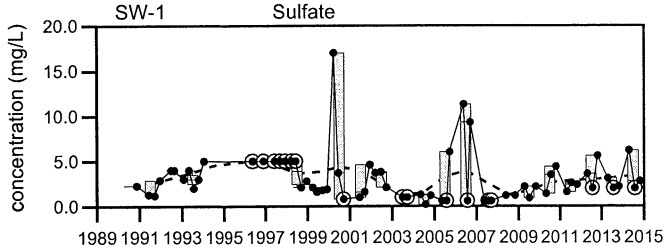


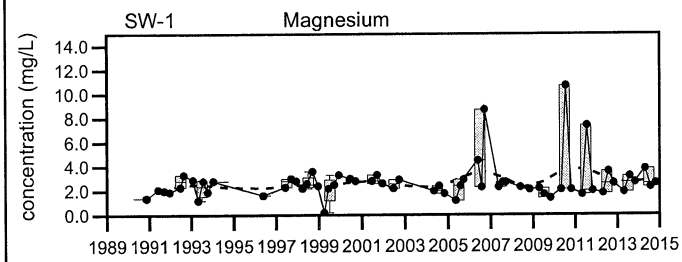


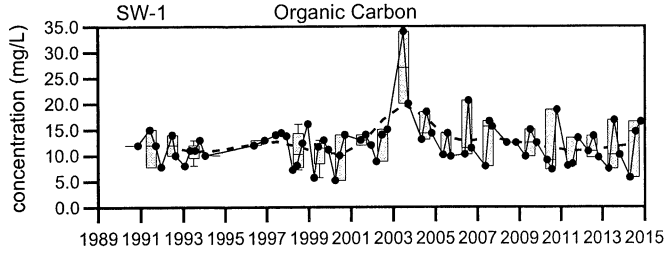


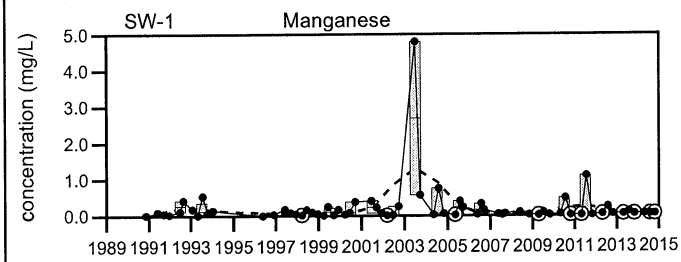


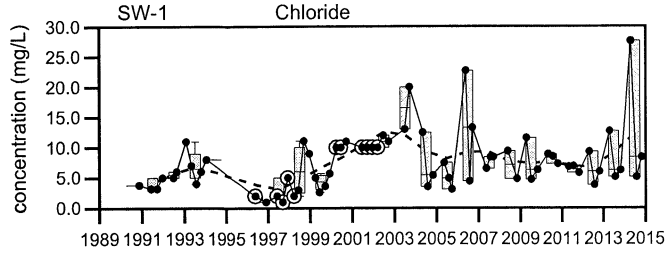












LEGEND

- Maximum Value
- 75th Percentile
- Median
- 25th Percentile
- Minimum Value
- FFT smoothing of yearly mean values.
- Sample Event
- BDL

Juniper Ridge Landfill

SW-1

Sevee & Maher Engineers, Inc.

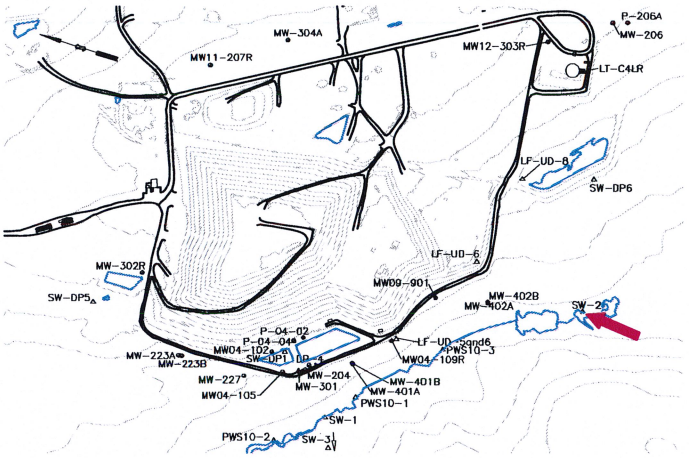
SW-2

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

SW-2 is located upgradient of the landfill and monitors surface water quality in an unnamed tributary to Pushaw Stream.



Sampled: **3 Times Annually**

Sampled Since: **11/13/90**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min		Historical Max	Historical Mean	SE	n
Dissolved Oxygen (mg/L)		6	6	5	0.4	to	13.7	4.2	± 0.29	77
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to	0.1 U	0.1	± 0	3
Specific Conductance (µmhos/cm @25°C)		76	66	74	10	to	150	73	± 2.9	79
pH (Standard Units)		7	7.8	7	5.42	to	8.4	6.6	± 0.07	79
Alkalinity (CaCO3) (field) (mg/L)		25	15	15	15	to	50	28	± 1.6	30
Arsenic (mg/L)		0.005 U	0.005 U	0.005 U	0.001 U	to	0.007	0.0032	± 0.000	30
Cadmium (mg/L)		0.00006	0.00006	0.00006	0.00002 U	to	0.0004	0.0017	± 0.000	41
Calcium (mg/L)		4.7	5.9	6.3	0.1 U	to	10	5.7	± 0.25	65
Iron (mg/L)		0.24	**1.52**	0.5	0.03 U	to	8.8	1.2	± 0.14	71
Magnesium (mg/L)		1.8	2	2.2	0.1 U	to	3.7	2	± 0.08	65
Manganese (mg/L)		0.05 U	0.12	0.05 U	0.003	to	0.43	0.085	± 0.008	71
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	to	0.006	0.003	± 0.000	27
Potassium (mg/L)		0.8	0.3 U	0.6	0.1 U	to	1.4	0.52	± 0.06	30
Sodium (mg/L)		5.5	4.2	5.3	1 U	to	14	5.4	± 0.27	71
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.05 U	to	2.1	0.16	± 0.05	44
Phosphate Phosphorus (mg/L)		0.04 U	0.1	0.04 U	0.01	to	0.31	0.047	± 0.009	44
Total Dissolved Solids (mg/L)		56	76	95	2	to	119	68	± 2.4	71
Total Suspended Solids (mg/L)		4 U	42	4 U	4 U	to	89	9.4	± 2.9	30
Sulfate (mg/L)		2.6	2 U	2.2	0.1 U	to	8	2	± 0.2	71
Bicarbonate (CaCO3) (mg/L)		13.6	26	13.7	8.5	to	35	19	± 1.2	30
Organic Carbon (mg/L)		6.6	15.1	17.6	1 U	to	24.1	14	± 0.56	71
Biochemical Oxygen Demand (mg/L)		2 U	5	2 U	1 U	to	16	4.9	± 0.34	43
Chemical Oxygen Demand (mg/L)		20	52	51	9.6	to	100	43	± 1.8	71
Chloride (mg/L)		16.1	5.3	9	2 U	to	23	7.7	± 0.52	71
Turbidity (field) (NTU)		2.6	2.8	2.5	0	to	10	1.6	± 0.26	53
Tannin & Lignins (Tannic Acid) (mg/L)		1.2	2.9	3.7	0.8	to	5.4	3	± 0.12	71

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Chloride MFCCC=230 mg/L, Arsenic MFCCC=0.15 mg/L, Cadmium MFCCC=0.00008 mg/L, Iron MFCCC=1 mg/L, Nickel MFCCC=0.0134 mg/L

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Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed. April 2014, July 2014 and October 2014 Cadmium results are non-detect above the laboratory reporting limit (0.00006U mg/l).

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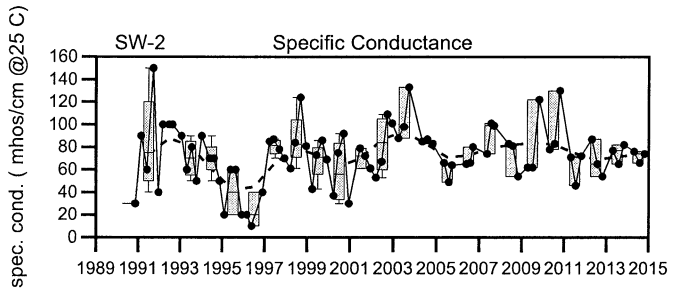
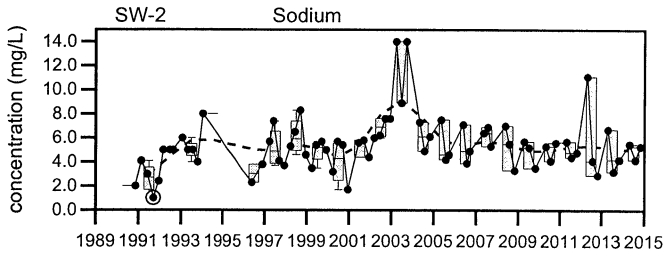
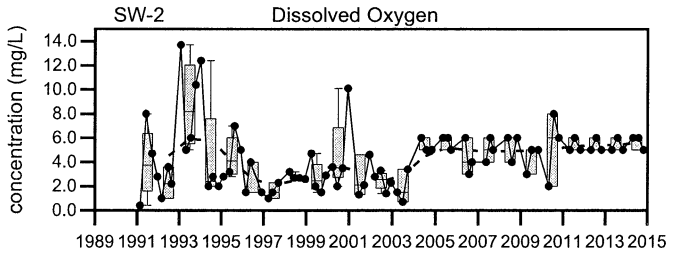
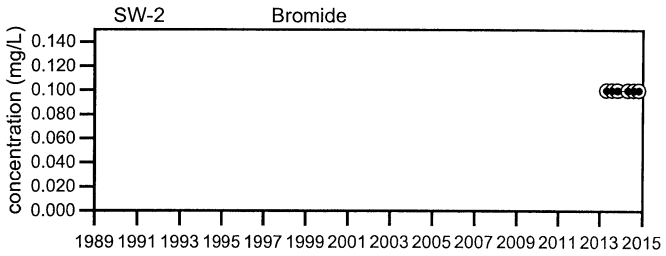
Printed: 3/24/2015 13:39

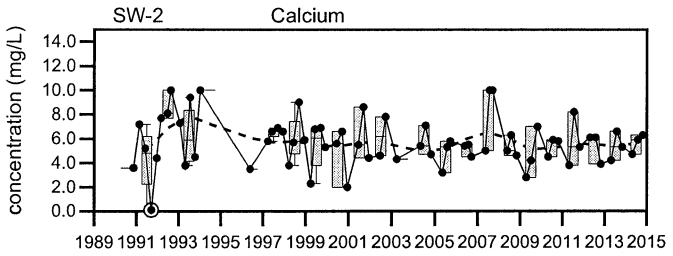
SME
Sewee & Maher Engineers, Inc.

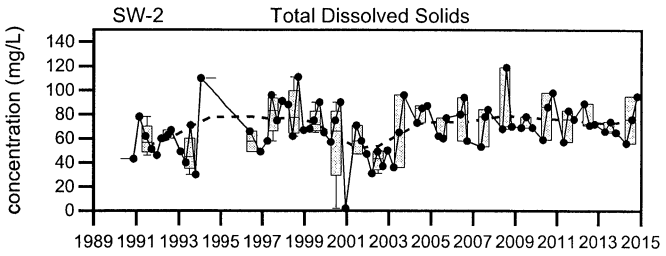


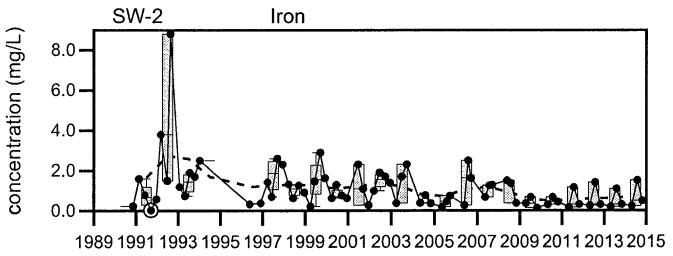


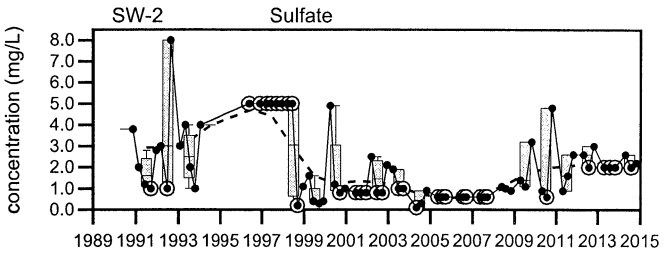


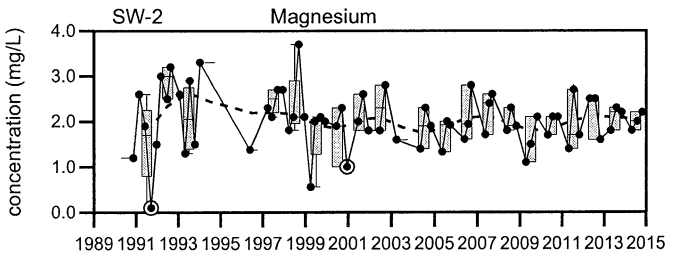


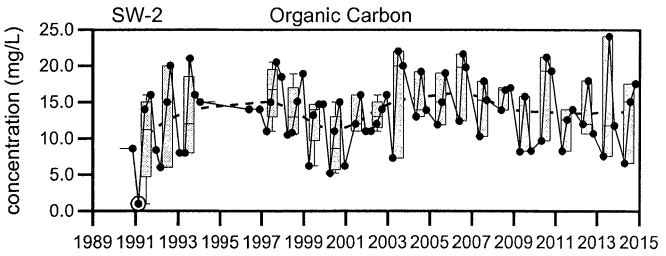


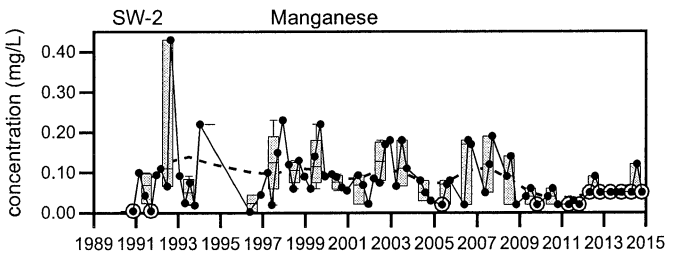


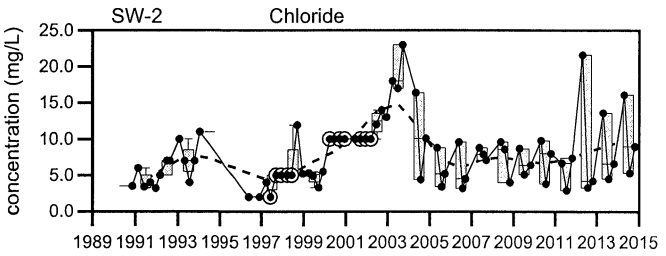


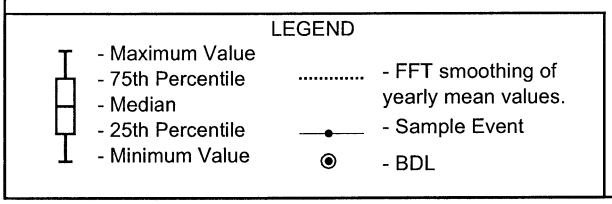












Juniper Ridge Landfill

SW-2

Sevee & Maher Engineers, Inc.

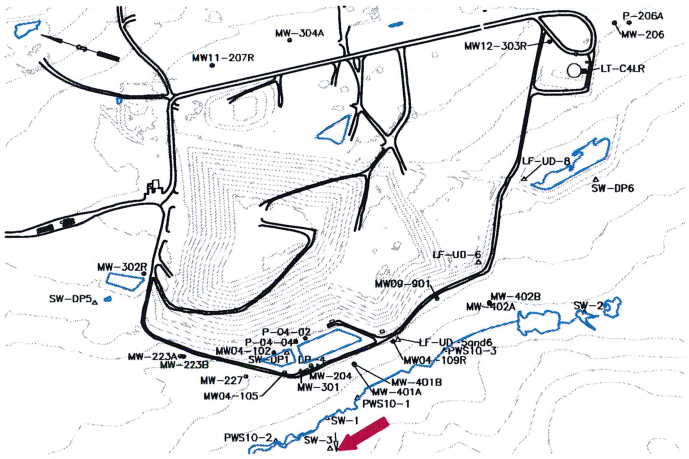
SW-3

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

SW-3 is located downgradient of the landfill and monitors surface water quality in an unnamed tributary of Pushaw Stream.



Sampled: **3 Times Annually**

Sampled Since: **05/26/94**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Dissolved Oxygen (mg/L)		6	5	5	1	12.1	5.5	0.31	62
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1	0	3
Specific Conductance (µmhos/cm @25°C)		71	81	78	20	151	79	3.4	63
pH (Standard Units)		7.3	7.9	7.7	5.4	8.2	6.6	0.07	63
Alkalinity (CaCO3) (field) (mg/L)		30	15	15	15	100	32	3.2	30
Arsenic (mg/L)		0.005 U	0.005 U	0.005 U	0.001 U	0.005	0.0028	0.000	30
Cadmium (mg/L)		0.00006	0.00006	0.00006	0.00002 U	0.0003	0.0015	0.000	36
Calcium (mg/L)		4.4	7.7	8	2.8	11.2	6.8	0.27	56
Iron (mg/L)		0.19	0.49	0.46	0.17	3.5	0.93	0.09	63
Magnesium (mg/L)		1.3	1.9	2.2	0.47	3.1	1.9	0.08	56
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.004	1.3	0.15	0.03	63
Nickel (mg/L)		↑ 0.005 U	↑ 0.005 U	↑ 0.005 U	0.002 U	0.003	0.0028	0.000	27
Potassium (mg/L)		0.6	0.6	0.9	0.2	1.6	0.66	0.07	30
Sodium (mg/L)		4.9	3.4	4.7	2.4	9.3	4.6	0.16	63
Nitrate (N) (mg/L)		↑ 0.3 U	↑ 0.3 U	↑ 0.3 U	0.05 U	0.2	0.12	0.01	39
Phosphate Phosphorus (mg/L)		0.04 U	0.04 U	0.04 U	0.01 U	0.4	0.043	0.01	39
Total Dissolved Solids (mg/L)		53	75	90	31	210	72	3.1	63
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	16	4.8	0.45	30
Sulfate (mg/L)		3.3	2 U	5.7	0.4	35	3.8	0.62	63
Bicarbonate (CaCO3) (mg/L)		12	27	15.1	10	40	22	1.6	30
Organic Carbon (mg/L)		6.4	10	15.4	5.7	40	13	0.58	63
Biochemical Oxygen Demand (mg/L)		2 U	3 U	2 U	1 U	6 U	4.9	0.21	39
Chemical Oxygen Demand (mg/L)		22	24	51	18	61	35	1.2	63
Chloride (mg/L)		↑ 13.8	5.3	7	1 U	12	6.1	0.37	63
Turbidity (field) (NTU)		0.8	0.5	1.2	0	16	1.8	0.38	51
Tannin & Lignins (Tannic Acid) (mg/L)		0.98	1.5	1.2	0.5 U	4.7	2.1	0.09	63

underlined/bold - values exceed a regulatory standard listed below.

Applicable Limits:
Chloride MFCCC=230 mg/L, Arsenic MFCCC=0.15 mg/L, Cadmium MFCCC=0.00008 mg/L, Iron MFCCC=1 mg/L, Nickel MFCCC=0.0134 mg/L

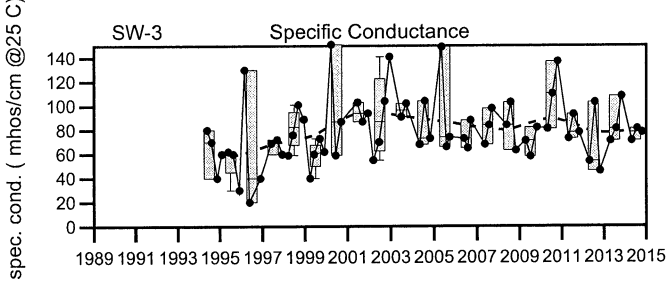
↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

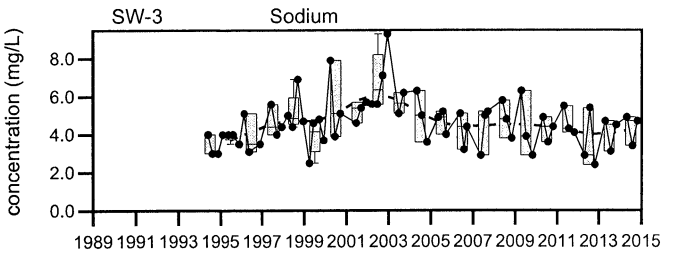
Comments

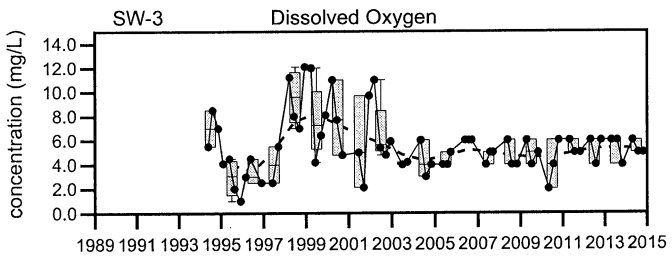
Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed. April 2014, July 2014 and October 2014 Cadmium results are non-detect above the laboratory reporting limit (0.00006U mg/l).

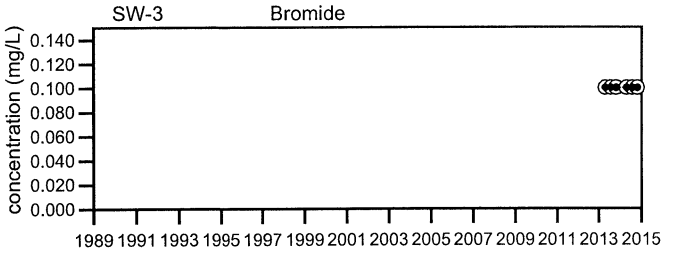
Data Group: 235
Printed: 3/24/2015 13:39

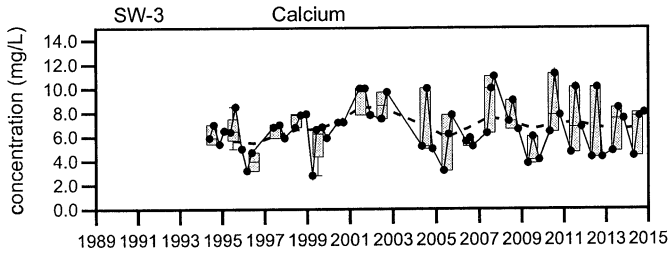
SME
Sewee & Maher Engineers, Inc.

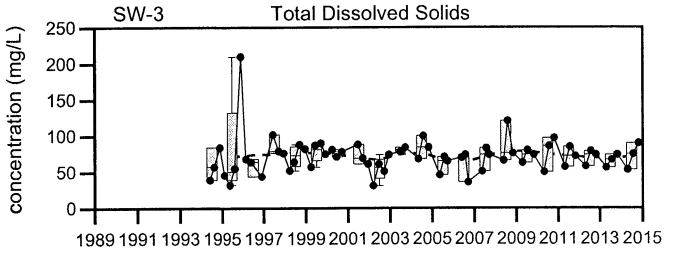


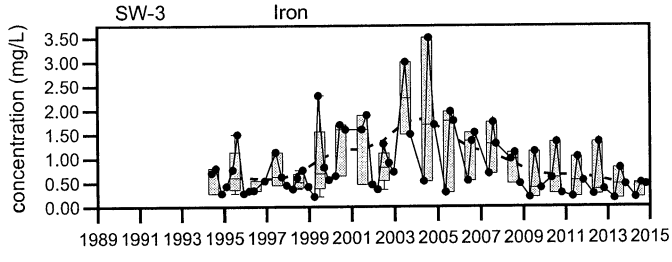


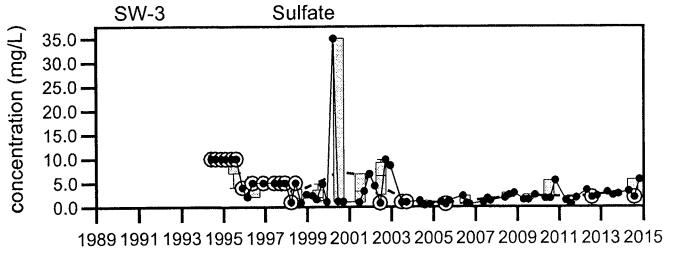


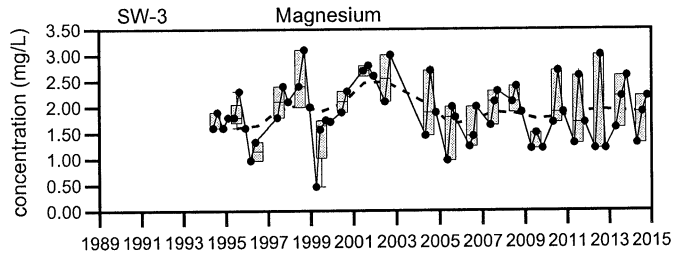


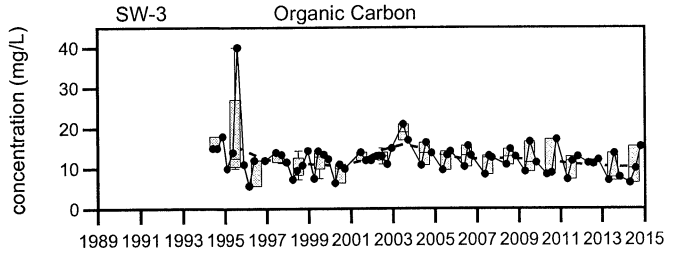


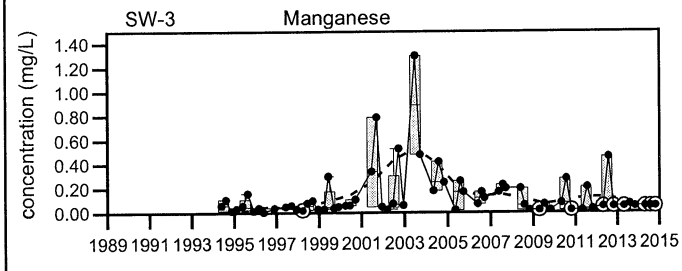


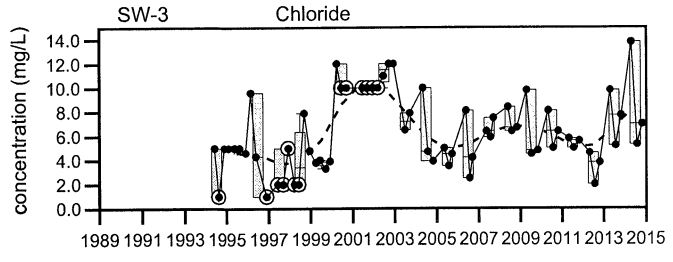


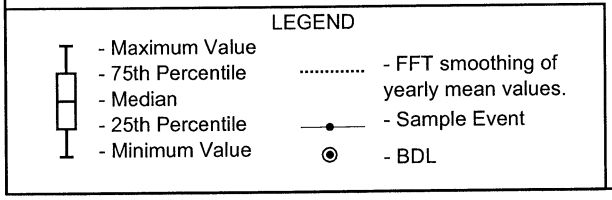












Juniper Ridge Landfill

SW-3

Sevee & Maher Engineers, Inc.

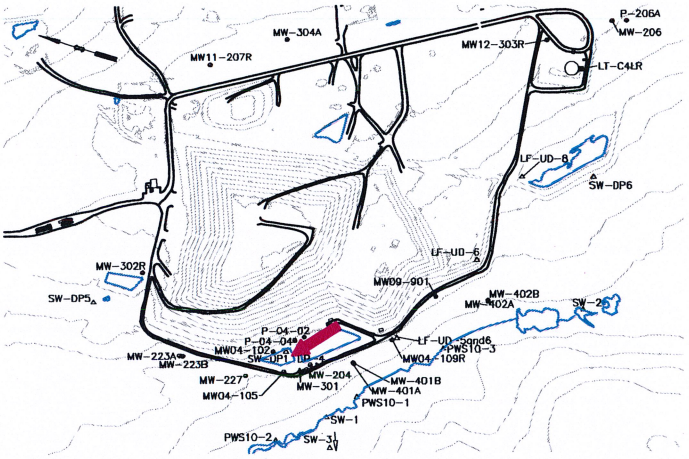
SW-DP1

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

SW-DP1 is located in Detention Pond #1 which is situated to the north of the leachate pond.



Sampled: **3 Times Annually**

Sampled Since: **05/03/04**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Dissolved Oxygen (mg/L)		6	6	6	0.8	8	5.7	0.22	30
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	0.13	0.11	0.01	3
Specific Conductance (µmhos/cm @25°C)		83	↓ 47	↓ 54	66	400	170	13	30
pH (Standard Units)		7.7	7.1	7.4	6.3	9.4	7.5	0.15	30
Alkalinity (CaCO3) (field) (mg/L)		30	↓ 10	↓ 15	20	175	60	6.8	30
Arsenic (mg/L)		0.006	0.005 U	0.005	0.001 U	0.012	0.0035	0.000	30
Cadmium (mg/L)		0.00006	0.00006	0.00006	0.00002 U	0.0008	0.00018	5E-05	27
Calcium (mg/L)		10.8	↓ 6.7	↓ 8	10.4	40	21	1.4	30
Iron (mg/L)		0.31	0.29	0.1	0.05	2.94	0.5	0.12	30
Magnesium (mg/L)		1.5	↓ 0.7	↓ 0.8	1.1	7.6	3.3	0.29	30
Manganese (mg/L)		0.05 U	0.05	0.05 U	0.02	0.88	0.1	0.03	30
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	0.005	0.0028	0.000	27
Potassium (mg/L)		1.2	0.6	0.8	0.4	25	3.4	0.95	30
Sodium (mg/L)		1.8	↓ 0.8	↓ 1	1.2	25	5.2	0.87	30
Nitrate (N) (mg/L)		↑ 0.3 U	↑ 0.3 U	↑ 0.3 U	0.1 U	0.1	0.14	0.02	30
Phosphate Phosphorus (mg/L)		0.05	0.07	0.04 U	0.01 U	0.15	0.047	0.007	30
Total Dissolved Solids (mg/L)		58	↓ 44	↓ 47	51	262	110	8.3	30
Total Suspended Solids (mg/L)		10	6	4 U	4 U	115	13	4.2	30
Sulfate (mg/L)		5.3	2.3	4.9	0.2	30	10	1.2	30
Bicarbonate (CaCO3) (mg/L)		32	16.2	17	16	170	58	6.1	30
Organic Carbon (mg/L)		2 U	2.4	2.2	2 U	13.3	4.6	0.55	30
Chemical Oxygen Demand (mg/L)		11	10 U	10 U	3	45	14	1.8	30
Chloride (mg/L)		5.4	1.8	1.9	1.5	15.2	6.1	0.62	30
Turbidity (field) (NTU)		3.6	0.8	0.8	0	28.1	4.9	1.2	30
Tannin & Lignins (Tannic Acid) (mg/L)		0.23	0.2 U	0.25	0.2 U	2	0.48	0.08	30

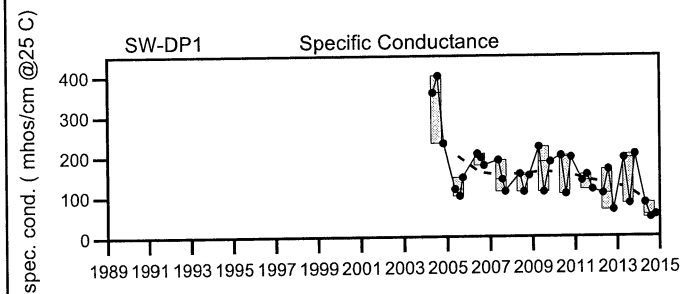
underlined/bold - values exceed a regulatory standard listed below.

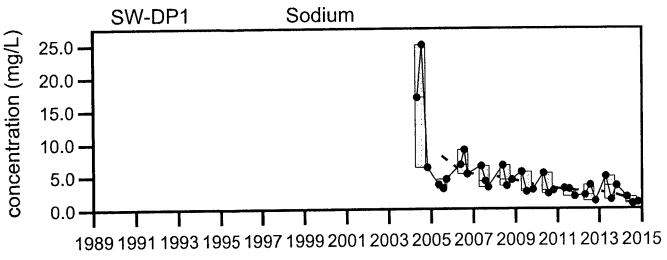
↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

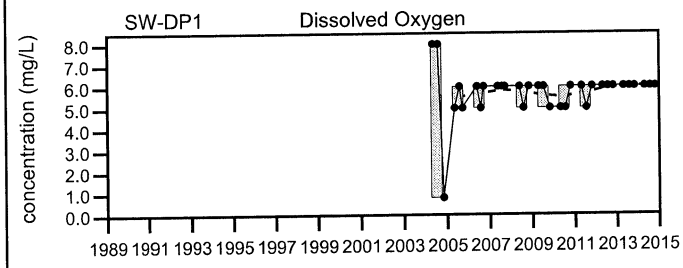
Comments

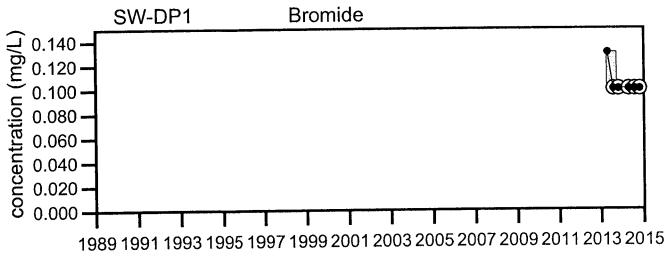
Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed. April 2014, July 2014 and October 2014 Cadmium results are non-detect above the laboratory reporting limit (0.00006U mg/l).

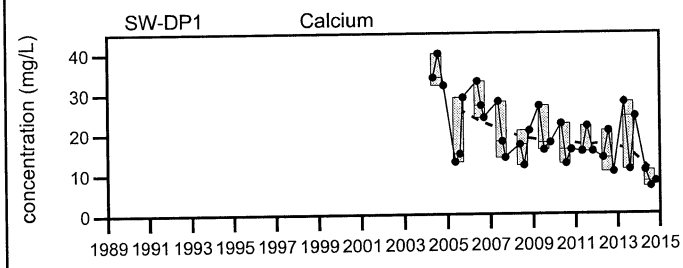
SME Sevee & Maher Engineers, Inc.

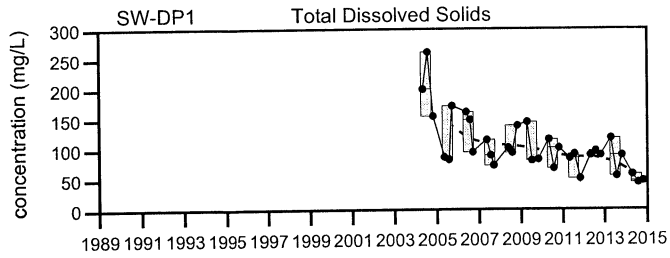


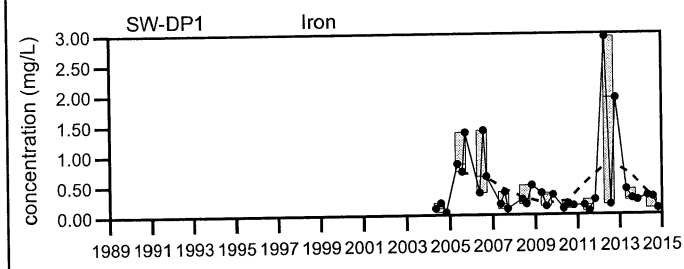


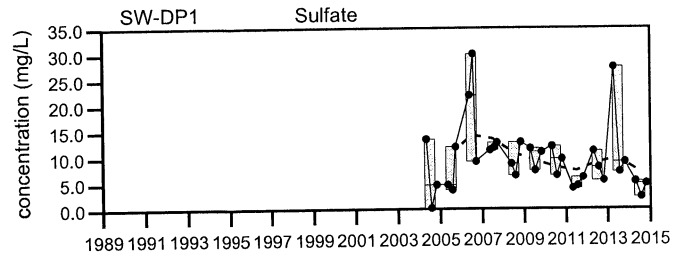


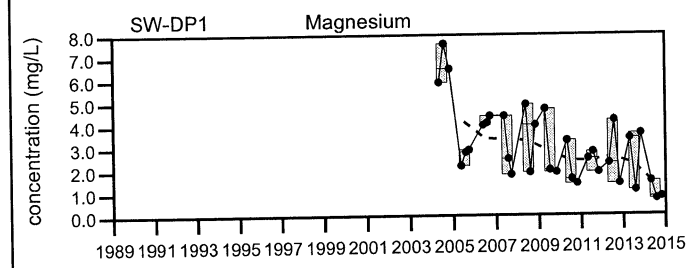


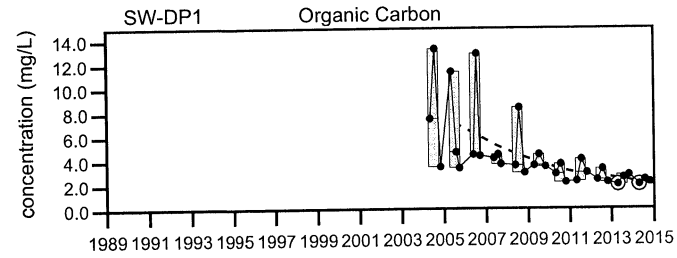


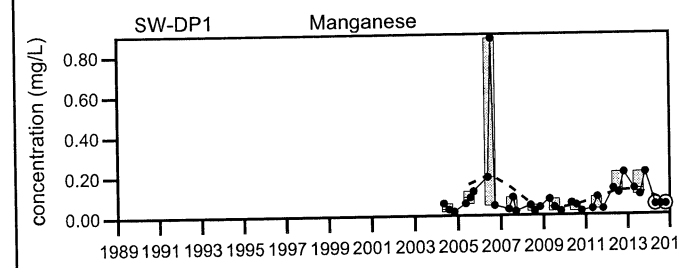


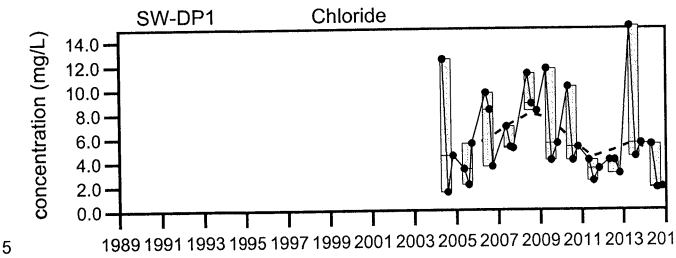


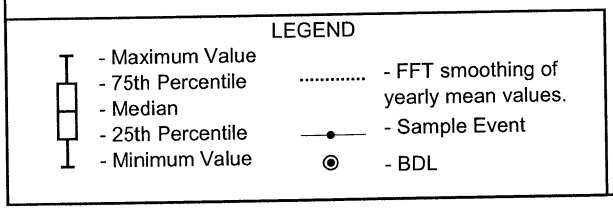












Juniper Ridge Landfill

SW-DP1

Sevee & Maher Engineers, Inc.

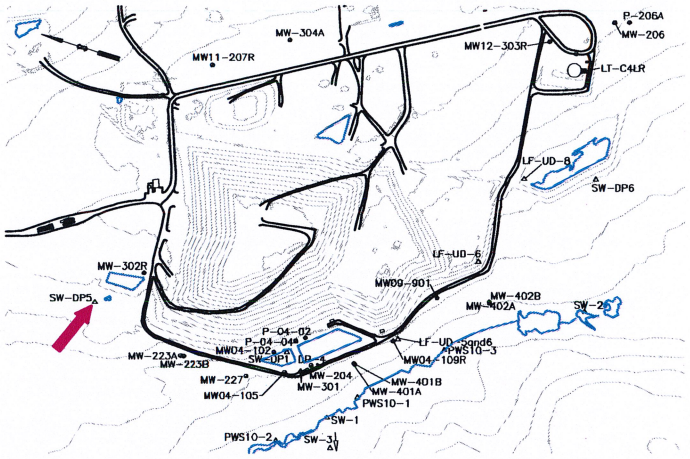
SW-DP5

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

Sample collected from outfall on the west side of detention pond number five.



Screen Interval:

Sampled: **3 Times Annually**

Sampled Since: **4/23/2013**

Material Screened:

Well Condition: **Good**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Dissolved Oxygen (mg/L)		6	6	↓ 5	6	to 6	6	± 0	2
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to 0.1 U	0.1	± 0	2
Specific Conductance (µmhos/cm @25°C)		↑ 194	↓ 99	↓ 113	150	to 162	160	± 6	2
pH (Standard Units)		↓ 6.9	7.9	7.6	7.6	to 8	7.8	± 0.2	2
Alkalinity (CaCO3) (field) (mg/L)		30	↓ 15	↓ 15	20	to 50	35	± 15	2
Arsenic (mg/L)		0.005 U	0.006	↑ 0.01	0.005 U	to 0.006	0.0055	± 0.000	2
Cadmium (mg/L)		0.00006	0.00006	0.00006	0.00006 U	to 0.00007	6.5E-05	± 5E-06	2
Calcium (mg/L)		19.7	↓ 14.2	18.4	14.4	to 22.4	18	± 4	2
Iron (mg/L)		↑ 1.34	↑ 0.4	↓ 0.27	0.32	to 0.33	0.33	± 0.005	2
Magnesium (mg/L)		1.6	0.8	0.8	0.8	to 1.8	1.3	± 0.5	2
Manganese (mg/L)		↑ 0.17	↑ 0.09	0.05 U	0.05 U	to 0.06	0.055	± 0.005	2
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.005 U	to 0.005 U	0.005	± 0	2
Potassium (mg/L)		↑ 2.2	1.6	1.3	1	to 1.9	1.5	± 0.45	2
Sodium (mg/L)		↑ 5.4	1.9	↓ 1.5	1.9	to 4.7	3.3	± 1.4	2
Nitrate (N) (mg/L)		0.3 U	0.3 U	0.3 U	0.3 U	to 0.3 U	0.3	± 0	2
Phosphate Phosphorus (mg/L)		↑ 0.07	↑ 0.1	0.05	0.05	to 0.06	0.055	± 0.005	2
Total Dissolved Solids (mg/L)		110	81	90	71	to 110	91	± 20	2
Total Suspended Solids (mg/L)		↑ 15	↑ 29	↑ 9	5	to 7	6	± 1	2
Sulfate (mg/L)		↑ 38	↓ 7.5	22.9	12.3	to 32.1	22	± 9.9	2
Bicarbonate (CaCO3) (mg/L)		29	26	23	9	to 37	23	± 14	2
Organic Carbon (mg/L)		3.1	2.9	2 U	2 U	to 4.8	3.4	± 1.4	2
Chemical Oxygen Demand (mg/L)		13	10 U	10 U	10 U	to 21	16	± 5.5	2
Chloride (mg/L)		↑ 20.9	3.9	4.1	2.3	to 10.7	6.5	± 4.2	2
Turbidity (field) (NTU)		↑ 9.8	2.6	↓ 1.2	1.5	to 2.6	2.1	± 0.55	2
Tannin & Lignins (Tannic Acid) (mg/L)		↓ 0.3	↓ 0.32	↓ 0.2 U	0.4 U	to 0.5 U	0.45	± 0.05	2

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

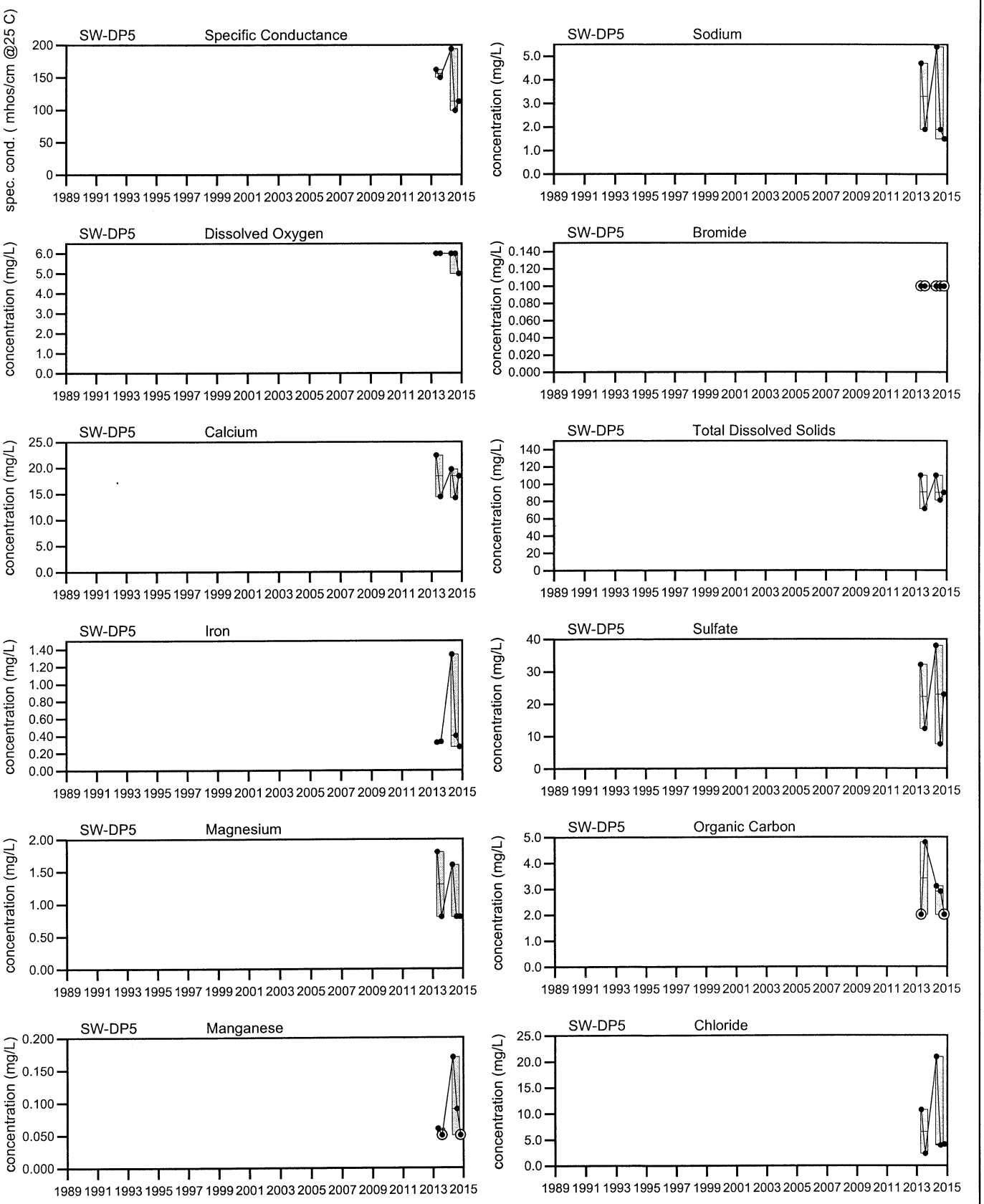
Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed != the sampling location was damaged or destroyed. April 2014, July 2014 and October 2014 Cadmium results are non-detect above the laboratory reporting limit (0.00006U mg/l).

Data Group: 235

Printed: 3/30/2015 08:40

SME Sovee & Maher Engineers, Inc.



Juniper Ridge Landfill

SW-DP5

Sevee & Maher Engineers, Inc.

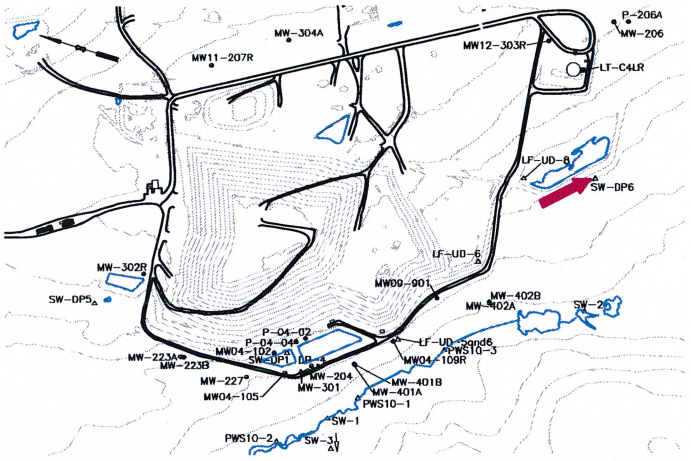
SW-DP6

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

SW-DP6 is located in Detention Pond #6, which is situated to the south of the landfill and west of the leachate storage tank.



Sampled: **3 Times Annually**

Sampled Since: **10/27/2009**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	Q2	Q3	Q4	Historical Min	Max	Mean	SE	n
Dissolved Oxygen (mg/L)		6	5	6	5	to 6	5.6	± 0.14	13
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to 0.1 U	0.1	± 0	3
Specific Conductance (µmhos/cm @25°C)		107	72	75	62	to 427	190	± 31	13
pH (Standard Units)		↑ 7.6	7.3	↑ 7.7	6.3	to 7.5	7	± 0.13	13
Alkalinity (CaCO3) (field) (mg/L)		40	↓ 10	15	15	to 100	47	± 9	12
Arsenic (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	to 0.011	0.0051	± 0.000	13
Cadmium (mg/L)		↑ 0.00006	↑ 0.00006	↑ 0.00006	0.00002 U	to 0.00002	3.8E-05	± 6E-06	13
Calcium (mg/L)		10.4	7.7	9.6	5.6	to 63.3	21	± 4.6	13
Iron (mg/L)		0.99	1.29	0.36	0.1	to 3.05	0.97	± 0.27	13
Magnesium (mg/L)		↓ 1.1	↓ 1	↓ 1.1	1.3	to 7.3	2.8	± 0.45	13
Manganese (mg/L)		0.24	0.05 U	0.05 U	0.05 U	to 0.96	0.22	± 0.09	13
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	to 0.005	0.0035	± 0.000	13
Potassium (mg/L)		1.3	↓ 1	↓ 1	1.1	to 3.4	2.1	± 0.21	13
Sodium (mg/L)		5.4	2.6	2	1.4	to 7.5	4.1	± 0.61	13
Nitrate (N) (mg/L)		↑ 0.3 U	↑ 0.3 U	↑ 0.3 U	0.1 U	to 0.1	0.2	± 0.03	13
Phosphate Phosphorus (mg/L)		0.1	0.04 U	0.04 U	0.03	to 0.14	0.065	± 0.01	13
Total Dissolved Solids (mg/L)		70	65	62	60	to 323	130	± 20	13
Total Suspended Solids (mg/L)		6	4 U	4 U	4 U	to 54	14	± 4.4	13
Sulfate (mg/L)		21.8	4.5	12.9	3.9	to 155	28	± 11	13
Bicarbonate (CaCO3) (mg/L)		13.1	18.3	13.7	7.8	to 75	36	± 6.6	13
Organic Carbon (mg/L)		4.3	6.9	4.7	3.1	to 11.9	6	± 0.81	13
Chemical Oxygen Demand (mg/L)		23	16	11	8	to 37	19	± 2.6	13
Chloride (mg/L)		17.8	4.7	3.6	1.1	to 22.3	10	± 2	13
Turbidity (field) (NTU)		3.7	1.2	2.6	0	to 12	3.8	± 0.96	13
Tannin & Lignins (Tannic Acid) (mg/L)		0.58	0.73	0.52	0.31	to 0.93	0.7	± 0.16	13

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

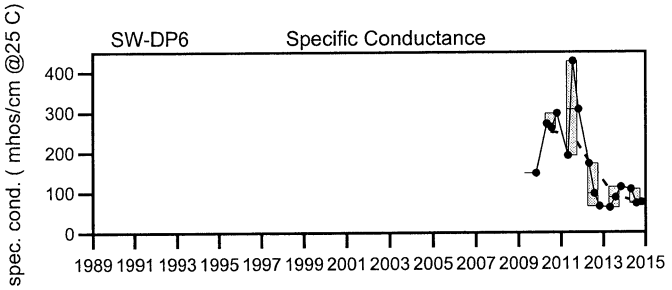
Comments

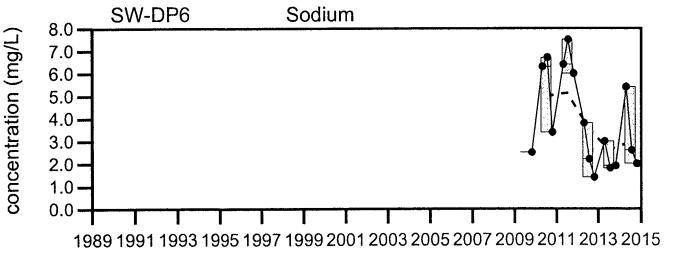
Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed !=the sampling location was damaged or destroyed. April 2014, July 2014 and October 2014 Cadmium results are non-detect above the laboratory reporting limit (0.00006U mg/l).

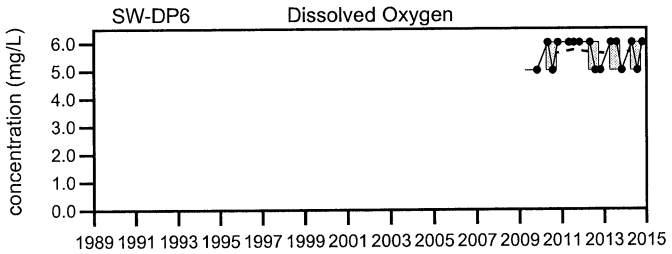
Data Group: 235

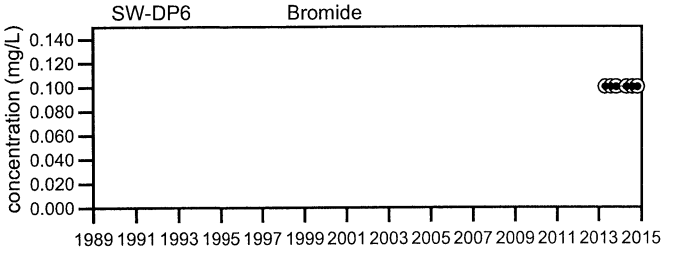
Printed: 3/30/2015 08:40

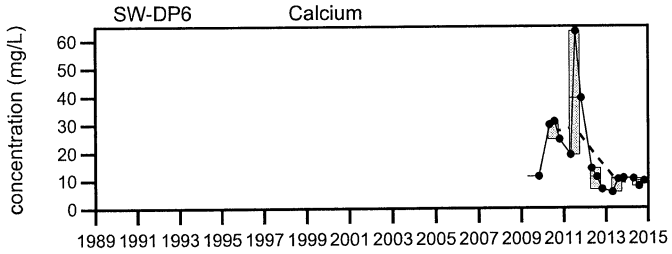
SME
Sevee & Maher Engineers, Inc.

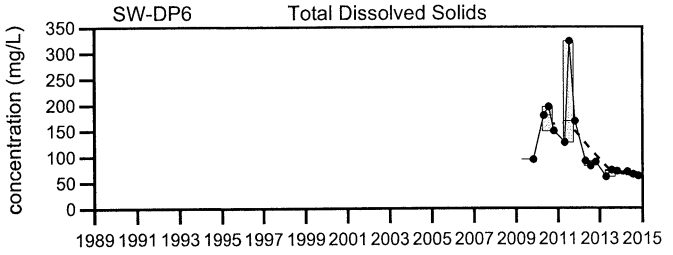


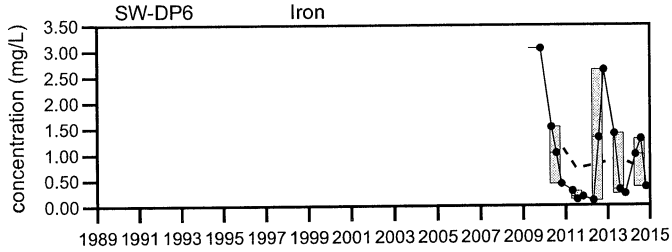


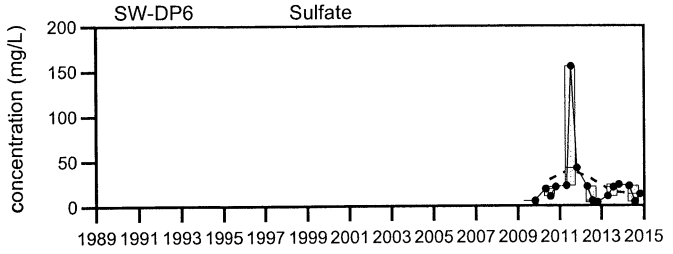


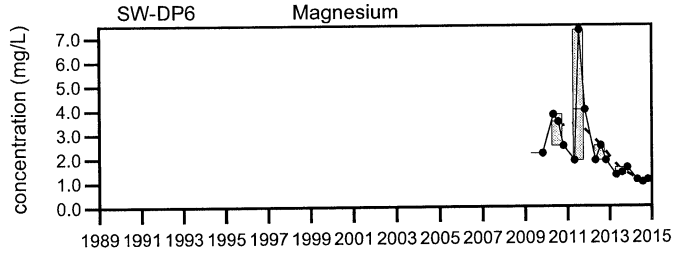


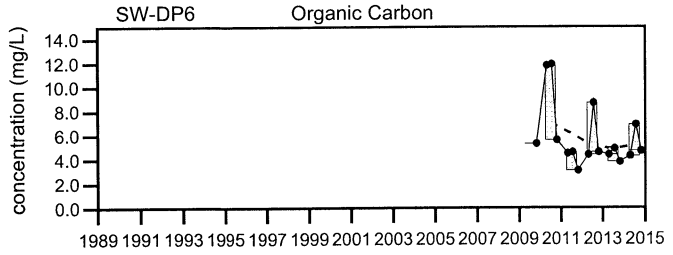


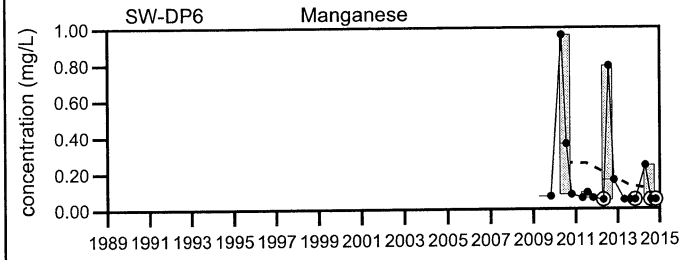


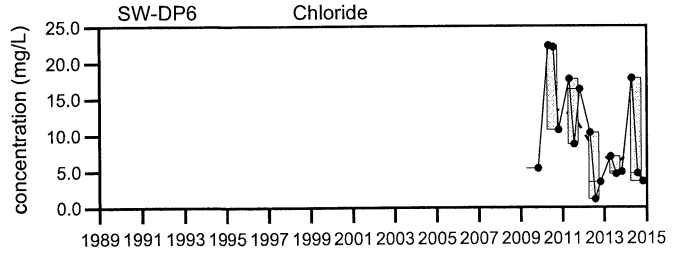


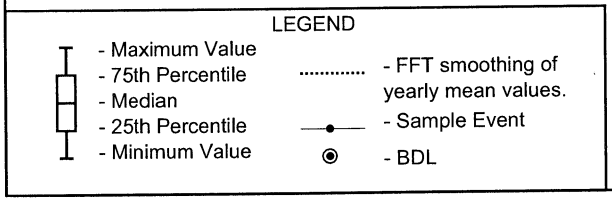












Juniper Ridge Landfill

SW-DP6

Sevee & Maher Engineers, Inc.

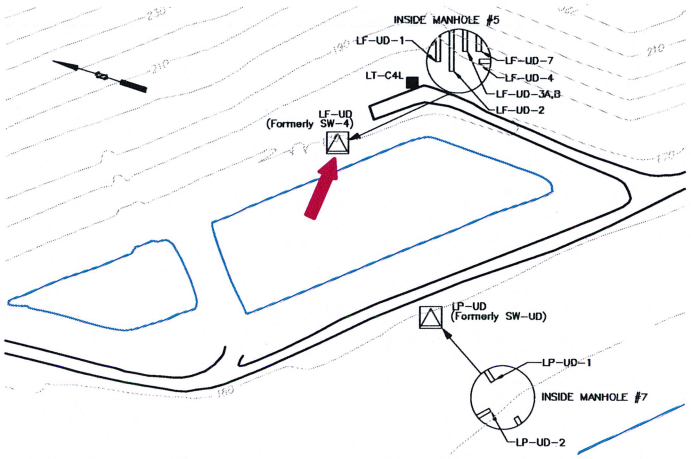
LF-COMP

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

Manhole #5 composite sample



Sampled:

Sampled Since: **See comments below**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	Q2	Q3	Q4	Historical Min	Max	Mean	SE	n
Dissolved Oxygen (mg/L)	↑ 9 E2	8	M7	6	4	to 8	6.5	± 0.25	26
Specific Conductance (µmhos/cm @25°C)	387	↑ 442	↑ 449	398	223	to 421	340	± 10	27
pH (Standard Units)	8.1	7.9	7.6	7.3	6.8	to 8.4	7.3	± 0.08	27
Alkalinity (CaCO3) (field) (mg/L)	↑ 200	↑ 200	165	150	80	to 185	130	± 5.3	27
Turbidity (field) (NTU)	2.22	0.76	0.09	0.89	0	to 129.3	7.7	± 4.8	27

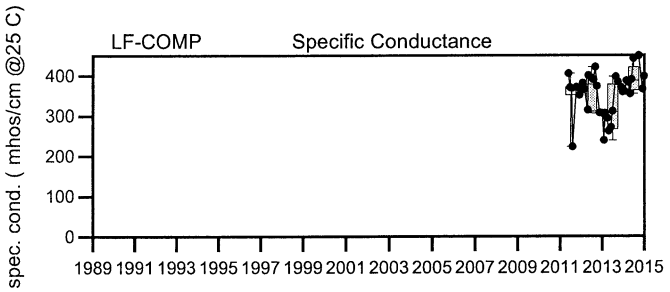
underlined/bold - values exceed a regulatory standard listed below.

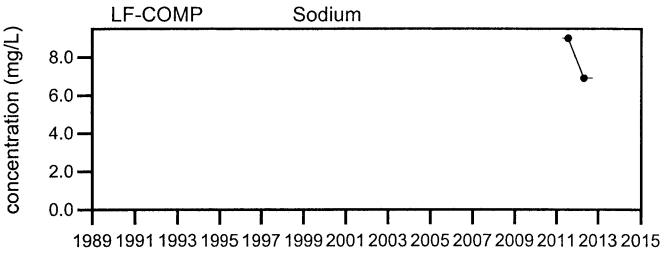
↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

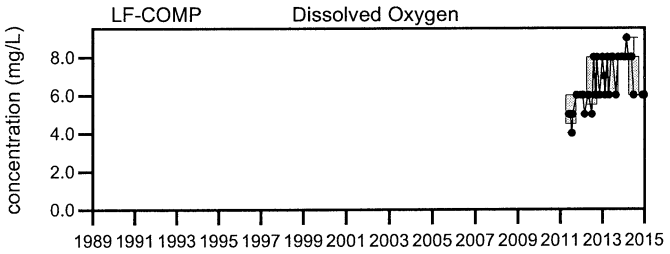
Comments

This location is monitored monthly for field parameters only when the water level is higher than the LF sample location pipes in Manhole #5.

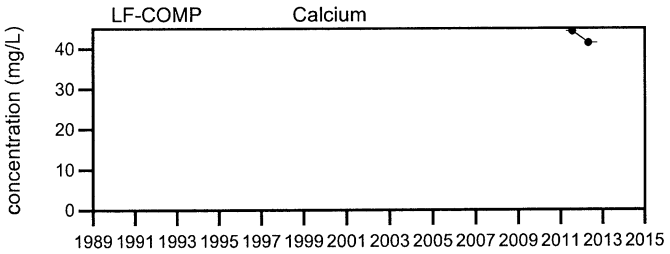
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed H2= water level higher than pipes. See LF-COMP for readings. F6= No flow.Sample not taken F-12= Pipe under water, no sample taken. G7= Field measurements elevated due to recent cleaning of underdrain pipe. H6= Pipe under water, could not measure flow. E2= Estimated Field Value.

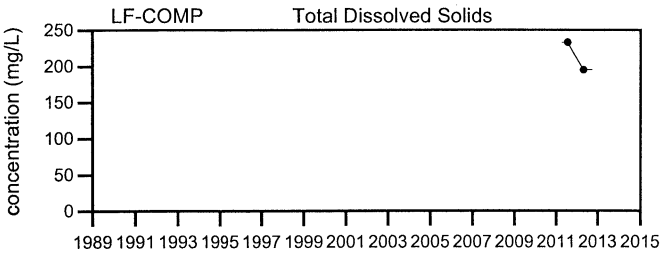


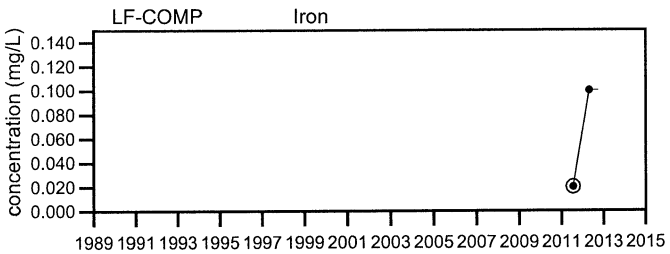


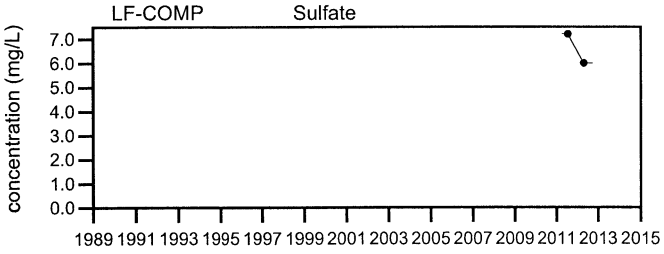


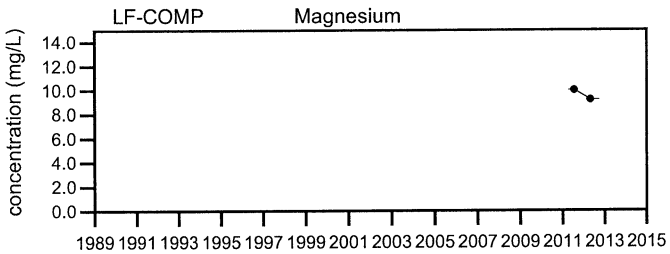
No data for Bromide at LF-COMP

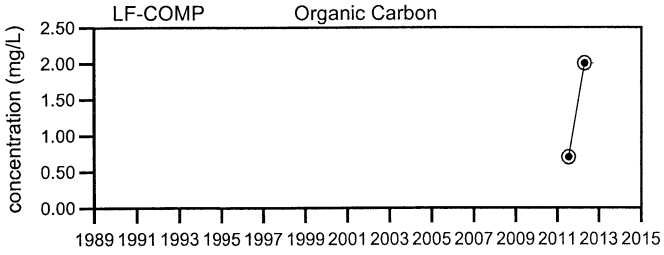


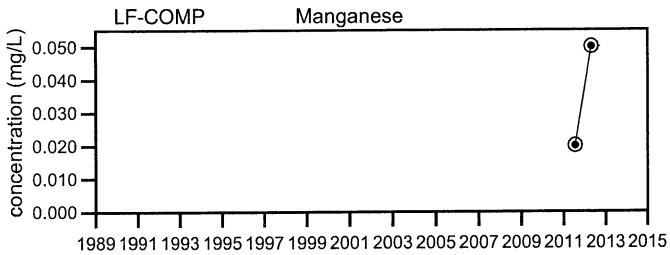


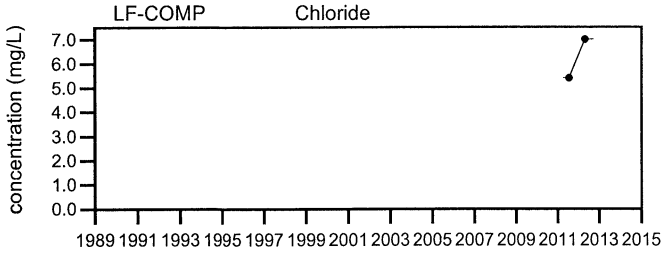


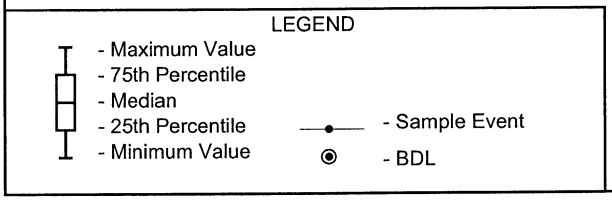












Juniper Ridge Landfill

LF-COMP

Sevee & Maher Engineers, Inc.

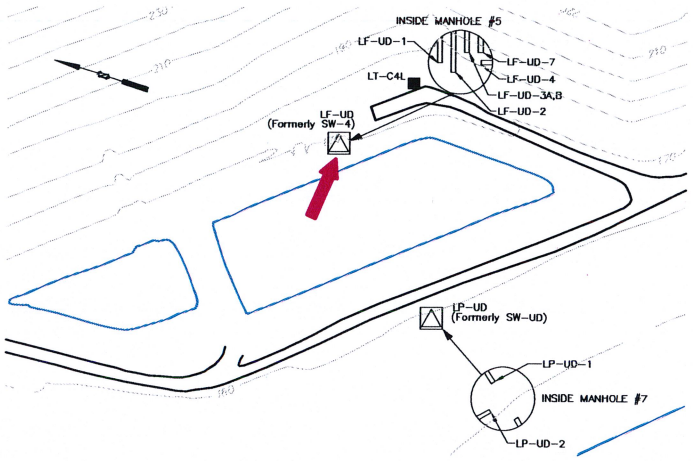
LF-UD-1

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

LF-UD-1 monitors the landfill underdrain from Cell #1 at Manhole #5.



Sampled: **Monthly & 3 Times Annually**

Sampled Since: **07/28/04**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Dissolved Oxygen (mg/L)	10	8	7	7	2	10	5.9	0.14	88
Bromide (mg/L)		↓ 0.1 U	0.14	F6	0.14	0.16	0.15	0.01	2
Specific Conductance (µmhos/cm @25°C)	355	388	368	341	102	611	310	8	88
pH (Standard Units)	8.2	8.1	7.6	7	6.3	8.3	7.2	0.05	88
Alkalinity (CaCO3) (field) (mg/L)	175	175	↓ 40	160	75	485	140	5.7	88
Arsenic (mg/L)		0.015	0.006	F6	0.001	0.015	0.0048	0.001	21
Cadmium (mg/L)		0.0006 U	0.0006 U	F6	0.0002 U	0.001	0.00039	6E-05	19
Calcium (mg/L)		↑ 54.1	47.3	F6	25	53.6	39	1.8	21
Iron (mg/L)		0.05	↑ 4.57	F6	0.02 U	0.3	0.047	0.01	21
Magnesium (mg/L)		11.4	12.1	F6	7.4	12.2	9.7	0.29	21
Manganese (mg/L)		↑ 0.05 U	↑ 0.1	F6	0.02 U	0.02	0.024	0.002	21
Nickel (mg/L)		0.005 U	0.005 U	F6	0.002 U	0.01	0.003	0.000	19
Potassium (mg/L)		3.8	4	F6	1.8	4.1	2.7	0.16	21
Sodium (mg/L)		8.2	7.5	F6	5.8	9.4	7.7	0.22	21
Nitrate (N) (mg/L)		0.3 U	0.4	F6	0.1	0.6	0.31	0.03	21
Phosphate Phosphorus (mg/L)		0.04	↑ 0.33	F6	0.01 U	0.05	0.02	0.003	21
Total Dissolved Solids (mg/L)		↑ 235	231	F6	130	232	190	6.6	21
Total Suspended Solids (mg/L)		35	↑ 394	F6	4 U	40	6.2	1.7	21
Sulfate (mg/L)		10.4	5	F6	4.1	11	7.3	0.39	21
Bicarbonate (CaCO3) (mg/L)		↑ 177	155	F6	110	175	140	5.2	21
Organic Carbon (mg/L)		2 U	2 U	F6	0.5 U	6.4	1.9	0.28	21
Chemical Oxygen Demand (mg/L)		10 U	11	F6	3 U	14	5.1	0.73	21
Chloride (mg/L)		19.1	17.3	F6	1.9	22.5	4.9	0.99	21
Turbidity (field) (NTU)	3.15	2.2	↑ 8.1	0.28	0	4.9	1.2	0.13	88
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	F6	0.2 U	0.21	0.24	0.04	21

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
This location is monitored triannually for field and lab parameters and monthly for field parameters only.

U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed H2= water level higher than pipes. See LF-COMP for readings. F6= No flow.Sample not taken F-12= Pipe under water, no sample taken. G7= Field measurements elevated due to recent cleaning of underdrain pipe. H6= Pipe under water, could not measure flow.

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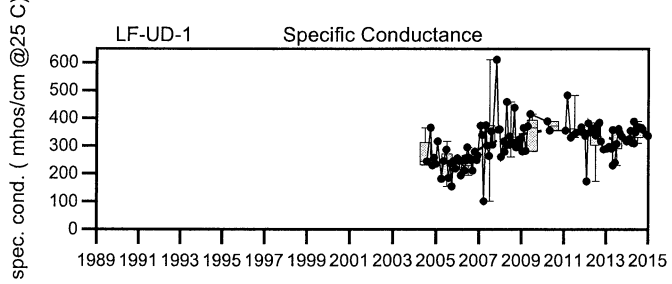
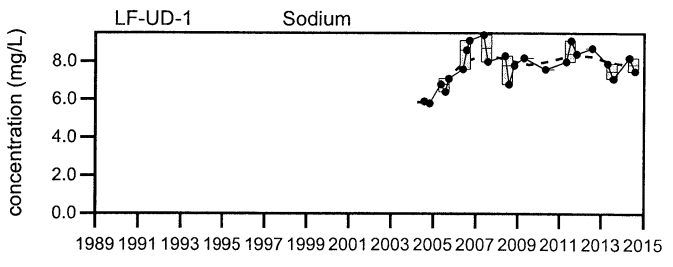
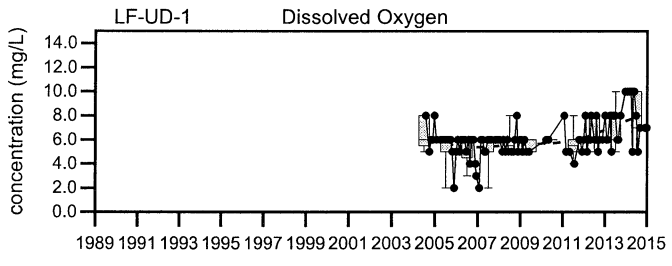
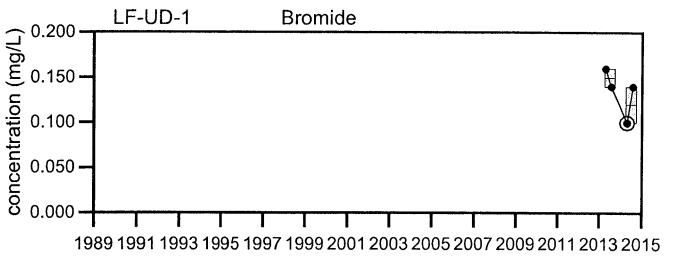
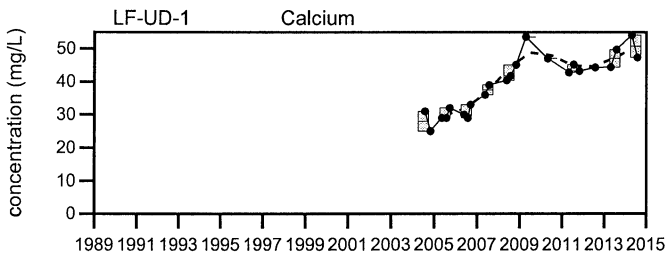
SME
Sevee & Maher Engineers, Inc.

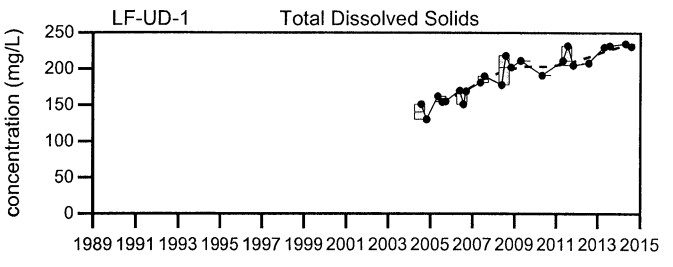


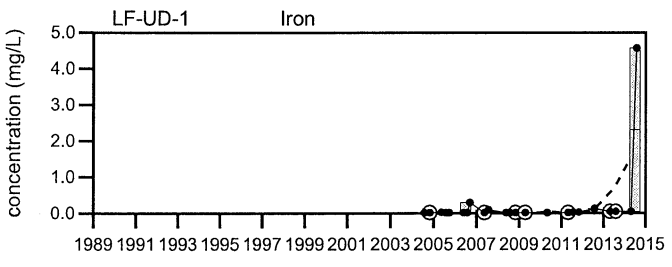


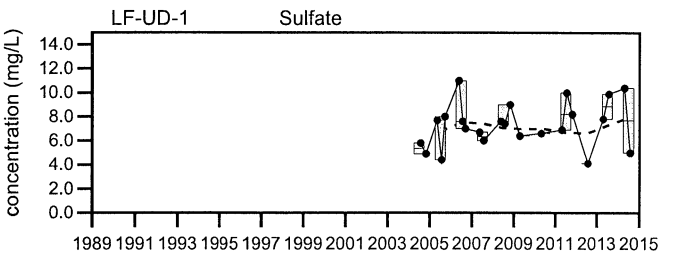


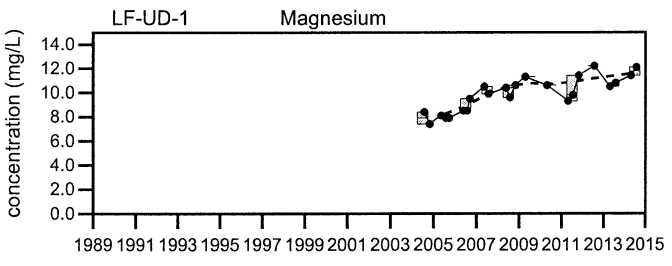


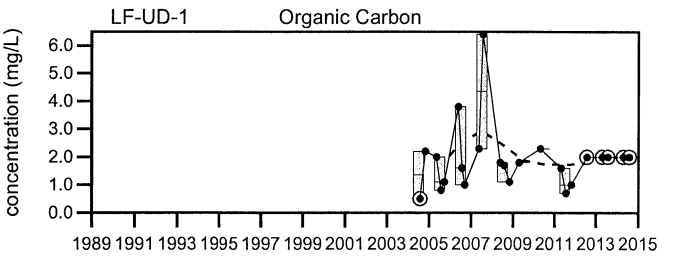


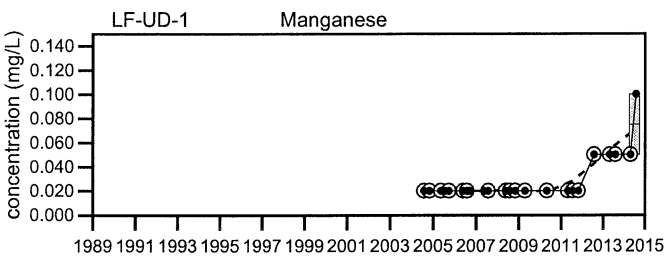


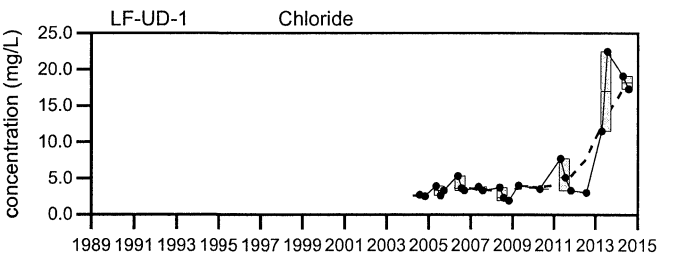


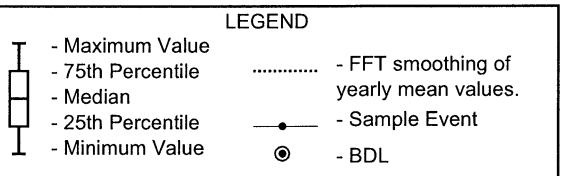












Juniper Ridge Landfill

LF-UD-1

Sevee & Maher Engineers, Inc.

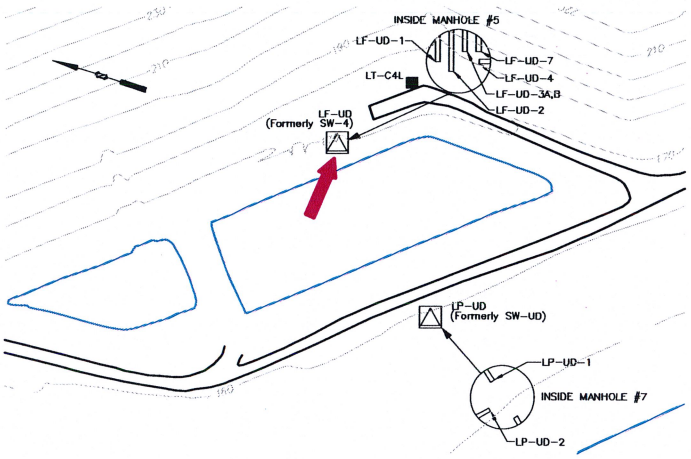
LF-UD-2

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

LF-UD-2 monitors the landfill underdrain from Cell #2 at Manhole #5.



Sampled: **Monthly & 3 Times Annually**

Sampled Since: **07/28/04**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	Q2	Q3	Q4	Historical Min	Max	Mean	SE	n
Dissolved Oxygen (mg/L)	8	8	6	5.5	2	to 9	5.8	± 0.11	103
Bromide (mg/L)		↓ 0.11	0.17	↓ 0.1 U	0.12	to 0.19	0.16	± 0.02	3
Specific Conductance (µmhos/cm @25°C)	363	391	417	384	134	to 709	280	± 7.4	104
pH (Standard Units)	8.4	8.3	8	7.4	6	to 8.4	7.5	± 0.05	104
Alkalinity (CaCO3) (field) (mg/L)	175	170	40	70	35	to 350	120	± 4	104
Arsenic (mg/L)		0.012	↑ 0.018	↑ 0.016	0.001 U	to 0.014	0.0053	± 0.000	26
Cadmium (mg/L)		↑ 0.0006 U	↑ 0.0006 U	↑ 0.0006 U	0.0002 U	to 0.0005	0.00035	± 4E-05	24
Calcium (mg/L)		46	46.3	↑ 71.5	20	to 64.3	35	± 1.9	26
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	to 0.18	0.04	± 0.007	26
Magnesium (mg/L)		11.4	10.8	12.3	6.1	to 12.3	8.8	± 0.3	26
Manganese (mg/L)		↑ 0.05 U	↑ 0.05 U	↑ 0.05 U	0.02 U	to 0.02	0.026	± 0.002	26
Nickel (mg/L)		↑ 0.005 U	↑ 0.005 U	↑ 0.005 U	0.002 U	to 0.002	0.0027	± 0.000	24
Potassium (mg/L)		3.2	3	4.5	1.9	to 5	2.7	± 0.13	26
Sodium (mg/L)		7.4	7	9.2	5.2	to 18.1	6.6	± 0.49	26
Nitrate (N) (mg/L)		0.3 U	0.3	0.3 U	0.1 U	to 0.4	0.27	± 0.02	26
Phosphate Phosphorus (mg/L)		0.04 U	0.04 U	0.04 U	0.01 U	to 0.66	0.047	± 0.03	26
Total Dissolved Solids (mg/L)		218	220	279	132	to 290	180	± 7.3	26
Total Suspended Solids (mg/L)		4 U	↑ 45	25	4 U	to 39	6.9	± 1.8	26
Sulfate (mg/L)		4.8	2	7.2	2 U	to 17.5	4.8	± 0.73	26
Bicarbonate (CaCO3) (mg/L)		147	152	↑ 220	92	to 213	130	± 4.9	26
Organic Carbon (mg/L)		2 U	2 U	2 U	0.6	to 12	1.7	± 0.43	26
Chemical Oxygen Demand (mg/L)		↑ 10 U	↑ 10 U	↑ 10 U	3 U	to 7	4.8	± 0.55	26
Chloride (mg/L)		33.6	21.6	7.7	1.7	to 35.2	6.4	± 1.4	26
Turbidity (field) (NTU)	3.43	2.6	2.6	0.4	0	to 8.5	1	± 0.15	104
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to 0.3	0.2	± 0.004	26

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
This location is monitored triannually for field and lab parameters and monthly for field parameters only.

U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed H2= water level higher than pipes. See LF-COMP for readings. F6= No flow.Sample not taken F-12= Pipe under water, no sample taken. G7= Field measurements elevated due to recent cleaning of underdrain pipe. H6= Pipe under water, could not measure flow.

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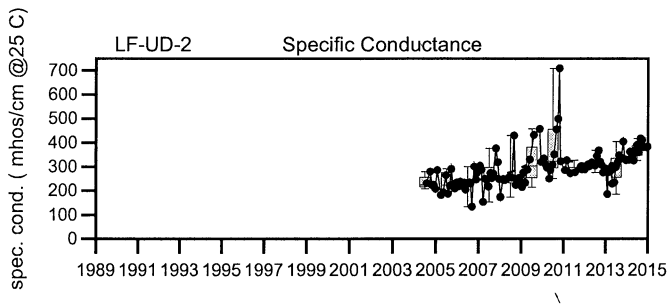
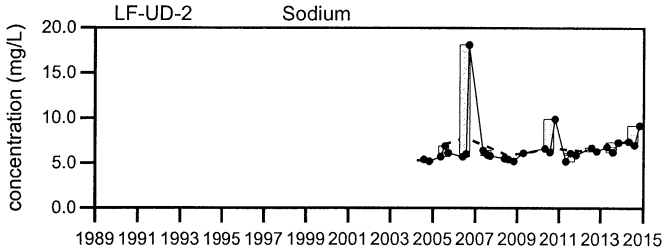
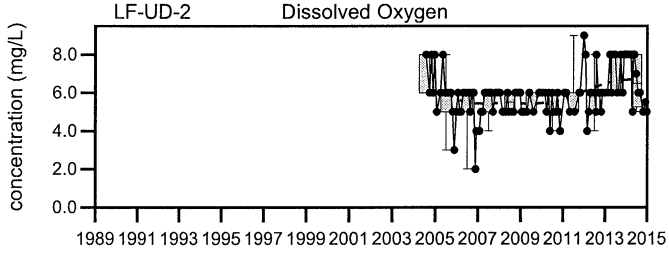
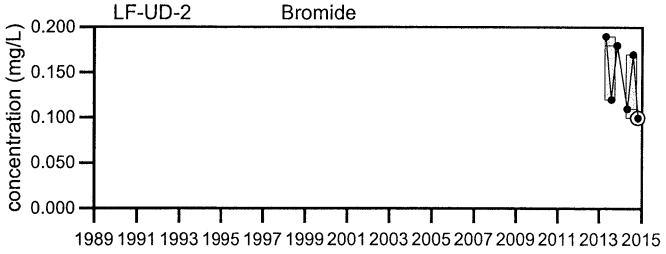
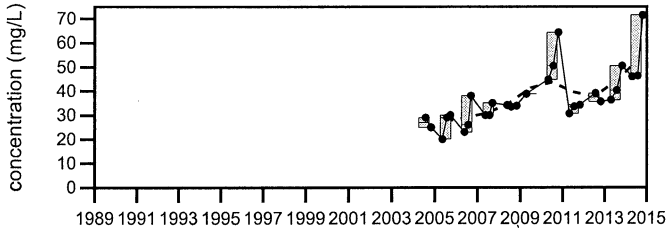
SME
Sowee & Maher Engineers, Inc.

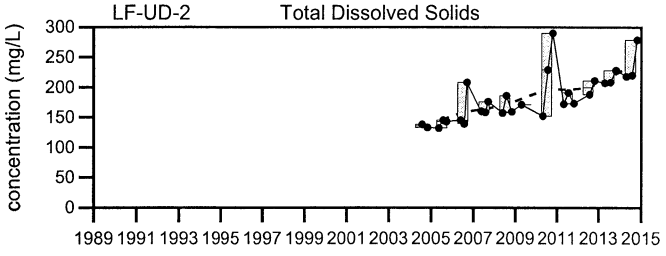


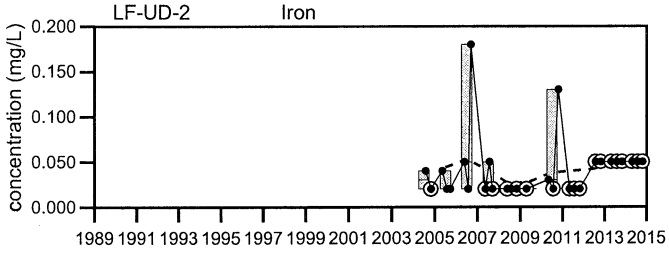


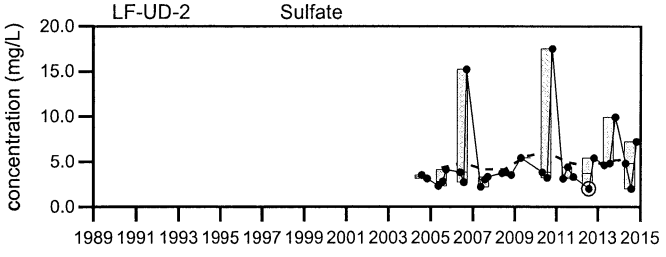


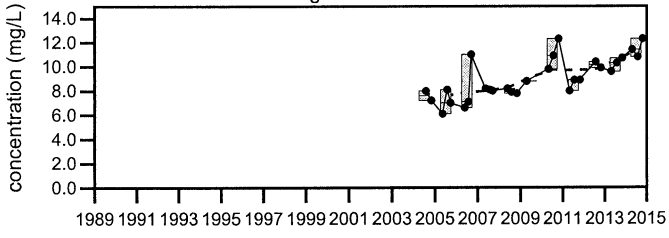


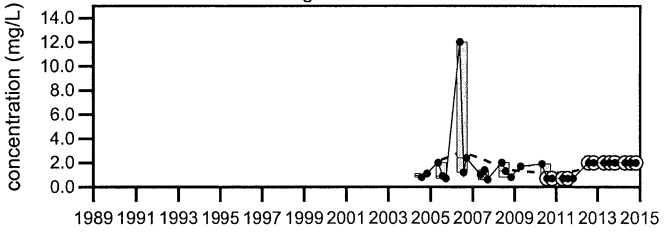


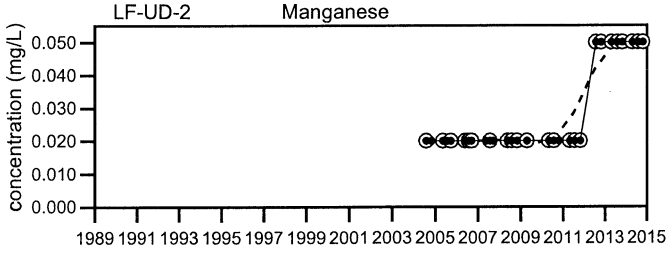


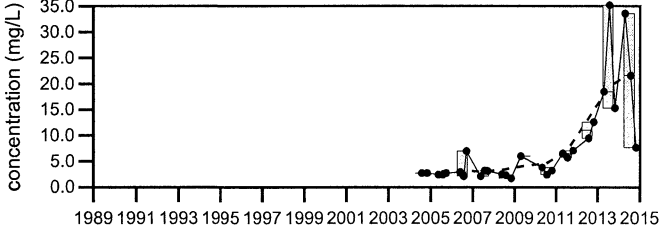


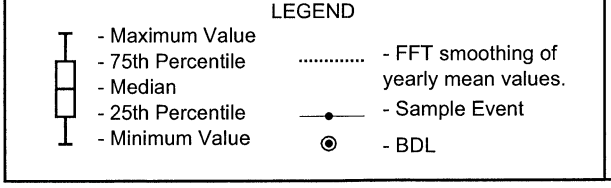












Juniper Ridge Landfill

LF-UD-2

Sevee & Maher Engineers, Inc.

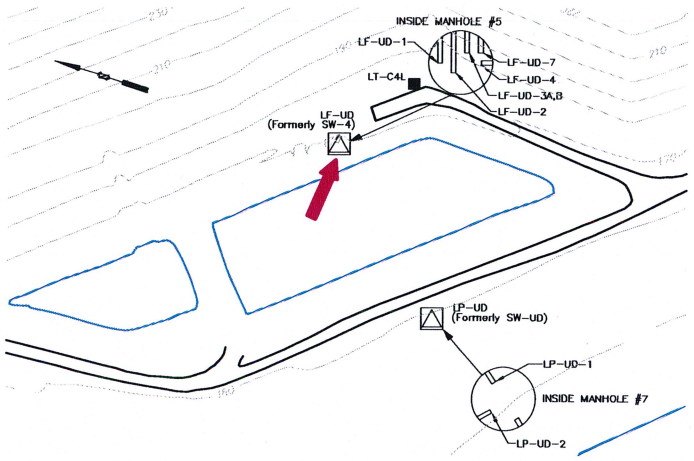
LF-UD-3A,B

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

LF-UD-3A, B monitors the landfill underdrains from cell 3A and cell 3B at Manhole #5.



Sampled: **3 Times Annually**

Sampled Since: **July 2011**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Dissolved Oxygen (mg/L)	H8	H8	H8	H8	4	8	5.6	0.14	27
Bromide (mg/L)		F6	F6	F6	No historical data for Bromide.				
Specific Conductance (µmhos/cm @25°C)	H8	H8	H8	H8	126	565	370	19	27
pH (Standard Units)	H8	H8	H8	H8	6.2	8.4	7.6	0.12	27
Alkalinity (CaCO3) (field) (mg/L)	H8	H8	H8	H8	85	475	180	17	27
Arsenic (mg/L)		F6	F6	F6	0.003 U	0.01	0.0048	0.001	5
Cadmium (mg/L)		F6	F6	F6	0.0002 U	0.0004	0.00044	0.000	5
Calcium (mg/L)		F6	F6	F6	46.4	69.9	56	4.4	5
Iron (mg/L)		F6	F6	F6	0.02 U	0.02 U	0.02	1E-10	5
Magnesium (mg/L)		F6	F6	F6	8.2	12.5	10	0.81	5
Manganese (mg/L)		F6	F6	F6	0.02 U	0.12	0.048	0.02	5
Nickel (mg/L)		F6	F6	F6	0.002 U	0.003 U	0.0022	0.000	5
Potassium (mg/L)		F6	F6	F6	1.8	3.3	2.4	0.31	5
Sodium (mg/L)		F6	F6	F6	6	9.5	8	0.63	5
Nitrate (N) (mg/L)		F6	F6	F6	0.1	1.3	0.6	0.2	5
Phosphate Phosphorus (mg/L)		F6	F6	F6	0.01 U	0.01	0.01	7E-11	5
Total Dissolved Solids (mg/L)		F6	F6	F6	163	263	230	17	5
Total Suspended Solids (mg/L)		F6	F6	F6	4 U	4 U	4	0	5
Sulfate (mg/L)		F6	F6	F6	8.3	16.3	13	1.3	5
Bicarbonate (CaCO3) (mg/L)		F6	F6	F6	123	201	160	15	5
Organic Carbon (mg/L)		F6	F6	F6	1.2	4.8	3.4	0.66	5
Chemical Oxygen Demand (mg/L)		F6	F6	F6	3 U	10	5.6	1.6	5
Chloride (mg/L)		F6	F6	F6	2.4	12.6	7.8	1.7	5
Turbidity (field) (NTU)	H8	H8	H8	H8	0	5	0.9	0.2	27
Tannin & Lignins (Tannic Acid) (mg/L)		F6	F6	F6	0.2 U	0.24	0.21	0.008	5

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
This location is monitored triannually for field and lab parameters and monthly for field parameters only.

U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed. H2= water level higher than pipes. See LF-COMP for readings.H8=No flow from pipe. See LF-COMP for readings. F6= No flow.Sample not taken F-12= Pipe under water, no sample taken. G7= Field measurements elevated due to recent cleaning of underdrain pipe. H6= Pipe under water, could not measure flow.

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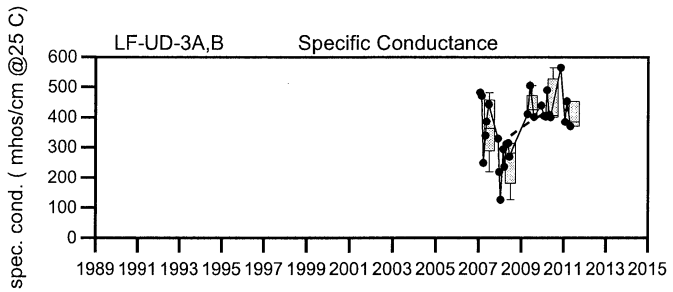
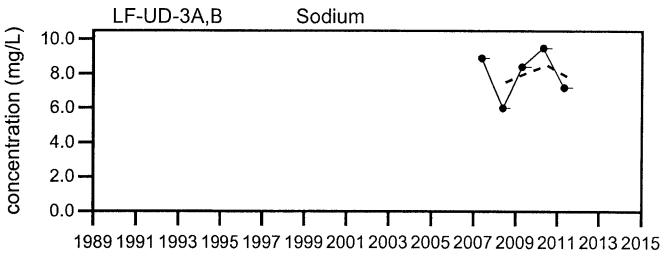
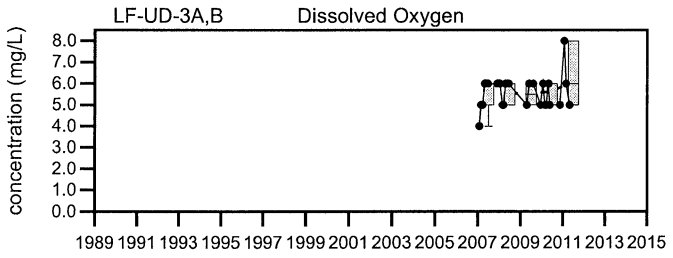
SME Sevee & Maher Engineers, Inc.







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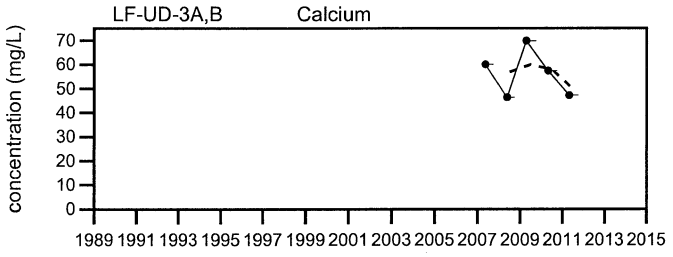
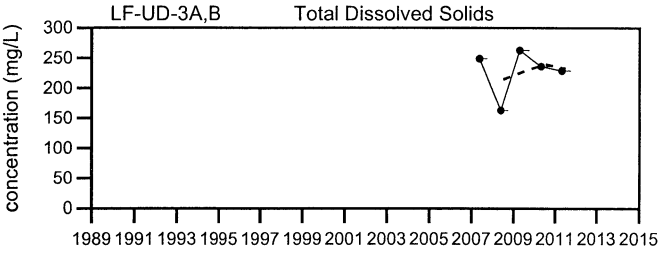
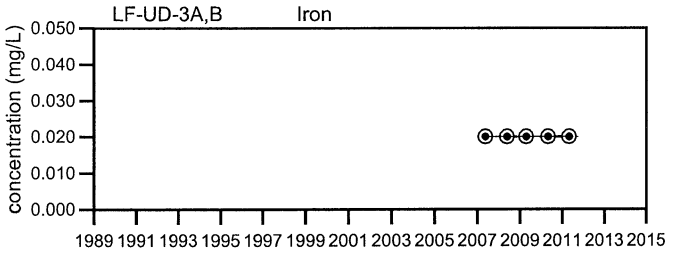
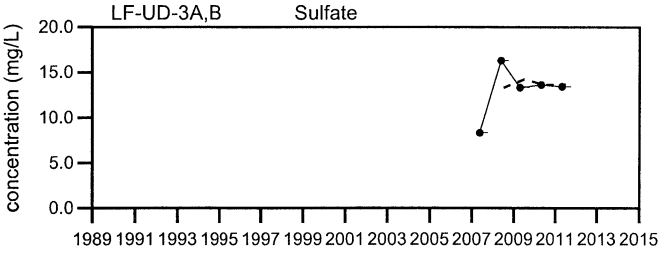
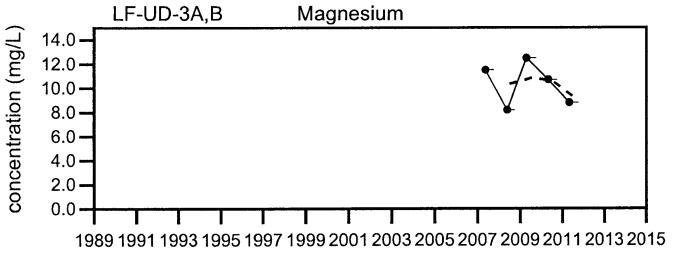
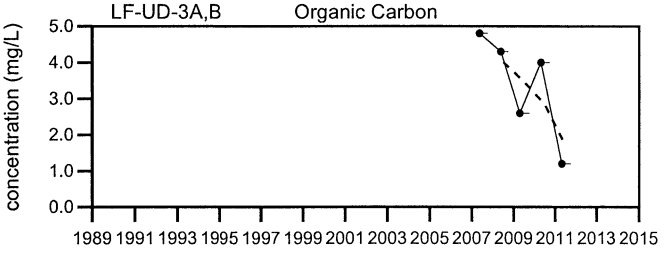


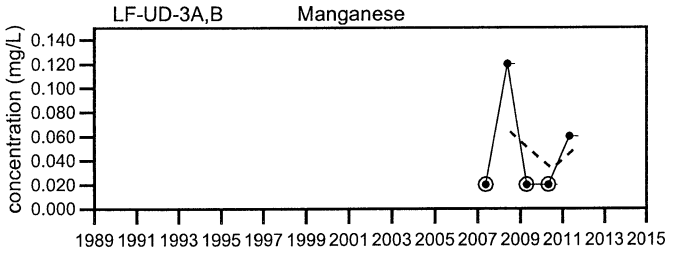


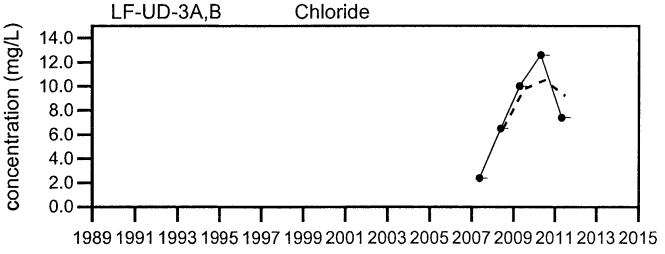


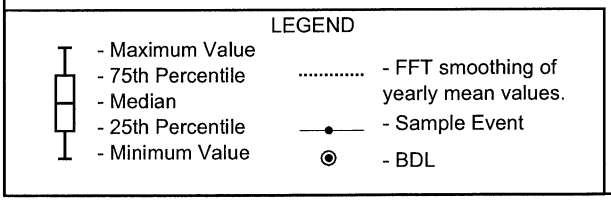












Juniper Ridge Landfill

LF-UD-3A,B

Sevee & Maher Engineers, Inc.

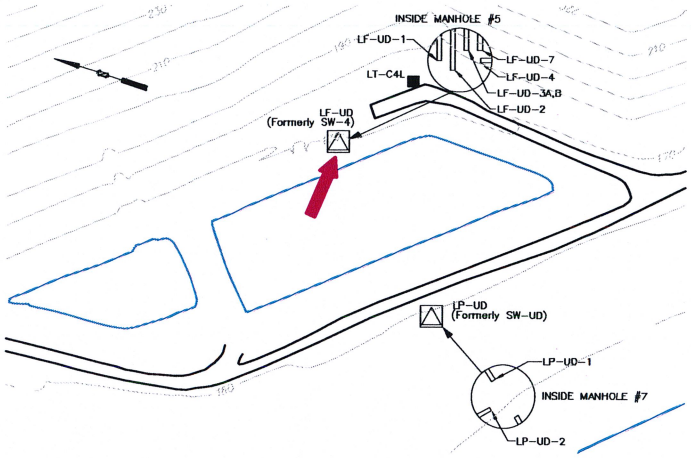
LF-UD-4

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

LF-UD-4 monitors the landfill underdrain from Cell #4 at Manhole #5.



Sampled: **Monthly & 3 Times Annually**

Sampled Since: **03/11/2009**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Dissolved Oxygen (mg/L)	8	6	H8	H8	4	8	6	0.25	26
Bromide (mg/L)		0.1	F6	F6	0.1 U	0.14	0.12	0.02	2
Specific Conductance (µmhos/cm @25°C)	431	430	H8	H8	327	562	430	10	26
pH (Standard Units)	8.2	8.12	H8	H8	6.9	8.3	7.4	0.08	26
Alkalinity (CaCO3) (field) (mg/L)	250	250	H8	H8	92	300	170	9.1	26
Arsenic (mg/L)		↑ 0.014	F6	F6	0.002	0.012	0.0082	0.002	5
Cadmium (mg/L)		0.0006 U	F6	F6	0.0002 U	0.0006 U	0.00052	8E-05	5
Calcium (mg/L)		62.6	F6	F6	44.8	63.5	52	3.2	5
Iron (mg/L)		0.05 U	F6	F6	0.02 U	0.05 U	0.044	0.006	5
Magnesium (mg/L)		11.3	F6	F6	10.6	12.1	11	0.28	5
Manganese (mg/L)		0.05 U	F6	F6	0.02 U	0.05 U	0.044	0.006	5
Nickel (mg/L)		0.005 U	F6	F6	0.002 U	0.005 U	0.0044	0.000	5
Potassium (mg/L)		4.7	F6	F6	3.4	5.8	4.3	0.45	5
Sodium (mg/L)		9	F6	F6	7.4	10.6	9	0.61	5
Nitrate (N) (mg/L)		0.3	F6	F6	0.3 U	0.6	0.38	0.06	5
Phosphate Phosphorus (mg/L)		0.04 U	F6	F6	0.01 U	0.04 U	0.034	0.006	5
Total Dissolved Solids (mg/L)		252	F6	F6	206	263	240	9.7	5
Total Suspended Solids (mg/L)		4 U	F6	F6	4 U	5	4.2	0.2	5
Sulfate (mg/L)		14.2	F6	F6	2 U	14.8	8.9	2.1	5
Bicarbonate (CaCO3) (mg/L)		206	F6	F6	136	207	170	11	5
Organic Carbon (mg/L)		2 U	F6	F6	2 U	5.1	2.6	0.62	5
Chemical Oxygen Demand (mg/L)		↑ 10 U	F6	F6	6	6	9.2	0.8	5
Chloride (mg/L)		8.9	F6	F6	3.1	13.2	9	1.7	5
Turbidity (field) (NTU)	0.86	2.6	H8	H8	0	9.1	0.96	0.35	26
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	F6	F6	0.2 U	0.2 U	0.2	2E-09	5

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
This location is monitored triannually for field and lab parameters and monthly for field parameters only.

U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed H2= water level higher than pipes. See LF-COMP for readings. F6= No flow.Sample not taken F-12= Pipe under water, no sample taken. G7= Field measurements elevated due to recent cleaning of underdrain pipe. H6= Pipe under water, could not measure flow. H8= No flow from pipe, See LF-COMP for readings.

Data Group: 235

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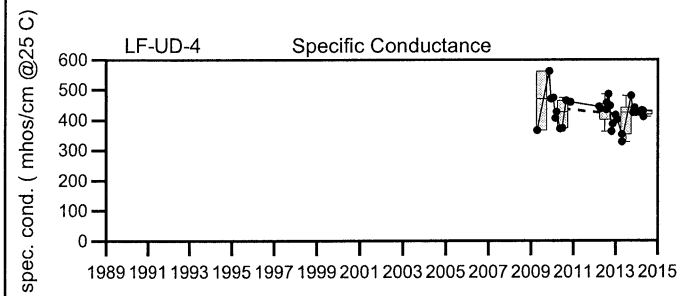
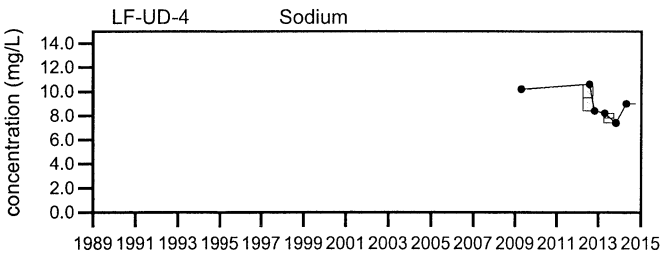
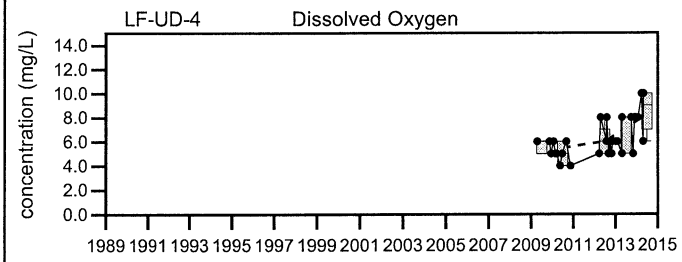
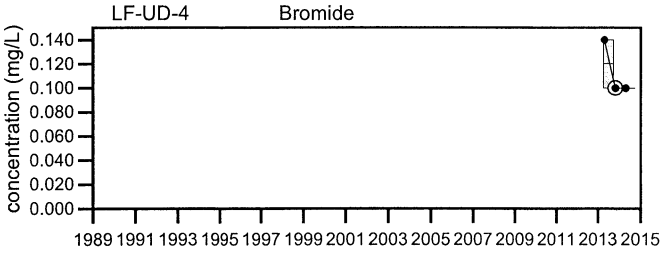
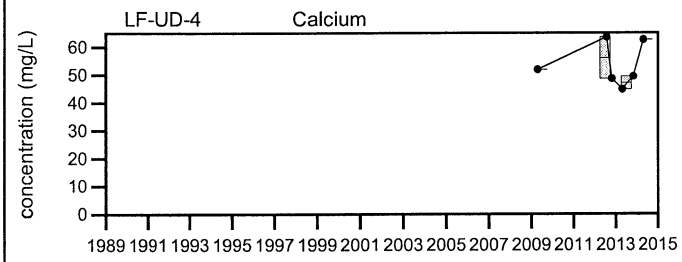
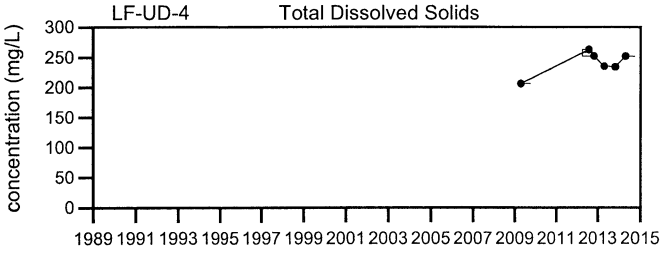


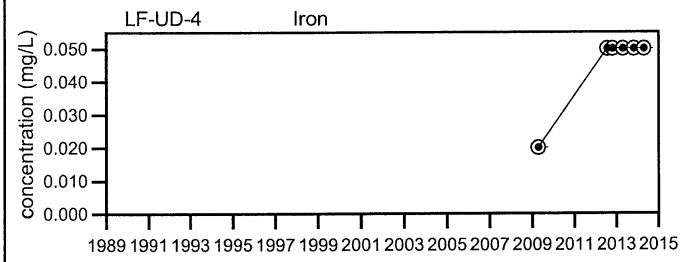


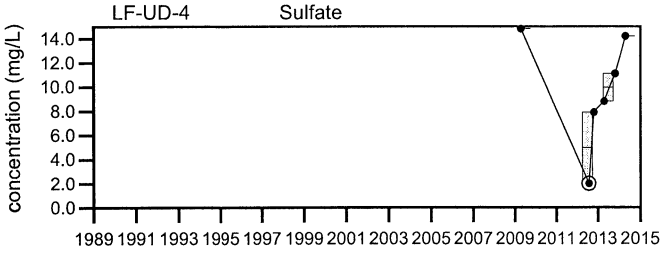


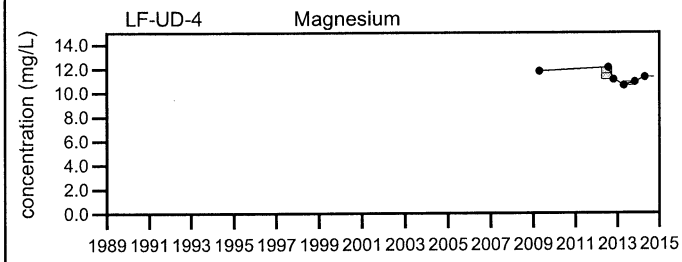


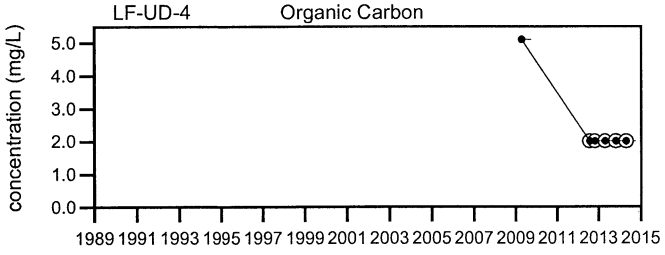


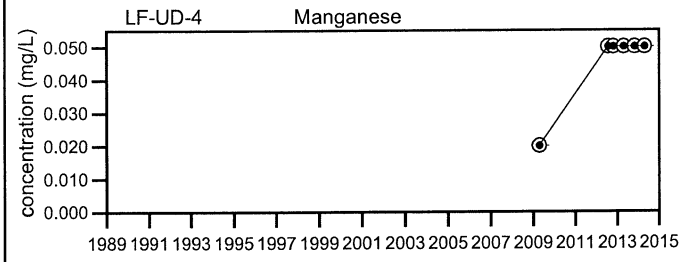


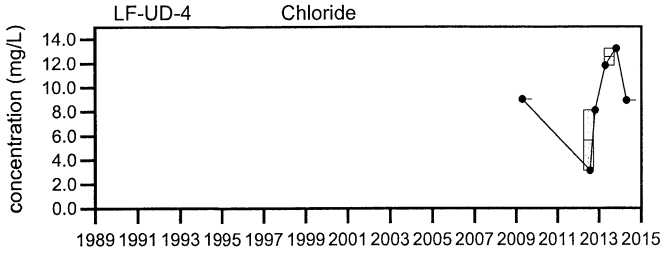












LEGEND

- Maximum Value
- 75th Percentile
- Median
- 25th Percentile
- Minimum Value

..... - FFT smoothing of yearly mean values.

- Sample Event

- BDL

Juniper Ridge Landfill

LF-UD-4

Sevee & Maher Engineers, Inc.

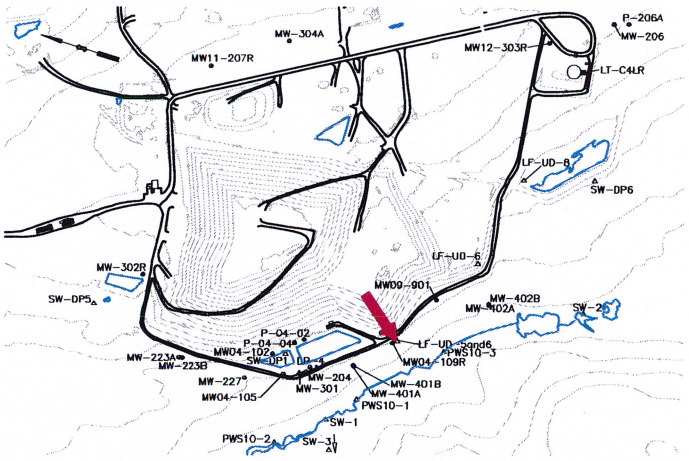
LF-UD-5and6

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

LF-UD-5and6 monitors the landfill underdrain from Cell #5 and Cell #6(composite). This underdrain pipe is located southeast of MW04-109R.



Sampled: **3 Times Annually and Monthly**

Sampled Since: **July 2011**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	Q2	Q3	Q4	Historical Min	Max	Mean	SE	n
Dissolved Oxygen (mg/L)	↑ 12	8	7	7	4	to 10	6.5	± 0.21	42
Bromide (mg/L)		0.1 U	0.1	F6	0.1 U	to 0.11	0.1	± 0.003	3
Specific Conductance (µmhos/cm @25°C)	379	474	458	372	177	to 652	430	± 12	43
pH (Standard Units)	7.9	7.9	8.1	7.9	6.7	to 8.3	7.6	± 0.06	43
Alkalinity (CaCO3) (field) (mg/L)	200	250	↓ 35	180	75	to 435	180	± 11	43
Arsenic (mg/L)		0.015	0.014	F6	0.007	to 0.017	0.011	± 0.001	11
Cadmium (mg/L)		↑ 0.0006 U	↑ 0.0006 U	F6	0.0002 U	to 0.0004	0.00044	± 6E-05	11
Calcium (mg/L)		55.5	64.7	F6	42.8	to 71.3	59	± 2.6	11
Iron (mg/L)		0.05 U	0.05 U	F6	0.02 U	to 11.3	1.1	± 1	11
Magnesium (mg/L)		10.9	12	F6	8.4	to 15.4	12	± 0.61	11
Manganese (mg/L)		0.05 U	0.05 U	F6	0.02 U	to 0.25	0.06	± 0.02	11
Nickel (mg/L)		0.005 U	0.005 U	F6	0.002 U	to 0.007	0.0041	± 0.000	11
Potassium (mg/L)		3.6	4.2	F6	3.4	to 7	5	± 0.3	11
Sodium (mg/L)		7.6	8.3	F6	6.2	to 10.2	8.5	± 0.43	11
Nitrate (N) (mg/L)		0.3	0.3	F6	0.1	to 1.1	0.34	± 0.08	11
Phosphate Phosphorus (mg/L)		0.04 U	0.04 U	F6	0.01	to 0.16	0.051	± 0.01	11
Total Dissolved Solids (mg/L)		222	269	F6	200	to 332	270	± 12	11
Total Suspended Solids (mg/L)		18	4 U	F6	4 U	to 154	36	± 16	11
Sulfate (mg/L)		14.7	↓ 8.7	F6	10.8	to 22	15	± 1.1	11
Bicarbonate (CaCO3) (mg/L)		181	207	F6	157	to 238	200	± 8.7	11
Organic Carbon (mg/L)		2 U	2 U	F6	1.5	to 2.5	2	± 0.09	11
Chemical Oxygen Demand (mg/L)		↑ 10 U	↑ 10 U	F6	3 U	to 5	7.1	± 1	11
Chloride (mg/L)		4.7	↓ 2.2	F6	2.5	to 6.2	3.4	± 0.3	11
Turbidity (field) (NTU)	0.71	1.2	0.5	0.12	0	to 30.88	4.4	± 0.94	43
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	F6	0.2 U	to 3.2	0.47	± 0.27	11

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER

U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed H2= water level higher than pipes. See LF-COMP for readings. F6= No flow.Sample not taken F-12= Pipe under water, no sample taken. G7= Field measurements elevated due to recent cleaning of underdrain pipe. H6= Pipe under water, could not measure flow.

Data Group: 235

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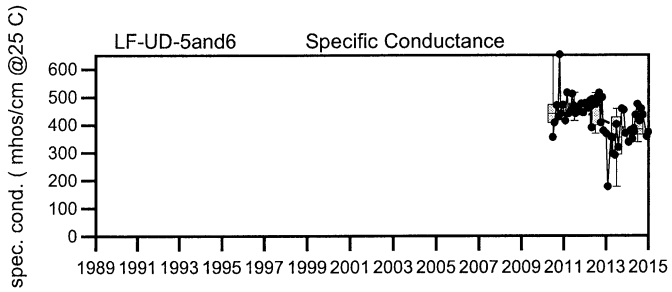
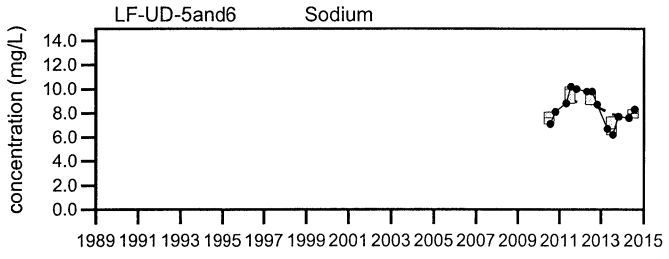
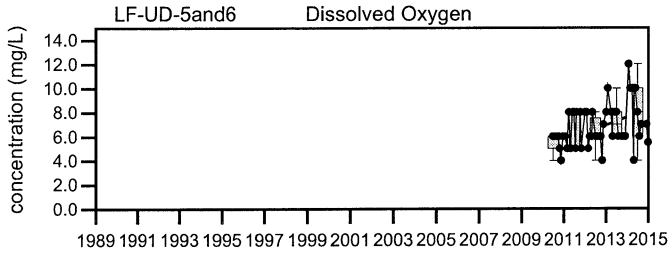
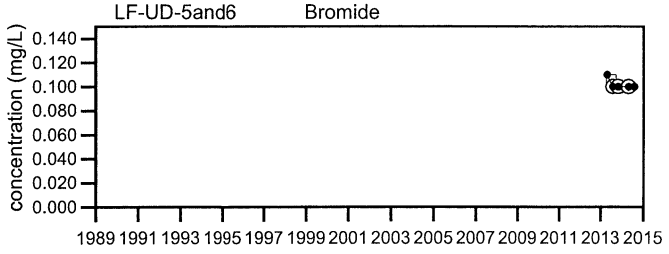
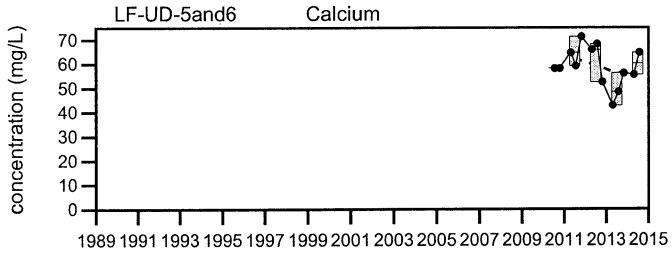
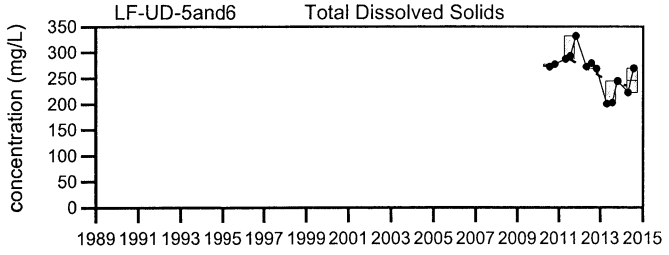


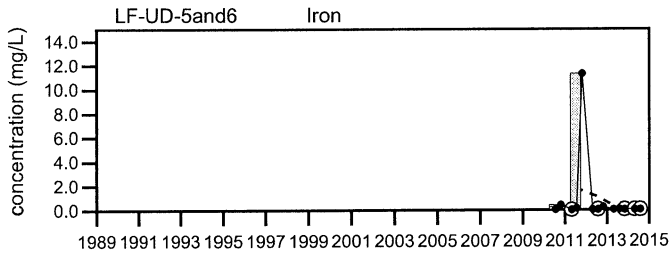


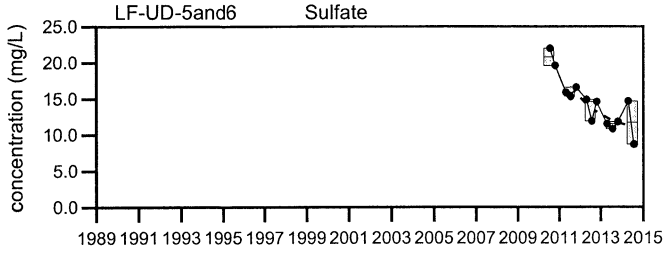


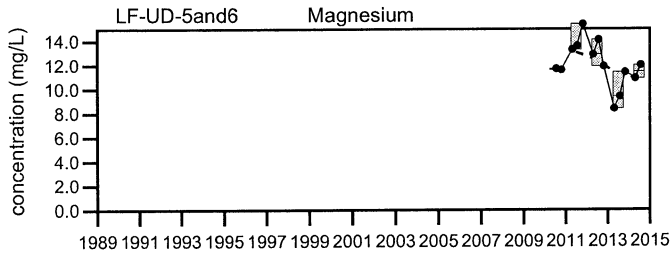


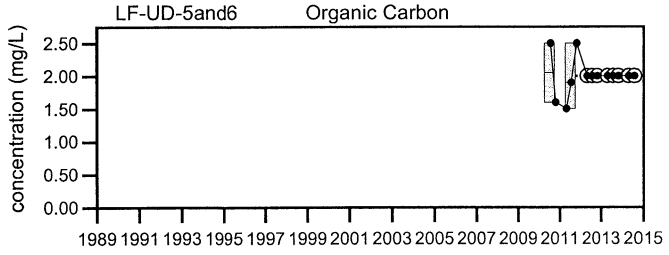


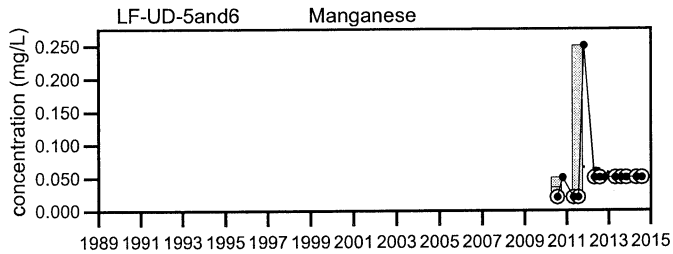


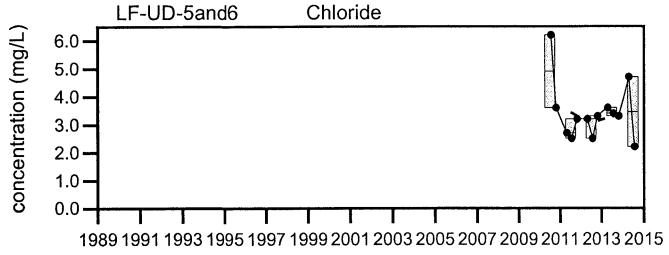


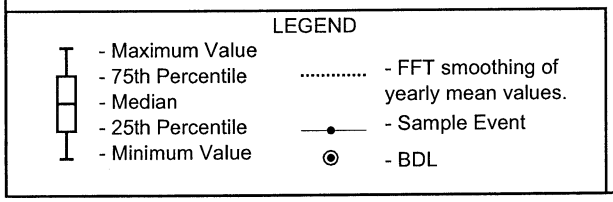












Juniper Ridge Landfill

LF-UD-5and6

Sevee & Maher Engineers, Inc.

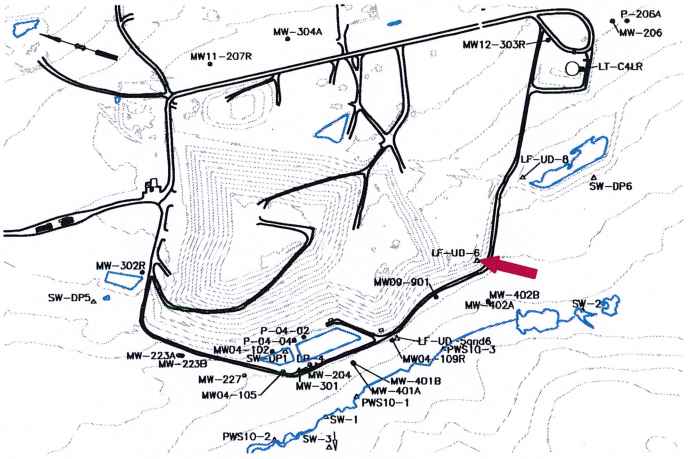
LF-UD-6

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

LF-UD-6 monitors the landfill underdrain from Cell #6. This underdrain pipe is located along the south perimeter of the landfill.



Sampled: **Monthly and 3 Times Annually**

Sampled Since: **02/03/2011**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	n
Dissolved Oxygen (mg/L)	8	8	7	7	4	8	5.6	0.17	38
Bromide (mg/L)		0.1 U	0.11	0.11	0.1 U	0.12	0.11	0.007	3
Specific Conductance (µmhos/cm @25°C)	685	841	847	847	281	919	640	22	39
pH (Standard Units)	↑ 7.8	↑ 8.1	7.6	7.5	6.9	7.7	7.3	0.03	38
Alkalinity (CaCO3) (field) (mg/L)	275	350	90	325	88	490	220	12	39
Arsenic (mg/L)		0.019	↑ 0.026	0.019	0.003	0.025	0.014	0.003	9
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006	0.0002 U	0.0007	0.00057	5E-05	9
Calcium (mg/L)		72.7	80.5	87.9	62	96.4	83	3.4	9
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	6.28	0.74	0.69	9
Magnesium (mg/L)		21	22.5	23.3	14.7	25.4	20	1.3	9
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	0.17	0.057	0.02	9
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	0.013	0.0058	0.001	9
Potassium (mg/L)		4.6	4.1	4.1	3.3	5.9	4.8	0.25	9
Sodium (mg/L)		57.3	69.1	70.9	7.9	74.3	35	9.6	9
Nitrate (N) (mg/L)		↑ 13.9	0.8	0.4	0.3 U	1.2	0.68	0.11	9
Phosphate Phosphorus (mg/L)		0.11	0.04	0.06	0.01	0.17	0.05	0.02	9
Total Dissolved Solids (mg/L)		464	522	536	309	563	430	34	9
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	102	15	11	9
Sulfate (mg/L)		128	52.6	88.7	2 U	143	59	18	9
Bicarbonate (CaCO3) (mg/L)		275	332	343	222	359	300	15	9
Organic Carbon (mg/L)		2.9	2.9	3	2 U	3.6	3	0.21	9
Chemical Oxygen Demand (mg/L)		11	10 U	10 U	3 U	14	9.1	0.99	9
Chloride (mg/L)		15	11.5	9.4	2.1	18.2	7.3	2	9
Turbidity (field) (NTU)	6.68	8.27	1	0.65	0.26	27.87	4.6	1.1	39
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.28	↑ 0.37	0.2 U	0.33	0.21	0.01	9

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

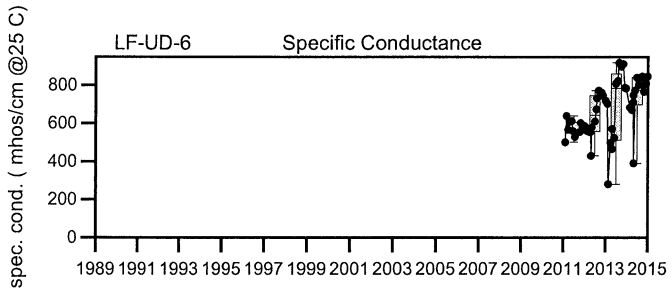
Comments

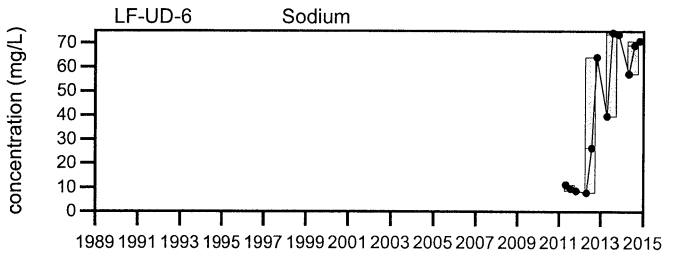
Q2= APRIL Q3= JULY Q4= OCTOBER
This location is monitored triannually for field and lab parameters and monthly for field parameters only.

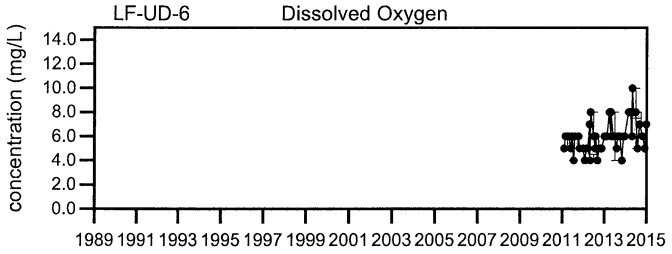
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed H2= water level higher than pipes. See LF-COMP for readings. F6= No flow.Sample not taken F-12= Pipe under water, no sample taken. G7= Field measurements elevated due to recent cleaning of underdrain pipe. H6= Pipe under water, could not measure flow.

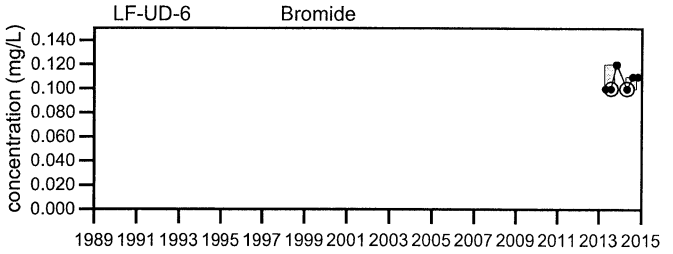
Data Group: 235
Printed: 3/24/2015 13:39

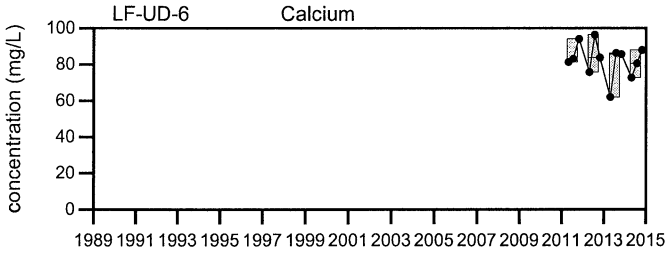
SME
Sevee & Maher Engineers, Inc.

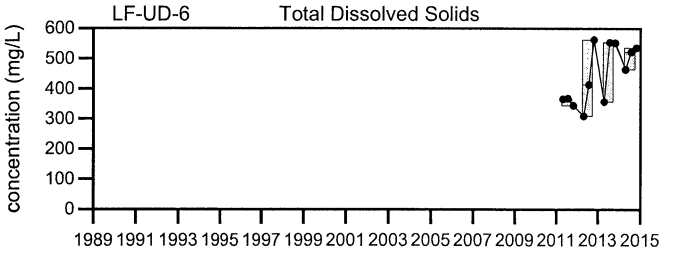


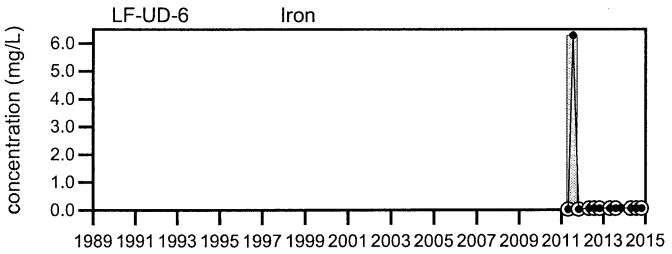


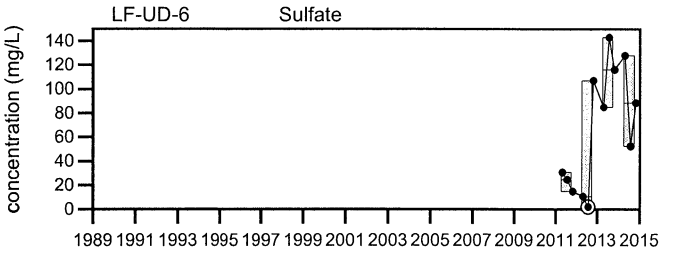


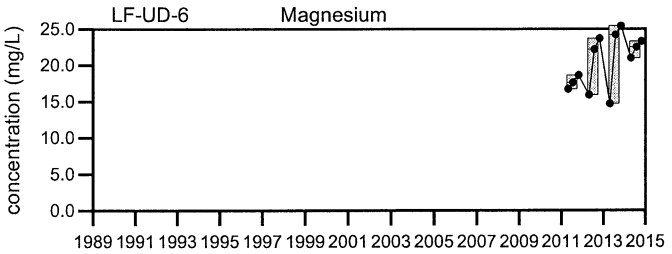


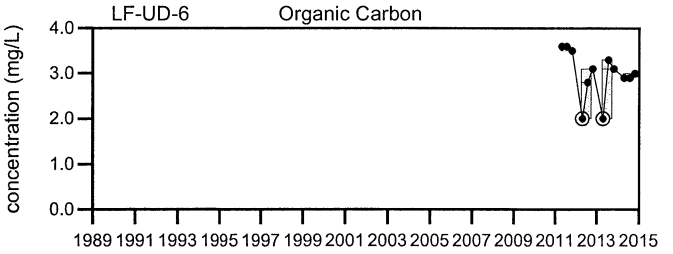


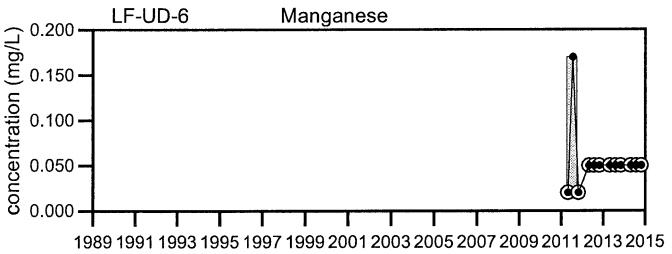


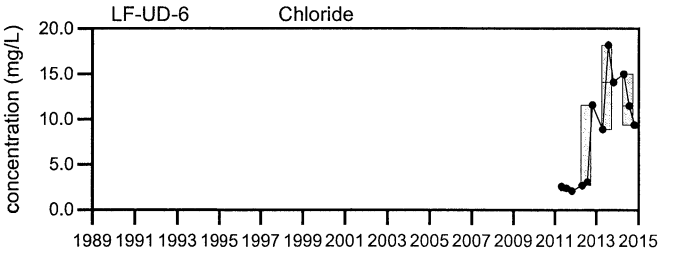


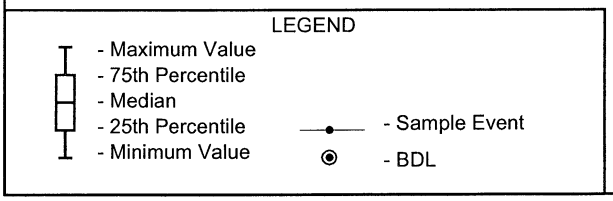












Juniper Ridge Landfill

LF-UD-6

Sevee & Maher Engineers, Inc.

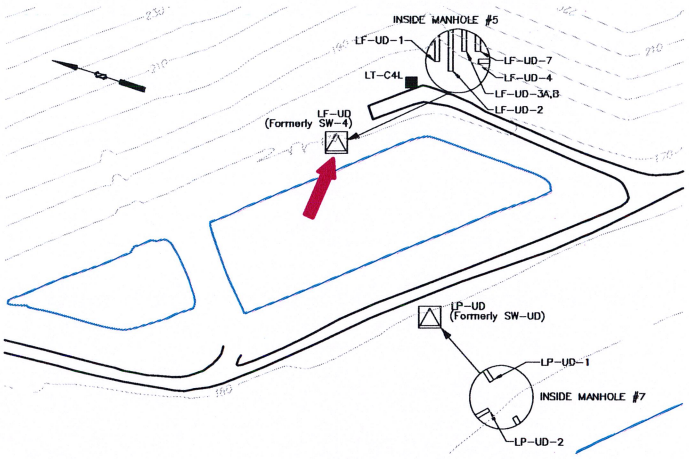
LF-UD-7

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

LF-UD-7 monitors the landfill underdrain from Cell #7 and Manhole #5.



Sampled: **Monthly and 3 Times Annually**

Sampled Since: **11/30/2011**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Max	Mean	SE	n
Dissolved Oxygen (mg/L)	H8	H8	H8	H8	No historical data for Dissolved Oxygen.				
Bromide (mg/L)		F6	F6	F6	No historical data for Bromide.				
Specific Conductance (µmhos/cm @25°C)	H8	H8	H8	H8	No historical data for Specific Conductance.				
pH (Standard Units)	H8	H8	H8	H8	No historical data for pH.				
Alkalinity (CaCO3) (field) (mg/L)	H8	H8	H8	H8	No historical data for Alkalinity (CaCO3) (field).				
Arsenic (mg/L)		F6	F6	F6	No historical data for Arsenic.				
Cadmium (mg/L)		F6	F6	F6	No historical data for Cadmium.				
Calcium (mg/L)		F6	F6	F6	No historical data for Calcium.				
Iron (mg/L)		F6	F6	F6	No historical data for Iron.				
Magnesium (mg/L)		F6	F6	F6	No historical data for Magnesium.				
Manganese (mg/L)		F6	F6	F6	No historical data for Manganese.				
Nickel (mg/L)		F6	F6	F6	No historical data for Nickel.				
Potassium (mg/L)		F6	F6	F6	No historical data for Potassium.				
Sodium (mg/L)		F6	F6	F6	No historical data for Sodium.				
Nitrate (N) (mg/L)		F6	F6	F6	No historical data for Nitrate (N).				
Phosphate Phosphorus (mg/L)		F6	F6	F6	No historical data for Phosphate Phosphorus.				
Total Dissolved Solids (mg/L)		F6	F6	F6	No historical data for Total Dissolved Solids.				
Total Suspended Solids (mg/L)		F6	F6	F6	No historical data for Total Suspended Solids.				
Sulfate (mg/L)		F6	F6	F6	No historical data for Sulfate.				
Bicarbonate (CaCO3) (mg/L)		F6	F6	F6	No historical data for Bicarbonate (CaCO3).				
Organic Carbon (mg/L)		F6	F6	F6	No historical data for Organic Carbon.				
Chemical Oxygen Demand (mg/L)		F6	F6	F6	No historical data for Chemical Oxygen Demand.				
Chloride (mg/L)		F6	F6	F6	No historical data for Chloride.				
Turbidity (field) (NTU)	H8	H8	H8	H8	No historical data for Turbidity (field).				
Tannin & Lignins (Tannic Acid) (mg/L)		F6	F6	F6	No historical data for Tannin & Lignins (Tannic Acid).				

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
This location is monitored triannually for field and lab parameters and monthly for field parameters only.

U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed H2= water level higher than pipes. See LF-COMP for readings. F6= No flow.Sample not taken. H8=No flow from pipe. See LF-COMP for readings. F-12= Pipe under water, no sample taken. G7= Field measurements elevated due to recent cleaning of underdrain pipe. H6= Pipe under water, could not measure flow.

Data Group: 235
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SME
Sewee & Maher Engineers, Inc.

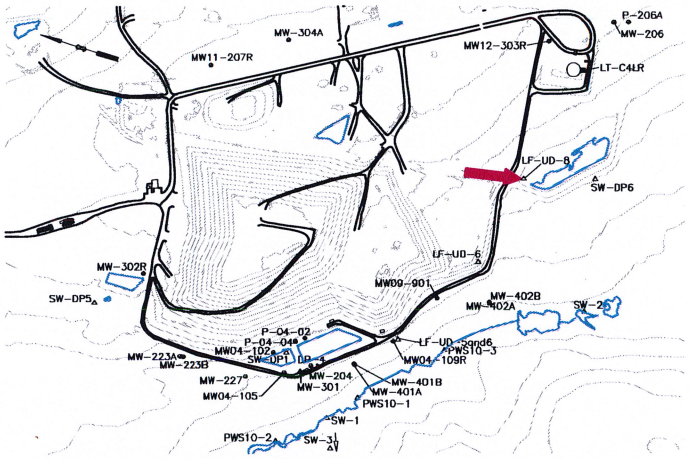
LF-UD-8

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

LF-UD-8 monitors the landfill underdrain from Cell #8. This underdrain pipe is located along the southern perimeter of the landfill.



Sampled: **3 Times Annually**

Sampled Since: **4/23/2013**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	Q2	Q3	Q4	Historical Min	Max	Mean	SE	n
Dissolved Oxygen (mg/L)	F12	F12	5	6	5	10	7.2	0.68	9
Bromide (mg/L)		F12	0.1 U	0.1 U	0.1 U	0.1 U	0.1	0	3
Specific Conductance (µmhos/cm @25°C)	F12	F12	108	96	64	407	310	34	9
pH (Standard Units)	F12	F12	7.8	7.9	6.8	8.1	7.2	0.12	9
Alkalinity (CaCO3) (field) (mg/L)	F12	F12	↓ 15	↓ 25	50	185	140	12	9
Arsenic (mg/L)		F12	↓ 0.005	↓ 0.005 U	0.009	0.014	0.012	0.002	3
Cadmium (mg/L)		F12	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006	5E-12	3
Calcium (mg/L)		F12	↓ 14.5	↓ 9.6	39.3	50.1	46	3.4	3
Iron (mg/L)		F12	↑ 0.85	↑ 0.44	0.05 U	0.05 U	0.05	0	3
Magnesium (mg/L)		F12	↓ 1.6	↓ 1.2	9	11.1	10	0.64	3
Manganese (mg/L)		F12	0.05 U	0.05 U	0.05 U	0.05 U	0.05	0	3
Nickel (mg/L)		F12	0.005 U	0.005 U	0.005 U	0.005 U	0.005	4E-11	3
Potassium (mg/L)		F12	↓ 1.2	↓ 1.1	3.7	3.7	3.7	3E-08	3
Sodium (mg/L)		F12	↓ 2.4	↓ 2.1	6.9	7.3	7.1	0.12	3
Nitrate (N) (mg/L)		F12	↓ 0.3 U	↓ 0.3 U	0.8	1.4	1	0.19	3
Phosphate Phosphorus (mg/L)		F12	↑ 0.05	0.04 U	0.04 U	0.04 U	0.04	3E-10	3
Total Dissolved Solids (mg/L)		F12	↓ 74	↓ 69	195	222	210	8.2	3
Total Suspended Solids (mg/L)		F12	4 U	4	4 U	4 U	4	0	3
Sulfate (mg/L)		F12	↓ 4.6	↑ 12.9	7.3	9.6	8.4	0.67	3
Bicarbonate (CaCO3) (mg/L)		F12	↓ 38	↓ 12.4	152	180	170	8.3	3
Organic Carbon (mg/L)		F12	↑ 5.7	↑ 5.4	2 U	2 U	2	0	3
Chemical Oxygen Demand (mg/L)		F12	10	↑ 11	10 U	10 U	10	0	3
Chloride (mg/L)		F12	↓ 3.3	3.7	3.5	4	3.7	0.17	3
Turbidity (field) (NTU)	F12	F12	0.8	2.6	0.04	24.35	3.2	2.6	9
Tannin & Lignins (Tannic Acid) (mg/L)		F12	↑ 0.59	↑ 0.61	0.2 U	0.2 U	0.2	0	3

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection.
This location is monitored triannually for field and lab parameters and monthly for field parameters only. F12= Pipe under water, no sample taken.

Data Group: 235

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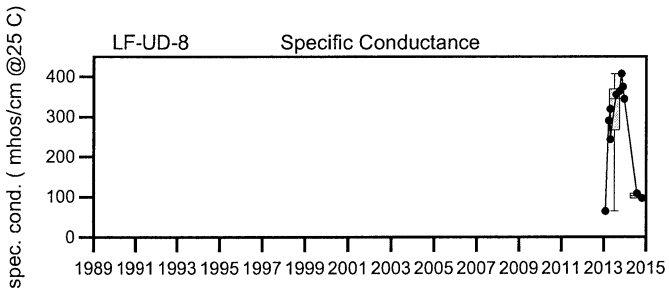
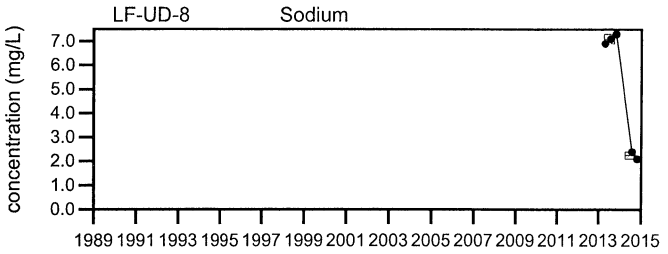
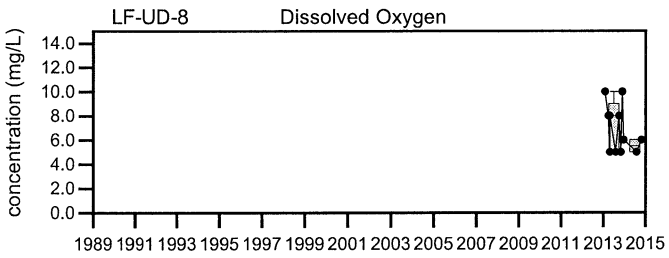
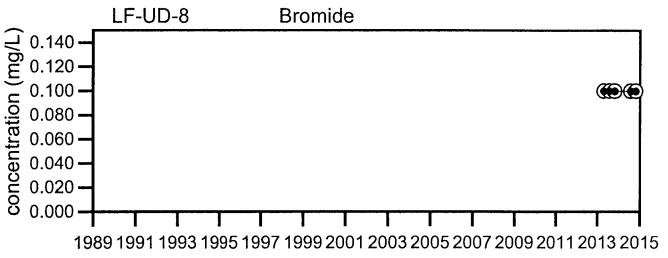
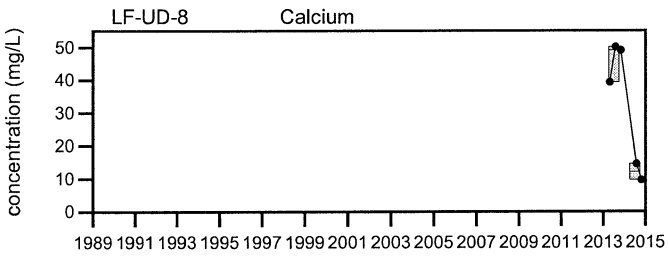
SME
Sevee & Maher Engineers, Inc.

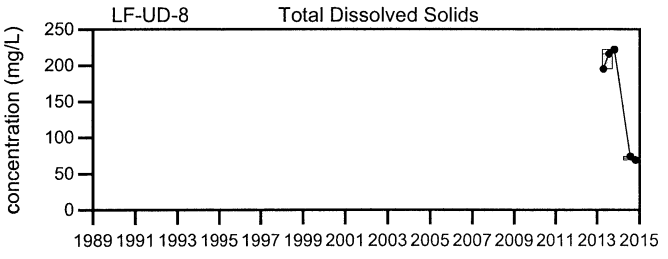


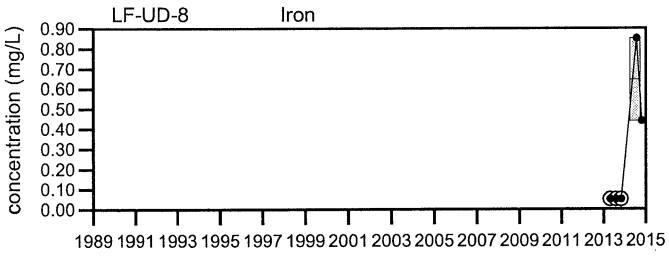


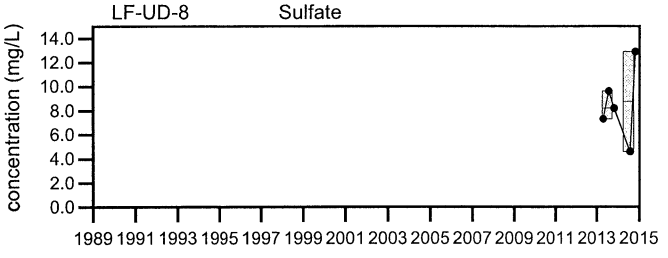


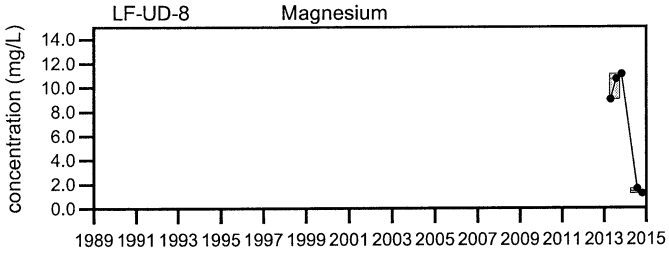


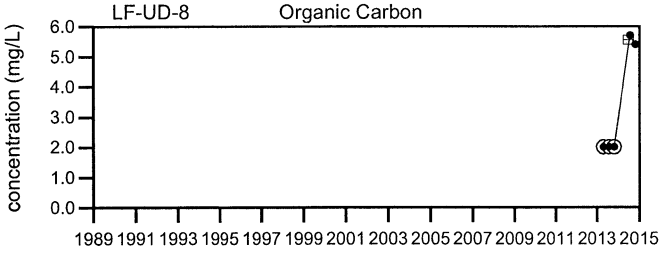


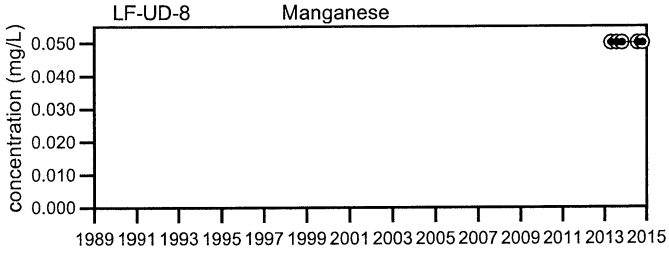


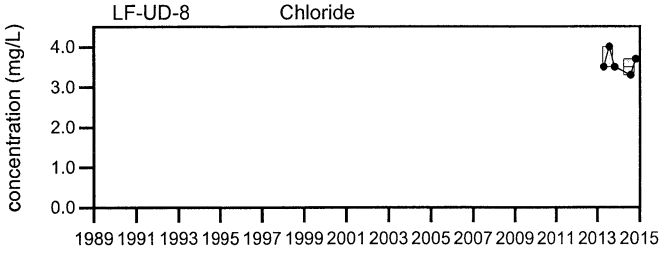


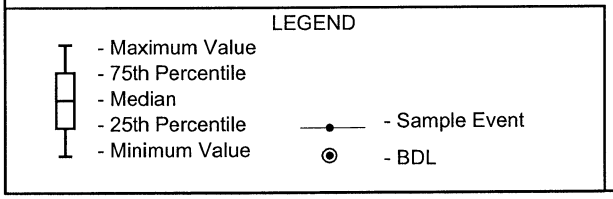












Juniper Ridge Landfill

LF-UD-8

Sevee & Maher Engineers, Inc.

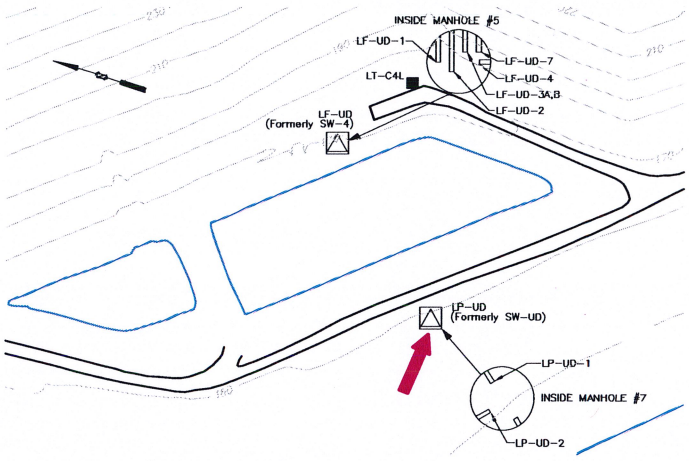
LP-COMP

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

Manhole #7 composite sample



Sampled: **See comments below**

Sampled Since: **10/27/04**

Sampling Method: **Grab**

Chemical Summary

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

This location is monitored monthly for field parameters only when the water level is higher than the LP sample location pipes in Manhole #7.

U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed H2= water level higher than pipes. See LF-COMP for readings. F6= No flow.Sample not taken F-12= Pipe under water, no sample taken. G7= Field measurements elevated due to recent cleaning of underdrain pipe. H6= Pipe under water, could not measure flow.

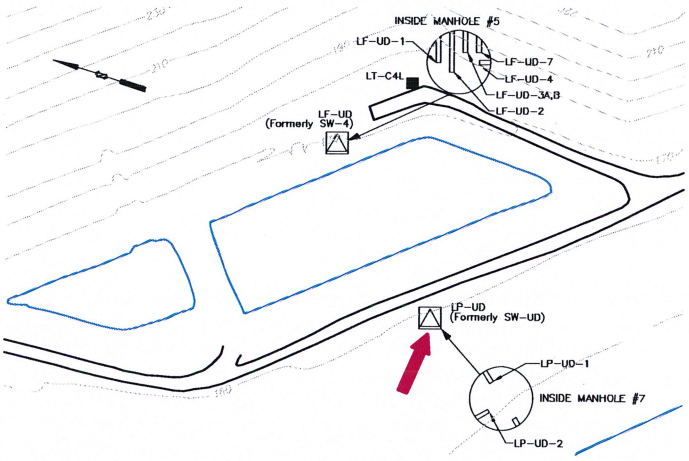
LP-UD-1

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

LP-UD-1 is located at Manhole #7 and monitors the leachate underdrain from the southern end of the leachate pond.



Sampled: **Monthly and 3 Times Annually**

Sampled Since: **07/28/04**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	Q2	Q3	Q4	Historical Min	Max	Mean	SE	n
Dissolved Oxygen (mg/L)	F6	F6	F6	F6	5	to 5	5	± 0	1
Bromide (mg/L)		F6	F6	F6	No historical data for Bromide.				
Specific Conductance (µmhos/cm @25°C)	F6	F6	F6	F6	517	to 517	520	± 0	1
pH (Standard Units)	F6	F6	F6	F6	6.8	to 6.8	6.8	± 0	1
Alkalinity (CaCO3) (field) (mg/L)	F6	F6	F6	F6	125	to 125	130	± 0	1
Arsenic (mg/L)		F6	F6	F6	No historical data for Arsenic.				
Cadmium (mg/L)		F6	F6	F6	No historical data for Cadmium.				
Calcium (mg/L)		F6	F6	F6	No historical data for Calcium.				
Iron (mg/L)		F6	F6	F6	No historical data for Iron.				
Magnesium (mg/L)		F6	F6	F6	No historical data for Magnesium.				
Manganese (mg/L)		F6	F6	F6	No historical data for Manganese.				
Nickel (mg/L)		F6	F6	F6	No historical data for Nickel.				
Potassium (mg/L)		F6	F6	F6	No historical data for Potassium.				
Sodium (mg/L)		F6	F6	F6	No historical data for Sodium.				
Nitrate (N) (mg/L)		F6	F6	F6	No historical data for Nitrate (N).				
Phosphate Phosphorus (mg/L)		F6	F6	F6	No historical data for Phosphate Phosphorus.				
Total Dissolved Solids (mg/L)		F6	F6	F6	No historical data for Total Dissolved Solids.				
Total Suspended Solids (mg/L)		F6	F6	F6	No historical data for Total Suspended Solids.				
Sulfate (mg/L)		F6	F6	F6	No historical data for Sulfate.				
Bicarbonate (CaCO3) (mg/L)		F6	F6	F6	No historical data for Bicarbonate (CaCO3).				
Organic Carbon (mg/L)		F6	F6	F6	No historical data for Organic Carbon.				
Chemical Oxygen Demand (mg/L)		F6	F6	F6	No historical data for Chemical Oxygen Demand.				
Chloride (mg/L)		F6	F6	F6	No historical data for Chloride.				
Turbidity (field) (NTU)	F6	F6	F6	F6	0	to 0	0	± 0	1
Tannin & Lignins (Tannic Acid) (mg/L)		F6	F6	F6	No historical data for Tannin & Lignins (Tannic Acid).				

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
This location is monitored triannually for field and lab parameters and monthly for field parameters only.

U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed H2= water level higher than pipes. See LF-COMP for readings. F6= No flow.Sample not taken F-12= Pipe under water, no sample taken. G7= Field measurements elevated due to recent cleaning of underdrain pipe. H6= Pipe under water, could not measure flow. H9=No flow from pipe, See LP-COMP for readings.

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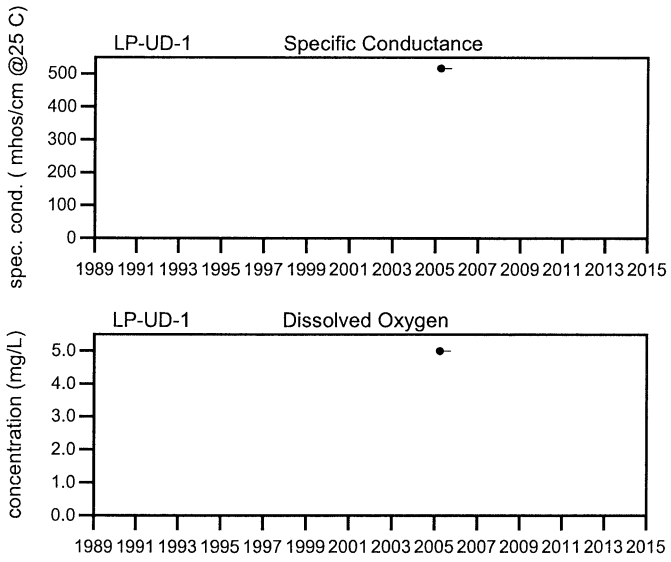
SME
Sowee & Maher Engineers, Inc.



No data for Sodium at LP-UD-1

No data for Bromide at LP-UD-1

No data for Calcium at LP-UD-1

No data for Total Dissolved Solids at LP-UD-1

No data for Iron at LP-UD-1

No data for Sulfate at LP-UD-1

No data for Magnesium at LP-UD-1

No data for Organic Carbon at LP-UD-1

No data for Manganese at LP-UD-1

No data for Chloride at LP-UD-1

LEGEND

- Maximum Value
- 75th Percentile
- Median
- 25th Percentile
- Minimum Value
- Sample Event
- BDL

Juniper Ridge Landfill

LP-UD-1

Sevee & Maher Engineers, Inc.

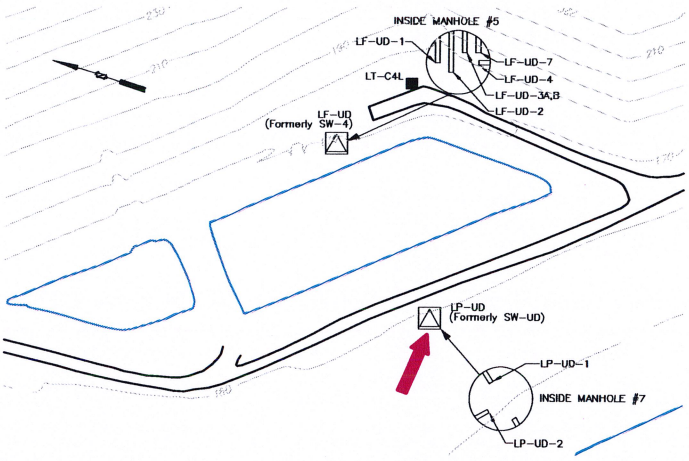
LP-UD-2

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

LP-UD-2 is located in Manhole #7 and monitors the water quality of the leachate underdrain on the north end of the leachate pond.



Sampled: **Monthly and 3 Times Annually**

Sampled Since: **07/28/04**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	Q2	Q3	Q4	Historical Min	Max	Mean	SE	n
Dissolved Oxygen (mg/L)	↑ 12	8	8	8	1	to 10	6	± 0.15	102
Bromide (mg/L)		0.1 U	0.1 U	0.1 U	0.1 U	to 0.11	0.11	± 0.003	3
Specific Conductance (µmhos/cm @25°C)	297	369	336	316	110	to 834	340	± 9.7	102
pH (Standard Units)	7.7	7.4	7.3	7.3	5.9	to 8	7.1	± 0.04	102
Alkalinity (CaCO3) (field) (mg/L)	170	90	↓ 30	75	50	to 350	140	± 4.8	100
Arsenic (mg/L)		0.011	↑ 0.015	0.011	0.001 U	to 0.012	0.0046	± 0.000	29
Cadmium (mg/L)		0.0006 U	0.0006 U	0.0006 U	0.0002 U	to 0.0016	0.00041	± 6E-05	27
Calcium (mg/L)		37.7	36.5	40.1	28.8	to 60	37	± 1.3	29
Iron (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	to 2.86	0.17	± 0.1	29
Magnesium (mg/L)		11.5	10	10.5	7.7	to 21	11	± 0.46	29
Manganese (mg/L)		0.05 U	0.05 U	0.05 U	0.02 U	to 0.36	0.041	± 0.01	29
Nickel (mg/L)		0.005 U	0.005 U	0.005 U	0.002 U	to 0.007	0.003	± 0.000	27
Potassium (mg/L)		2.3	2.8	2.3	2.2	to 25	4.2	± 0.8	29
Sodium (mg/L)		8	8.2	8	7	to 58	14	± 1.9	29
Nitrate (N) (mg/L)		0.3	0.4	0.3 U	0.1	to 2.3	0.4	± 0.08	29
Phosphate Phosphorus (mg/L)		0.04 U	0.04 U	0.04 U	0.01 U	to 0.11	0.024	± 0.004	29
Total Dissolved Solids (mg/L)		183	193	189	151	to 455	210	± 11	29
Total Suspended Solids (mg/L)		4 U	4 U	4 U	4 U	to 73	6.6	± 2.4	29
Sulfate (mg/L)		13.9	4.7	8.1	2.7	to 116	18	± 4	29
Bicarbonate (CaCO3) (mg/L)		140	139	137	90	to 228	140	± 4.5	29
Organic Carbon (mg/L)		2 U	2 U	2 U	0.7 U	to 6.3	2	± 0.21	29
Chemical Oxygen Demand (mg/L)		10 U	10 U	10 U	3 U	to 18	6.2	± 0.76	29
Chloride (mg/L)		8.3	3.9	3.9	2.3	to 31.1	9.3	± 0.98	29
Turbidity (field) (NTU)	1.91	1.84	0.8	0.4	0	to 60	1.7	± 0.6	102
Tannin & Lignins (Tannic Acid) (mg/L)		0.2 U	0.2 U	0.2 U	0.2 U	to 0.29	0.2	± 0.003	29

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

Q2= APRIL Q3= JULY Q4= OCTOBER
This location is monitored triannually for field and lab parameters and monthly for field parameters only.

U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed H2= water level higher than pipes. See LF-COMP for readings. F6= No flow.Sample not taken F-12= Pipe under water, no sample taken. G7= Field measurements elevated due to recent cleaning of underdrain pipe. H6= Pipe under water, could not measure flow. H9=No flow from pipe, See LP-COMP for readings.

Data Group: 235
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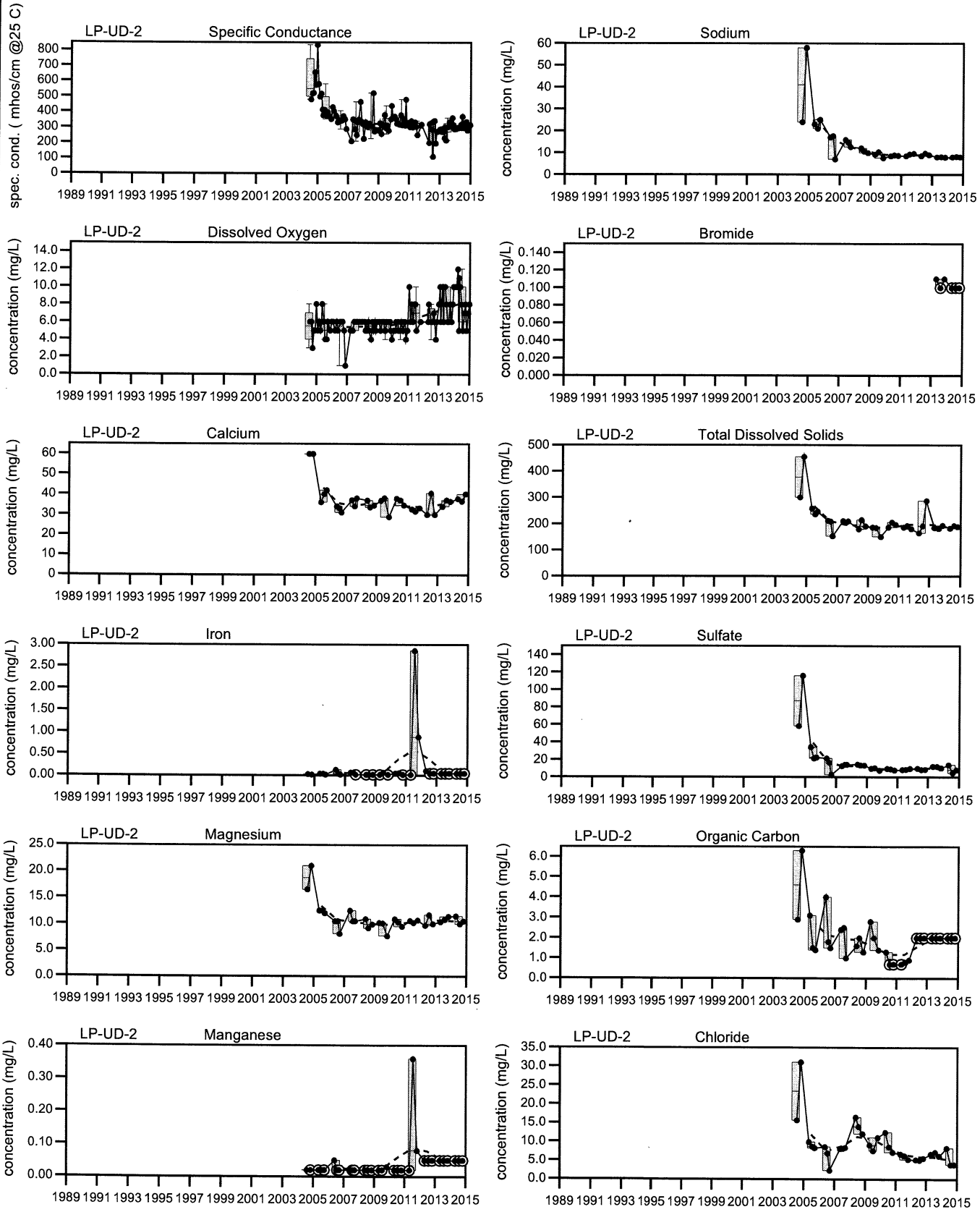
SME
Sevee & Maher Engineers, Inc.



Juniper Ridge Landfill

LP-UD-2

Sevee & Maher Engineers, Inc.

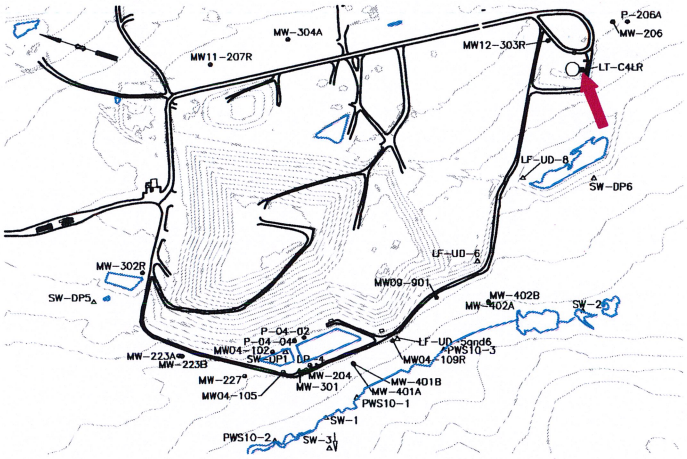
LT-C4LR

Juniper Ridge Landfill

annual stats 2014 minus leachate

Well Description

Leachate collection location at leachate storage tank.



Sampled: **3 Times Annually**

Sampled Since: **07/30/2013**

Sampling Method: **Grab**

Chemical Summary

Indicator Parameters	2014 Q1	2014 Q2	2014 Q3	2014 Q4	Historical Min	Historical Max	Historical Mean	Historical SE	Historical n
Dissolved Oxygen (mg/L)		D2	D2	D2	No historical data for Dissolved Oxygen.				
Bromide (mg/L)		63.6	39	↑ 100	38.8	95	67	28	2
Specific Conductance (µmhos/cm @25°C)		↓ 15370	23800	↓ 21300	23400	24100	24000	350	2
pH (Standard Units)		↑ 7.2	↑ 7.2	↑ 7.2	6.7	6.8	6.8	0.05	2
Alkalinity (CaCO3) (field) (mg/L)		D3	D3	D3	No historical data for Alkalinity (CaCO3) (field).				
Arsenic (mg/L)		↓ 0.131	0.143	↑ 0.186	0.137	0.16	0.15	0.01	2
Cadmium (mg/L)		0.0061	↓ 0.0038	0.009	0.004	0.0146	0.0093	0.005	2
Calcium (mg/L)		↓ 329	↓ 311	↓ 406	860	958	910	49	2
Iron (mg/L)		↓ 13.2	↓ 28.6	↓ 27.3	100	179	140	40	2
Magnesium (mg/L)		↓ 259	↓ 289	↓ 355	433	532	480	50	2
Manganese (mg/L)		↓ 2.73	↓ 3.8	↓ 4.23	16.7	23.4	20	3.4	2
Nickel (mg/L)		↓ 0.073	↓ 0.146	↓ 0.094	0.23	0.304	0.27	0.04	2
Potassium (mg/L)		↓ 941	↓ 1140	1472	1234	1622	1400	190	2
Sodium (mg/L)		↓ 1633	1948	↑ 2316	1910	2290	2100	190	2
Total Kjeldahl Nitrogen (mg/L)		↓ 520	850	820	742	880	810	69	2
Nitrate (N) (mg/L)		45 U	348	30 U	5	1210	610	600	2
Phosphate Phosphorus (mg/L)				0.83	0.79	1.39	1.1	0.3	2
Total Dissolved Solids (mg/L)		↓ 8600	↓ 12040	↓ 13280	15050	17400	16000	1200	2
Total Suspended Solids (mg/L)		↓ 28	↓ 64	↓ 44	140	625	380	240	2
Sulfate (mg/L)		↑ 300 U	↑ 2250	↑ 200 U	10.4	10.4	210	190	2
Bicarbonate (CaCO3) (mg/L)		↓ 2010	↓ 3200	↓ 2740	3700	3980	3800	140	2
Organic Carbon (mg/L)		↓ 364	↓ 761	↓ 460	2450	2560	2500	55	2
Biochemical Oxygen Demand (mg/L)		↓ 434		↓ 448	855	4850	2900	2000	2
Chemical Oxygen Demand (mg/L)		↓ 1620	↓ 2760	↓ 2320	8080	8110	8100	15	2
Chloride (mg/L)		7650	13950	7070	5970	24300	15000	9200	2
Turbidity (field) (NTU)		D3	D3	D3	No historical data for Turbidity (field).				
Tannin & Lignins (Tannic Acid) (mg/L)			↓ 75	↓ 100	102	480	290	190	2

underlined/bold - values exceed a regulatory standard listed below.

↑ indicates a value greater than the historical maximum value; ↓ indicates a value less than the historical minimum value.

Comments

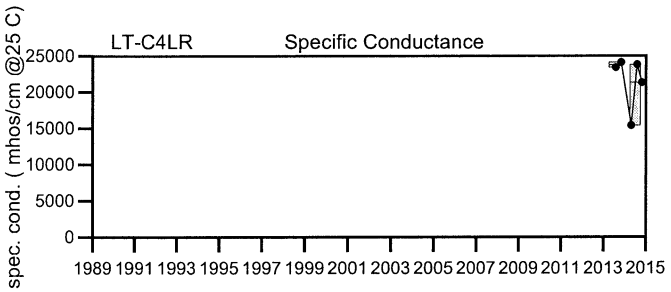
Q2= APRIL Q3= JULY Q4= OCTOBER

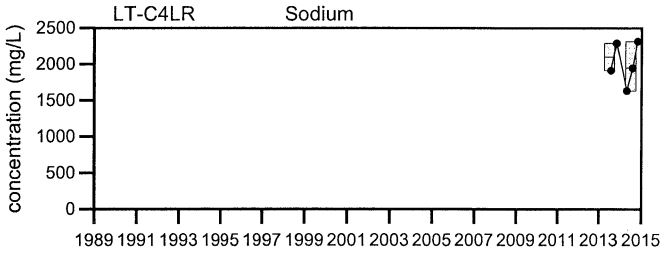
U= sample below PQL or MDL J= estimated quantity D= location dry F= location frozen I=insufficient water for sample collection A=sample location could not be accessed HD= water above pipe invert. D2= Sample too dark to read D.O. reading. D3= Sample too dark to take reading.

Data Group: 235

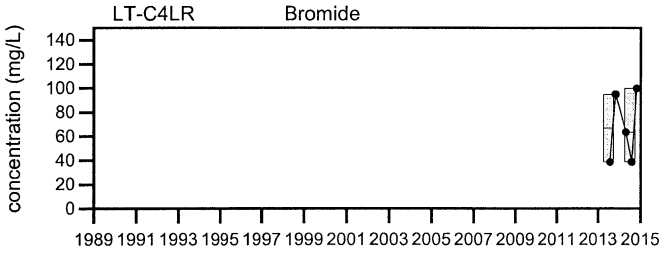
Printed: 3/24/2015 13:39

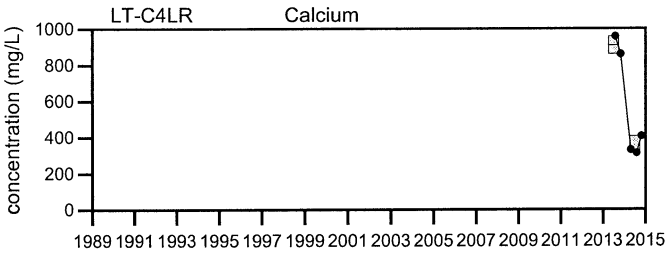
SME Sevee & Maher Engineers, Inc.

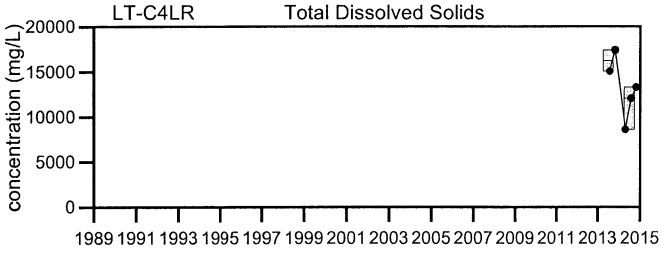


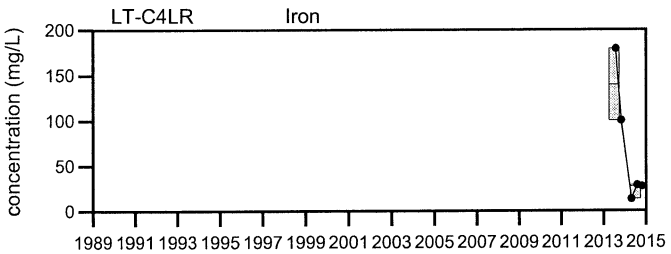


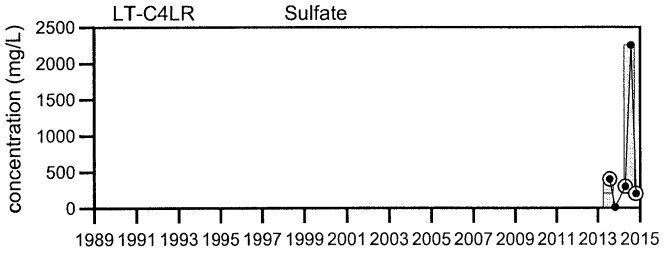
No data for Dissolved Oxygen at LT-C4LR

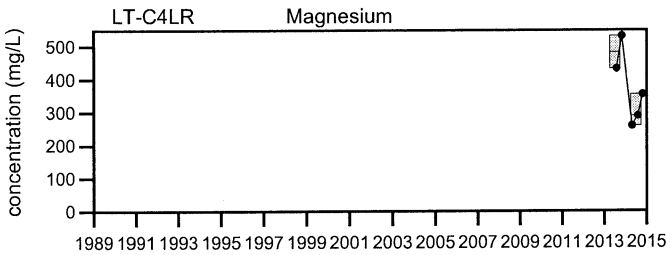


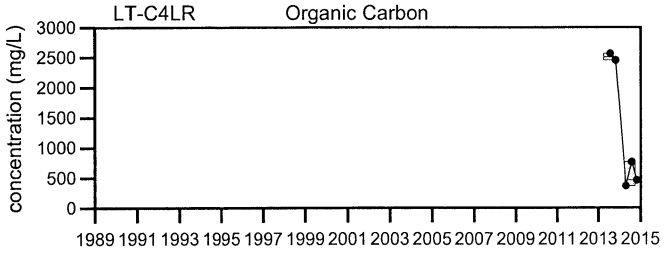


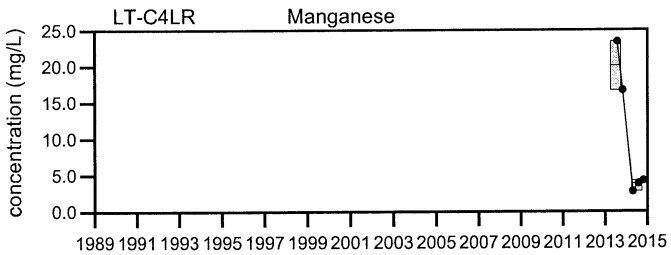


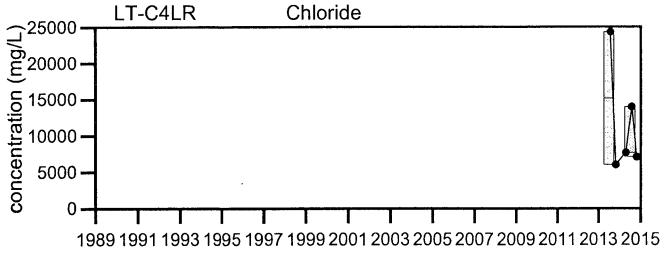












LEGEND

- Maximum Value
- 75th Percentile
- Median
- 25th Percentile
- Minimum Value
- Sample Event
- BDL

Juniper Ridge Landfill

LT-C4LR

Sevee & Maher Engineers, Inc.

APPENDIX C

MANN-KENDALL TREND ANALYSIS RESULTS

Summary of Mann-Kendall Trend Analysis
95% Confidence (alpha=0.05)
Juniper Ridge Landfill 2014

Location	Increasing Trends		Decreasing Trends		No Trends	
	Trend Analysis 3-yr	Trend Analysis 5-yr	Trend Analysis 3-yr	Trend Analysis 5-yr	Trend Analysis 3-yr	Trend Analysis 5-yr
DP-4			Spec Cond	DO	pH, Temp, Eh, DO, ALK (fld), TURB (fld)	Spec Cond, pH, Temp, Eh, ALK (fld), TURB (fld)
LF-COMP	DO, ALK (fld)	Insufficient Data	Insufficient Data		Spec Cond, pH, Temp, Eh, TURB (fld)	Insufficient Data
LF-UD-1	DO	DO, Fe, TDS			Spec Cond, pH, Temp, Eh, As, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, NO3 - N, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC	Spec Cond, pH, Temp, Eh, As, Cd, Ca, Mg, K, Na, NO3 - N, P, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC **(Mn, Ni)**
LF-UD-2	Spec Cond, As, Ca, Mg, Na, TDS, ALK (fld)	Temp, Eh, DO, As, Mg, Na, TDS, Cl			pH, Temp, Eh, DO, Cd, Fe, Mn, Ni, K, NO3 - N, P, TSS, SO4, HCO3, OC, COD, Cl, TURB (fld), TANNIC	Spec Cond, pH, Ca, Fe, K, NO3 - N, P, TSS, SO4, HCO3, ALK (fld), TURB (fld), TANNIC **(Cd, Mn, Ni, OC, COD)**
LF-UD-3A,B	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
LF-UD-4	pH, DO, SO4, TURB (fld)	pH, Eh, DO, ALK (fld), TURB (fld)	Temp	Temp	Spec Cond, Eh, As, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, NO3 - N, P, TDS, TSS, HCO3, ALK (fld), OC, COD, Cl, TANNIC	Spec Cond
LF-UD-5and6		pH, DO	Spec Cond, TURB (fld)	K, TDS, SO4, OC	pH, Temp, Eh, DO, As, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, NO3 - N, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TANNIC	Spec Cond, Temp, Eh, As, Cd, Ca, Fe, Mg, Mn, Ni, Na, NO3 - N, P, TSS, HCO3, ALK (fld), COD, Cl, TURB (fld), TANNIC
LF-UD-6	Spec Cond, pH, DO, Na, ALK (fld)	Insufficient Data	TURB (fld)	Insufficient Data	Temp, Eh, Flow Rate, As, Cd, Ca, Fe, Mg, Mn, Ni, K, NO3 - N, P, TDS, TSS, SO4, HCO3, OC, COD, Cl, TANNIC	Insufficient Data
LF-UD-7	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
LF-UD-8	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
LP-COMP	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
LP-UD-1	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
LP-UD-2	Spec Cond	Temp, Eh, DO, As, HCO3, COD, TURB (fld)		Spec Cond, Na, Cl	pH, Temp, Eh, DO, As, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, NO3 - N, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC	pH, Ca, Fe, Mg, Mn, K, NO3 - N, P, TDS, TSS, SO4, ALK (fld), TANNIC **(Cd, Ni, OC)**
LT-C4LR	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
MW04-102	Eh	Eh, As, Na	Mg	Spec Cond	Spec Cond, pH, Temp, DO, As, Cd, Ca, Fe, Mn, Ni, K, Na, TKN, NO3 - N, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC	pH, Temp. DO, Ca, Mg, K, TKN, NO3 - N, TDS, TSS, SO4, HCO3, ALK (fld), OC, Cl, TURB (fld), TANNIC **(Cd, Fe, Mn, Ni, COD)**
MW04-105			pH		Spec Cond, Temp, Eh, DO, ALK (fld), TURB (fld)	Spec Cond, pH, Temp, Eh, DO, ALK (fld), TURB (fld)
MW04-109R	Eh, Ca, Mn, HCO3	Eh, Mn, TKN, ALK (fld)	Na, TURB (fld)	Spec Cond, Mg, Na, OC	Spec Cond, pH, Temp, DO, As, Cd, Fe, Mg, Ni, K, TKN, NO3 - N, TDS, TSS, SO4, ALK (fld), OC, COD, Cl, TANNIC	pH, Temp, DO, As, Ca, K, TDS, TSS, SO4, HCO3, Cl, TURB (fld), TANNIC **(Cd, Fe, Ni, NO3-N, COD)**

Summary of Mann-Kendall Trend Analysis
95% Confidence (alpha=0.05)
Juniper Ridge Landfill 2014

Location	Increasing Trends		Decreasing Trends		No Trends	
	Trend Analysis 3-yr	Trend Analysis 5-yr	Trend Analysis 3-yr	Trend Analysis 5-yr	Trend Analysis 3-yr	Trend Analysis 5-yr
MW09-901	Spec Cond, Eh, As, Ca, Mg, TDS, HCO3	As, COD			pH, Temp, DO, Cd, Fe, Mn, Ni, K, Na, TKN, NO3 - N, TSS, SO4, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC	Spec Cond, pH, Temp, Eh, DO, Ca, Fe, Mg, Mn, K, Na, TDS, TSS, SO4, HCO3, ALK (fld), OC, Cl, TURB (fld), TANNIC **(Cd, Ni, TKN, NO3 - N)**
MW11-207R	Eh, As, Cl	Insufficient Data	TURB (fld)	Insufficient Data	Spec Cond, pH, Temp, DO, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, TKN, NO3 - N, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, TANNIC	Insufficient Data
MW12-303R	Spec Cond, Eh, Ca, Mg, HCO3, ALK (fld), Cl	Insufficient Data	DO	Insufficient Data	pH, Temp, As, Cd, Fe, Mn, Ni, K, Na, TKN, NO3 - N, TDS, TSS, SO4, OC, COD, TURB (fld), TANNIC	Insufficient Data
MW-204					Spec Cond, pH, Temp,Eh, DO, ALK (fld), TURB (fld)	Spec Cond, pH, Temp, Eh, DO, ALK (fld), TURB (fld)
MW-206	As	pH, DO	TURB (fld)	K	Spec Cond, pH, Temp, Eh, DO, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, TKN, NO3 - N, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TANNIC	Spec Cond, Temp, , Eh, As, Cd, Ca, Fe, Mg, Mn, Na, TKN, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC **(Ni, NO3-N)**
MW-223A	Spec Cond, Eh, As, Ca, Mg, TDS, HCO3	Spec Cond, pH, As, Ca, Mg, K, Na, TDS, SO4, HCO3, ALK (fld), Cl	DO	DO	pH, Temp, Cd, Fe, Mn, Ni, K, Na, TKN, NO3 - N, TSS, SO4, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC	Temp, Eh, TKN, NO3 - N, TSS, OC, TURB (fld), TANNIC **(Cd, Fe, Mn, Ni, COD)**
MW-223B	Spec Cond, Eh, Ca, Mg, Na, TDS, HCO3, Cl	Spec Cond, pH, Eh, Ca, Mg, Na, NO3 - N, TDS, SO4, ALK (fld), Cl			pH, Temp, DO, As, Cd, Fe, Mn, Ni, K, TKN, NO3 - N, TSS, SO4, ALK (fld), OC, COD, TURB (fld), TANNIC	Temp, DO, As, Fe, Mn, K, TKN, TSS, HCO3, OC, COD, TURB (fld), TANNIC **(Cd, Ni)**
MW-227	Eh, As, Ca	As, Ca, SO4, ALK (fld)		TURB (fld)	Spec Cond, pH, Temp, DO, Cd, Fe, Mg, Mn, Ni, K, Na, TKN, NO3 - N, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC	Spec Cond, pH, Temp, Eh, DO, Fe, Mg, K, Na, TDS, TSS, HCO3, OC, Cl, TANNIC **(Cd, Tkn, Mn, Ni, NO3-N, COD)**
MW-301	Ca, Cl	Eh, Ca, Mg, Mn, HCO3, Cl	pH,	pH, DO, Fe	Spec Cond, Temp, Eh, DO, As, Cd, Fe, Mg, Mn, Ni, K, Na, TKN, NO3 - N, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, TURB (fld), TANNIC	Spec Cond, Temp, As, K, Na, TKN, TDS, TSS, SO4, ALK (fld), OC, TURB (fld), TANNIC **(Cd, Ni, NO3 - N, COD)**
MW-302R	Eh, As, HCO3	Eh, TKN, Cl			Spec Cond, pH, Temp, DO, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, TKN, NO3 - N, TDS, TSS, SO4, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC	Spec Cond, pH, Temp, DO, As, Ca, Mg, Mn, K, Na, NO3 - N, TDS, TSS, SO4, HCO3, ALK (fld), TURB (fld), TANNIC **(Cd, Fe, Ni, OC, COD)**
MW-303R	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data

Summary of Mann-Kendall Trend Analysis
95% Confidence (alpha=0.05)
Juniper Ridge Landfill 2014

Location	Increasing Trends		Decreasing Trends		No Trends	
	Trend Analysis 3-yr	Trend Analysis 5-yr	Trend Analysis 3-yr	Trend Analysis 5-yr	Trend Analysis 3-yr	Trend Analysis 5-yr
MW-304A		Spec Cond, Eh, Fe, TDS, HCO3	Na, TDS	Temp	Spec Cond, pH, Temp, Eh, DO, As, Cd, Ca, Fe, Mg, Mn, Ni, K, TKN, NO3 - N, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC	pH, DO, As, Cd, Ca, Mg, K, Na, TKN, TSS, SO4, ALK (fld), Cl, TURB (fld), TANNIC **(Mn, Ni, NO3 - N, OC, COD)**
MW-401A	Ca, HCO3	Cd	ALK (fld)	ALK (fld)	Spec Cond, pH, Temp, Eh, DO, As, Cd, Fe, Mg, Mn, Ni, K, Na, TKN, NO3 - N, TDS, TSS, SO4, OC, COD, Cl, TURB (fld), TANNIC	Spec Cond, pH, Temp, Eh, DO, As, Ca, Mg, K, Na, TKN, TDS, TSS, SO4, HCO3, OC, Cl, TURB (fld), TANNIC **(Fe, Mn, Ni, NO3 - N, COD)**
MW-401B	As, Ca, Fe, HCO3	As, Mn, HCO3, Cl	ALK (fld)	ALK (fld)	Spec Cond, pH, Temp, Eh, DO, Cd, Mg, Mn, Ni, K, Na, TKN, NO3 - N, TDS, TSS, SO4, OC, COD, Cl, TURB (fld), TANNIC	Spec Cond, pH, Temp, Eh, DO, Ca, Fe, Mg, K, Na, TKN, TDS, TSS, SO4, OC, TURB (fld), TANNIC **(Cd, Ni, NO3-N, COD)**
MW-402A	As, Ca	pH, Ca, Mg, SO4	ALK (fld), TURB (fld)	ALK (fld)	Spec Cond, pH, Temp, Eh, DO, Cd, Fe, Mg, Mn, Ni, K, Na, TKN, NO3 - N, TDS, TSS, SO4, HCO3, OC, COD, Cl, TANNIC	Spec Cond, Temp, Eh, DO, As, Cd, K, Na, TKN, TDS, TSS, HCO3, OC, Cl, TURB (fld), TANNIC **(Fe, Mn, Ni, NO3 - N, COD)**
MW-402B	DO	pH, As	Mg, SO4, ALK (fld), TURB (fld)	ALK (fld)	Spec Cond, pH, Temp, Eh, As, Cd, Ca, Fe, Mn, Ni, K, Na, NO3 - N, TDS, TSS, HCO3, OC, COD, Cl, TANNIC **(TKN)**	Spec Cond, Temp, ,Eh, DO, Cd, Ca, Mg, K, Na, TKN, TDS, TSS, SO4, HCO3, OC, Cl, TURB (fld), TANNIC **(Fe, Mn, Ni, NO3 - N, COD)**
P-04-02	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
P-04-04		As	SO4, ALK (fld)	ALK (fld)	Spec Cond, pH, Temp, Eh, DO, As, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, TKN, NO3 - N, TDS, TSS, HCO3, OC, COD, Cl, TURB (fld), TANNIC	Spec Cond, pH, Temp, Eh, DO, Ca, Mg, K, Na, TKN, TDS, TSS, SO4, HCO3, Cl, TURB (fld), TANNIC **(Cd, Fe, Mn, Ni, NO3 - N, OC, COD)**
P-206A	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
PWS10-1					Spec Cond, pH, Temp, Eh, DO, As, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, NO3 - N, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC	Spec Cond, pH, Temp, Eh, DO, As, Ca, Fe, Mg, Mn, Ni, K, Na, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC **(Cd, NO3 - N)**
PWS10-2	Spec Cond, As, Ca, Mg, HCO3				pH, Temp, Eh, DO, Cd, Fe, Mn, Ni, K, Na, NO3 - N, P, TDS, TSS, SO4, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC	Spec Cond, pH, Temp, Eh, DO, As, Ca, Fe, Mg, Mn, Ni, K, Na, NO3 - N, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC **(Cd)**
PWS10-3	K, Cl	NO3 - N, OC, Cl		Spec Cond, Ca, Mg, ALK (fld)	Spec Cond, pH, Temp, Eh, DO, As, Cd, Ca, Fe, Mg, Mn, Ni, Na, NO3 - N, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, COD, TURB (fld), TANNIC	pH, Temp, Eh, DO, As, Fe, Mn, K, Na, P, TDS, TSS, SO4, HCO3, COD, TURB (fld), TANNIC **(Cd, Ni)**

Summary of Mann-Kendall Trend Analysis
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Juniper Ridge Landfill 2014

Location	Increasing Trends		Decreasing Trends		No Trends	
	Trend Analysis 3-yr	Trend Analysis 5-yr	Trend Analysis 3-yr	Trend Analysis 5-yr	Trend Analysis 3-yr	Trend Analysis 5-yr
SW-1		pH, DO			Spec Cond, pH, Temp, Eh, DO, As, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, NO3 - N, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, BOD5, COD, Cl, TURB (fld), TANNIC	Spec Cond, Temp, Eh, As, Ca, Fe, Mg, Mn, Ni, K, Na, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, BOD5, COD, Cl, TURB (fld), TANNIC **(Cd, NO3 - N)**
SW-2		Cd			Spec Cond, pH, Temp, Eh, DO, As, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, NO3 - N, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, BOD5, COD, Cl, TURB (fld), TANNIC	Spec Cond, pH, Temp, Eh, DO, As, Ca, Fe, Mg, Mn, Ni, K, Na, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, BOD5, COD, Cl, TURB (fld), TANNIC (NO3 - N)
SW-3		pH, K	ALK (fld), TURB (fld)		Spec Cond, pH, Temp, Eh, DO, As, Cd, Ca, Fe, Mg, Mn, Ni, K, Na, NO3 - N, P, TDS, TSS, SO4, HCO3, OC, BOD5, COD, Cl, TANNIC	Spec Cond, Temp, Eh, DO, As, Ca, Fe, Mg, Mn, Ni, Na, P, TDS, TSS, SO4, HCO3, ALK (fld), OC, BOD5, COD, Cl, TURB (fld), TANNIC **(Cd, NO3-N)**
SW-DP1		As, Cd	K, P, TDS, TSS, SO4, ALK (fld)	Spec Cond, Ca, Na, TDS, ALK (fld)	Spec Cond, pH, Temp, Eh, DO, As, Cd, Ca, Fe, Mg, Mn, Ni, Na, NO3 - N, HCO3, OC, COD, Cl, TURB (fld), TANNIC	pH, Temp, Eh, DO, Fe, Mg, Mn, Ni, K, P, TSS, SO4, HCO3, OC, COD, Cl, TURB (fld), TANNIC **(NO3 – N)**
SW-DP5	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
SW-DP6	pH	pH	Mg, K, TDS	Spec Cond, Ca, Mg, Mn, K, Na, TDS, HCO3, ALK (fld), Cl	Spec Cond, Temp, Eh, DO, As, Cd, Ca, Fe, Mn, Ni, Na, NO3 - N, P, TSS, SO4, HCO3, ALK (fld), OC, COD, Cl, TURB (fld), TANNIC	Temp, Eh, DO, As, Fe, P, TSS, SO4, OC, COD, TURB (fld), TANNIC **(Cd, Ni, NO3 - N)**

Key
ALK (fld) = Alkalinity (Ca CO3) (field)
COD = Chemical Oxygen Demand
NO3-N = Nitrate (N)
pH = pH
Spec Cond = Specific Conductance
Temp = Temperature
TURB (fld) = Turbidity (field)

ALK = Alkalinity (CaCO3)
Cl = Chloride
DO = Dissolved Oxygen
HCO3 = Bicarbonate (CaCO3)
OC = Organic Carbon
S= = Sulfide
TANNIC =Tannin & Lignins (Tannic Acid)
TKN = Total Kjeldahl Nitrogen

BOD5 = Biological Oxygen Demand
Eh = Corrected Eh
NH3-N = Ammonia (N)
P = Phosphate Phosphorus
SO4 = Sulfate
TDS = Total Dissolved Solids
TSS = Total Suspended Solids

- Values below the laboratory PQL (non-detects) are divided by 2. All other data qualifiers are ignored but any associated value is used.
- Samples collected for data quality control are not analyzed.
- Data sets with less than 5 data points are not analyzed.
- Data sets with a period shorter than the intended period of analysis (e.g., 3-yr analysis or 5-yr analysis) are not analyzed.
- Significant events in historical data can affect the distribution in a way that compromises the assumption of a monotonic data set. Events could include the cessation of filtering, a spill, changing sampling protocols or analytical method changes that alter the detection limit.

Summary of Mann-Kendall Trend Analysis
95% Confidence (alpha=0.05)
Juniper Ridge Landfill 2014

Notes:

Parameters in parentheses and bold text were excluded from statistical screen due to all or most data values being non-detect with variable laboratory detection limits. These parameters were identified with statistically significant increasing trends (95% confidence level), but are considered for the purposes of this analysis to have no discernible statistically significant trends.

REFERENCES:

State of Wisconsin, Department of Natural Resources, Remediation and Redevelopment Program Mann-Kendall Statistical Test, Form 4400-215 (2/2001).

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Hollander, M. and Wolfe, A.M., Nonparametric Statistical Methods, John Wiley Sons, 1999.

APPENDIX D

DETECTED 2014 VOCs, SVOCs, PESTICIDES, HERBICIDES, AND PCBs FOR LEACHATE

REPORT PREPARED: 3/25/2015 12:25
FOR: Juniper Ridge Landfill

CONCENTRATIONS EXCEEDING LABORATORY REPORTING LIMIT

VOA, Semi-VOA, Pesticide, Herbicide, & PCB Hits

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

LOCATION (LT-C4LR)	PARAMETER NAME	DATE	CONCENTRATION/ QUALIFIER	UNITS	SAMPLE ID	ANALYTICAL METHOD
LT-C4LR						
	Acetone	4/22/2014	1000	ug/L	LTC4LX6EH	SW8260
		7/30/2014	60	ug/L	LTC4LX6J4	SW8260
		10/21/2014	400	ug/L	LTC4LX72F	SW8260
	Methyl Ethyl Ketone	4/22/2014	1400	ug/L	LTC4LX6EH	SW8260
		7/30/2014	200	ug/L	LTC4LX6J4	SW8260
		10/21/2014	1200	ug/L	LTC4LX72F	SW8260
	Phenol	4/22/2014	160	ug/L	LTC4LX6EH	SW8270
	2-Methylphenol	4/22/2014	12	ug/L	LTC4LX6EH	SW8270
	Naphthalene (SVOC)	4/22/2014	12	ug/L	LTC4LX6EH	SW8270
	3&4-Methylphenol	4/22/2014	690	ug/L	LTC4LX6EH	SW8270
	Acetophenone	4/22/2014	11	ug/L	LTC4LX6EH	SW8270

collection METHOD

GRB - Grab Sample

APPENDIX E

2014 AND HISTORICAL GAS MEASUREMENT DATA

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
DP-4	DP-4 is located downgradient of the landfill and leachate pond and monitors groundwater quality within the overburden.					
5/5/2004	0.1 US					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1		0		20.3	
8/1/2005	0.1 US		0		20.3	
9/20/2005	0.1 US		0		20.8	
12/27/2005	0.1 US		0		21	0
5/22/2006	0.1 US		0		21.1	0
7/26/2006	0.1 US		0		20.7	0
9/11/2006	0.1 US		0		19.7	0
10/4/2006	0.1 US		0		18.6	0
5/15/2007	0.1 US		0		20.6	0
7/25/2007	0.1 US		0		20.2	0
9/10/2007	0.1 US		0		20.3	0
5/19/2008	0.1 US		0		21.1	0
7/29/2008	0.1 US		0		21	0
10/29/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		21	0
7/6/2009	0.1 US		0		20.6	0
10/26/2009	0.1 US		0		20.4	0
4/26/2010	0.1 US		0		19.8	0
7/19/2010	0.1 US		0		20.4	0
10/18/2010	0.1 US	0.1 US	0	0	21.2	0
4/25/2011	0.1 US	0.1 US	0	0	20.7	0
7/18/2011	0.1 US	0.1 US	0	0	20.3	0
10/24/2011	0.1 US	0.1 US	0	0	20.8	0
4/25/2012	0.1 US	0.1 US	0	0	20.4	0
7/25/2012	0.1 US	0.1 US	0	0	20.7	0
10/24/2012	0.1 US	0.1 US	0	0	20.9	0
4/24/2013	0.1 US	0.1 US	0	0	20.8	0
7/31/2013	0.1 US	0.1 US	0	0	20.5	0
10/30/2013	0.1 US	0.1 US	0	0	21.1	0
4/21/2014	0.1 US	0.1 US	0	0	20.7	0
7/30/2014	0.1 US	0.1 US	0	0	20.2	0
10/21/2014	0.1 US	0.1 US	0	0	20.9	0
LF-UD	Manhole					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1		0		20.7	
8/1/2005	0.1 US		0		19.8	
9/21/2005	0.1 US		0		20.6	
12/27/2005	0.1 US		0		20.9	0
5/22/2006	0.1 US		0		20.5	0
7/26/2006	0.1 US		0		20	0
9/11/2006	0.1 US		0		20.5	0
10/4/2006	0.1 US		0		18.6	0
5/15/2007	0.1 US		0		20.2	0
7/25/2007	0.1 US		0		20.3	0
9/10/2007	0.1 US		0		20.3	0

SEVEE & MAHER ENGINEERS, INC.
4 BLANCHARD ROAD
CUMBERLAND CENTER, ME 04021

	Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
LF-UD		Manhole					
	5/20/2008	0.1 US		0		21.1	0
	7/28/2008	0.1 US		0		19.9	0
	10/29/2008	0.1 US		0		M	0
	4/15/2009	0.1 US		0		20.4	0
	7/7/2009	0.1 US		0		20.6	0
	10/27/2009	0.1 US		0		20.2	0
	4/27/2010	0.1 US		0		20.5	0
	7/21/2010	0.1 US		0		20.1	0
	10/19/2010	0.1 US	0.1 US	0	0	21	0
	4/26/2011	0.1 US	0.1 US	0	0	20.8	0
	7/19/2011	0.1 US	0.1 US	0	0	19.8	0
	10/26/2011	0.1 US	0.1 US	0	0	20.6	0
	4/24/2012	0.1 US	0.1 US	0	0	20.5	0
	7/24/2012	0.1 US	0.1 US	0	0	20.2	0
	10/23/2012	0.1 US	0.1 US	0	0	21.1	0
	4/23/2013	0.1 US	0.1 US	0	0	20.6	0
	7/30/2013	0.1 US	0.1 US	0	0	20.9	0
	10/29/2013	0.1 US	0.1 US	0	0	20.5	0
	4/22/2014	0.1 US	0.1 US	0	0	20.3	0
	7/30/2014	0.1 US	0.1 US	0	0	20.5	0
	10/21/2014	0.1 US	0.1 US	0	0	20.9	0
LP-LD		Manhole					
	8/4/2004	0.1 US					
	10/27/2004	0.1 US					
	5/9/2005	0.1		0		20.7	
	8/1/2005	0.1 US		0		20.2	
	9/21/2005	0.1 US		0		20.8	
	12/27/2005	0.1 US		0		20.8	0
	5/22/2006	0.1 US		0		20.5	0
	7/26/2006	0.1 US		0		20	0
	9/11/2006	0.1 US		0		20.5	0
	10/4/2006	0.1 US		0		18.6	0
	5/15/2007	0.1 US		0		20.2	0
	7/25/2007	0.1 US		0		20.4	0
	9/10/2007	0.1 US		0		20.3	0
	5/20/2008	0.1 US		0		20.9	0
	7/28/2008	0.1 US		0		20.8	0
	10/29/2008	0.1 US		0		M	0
	4/15/2009	0.1 US		0		19.8	0
	7/7/2009	0.1 US		0		20.6	0
	10/27/2009	0.1 US		0		20.1	0
	4/27/2010	0.1 US		0		20.6	0
	7/19/2010	0.1 US		0		20.4	0
	10/19/2010	0.1 US	0.1 US	0	0	21	0
	4/26/2011	0.1 US	0.1 US	0	0	20.8	0
	7/19/2011	0.1 US	0.1 US	0	0	19.9	0
	10/26/2011	0.1 US	0.1 US	0	0	20.6	0
	4/24/2012	0.1 US	0.1 US	0	0	20.3	0
	7/24/2012	0.1 US	0.1 US	0	0	20.7	0
	10/23/2012	0.1 US	0.1 US	0	0	20.9	0

	Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
LP-LD		Manhole					
	4/23/2013	0.1 US	0.1 US	0	0	20.6	0
	7/30/2013	0.1 US	0.1 US	0	0	20.6	0
	10/29/2013	0.1 US	0.1 US	0	0	20.7	0
	4/22/2014	0.1 US	0.1 US	0	0	20.3	0
	7/30/2014	0.1 US	0.1 US	0	0	20.5	0
	10/21/2014	0.1 US	0.1 US	0	0	20.9	0
LP-UD		LP-UD is a composite sample from the leachate pond underdrain.					
	8/4/2004	0.1 US					
	10/27/2004	0.1 US					
	5/9/2005	0.1 US		0		20.7	
	8/1/2005	0.1 US		0		19.8	
	9/21/2005	0.1 US		0		20.8	
	12/27/2005	0.1 US		0		20.8	0
	5/22/2006	0.1 US		0		20.9	0
	7/26/2006	0.1 US		0		20	0
	9/11/2006	0.1 US		0		20.6	0
	10/4/2006	0.1 US		0		18.3	0
	5/15/2007	0.1 US		0		20.2	0
	7/25/2007	0.1 US		0		20.3	0
	9/10/2007	0.1 US		0		20.3	0
	5/20/2008	0.1 US		0		20.9	0
	7/28/2008	0.1 US		0		19.8	0
	10/29/2008	0.1 US		0		M	0
	4/15/2009	0.1 US		0		20.3	0
	7/7/2009	0.1 US		0		20.7	0
	10/27/2009	0.1 US		0		20.1	0
	4/27/2010	0.1 US		0		20.1	0
	7/21/2010	0.1 US		0		20.6	0
	10/19/2010	0.1 US	0.1 US	0	0	21	0
	4/26/2011	0.1 US	0.1 US	0	0	20.8	0
	7/19/2011	0.1 US	0.1 US	0	0	20	0
	10/26/2011	0.1 US	0.1 US	0	0	20.7	0
	4/24/2012	0.1 US	0.1 US	0	0	20.5	0
	7/24/2012	0.1 US	0.1 US	0	0	20.7	0
	10/23/2012	0.1 US	0.1 US	0	0	21.2	0
	4/23/2013	0.1 US	0.1 US	0	0	20.7	0
	7/30/2013	0.1 US	0.1 US	0	0	20.7	0
	10/29/2013	0.1 US	0.1 US	0	0	20.8	0
	4/22/2014	0.1 US	0.1 US	0	0	20.3	0
	7/30/2014	0.1 US	0.1 US	0	0	20.5	0
	10/21/2014	0.1 US	0.1 US	0	0	21.1	0
LT-C4L		Leachate collection location for cells #1, #2, #3A, #3B, #4 and #7.					
	4/14/2009	0.1 US		0		21.2	0
	7/7/2009	0.1 US		0		20.7	0
	10/28/2009	0.1 US		0		20.2	0
	4/27/2010	0.1 US		0		20.5	0
	7/21/2010	0.1 US		0		20.1	0
	10/19/2010	0.1 US	0.1 US	0	0	21.4	0
	4/27/2011	0.1 US	0.1 US	0	0	20.8	0

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	Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
LT-C4L		Leachate collection location for cells #1, #2, #3A, #3B, #4 and #7.					
	7/19/2011	0.1 US	0.1 US	0	0	20.3	0
	10/25/2011	0.1 US	0.1 US	0	0	20.2	0
	4/24/2012	0.1 US	0.1 US	0	0	20.3	0
	7/25/2012	0.1 US	0.1 US	0	0	20.7	0
	10/23/2012	0.1 US	0.1 US	0	0	21.1	0
	4/23/2013	0.1 US	0.1 US	0	0	20.6	0
LT-C4LR		Leachate collection location at leachate storage tank.					
	7/30/2013	0.1 US	0.1 US	0	0	20.6	0
	10/29/2013	0.1 US	0.1 US	0	0	21.4	0
	4/21/2014	0.1 US	0.1 US	0	0	20.8	0
	7/30/2014	0.1 US	0.1 US	0	0	20.1	0
	10/21/2014	0.1 US	0.1 US	0	0	20.8	0
MW04-102		MW04-102 monitors groundwater in the overburden downgradient of the landfill and upgradient of Stormwater Detention Pond-1.					
	3/25/2005	0.1 US					
	7/25/2005	0.1 US		0		20.5	
	9/20/2005	0.1 US		4		20.6	
	12/27/2005	0.1 US		0		20.7	0
	5/22/2006	0.1 US		0		20.7	0
	7/26/2006	0.1 US		0		20.4	0
	9/11/2006	0.1 US		0		20.7	0
	10/4/2006	0.1 US		0		19.8	0
	5/15/2007	0.1 US		0		19.8	0
	7/25/2007	0.1 US		0		20.5	0
	9/10/2007	0.1 US		0		20.3	0
	5/20/2008	0.1 US		0		21.2	0
	7/29/2008	0.1 US		0		20.8	0
	10/27/2008	0.1 US		0		M	0
	4/14/2009	0.1 US		0		19.7	0
	7/7/2009	0.1 US		0		20.6	0
	10/27/2009	0.1 US		0		20.7	0
	4/27/2010	0.1 US		0		20.8	0
	7/21/2010	0.1 US		0		20.1	0
	10/19/2010	0.1 US	0.1 US	0	0	21.1	0
	4/25/2011	0.1 US	0.1 US	0	0	21.1	0
	7/19/2011	0.1 US	0.1 US	0	0	20.2	0
	10/25/2011	0.1 US	0.1 US	0	0	21	0
	4/25/2012	0.1 US	0.1 US	0	0	20.3	0
	7/23/2012	0.1 US	0.1 US	0	0	20.2	0
	10/22/2012	0.1 US	0.1 US	0	0	21.2	0
	4/23/2013	0.1 US	0.1 US	0	0	20.8	0
	7/31/2013	0.1 US	0.1 US	0	0	20.7	0
	10/28/2013	0.1 US	0.1 US	0	0	20.8	0
	4/21/2014	0.1 US	0.1 US	0	0	20.7	0
	7/30/2014	0.1 US	0.1 US	0	0	20.5	0
	10/21/2014	0.1 US	0.1 US	0	0	20.9	0
MW04-105		MW04-105 monitors groundwater in the overburden downgradient of the landfill and Stormwater Detention Pond-1.					
	3/25/2005	0.1 US					

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	Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW04-105		MW04-105 monitors groundwater in the overburden downgradient of the landfill and Stormwater Detention Pond-1.					
	7/25/2005	0.1 US		0		20.1	
	9/20/2005	0.1 US		9		20.9	
	12/27/2005	0.1 US		0		20.9	0
	5/22/2006	0.1 US		0		20.8	0
	7/26/2006	0.1 US		0		20.3	0
	9/11/2006	0.1 US		0		20.2	0
	10/4/2006	0.1 US		0		19.7	0
	5/15/2007	0.1 US		0		21.3	0
	7/25/2007	0.1 US		0		20.5	0
	9/10/2007	0.1 US		0		20.3	0
	5/19/2008	0.1 US		0		21	0
	7/29/2008	0.1 US		0		20.9	0
	10/27/2008	0.1 US		0		M	0
	4/14/2009	0.1 US		0		20	0
	7/6/2009	0.1 US		0		19.8	0
	10/26/2009	0.1 US		0		20.6	0
	4/27/2010	0.1 US		0		20.7	0
	7/19/2010	0.1 US		0		20.5	0
	10/18/2010	0.1 US	0.1 US	0	0	21.2	0
	4/26/2011	0.1 US	0.1 US	0	0	20.9	0
	7/18/2011	0.1 US	0.1 US	0	0	20.2	0
	10/25/2011	0.1 US	0.1 US	0	0	21	0
	4/25/2012	0.1 US	0.1 US	0	0	20.3	0
	7/23/2012	0.1 US	0.1 US	0	0	20.2	0
	10/22/2012	0.1 US	0.1 US	0	0	21.1	0
	4/24/2013	0.1 US	0.1 US	0	0	20.8	0
	7/30/2013	0.1 US	0.1 US	0	0	20.5	0
	10/29/2013	0.1 US	0.1 US	0	0	21.5	0
	4/21/2014	0.1 US	0.1 US	0	0	20.7	0
	7/30/2014	0.1 US	0.1 US	0	0	20.2	0
	10/21/2014	0.1 US	0.1 US	0	0	20.9	0
MW04-109		MW04-109 monitors groundwater in the overburden downgradient of the landfill and Stormwater Detention Pond-2.					
	3/25/2005	0.1 US					
	7/26/2005	0.1 US		0		19.2	
	9/20/2005	0.1 US		5		20.9	
	12/27/2005	0.1 US		0		20.8	0
	5/22/2006	0.1 US		0		20.8	0
	7/26/2006	0.1 US		0		20.5	0
	9/11/2006	0.1 US		0		19.5	0
	10/4/2006	0.1 US		0		19.8	0
	5/15/2007	0.1 US		0		20.1	0
	7/25/2007	0.1 US		0		20.6	0
	9/10/2007	0.1 US		0		20.3	0
	5/19/2008	0.1 US		0		20.9	0
	7/29/2008	0.1 US		0		20.9	0
	10/28/2008	0.1 US		0		M	0
	4/14/2009	0.1 US		0		19.9	0
	7/6/2009	DE		DE		DE	DE

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Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW04-109R	MW04-109R is located to the south of Cell #5 of the expansion landfill and near Manhole #5. This well monitors water quality within the overburden downgradient of the landfill.					
4/27/2010	0.1 US		0		20.8	0
7/20/2010	0.1 US		0		20.4	0
10/19/2010	0.1 US	0.1 US	0	0	21.3	0
4/26/2011	0.1 US	0.1 US	0	0	21	0
7/19/2011	0.1 US	0.1 US	0	0	20.4	0
10/25/2011	0.1 US	0.1 US	0	0	20.3	0
4/25/2012	0.1 US	0.1 US	0	0	20.3	0
7/23/2012	0.1 US	0.1 US	0	0	20.4	0
10/23/2012	0.1 US	0.1 US	0	0	21.2	0
4/23/2013	0.1 US	0.1 US	0	0	20.8	0
7/30/2013	0.1 US	0.1 US	0	0	20.4	0
10/29/2013	0.1 US	0.1 US	0	0	21.2	0
4/21/2014	0.1 US	0.1 US	0	0	20.7	0
7/30/2014	0.1 US	0.1 US	0	0	20.5	0
10/21/2014	0.1 US	0.1 US	0	0	20.9	0
MW09-901	MW09-901 is located to the south of Cell #5 and detention pond #2 of the expansion landfill. This well monitors water quality within the overburden downgradient of the landfill.					
4/27/2010	0.1 US		0		20.7	0
7/20/2010	0.1 US		0		20.3	0
10/19/2010	0.1 US	0.1 US	0	0	21.3	0
4/26/2011	0.1 US	0.1 US	0	0	21	0
7/19/2011	0.1 US	0.1 US	0	0	20.2	0
10/25/2011	0.1 US	0.1 US	0	0	21	0
4/25/2012	0.1 US	0.1 US	0	0	20.3	0
7/23/2012	0.1 US	0.1 US	0	0	20.3	0
10/23/2012	0.1 US	0.1 US	0	0	21.1	0
4/23/2013	0.1 US	0.1 US	0	0	20.7	0
7/30/2013	0.1 US	0.1 US	0	0	20.8	0
10/29/2013	0.1 US	0.1 US	0	0	21.2	0
4/21/2014	0.1 US	0.1 US	0	0	20.7	0
7/30/2014	0.1 US	0.1 US	0	0	20.7	0
10/21/2014	0.1 US	0.1 US	0	0	20.9	0
MW11-207R	MW11-207R monitors bedrock groundwater quality upgradient of the landfill. This well replaced MW-207.					
7/20/2011	0.1 US	0.1 US	0	0	20.2	0
10/24/2011	0.1 US	0.1 US	0	0	20.8	0
4/25/2012	0.1 US	0.1 US	0	0	20.3	0
7/23/2012	0.1 US	0.1 US	0	0	20.1	0
10/22/2012	0.1 US	0.1 US	0	0	21.2	0
4/22/2013	0.1 US	0.1 US	0	0	20.6	0
7/31/2013	0.1 US	0.1 US	0	0	20.7	0
10/29/2013	0.1 US	0.1 US	0	0	20.8	0
4/21/2014	0.1 US	0.1 US	0	0	20.3	0
7/29/2014	0.1 US	0.1 US	0	0	20.4	0
10/20/2014	0.1 US	0.1 US	0	0	20.9	0
MW12-303R	MW12-303R was installed in September 2012 to replace MW-303. MW12-303R monitors the background water quality at the site upgradient of the landfill.					
10/22/2012	0.1 US	0.1 US	0	0	21.1	0
4/22/2013	0.1 US	0.1 US	0	0	20.6	0
7/29/2013	0.1 US	0.1 US	0	0	20.6	0

	Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW12-303R		MW12-303R was installed in September 2012 to replace MW-303. MW12-303R monitors the background water quality at the site upgradient of the landfill.					
	10/28/2013	0.1 US	0.1 US	0	0	21.2	0
	4/21/2014	0.1 US	0.1 US	0	0	20.7	0
	7/29/2014	0.1 US	0.1 US	0	0	20.2	0
	10/20/2014	0.1 US	0.1 US	0	0	20.9	0
MW-204		MW-204 monitors the overburden water quality downgradient from the landfill.					
	5/5/2004	0.1 US					
	8/4/2004	23					
	10/27/2004	0.1 US					
	5/9/2005	0.1		0		20.3	
	8/1/2005	0.1 US		0		20.1	
	9/20/2005	0.1 US		0		20.8	
	12/27/2005	0.1 US		0		20.9	0
	5/22/2006	0.1 US		0		20.9	0
	7/26/2006	0.9		0		19.7	1.7
	9/11/2006	0.1 US		0		18.9	0
	10/4/2006	0.1 US		0		19.1	0
	5/15/2007	0.1 US		0		20.8	0
	7/25/2007	0.1 US		0		20.2	0
	9/10/2007	0.1 US		0		20.4	0
	5/21/2008	0.1 US		0		20.4	0
	7/30/2008	0.8		0		18.7	1.9
	10/28/2008	5.3		0		M	2.9
	4/13/2009	0.1 US		0		20.9	0
	7/6/2009	0.1 US		0		19.7	0
	10/26/2009	0.1 US		0		20.6	0
	4/27/2010	0.1 US		0		20.5	0
	7/19/2010	0.1 US		0		20.4	0
	10/19/2010	0.1 US	0.1 US	0	0	21.2	0
	4/27/2011	0.1 US	0.1 US	0	0	20.9	0
	7/19/2011	0.1 US	0.1 US	0	0	20.4	0
	10/25/2011	0.1 US	0.1 US	0	0	20	0
	4/25/2012	0.1 US	0.1 US	0	0	20.2	0
	7/23/2012	0.1 US	0.1 US	0	0	20.4	0
	10/24/2012	0.1 US	0.1 US	0	0	20.9	0
	4/24/2013	0.1 US	0.1 US	0	0	20.7	0
	7/31/2013	0.1 US	0.1 US	0	0	20.6	0
	10/30/2013	0.1 US	0.1 US	0	0	21.1	0
	4/21/2014	0.1 US	0.1 US	0	0	20.7	0
	7/30/2014	0.1 US	0.1 US	0	0	20.3	0
	10/21/2014	0.1 US	0.1 US	0	0	20.9	0
MW-206		MW-206 monitors overburden water quality upgradient of the landfill.					
	5/5/2004	0.1 US					
	8/4/2004	0.1 US					
	10/27/2004	0.1 US					
	5/9/2005	0.1 US		0		21.6	
	8/1/2005	0.1 US		0		20.3	
	9/19/2005	0.1 US		5		20.5	
	12/27/2005	0.1 US		0		20.7	0
	5/22/2006	0.1 US		0		20.8	0

Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW-206	MW-206 monitors overburden water quality upgradient of the landfill.					
7/26/2006	0.1 US		0		20.4	0
9/11/2006	0.1 US		0		20.3	0
10/4/2006	0.1 US		0		19.2	0
5/15/2007	0.1 US		0		20.1	0
7/25/2007	0.1 US		0		20.6	0
9/10/2007	0.1 US		0		20.2	0
5/20/2008	0.1 US		0		20.1	0
7/29/2008	0.1 US		0		20.9	0
10/27/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		20	0
7/6/2009	0.1 US		0		19.7	0
10/28/2009	0.1 US		0		20.7	0
4/26/2010	0.1 US		0		20.4	0
7/19/2010	0.1 US		0		20	0
10/18/2010	0.1 US	0.1 US	0	0	21.1	0
4/25/2011	0.1 US	0.1 US	0	0	20.4	0
7/18/2011	0.1 US	0.1 US	0	0	20.5	0
10/24/2011	0.1 US	0.1 US	0	0	20.6	0
4/25/2012	0.1 US	0.1 US	0	0	20.3	0
7/23/2012	0.1 US	0.1 US	0	0	20.2	0
10/22/2012	0.1 US	0.1 US	0	0	21.1	0
4/22/2013	0.1 US	0.1 US	0	0	20.5	0
7/31/2013	0.1 US	0.1 US	0	0	20.6	0
10/28/2013	0.1 US	0.1 US	0	0	20.8	0
4/21/2014	0.1 US	0.1 US	0	0	20.6	0
7/29/2014	0.1 US	0.1 US	0	0	20.2	0
10/20/2014	0.1 US	0.1 US	0	0	20.9	0
MW-207	MW-207 monitors bedrock groundwater quality upgradient of the landfill.					
5/5/2004	0.1 US					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1 US		0		20.2	
8/1/2005	0.1 US		0		20.4	
9/19/2005	0.1 US		0		20.6	
12/27/2005	0.1 US		0		20.6	0
5/22/2006	0.1 US		0		21.1	0
7/26/2006	0.1 US		0		20.6	0
9/11/2006	0.1 US		0		19.9	0
10/4/2006	0.1 US		0		19.2	0
5/15/2007	0.1 US		0		20.7	0
7/25/2007	0.1 US		0		20.1	0.5
9/10/2007	0.1 US		0		20.2	0
5/19/2008	0.1 US		0		20.4	0
7/29/2008	0.1 US		0		20.8	0
10/28/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		20.1	0
7/6/2009	0.1 US		0		19.7	0
10/26/2009	0.1 US		0		20.6	0
4/26/2010	0.1 US		0		20.2	0
7/19/2010	0.1 US		0		20	0

	Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW-207		MW-207 monitors bedrock groundwater quality upgradient of the landfill.					
	10/18/2010	0.1 US	0.1 US	0	0	21.1	0
	4/25/2011	0.1 US	0.1 US	0	0	20.2	0
MW-212		MW-212 monitors the overburden groundwater upgradient of the landfill.					
	5/5/2004	0.1 US					
	8/4/2004	0.1 US					
	10/27/2004	0.1 US					
	5/9/2005	0.1 US		0		20.2	
	8/1/2005	0.1 US		0		20.3	
	9/20/2005	0.1 US		0		20.7	
	12/27/2005	0.1 US		0		20.6	0
	5/22/2006	0.1 US		0		21.1	0
	7/26/2006	0.1 US		0		19.5	0.5
	9/11/2006	0.1 US		0		19.8	0
	10/4/2006	0.1 US		0		19.3	0
	5/15/2007	0.1 US		0		22.1	0
	7/25/2007	0.1 US		0		20.6	0
	9/10/2007	0.1 US		0		20.3	0
	5/19/2008	0.1 US		0		20.4	0
	7/29/2008	0.1 US		0		20.8	0
	10/28/2008	0.1 US		0		M	0
	4/14/2009	0.1 US		0		20.2	0
	7/6/2009	0.1		0		19.3	0.6
	10/26/2009	0.1 US		0		20.5	0
	4/26/2010	0.1 US		0		20.3	0
	7/19/2010	0.1 US		0		19.9	0
	10/18/2010	0.1 US	0.1 US	0	0	21	0
	4/25/2011	0.1 US	0.1 US	0	0	19.9	0
	7/18/2011	0.1 US	0.1 US	0	0	20.1	0
	10/24/2011	0.1 US	0.1 US	0	0	17.2	3.6
	4/25/2012	0.1 US	0.1 US	0	0	20.2	0
	7/23/2012	0.1 US	0.1 US	0	0	20.2	0
	10/22/2012	0.1 US	0.1 US	0	0	21	0
	4/22/2013	0.1 US	0.1 US	0	0	20.5	0
MW-216B		MW-216B monitors the overburden water quality downgradient of the landfill.					
	5/5/2004	0.1 US					
	8/4/2004	0.1 US					
	10/27/2004	0.1 US					
	5/9/2005	0.1		0		20.1	
	8/1/2005	0.1 US		0		20.3	
	9/22/2005	0.1 US		0		20.7	
	12/27/2005	A		A		A	A
	5/22/2006	0.1 US		0		20.9	0
	7/26/2006	0.1 US		0		14.5	7.1
	9/11/2006	0.1 US		0		17	6.5
	10/4/2006	0.1 US		0		19.5	0
	5/15/2007	0.1 US		0		16.5	3.3
	7/25/2007	0.1 US		0		15.3	6.7
	9/10/2007	0.1 US		0		20.4	0
	5/20/2008	0.1 US		0		20.9	0

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	Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW-216B		MW-216B monitors the overburden water quality downgradient of the landfill.					
	7/28/2008	0.1 US		0		21.1	0
	10/28/2008	0.1 US		0		M	0
	4/14/2009	0.1 US		0		19.9	0
	7/6/2009	DE		DE		DE	DE
MW-216BR		MW-216BR is located to the south of Cell #5 of the expansion landfill and near Manhole #5. This well monitors water quality within the overburden downgradient of the landfill.					
	4/27/2010	0.1 US		0		20.7	0
	7/20/2010	0.1 US		0		20.3	0
	10/19/2010	0.1 US	0.1 US	0	0	21.2	0
	4/26/2011	0.1 US	0.1 US	0	0	21	0
	7/19/2011	0.1 US	0.1 US	0	0	20.4	0
	10/25/2011	0.1 US	0.1 US	0	0	20.4	0
	4/25/2012	0.1 US	0.1 US	0	0	20.3	0
	7/23/2012	0.1 US	0.1 US	0	0	20.3	0
	10/23/2012	0.1 US	0.1 US	0	0	21.2	0
	4/23/2013	0.1 US	0.1 US	0	0	20.7	0
	7/30/2013	0.1 US	0.1 US	0	0	19.8	0
	10/29/2013	0.1 US	0.1 US	0	0	21.1	0
MW-223A		MW-223A monitors the bedrock water quality downgradient of the landfill.					
	5/5/2004	0.1 US					
	8/4/2004	0.1 US					
	10/27/2004	0.1 US					
	5/9/2005	0.1 US		0		20.5	
	8/1/2005	0.1 US		0		20.6	
	9/21/2005	0.1 US		3		20.9	
	12/27/2005	0.1 US		0		20.8	0
	5/22/2006	0.1 US		0		20.7	0
	7/26/2006	0.1 US		0		20.3	0
	9/11/2006	0.1 US		0		20.5	0
	10/4/2006	0.1 US		0		19.4	0
	5/15/2007	0.1 US		0		19.9	0
	7/25/2007	0.1 US		0		20.6	0
	9/10/2007	0.1 US		0		20.4	0
	5/20/2008	0.1 US		0		19.8	0
	7/30/2008	0.1 US		0		21	0
	10/28/2008	0.1 US		0		M	0
	4/14/2009	0.1 US		0		19.6	0
	7/7/2009	0.1 US		0		20.5	0
	10/27/2009	0.1 US		0		20.5	0
	4/27/2010	0.1 US		0		20.7	0
	7/20/2010	0.1 US		0		20.4	0
	10/19/2010	0.1 US	0.1 US	0	0	21.2	0
	4/26/2011	0.1 US	0.1 US	0	0	21.1	0
	7/19/2011	0.1 US	0.1 US	0	0	20.1	0
	10/25/2011	0.1 US	0.1 US	0	0	20.9	0
	4/25/2012	0.1 US	0.1 US	0	0	20.2	0
	7/23/2012	0.1 US	0.1 US	0	0	20.1	0
	10/23/2012	0.1 US	0.1 US	0	0	21.3	0
	4/23/2013	0.1 US	0.1 US	0	0	20.8	0
	7/30/2013	0.1 US	0.1 US	0	0	19.9	0

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	Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW-223A		MW-223A monitors the bedrock water quality downgradient of the landfill.					
	10/29/2013	0.1 US	0.1 US	0	0	21.2	0
	4/21/2014	0.1 US	0.1 US	0	0	20.7	0
	7/30/2014	0.1 US	0.1 US	0	0	20.1	0
	10/21/2014	0.1 US	0.1 US	0	0	20.9	0
MW-223B		MW-223B monitors the overburden water quality downgradient of the landfill.					
	5/5/2004	0.1 US					
	8/4/2004	0.1 US					
	10/27/2004	0.1 US					
	5/9/2005	0.1 US		0		20.6	
	8/1/2005	0.1 US		0		20.5	
	9/21/2005	0.1 US		5		20.9	
	12/27/2005	0.1 US		0		20.7	0
	5/22/2006	0.1 US		0		20.7	0
	7/26/2006	0.1 US		0		20.2	0
	9/11/2006	0.1 US		0		20.5	0
	10/4/2006	0.1 US		0		19.3	0
	5/15/2007	0.1 US		0		19.9	0
	7/25/2007	0.1 US		0		20.7	0
	9/10/2007	0.1 US		0		20.4	0
	5/20/2008	0.1 US		0		19.8	0
	7/30/2008	0.1 US		0		21	0
	10/28/2008	0.1 US		0		M	0
	4/14/2009	0.1 US		0		19.4	0
	7/7/2009	0.1 US		0		20.6	0
	10/27/2009	0.1 US		0		20.6	0
	4/27/2010	0.1 US		0		20.7	0
	7/20/2010	0.1 US		0		20.4	0
	10/19/2010	0.1 US	0.1 US	0	0	21.2	0
	4/26/2011	0.1 US	0.1 US	0	0	21.1	0
	7/19/2011	0.1 US	0.1 US	0	0	20	0
	10/25/2011	0.1 US	0.1 US	0	0	20.9	0
	4/25/2012	0.1 US	0.1 US	0	0	20.2	0
	7/23/2012	0.1 US	0.1 US	0	0	20.1	0
	10/23/2012	0.1 US	0.1 US	0	0	21.3	0
	4/23/2013	0.1 US	0.1 US	0	0	20.7	0
	7/30/2013	0.1 US	0.1 US	0	0	20	0
	10/29/2013	0.1 US	0.1 US	0	0	21.2	0
	4/21/2014	0.1 US	0.1 US	0	0	20.7	0
	7/30/2014	0.1 US	0.1 US	0	0	20.1	0
	10/21/2014	0.1 US	0.1 US	0	0	20.9	0
MW-227		MW-227 monitors water quality in the overburden downgradient of the landfill.					
	5/5/2004	0.1 US					
	8/4/2004	0.1 US					
	10/27/2004	0.1 US					
	5/9/2005	0.1 US		0		20.5	
	8/1/2005	0.1 US		0		20.3	
	9/21/2005	0.1 US		0		20.8	
	12/27/2005	0.1 US		0		20.8	0
	5/22/2006	0.1 US		0		20.7	0

	Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW-227		MW-227 monitors water quality in the overburden downgradient of the landfill.					
	7/26/2006	0.1 US		0		19.7	0
	9/11/2006	0.1 US		0		20.2	0
	10/4/2006	0.1 US		0		19.3	0
	5/15/2007	0.1 US		0		20.1	0
	7/25/2007	0.1 US		0		20.6	0
	9/10/2007	0.1 US		0		20.3	0
	5/20/2008	0.1 US		0		20.8	0
	7/30/2008	0.1 US		0		21.2	0
	10/27/2008	0.1 US		0		M	0
	4/14/2009	0.1 US		0		19.7	0
	7/7/2009	0.1 US		0		20.6	0
	10/27/2009	0.1 US		0		20.4	0
	4/27/2010	0.1 US		0		20.8	0
	7/20/2010	0.1 US		0		20.3	0
	10/19/2010	0.1 US	0.1 US	0	0	21.3	0
	4/26/2011	0.1 US	0.1 US	0	0	20.9	0
	7/19/2011	0.1 US	0.1 US	0	0	20.1	0
	10/25/2011	0.1 US	0.1 US	0	0	20.8	0
	4/25/2012	0.1 US	0.1 US	0	0	20.3	0
	7/23/2012	0.1 US	0.1 US	0	0	20.1	0
	10/23/2012	0.1 US	0.1 US	0	0	21.2	0
	4/23/2013	0.1 US	0.1 US	0	0	20.8	0
	7/30/2013	0.1 US	0.1 US	0	0	19.8	0
	10/29/2013	0.1 US	0.1 US	0	0	21.4	0
	4/21/2014	0.1 US	0.1 US	0	0	20.7	0
	7/30/2014	0.1 US	0.1 US	0	0	20.1	0
	10/21/2014	0.1 US	0.1 US	0	0	20.9	0
MW-301		MW-301 monitors the water quality within the bedrock downgradient of the landfill.					
	5/5/2004	0.1 US					
	8/4/2004	0.1 US					
	10/27/2004	0.1 US					
	5/9/2005	0.1		0		20.1	
	8/1/2005	0.1 US		0		19.9	
	9/22/2005	0.1 US		7		20.1	
	12/27/2005	0.1 US		0		20.8	0
	5/22/2006	0.1 US		0		21.1	0
	7/26/2006	0.1 US		0		20.1	0
	9/11/2006	0.1 US		0		20.1	0
	10/4/2006	0.1 US		0		19.3	0
	5/15/2007	0.1 US		0		20.6	0
	7/25/2007	0.1 US		0		19.8	0.01
	9/10/2007	0.1 US		0		20.3	0
	5/19/2008	0.1 US		0		20.9	0
	7/30/2008	0.1 US		0		20.5	0
	10/28/2008	0.1 US		0		M	0
	4/14/2009	0.1 US		0		21.1	0
	7/6/2009	0.1 US		0		19.7	0
	10/26/2009	0.1 US		0		20.4	0
	4/26/2010	0.1 US		0		19.8	0
	7/19/2010	0.1 US		0		20.4	0

Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW-301	MW-301 monitors the water quality within the bedrock downgradient of the landfill.					
10/19/2010	0.1 US	0.1 US	0	0	21.2	0
4/27/2011	0.1 US	0.1 US	0	0	20.9	0
7/20/2011	0.1 US	0.1 US	0	0	20.1	0
10/25/2011	0.1 US	0.1 US	0	0	20.1	0
4/25/2012	0.1 US	0.1 US	0	0	20.2	0
7/25/2012	0.1 US	0.1 US	0	0	20.7	0
10/24/2012	0.1 US	0.1 US	0	0	20.9	0
4/22/2013	0.1 US	0.1 US	0	0	20.8	0
7/31/2013	0.1 US	0.1 US	0	0	20.5	0
10/30/2013	0.1 US	0.1 US	0	0	21.2	0
4/21/2014	0.1 US	0.1 US	0	0	20.7	0
7/30/2014	0.1 US	0.1 US	0	0	20.3	0
10/20/2014	0.1 US	0.1 US	0	0	20.9	0
MW-302	MW-302 monitors the water quality in the shallow bedrock beside the landfill, but not directly downgradient of the landfill.					
5/5/2004	0.1 US					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1 US		0		21.4	
8/1/2005	0.1 US		0		19.9	
9/19/2005	0.1 US		3		20.7	
12/27/2005	0.1 US		0		20.7	0
5/22/2006	0.1 US		0		20.8	0
7/26/2006	0.1 US		0		20.2	0
9/11/2006	0.1 US		0		21.1	0
10/4/2006	0.1 US		0		19.5	0
5/15/2007	0.1 US		0		22.5	0
7/25/2007	0.1 US		0		20.6	0
9/10/2007	DE		DE		DE	DE
MW-302R	MW-302R monitors the water quality in the shallow bedrock beside the landfill, but not directly downgradient of the landfill.					
5/20/2008	0.1 US		0		21.1	0
7/29/2008	0.1 US		0		20.9	0
10/27/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		20.2	0
7/6/2009	0.1 US		0		19.8	0
10/27/2009	0.1 US		0		21	0
4/26/2010	0.1 US		0		20.2	0
7/19/2010	0.1 US		0		20.4	0
10/18/2010	0.1 US	0.1 US	0	0	21	0
4/25/2011	0.1 US	0.1 US	0	0	20.4	0
7/18/2011	0.1 US	0.1 US	0	0	20.5	0
10/24/2011	0.1 US	0.1 US	0	0	20.5	0
4/25/2012	0.1 US	0.1 US	0	0	20.2	0
7/23/2012	0.1 US	0.1 US	0	0	20.3	0
10/22/2012	0.1 US	0.1 US	0	0	21.2	0
4/22/2013	0.1 US	0.1 US	0	0	20.5	0
7/31/2013	0.1 US	0.1 US	0	0	20.7	0
10/28/2013	0.1 US	0.1 US	0	0	21	0
4/21/2014	0.1 US	0.1 US	0	0	20.7	0

	Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW-302R		MW-302R monitors the water quality in the shallow bedrock beside the landfill, but not directly downgradient of the landfill.					
	7/29/2014	0.1 US	0.1 US	0	0	20.3	0
	10/20/2014	0.1 US	0.1 US	0	0	20.9	0
MW-303		MW-303 monitors the background overburden water quality at the site upgradient of the landfill. MW-303 was not sampled after the April 2012 round and was replaced with MW12-303R in 2012.					
	5/5/2004	0.1 US					
	8/4/2004	0.1 US					
	10/27/2004	0.1 US					
	5/9/2005	0.1 US		0		21.4	
	8/1/2005	0.1 US		0		20.3	
	9/19/2005	0.1 US		0		20.9	
	12/27/2005	0.1 US		0		20.8	0
	5/22/2006	0.1 US		0		20.9	0
	7/26/2006	0.1 US		0		19.7	0
	9/11/2006	0.1 US		0		20.3	0
	10/4/2006	0.1 US		0		19.3	0
	5/15/2007	0.1 US		0		20.2	0
	7/25/2007	0.1 US		0		20.6	0
	9/10/2007	0.1 US		0		20.3	0
	5/19/2008	0.1 US		0		20.9	0
	7/29/2008	0.1 US		0		20.9	0
	10/27/2008	0.1 US		0		M	0
	4/14/2009	0.1 US		0		20.1	0
	7/6/2009	0.1 US		0		19.6	0
	10/28/2009	0.1 US		0		20.6	0
	4/26/2010	0.1 US		0		20.1	0
	7/19/2010	0.1 US		0		20.3	0
	10/18/2010	0.1 US	0.1 US	0	0	21.1	0
	4/25/2011	0.1 US	0.1 US	0	0	20.4	0
	7/18/2011	0.1 US	0.1 US	0	0	20.5	0
	10/24/2011	0.1 US	0.1 US	0	0	20.6	0
	4/25/2012	0.1 US	0.1 US	0	0	20.3	0
	7/23/2012	!	!	!	!	!	!
MW-304A		MW-304A monitors the water quality in the upper portion of the bedrock upgradient of the landfill.					
	8/4/2004	0.1 US					
	10/27/2004	0.1 US					
	5/9/2005	0.1 US		0		21.4	
	8/1/2005	0.1 US		0		20.2	
	9/19/2005	0.1 US		5		20.5	
	12/27/2005	0.1 US		0		20.6	0
	5/22/2006	0.1 US		0		21	0
	7/26/2006	0.1 US		0		20.8	0
	9/11/2006	0.1 US		0		20.7	0
	10/4/2006	0.1 US		0		19.4	0
	5/15/2007	0.1 US		0		20.1	0
	7/25/2007	0.1 US		0		20.7	0
	9/10/2007	0.1 US		0		20.4	0
	5/20/2008	0.1 US		0		21.2	0
	7/29/2008	0.1 US		0		20.9	0
	10/27/2008	0.1 US		0		M	0

Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW-304A	MW-304A monitors the water quality in the upper portion of the bedrock upgradient of the landfill.					
4/14/2009	0.1 US		0		20.1	0
7/6/2009	0.1 US		0		19.7	0
10/27/2009	0.1 US		0		20.8	0
4/26/2010	0.1 US		0		19.9	0
7/19/2010	0.1 US		0		19.9	0
10/18/2010	0.1 US	0.1 US	0	0	21	0
4/25/2011	0.1 US	0.1 US	0	0	20.3	0
7/18/2011	0.1 US	0.1 US	0	0	20.5	0
10/24/2011	0.1 US	0.1 US	0	0	20.6	0
4/25/2012	0.1 US	0.1 US	0	0	20.3	0
7/23/2012	0.1 US	0.1 US	0	0	20.2	0
10/22/2012	0.1 US	0.1 US	0	0	21.1	0
4/22/2013	0.1 US	0.1 US	0	0	20.6	0
7/31/2013	0.1 US	0.1 US	0	0	20.6	0
10/28/2013	0.1 US	0.1 US	0	0	20.9	0
4/21/2014	0.1 US	0.1 US	0	0	20.5	0
7/29/2014	0.1 US	0.1 US	0	0	20.4	0
10/20/2014	0.1 US	0.1 US	0	0	20.9	0
MW-401A	MW-401A monitors bedrock water quality downgradient of the landfill and leachate pond.					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1 US		0		21.4	
8/1/2005	0.1 US		0		20.7	
9/21/2005	0.1 US		0		20.8	
12/27/2005	0.1 US		0		20.8	0
5/22/2006	0.1 US		0		20.7	0
7/26/2006	0.1 US		0		19.7	0
9/11/2006	0.1 US		0		20.3	0
10/4/2006	0.1 US		0		19.9	0
5/15/2007	0.1 US		0		20.1	0
7/25/2007	0.1 US		0		20.5	0
9/10/2007	0.1 US		0		20.3	0
5/20/2008	0.1 US		0		20.9	0
7/28/2008	0.1 US		0		21.2	0
10/29/2008	0.1 US		0		M	0
4/13/2009	0.1 US		0		20.9	0
7/7/2009	0.1 US		0		20.9	0
10/28/2009	0.1 US		0		20.2	0
4/27/2010	0.1 US		0		20.5	0
7/21/2010	0.1 US		0		20.1	0
10/20/2010	0.1 US	0.1 US	0	0	21.1	0
4/25/2011	0.1 US	0.1 US	0	0	20.5	0
7/18/2011	0.1 US	0.1 US	0	0	20.1	0
10/24/2011	0.1 US	0.1 US	0	0	20.9	0
4/25/2012	0.1 US	0.1 US	0	0	20.3	0
7/23/2012	0.1 US	0.1 US	0	0	20.3	0
10/22/2012	0.1 US	0.1 US	0	0	21.2	0
4/22/2013	0.1 US	0.1 US	0	0	20.5	0
7/29/2013	0.1 US	0.1 US	0	0	20.4	0
10/28/2013	0.1 US	0.1 US	0	0	21.2	0

Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW-401A	MW-401A monitors bedrock water quality downgradient of the landfill and leachate pond.					
4/21/2014	0.1 US	0.1 US	0	0	20.5	0
7/29/2014	0.1 US	0.1 US	0	0	20.4	0
10/20/2014	0.1 US	0.1 US	0	0	20.9	0
MW-401B	MW-401B is located downgradient of the landfill and leachate pond and monitors groundwater quality in the overburden.					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1 US		0		21.4	
8/1/2005	0.1 US		0		20.5	
9/21/2005	0.1 US		8		20.9	
12/27/2005	0.1 US		0		20.9	0
5/22/2006	0.1 US		0		20.7	0
7/26/2006	0.1 US		0		19.7	0
9/11/2006	0.1 US		0		20.3	0
10/4/2006	0.1 US		0		19.9	0
5/15/2007	0.1 US		0		20.1	0
7/25/2007	0.1 US		0		20.5	0
9/10/2007	0.1 US		0		20.3	0
5/20/2008	0.1 US		0		20.9	0
7/28/2008	0.1 US		0		21.2	0
10/29/2008	0.1 US		0		M	0
4/13/2009	0.1 US		0		21	0
7/7/2009	0.1 US		0		20.9	0
10/28/2009	0.1 US		0		20.2	0
4/27/2010	0.1 US		0		20.5	0
7/21/2010	0.1 US		0		20.1	0
10/20/2010	0.1 US	0.1 US	0	0	21.1	0
4/25/2011	0.1 US	0.1 US	0	0	20.5	0
7/18/2011	0.1 US	0.1 US	0	0	20.1	0
10/24/2011	0.1 US	0.1 US	0	0	20.9	0
4/25/2012	0.1 US	0.1 US	0	0	20.3	0
7/23/2012	0.1 US	0.1 US	0	0	20.4	0
10/22/2012	0.1 US	0.1 US	0	0	21.2	0
4/22/2013	0.1 US	0.1 US	0	0	20.5	0
7/29/2013	0.1 US	0.1 US	0	0	20.4	0
10/28/2013	0.1 US	0.1 US	0	0	21.2	0
4/21/2014	0.1 US	0.1 US	0	0	20.5	0
7/29/2014	0.1 US	0.1 US	0	0	20.4	0
10/20/2014	0.1 US	0.1 US	0	0	20.9	0
MW-402A	MW-402A monitors water quality within the bedrock downgradient of the landfill.					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1 US		0		20.6	
8/1/2005	0.1 US		0		20.3	
9/21/2005	0.1 US		3		20.6	
12/27/2005	0.1 US		0		20.8	0
5/22/2006	0.1 US		0		20.8	0
7/26/2006	0.1 US		0		19.5	0
9/11/2006	0.1 US		0		20.3	0
10/4/2006	0.1 US		0		19.4	0

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Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW-402A	MW-402A monitors water quality within the bedrock downgradient of the landfill.					
5/15/2007	0.1 US		0		20.2	0
7/25/2007	0.1 US		0		20.6	0
9/10/2007	0.1 US		0		20.3	0
5/20/2008	0.1 US		0		20.9	0
7/28/2008	0.1 US		0		21.1	0
10/29/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		19.4	0
7/8/2009	0.1 US		0		20.5	0
10/28/2009	0.1 US		0		20.1	0
4/27/2010	0.1 US		0		20.5	0
7/21/2010	0.1 US		0		20.3	0
10/20/2010	0.1 US	0.1 US	0	0	21.2	0
4/27/2011	0.1 US	0.1 US	0	0	20.8	0
7/20/2011	0.1 US	0.1 US	0	0	20.2	0
10/26/2011	0.1 US	0.1 US	0	0	20.8	0
4/24/2012	0.1 US	0.1 US	0	0	20.2	0
7/25/2012	0.1 US	0.1 US	0	0	20.9	0
10/24/2012	0.1 US	0.1 US	0	0	20.9	0
4/22/2013	0.1 US	0.1 US	0	0	20.9	0
7/31/2013	0.1 US	0.1 US	0	0	20.9	0
10/30/2013	0.1 US	0.1 US	0	0	20.8	0
4/21/2014	0.1 US	0.1 US	0	0	20.6	0
7/30/2014	0.1 US	0.1 US	0	0	20.7	0
10/22/2014	0.1 US	0.1 US	0	0	21	0
MW-402B	MW-402B monitors water quality within the overburden downgradient of the landfill.					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1 US		0		20.7	
8/1/2005	0.1 US		0		20.3	
9/21/2005	0.1 US		3		20.6	
12/27/2005	0.1 US		0		20.8	0
5/22/2006	0.1 US		0		20.7	0
7/26/2006	0.1 US		0		19.5	0
9/11/2006	0.1 US		0		20.3	0
10/4/2006	0.1 US		0		19.4	0
5/15/2007	0.1 US		0		20.2	0
7/25/2007	0.1 US		0		20.6	0
9/10/2007	0.1 US		0		20.3	0
5/20/2008	0.1 US		0		20.9	0
7/28/2008	0.1 US		0		21.2	0
10/29/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		19.4	0
7/8/2009	0.1 US		0		20.5	0
10/28/2009	0.1 US		0		20.1	0
4/27/2010	0.1 US		0		20.5	0
7/21/2010	0.1 US		0		20.3	0
10/20/2010	0.1 US	0.1 US	0	0	21.2	0
4/27/2011	0.1 US	0.1 US	0	0	20.8	0
7/20/2011	0.1 US	0.1 US	0	0	20.2	0
10/26/2011	0.1 US	0.1 US	0	0	20.8	0

Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
MW-402B	MW-402B monitors water quality within the overburden downgradient of the landfill.					
4/24/2012	0.1 US	0.1 US	0	0	20.5	0
7/25/2012	0.1 US	0.1 US	0	0	20.9	0
10/24/2012	0.1 US	0.1 US	0	0	20.9	0
4/22/2013	0.1 US	0.1 US	0	0	20.9	0
7/31/2013	0.1 US	0.1 US	0	0	20.9	0
10/30/2013	0.1 US	0.1 US	0	0	20.8	0
4/21/2014	0.1 US	0.1 US	0	0	20.6	0
7/30/2014	0.1 US	0.1 US	0	0	20.7	0
10/22/2014	0.1 US	0.1 US	0	0	21	0
NE Property Line						
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1 US		0		20.7	
8/1/2005	0.1 US		0		20.1	
9/19/2005	0.1 US		0		20.8	
12/27/2005	0.1 US		0		20.7	0
5/22/2006	0.1 US		0		20.8	0
7/26/2006	0.1 US		0		19.8	0
9/11/2006	0.1 US		0		20.9	0
10/4/2006	0.1 US		0		19.3	0
5/15/2007	0.1 US		0		20.2	0
7/25/2007	0.1 US		0		20.3	0
9/10/2007	0.1 US		0		20.3	0
5/21/2008	0.1 US		0		20.8	0
7/30/2008	0.1 US		0		20.8	0
10/28/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		20.8	0
7/6/2009	0.1 US		0		19.6	0
10/28/2009	0.1 US		0		20.2	0
4/27/2010	0.1 US		0		20.5	0
7/20/2010	0.1 US		0		20.2	0
10/20/2010	0.1 US	0.1 US	0	0	21	0
4/27/2011	0.1 US	0.1 US	0	0	20.8	0
7/20/2011	0.1 US	0.1 US	0	0	20	0
10/26/2011	0.1 US	0.1 US	0	0	20.6	0
4/24/2012	0.1 US	0.1 US	0	0	20.5	0
7/25/2012	0.1 US	0.1 US	0	0	20.6	0
10/24/2012	0.1 US	0.1 US	0	0	20.9	0
4/24/2013	0.1 US	0.1 US	0	0	20.7	0
7/30/2013	0.1 US	0.1 US	0	0	20.7	0
10/29/2013	0.1 US	0.1 US	0	0	21.2	0
4/21/2014	0.1 US	0.1 US	0	0	20.6	0
7/30/2014	0.1 US	0.1 US	0	0	20.7	0
10/20/2014	0.1 US	0.1 US	0	0	20.9	0
P-04-02	P-04-02 monitors the water quality in the overburden downgradient of the landfill, between the leachate pond and landfill toe.					
5/5/2004	0.1 US					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1		0		20	

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Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
P-04-02	P-04-02 monitors the water quality in the overburden downgradient of the landfill, between the leachate pond and landfill toe.					
8/1/2005	0.1 US		0		20.3	
9/22/2005	0.1 US		6		20.4	
12/27/2005	0.1 US		0		20.8	0
5/22/2006	0.1 US		0		21.3	0
7/26/2006	0.1 US		0		19.9	0
9/11/2006	0.1 US		0		20.3	0
10/4/2006	0.1 US		0		18.5	0
5/15/2007	0.1 US		0		20.5	0
7/25/2007	0.1 US		0		20.1	0
9/10/2007	0.1 US		0		20.3	0
5/21/2008	0.1 US		0		19.9	0
7/30/2008	0.1 US		0		20.6	0
10/29/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		21	0
7/6/2009	0.1 US		0		20.7	0
10/27/2009	0.1 US		0		20.3	0
4/26/2010	0.1 US		0		20	0
7/21/2010	0.1 US		0		20.1	0
10/20/2010	0.1 US	0.1 US	0	0	21.3	0
4/27/2011	0.1 US	0.1 US	0	0	20.8	0
7/20/2011	0.1 US	0.1 US	0	0	19.9	0
10/26/2011	0.1 US	0.1 US	0	0	20.6	0
4/25/2012	0.1 US	0.1 US	0	0	20.4	0
7/25/2012	0.1 US	0.1 US	0	0	20.9	0
10/24/2012	0.1 US	0.1 US	0	0	20.9	0
4/22/2013	!	!	!	!	!	!
P-04-04	P-04-02 monitors the water quality in the overburden downgradient of the landfill, between the leachate pond and landfill toe.					
5/5/2004	0.1 US					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1		0		19.9	
8/1/2005	0.1 US		0		20.4	
9/22/2005	0.1 US		4		20.6	
12/27/2005	0.1 US		0		20.8	0
5/22/2006	0.1 US		0		21.3	0
7/26/2006	0.1 US		0		19.8	0
9/11/2006	0.1 US		0		20.3	0
10/4/2006	0.1 US		0		18.5	0
5/15/2007	0.1 US		0		20.1	0
7/25/2007	0.1 US		0		20.1	0
9/10/2007	0.1 US		0		20.4	0
5/21/2008	0.1 US		0		20.3	0
7/30/2008	0.1 US		0		20.8	0
10/29/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		21	0
7/6/2009	0.1 US		0		20.6	0
10/27/2009	0.1 US		0		20.3	0
4/26/2010	0.1 US		0		20	0
7/21/2010	0.1 US		0		20.2	0

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Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
P-04-04	P-04-02 monitors the water quality in the overburden downgradient of the landfill, between the leachate pond and landfill toe.					
10/20/2010	0.1 US	0.1 US	0	0	21.3	0
4/27/2011	0.1 US	0.1 US	0	0	20.8	0
7/20/2011	0.1 US	0.1 US	0	0	19.9	0
10/26/2011	0.1 US	0.1 US	0	0	20.6	0
4/25/2012	0.1 US	0.1 US	0	0	20.4	0
7/25/2012	0.1 US	0.1 US	0	0	20.9	0
10/24/2012	0.1 US	0.1 US	0	0	21	0
4/24/2013	0.1 US	0.1 US	0	0	20.8	0
7/31/2013	0.1 US	0.1 US	0	0	20.4	0
10/30/2013	0.1 US	0.1 US	0	0	20.7	0
4/21/2014	0.1 US	0.1 US	0	0	20.7	0
7/30/2014	0.1 US	0.1 US	0	0	20.6	0
10/22/2014	0.1 US	0.1 US	0	0	20.9	0
P-206A	P-206A monitors bedrock water quality upgradient of the landfill.					
7/31/2013	0.1 US	0.1 US	0	0	20.5	0
10/28/2013	0.1 US	0.1 US	0	0	20.8	0
4/21/2014	0.1 US	0.1 US	0	0	20.7	0
7/29/2014	0.1 US	0.1 US	0	0	20.6	0
10/20/2014	0.1 US	0.1 US	0	0	20.9	0
S Property Line						
5/5/2004	0.1 US					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1 US		0		20.7	
8/1/2005	0.1 US		0		20.4	
9/19/2005	0.1 US		0		20.8	
12/27/2005	0.1 US		0		20.6	0
5/22/2006	0.1 US		0		20.7	0
7/26/2006	0.1 US		0		19.9	0
9/11/2006	0.1 US		0		20.8	0
10/4/2006	0.1 US		0		19.2	0
5/15/2007	0.1 US		0		20.2	0
7/25/2007	0.1 US		0		20.4	0
9/10/2007	0.1 US		0		20.1	0
5/21/2008	0.1 US		0		20.7	0
7/30/2008	0.1 US		0		20.8	0
10/28/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		20.7	0
7/6/2009	0.1 US		0		19.6	0
10/28/2009	0.1 US		0		20.2	0
4/27/2010	0.1 US		0		20.6	0
7/20/2010	0.1 US		0		20.2	0
10/20/2010	0.1 US	0.1 US	0	0	21	0
4/27/2011	0.1 US	0.1 US	0	0	20.7	0
7/20/2011	0.1 US	0.1 US	0	0	20	0
10/26/2011	0.1 US	0.1 US	0	0	20.6	0
4/24/2012	0.1 US	0.1 US	0	0	20.5	0
7/25/2012	0.1 US	0.1 US	0	0	20.6	0
10/24/2012	0.1 US	0.1 US	0	0	20.9	0

Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
S Property Line						
4/24/2013	0.1 US	0.1 US	0	0	20.7	0
7/30/2013	0.1 US	0.1 US	0	0	20.6	0
10/29/2013	0.1 US	0.1 US	0	0	21.2	0
4/21/2014	0.1 US	0.1 US	0	0	20.6	0
7/30/2014	0.1 US	0.1 US	0	0	20.6	0
10/20/2014	0.1 US	0.1 US	0	0	20.9	0
W Property Line A						
5/5/2004	0.1 US					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1 US		0		20.7	
8/1/2005	0.1 US		0		20.1	
9/19/2005	0.1 US		0		20.8	
12/27/2005	0.1 US		0		20.7	0
5/22/2006	0.1 US		0		20.7	0
7/26/2006	0.1 US		0		19.7	0
9/11/2006	0.1 US		0		20.8	0
10/4/2006	0.1 US		0		19.3	0
5/15/2007	0.1 US		0		20.1	0
7/25/2007	0.1 US		0		20.3	0
9/10/2007	0.1 US		0		20.3	0
5/21/2008	0.1 US		0		20.6	0
7/30/2008	0.1 US		0		20.8	0
10/28/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		20.7	0
7/6/2009	0.1 US		0		19.6	0
10/28/2009	0.1 US		0		20.1	0
4/27/2010	0.1 US		0		20.5	0
7/20/2010	0.1 US		0		20.1	0
10/20/2010	0.1 US	0.1 US	0	0	21.1	0
4/27/2011	0.1 US	0.1 US	0	0	20.8	0
7/20/2011	0.1 US	0.1 US	0	0	20	0
10/26/2011	0.1 US	0.1 US	0	0	20.6	0
4/24/2012	0.1 US	0.1 US	0	0	20.5	0
7/25/2012	0.1 US	0.1 US	0	0	20.6	0
10/24/2012	0.1 US	0.1 US	0	0	20.9	0
4/24/2013	0.1 US	0.1 US	0	0	20.7	0
7/30/2013	0.1 US	0.1 US	0	0	20.7	0
10/29/2013	0.1 US	0.1 US	0	0	21.3	0
4/21/2014	0.1 US	0.1 US	0	0	20.6	0
7/30/2014	0.1 US	0.1 US	0	0	20.7	0
10/20/2014	0.1 US	0.1 US	0	0	20.9	0
W Property Line B						
5/5/2004	0.1 US					
8/4/2004	0.1 US					
10/27/2004	0.1 US					
5/9/2005	0.1 US		0		20.7	
8/1/2005	0.1 US		0		20.3	
9/19/2005	0.1 US		0		20.8	

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W Property Line B

Date	Methane Equivalent % Vol.	Methane Equivalent (Ambient) % Vol.	Hydrogen Sulfide ppm	Hydrogen Sulfide (Ambient) ppm	Oxygen % Vol.	Carbon Dioxide % Vol.
12/27/2005	0.1 US		0		20.6	0
5/22/2006	0.1 US		0		20.7	0
7/26/2006	0.1 US		0		19.7	0
9/11/2006	0.1 US		0		20.9	0
10/4/2006	0.1 US		0		19.3	0
5/15/2007	0.1 US		0		20	0
7/25/2007	0.1 US		0		20.3	0
9/10/2007	0.1 US		0		20.2	0
5/21/2008	0.1 US		0		20.7	0
7/30/2008	0.1 US		0		20.9	0
10/28/2008	0.1 US		0		M	0
4/14/2009	0.1 US		0		20.6	0
7/6/2009	0.1 US		0		19.7	0
10/28/2009	0.1 US		0		20.1	0
4/27/2010	0.1 US		0		20.5	0
7/20/2010	0.1 US		0		20.1	0
10/20/2010	0.1 US	0.1 US	0	0	21	0
4/27/2011	0.1 US	0.1 US	0	0	20.7	0
7/20/2011	0.1 US	0.1 US	0	0	20	0
10/26/2011	0.1 US	0.1 US	0	0	20.6	0
4/24/2012	0.1 US	0.1 US	0	0	20.5	0
7/25/2012	0.1 US	0.1 US	0	0	20.6	0
10/24/2012	0.1 US	0.1 US	0	0	20.9	0
4/24/2013	0.1 US	0.1 US	0	0	20.7	0
7/30/2013	0.1 US	0.1 US	0	0	20.7	0
10/29/2013	0.1 US	0.1 US	0	0	21.3	0
4/21/2014	0.1 US	0.1 US	0	0	20.7	0
7/30/2014	0.1 US	0.1 US	0	0	20.6	0
10/20/2014	0.1 US	0.1 US	0	0	20.9	0

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Concentration Qualifier Notes:

! - The sampling location was damaged or destroyed.
A - The sampling location was Inaccessible
DE - Decommissioned Location
M - Results are missing or not reliable due to a meter malfunction.
US - Not Detected above the reported reporting limit determined by interpreted instrument specification.

APPENDIX F

2014 AND HISTORICAL FALL SPECIFIC CONDUCTIVITY DATA (EXPANDED LOCATIONS)

SUMMARY REPORT
Conductivity and Water Levels

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(DP-4) Date	Specific Conductance µmhos/cm @25°C	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet
DP-4				
10/26/2009	409	13.68	155.69	27.05
10/18/2010	401	14.98	154.39	27.1
10/24/2011	256	16.95	152.42	27.06
10/24/2012	302	14.08	155.29	27.06
10/30/2013	273	14.9	154.47	27.06
10/21/2014	239	14.67	154.7	27.05
MW04-101				
10/28/2008	176			
10/27/2009	191	4.1	163.82	23.75
10/18/2010	198	5.1	162.82	23.75
10/25/2011	177	5.7	162.22	23.75
10/22/2012	196	5.45	162.47	23.75
10/28/2013	186	6.42	161.5	23.82
10/21/2014	193	5.86	162.06	23.82
MW04-102				
10/27/2009	236	5.27	164.95	17.84
10/19/2010	232	5.85	164.37	17.97
10/25/2011	209	6.5	163.72	17.85
10/22/2012	221	5.78	164.44	17.98
10/28/2013	207	7.1	163.12	18.05
10/21/2014	196	6.58	163.64	18.05
MW04-104				
10/28/2008	192			
10/27/2009	213	7.3	160.76	28
10/18/2010	229	8	160.06	28
10/25/2011	206	8	160.06	28
10/22/2012	231	7.5	160.56	28
10/29/2013	209	9	159.06	28.05
10/22/2014	203	8.2	159.86	28.07
MW04-105				
10/26/2009	528	5.8	159.79	22.75
10/18/2010	306	6.9	158.69	22.75
10/25/2011	217	6.9	158.69	22.75
10/22/2012	252	6.6	158.99	22.75
10/29/2013	286	8.43	157.16	22.83
10/22/2014	322	7.28	158.31	22.83
MW04-109R				
10/19/2010	488	6.6	153.53	22.92
10/25/2011	416	6.62	153.51	22.95
10/23/2012	404	6.4	153.73	22.92
10/29/2013	397	7.41	152.72	22.97
10/21/2014	389	7.07	153.06	22.98
MW09-901				
10/19/2010	300	9.25	155.85	22.75

SUMMARY REPORT
Conductivity and Water Levels

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(MW09-901) Date	Specific Conductance µmhos/cm @25°C	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet
10/23/2012	197	8.8	156.3	22.73
10/29/2013	195	10.63	154.47	22.8
10/21/2014	266	9.7	155.4	22.8
MW11-207R				
10/24/2011	83	11.5	203.63	44
10/22/2012	88	6.57	208.56	44.2
10/28/2013	82	14.54	200.59	44.11
10/20/2014	89	16.6	196.53	44.12
MW12-303R				
10/23/2012	189	27.47		43.32
10/28/2013	223	27.43		43.38
10/20/2014	440	30.08		43.38
MW-204				
10/26/2009	309	8.7	156.05	24.42
10/19/2010	200	9.32	155.43	24.45
10/26/2011	180	9.1	155.65	24.45
10/24/2012	193	9.05	155.7	24.45
10/30/2013	185	9.95	154.8	24.43
10/22/2014	192	9.45	155.3	24.48
MW-212				
10/24/2011	D	D		D
10/22/2012	D	D		D
10/21/2014	D	D	D	D
MW-216BR				
10/19/2010	289	5.51	153.89	22.46
10/25/2011	400	5.48	153.92	22.48
10/23/2012	334	5.2	154.2	22.45
10/29/2013	278	6.35	153.05	22.53
10/21/2014	263	6	153.4	22.53
MW-223A				
10/27/2009	271	1.35	175.19	35.44
10/19/2010	326	2.2	174.34	35.42
10/25/2011	367	0.7	175.84	35.56
10/23/2012	390	0.5	176.04	35.48
10/29/2013	420	1.95	174.59	35.56
10/20/2014	435	2.43	174.11	35.57
MW-223B				
10/27/2009	331	2.65	173.28	19.95
10/19/2010	316	3.45	172.48	20
10/25/2011	327	2.2	173.73	19.93
10/23/2012	333	2.1	173.83	20.05
10/29/2013	336	3.3	172.63	20.07
10/20/2014	350	3.5	172.43	20.07
MW-227				

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(MW-227) Date	Specific Conductance µmhos/cm @25°C	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet
10/27/2009	182	4.1	160.13	22.2
10/19/2010	189	4.42	159.81	22.3
10/25/2011	188	4.05	160.18	22.28
10/23/2012	201	4.23	160	22.3
10/29/2013	177	4.65	159.58	22.28
10/20/2014	181	4.6	159.63	22.3
MW-301				
10/26/2009	276	4.25	162.11	185.15
10/19/2010	340	4.96	161.4	182.45
10/26/2011	204	4.11	162.25	185.1
10/24/2012	171	4.56	161.8	179.61
10/30/2013	198	0.1	165.81	184.1
10/22/2014	299	0.3	165.61	184.1
MW-302R				
10/27/2009	470	8.46	198.4	32.25
10/18/2010	649	8.05	198.81	32.22
10/24/2011	400	6.6	200.26	32.2
10/22/2012	463	4.12	202.74	32.2
10/28/2013	341	14.15	192.71	32.22
10/20/2014	500	15.75	191.11	32.22
MW-401A				
10/28/2009	165	4.12	152.71	111.98
10/20/2010	191	5.52	151.31	112.1
10/24/2011	128	3.62	153.21	112.02
10/22/2012	119	0.93	155.9	112.02
10/28/2013	140	6.1	150.73	112.04
10/20/2014	118	7.15	149.68	112.04
MW-401B				
10/28/2009	520	6.6	150.72	23.2
10/20/2010	514	6.82	150.5	23.1
10/24/2011	319	6.63	150.69	23.12
10/22/2012	310	6.35	150.97	23.13
10/28/2013	376	7.2	150.12	23.11
10/20/2014	336	7.14	150.18	23.12
MW-402A				
10/28/2009	183	F1		108.45
10/20/2010	197	F1		108.35
10/26/2011	130	0	152.2	108.35
10/24/2012	116	F1		108.35
10/30/2013	141	0	152.2	108.35
10/22/2014	58	0.25	151.95	108.3
MW-402B				
10/28/2009	215	2.98	149.76	25.26
10/20/2010	246	3.4	149.34	25.18
10/26/2011	160	2.95	149.79	25.18
10/24/2012	141	2.9	149.84	25.2

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(MW-402B) Date	Specific Conductance µmhos/cm @25°C	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet
10/30/2013	174	3.8	148.94	25.18
10/22/2014	147	3.87	148.87	25.13
P-04-04				
10/27/2009	175	7.96	161.39	32.21
10/20/2010	177	9	160.35	32.25
10/26/2011	181	9.3	160.05	32.3
10/24/2012	158	8.9	160.45	32.33
10/30/2013	194	10.01	159.24	32.26
10/22/2014	165	9.35	159.9	32.28
P-201A				
10/29/2008	123	F1		
10/27/2009	328	F1		70.25
10/19/2010	287	2.46	147.09	Q
10/25/2011	131	1.92	147.63	21.84
10/23/2012	118	1.8	147.75	7.5 Q
10/30/2013	232	2.65	146.9	22.95
10/21/2014	78	2.99	146.56	Q
P-201B				
10/29/2008	146			
10/27/2009	195	F1		68.1
10/19/2010	248	F1		67.92
10/25/2011	150	0.05	152.13	68.1
10/23/2012	120	F1		71.1
10/30/2013	147	0	152.18	69.3
10/21/2014	124	F1		70.7
P-201C				
10/29/2008	136			
10/27/2009	209	2.45	149.74	49.45
10/19/2010	235	2.29	149.9	49.4
10/25/2011	147	2.25	149.94	49.53
10/23/2012	121	F1		42.85
10/30/2013	264	2.2	149.99	68.15
10/21/2014	150	3.76	148.43	67.82
P-201D				
10/29/2008	127			
10/27/2009	325	0.05	151.28	43.15
10/19/2010	220	0.7	150.63	42.4
10/25/2011	143	F1		43.02
10/23/2012	128	3.1	148.23	49.46
10/30/2013	279	2.57	148.76	49.8
10/21/2014	153	3.02	148.31	49.42
P-201E				
10/29/2008	249			
10/27/2009	532	2.2	150.06	Q
10/19/2010	286	F1		71.1
10/25/2011	225	F1		69.8

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(P-201E) Date	Specific Conductance µmhos/cm @25°C	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet
10/23/2012	135	F1		67.93
10/30/2013	281	1.11	151.15	44.15
10/21/2014	130	2.04	150.22	42.5
P-202A				
10/27/2008	162			
10/27/2009	125	2.55	146.83	21.35
10/19/2010	250	3.1	146.28	21.3
10/26/2011	175	1.98	147.4	21.3
10/22/2012	171	2.1	147.28	21.3
10/28/2013	236	2.2	147.18	32.15
10/20/2014	164	3.16	146.22	21.31
P-202B				
10/27/2008	155			
10/27/2009	250	2.2	147.17	Q
10/19/2010	312	2.35	147.02	16.05
10/26/2011	212	2.9	146.47	6.05
10/22/2012	171	2.25	147.12	6.1 Q
10/28/2013	191	2.25	147.12	21.4
10/20/2014	168	2.29	147.08	6.31
P-206A				
10/28/2013	126	22.9	181.61	93.5
10/20/2014	128	25.7	178.81	93.48
P-209A				
10/29/2008	69			
10/27/2009	93	3.85	174.94	55.95
10/19/2010	282	6.58	172.21	55.9
10/25/2011	124	F1		55.9
10/23/2012	45	F1		55.91
10/29/2013	84	9.3	169.49	56.1
10/21/2014	82	22.21	156.58	55.82
P-209B				
10/29/2008	100			
10/27/2009	70	4.25	174.57	30.75
10/19/2010	240	6.85	171.97	30.71
10/25/2011	69	0.15	178.67	30.66
10/23/2012	76	F1		30.75
10/29/2013	124	9.4	169.42	30.83
10/21/2014	184	22.35	156.47	30.65
P-209C				
10/29/2008	71			
10/27/2009	D	D		12.75
10/19/2010	D	D		12.76
10/25/2011	95	3.15	175.73	12.82
10/23/2012	55	3.2	175.68	12.75
10/29/2013	D	12.61	166.27	12.63
10/21/2014	D	D		9.82

SUMMARY REPORT
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(P-211A) Date	Specific Conductance µmhos/cm @25°C	Water Level Depth Feet	Water Level Elevation Feet	Well Depth Feet
P-211A				
10/27/2008	73			
10/27/2009	83	5.5	178.07	25.6
10/18/2010	87	6	177.57	25.6
10/25/2011	140	5.4	178.17	25.6
10/22/2012	176	3.8	179.77	25.62
10/29/2013	215	7.4	176.17	25.63
10/21/2014	180	5.5	178.07	25.62
P-211B				
10/27/2008	115			
10/27/2009	96	6.1	177.87	13.43
10/18/2010	101	6.4	177.57	13.42
10/25/2011	123	6.1	177.87	13.45
10/22/2012	165	4.3	179.67	13.43
10/29/2013	194	7.8	176.17	13.5
10/21/2014	249	5.7	178.27	13.44
P-220A				
10/29/2008	170			
10/27/2009	223	F1		40.9
10/18/2010	264	F1		40.95
10/26/2011	172	F1		40.91
10/22/2012	157	F1		40.82
10/28/2013	186	F1	147.99	41.02
10/20/2014	152	F1		40.8
P-220B				
10/29/2008	157			
10/27/2009	239	F1		22.85
10/18/2010	309	F1		22.85
10/26/2011	202	F1		22.82
10/22/2012	233	F1		22.85
10/28/2013	205	F1	148.05	22.88
10/20/2014	154	F1		22.8

Notes: TYPE - Sample Type Qualifier where D = Duplicate Sample.

Concentration Qualifier Notes:

D - The sampling location was dry.

F1 - Well was flowing

Q - An obstruction prevented the collection of data.

APPENDIX X

TRAVEL TIME CALCULATIONS

EXISTING CONDITIONS - TRAVEL TIME CALCULATIONS (Base of Imported Soil Layer to Sensitive Receptors)

Project: Juniper Ridge Landfill, Expansion (9.35 Mcy)
Client: NEWSME

Proj #: 14101.00
Date: June 5, 2015

Calc by: BBJ
Ckd by:

PURPOSE: To calculate the time of travel for a hypothetical drop of liquid to travel from the base of the Imported Soil Layer to the Sensitive Receptors shown on Figure 7-1.

INPUT PARAMETERS:

Soil Layer Name (Top Down)		Layer Thickness		Effective Porosity		Hydraulic Conductivity				Conversions	
Imported Soil Layer	t_{ISL} =	1	ft	n_{ISL} =	0.39	k_{ISL} =	1.0E-07	cm/sec	1.0E-01	ft/yr	
Till (Native and recompacted as Fill)	T_{TILL} =	Varies, based on Geology, see below		n_{TILL} =	0.25	k_{TILL} =	9.4E-06	cm/sec	9.7E+00	ft/yr	3.2E+07 sec/yr
Bedrock (horizontal)	L_{BR} =	Varies, based on Geology, see below		n_{BR} =	0.00100	k_{BR} =	3.5E-05	cm/sec	3.6E+01	ft/yr	30.48 cm/ft

		Nodes (Refer to Figure 7-1 in Volume II of the Application)	Cell 11 Southern End	Cell 11 Center	Cell 12 Center	Cell 13 Center	Cell 13 Leachate Sump	Cell 14 Center	Cell 14 Center	Cell 15 Center	Cell 16 Center	Cell 16 Leachate Sump
Parameter	**Units**	**Symbol or Equation**	1	2	3	4	5	6	6	7	8	9
Existing Ground Surface	ft, Elev	E_{EX-GS}	212.66	213.62	210.00	200.00	176.39	207.00	207.00	204.00	201.29	190.61
Base of Grubbing, Elevation	ft, Elev	E_{GRUB}	211.66	212.63	209.66	199.00	175.38	206.67	206.67	203.01	200.29	189.60
Base Grade of Secondary Liner System (or Base of Imported Soil Layer), Elevation	ft, Elev	E_{BASE}	214.00	210.49	206.00	194.15	171.00	207.42	207.42	204.65	201.02	191.00
Underdrain, Thickness	ft	T_{UD}	0	0	0	1	1	0	0	0	0	0
Bedrock Surface, Elevation	ft, Elev	E_{BR}	212.14	185.24	182.16	153.38	129.28	200.90	200.90	189.55	170.18	188.78
Existing (Dry Season) Phreatic Surface, Elevation	ft, Elev	E_{DRY-PS}	192.94	193.25	201.00	192.28	166.11	198.88	198.88	196.36	193.16	181.88
Existing (Wet Season) Phreatic Surface, Elevation	ft, Elev	E_{WET-PS}	197.41	200.60	201.95	198.21	171.50	201.34	201.34	200.44	199.25	184.62
Existing (Dry Season) Potentiometric Surface in Shallow Bedrock, Elevation	ft, Elev	$E_{DRY-PS-SBR}$ (Note 1)	192.94	190.00	192.14	181.03	162.96	198.88	198.88	188.62	184.09	181.88
Existing (Wet Season) Potentiometric Surface in Shallow Bedrock, Elevation	ft, Elev	$E_{WET-PS-SBR}$ (Note 2)	197.41	196.25	197.67	185.00	170.00	200.00	200.00	192.94	186.80	184.62
			See Note 3									See Note 3

SUMMARY OF TRAVEL TIMES (see the following pages for details):

Site Sensitive Receptors		Figure 7-1 in Volume II of the Application	A	B	C	C	C	D	E	F	G	G
Offset Credits	Years	MEDEP 401.2.D(2) Secondary liner with leak detection.	2	2	2	2	3	3	3	2	2	3
Imported Soil Credits	Years	MEDEP 401.2.D(2) imported soil	3	3	3	3	3	3	3	3	3	3
Calculated Travel Time: Sum of Time to Bedrock Surface; Time through Bedrock; and if appropriate Time to Surfacewater	Years	Determined in the following pages (Value from bottom of page 3)	10.5	3.9	11.3	11.0	35.8	47.7	3.3	1.2	4.7	10.3
Total Travel Time to Site Sensitive Receptor	**Years**		**15.5**	**8.9**	**16.3**	**16.0**	**41.8**	**53.7**	**9.3**	**6.2**	**9.7**	**16.3**

NOTES:

1. Dry Season Potentiometric Surface in Shallow Bedrock is equal to the Dry Season Phreatic Surface when it is below the bedrock surface (Cell 14 Center and Cell 16 Sump), otherwise the Potentiometric surface map (Figure 5-8 in Volume II of the Application) was used.

2. Wet Season Potentiometric Surface in Shallow Bedrock is equal to the Wet Season Phreatic Surface when it is below the bedrock surface (Cell 16 Sump), otherwse the Potentiometric Surface map (Figure 5-8 in Volume II of the Application) was used.

3. The wet season phreatic surface is below the bedrock surface at this Node. So, under these conditions, no natural vertical seepage would occur in the Till. To provide flow through the Till, the seepage from the Imported Soil Layer was assumed to be the only source of vertical flow for this node. See "Hydraulic Gradient Calculation for Dry Till", unit gradient assumption applied to the Imported Soil Layer.

EXISTING CONDITIONS - TRAVEL TIME CALCULATIONS (Base of Imported Soil Layer to Sensitive Receptors)

Project: Juniper Ridge Landfill, Expansion (9.35 Mcy)
Client: NEWSME

Proj #: 14101.00
Date: June 5, 2015

Calc by: BBJ
Ckd by:

TRAVEL TIME TO BEDROCK SURFACE

Soil Profile (vertical thickness through which a hypothetical leak travels, top down):

Parameter	Units	Symbol or Equation	Nodes (Refer to Figure 7-1 in Volume II of the Application)	Cell 11 Southern End	Cell 11 Center	Cell 12 Center	Cell 13 Center	Cell 13 Leachate Sump	Cell 14 Center	Cell 14 Center	Cell 15 Center	Cell 16 Center	Cell 16 Leachate Sump
Is Fill Soil Required (in addition to Underdrain)?		CUT or FILL		FILL	CUT	CUT	CUT	CUT	FILL	FILL	FILL	FILL	FILL
Fill Thickness is:	ft	If(FILL, $T_{FILL}=(E_{BASE}-T_{UD})-E_{GRUB}$)		2.34					0.75	0.75	1.64	0.73	1.40
Native Till Thickness	ft	$T_{TILL}=(E_{BASE}-T_{UD}-E_{BR})$		1.86	25.25	23.84	39.77	40.72	6.52	6.52	15.10	30.84	2.22
Delta L, (for hydraulic gradient calculation)	ft	$\Delta L=T_{FILL}+T_{TILL}$		4.20	25.25	23.84	39.77	40.72	7.27	7.27	16.74	31.57	3.62
Hydraulics:													
Base of Liner System, Elevation	ft, Elev	E_{BASE}		214.00	210.49	206.00	194.15	171.00	207.42	207.42	204.65	201.02	191.00
Underdrain Present		Yes or No		No	No	No	Yes	Yes	No	No	No	No	No
Head Driving Seepage	ft, Elev	E_{HDS} = (Note 1)		Till is Dry	200.60	201.95	198.21	171.50	201.34	201.34	200.44	199.25	Till is Dry
(Wet Season) Potentiometric Surface in Shallow Bedrock, Elevation	ft, Elev	$E_{WS-PS-SBR}$		Till is Dry	196.25	197.67	185.00	170.00	200.00	200.00	192.94	186.80	Till is Dry
Bedrock Surface, Elevation	ft, Elev	E_{BR}		212.14	185.24	182.16	153.38	129.28	200.90	200.90	189.55	170.18	188.78
Head Receiving Seepage, Elevation	ft, Elev	E_{HRS} = Max($E_{WS-PS-SBR}$ or E_{BR}) (Note 2)		Till is Dry	196.25	197.67	185.00	170.00	200.90	200.90	192.94	186.80	Till is Dry
Delta H, (for hydraulic gradient calculation)	ft/ft	$\Delta H = E_{HDS} - E_{HRS}$		Till is Dry	4.35	4.28	13.21	1.50	0.44	0.44	7.50	12.45	Till is Dry
Existing Hydraulic Gradient (Wet Season)	ft/ft	$i_{BRS} = \Delta H/\Delta L$ (Note 3)		0.0106	0.17	0.18	0.33	0.04	0.06	0.06	0.45	0.39	0.0106
Travel Time to Bedrock Surface:													
Travel Time to Bedrock Surface, under Wet Season hydraulic conditions	Years	$TT_{BRS} = (\Delta L \times n_{TILL}) / (K_{TILL} \times i_{BRS})$		10.14	3.76	3.41	3.08	28.40	3.09	3.09	0.96	2.06	8.74

NOTES:

1. Assumed to be the existing wet season potentiometric surface away from sumps. Where Till is Dry, See Note 3 on Page 1.
2. The Elevation Head Receiving Seepage is the highest of: a) the Bedrock Surface; or b) the Existing (Wet Season) Potentiometric Surface in Shallow Bedrock. When Till is NOT Dry.
3. Calculated as shown, unless the wet season phreatic surface is below the bedrock surface at this Node. So, under these conditions, no natural vertical seepage would occur in the Till. To provide flow through the Till, the seepage from the Imported Soil Layer was assumed to be the only source of vertical flow for this node. See "Hydraulic Gradient Calculation for Dry Till", for determination of i_{BRS} = 0.0106, when the flow rate through the Till equals the flow rate through the overlying and less permeable Imported Soil Layer under a unit gradient condition.

EXISTING CONDITIONS - TRAVEL TIME CALCULATIONS (Base of Imported Soil Layer to Sensitive Receptors)

Project: Juniper Ridge Landfill, Expansion (9.35 Mcy)
Client: NEWSME

Proj #: 14101.00
Date: June 5, 2015

Calc by: BBJ
Ckd by:

TRAVEL TIME TO SENSITIVE RECEPTORS (in Bedrock)

Bedrock (horizontal lengths through which a hypothetical leak travels):

Parameter	Units	Hypothetical Leak Location "Node" (See Figure 7-1) / Symbol or Equation	Cell 11 Southern End	Cell 11 Center	Cell 12 Center	Cell 13 Center	Cell 13 Leachate Sump	Cell 14 Center	Cell 14 Center	Cell 15 Center	Cell 16 Center	Cell 16 Leachate Sump
Sensitive Receptor Location (See Figure 7-1)			A	B	C	C	C	D	E	F	G	G
Sensitive Receptor Type (See Table 7-1)			Southern Sandy Zone	Property Line	Surface Water	Surface Water	Surface Water	Surface Water	Property Line	Property Line	Surface Water	Surface Water
Ground Surface at Sensitive Receptor (OR Surface Water, Elevation)	ft, Elev	E_{EX-GS}	180.00	157.22	141.17	141.17	141.17	146.41	172.13	176.84	161.78	161.78
Bedrock Surface, Elevation	ft, Elev	E_{BR}	115.00	150.00	110.00	110.00	110.00	80.00	150.00	172.82	153.00	153.00
Delta L, Horizontal Length through Bedrock	ft	ΔL_{BR}	740	880	1600	1410	920	1300	900	920	1270	900
Hydraulics:												
Assumed Drawdown in at Property-Line Well	ft	ΔH_{WELL}		100					100	100		
Head Driving Seepage (in Bedrock)	ft, Elev	$E_{HDS-BR} = E_{HRS}$ (Note 1)	212.14	196.25	197.67	185.00	170.00	200.90	200.90	192.94	186.80	188.78
Head Receiving Seepage (in Bedrock)	ft, Elev	E_{HRS-BR} (Note 2)	173.00	160.00	145.00	145.00	145.00	149.00	172.00	177.00	165.00	165.00
Man-Made Head	ft, Elev	$E_{HRS-MM} = E_{HRS-BR} - \Delta H_{WELL}$ (Note 3)	173.00	60.00	NA	NA	NA	NA	72.00	77.00	NA	NA
Delta H, (for hydraulic gradient calculation)	ft/ft	Natural Head: $\Delta H_{BR} = E_{HDS-BR} - E_{HRS-BR}$			52.67	40.00	25.00	51.90			21.80	23.78
		Man-Made Head: $\Delta H_{BR} = E_{HDS-BR} - E_{HRS-MM}$	39.14	136.25					128.90	115.94		
Hydraulic Gradient through Bedrock	ft/ft	$i_{BR} = \Delta H_{BR} / \Delta L_{BR}$	0.05	0.15	0.03	0.03	0.03	0.04	0.14	0.13	0.02	0.03
Travel Time through Bedrock (Horizontally):												
Travel Time Horizontally through Bed Rock, under DRY SEASON hydraulic conditions (Note 4)	Years	$TT_{BR} = (\Delta L_{BR} \times n_{BR}) / (K_{BR} \times i_{BR})$	0.4	0.2	1.3	1.4	0.9	0.9	0.2	0.2	2.0	0.9
From Bedrock Vertically Upward to Surface Water:												
Native Till Thickness = Flow Length (ΔL_{TILL})	ft	$T_{TILL} = (E_{EX-GS} - E_{BR}) = \Delta L_{TILL}$			31.2	31.2	31.2	66.4			8.8	8.8
Delta H, (for hydraulic gradient calculation)	ft/ft	Head Through Till: $\Delta H_{TILL} = E_{HRS-BR} - E_{EX-GS}$			3.8	3.8	3.8	2.6			3.2	3.2
Existing Hydraulic Gradient through Till	ft/ft	$i_{TILL} = \Delta H_{TILL} / \Delta L_{TILL}$			0.1	0.1	0.1	0.0			0.4	0.4
Travel Time Vertically through Till, under DRY SEASON hydraulic conditions (Note 4)	Years	$TT_{TILL} = (\Delta L_{TILL} \times n_{TILL}) / (K_{TILL} \times i_{TILL})$			6.5	6.5	6.5	43.7			0.6	0.6
TOTAL TRAVEL TIME (Value shown on Page 1):												
Calculated Travel Time: Sum of Time to Bedrock Surface; Time through Bedrock; and if appropriate Time to Surfacewater	Years	$TT_{TOTAL} = TT + TT_{BR} + TT_{TILL}$	**10.5**	**3.9**	**11.3**	**11.0**	**35.8**	**47.7**	**3.3**	**1.2**	**4.7**	**10.3**

NOTES:

1. The head driving seepage horizontally through the bedrock is assumed to be equal to the Head Receiving Seepage from the previous page. See Note 3 on pages 1 and 2, for special conditions where till is dry.
2. The head receiving seepage (under Natural Conditions) is the potentiometric surface elevation in shallow bedrock (Wet Season). See Figure 5-8 in Volume II of the Application.
3. A Man-Made Water Level is assumed. Ex. A potential water supply well having a drawdown of 100 feet at sensitive Receptor A: EHRS-MM = 160 - 100 = 60
4. Assume that all flow is horizontal through bedrock to be conservative. Actual flow path would be longer and therefore take longer.

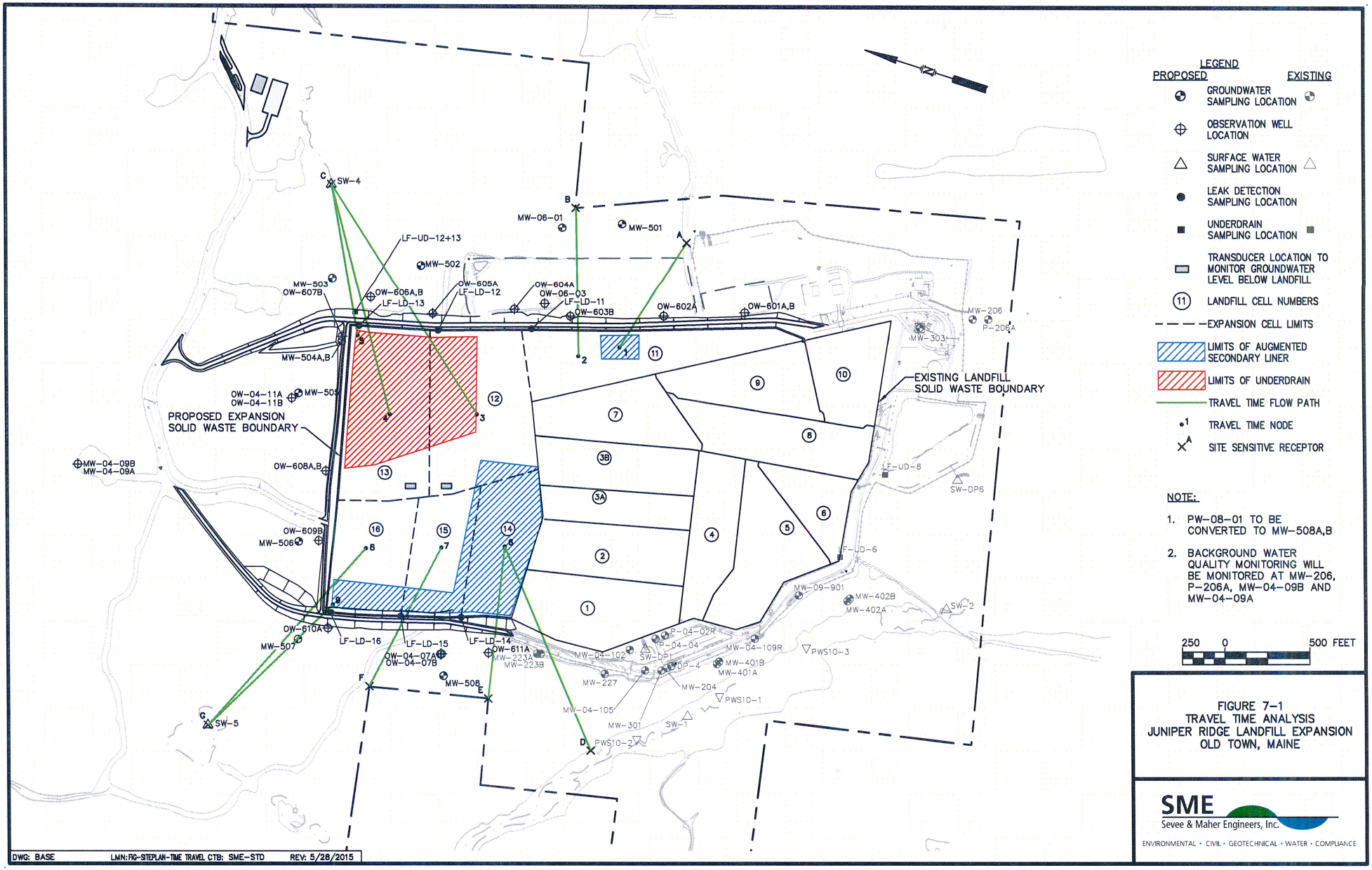

FIGURE 7-1
TRAVEL TIME ANALYSIS
JUNIPER RIDGE LANDFILL EXPANSION
OLD TOWN, MAINE

SME
Sevee & Maher Engineers, Inc.
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DWG: BASE LMN:FIG-SITEPLAN-TIME TRAVEL CTB: SME-STD REV: 5/28/2015

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Hydraulic Gradient Calculation for Dry Till

SITE: Juniper Ridge Landfill DATE: Date: June 5, 2015 Calc. By: BBJ

PROJECT: Expansion Application PROJECT No.: 14101.00 Ckd. By: bmj

LOCATIONS: Only applys when till is dry.

COMMENTS:

PURPOSE: Determine the hydraulic gradient through till and fill soils, below the Imported Soil Layer; where the flow rate vertically through the Till is controlled by the leakage through the Imported Soil Layer.

Soil Layer Name (Top Down)	Layer Thickness	Effective Porosity	Hydraulic Conductivity					Conversions	
Imported Soil Layer	t_{ISL} = 1 ft	n_{ISL} = 0.39	k_{ISL} = 1.0E-07	cm/sec	1.0E-01	ft/yr			
Till (Native and recompacted as Fill)		n_{TILL} = 0.25	k_{TILL} = 9.4E-06	cm/sec	9.7E+00	ft/yr	3.2E+07	sec/yr	
Bedrock (horizontal)		n_{BR} = 0.001	k_{BR} = 3.5E-05	cm/sec	3.6E+01	ft/yr	30.48	cm/ft	

Determine Seepage Rate through the Imported Soil Layer; the time of travel through that layer; and the hydraulic gradient through the Till (Fill and Native).
Nodes (Refer to Figure 7-1 in Volume II of the Application)

Parameter	Units	Symbol or Equation	Value
Imported Soil Layer Thickness	ft	$t_{ISL} = \Delta L_{ISL}$	1.0
Change in Head across Imported Soil Layer (**Delta H**) (For a free-draining Imported Soil Layer $\Delta H = t_{EBS}$)	ft	ΔH_{ISL}	1.0
Hydraulic Gradient (Imported Soil Layer)	ft/ft	$i_{ISL} = \Delta H_{ISL}/\Delta L_{ISL}$	1.0

Travel Time through Imported Soil Layer:

Travel Time through Imported Soil Layer (unit gradient)	Years	$TT_{ISL\_UG} = (\Delta L_{SISL} \times n_{ISL}) / (K_{ISL} \times i_{ISL})$	**3.77**	<-- **Travel Time through the Imported Soil Layer (unit gradient assumption).**
Flow Rate through Imported Soil Layer	ft/year	$q_{ISL} = (k_{ISL} \times i_{ISL})$	0.10	

The Flow Rate in the Imported Soil Layer sets the flow rate in the underlying Till

Flow Rate through Till	ft/year	$q_{TILL} = q_{ISL}$	0.10	
Gradient in Till	ft/ft	$i_{TILL} = q_{TILL}/k_{TILL}$	0.0106	<--**Applied in Travel Time Calculation for "Dry Till".**

This value is used in Travel Time Calculations as i_{BRS} in Post Closure Analysis.

Determine Seepage Rate through the Imported Soil Layer; the time of travel through that layer; Assuming that the leakage is due to the Design Leakage Rate

Parameter	Units	Symbol or Equation	Value			
Imported Soil Layer Thickness	ft	$t_{ISL} = \Delta L_{ISL}$	1.0			
Design Leakage Rate	gal/acre/day	DLR =	4.60	224.62	ft^3/yr	7.48 gal/ft^3
Hydraulic Gradient (Imported Soil Layer)	ft/ft	i_{ISL} = DLR / k_{ISL} / 43560	0.0498			

Travel Time through Imported Soil Layer:

Travel Time through Imported Soil Layer (Design Leakage Rate)	Years	$TT_{ISL\_DLR} = (\Delta L_{ISL} \times n_{ISL}) / (K_{ISL} \times i_{ISL})$	**75.63**	<-- **Travel Time through the Imported Soil Layer (Design Leakage Rate).**

POST-CLOSURE CONDITIONS - TIME OF TRAVEL (Base of Imported Soil Layer to Sensitive Receptors)

Project: Juniper Ridge Landfill, Expansion (9.35 Mcy) | Proj #: 14101.00 | Calc by: BBJ
Client: NEWSME | Date: June 5, 2015 | Ckd by:

PURPOSE: To calculate the time of travel for a hypothetical drop of liquid to travel from the base of the Imported Soil Layer to Sensitive Receptors shown on Figure 7-1. Under the condition where the leak is driven by some leakage rate out from the bottom of the Imported Soil Layer

INPUT PARAMETERS:

Soil Layer Name (Top Down)	Layer Thickness		Effective Porosity		Hydraulic Conductivity						
Imported Soil Layer	t_{ISL} =	1 ft	n_{ISL} =	0.39	k_{ISL} =	1.0E-07	cm/sec	1.0E-01	ft/yr		
Till (Native and recompacted as Fill)	T_{TILL} =	Varies, based on Geology, see below	n_{TILL} =	0.25	k_{TILL} =	9.4E-06	cm/sec	9.7E+00	ft/yr	3.2E+07	sec/yr
Bedrock (horizontal)	L_{BR} =	Varies, based on Geology, see below	n_{BR} =	0.00100	k_{BR} =	3.5E-05	cm/sec	3.6E+01	ft/yr	30.48	cm/ft

	Parameter	Units	Symbol or Equation	Nodes (Refer to Figure 7-1 in Volume II of the Application)	Cell 11 Southern End	Cell 11 Center	Cell 12 Center	Cell 13 Center	Cell 13 Leachate Sump	Cell 14 Center	Cell 14 Center	Cell 15 Center	Cell 16 Center	Cell 16 Leachate Sump
					1	2	3	4	5	6	6	7	8	9
	Existing Ground Surface	ft, Elev	E_{EX-GS}		212.66	213.62	210.00	200.00	176.39	207.00	207.00	204.00	201.29	190.61
	Base of Grubbing, Elevation	ft, Elev	E_{GRUB}		211.66	212.63	209.66	199.00	175.38	206.67	206.67	203.01	200.29	189.60
	Base Grade of Secondary Liner System (or Base of Imported Soil Layer), Elevation	ft	E_{BASE}		214.00	210.49	206.00	194.15	171.00	207.42	207.42	204.65	201.02	191.00
	Underdrain, Thickness	ft	T_{UD}		0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
	Bedrock Surface, Elevation	ft, Elev	E_{BR}		212.14	185.24	182.16	153.38	129.28	200.90	200.90	189.55	170.18	188.78
	Existing (Wet Season) Phreatic Surface, Elevation	ft, Elev	E_{WET-PS}		197.41	200.60	201.95	198.21	171.50	201.34	201.34	200.44	199.25	184.62
5	Post-Closure Phreatic Surface, Elevation	ft, Elev	E_{WET-PS} - (Drop due to Liner Installation)		192.41	195.60	196.95	193.21	166.50	196.34	196.34	195.44	194.25	179.62
ft drop	Existing (Wet Season) Potentiometric Surface in Shallow Bedrock, Elevation	ft, Elev	$E_{WET-PS-SBR}$ (Note 1)		197.41	196.25	197.67	185.00	170.00	200.00	200.00	192.94	186.80	184.62
5	Post-Closure Potentiometric Surface in Shallow Bedrock, Elevation	ft, Elev	$E_{WET-PS-SBR}$ - (Drop due to Liner Installation) (Note 1)		192.41	191.25	192.67	180.00	165.00	195.00	195.00	187.94	181.80	179.62
ft drop					See Note 3					See Note 3	See Note 3			See Note 3

SUMMARY OF TRAVEL TIMES (see the following pages for details):

Site Sensitive Receptors		Figure 7-1 in Volume II of the Application	A	B	C	C	C	D	E	F	G	G
Offset Credits	Years	MEDEP 401.2.D(2) Secondary liner with leak detection.	2	2	2	2	3	3	3	2	2	3
Imported Soil Credits	Years	MEDEP 401.2.D(2) Imported Soil.	3	3	3	3	3	3	3	3	3	3
Calculated Travel Time: Sum of Time to Bedrock Surface; Time through Bedrock; and if appropriate Time to Surfacewater	Years	Determined in the following pages (Value from bottom of page 3)	10.5	3.9	11.4	11.2	36.1	62.2	17.7	1.4	5.3	10.3
Total Travel Time to Site Sensitive Receptor	**Years**		**15.5**	**8.9**	**16.4**	**16.2**	**42.1**	**68.2**	**23.7**	**6.4**	**10.3**	**16.3**

NOTES:

1. Wet Season Potentiometric Surface in Shallow Bedrock is equal to the Wet Season Phreatric Surface when it is below the bedrock surface (Cell 16 Sump), otherwse the Potentiometric Surface map was used.

2. Drop due to Liner Installation, based on Groundwater Modeling presented in Appendix V of Volume II of the Application.

3. The wet season phreatic surface is below the bedrock surface at this Node. So, under these conditions, no natural vertical seepage would occur in the Till. To provide flow through the Till, the seepage from the Imported Soil Layer was assumed to be the only source of vertical flow for this node. See "Hydraulic Gradient Calculation for Dry Till", unit gradient assumption applied to the Imported Soil Layer.

POST-CLOSURE CONDITIONS - TIME OF TRAVEL (Base of Imported Soil Layer to Sensitive Receptors)

Project: Juniper Ridge Landfill, Expansion (9.35 Mcy)
Client: NEWSME

Proj #: 14101.00
Date: June 5, 2015

Calc by: BBJ
Ckd by:

TRAVEL TIME TO BEDROCK SURFACE

Soil Profile (vertical thickness through which a hypothetical leak travels, top down):

Parameter	Units	Nodes (Refer to Figure 7-1 in Volume II of the Application)	Cell 11 Southern End	Cell 11 Center	Cell 12 Center	Cell 13 Center	Cell 13 Leachate Sump	Cell 14 Center	Cell 14 Center	Cell 15 Center	Cell 16 Center	Cell 16 Leachate Sump
		Symbol or Equation										
Is Fill Soil Required (in addition to Underdrain)?		CUT or FILL	FILL	CUT	CUT	CUT	CUT	FILL	FILL	FILL	FILL	FILL
Fill Thickness is:	ft	If(FILL, $T_{FILL}=(E_{BASE}-T_{UD})-E_{GRUB}$)	2.34					0.75	0.75	1.64	0.73	1.40
Native Till Thickness	ft	$T_{TILL}=(E_{BASE}-T_{UD}-E_{BR})$	1.86	25.25	23.84	39.77	40.72	6.52	6.52	15.10	30.84	2.22
Delta L, (for hydraulic gradient calculation)	ft	$\Delta L=T_{FILL}+T_{TILL}$	4.20	25.25	23.84	39.77	40.72	7.27	7.27	16.74	31.57	3.62
Hydraulics:												
Base of Liner System, Elevation	ft, Elev	E_{BASE}	214.00	210.49	206.00	194.15	171.00	207.42	207.42	204.65	201.02	191.00
Underdrain Present		Yes or No	No	No	No	No	No	No	No	No	No	No
Head Driving Seepage	ft, Elev	E_{HDS} = (Note 1)	Till is Dry	195.60	196.95	193.21	166.50	Till is Dry	Till is Dry	195.44	194.25	Till is Dry
(Wet Season) Potentiometric Surface in Shallow Bedrock, Elevation	ft, Elev	$E_{WS-PS-SBR}$	Till is Dry	191.25	192.67	180.00	165.00	Till is Dry	Till is Dry	187.94	181.80	Till is Dry
Bedrock Surface, Elevation	ft, Elev	E_{BR}	212.14	185.24	182.16	153.38	129.28	200.90	200.90	189.55	170.18	188.78
Head Receiving Seepage, Elevation	ft, Elev	E_{HRS} = Max($E_{WS-PS-SBR}$ or E_{BR}) (Note 2)	212.14	191.25	192.67	180.00	165.00	200.90	200.90	189.55	181.80	188.78
Delta H, (for hydraulic gradient calculation)	ft/ft	$\Delta H = E_{HDS} - E_{HRS}$	Till is Dry	4.35	4.28	13.21	1.50	Till is Dry	Till is Dry	5.89	12.45	Till is Dry
Future Hydraulic Gradient (Wet Season)	ft/ft	$i_{BRS} = \Delta H/\Delta L$ (Note 3)	0.0106	0.17	0.18	0.33	0.04	0.0106	0.0106	0.35	0.39	0.0106
Travel Time to Bedrock Surface:												
Travel Time to Bedrock Surface, under **Wet Season** hydraulic conditions	Years	$TT_{BRS} = (\Delta L \times n_{TILL}) / (K_{TILL} \times i_{BRS})$	10.14	3.76	3.41	3.08	28.40	17.55	17.55	1.22	2.06	8.74

NOTES:

1. Assumed to be the existing wet season potentiometric surface away from sumps. Where Till is Dry, See Note 3 on Page 1.
2. The Elevation Head Receiving Seepage is the highest of: a) the Bedrock Surface; or b) the Existing (Wet Season) Potentiometric Surface in Shallow Bedrock. When Till is NOT Dry.
3. Calculated as shown, unless the wet season phreatic surface is below the bedrock surface at this Node. So, under these conditions, no natural vertical seepage would occur in the Till. To provide flow through the Till, the seepage from the Imported Soil Layer was assumed to be the only source of vertical flow for this node. See "Hydraulic Gradient Calculation for Dry Till", for determination of iBRS = 0.0106, when the flow rate through the Till equals the flow rate through the overlying and less permeable Imported Soil Layer under a unit gradient condition.

POST-CLOSURE CONDITIONS - TIME OF TRAVEL (Base of Imported Soil Layer to Sensitive Receptors)

Project: Juniper Ridge Landfill, Expansion (9.35 Mcy)
Client: NEWSME

Proj #: 14101.00
Date: June 5, 2015

Calc by: BBJ
Ckd by:

TRAVEL TIME TO SENSITIVE RECEPTORS

Bedrock (horizontal lengths through which a hypothetical leak travels):

Parameter	Units	Symbol or Equation	Cell 11 Southern End	Cell 11 Center	Cell 12 Center	Cell 13 Center	Cell 13 Leachate Sump	Cell 14 Center	Cell 14 Center	Cell 15 Center	Cell 16 Center	Cell 16 Leachate Sump
		Hypothetical Leak Location "Node" (See Figure 7-1)										
Sensitive Receptor Location (See Figure 7-1)			A	B	C	C	C	D	E	F	G	G
Sensitive Receptor Type (See Table 7-1)			Southern Sandy Zone	Property Line	Surface Water	Surface Water	Surface Water	Surface Water	Property Line	Property Line	Surface Water	Surface Water
Ground Surface at Sensitive Receptor (OR Surface Water, Elevation)	ft, Elev	E_{EX-GS}	180.00	157.22	141.17	141.17	141.17	146.41	172.13	176.84	161.78	161.78
Bedrock Surface, Elevation	ft, Elev	E_{BR}	115.00	150.00	110.00	110.00	110.00	80.00	150.00	172.82	153.00	153.00
Delta L, Horizontal Length through Bedrock	ft	ΔL_{BR}	740	880	1600	1410	920	1300	900	920	1270	900
Hydraulics:												
Assumed Drawdown in at Property-Line Well	ft	ΔH_{WELL}		100					100	100		
Head Driving Seepage (in Bedrock)	ft, Elev	$E_{HDS-BR} = E_{HRS}$ (Note 1)	212.14	191.25	192.67	180.00	165.00	200.90	200.90	189.55	181.80	188.78
Head Receiving Seepage (in Bedrock)	ft, Elev	E_{HRS-BR} (Note 2)	173.00	160.00	145.00	145.00	145.00	149.00	172.00	177.00	165.00	165.00
Man-Made Head	ft, Elev	$E_{HRS-MM} = E_{HRS-BR} - \Delta H_{WELL}$ (Note 3)	NA	60.00	NA	NA	NA	NA	72.00	77.00	NA	NA
Delta H, (for hydraulic gradient calculation)	ft/ft	Natural Head: $\Delta H_{BR} = E_{HDS-BR} - E_{HRS-BR}$	39.14		47.67	35.00	20.00	51.90			16.80	23.78
		Man-Made Head: $\Delta H_{BR} = E_{HDS-BR} - E_{HRS-MM}$		131.25					128.90	112.55		
Hydraulic Gradient through Bedrock	ft/ft	$i_{BR} = \Delta H_{BR} / \Delta L_{BR}$	0.05	0.15	0.03	0.02	0.02	0.04	0.14	0.12	0.01	0.03
Travel Time through Bedrock (Horizontally):												
Travel Time Horizontally through Bed Rock, under **DRY SEASON** hydraulic conditions (Note 4)	Years	$TT_{BR} = (\Delta L_{BR} \times n_{BR}) / (K_{BR} \times i_{BR})$	0.4	0.2	1.5	1.6	1.2	0.9	0.2	0.2	2.6	0.9
From Bedrock Vertically Upward to Surface Water:												
Native Till Thickness = Flow Length (ΔL_{TILL})	ft	$T_{TILL} = (E_{EX-GS} - E_{BR}) = \Delta L_{TILL}$			31.17	31.17	31.17	66.41			8.78	8.78
Delta H, (for hydraulic gradient calculation)	ft/ft	Head Through Till: $\Delta H_{TILL} = E_{HRS-BR} - E_{EX-GS}$			3.83	3.83	3.83	2.59			3.22	3.22
Existing Hydraulic Gradient through Till	ft/ft	$i_{TILL} = \Delta H_{TILL} / \Delta L_{TILL}$			0.12	0.12	0.12	0.04			0.37	0.37
Travel Time Vertically through Till, under **DRY SEASON** hydraulic conditions (Note 4)	Years	$TT_{TILL} = (\Delta L_{TILL} \times n_{TILL}) / (K_{TILL} \times i_{TILL})$			6.5	6.5	6.5	43.7			0.6	0.6
TOTAL TRAVEL TIME (Value shown on Page 1):												
Calculated Travel Time: Sum of Time to Bedrock Surface; Time through Bedrock; and if appropriate Time to Surfacewater	Years	$TT_{TOTAL} = TT + TT_{BR} + TT_{TILL}$	**10.5**	**3.9**	**11.4**	**11.2**	**36.1**	**62.2**	**17.7**	**1.4**	**5.3**	**10.3**

NOTES:

1. The head driving seepage horizontally through the bedrock is assumed to be equal to the Head Receiving Seepage from the previous page. See Note 3 on pages 1 and 2, for special conditions where till is dry.
2. The head receiving seepage (under Natural Conditions) is the potentiometric surface elevation in shallow bedrock (Wet Season). See Figure 5-8 in Volume II of the Application.
3. A Man-Made Water Level is assumed. Ex. A potential water supply well having a drawdown of 100 feet at sensitive Receptor A: EHRS-MM = 160 - 100 = 60
4. Assume that all flow is horizontal through bedrock to be conservative. Actual flow path would be longer and therefore take longer.

SUMMARY of Sensitivity Analysis, JRL Expansion Application.
Values shown here include Offsets and Credits, Yielding Total Travel Time to Site Sensitive Receptors

					Node:	Cell 11 Southern End	Cell 11 Center	Cell 12 Center	Cell 13 Center	Cell 13 Leachate Sump	Cell 14 Center	Cell 14 Center	Cell 15 Center	Cell 16 Center	Cell 16 Leachate Sump
				Site Sensitive Receptor:		A	B	C	C	C	D	E	F	G	G
				Sensitivity Parameters											
				Permeability	Porosity										
		Till	LCL	5.2 x 10-6	0.25	23.7	12.0	24.3	23.7	70.0	91.5	11.8	6.9	11.9	23.9
Base Evaluation			GeoMean	9.4 x 10-6		15.5	8.9	16.3	16.0	41.8	53.7	9.3	6.2	9.7	16.3
			UCL	1.7 x 10-5		11.0	7.2	11.8	11.7	26.2	32.8	7.9	5.7	8.5	12.1
		Bedrock	LCL	2.9 x 10-5	0.001	15.6	9.0	16.5	16.2	42.0	53.9	9.3	6.2	10.1	16.5
Base Evaluation			GeoMean	3.5 x 10-5		15.5	8.9	16.3	16.0	41.8	53.7	9.3	6.2	9.7	16.3
			UCL	4.2 x 10-5		15.5	8.9	16.0	15.7	41.7	53.6	9.2	6.1	9.4	16.1
		Till	LCL	9.4 x 10-6	0.3	17.6	9.7	18.3	17.9	48.8	63.1	9.9	6.4	10.2	18.2
Base Evaluation			GeoMean		0.25	15.5	8.9	16.3	16.0	41.8	53.7	9.3	6.2	9.7	16.3
			UCL		0.18	12.7	7.9	13.5	13.3	32.1	40.6	8.4	5.9	9.0	13.7
		Bedrock	LCL	3.5 x 10-5	0.016	21.3	11.3	36.4	36.5	55.9	67.2	11.9	9.2	40.3	30.4
Base Evaluation			GeoMean		0.001	15.5	8.9	16.3	16.0	41.8	53.7	9.3	6.2	9.7	16.3
			UCL		0.000059	15.2	8.8	15.0	14.7	41.0	52.9	9.1	6.0	7.8	15.4