MASSACHUSETTS CONTINGENCY PLAN
PHASE II COMPREHENSIVE SITE ASSESSMENT ADDENDUM

FORMER VARIAN FACILITY SITE
150 SOHIER ROAD
BEVERLY, MASSACHUSETTS 01915

MassDEP Site # 3-0485

Submitted by:

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Project No. 631010754
March 2023

Table of Contents

List of Tables

List of Tables (cont.)

List of Figures

List of Figures (cont.)

List of Appendices

List of Acronyms & Abbreviations

1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane
$\mu g/L$	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
ADAF	age-dependent adjustment factors
APTIM	Aptim Environmental and Infrastructure, LLC
ARA	Absolute Resource Associates
AST	aboveground storage tank
AUL	activity and use limitation
bgs	below ground surface
Bomac	Bomac Laboratories, Inc.
BWSC	Bureau of Waste Site Cleanup
CAM	Compendium of Analytical Methods
CDM	Camp Dresser & McKee
cfm	cubic feet per minute
CHES	Clean Harbors Environmental Services, Inc.
cis-1,2-DCE	*cis*-1,2-dichloroethene
CMR	Code of Massachusetts Regulations
COC	contaminants of concern
cP	centipoise
CPI	Communications & Power Industries, Inc.
CPT	cone penetrometer test
CSA	Comprehensive Site Assessment
CSM	conceptual site model
DHC	*Dehalococcoides*
DNAPL	dense nonaqueous phase liquid
DO	deep overburden
EPA	U.S. Environmental Protection Agency
ERI	electrical resistivity imaging
EPC	exposure point concentration
foc	fraction of organic carbon
ft/ft	feet per foot
g/cm^3	grams per cubic centimeter
gpm	gallons per minute
HA	hand-auger
HI	hazard index
HQ	hazard quotient
HGI	Hager GeoScience, Inc.
HVAC	heating, ventilation, and air conditioning
IM	Imminent Hazard
IRA	Immediate Response Action
IRIS	Integrated Risk Information System

List of Acronyms & Abbreviations (cont.)

IT	IT Corporation, Inc.
LSP	Licensed Site Professional
m	meter
MassDEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
MDL	method detection limit
mg/kg	milligrams per kilogram = ppm
mg/L	milligrams per liter = ppb
MSL	mean sea level
OHM	oil or hazardous materials
ohm-m	ohm meter
O&M	operation and maintenance
PDB	passive diffusion bag
PCE	tetrachloroethene
PEL	permissible exposure limits
PID	photoionization detector
PPA	Potentially Productive Aquifer
ppb	parts per billion
ppm	parts per million
PSL	Potential Source Location
PVC	polyvinyl chloride
QC	quality control
RAP	Remedial Action Plan
RfD	reference dose values
ROS	Remedy Operation Status
ROUX	Roux Environmental
RSL	regional screening level
RTN	Release Tracking Number
Shaw	Shaw Environmental & Infrastructure, Inc.
SIM	Selective Ion Monitoring
SVE	soil vapor extraction
TCE	trichloroethene
TPH	total petroleum hydrocarbons
trans-1,2-DCE	*trans*-1,2-dichloroethene
TV	Threshold Value
UCL	Upper Concentration Limit
Varian	Varian Medical Systems, Inc.
VC	vinyl chloride
VOC	volatile organic compound

EXECUTIVE SUMMARY

In 2000, Varian Medical Systems, Inc. (Varian) submitted a Massachusetts Contingency Plan (MCP) Phase II Comprehensive Site Assessment (CSA) for the Former Varian facility located at 150 Sohier Road in Beverly, Massachusetts (IT Corporation, Inc., 2000a). This report documented the data and results of a comprehensive assessment of the site conducted from 1995 to 1999 to define the source, nature, and extent of the oil or hazardous material (OHM) releases at the property, including the investigation of 19 Potential Source Locations (PSLs).

Information about historical industrial processes and subsurface analytical data from PSL investigations indicated that the contaminants of concern (COCs) at the Site are chlorinated volatile organic compounds (VOCs). Trichloroethene (TCE), tetrachloroethene (PCE), and 1,1,1-trichloroethane (1,1,1-TCA) were the three primary chlorinated solvents historically used at Varian's former facility. Eight COCs were identified for the Site including the three parent compounds, TCE, PCE, 1,1,1-TCA, and five common degradation ("daughter") compounds, *cis*-1,2-dichloroethene (*cis*-1,2-DCE), *trans*-1,2-dichloroethene (*trans*-1,2-DCE), 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), and vinyl chloride (VC).

Releases of VOCs appear to have occurred in PSL-5 (former Building 1 septic tank/leach field), PSL-6 (former septic tank/leach field beneath Building 6), and PSL-11 (Building 3 chemical laboratory). These PSLs are collectively referred to as the Building 3 Source Area. Releases of VOCs appear to have also occurred at PSL-7 (Building 5 chemical laboratory), which is referred to as the Building 5 Source Area. Additionally, VOC releases seem to have occurred at PSL-10 (open field), primarily on the western property line near 32 Tozer Road. This location is referred to as the PSL-10 Source Area.

Based on the 2000 Phase II CSA, a condition of No Significant Risk existed at the Site with the exception of potential future risk associated with hypothetical future use of groundwater as drinking water. Remediation was recommended to address soil and groundwater impacts. Varian submitted a Phase IV Remedy Implementation Plan (Phase IV Plan; IT, 2001) in December 2001. The Phase IV Plan described proposed remedial actions for addressing VOCs in soil and groundwater at the Site. *In situ* oxidation of VOCs in soil and groundwater using permanganate (a common oxidant) was chosen as a suitable remedial alternative for the Site. Initial implementation of the Comprehensive Response Action, including injection of permanganate, began in July 2002.

Response actions at the Site continued under the MCP in Remedy Operations Status (ROS) from 2002 through 2022. Semiannual ROS reports documented the cleanup activities at the Site. Activities included supplementing the cleanup plan with bioremediation, installing multiple injection wells, and further assessment of source areas. Well installation since the completion of the 2000 Phase II CSA has included approximately 54 injection wells and 97 monitoring wells. From 2002 until 2019 over 219,000 gallons of permanganate solution were injected in the Building 3 Source Area, the Building 5 Source Area, the PSL-10 Source Area, and at downgradient locations under the cleanup program. In addition, between 2006 and 2020, over 67,000 gallons of bioremediation additive were injected at the Site to clean up VOCs in groundwater. Estimating treatment mass for *in situ* remediation requires a number of assumptions, which contribute to uncertainty. With that in mind, it is estimated that over 1,400 pounds of VOCs have been treated by permanganate and bioremediation since 2002. In 2012, the Phase III Remedial Action Plan and

Phase IV Plan were modified to include soil vapor extraction (SVE). Two SVE systems were installed and continue to operate at Building 3 and Building 5 to mitigate potential vapor intrusion into the buildings and to extract VOCs from the soil above the water table. More than 2,000 pounds of VOCs have been removed and safely treated by the two SVE systems. Prior to the start of permanganate treatment at the Site, a groundwater pumping system operated from 1992 until 2002. During its operation, the groundwater pump and treat system removed over 5,000 pounds of VOCs in groundwater.

In November 2020, the Massachusetts Department of Environmental Protection (MassDEP) began a comprehensive review of response actions at the Site at the request of Beverly public officials and area residents. In December 2020, MassDEP completed an indoor air sampling program at 41 homes in the area of the Site, which determined that there was no evidence that VOCs from the Varian site were impacting the indoor air of any of the homes that were sampled.

Varian began implementing a MassDEP-approved work plan at the Site in March 2021. That plan included:

- Resampling of indoor air at 21 homes selected by MassDEP
- Additional well installation, surface water sampling, and sediment sampling activities in response to data gaps identified by MassDEP
- Evaluation of potential human health, ecologic, and pet risk posed by VOCs detected in the streams at the Site

A Vapor Intrusion Assessment Report was submitted on April 29, 2021 (Aptim Environmental and Infrastructure, LLC [APTIM], 2021c), which detailed the results of the indoor air sampling. A total of 55 indoor air samples and 33 soil vapor samples were collected at 21 homes in February and March 2021. Additionally, sump water samples were collected at five homes in the study area. Groundwater sample results from 13 shallow groundwater monitoring wells were also considered in the vapor intrusion assessment. Based on a lines-of-evidence evaluation conducted following MassDEP guidelines and using the data collected, a complete vapor intrusion pathway was not identified in any of the homes where testing was conducted.

Results of additional assessment activities outlined in the January 25, 2021, work plan were included in the August 4, 2021, Phase V Remedy Operation Status Inspection and Monitoring Report (APTIM, 2021d). As outlined in the work plan and MassDEP approval letter, this report included an evaluation of potential human health, ecologic, and pet risk posed by VOCs detected in the streams at the Site. This report concluded that:

- The data from vapor intrusion investigations at commercial properties on Tozer Road indicated there is No Significant Risk due to potential indoor air exposure related to contributions from the Varian Site. At that time, three properties were recommended for additional sampling to exclude background sources unrelated to the Site and further assess the vapor intrusion pathway.
- Potential human health exposure for Stream A and the Unnamed Stream posed No Significant Risk to human health.
- Potential risk to the environment did not need to be further evaluated.

- The screening for potential risk to pets (dogs) that may drink surface water demonstrated that the maximum detected concentrations in surface water are well below the screening levels identified for the protection of pets.

In a letter dated February 18, 2022, MassDEP suspended the ROS for the Site [https://eeaonline.eea.state.ma.us/EEA/fileviewer/Default.aspx?formdataid=0&documentid=662281]. The letter also requested the completion of an amended Phase II CSA and an amended Phase III Comprehensive Remedial Action Alternative Report for the Site. The MassDEP letter outlined the following inadequacies with the 2000 Phase II CSA (MassDEP, 2022).

- MassDEP indicated that the 2000 Phase II CSA had not adequately assessed the extent of VOC impacts in the residential areas west of 150 Sohier Road. In response to this concern, which was originally expressed by MassDEP in a report dated January 2021, Varian completed the installation of six shallow groundwater wells in the spring of 2021 in the neighborhoods downgradient of 150 Sohier Road under a MassDEP-approved work scope. As outlined in the January 2022 ROS Report, four rounds of groundwater sampling at these new wells did not indicate the presence of VOCs. This confirmed the 2000 Phase II CSA conclusions that shallow VOC impacts in groundwater did not present a risk in the residential areas west and south of 150 Sohier Road.

- MassDEP indicated that the 2000 Phase II CSA did not adequately assess the seepage of VOC-impacted groundwater at the Site that was first identified in 2021. The 2000 Phase II CSA did not identify an apparent VOC-impacted seep present at the bank of Stream A (west of Longview Terrace). However, evaluation of potential human health risk using stream sample results downstream from the seep was evaluated in the 2000 Phase II CSA. That evaluation showed No Significant Risk. In 2021, additional surface water sampling was conducted. The risk assessment included in the June 2021 ROS Report illustrated again that VOCs detected in the streams at the Site do not pose a Significant Risk to human health or the environment.

- MassDEP indicated that the 2000 Phase II CSA did not adequately assess the extent of sediment impacts to streams in the area of the Site. This concern was originally expressed in a MassDEP report dated January 2021. In response to this concern, Varian implemented additional sediment sampling activities under a MassDEP-approved work scope in the spring of 2021. The risk assessment included in the June 2021 ROS Report illustrated that VOCs detected in the streams at the Site do not pose a Significant Risk to human health or the environment.

- MassDEP indicated that the 2000 Phase II CSA did not adequately assess the extent of dense nonaqueous phase liquid (DNAPL) at the Site. The 2000 Phase II CSA did conclude that DNAPL, as defined by the regulations at the time[1], was not present. This concern was expressed by MassDEP in an Audit of the 2000 Phase II CSA conducted in April 2003. In response to that Audit, Varian issued a work scope to install and sample groundwater wells at specified potential source locations

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[1] In 2000, the Massachusetts Contingency Plan defined nonaqueous phase liquid as a measurable thickness observed in a monitoring well.

> to assess the potential presence of DNAPL. That work scope was approved with minor modifications in a MassDEP letter dated October 20, 2003.
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> The results of those assessment activities were provided to MassDEP in a Post-Audit Completion Report dated April 14, 2004. The results of that assessment did indicate elevated concentrations of VOCs in groundwater in the Building 3 and Building 5 Source Areas. However, DNAPL was not observed in wells with elevated VOC concentrations. Based upon the assessment results, it was concluded that a revised Phase II and Phase III document was not required. MassDEP did not respond to the Post-Audit Completion Report.
>
> The definition of nonaqueous phase liquid has changed since 2000, and the current MCP no longer defines it as a measurable thickness in a well. As outlined in a report titled Building 3 and 5 Source Area Assessment Summary, dated June 30, 2021, groundwater concentrations were evaluated to assess the potential presence of DNAPL. That evaluation did identify wells in the Building 3 area where DNAPL is likely present in the vicinity of the wells. In addition, the June 2021 report and subsequent sampling of groundwater at the Building 5 area did indicate that there is likely DNAPL in bedrock near one well. Groundwater concentrations and persistent groundwater plumes suggest that DNAPL is or was present and has migrated into the deep overburden and potentially into fractured bedrock. Given the age of the release and absence of DNAPL detection in monitoring wells since 1997, DNAPL in the overburden is likely present residually (e.g., in discontinuous droplets), but is not mobile, while any DNAPL that is present in bedrock is likely present in fractures, many of which are small and poorly connected to other fractures, thereby limiting DNAPL mobility.

To further assess the potential extent of VOC impacts, additional bedrock wells were installed in the Building 5 area in March and April 2022. The results of sampling and monitoring at these new wells and other site wells provide definition of the potential extent of VOC impacts to soil and the extent of VOCs detected in bedrock groundwater that suggest DNAPL presence nearby.

To further assess the potential extent of elevated VOCs beneath and adjacent to the Building 3 complex, an electrical resistivity imaging (ERI) study and confirmation drilling were conducted in the summer of 2022. The results of that assessment work provide a clearer picture of the extent of elevated VOCs in the Building 3 Source Area. The data have been used to estimate the area of elevated VOC impacts that may warrant additional treatment.

Available data previously collected and presented in this Phase II addendum define the nature and extent of VOC impacts from the Former Varian facility at 150 Sohier Road. Existing and potential pathways identified during assessment include groundwater (flow through overburden and bedrock aquifers), surface water (nearby streams), utilities, sediment, soil vapor, and indoor air.

The nature and extent of VOCs in soil at the Site was determined based on the results of field (photoionization detector) screening recorded during drilling activities and laboratory analysis of soil samples collected at the Site. Soil impacts are noted in the three main source areas at 150 Sohier Road. These include the Building 3 Source Area (encompassing Buildings 1, 2, 3, and 6), the Building 5 Area, and the PSL-10 Source Area. VOC soil impacts have not been observed in downgradient areas.

The current nature and extent of the COCs in groundwater in both the overburden and bedrock aquifers were evaluated using data collected from monitoring wells over 2 years of sampling, May 2020 through May 2022. The highest VOC concentrations are detected in groundwater on the Former Varian Facility property. Groundwater sampling results from 2022 indicate the following:

- Concentrations of TCE range from non-detect to 260 milligrams per liter (mg/L), with the greatest concentration located beneath Building 3 (well AP31-DO).
- Concentrations of PCE range from non-detect to 43 mg/L, with the greatest concentration located beneath Building 5 (well OB35-DO).
- Concentrations of *cis*-1,2-DCE range from non-detect to 500 mg/L, with the greatest concentration located just east of Building 3 (well AP33-DO).
- Concentrations of 1,1,1-TCA range from non-detect to 41 mg/L, with the greatest concentration located just east of Building 3 (well AP24-DO).

Groundwater occurs at the Site in two distinct aquifers: the overburden aquifer and the bedrock aquifer. Groundwater in the overburden at the Site generally occurs in and flows under water table conditions through the porous space between the soil grains. The overburden aquifer is recharged directly by infiltration of rainwater and surface runoff through unpaved areas. In the bedrock aquifer, groundwater flows through interconnected fractures and faults within the rock itself. The two aquifers are locally in communication. The majority of Site groundwater in each aquifer generally flows from the facility property to the west/southwest, following the regional groundwater flow pattern, which is south and west toward Shoe Pond and the Bass River. The transmissivity of the bedrock aquifer is substantially lower than the overburden aquifer, meaning that lesser amount of groundwater (and dissolved VOCs, if present) flows through bedrock relative to the overburden.

Where VOCs are present at sufficient concentrations in the shallow groundwater, there is potential for volatilization of VOCs into soil vapor above the groundwater. If this occurs in close proximity to a building, there is a potential that VOCs can pass through cracks and gaps in the foundation or via diffusion through the building slab. Extensive sampling has been conducted to evaluate this potential at the 150 Sohier Road property, at commercial properties on Tozer Road, and in downgradient residential areas. As a result of that sampling, mitigation measures (SVE systems) are present to intercept and remove VOCs in soil vapor at Building 3 and Building 5. Sampling has shown that the two SVE systems have resulted in a condition of No Significant Risk. Additional sampling is planned at one property on Tozer Road and one property on Longview Drive. If warranted, mitigation measures may be implemented at those properties. At other locations where tests have been conducted, the results do not indicate that indoor air is a significant pathway of concern at the Site.

Based on the levels of VOCs present in the Building 3 Source Area and the Building 5 Source Area, additional remediation is warranted to limit the potential downgradient migration of VOCs in groundwater. These two areas will be a focus of additional remediation at the Site. While the levels of VOCs present in the PSL-10 Source Area are much lower than those in the Building 3 and Building 5 Source Areas, remediation may be conducted at PSL-10 to limit potential downgradient migration of VOCs in groundwater.

Remediation activities conducted over the past 20 years are summarized in this report. As documented in trend graphs provided in prior ROS reports, those activities have reduced VOC concentrations in some source areas as well as downgradient areas. This has resulted in a much-reduced VOC plume area in the shallow overburden and bedrock aquifers. Less of a reduction is noted in the deep overburden. Residual VOCs in groundwater in the Building 3 area, and to lesser extent at the Building 5 area, remain. Significant effort has been made to assess areas beneath both the Building 3 complex and Building 5. However, given the limitations in accessing these areas due to the buildings, there remain some uncertainties in the delineation of VOC impacts beneath the buildings. These data limitations and the accessibility of areas beneath the buildings may continue to affect the results of remedial efforts.

As required by the MCP and Site conditions, a Method 3 Risk Assessment was conducted. That assessment evaluated the potential health effect of possible exposure to VOCs associated with the Former Varian Facility Site. Receptors, or people potentially exposed included workers at the 150 Sohier Road facility, workers at properties on Tozer Road, and residents in areas to the west and south of Tozer Road. The result of that assessment indicated there is no current or future Significant Risk to residents, including children playing in the stream. No Significant Risk to workers in off-property commercial/industrial buildings along Tozer Road was identified. No Significant Risk was identified to workers in the 150 Sohier Road buildings with the operation of the existing SVE systems. However, a condition of No Significant Risk of harm has not been demonstrated for future construction workers who could potentially be exposed to groundwater in certain areas at the 150 Sohier Road property. The risk assessment demonstrated that a current condition of No Significant Risk of harm to safety, public welfare and the environment exists at the Site.

1.0 INTRODUCTION

On behalf of Varian Medical Systems, Inc. (Varian), Aptim Environmental and Infrastructure, LLC (APTIM) has prepared this Massachusetts Contingency Plan (MCP; Section 310 CMR 40.0835) Phase II Comprehensive Site Assessment Addendum (Phase II Addendum) for the former Varian facility located at 150 Sohier Road in Beverly, Massachusetts. A Site Location Map illustrating the location of the former Varian facility is attached as **Figure 1-1**, and an Expanded Site Plan is attached as **Figure 1-2**. The Massachusetts Department of Environmental Protection (MassDEP) has assigned Release Tracking Number (RTN) 3-0485 to the Site. As required by the MCP, this document has been submitted electronically to the MassDEP along with a completed Bureau of Waste Site Cleanup (BWSC) Comprehensive Response Action Transmittal Form (BWSC-108) through eDEP. A copy of the BWSC-108 form is provided as **Appendix A**.

1.1 Statement of Purpose

As stated in the MCP, the objective of a Phase II Comprehensive Site Assessment (CSA) is to present the findings and conclusions regarding site conditions, including source, nature, and extent of releases of oil or hazardous materials (OHM), the risk of harm posed by the disposal site, and to support nature of future remedial response actions. This Phase II Addendum has been prepared at the request of MassDEP in a letter dated February 18, 2022. Specifically, MassDEP requested an update to the original Phase II CSA, which was submitted to MassDEP in 2000 (IT Corporation, Inc. [IT], 2000a). The 2000 Phase II CSA was based on assessment investigations conducted between 1995 and 1998. This Phase II Addendum presents a summary of site investigation activities conducted since the 2000 Phase II CSA, with a focus on investigations conducted in 2021 and 2022. This Phase II addendum comprehensively assesses *current site conditions,* including nature and extent of volatile organic compounds (VOCs), which were determined to be the primary OHM released at the Site, and provides an updated evaluation of risk based on these current site conditions. Only portions of the original 2000 Phase II CSA are presented where necessary to provide a cohesive site description and history regarding OHM source and extent. The overall purpose of the Phase II Addendum is to support the decisions for future remedial actions to be conducted at the site.

1.2 Report Organization

The report includes the information set out in the MCP requirements for a Phase II report, as presented in 310 CMR 40.0835(4). The sections of this report are as follows:

- Section 1.0 - Introduction
- Section 2.0 - General Site Information
- Section 3.0 - Previous Environmental Investigations and Remedial Activities
- Section 4.0 - Site Hydrogeological Characteristics
- Section 5.0 - Environmental Fate and Transport of Oil and/or Hazardous Materials
- Section 6.0 - Nature and Extent of Contamination
- Section 7.0 - Exposure Assessment and Risk Characterization

- Section 8.0 - Conclusions and Findings
- Section 9.0 - References
- Section 10.0 - Limitations on Work Product

2.0 GENERAL SITE INFORMATION

The following sections present the site location, description, history of use, and regulatory history. This information has been essentially unchanged since the 2000 Phase II CSA.

2.1 Disposal Site Name, Location, and Locus Map [310 CMR 40.0835(4)(a)]

Varian's former facility was located at 150 Sohier Road in Beverly, Essex County, Massachusetts. The property at 150 Sohier Road has the Universal Transverse Mercator coordinates of North 4,715,075 meters and East 345,475 meters, Longitude 70° 52' 57" West: Latitude 42° 34' 28" North. **Figure 1-1**, the Former Varian Facility Location Map, identifies the location of 150 Sohier Road and the surrounding area.

2.2 Detailed Disposal Site Map [310 CMR 40.0835(4)(b)]

An Expanded Site Plan is included as **Figure 1-2** and illustrates the former Varian facility and surrounding area of investigation. Within this report, the "Site" is used in accordance with the MCP, being any place or area where OHM from Varian's former facility have come to be located. The "facility" refers to Varian's former facility property. **Figure 1-2** identifies properties located within the vicinity of the facility; structures; streams and surface water bodies; and the location of monitoring wells and sampling locations.

2.2.1 Facility and Site Vicinity Description

The facility is located on approximately 24 acres of land and contains four large complexes of buildings covering approximately 250,000 square feet. The site's southern portion includes a playing field and a paved parking area. The central portion of the Site includes a building complex (Buildings 5, 5A, and 8). North of this building network is a paved parking area and to the northwest is another building complex (Buildings 1, 2, 3, 4, and 6). Northeast of Buildings 1, 2, 3, 4, and 6 is a wastewater treatment plant in Building 9. West of Buildings 1, 2, 3, 4 and 6 is former Building 7, which is now operated as Kelly Classics and Restoration. Bomac Road (formerly known as Salem Water Works Road) traverses the Site from the southeast to the northwest between former Building 7 and the building complexes located in the central and northeast portions of the Site.

During Varian's operation of the facility, the building at 28 Tozer Road was leased to ST Olecktron, which manufactured radar-based solid-state equivalents. When Communication and Power Industries, LLC (CPI) obtained ownership of the former Varian property, the lease with ST Olecktron continued. Subsequently, ST Olecktron was acquired by Signal Technology. CPI sold the 28 Tozer Road building and property to Signal Technology in 1997.

Presently, CPI maintains the use of Buildings 1 through 6, 8, 9, and 10 and one of the residential structures. The two residential structures on Bomac road are owned by CPI. Neither of the structures has been used for residential purposes in decades. Except for the sale of the property at 28 Tozer Road and former Building 7, the property boundaries at 150 Sohier Road and adjacent parcels of land have not changed since Varian sold the property in 1995.

Sohier Road and undeveloped land abut the Site to the northeast. Across Sohier Road, to the east is a retail shopping plaza and to the southeast is an apartment complex (Northridge Homes). To the south of the facility is Life Storage, a rental storage facility. Southwest of the facility is a medical building (30 Tozer Road) and a biomedical manufacturing facility (32 Tozer Road). Hopeful Journeys Education Center is located to the west of the facility at 28 Tozer Road. Tozer Road is located west of the Facility. Across Tozer Road to the southwest is Danvers Packing and Tobin & Sons Moving and Storage (both at 39 Tozer Road), and west of Tozer Road are the businesses Bass River Tennis Club (31 Tozer Road) and Arro Engineering Corporation (27 Tozer Road). Route 128 traverses the northwest-north property line. Northwest of the facility and across Route 128 is the United States Postal Service facility located at 16 Tozer Road. North of the Site, also across Route 128, is the residential street Mark Road.

2.2.2 Facility Topography and Land Cover

The Site topography gently slopes from the southern portion of 150 Sohier Road at approximately 88 feet above Mean Sea Level (MSL) in elevation to the northern portion of the facility property near Route 128 at approximately 69 feet in elevation. To the east across the Brimbal Avenue exit, the topography is approximately 69 feet and then slopes gently up towards Brimbal Avenue. At the southwest, west, and northwest property lines, a steep embankment of approximately 30 feet slopes from Bomac Road to the abutting properties along Tozer Road.

The facility at 150 Sohier Road is predominantly covered with buildings and paved parking lots. An open grassy field is located on the southeast portion, and small strips of grass and landscaped areas surround some portions of the buildings and parking areas. Small trees and shrubs are located along the property line abutting Sohier Road and the embankment along the southwest, west, and northwest property lines.

2.2.3 Facility and Site Surface Drainage

Surface runoff and roof-top drainage are collected in the facility stormwater drainage system, which directs flow to the main drainage culvert running from east to west across the 150 Sohier Road property.

A 1970 report on the City of Beverly's storm drainage prepared by Camp Dresser & McKee (CDM) states that the facility is located within the North Beverly Brook drainage area. This drainage area, the smallest of five drainage areas located within Beverly, encompasses portions of North Beverly north of Route 128, which drain to the south through culverts beneath Route 128 (CDM, 1970). The main drainage channel enters the 150 Sohier Road property at the northeast comer and directs stormwater runoff from Route 128 and areas north of Route 128 to the south. This open channel/stream is referred to as the Unnamed Stream. This stream enters a buried culvert that runs south and connects to the main east-to-west drainage culvert.

At the northeast corner of the facility property, storm sewers from the abutting roads and from an area across Sohier Road to the east also drain into the Unnamed Stream. Drainage from the east, across Sohier Road, comprises the predominant flow during the summer months when there is little or no flow.

The Unnamed Stream flows from the Site in a southwesterly direction between buildings located on 28 and 30 Tozer Road. From this point, it flows along Tozer Road in a channel with overgrown vegetation along its banks. The stream passes through a culvert below Tozer Road and past a small wetland area. At this point, it joins with another stream flowing in from the northwest. The stream then flows along the back property lines of residential homes located on Tudor Road and Jordan Street and next to the Beverly High School athletic fields (approximately 2,000 feet or 600 meters from the Site). There is a small fence between the high school's stream and athletic fields. After flowing past the high school, the stream flows in drainage pipes under a park and industrial facility before emerging between Shoe Pond and the Bass River (more than a mile from the Site).

2.3 Disposal Site History [310 CMR 40.0835(4)(c)]

Bomac Laboratories, Inc. (Bomac) initially developed the facility property in 1950. Bomac sold the operations to Varian in 1959. Varian continued operations at the facility until the sale of the business in 1995 to the current owner and operator, CPI.

Since the facility's construction and during Varian's occupancy from 1959 to 1995, operations at the facility have consisted of manufacturing electronic equipment and research related to the manufacturing of this equipment. During Varian's ownership, electron tubes were manufactured for radar applications under Standard Industrial Codes 3671 and 3673. The electron tubes were shipped off- site and primarily used by the United States Department of Defense. Manufacturing processes at the facility included electroplating, acid and alkali cleaning, painting, etching, and equipment maintenance.

During Varian's operations, various industrial processes were performed in the production areas of the facility buildings. These areas were locations where contaminants of concern (COCs) were present. Drywells and leaching fields associated with the production areas were reportedly used for waste disposal prior to the installation of the wastewater treatment system in 1972. A 1949 foundation plan (Clean Harbors Environmental Services, Inc. [CHES], 1993) of Building 1 indicated there were two dry wells near the northeast corner of Building 1 and two dry wells near the southeast corner of Building 1. A 1949 plot plan (CHES, 1993) for Building 1 depicts two septic systems: one near the northeast corner and one near the western side of the building. Both septic systems appeared to be connected to bathrooms of this building (CHES, 1993). Building 1 was built in 1950 and the 1949 foundation plan implies that discharges from the production areas in this building were directed to the dry wells/septic systems.

A 1962 blue line drawing showing the layout of Building 5, built in 1957, includes a production area and boiler room. OHM such as solvents, acids or bases were used in the production area. A February 1964 blue line drawing depicts Buildings 1, 2, 3, 4, and 6. Building 2 was built in 1951, Building 3 in 1953, Building 4 in 1955, and Building 6 in 1959. The plan illustrates that a chemical laboratory, machine shop, and chemical cleaning and plating shop were present in this building cluster (CHES, 1993).

The process areas illustrated on the Master Plan dated October 1972 indicated that a machine shop was located in Building 7 and a shipping and receiving area was located at the northeast side of Building 6. This plan also illustrates that a plating operation was located in Building 5. This operation was discontinued in June 1973 when plating operations were consolidated into Building 3 (CHES, 1993).

Operation of the wastewater treatment system at the facility, located in Building 9, was begun by Varian in 1972 to treat industrial wastes prior to discharge to the municipal sewer. The treatment facility consisted of one cyanide destruction tank, one acid neutralization tank, one large settling tank for the collection of metal hydroxide sludge, and one holding tank for storing metal hydroxide sludge prior to the sludge being drummed for off-site transportation and disposal. With the addition of a filter press and a few minor modifications, Varian operated this system until the sale of the operation to CPI. The system effluent was discharged under permit to the Southeast Essex Sewerage District (CHES, 1993).

2.4 MCP Regulatory Status

This regulatory status history of the Site (RTN 3-0485) since the submittal of the 2000 Phase II CSA is summarized below. Other RTNs related to the property that have been closed out under the MCP were described in the 2000 Phase II CSA.

2.4.1 Site Regulatory Status 2000 through Today

As described in the 2000 Phase II CSA, a total of 19 Potential Source Locations (PSLs) were identified at the Site, as summarized below. The general area of these locations is illustrated on **Figure 2-1**. As detailed and documented by data in the 2000 Phase II CSA, several PSLs were determined to be low priority and not found to be areas of primary volatile organic compounds (VOC) releases (see Section 3.1). Other PSLs have been further investigated and/or are currently being remediated. The current status of each of the PSLs is summarized below and described in more detail in Section 3.0.

Original Potential Source Locations	Site Location	PSL Status in 2022
PSL-1 Former 500-gallon Aboveground Storage Tank (AST)	North of Building 4	Not a Source Area (low priority)
PSL-2 Potential Former Dry Well	Southeast Corner of Building 9	Not a Source Area (low priority)
PSL-3 Potential Former Dry Well	Southwest Corner of Building 1	Not a Source Area (low priority)
PSL-4 Former Septic System	Building 1	Not a Source Area (low priority)
PSL-5 Former Septic Tank/Leach Field	Northeast corner of Building 1	Likely Source Area - ongoing investigation and remediation as part of the Building 3 Area
PS-6 Former Septic Tank/ Leach Field	Southeast of Building 1 (presently beneath Building 6)	Likely Source Area - ongoing investigation and remediation as part of the Building 3 Area
PSL-7 Chem Laboratory	Building 5, includes former piping beneath the building	Confirmed Source Area - ongoing investigation and

Original Potential Source Locations	Site Location	PSL Status in 2022
		remediation as part of the Building 5 Source Area
PSL-8 Building 7 Sumps	West Side of Building 7	Not a Source Area (low priority)
PSL-9 Utility Inspection Pit	Exterior Wall of Chem Lab in Building 3	While the pit itself was not a Source Area, lines in the structure are part of PSL-11
PSL-10 Open Field	South of Building 5	Confirmed Source Area - ongoing investigation and remediation
PSL-11 Laboratory	Northern Portion of Building 3, includes former piping beneath the building and former discharge line to unnamed stream	Confirmed Source Area - ongoing investigation and remediation as part of the Building 3 Source Area
PSL-12 Potential Former Lime Pit	Northeast corner of Building 1	Not a Source Area (low priority)
PSL-13 Former Beverly Landfill	East of Sohier Road and extending onto facility near Building 5	Not a VOC Source Area (low priority)
PSL-14 Concrete-lined Trenches	Facility buildings	Not a Source Area (low priority)
PSL-15 Sumps	Buildings 2 and 3	Not a Source Area (low priority)
PSL-16 Transformers	Five locations on Site	Not a Source Area (low priority)
PSL-17 Floor Drains	Facility buildings	Not a Source Area (low priority)
PSL-18 Machine Shop Oils	West side of Building 7	Not a Source Area (low priority)
PSL-19 Unnamed Stream	Northeast Corner of Facility	Not a Source Area but ongoing investigation and risk evaluation being conducted

It should be noted that additional assessment (i.e., well installation) has been conducted in the area of several PSLs that were determined in the 2000 Phase II CSA to be low priority and not found to be areas of primary VOC releases. For example, wells were installed in the area of PSL-3, -4, and -8. These subsequent assessment activities did not change the conclusions of the 2000 Phase II CSA for these PSLs.

Based on the 2000 Phase II CSA, a condition of No Significant Risk existed at the Site with the exception of potential future significant risk associated with groundwater use in the area identified as a Potentially Productive Aquifer (PPA) north of Route 128. Groundwater concentrations in this PPA area were above applicable Massachusetts Drinking Water Standards. As a result, one of the stated remedial action goals in the December 2001 Phase IV Remedial Implementation Plan (Phase IV Plan) submitted to MassDEP was to achieve Drinking Water Standards in this area of the Site (IT, 2001).

The 2001 Phase IV Plan proposed remedial actions for addressing VOCs in soil and groundwater at the subject Site. In situ oxidation of VOCs in soil and groundwater using permanganate solution was chosen as the best remedial alternative for the Site. The Phase IV Plan proposed treatment in the “source areas” to achieve these objectives. The PSL areas at the former Varian facility identified in the Phase IV Plan as potentially affecting the PPA area are as follows:

- PSL-5 Potential former septic tank near Building 3
- PSL-6 Potential former septic tank/leach field at Building 6
- PSL-9 Utility inspection pit near Building 3
- PSL-11 Chemical laboratory at Building 3

Other PSL areas that do not impact the PPA, and certain other downgradient areas, have been included in the in-situ oxidation program to expedite groundwater cleanup. These areas include PSL-7—Building 5 Chem Lab, PSL-10—open field at south end of 150 Sohier Road, and downgradient treatment areas at 31 Tozer Road and in the Longview/Hill Street area.

Implementation of the Comprehensive Response Actions, including the injection of permanganate solution, began in July 2002, and a Phase IV As-Built Construction and Final Inspection Report (Shaw Environmental & Infrastructure, Inc. [Shaw], 2002a) detailing initial Phase IV activities including permitting, well installation, construction of the remedial treatment system, and initial implementation of remedial actions, was submitted to MassDEP in October 2002. The Phase IV As-Built Construction and Final Inspection Report also provided results of additional soil and groundwater analyses, identified minor modifications to the Phase IV Plan, and documented the final inspection of the remedial system.

In December 2002, Varian submitted an MCP Remedy Operation Status (ROS) Opinion (Shaw, 2002b), which stated that the performance standards for ROS, as specified in 310 CMR 40.0893(2), have been achieved and will be maintained at the Site. The submittal also stated that a Permanent Solution has not yet been achieved at the Site, and the operation and maintenance (O&M) of the remedial action will proceed under ROS.

The sodium permanganate treatment conducted at the Site since 2002 has produced significant reductions in chlorinated VOC concentrations at multiple depths in groundwater across the Site. These remedial activities were reported to MassDEP in regular semiannual ROS reports. As detailed in the October 2006 status report, bioremediation was proposed as a supplemental remedial approach to address two small VOC-impacted areas in the northeast corner of the Site (Shaw, 2006). The first area included shallow groundwater with residual trichloroethene (TCE) impacts located close to the Unnamed Stream to the northeast of Building 9. Bioremediation was used to address the shallow groundwater near the Unnamed Stream in lieu of permanganate because permanganate treatment may affect the stream. The second bioremediation area was northeast of Building 3 where deep overburden groundwater is impacted with residual 1,1,1-trichloroethane (1,1,1-TCA) and acetone, which are not effectively treated by permanganate.

After the start of Comprehensive Response Actions, the PPA designation for the area to the north of Route 128 was removed by MassDEP and, as a result, Drinking Water Standards no longer apply to this area. Therefore, the Remedial Action Goal specified in the Phase IV Plan to achieve drinking water standards in downgradient wells in the PPA area such as BR-1 is no longer applicable. As presented in the October 2010 ROS Report (Shaw, 2010), the following updated remedial action goals were used for ongoing response actions conducted under Phase V ROS at the Site:

- Maintain compliance with Upper Concentration Limits (UCLs)
- Achieve a condition of No Significant Risk for facility workers in facility buildings by remediating, where necessary, elevated VOC concentrations in soil and groundwater beneath buildings
- Limit rebound in VOC source areas such that potential impacts to indoor air in downgradient areas continue to pose No Significant Risk
- Demonstrate that VOC concentrations in groundwater at the Site do not represent an uncontrolled source for impacts to surface water
- Demonstrate that VOC concentrations in soil and groundwater at the Site continue to pose No Significant Risk in accordance with current MassDEP requirements

To achieve these goals, the previously proposed remediation planning criteria continued to be applied to focus remediation activities at the Site. These remediation planning criteria included the decrease of target VOC concentrations in certain source area wells to 50 percent or less of the UCL and the reduction of target VOC concentrations (including breakdown products) in treatment areas by at least 50 percent below pretreatment levels to mitigate potential post-remediation rebound effects. These criteria are no longer being used for future remediation planning.

In December 2012, a modification of the Phase III Remedial Action Plan (RAP) and Phase IV Plan for RTN 3-0485 was submitted (Shaw, 2012a). This modification addressed the Building 5 remedial area, located in the central portion of the former Varian facility (**Figure 1-2**). The Building 5 treatment area was not previously included in the original Phase III RAP and Phase IV Plan submitted to MassDEP in 2001. The Phase III RAP was modified to identify, evaluate, and select remedial action alternatives to reduce the potential risk associated with indoor air exposure in the Building 5 area. Soil vapor extraction (SVE) was selected as the preferred remedial alternative. The goal of the selected remedial action alternative in the Modified Phase III RAP was to control exposures and reduce VOC concentrations remaining in shallow soil that have the potential to migrate into the indoor air of Building 5. The Modified Phase IV Plan provided detailed engineering designs, waste management plans, and initial O&M activities for the selected SVE remedial alternative (Shaw, 2012a). Details regarding the Building 5 SVE installation, including a Final Licensed Site Professional (LSP) Inspection and Phase IV Completion Statement, were included in the October 2013 ROS Report (Shaw, 2013a).

As discussed above, remediation in the Building 3 area, located in the northeast corner of the former Varian facility (**Figure 1-2**), was conducted under ROS (to address groundwater impacts) and as an Immediate Response Action (IRA) under RTN 3-28531 (to address potential vapor intrusion). IRA activities included installation of an SVE system in December 2009. Phase II CSA and Phase III RAP Reports were submitted for RTN 3-28531 in May 2012 (Shaw, 2012b, 2012c). The Phase II and Method 3

Risk Assessment (Shaw, 2012b) concluded that a Condition of No Significant Risk had been achieved with the operation of the existing Building 3 SVE system, which effectively reduced VOC levels in indoor air in the Building 3 area. An IRA Completion Report was submitted for RTN 3-28531 in February 2013 (Shaw, 2013b). The IRA Completion Report concluded that the primary objective of the IRA (to assess and mitigate the potential impacts to indoor air in the Building 3 area and thereby eliminate the potential for an Imminent Hazard) had been met by conducting IRA activities. Response actions for RTN 3-28531 had been effective in decreasing indoor air concentrations to below levels that would constitute an Imminent Hazard. However, continued operation of the SVE system was necessary to maintain a level of No Significant Risk in the Building 3 area. The IRA Completion Report linked RTN 3-28531 to RTN 3-0485 and included a Phase IV Remedy Implementation Plan, Phase IV Completion Report, and Phase V ROS Opinion. The combined report for RTN 3-28531 closed this RTN. It concluded that continued response actions (including the operation of the Building 3 SVE system) would be conducted in conjunction with Comprehensive Response Actions under Phase V ROS for RTN 3-0485. Building 3 remedial activities were therefore included as part of this ROS Report.

As discussed in the June 2020 ROS Report (APTIM, 2020), groundwater results from well AP38-S, located inside Building 5, from the May 2020 sampling round indicated an elevated acetone concentration. Acetone was detected at a concentration of 6.7 milligrams per liter (mg/L) at AP38-S, compared to prior sample results that indicated non-detect levels for acetone. After confirmation sampling of this well in June 2020 indicated the presence of acetone at 200 mg/L, the building owner was notified of a potential release of acetone to the environment. Varian coordinated with the current facility owner to further assess the potential acetone release at Building 5. This included a groundwater sampling event by APTIM in August 2020 and a sampling event by the owner’s consultant, Roux Environmental (ROUX), in September 2020. Based on the results of these assessment activities, the current owner, CPI, submitted a notice to the MassDEP of a 120-Day Reportable Condition for the detection of acetone in groundwater at Building 5. In response to this notice, MassDEP issued RTN 30036528 to CPI. On October 11, 2021, ROUX submitted a Permanent Solution Report for this RTN (ROUX, 2021). The document did not definitively identify the source of the acetone release. The concentrations of acetone in groundwater in the release area were reported to have returned to pre-release levels. It was concluded that no migration of acetone from the release area had occurred based on groundwater sampling results. The concentrations of acetone in groundwater at monitoring well AP38-S were well below MCP Method 1 GW-2 and GW-3 standards during sampling events after September 2020. ROUX, therefore, concluded that, with respect to just the acetone released in the spring of 2020 in Building 5, a condition of No Significant Risk has been achieved.

In November 2020, MassDEP began a comprehensive review of response actions at the Site at the request of Beverly public officials and area residents. In December 2020, MassDEP also completed an indoor air sampling program in residential areas downgradient of the Site (MassDEP, 2020). Based on the indoor air data collected in December 2020, MassDEP determined that there was no evidence that contaminants from the Varian Site are impacting the indoor air of any of the homes that were sampled.

APTIM prepared a work plan dated January 25, 2021 (APTIM, 2021a) to confirm the conclusions of the December 2020 MassDEP assessment. The work plan included the methods and procedures for completing additional vapor intrusion assessment at a group of homes selected by MassDEP, installation of additional wells, and the sampling of groundwater, surface water and stream sediments. The work plan was approved with conditions by MassDEP in a letter dated February 2, 2021, (MassDEP, 2021). A Vapor Intrusion Assessment Report was submitted on April 29, 2021 (APTIM, 2021c), which detailed the results of the assessment. A total of 55 indoor air samples and 33 soil vapor samples were collected at 21 homes in February and March 2021. Additionally, sump water samples were collected at five homes in the study area. Groundwater sample results from 13 shallow groundwater monitoring wells were also considered in the vapor intrusion assessment. Based on a lines-of-evidence evaluation using the data collected, a complete vapor intrusion pathway of concern was not identified in any of the homes where testing was conducted.

Results of additional assessment activities outlined in the January 25, 2021, work plan were included in the August 4, 2021, Phase V Remedy Operation Status Inspection and Monitoring Report (APTIM, 2021d). As outlined in the work plan and MassDEP approval, this report included an evaluation of potential human health, ecologic, and pet risk posed by VOCs detected in the streams at the Site. This report concluded that:

- The data from vapor intrusion investigations at commercial properties at 27, 30, 31, and 39 Tozer Road reflected concentrations of VOCs that were below the MassDEP's commercial/industrial Threshold Values (TVs), with the exception of TCE in one sample. At that one location, a background source of TCE was present. The data demonstrated that there is No Significant Risk from the Varian Site due to potential indoor air exposure. However, due to exceedances of MassDEP's commercial/industrial sub-slab soil gas screening levels for tetrachloroethene (PCE) and/or TCE, three properties (30, 31 and 39 Tozer Road) were recommended for additional sampling to confirm the conclusions. It should be noted that the 30 Tozer Road property has an operating sub-slab depressurization system.
- The risk assessment includes in the August 2021 ROS Report to assess potential human health exposure for Stream A and the Unnamed Stream concluded that a condition of No Significant Risk to human health exists.
- The outcome of a Stage I Environmental Screening for ecological receptors showed that surface water and sediment pose No Significant Risk, and a Stage II Environmental Risk Characterization is not needed to further evaluate this pathway.
- The screening for potential risk to pets (dogs) that may drink surface water demonstrated that the maximum detected concentrations in surface water are well below the screening levels identified for the protection of pets. Therefore, additional evaluation of this exposure pathway was not needed.
- The report did not identify any significant problems affecting the performance of the cleanup during this reporting period. Although the cleanup is not complete, test results contained in the report show progress continued to be made in the treatment of soil and groundwater at the Site. The report also included recommendations for additional assessment activities at the Site.

In a letter dated February 18, 2022, MassDEP suspended the ROS for the Site. The letter also requested completion of an amended Phase II CSA and an amended Phase III Comprehensive Remedial Action

Alternative Report for the Site. In addition, the February 2022 MassDEP letter requested the submittal of a Tier Classification Extension for the Site. A Tier I Extension was submitted to MassDEP on March 24, 2022.

3.0 PREVIOUS ENVIRONMENTAL INVESTIGATIONS AND REMEDIAL ACTIVITIES

Environmental investigation activities and/or remedial activities have been conducted at the Site from 1995 through 2022. The sections below provide a general summary of these activities, including a summary of key conclusions from the investigation activities that were detailed in the 2000 Phase II CSA (Section 3.1) and a summary of subsequent investigation and remedial activities that were reported in various MCP submittals between 2000 and 2021 (Section 3.2).

3.1 Summary of Historical Assessment (1995–1999)

From 1995 to 1999, a comprehensive assessment of the Site was conducted to define the source, nature, and extent of the OHM releases at the property. These activities, which included the investigation of the 19 PSLs, were presented and discussed in detail in the 2000 Phase II report (IT, 2000a). Below is a summary of the key conclusions of these investigation activities as they relate to source, nature, and extent based on the data collected then. It should be noted that these conclusions were based upon MCP definitions and regulations at that time.

1. Nineteen PSLs at 150 Sohier Road were identified as part of the Phase II investigation. Initial evaluation of each PSL was conducted in 1995 to determine the target COCs for the Site. Information about historical industrial processes and subsurface analytical data from PSL investigations indicated that the COCs at the Site are chlorinated VOCs. TCE, PCE, and 1,1,1-TCA were the three primary chlorinated solvents historically used at Varian's former facility. Eight COCs were identified for the Site including the three parent compounds, TCE, PCE, 1,1,1-TCA, and five common degradation ("daughter") compounds, *cis*-1,2-dichloroethene (*cis*-1,2-DCE), *trans*-1,2-dichloroethene (*trans*-1,2-DCE), 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), and vinyl chloride (VC).

2. Each PSL was investigated for VOCs and specific COCs based on former facility operations (e.g., metals, cyanide, total petroleum hydrocarbons [TPH]). The PSLs investigated are no longer used and were areas where former Varian facility activities may have led to the potential release of the OHM investigated as part of the Phase II. A summary of the investigations of the PSLs where a release of OHM is believed to have occurred is presented below:

    - <u>PSL-5, -9, -11, and -12—Former Septic Tank 1985 Release Notification to MassDEP, Former Building 3 Laboratory and Acid/Neutralization Pit</u>
      PSL-5 is a former septic tank and PSL-9 is a release reported in 1985 of an acid rinse water containing cyanide, which was released from a broken wastewater line located in an inspection pit outside of the Chem Lab in Building 3. PSL-11 is associated with potential

discharges of liquid wastes from the former laboratory in Building 3. PSL-12 is associated with a potential former acid neutralization pit located at the northeastern corner of Building 1.

Metals were not detected in any of the samples collected and analyzed in 1995 from PSL-5, -9, -11, and -12 at concentrations above MCP RCS-2 levels for soils. In addition, TPH and total cyanide were not detected above their respective laboratory method detection limits (MDLs). This area did have the highest VOC concentrations detected in soil gas samples collected in 1995, supporting the conclusion that these PSLs are a source area for the VOCs detected in the subsurface at the Site.

- PSL-7—Building 5 Laboratory
  Building 5 formerly contained a machine shop, a chemical cleaning and plating area, and a laboratory. In addition, a facility plan dated 1962 indicated the presence of floor drains and production lines in the laboratory area of the building. Based on the data collected, it appeared that there are two areas with elevated levels of VOCs in soil vapor. One area is beneath the former Building 5 laboratory and the second area is east of this building beneath the parking lot. Soil sampling detected VOCs in soil in the area under Building 5, confirming PSL-7 as a former source area. However, soil sampling did not detect VOCs in the area to the east of Building 5 under the parking lot. Metals, TPH, and total cyanide were not detected above MDLs at PSL-7.

- PSL-10—Open Field
  The Phase II investigation results identified the open field located at southwest portion of the facility property as a source of VOCs in the subsurface. The results of soil vapor and field screening conducted on soil samples collected from PSL-10 indicated that impacts to this portion of the open field may have occurred at one time, possibly due to the historic disposal of waste liquids containing TCE, PCE, and 1,1,1-TCA. Soil data collected in 1995 did not indicate concentrations of metals or TPH that exceeded MDLs or Reportable S-2 levels. Soil data collected in 1999 indicated low levels of residual VOCs oil. Therefore, PSL-10 is considered a source of VOCs detected in the subsurface of the Site.

- PSL-19—The Unnamed Stream
  Information gathered during the Phase II indicated that the Unnamed Stream located at the northeast corner of Varian's former property was the portion of the Unnamed Stream that received process wastewater and cooling water discharges from the Building 3 Laboratory prior to installation of the wastewater treatment plant.

  Analytical results for the samples collected from the northeast corner of the facility property indicated that VOCs including TCE, PCE, *cis*-1,2-DCE, 2-butanone (also known as methyl ethyl ketone), and acetone were present at trace concentrations in the sediment sample collected from the midstream location. Acetone was the only VOC detected in the upstream sediment sample, and VOCs were not detected above laboratory MDLs in the downstream sediment sample, or the sediment sample collected north of Route 128. Total cyanide concentrations were detected only in the midstream sediment sample and the sample collected north of Route 128.

While historical discharges from the former Varian facility to the stream likely impacted sediments, the data suggested that VOC impacts to sediment had been limited due to the volatility of the chemicals. Most of the residual VOCs in sediment would have vaporized over the years as they were exposed to variable weather conditions.

Results of the analysis also indicate that chemicals from Route 128 runoff may have impacted the Unnamed Stream, particularly in the northeast corner of the facility property.

In summary, the results of the investigation of PSL-1 through -19 identified both primary and low-priority source areas. At the completion of the investigation of facility trenches, sumps, floor drains, and transformer areas (PSL-14 through -19) in 1995, these locations were no longer considered PSLs and did not warrant further individual assessment.

Several PSLs (PSL-1 through -4) were characterized as low priority former source areas. PSL-1, -2, -3, and -4 do not appear to have been primary release locations for the Site COCs. The area of PSL-5, which includes PSL-5, PSL-9, PSL-11, and PSL-12, appeared to be a primary source area at Varian's former facility property. PSL-6, -7, and -10 were also identified as a primary source area for Site COCs. At PSL-8, although soil vapor survey results indicated VOCs were present in the soil gas, the field screening and laboratory analysis of soil samples collected did not confirm the presence of VOCs. Investigations at PSL-13 were designed to assess the impact of the adjacent former Beverly landfill. Results indicate that this PSL had not impacted the Site.

3. The elevated levels of VOCs in the shallow overburden groundwater observed at the 31 Tozer Road property are likely the result of impacts associated with the former location of the Unnamed Stream. This stream was historically located along the current location of Tozer Road, adjacent to 31 Tozer Road. It is likely that shallow overburden impacts in this area were the result of historical discharges to the Unnamed Stream that were transported down the hill from the former Varian facility and settled in this area as the stream flowed through a former highly vegetated area (as observed in historical aerial photographs).

4. The results of the field investigations indicated that impacts to soil were predominantly at locations at 150 Sohier Road, Varian's former facility. Beyond Varian's former facility property, VOCs were present in groundwater, soil gas, and surface water samples.

5. Site hydrogeology is characterized by the presence of two aquifers. The overburden aquifer is composed of unconsolidated sediments laid in glacial, post-glacial, and coastal depositional environments. The Site is typically underlain by dense till, sand and gravel, and silt and clay deposits. The bedrock aquifer is characterized by fractured granite and gabbro formations. The

depths to bedrock between the overburden and the bedrock are highly variable throughout the Site.

In the shallow overburden aquifer, groundwater flows at variable rates in a general southerly to southwesterly direction toward the Bass River. The overburden aquifer discharges into the two local streams: the Unnamed Stream that transects the facility and Stream A, located further to the west of Varian's former facility. A component of groundwater flow from Varian's former facility is also to the north-northwest.

In the bedrock aquifer, groundwater flows through interconnected fractures and faults in directions generally similar to those of the overburden aquifer. The two aquifers are locally in communication.

6. The results of soil gas sampling indicate that higher concentrations of VOCs were detected in the areas at the former Varian facility that were determined to be likely source areas PSL-5, -6, -7, -9, -10, -11, and -12). Lower levels of VOCs were detected in the soil gas, surface water, and groundwater at other areas at the former facility property and at locations hydraulically downgradient of the facility. Extensive soil gas sampling has been conducted at the Site, including a 1999 flux chamber soil gas sampling event. This was conducted to evaluate potential off-gassing from soil gas to the atmosphere and potentially into facility buildings. Low concentrations of VOCs, including TCE and PCE, were detected, and the concentrations potentially entering the buildings were calculated. The sampling results were evaluated by a risk assessor who determined the concentrations did not pose a potential risk to facility workers.

7. TCE is the chemical most detected, with elevated concentrations in surface water samples from the Site. While TCE is the most frequently detected VOC in surface water, PCE, *cis*-1,2-DCE, 1,1-DCE, and VC were also detected on occasion depending on location. In surface water samples where TCE and PCE were detected, their concentrations represented more than 70% of the total VOCs detected.

   The Site data established the following observations and conclusions regarding surface water impacts. At locations where VOCs were detected in the streams (STRHA points), the same VOCs were detected in nearby hand-auger shallow wells (HA points) located on the banks of the streams. The detection of VOCs at stream points where VOCs are also detected in the adjacent shallow wells confirmed that groundwater containing VOCs was discharging into portions of the streams.

8. General conclusions regarding the extent of the COCs in groundwater based on the Site data suggested that the areal extent of dissolved VOCs in groundwater generally increased with depth. For individual constituents, the plume is generally the smallest in the shallow overburden aquifer and due to the geology increases in size and in concentrations in the deep overburden aquifer and in the bedrock aquifer.

Based on the extensive groundwater sampling data evaluated, the following general observations were made regarding the extent of VOCs at the Site:

- While the concentrations of TCE and PCE detected in the deep overburden wells in the areas of PSL-5, -9, -11, and -12 may have implied the presence of dense nonaqueous-phase liquid (DNAPL) in the vicinity of those wells, it did not appear that DNAPL, as defined by the MCP at that time was present. The historic presence of DNAPL had been observed, and samples were recovered on two occasions, from recovery well RW-2 in 1992 and from RW-4 in 1997. No further detection of DNAPL had been reported in the 2000 Phase II CSA. This indicated that the DNAPL that was released is now adsorbed in the overburden soil matrix and no longer mobile as a DNAPL within the meaning of the MCP at that time. The residual solvent, however, will slowly dissolve into the groundwater and provide a long-term source for groundwater VOC impact.

- Of the three principal COCs (TCE, PCE and 1,1,1-TCA), TCE and PCE are distributed in the longest and widest plume configurations. The TCE plume extent was approximately 3,600 feet long in a north-south direction and 1,500 feet wide at its widest point at the latitude of the 150 Sohier Road property. From Varian's former property the plume had migrated approximately 1,500 feet to the north to the Walden Street area and approximately 2,100 feet to the south, to the confluence area of the Unnamed stream and Stream A.

- The extent of dissolved degradation products in the groundwater (e.g., *cis*-1,2-DCE) was smaller and not always continuous as compared to the extent of the parent products.

The areal distribution of dissolved VOCs in the groundwater showed zones of impacted groundwater that were outside and away from the main plume body or that appeared like attachments to the main plume body. For example, the TCE and PCE plume maps in the shallow aquifer showed such areas to the west by Longview Terrace and Cabot Street and the northwest by Dodge Street. These particular configurations suggested the contribution of other sources different from the historical source areas identified at the 150 Sohier Road property.

9. During pumping of the existing recovery wells, a capture zone was created in the overburden that contained source area VOCs, including residual solvent.

10. Natural attenuation of the chlorinated solvents is occurring in the groundwater system. Degradation of the PCE and TCE is the source of the *cis*-1,2-DCE and VC detected at the Site. Degradation of 1,1,1-TCA is the source of the 1,1-DCA and 1,1-DCE detected at the Site. Ethene and ethane were observed in a few of the groundwater samples collected for the natural attenuation analysis, which illustrated that further natural degradation is occurring. The conclusions from the natural attenuation assessment completed for the Site suggested that natural attenuation will play a significant role in the long-term fate and transport of VOCs in groundwater and aid the effectiveness of remedial efforts at the Site.

3.2 Site Assessment and Remediation Activities (2000 through 2021)

The following is a general chronology of the main Site activities conducted following submittal of the Phase II CSA in 2000 to summer 2022. Details and results of these assessment and remediation activities have been documented in MCP reports submitted to MassDEP between 2000 and January 2022 and are not included herein. **Table 3-1** provides a summary of monitoring and remediation wells installed since the completion of the 2000 Phase II CSA. Well locations across the Site are illustrated on **Figure 1-2**. Copies of well logs for subsurface investigation activities conducted post 2000 Phase II are included as **Appendix B**.

2000

- Between November 2000 and February 2001, supplemental field activities proposed by Varian to address the City of Beverly's concerns with the Phase II assessment were completed. These activities included stream sediment sampling, monitoring well installation, groundwater sampling, and additional soil vapor sampling in the residential area to assess potential impacts to indoor air.

2001

- On March 29, 2001, Varian issued a report summarizing the results of the additional assessment activities conducted at the request of the City of Beverly. The additional assessment included well installation and sampling, soil vapor sampling in the residential area to assess potential indoor air exposure, and sediment sampling. The assessment report included an update of the Phase II Risk Assessment, which confirmed the Phase II conclusion that impacts from the Site pose No Significant Risk to Human Health and the Environment.
- In May 2001, Varian conducted semiannual groundwater sampling.
- In June and July 2001, indoor air samples were collected at 36 homes in the residential area.
- On August 29, 2001, the Final Phase III RAP was issued and outlined the selection of the Comprehensive Response Action (cleanup plan). Chemical oxidation of VOCs using sodium permanganate was the selected remedial alternative.
- On October 5, 2001, Varian issued a report summarizing the results from the summer 2001 sampling of indoor air at residents. Only three of the 36 homes sampled showed results above MassDEP background levels. Those three homes were not located in an area with shallow groundwater impact attributed to the former Varian Site. Household products that contain target VOCs were identified in each of the three homes and represent the likely source of the detected VOCs. Data presented in the report confirmed the conclusion that impacts from the Site pose No Significant Risk to Human Health.
- In November 2001, Varian conducted semiannual groundwater sampling.
- In December 2001, the final Phase IV Implementation Plan was issued.

2002

- In January and February 2002, indoor air samples were collected at 29 homes in the residential area.
- In May 2002, Varian conducted semiannual groundwater sampling.
- On May 3, 2002, Varian issued a report summarizing the results from the winter 2002 sampling of indoor air at residents. Only one of the 29 homes sampled showed results above MassDEP background levels. That home was not located in an area with shallow groundwater impact

attributed to the former Varian Site. A household product that contains target VOCs was identified in the home and represents the likely source of the detected VOCs. Data presented in the report provided further confirmation that the Site poses No Significant Risk to Human Health.

- In July 2002, Varian started comprehensive response actions at the Site. This included the installation of additional monitoring wells, the installation of oxidant (permanganate) injection wells, and the start of permanganate injections to treat site groundwater.
- In August 2002, Varian issued an MCP Release Abatement Measure Completion Report closing out the O&M of the groundwater pump and treat system and stating that future activities at the Site will be documented in semiannual status reports under Phase V.
- In October 2002, the Phase IV As-built and Final Inspection Report was issued by Varian. The report documented the techniques and materials used during construction activities, tests and measurements used, presented any significant modifications to the design or implementation of the remedial action, and provided as-built drawings. This report also documented the final inspection of the remedial actions by the Licensed Site Professional (LSP) of Record and included a Phase IV Completion Statement.
- In November 2002, Varian conducted semiannual groundwater sampling.
- During 2002, approximately 77,000 gallons of sodium permanganate solution were injected at 30 locations. This included locations in source areas and downgradient of 150 Sohier Road.
- In December 2002, Varian submitted an ROS Opinion, which stated that the performance standards for ROS have been achieved and will be maintained at the Site and operation and maintenance of the Comprehensive remedial action proceeded under Remedy Operation Status.

2003

- In April 2003, Varian issued a semiannual ROS report and continued to submit ROS status reports every 6-months through January 2022.
- In May 2003, Varian conducted semiannual groundwater sampling.
- On August 29, 2003, Varian issued a Scope of Work in response to MassDEP recommendations as a result of an Audit of the Phase II CSA.
- On October 20, 2003, MassDEP issued a letter approving the August 29, 2003, Audit Work Scope with modifications.
- In November 2003, Varian conducted semiannual groundwater sampling.
- Between December 2003 and February 2004, the Audit Work Scope was implemented. This included additional well installations and sampling of groundwater.
- In 2003, approximately 42,000 gallons of sodium permanganate solution were injected at 31 locations. This included locations in source areas and downgradient of 150 Sohier Road.

2004

- On April 14, 2004, a report documenting the results of the Audit Work Scope was issued. The assessment activities included installation and sampling of eight (8) new wells in potential source areas and monitoring for DNAPL at these and existing wells in source areas. DNAPL, as defined by the MCP at that time, was not detected. These observations were consistent with the conclusion in the 2000 Phase II CSA report that DNAPL is not present at the Site. Based on the results of the activities conducted, the report concluded that the submittal of a revised Phase II, Phase III, or Phase IV completion statements was not required for the Site.
- In May and November 2004, Varian conducted semiannual groundwater sampling.

- In 2004, approximately 43,000 gallons of sodium permanganate solution were injected at 33 locations. This included locations in source areas and downgradient of 150 Sohier Road.

2005

- In May and November 2005, Varian conducted semiannual groundwater sampling.
- In 2005, approximately 15,000 gallons of sodium permanganate solution were injected at 14 locations. This included locations in source areas and downgradient of 150 Sohier Road.

2006

- In May 2006, Varian conducted semiannual groundwater sampling.
- In the October 2006 ROS Report, bioremediation was proposed as a supplemental remedial approach to address two VOC-impacted areas in the northeast corner of the Site. Bioremediation was proposed to address the shallow groundwater near the Unnamed Stream in place of permanganate because of potential impacts to the quality of the stream water from permanganate treatment. The second bioremediation area was northeast of Building 3 where deep overburden groundwater is impacted with residual 1,1,1-TCA, which is not effectively treated with permanganate.
- Starting in October 2006 to the present, quarterly sampling of groundwater at select wells in bioremediation areas has been completed to meet the requirements of the MCP.
- From October 2006 to early January 2007, approximately 4,700 gallons of bioremediation solution were applied to six shallow overburden locations near the stream and two deep overburden locations adjacent to Building 3.
- In October 2006, Varian sampled soil vapor at 27, 30, 31, 32, and 39 Tozer Road properties to further assess potential impacts to indoor air. A mathematical model was used to estimate the potential impacts to indoor air at each property based on detected concentrations in soil vapor. The model results demonstrated that the levels of VOCs found in the environment pose No Significant Risk to occupants at each facility.
- In November 2006, Varian conducted semiannual groundwater sampling.
- In 2006, approximately 2,000 gallons of sodium permanganate solution were injected at six locations at the former Varian property.

2007

- In May 2007, Varian conducted semiannual groundwater sampling.
- From September to November 2007, approximately 2,900 gallons of bioremediation solution were applied to six shallow overburden locations near the stream and four deep overburden locations adjacent to Building 3.
- In November 2007, Varian conducted semiannual groundwater sampling.
- In 2007, approximately 2,100 gallons of sodium permanganate solution were injected at six locations at the former Varian property.

2008

- In May 2008, Varian conducted semiannual groundwater sampling.
- From August to September 2008, approximately 1,400 gallons of bioremediation solution were applied to five shallow overburden locations near the stream and one deep overburden location adjacent to Building 3. Injections included a buffering solution to keep pH at an optimal range for bioremediation.

- In November 2008, Varian conducted semiannual groundwater sampling.
- In 2008, approximately 1,100 gallons of sodium permanganate solution were injected at five locations at the former Varian property.

2009

- In May 2009, Varian conducted semiannual groundwater sampling.
- In May 2009, a soil vapor survey was completed to assess the needs of additional groundwater remediation in the Building 3 area. A total of 20 soil vapor sampling locations were installed, including two locations installed through the exposed foundation wall and below the Building 3 floor. Soil vapor samples collected from beneath Building 3 illustrated elevated concentrations of VOCs. Starting with the VOC concentrations in soil vapor, modeling was used to estimate potential indoor air concentrations. These estimated indoor air concentrations were compared to Imminent Hazard risk limits provided in the MCP. The conclusions of this evaluation were that an Imminent Hazard could potentially exist in Building 3 and indoor air samples should be collected to evaluate this potential exposure with measured indoor air data. Results of this evaluation were promptly reported to the MassDEP on May 28, 2009.
- On June 1, 2009, Varian undertook indoor air sampling at the facility to assess VOC levels in indoor air. A total of six samples of breathing zone air were collected within Buildings 2 and 3. Analytical results of air samples collected from within Building 3 indicated the presence of elevated levels of VOCs. However, sampling and analysis of indoor air concentrations showed that measured concentrations were much lower than the concentrations estimated by modeling. The risk characterization using the measured indoor air concentrations showed that an Imminent Hazard was not present, although the calculations indicated that the measured air levels present risks close to the Imminent Hazard threshold.
- From July through December 2009, because the levels of VOCs in indoor air were close to the Imminent Hazard threshold, Varian undertook the following Immediate Response Actions with MassDEP approval:

    - Adjusted the existing heating, ventilation, and air-conditioning (HVAC) unit to provide a continual flow (200 to 400 cubic feet per minute (cfm)) of fresh air intake to the building.
    - Sealed potential vapor migration pathways in Building 3. Concrete and expandable foam insulation was used to seal accessible cracks in floor trenches and pipe penetrations, and unused concrete utility trenches in Building 3 were filled with concrete.
    - Installed and activated two air exchange ventilation units on July 15, 2009, to provide additional fresh air to the Building 3 area, including one unit in the Machine Shop and the other in the Stock Room. Each unit provides about 200 cfm of additional fresh air ventilation. Sampling following the activation of the supplemental air units indicated lower concentrations of VOC in indoor air.
    - Installed two 60-foot-long, horizontal SVE wells beneath Building 3, with drilling conducted by Directional Technologies, Inc. from July 21 to 24, 2009. See **Figure 3-1**.
    - Conducted an SVE pilot test in August 2009 to support the design of the full-scale SVE system.
    - Installed and activated an SVE system at Building 3 in December 2009. This system continues to operate in Building 3.
    - Sampled indoor air after startup of the SVE system; results indicated No Significant Risk to building occupants.

- From May to June 2009, approximately 920 gallons of bioremediation solution were applied to five shallow overburden locations near the Unnamed Stream.
- In November 2009, Varian conducted semiannual groundwater sampling.
- In 2009, approximately 1,200 gallons of sodium permanganate solution were injected at two locations at the former Varian property.

2010

- In January and February 2010, Varian installed additional deep treatment wells angled beneath the western end of Building 3. See **Figure 3-1**.
- In May 2010, Varian conducted semiannual groundwater sampling.
- In March, June, and December 2010, during three separate events, approximately 1,500 gallons of bioremediation solution were applied to nine shallow overburden locations near the stream and three deep overburden locations adjacent to Building 3.
- In November 2010, Varian conducted semiannual groundwater sampling.
- In 2010, approximately 13,000 gallons of sodium permanganate solution were injected at nine locations at the former Varian property.

2011

- In February 2011, soil vapor samples were collected beneath Buildings 5 and 6 to further assess potential indoor air exposure. Modeling using site-specific attenuation factors was conducted to estimate indoor levels at both buildings. Estimated indoor air levels did not indicate the potential of an Immediate Hazard in either Building 5 or Building 6. In addition, estimated indoor air levels indicated a condition of No Significant Risk to occupants in either Building 5 or Building 6.
- In March 2011, two shallow groundwater monitoring wells were installed, one near the northeast corner of the building located at 30 Tozer Road and the second near the northeast corner of the building at 39 Tozer Road. VOC results from the 30 and 39 Tozer Road wells indicated levels above the GW-2 Standards, indicating additional assessment was needed. See below.
- In February and March 2011, a pre-construction assessment was completed by the 32 Tozer Road property owner. The subsurface investigation included soil sampling, monitoring well installation, and groundwater sampling. Results of these activities were generally consistent with assessment activities completed by Varian.
- In March 2011, indoor air samples were collected by the property owner at 32 Tozer Road. The indoor air data was used to evaluate potential indoor air exposures to current workers in this building. This evaluation indicated that conditions at 32 Tozer Road do not pose an Imminent Hazard or Significant Risk to workers in the building. This conclusion was consistent with previous evaluations of this location using historical soil vapor and groundwater data.
- In May 2011, Varian conducted semiannual groundwater sampling.
- In June 2011, soil vapor samples were collected beneath Building 5 and Building 6 to further assess potential indoor air exposure. Analytical results of sample from beneath Building 5 and Building 6 indicated higher levels compared to February 2011 results. Therefore, indoor air samples were collected inside Buildings 5 and 6 in August 2011. Risk evaluation of indoor air samples collected in August 2011 did not indicate the potential of an Immediate Hazard in either Building 5 or Building 6. Estimated exposure in Building 6 did not exceed this risk limit, confirming no Significant Risk. However, the estimated cancer risk for Building 5 did exceed the MCP risk limit, indicating a potential Significant Risk.

- October 2011, a shallow groundwater monitoring well was installed adjacent to the building located at 27 Tozer Road. VOC results from this well indicated levels below the GW-2 Standards, indicating additional assessment of potential indoor air exposure was not needed.
- In late 2011, the property owner conducted additional assessment activities at 32 Tozer Road. These included soil sampling during the advancement of soil borings and test pits, installation of new monitoring wells, groundwater sampling of onsite monitoring wells and test pits, and concrete sampling. Results of these activities were generally consistent with assessment activities completed by Varian.
- In 2011, approximately 3,500 gallons of sodium permanganate solution were injected at seven locations at the former Varian property.
- From June to July 2011, approximately 950 gallons of bioremediation solution were applied to five shallow overburden locations near the stream and three deep overburden locations adjacent to Building 3.
- In November 2011, Varian conducted semiannual groundwater sampling.

2012

- In 2012, Varian submitted documents to link the operation of the Building 3 SVE system to the main site number. These documents included an evaluation of exposure to indoor air at Building 3 with the SVE system operating, considering four rounds of indoor air data collected from February 2011 to January 2012. The conclusion of that evaluation was that a Condition of No Significant Risk has been achieved with the operation of the Building 3 SVE system.
- In January 2012, soil vapor sampling was conducted adjacent to the building at 30 Tozer Road to further evaluate potential indoor air impacts. Analytical results of the sub-surface vapor sampling conducted at 30 Tozer were above the December 2011 commercial/industrial sub-slab soil gas screening values from the MassDEP. However, these values are intended for samples collected beneath (i.e., within) the building footprint. Additional sampling within the building was conducted in May 2012.
- In May 2012, Varian conducted semiannual groundwater sampling.
- In May 2012, soil vapor sampling was conducted beneath the building at 30 Tozer Road to further evaluate potential indoor air impacts. Analytical results of the sub-slab vapor sampling conducted at 30 Tozer were above the December 2011 Commercial/Industrial sub-slab soil gas screening values from the MassDEP. This suggested that additional sampling was warranted (see November 2012 and February 2013 below).
- In July 2012, Varian installed three horizontal SVE trench wells beneath Building 5 to evaluate the potential use of SVE to remediate VOCs beneath Building 5. See **Figure 3-2**. On September 8, 2012, Varian conducted an SVE pilot test using two of the SVE trench wells. The pilot test results indicated that an SVE system would be effective at removing VOCs from beneath Building 5 and at limiting potential vapor migration into the building.
- In November 2012, sub-slab soil vapor and indoor air sampling were completed at 30 Tozer Road. See the second round of sampling in February 2013 below.
- In 2012, approximately 2,100 gallons of sodium permanganate solution were injected at seven locations at the former Varian property.
- In July 2012, approximately 3,000 gallons of bioremediation solution were applied to eight shallow overburden locations near the stream. This included the use of emulsified vegetable oil to provide a longer lasting carbon source for bioremediation.
- In November 2012, Varian conducted semiannual groundwater sampling.
- In December 2012, using indoor air sampling results from June 2011, January 2012, and October 2012, the potential risk to workers in Buildings 5 and 6 were calculated according to

MassDEP methods. The evaluation of this data concluded that the indoor air sampling results did not indicate the presence of an Imminent Hazard in Building 5 or 6. In addition, indoor air at Building 6 did not indicate a Significant Risk to human health. However, the indoor air sampling data in Building 5 suggested that longer term exposures may result in risk above the MCP limits.

2013

- In January 2013, Varian collected sub-slab soil vapor samples and indoor air samples in the building at 39 Tozer Road. An indoor air risk evaluation was conducted to estimate the potential risk to workers from exposure to VOCs detected at the 39 Tozer Road property. The results of this evaluation demonstrated that there was No Significant Risk associated with VOCs from the former Varian Site at the 39 Tozer Road property.
- In February 2013, a second round of sub-slab soil vapor and indoor air sampling was completed at 30 Tozer Road. An indoor air risk evaluation was conducted to estimate the potential risk to workers from exposure to VOCs detected at the 30 Tozer Road property using procedures provided by MassDEP. This evaluation demonstrated that there was No Significant Risk associated with VOCs from the former Varian Site at the 30 Tozer Road property.
- In March 2013, Varian completed the Installation of an SVE system at Building 5. The system was designed to limit potential vapor migration into the building. The Building 5 SVE system was activated on March 11, 2013. This system continues to operate at Building 5.
- In May 2013, Varian conducted semiannual groundwater sampling.
- In May 2013, soil vapor and indoor air samples were collected at 32 Tozer Road. An indoor air risk evaluation was conducted to estimate the potential risk to workers from exposure to VOCs detected at the 32 Tozer Road property using procedures recommended by MassDEP. This evaluation demonstrated that there was No Significant Risk associated with VOCs from the former Varian Site at the 32 Tozer Road property.
- In July 2013, Varian installed additional shallow soil borings inside Building 3 to further assess potential source areas. Data from these soil borings indicated areas of shallow VOC impacts beneath the east and the western portions of Building 3.
- In July 2013, Varian conducted video inspections of drain lines beneath Building 3, including active roof drains which may discharge to a dry well. The presence of a dry well in the Building 3 area could result in water infiltrating through impacted soil under the western end of Building 3.
- In September 2013, three additional treatment wells were installed on the east side of Building 3 to increase the ability to treat impacted groundwater.
- In October 2013, an additional round of soil vapor and indoor air samples were collected at 32 Tozer Road. See below.
- In October and December 2013, additional video inspections of former and existing drain lines were conducted in the Building 3 area. This included drain lines beneath Buildings 3 and 6, a drain line associated with Buildings 1 and 2, and several additional lines associated with Building 3. Some of the drain lines may have historically received waste. These inspections suggested some locations in the Building 3 area where releases may have occurred when liquid wastes were discharged to the drain lines. Those locations could therefore require additional treatment to remove subsurface VOCs.
- In December 2013, drilling was conducted inside Building 5 to provide an additional evaluation of shallow impacts beneath the building. Soil and groundwater data from well OB44-S (see **Figure 3-2**) indicated residual VOC impacts and represented a likely source of indoor air impacts observed at Building 5.

- In 2013, approximately 3,500 gallons of sodium permanganate solution were injected at five locations at the former Varian property and one location downgradient on Tozer Road.
- In October 2013, approximately 2,100 gallons of bioremediation solution were applied to three deep overburden wells next to Building 3.
- In November 2013, Varian conducted semiannual groundwater sampling.

2014

- In February 2014, a third round of soil vapor and indoor air samples were collected at 32 Tozer Road. The indoor air and soil gas results from the October 2013 and February 2014 sampling events are consistent with or slightly lower than the May 2013 results, showing that a condition of No Significant Risk continued to exist for site workers at this downgradient property.
- In April 2014, three Building 3 inactive drain lines were reinspected following cleaning to allow more thorough inspection of the lines. The results of reinspection indicated that former lines were not a continuing source of VOCs. However, the inspections did indicate that areas around the lines are potential locations of historic VOC releases to the environment.
- In April 2014, video inspections of existing drain lines at Building 5 were also conducted. These inspections did not indicate potential release areas or sources of VOC impacts.
- In April 2014, a fourth round of soil vapor and indoor air samples were collected at 32 Tozer Road. Varian used the maximum concentration of each VOC detected over the four sampling events (May 2013, October 2013, February 2014, and April 2014) to conservatively estimate risk in accordance with evaluation procedures established by MassDEP. Based on this evaluation, the data demonstrate that a condition of No Significant Risk exists at the 32 Tozer Road property in accordance with MassDEP criteria.
- In May 2014, Varian conducted semiannual groundwater sampling.
- In August 2014, a fourth SVE trench well was installed in the Building 5 area near well OB44-S, where soil and groundwater testing had indicated impacts of VOCs. See **Figure 3-2**. The Building 5 SVE system was connected to the new SVE trench well on August 11, 2014.
- In September 2014, based on additional data collected in 2014, two new horizontal SVE wells were installed beneath Building 3. See **Figure 3-1**. One well targeted the eastern part of the building while the second targeted the western part of the building. Soil vapor extraction began at these two horizontal SVE wells in September 2014.
- In September 2014, MassDEP completed an Audit of the SVE systems operating at 150 Sohier Road. A Notice of Audit Findings was issued on September 14, 2015, that did not report any violation, documenting the SVE systems were being operated in compliance with the MCP.
- In October 2014, a fifth round of soil vapor and indoor air samples were collected at 32 Tozer Road. The October 2014 soil vapor and indoor air data indicated VOC concentrations lower than the levels assessed in an earlier evaluation. Therefore, a condition of No Significant Risk is still present.
- In 2014, approximately 1,200 gallons of sodium permanganate solution were injected at seven locations at the former Varian property.
- In November 2014, Varian conducted semiannual groundwater sampling.
- From November 2014 to March 2015, approximately 3,500 gallons of bioremediation solution were applied to five deep overburden wells next to Building 3.

2015

- In early 2015, approximately 1,000 gallons of sodium permanganate solution were injected at five locations at the former Varian property. This included shallow injection beneath Building 3 at three horizontal SVE wells.
- In April 2015, Varian installed additional wells outside of Building 5 (OB46-S) to further assess VOC impacts and assess the area for potential bioremediation.
- In April 2015, a sixth round of soil vapor and indoor air samples were collected at 32 Tozer Road. The April 2015 soil vapor and indoor air data indicated VOC concentrations similar to the levels assessed in an earlier evaluation. Therefore, a condition of No Significant Risk is still present.
- In May 2015, Varian conducted semiannual groundwater sampling.
- In May and November 2015, during two separate events, approximately 12,000 gallons of bioremediation solution were applied to two of the trench SVE wells in the Building 5 area.
- In September 2015, the new owner of the 28 Tozer Road property completed assessment activities. This included well installation, groundwater sampling, and indoor air sampling. Indoor air sampling did not indicate the presence of detectable levels of VOC potentially from the former Varian Site. The only VOC detected that could have been attributed to the former Varian Site was determined to be associated with a vapor degreaser located on the second floor of the 28 Tozer Road building. Results of groundwater sampling completed by the 28 Tozer Road owner were generally consistent with data collected during Varian’s assessment.
- In November 2015, MassDEP completed an Audit of the SVE systems operating at 150 Sohier Road. A Notice of Audit Findings was issued on November 23, 2015, that did not report any violation, documenting that the SVE systems were being operated in compliance with the MCP.
- In May 2015, Varian conducted semiannual groundwater sampling.
- In late 2015 into early 2016, approximately 1,500 gallons of sodium permanganate solution were injected at seven locations at the former Varian property. This included shallow injections beneath Building 3 at two horizontal SVE wells.
- In December 2015, the consultant for a potential property buyer collected an indoor air sample at former Building 7 (aka 148 Sohier Road and 4 Bomac Road). The sample location was based on sub-slab soil vapor sampling results, which were reported to indicate the presence of VOCs beneath the building floor. It was reported that analytical results of the indoor air sample collected inside former Building 7 did not indicate detectable levels of VOCs from the former Varian Site.

2016

- In January 2016, following renovations at the 30 Tozer Road building, indoor air sampling was conducted to confirm a condition of No Significant Risk following the renovations. It should be noted that during building renovations the 30 Tozer Road owner conducted installation of an active soil vapor mitigation system to further mitigate potential vapor migration beyond a condition of No Significant Risk. Using the January 2016 data, Varian estimated risk in accordance with evaluation procedures established by MassDEP. Based on this evaluation, the data demonstrated that a condition of No Significant Risk exists at the 30 Tozer Road property in accordance with MassDEP criteria.
- In May 2016, Varian conducted semiannual groundwater sampling.
- From April into May 2016, Varian completed injections in the deep overburden at Building 3 to adjust the groundwater pH. Previous sampling data suggested that the bioremediation progress was being limited by a low groundwater pH. Groundwater monitoring after these injections indicated pH levels more suitable to bioremediation in groundwater. In September 2016, approximately 4,000 gallons of bioremediation solution were injected at six deep overburden wells in the Building 3 area.

- In December 2016, approximately 4,300 gallons of bioremediation solution were applied to the four trench SVE wells in the Building 5 area.
- In late 2016 into early 2017, approximately 2,000 gallons of sodium permanganate solution were injected at four deep overburden wells at the former Varian property and at two horizontal SVE wells beneath Building 3.
- In November 2016, Varian conducted semiannual groundwater sampling.

2017

- In May 2017, Varian conducted semiannual groundwater sampling.
- From September to October 2017, approximately 2,000 gallons of bioremediation solution were applied to the four trench SVE wells in the Building 5 area.
- From September to December 2017, approximately 1,600 gallons of sodium permanganate solution were injected at six locations at the former Varian property. This included shallow injections beneath Building 3 at two horizontal SVE wells.
- In November 2017, Varian conducted semiannual groundwater sampling.
- From December 2017 to April 2018, approximately 4,700 gallons of bioremediation solution were applied to seven deep wells in the Building 3 area. This included ferrous sulfate heptahydrate to promote abiotic degradation of VOCs in addition to anaerobic degradation.

2018

- In May 2018, MassDEP completed an Audit of the SVE systems operating at 150 Sohier Road. A Notice of Audit Findings was issued on May 14, 2018, that did not report any violation, documenting the SVE systems were being operated in compliance with the MCP.
- In May 2018, Varian conducted semiannual groundwater sampling.
- In July 2018, Varian completed installation of four new treatment wells inside Building 5 (AP36-S through AP39-S). See **Figure 3-2**. These wells were designed to provide further treatment of shallow groundwater beneath Building 5.
- In October 2018, approximately 4,200 gallons of bioremediation solution were applied to the four recently installed shallow wells inside Building 5.
- In November 2018, Varian conducted semiannual groundwater sampling.
- In November 2018, a pumping test was conducted to evaluate whether pumping at existing recovery well RW-1 (east side of building) would be affective at recirculating remedial additives injected along the north side of Building 3 and through impacted areas beneath the building. The results of the pumping test did not support the use of a recirculation system using existing wells as a remedial treatment option for this area.
- From November into December 2018, a total of approximately 6,900 gallons of bioremediation solution were applied to nine deep wells in the Building 3 area.

2019

- In February 2019, Varian collected sub-slab soil vapor samples from beneath the building at 27 Tozer Road. This sampling was conducted to evaluate potential indoor air impacts following increased levels of VOCs in shallow groundwater at this property. Analytical results of the sub-slab soil vapor samples collected beneath the 27 Tozer Road building indicated no concentrations exceeded the MassDEP commercial and industrial sub-slab soil gas screening levels. Consistent with MassDEP guidance, these results indicated that indoor air sampling was not warranted.
- In February 2019, Varian submitted a request to adjust the reporting schedule for the Site. The MassDEP provided concurrence with the new reporting schedule in an e-mail on

February 26, 2019. Semiannual status reports will be submitted by January 31 and July 31 each year.

- In March 2019, Varian submitted an LSP Opinion to remove the off-gas treatment from the Building 5 SVE system. Using MassDEP guidance, it was illustrated using analytical data that the discharge from the Building 5 SVE system is currently below the remedial air emissions standards requiring off-gas treatment and that off-gas treatment is not required for the Building 5 SVE system.
- In April 2019, two shallow angled wells were installed beneath the eastern end of Building 3 (AP40-S and AP41-S, see **Figure 3-1**). The wells were used to collect additional shallow assessment data beneath Building 3. Data collected during installation of AP40-S indicated significant VOC impacts starting at approximately ten feet below surface grade at the north wall of the building. This is the approximate area of a former drain line that likely received waste.
- In May 2019, Varian conducted semiannual groundwater sampling.
- In September 2019, Varian conducted an SVE pilot test at the shallow horizontal well beneath Building 3 that indicated shallow impacts of VOCs. The result of this pilot test indicated that due to the construction of the well (which was not designed for SVE) and the dense nature of the soil around the well, the horizontal well is not conducive to SVE.
- From September into October 2019, approximately 3,200 gallons of bioremediation solution were applied at shallow angled wells AP40-S and AP41-S beneath Building 3.
- From October to December 2019, approximately 165 gallons of sodium permanganate solution were injected at two locations at the former Varian property.
- In November 2019, Varian conducted semiannual groundwater sampling.
- In December 2019, Varian completed the installation of three vertical wells along the north side of Building 3 (OB49-S through OB51-S, see **Figure 3-1**). These wells were located in the area where soil sampling during installation of the shallow angled wells indicated impacted soils. The wells were installed to further assess the shallow VOC impacts observed adjacent to the building. Data from the three shallow wells confirmed soil and groundwater impacts in this area and provided further characterization of the impacts.

2020

- In March 2020, approximately 3,100 gallons of bioremediation solution were applied at the three shallow wells adjacent to Building 3.
- In May 2020, Varian conducted semiannual groundwater sampling.
- From October to November 2020, approximately 2,100 gallons of bioremediation solution were applied to four deep wells in the Building 3 area, OB49-S through OB51-S.
- In November 2020, Varian conducted semiannual groundwater sampling.
- In December 2020, MassDEP sampled air at 41 residential homes in areas downgradient of the Site. Based on the data collected, MassDEP determined that there was no evidence that contaminants from the former Varian Site are impacting any of the homes that were sampled.

2021

- In January 2021, MassDEP completed an evaluation of investigations, remedial activities, and review of response actions at the Site. MassDEP concluded that some data gaps exist and requested further investigative work [https://eeaonline.eea.state.ma.us/EEA/fileviewer/Default.aspx?formdataid=0&documentid=584682]. In response, Varian issued a work plan dated February 9, 2021, that included additional well installation, surface water sampling, and sediment sampling activities [see second attachment at https://eeaonline.eea.state.ma.us/EEA/fileviewer/Default.aspx?formdataid=0&documentid=593735]

- The February 2021 work plan was approved by MassDEP, with conditions, in a letter dated February 26, 2021 [https://eeaonline.eea.state.ma.us/EEA/fileviewer/Default.aspx?formdataid=0&documentid=593959].
- In February and March 2021, retesting of indoor air using more sensitive methods as required by MassDEP was conducted at 21 residential homes. Where present, water in basement sumps was also sampled. Results of this sampling indicated No Significant Risk at the 21 residential homes. However, additional sampling was recommended at five residential homes due to background sources and inconsistent data. The results of these sampling activities were documented in an April 30, 2021, report titled Vapor Intrusion Assessment Report, Downgradient Residential Areas [https://eeaonline.eea.state.ma.us/EEA/fileviewer/Default.aspx?formdataid=0&documentid=601609].
- In March and May 2021, surface water samples were collected at 17 locations and sediment samples were collected at 16 locations in the Unnamed Stream and Stream A.
- In March and April 2021, soil vapor and indoor air samples were collected at commercial/industrial buildings located on 30, 31, and 39 Tozer Road. At the owner's request, only soil vapor sampling was conducted at 27 Tozer Road. The results of this sampling did not indicate a Significant Risk. An additional round of soil vapor and indoor air sampling was recommended at 30, 31, and 39 Tozer Road.
- In April 2021, Varian installed four shallow wells on Sonning Road (P-13R, P-4R, P-30, and OB6-S), one shallow well on Tudor Road (P-31), and one shallow well on Jordan Street (P-4R). Groundwater sampling of these wells indicated non-detect levels of VOCs. See **Figure 1-2**.
- In April and May 2021, Varian installed six new wells at the Site, including bedrock wells at Building 5. These wells included OB38-BR, OB39-BR, OB45-BR, and well triplet OB52-S/DO/BR (see **Figure 1-2**). Test results in each well, except bedrock well OB45-BR at Building 5, were consistent with existing Site data. At OB45-BR, a higher than expected concentration of VOCs was detected in bedrock. This resulted in additional assessment discussed below.
- In May 2021, a site-wide groundwater sampling event was conducted. In addition, the event included surface water sampling.
- On June 30, 2021, a report titled Building 3 and 5 Source Area Assessment Summary report was submitted to MassDEP.
- On August 4, 2021, a semiannual ROS report was submitted to MassDEP [https://eeaonline.eea.state.ma.us/EEA/fileviewer/Default.aspx?formdataid=0&documentid=614691]. This report summarized the results of recent assessment activities, including well installation, soil vapor and indoor air sampling, and sediment, surface water and groundwater sampling. The report also included an evaluation of human health and environmental risk posed by VOCs detected in surface water and sediment at the Site. No Significant Risk to human health was identified. It was also demonstrated that further assessment of environmental risk was not warranted. In addition, the report provided a screening of potential risk to pets that may drink surface water. The maximum levels of VOCs in surface water were below the screening levels used to assess the potential risk to pets.
- In August 2021, select monitoring wells and surface water locations were sampled.
- On September 28, 2021, a report titled Summary of In-situ Chemical Oxidation and Soil Vapor Extraction was submitted to MassDEP [https://eeaonline.eea.state.ma.us/EEA/fileviewer/Default.aspx?formdataid=0&documentid=622921].
- In October 2021, a second round of soil vapor and indoor air sampling was conducted at four residences. Access was not obtained to sample at the fifth location recommended for resampling. Based on a lines–of–evidence approach, a complete vapor intrusion pathway likely to be of

concern was not identified at three of the homes sampled. At the fourth home, located on Longview Drive, levels in indoor air were above the MassDEP TVs. The levels detected did not indicate a Significant Risk. It should be noted that the TVs are not exclusively risk-based limits. The TVs are guidance criteria developed by MassDEP to indicate levels in indoor air that are above typical background, which require additional evaluation.

- In November 2021, a site-wide groundwater sampling event was conducted. In addition, the event included surface water sampling.
- In November 2021, soil vapor and indoor air were resampled at a home on Longview Drive. Again, the levels detected in indoor air did not indicate a Significant Risk, but they were above the TVs.
- In December 2021, soil vapor and indoor air were resampled at a home located on Longview Terrace. Based on a lines of evidence approach, a complete vapor intrusion pathway likely to be of concern was not identified at the Longview Terrace home.

3.3 Site Assessment Activities

Site assessment activities conducted in 2020 and 2021 have been described in detail in prior MCP submittals including the January 2022 ROS Report. Activities not previously described in these submittals provided to MassDEP are summarized in the following sections of this report.

3.3.1 Tozer Road Soil Vapor and Indoor Air Sampling (December 2021 and January 2022)

MassDEP requested indoor air and soil vapor sampling at commercial properties downgradient of 150 Sohier Road to confirm that current conditions posed No Significant Risk in this area. Those sampling activities were conducted in 2021 and reported in the August 2021 ROS Report. As noted in the text table below, follow-up sampling was recommended at three properties, 30 Tozer Road, 31 Tozer Road, and 39 Tozer Road. The location of each of the properties are illustrated on **Figure 1-2**. Plans for each property are provided in **Appendix C**.

Property	Soil Vapor Results Exceeded Screening Values? (1)	Indoor Air Results Exceeded Threshold Value? (1)	Background Source Identified?	Conclusion & Recommendations
30 Tozer Road	Yes	No	No	No Significant Risk, sample soil vapor and indoor air in winter 2022
31 Tozer Road	Yes	No	No	No Significant Risk, sample soil vapor and indoor air in winter 2022
39 Tozer Road	Yes	Yes	Yes	No Significant risk, remove background source, sample soil vapor and indoor air in winter 2022

Notes: (1) MassDEP, 2016.

Prior to conducting the air sampling, a survey was completed by APTIM with the property owner or the tenant. The survey requested details on the property and activities performed in buildings and included questions about the presence or use of potential background sources of VOCs such as dry cleaning, paint strippers, and solvents. Prior activities at 39 Tozer had identified products containing VOCs that are the same as the target VOCs associated with the Former Varian Facility Site. These included ZEP Power Solv and SOS Metal anti-seize, which both contained TCE, and Brakleen Brake Parts Cleaner and Kwikee Penetrating Oil, which both contained PCE. The previously known background sources had been removed prior to sampling in January 2022.

Indoor air samples were collected at 30 and 31 Tozer Road in December 2021 and at 39 Tozer Road in January 2022. At each building, samples were collected under normal HVAC operating conditions. The same sample locations as the prior events in March and April 2021 were used. A Summa® canister fitted with a regulator calibrated to collect air over an 8-hour period was used to collect each sample. Canisters were placed at an elevated location to sample air at breathing height. Indoor air samples were analyzed for VOCs by U.S. Environmental Protection Agency (EPA) Method TO-15. Laboratory quality control (QC) procedures were conducted as per the MassDEP Compendium of Analytical Methods (CAM) requirements.

Indoor air sample results from 30 Tozer Road are summarized in **Table 3-2** and indicated that:

- TCE was detected at concentrations ranging from 0.511 micrograms per cubic meter (μg/m^3) to 0.527 μg/m^3
- PCE was detected at concentrations ranging from 0.353 μg/m^3 to 0.427 μg/m^3
- *cis*-1,2-DCE concentrations ranged from non-detect to 0.079 μg/m^3
- 1,1,1-TCA concentrations were non-detect

Indoor air sample results from 31 Tozer Road are summarized in **Table 3-2** and indicated that:

- TCE was detected at concentrations ranging from non-detect to 0.247 μg/m^3
- PCE was detected at concentrations ranging from 0.22 μg/m^3 to 0.746 μg/m^3
- *cis*-1,2-DCE and 1,1,1-TCA concentrations were non-detect

None of the target VOCs associated with the Former Varian Facility Site were detected in indoor air at 30 or 31 Tozer Road at concentrations that exceeded the MassDEP's commercial/industrial TVs.

Indoor air sample results from 39 Tozer Road are summarized in **Table 3-2** and indicated that:

- TCE was detected at concentrations ranging from 1.9 μg/m^3 to 3.17 μg/m^3
- PCE was detected at concentrations ranging from 0.583 μg/m^3 to 2.03 μg/m^3
- *cis*-1,2-DCE was detected at concentrations ranging from 0.262 μg/m^3 to 0.92 μg/m^3
- 1,1,1-TCA was detected at one location at a concentration of 0.142 μg/m^3

Of the target VOCs associated with the Former Varian Facility Site, only TCE was detected in indoor air at 39 Tozer Road at concentrations that exceeded the MassDEP's commercial/industrial TV.

To evaluate a potential vapor migration pathway at the downgradient properties consistent with MassDEP guidance, soil vapor samples were collected beneath each building (sub-slab) at previously installed soil vapor points. After the sampling of indoor air, the soil vapor samples were collected by connecting each sample point to a Summa® canister. Samples were then collected over a two-hour period and submitted for laboratory analysis of VOCs by EPA Method TO-15. Laboratory QC procedures were conducted as per MassDEP CAM requirements.

Soil vapor sample results from 30 Tozer Road are summarized in **Table 3-3** and indicated that:

- TCE was detected at concentrations ranging from 0.435 μg/m^3 to 2,190 μg/m^3
- PCE was detected at concentrations ranging from 0.245 μg/m^3 to 76.6 μg/m^3
- *cis*-1,2-DCE concentrations ranged from non-detect to 4.76 μg/m^3
- 1,1,1-TCA concentrations were non-detect

Of target VOCs associated with the Former Varian Facility Site, only TCE was detected at a single 30 Tozer Road location in December 2021 above MassDEP's commercial/industrial sub-slab soil gas screening value. This included PCE which decreased from 1,210 μg/m^3 in April 2021 to 76.6 μg/m^3 in December 2021. It should be noted that TCE concentrations at that location, 30 Tozer-SV09, also indicated a decrease between April 2021 and December 2021.

Soil vapor sample results from 31 Tozer Road are summarized in **Table 3-3** and indicated that:

- TCE was detected at concentrations of 4.1 μg/m^3 and 6.72 μg/m^3
- PCE was detected at concentrations of 292 μg/m^3 and 166 μg/m^3
- *cis*-1,2-DCE concentrations were non-detect
- 1,1,1-TCA was detected at concentrations of 4.84 μg/m^3 and 9.93 μg/m^3

Of target VOCs associated with the Former Varian Facility Site, only PCE was detected at a single 31 Tozer Road location above MassDEP's commercial/industrial sub-slab soil gas screening value.

Soil vapor sample results from 39 Tozer Road are summarized in **Table 3-3** and indicated that:

- TCE was detected at concentrations ranging from 0.473 µg/m^3 to 11.1 µg/m^3
- PCE was detected at concentrations ranging from 0.271 µg/m^3 to 1.8 µg/m^3
- *cis*-1,2-DCE was detected at concentrations ranging from 0.123 µg/m^3 to 2.58 µg/m^3
- 1,1,1-TCA concentrations were non-detect

In January 2022, none of the target VOCs associated with the Former Varian Facility Site were detected at 39 Tozer Road locations at concentrations above MassDEP's commercial/industrial sub-slab soil gas screening values. This included location 39 Tozer-SV-02 which did indicate a TCE concentration above the screening value in March 2021.

At 30 Tozer Road and 31 Tozer Road, concentrations of target VOCs associated with the Former Varian Facility Site were detected at one location in each building at a concentration above MassDEP's commercial/industrial sub-slab soil gas screening value. In both cases, concentrations of target VOCs associated with the Former Varian Facility Site in indoor air were below the MassDEP TVs (**Table 3-2**). In the case of 30 Tozer Road, additional rounds of indoor air sampling conducted by MassDEP and the property owner also indicated levels below the TVs.

At 39 Tozer Road, TCE indoor air samples exceeded the TV in both the March 2021 and January 2022 sampling event. However, a background source was identified after the March 2021 event. The levels detected in soil vapor beneath the building in January 2022 were well below the MassDEP soil vapor screening values, indicating that vapor intrusion into the building resulting in concentrations of concern is not likely. However, TCE concentrations in indoor air increased from March 2021 to January 2022. This limited increase occurred despite lower levels of target VOCs beneath the building and the removal of known products in the building that were found to contain target VOCs (see above). This suggests that there could still be unidentified background sources within the building. Additionally, the levels of some VOCs in indoor air during the January 2022 sampling were higher than in soil vapor. It would be expected that if the source of VOCs were from groundwater, then the highest VOC levels would be measured beneath the building rather than in indoor air. Additional evaluation of potential background sources and sampling is warranted at 39 Tozer Road. Varian has attempted to be granted access to the building for that purpose; however, access has not yet been granted.

The following text table summarizes results and conclusions for 30, 31 and 39 Tozer Road. Complete laboratory analytical reports are provided in **Appendix D**.

Property	Soil Vapor Results Exceeded Screening Values? (1)	Indoor Air Results Exceeded Threshold Value? (1)	Background Source Identified?	Conclusion & Recommendations
30 Tozer Road	Yes, TCE during two events	No, during two events (2)	No	Not a significant pathway, monitor groundwater
31 Tozer Road	Yes, PCE during two events	No, during two events	No	Not a significant pathway, monitor groundwater
39 Tozer Road	Yes in the first event, no in the second event	Yes	Yes (3)	No Significant risk, data inconclusive, sample soil vapor and indoor air if access obtained

Notes:

(1) MassDEP, 2016.
(2) Below TVs in December 2020 MassDEP sampling (MassDEP, 2020) and owner sampling in March 2021.
(3) Background source identified in one event.

3.3.2 Groundwater Sampling (February and May 2022)

Two site-wide groundwater sampling events have been conducted at the Site since the last status report. This included sampling rounds conducted in February (winter) and May (spring) 2022. The winter sampling event included quarterly sampling focused on monitoring the reductive dechlorination progress associated with bioremediation activities in the Building 3 and Building 5 areas and at selected downgradient locations to monitor VOC concentration trends. The spring 2022 sampling event was an annual sampling event to monitor VOC trends and groundwater conditions at numerous wells across and downgradient the Site. In August 2022, additional samples were collected from newly installed wells and are included in this discussion. The February and May sampling events also included sampling of select stream surface water locations. Sampling locations are shown on **Figure 1-2**. A summary of samples collected during these monitoring events and the sampling rationale are provided in **Tables 3-4**, **3-5**, and **3-6**.

Groundwater gauging at select wells for depth-to-groundwater and total-well-depth measurements, as well as for the potential presence of DNAPL in wells with historically elevated VOC concentrations, was performed in February and May 2022, prior to the passive diffusion bag (PDB) samplers being deployed or sample collection. The electronic interface probe used during these monitoring activities did not detect DNAPL at monitoring wells gauged during this reporting period. Water level monitoring data are summarized in **Table 3-7**.

Groundwater and surface water samples collected in the winter and spring 2022 events were submitted to Absolute Resource Associates (ARA) located in Portsmouth, New Hampshire. Laboratory analysis of samples included site-specific VOCs by EPA Method 8260 and additional analysis outlined in **Tables 3-4**,

3-5, and **3-6**. Additionally, groundwater samples collected from select bioremediation wells were submitted for analysis of *Dehalococcoides* (DHC) bacteria at Microbial Insights in Knoxville, Tennessee, as noted in **Table 3-6**.

Groundwater VOC sampling of monitoring and application wells during this reporting period utilized PDB samplers, except for the stream monitoring points and certain wells where alternative sampling methods were used, as discussed below. For wells sampled utilizing the PDB method, the sampling apparatus was deployed in each groundwater monitoring well for a minimum 2-week equilibration period, after which the samples were collected. Select wells were sampled using a low flow method either due to their construction (e.g., angled) or because they were screened in the shallow overburden and used to assess potential indoor air vapor intrusion. At each well sampled using the low flow sampling method, dedicated polyethylene tubing was installed in the well for sampling. Each well was pumped with a surface-mounted peristaltic pump, and recovered groundwater was monitored for field parameters using a YSI 6920 multimeter equipped with a flow-through cell. Parameters monitored included temperature, dissolved oxygen, pH, specific conductance, oxidation-reduction potential, and turbidity. A sample was collected once these parameters stabilized. Bedrock zone wells were pumped from the specific screened zone depth using dedicated tubing and a peristaltic pump.

VOC analytical results from the winter and spring 2022 sampling events are summarized in **Table 3-8**. Results of bioremediation parameter analyses (i.e., methane, ethane, ethene, and DHC) are summarized in **Tables 3-9** and **3-10**. Results of surface water samples are included in **Table 3-11**. Results for TCE, PCE, and *cis*-1,2-DCE detected in samples collected in spring 2022 from shallow, deep overburden, and bedrock groundwater wells are illustrated on **Figures 3-3**, **3-4**, and **3-5**, respectively. Complete laboratory analytical reports for samples collected in winter and spring 2022 are provided in **Appendix E**. Results of these sampling events are discussed in the nature and extent section of this report (Section 6.0).

3.3.3 P21 Well Installation and Sampling (April to March 2022)

On February 28 and March 1, 2022, APTIM supervised the installation of a deep overburden well and a bedrock well adjacent to existing well P-21, located at the corner of Longview Drive and Longview Terrace. These two wells were installed to assess potential VOC impacts in the area. Deep overburden well P21-DO was installed to a depth of 17 feet below grade where bedrock was encountered.
Well P21-BR was installed to a depth of 66 feet below grade. Both wells were installed by Geosearch Environmental Drilling of Sterling, Massachusetts using a hollow-stem auger drilling technique in the overburden and air rotary drilling in bedrock. The well locations are illustrated on **Figure 1-2**.

During drilling, soil samples were collected at approximately five-foot depth intervals for soil logging purposes and to conduct headspace VOC screening with a photoionization detector (PID). Headspace screening results only indicated low levels of VOCs; the highest concentration detected was 0.2 parts per million (ppm). Based on the low levels during soil screening, no soil samples were submitted for laboratory analysis.

Overburden soils encountered at both well locations consisted of sand with varying amounts of gravel. The deep overburden well P21-DO was constructed of five feet of 2-inch diameter polyvinyl chloride

(PVC) well screen (10-slot) set just above bedrock and an appropriate amount of PVC riser to complete the well just below the ground surface. A one-to-two-foot bentonite seal was set above the sand pack, which was installed in the annular space around the well screen from 10 to 17 feet below grade (2 feet above the screen depth). The remaining annulus was sealed with grout then backfilled with clean, native soil. At bedrock well P21-BR, a 4-inch diameter steel casing was advanced at least ten feet into competent bedrock and grouted in place. An air hammer was then used to install an open borehole well beneath the sealed casing. Once installed, both wells were developed to remove fine-grained sand or silt and improve the hydraulic connection with the surrounding aquifer. Soil descriptions, headspace screening results, and well construction details are summarized in the drilling logs provided in **Appendix B**.

Groundwater samples were collected from shallow well P-21, deep overburden well P21-DO, and bedrock well P21-BR in March and May 2022. On March 7, 2022, groundwater samples were collected from the three wells using a low flow sampling method. In May 2022, samples collected at P-21 were also obtained using the low flow method. Samples collected in May 2022 at wells P21-DO and P21-BR were obtained using PDBs. A PDB was deployed in each groundwater monitoring well for a minimum 2-week equilibration period, after which the samples were collected. Groundwater samples collected were submitted to ARA for laboratory analysis of VOCs by EPA Method 8260.

Prior to sample collection, each well was gauged. Groundwater elevations are provided in **Table 3-7**. Site data from the Former Varian Facility Site indicates groundwater flow in the area of the P-21 triplet is southerly with a very flat gradient. Groundwater elevations in **Table 3-7** indicate that in March 2022, there was a downward vertical gradient from deep overburden into the bedrock (with a hydraulic head difference of 2 feet) in the area of the P-21 well triplet. However, in May 2022, there was a slight upward vertical flow potential between the bedrock and deep overburden in this area (with only 0.3 feet hydraulic head difference)

VOC results of groundwater sampling are summarized in **Table 3-8** and are discussed below.

Results of samples collected in March 2022 indicated the following:

- All target VOC were non-detect at shallow well P-21.
- TCE and *cis*-1,2-DCE were detected at well P21-DO at concentrations of 0.003 mg/L and 0.002 mg/L, respectively.
- Acetone and *cis*-1,2-DCE were detected at P21-BR at concentrations of 0.014 mg/L and 0.14 mg/L, respectively.

Results of samples collected in May 2022 indicated the following:

- TCE and *cis*-1,2-DCE were detected at well P-21 at concentrations of 0.002 mg/L and 0.003 mg/L, respectively.
- TCE and *cis*-1,2-DCE were detected at well P21-DO, both at a concentration of 0.002 mg/L, respectively.
- *cis*-1,2-DCE was detected at P21-BR at concentrations of 0.16 mg/L.
- Acetone was not detected.

Laboratory analytical reports for the March, May, and August 2022 groundwater sampling are provided in **Appendix E**.

3.3.4 Building 5 Bedrock Well Installation (March 2022)

Between March 29 and April 14, 2022, three new bedrock wells were installed in the Building 5 area. These included an angled bedrock well beneath Building 5 (OB53-BR), one bedrock well to the northwest of Building 5 (OB54-BR), and one bedrock well downgradient at 30 Tozer Road (OB42-BR). The wells were installed by Cascade Environmental from Gardner, Massachusetts, under the direct supervision of APTIM. The three wells are illustrated on **Figure 1-2**. Drilling was completed using a mini-sonic drilling rig. During drilling in the overburden, soil samples were collected at approximately five-foot depth intervals for logging purposes and to conduct headspace VOC screening with a PID. Headspace screening results indicated VOC concentrations up to 2,000 ppm at well OB53-BR at approximately 48 feet below the building. Headspace screening results indicated VOC concentrations of up to 44 ppm at OB54-BR at approximately 43 feet below grade and up to 44 ppm at OB42-BR at approximately 17 feet below grade. Soil descriptions and headspace screening results are summarized in the drilling logs provided in **Appendix B**.

Once bedrock was encountered at each well, drilling continued 10 feet into competent bedrock. Then a 7-inch casing was installed over the drive casing into bedrock. A 15-minute falling head test was conducted to confirm the efficacy of the seal between the casing and the bedrock. Drilling then continued into bedrock. At OB53-BR, drilling advanced to a depth of approximately 105 feet below the building. At OB54-BR, drilling advanced to approximately 92 feet below grade and at OB42-BR, drilling advanced to approximately 80 feet below grade. Once the final depth was achieved, a 2-inch diameter PVC well with 15 feet of the screen and a sand pack was installed at each location. A 2-foot bentonite seal was installed from the top of the sand pack, and the remaining annulus was sealed with grout to the surface. Once the bentonite seal was installed, all the casing was extracted. Following installation, the well was developed to remove fine-grained sand and silt from bedrock fractures and improve the hydraulic connection with the surrounding aquifer.

Three soil samples were collected from OB53-BR, one soil sample was obtained from OB54-BR, and two samples were collected from OB42-BR. Samples were submitted for laboratory analysis of VOCs at ARA by EPA Method 8260. Methanol field extraction was used for the preservation of each sample. Analytical results of these soil samples are included in **Table 3-12**. Analytical results of soil samples indicated:

- At OB53-BR, TCE was non-detect at approximately 19 feet below the building, was detected at a concentration of 35 milligrams per kilogram (mg/kg) at 42 feet below the building and was non-detect at 64 feet below the building. PCE was detected at 11 mg/kg at both 19 feet and 42 feet below the building but was non-detect at 64 feet below the building. Bedrock was encountered approximately 75 feet below the building.
- At OB54-BR, TCE was detected at 0.79 mg/kg and PCE was detected at 0.46 mg/kg at approximately 42 feet below grade.
- All VOCs were non-detect in soil samples collected at approximately 27 and 47 feet below grade at OB42-BR.

Complete laboratory analytical reports are provided in **Appendix F**.

3.3.5 OB45-BR Bedrock Logging (March 2022)

On March 30, 2022, Hager GeoScience, Inc. (HGI) from Woburn, Massachusetts, performed geophysical logging of the open borehole well OB-45-BR, located northwest of Building 5. The objective of the logging was to characterize bedrock fractures and identify potential flow pathways. The borehole was approximately 96 feet deep and 4-inches in diameter. Bedrock was encountered during drilling at approximately 45 feet below ground surface (bgs), for well completion, a 4-inch diameter steel casing was installed to approximately 60 feet bgs with an open bedrock borehole to 96 feet bgs. Details of the data acquisition, logging, and data processing that were completed by HGI are provided in their report in **Appendix G**. The following is a brief summary of their findings.

As expected, based on prior bedrock evaluation at the Site, bedrock at OB-45-BR was composed of medium-grained Cape Ann granite. Observation in the caliper and image logs did not indicate open fractures from 60 feet to 96 feet bgs. However, many tight fractures were identified throughout the borehole. A contact appears at 90.5 feet between a darker rock material above and lighter below; however, it does not appear that there is any significant change in mineral composition.

The predominant dip direction of the identified rock fabric is to the west, with the dip orientations of fractures less uniform. Within the small clusters of varying dip directions, one dominant cluster appears to be dipping to the north.

Ambient flow rates were obtained at ten depth intervals, which were determined based on the field observations of the imaging and caliper logs. The heat pulse flow meter tool was then lowered into the hole for a stress test, which included pumping water out of the well at an average rate of approximately 0.10 gallons per minute (gpm). Stress test data show minimal water level drop and no-flow readings at the same intervals. This indicates that any inflow from the identified fractures is either below the lower limit of the probe (0.01 gpm) or non-existent.

The results of this borehole logging, including ambient flow rates and heat pulse flow meter testing, indicate that there are limited water bearing fractures in bedrock at well OB-45-BR. The logging also did not reveal the presence of sub-horizontal fractures, which have been seen in the granite in other areas of the Site.

HGI attempted to log a second borehole, OB-53-BR, on April 6, 2022. This angled borehole was drilled at a 50° angle, traveling beneath the building. However, silt and drilling mud at the well blocked the probes from properly imaging and reaching the bottom of the well. Since the angled installation of this well necessitated the installation of a PVC well to keep the bedrock bore open, logging was not completed following the installation and development of the well.

3.3.6 Building 3 Indoor air and Soil Vapor Sampling (March and June 2022)

As discussed in the January 2022 ROS Report, Varian deactivated the Building 3 SVE system. Multiple rounds of indoor air sampling indicated TCE indoor air concentrations below not only the MassDEP long-term remediation target but also the commercial/industrial TV. Additionally, the indoor air PCE results were below the commercial/industrial TVs. Based on these results, the Building 3 SVE system was deactivated on January 13, 2022. Quarterly indoor air sampling was conducted to monitor for a potential rebound in the TCE and PCE levels in indoor air and assess long-term static conditions following treatment beneath the building.

On March 9 and June 7, 2022, indoor air samples were collected from the Building 2 basement and in Building 3. These locations included BLDG2-6 (Building 2 Basement), BLDG3-1 Chem Lab), BDLG3-2 (Bench Testing Room), BLDG3-3 (MID Stock Room), BLDG3-5 (Building 3 Basement Boiler Room) and BLDG6-2 (Building 6). The indoor air samples were collected using evacuated Summa® canisters over an 8-hour sampling interval. During sampling, the supplemental air exchange units installed within Building 3 as part of the IRA remained operational, as did the Building 3 chemical laboratory ventilation system. The indoor air sampling locations are illustrated on **Figure 3-1**. The indoor air samples collected were submitted to Alpha Laboratory for analysis of select VOCs by EPA Method TO-15. Results of indoor air samples collected in March 2022 continued to show concentrations of TCE and PCE in indoor air below the TVs. However, results of indoor air from June 2022 did indicate concentrations of TCE and PCE at BLDG3-3 that exceeded the TVs. As a result, the Building 3 SVE system was reactivated on June 22, 2022. Analytical results of the indoor air samples are summarized in **Table 3-13**. As documented in prior reports, both acetone and *trans*-1,2-DCE are currently used in the manufacturing activities at the facility, and thus, their presence in indoor air is most likely related to contributions from these background sources. Complete copies of the laboratory analytical reports are provided in **Appendix H**.

Sub-slab soil vapor samples were collected in March and June 2022. Sub-slab soil vapor samples were collected from five vapor points, one in the basement of Building 2 (BLDG2-SV1) and four beneath Building 3 (BLDG3-VP1, BLDG3-VP2, BLDG3-VP3, and BLDG3-VP7). The sub-slab soil vapor sampling points locations are illustrated on **Figure 3-1**. Each sample was collected using evacuated Summa® canisters over a four-hour sampling interval. The soil vapor samples collected were submitted to Alpha Laboratory for analysis of select VOCs by EPA Method TO-15. Following sample collection, the SVE system was reactivated. Analytical results of the sub-slab soil vapor samples are summarized in **Table 3-14**. Complete copies of the laboratory analytical reports are provided in **Appendix H**.

3.3.7 Building 3 Electrical Resistivity Imaging Study (April 2022)

Between April 18 and 26, 2022, an electrical resistivity imaging (ERI) study was conducted in the area of Buildings 1, 2, 3, 4, and 6 (Building 3 Area) at the facility. The study was conducted to assess vertical and horizontal extent and distribution of subsurface VOCs beneath and around the buildings. The study was conducted by Aestus, LLC, from Loveland, Colorado. This assessment method is based on conventional ERI techniques. However, modern data acquisition and processing provide higher data quality and a more robust and accurate subsurface image. A copy of the Aestus, LLC 2022 final report is included as **Appendix I**.

A total of six ERI lines, identified as VAR-01 through VAR-06, were implemented at the Site by installing a series of small diameter probes approximately 12 inches below grade. Probe spacing ranged from approximately 5 to 10 feet. Four lines were run through the building complex and two were run on the outside of the buildings. The location of each line is illustrated on Figure 1 in **Appendix I**. The length of the lines ranged from 271 feet (VAR-04) to 541 feet (VAR-05 and 06). The depth of imagery is proportional to the length of the lines. In this study, the imagery depth ranged from 54 feet below grade at VAR-04 to 108 feet below grade at VAR-05 and 06.

Data collected during the study was used to generate resistivity cross sections (Figures 2 through 7 in **Appendix I**. Areas with a high resistivity (>1,000 ohm-meter (m)) can indicate locations with potential for high VOC concentrations. However, some subsurface lithology, such as very dense soil, boulders, or bedrock can also result in high resistivity. Areas with low resistivity (i.e., high conductivity) can be observed in subsurface areas where biologic activity is occurring, such as bioremediation. Additionally, areas of permanganate treatment can also result in high conductivity.

The results of the ERI study indicate the following.

- Line VAR-01 was completed running southwest to northeast through Buildings 1 and 3. This line passes through areas beneath Building 3 where prior soil and groundwater sampling indicated locations with elevated VOC impacts. For example, TCE and PCE concentrations of 28 mg/kg and 260 mg/kg, respectively, in soil samples from OB50-S in 2019. OB50-S is located adjacent to the northeast corner of Building 3. The TCE concentration in groundwater at AP31-DO, located beneath the Building 3 chem lab, was 270 mg/L in November 2021. Areas of high resistivity are indicated on Figure 2 of **Appendix I**, beneath Building 3 that correspond to the known areas of VOC impact. The ERI data indicates that these VOC impacts do not extend into bedrock. In addition, there is an area indicating high conductivity near where Line VAR-03 intersects with VAR-01. That location is an area where bioremediation has been conducted. This area of high conductivity suggests that biological activity associated with the bioremediation program is occurring.

- Line VAR-02 was completed running southwest to northeast through Buildings 2 and 3. This line included areas in the Building 2 and Building 3 basements. High resistivity is observed beneath Building 3 (Figure 3, **Appendix I**). This data indicates that VOC impacts noted in the north and central area of Building 3 extend to the south and partially beneath Building 6. An additional area of high resistivity is observed beneath Building 2. This area does not correspond with a known source area of VOC impacts and requires additional assessment (drilling) to evaluate the potential presence of VOC impacts. That confirmation drilling is discussed in Section 3.3.8.

- Line VAR-03 was completed running northwest to southeast through Buildings 1 and 2. This line runs just to the west of the Building 2 basement and intersects with VAR-01 and VAR-02. High resistivity is observed beneath Building 1 (Figure 4, **Appendix I**). However, the level of resistivity is lower than noted beneath Building 3. While these data suggests that VOC impacts noted beneath Building 3 extend to the west and partially beneath Building 1, the ERI data indicate that level of impact is not as high as beneath Building 3. Like the results from line VAR-02, an area of highly resistive soil was observed beneath Building 2. Further assessment of this area of high resistive soil is discussed in Section 3.3.9. To the south of Building 2, just to the west of Building 4, an area of highly resistive soil was observed from a depth of approximately 10 feet, extending to approximately 30 feet below grade. There is no available data in this area, and therefore, additional assessment was required to evaluate the potential presence of VOC impacts. That confirmation drilling is discussed in Section 3.3.9.

- Line VAR-04 was completed running northwest to southeast through Buildings 3 and 6. This line intersects with VAR-01 and VAR-02 and passes through areas beneath Building 3 where prior soil and groundwater sampling indicated locations with elevated VOC impacts. High resistivity is observed beneath Building 3 (Figure 5, **Appendix I**). This area extends from the north side of Building 3 at the location of a former chem lab discharge line, down and to the south. Soil and groundwater data from the area of the chem lab discharge line has shown elevated levels of VOCs. For example, PCE was detected at up to 44 mg/L at OB50-S near the former discharge line. Deeper beneath Building 3, TCE was detected at up to 230 mg/L at AP43-DO prior to treatment. The ERI data does indicate that the area of the highest resistivity is bounded vertically at the bedrock contact. This also indicates that elevated VOC impacts are bounded at the bedrock contact. An area of conductive soil is observed at the southern end of VAR-04, beneath Building 6. That area corresponds to a location where significate permanganate treatment was conducted at horizontal wells beneath Building 6. The ERI data indicates the widespread distribution of permanganate treatment beneath Building 6.

- Line VAR-05 was completed running northwest to southeast, to the west of Buildings 1 and 2. Line VAR-05 intersects with lines VAR-01 and VAR-02. Line VAR-05 indicated an area with moderate resistivity between approximately 20 and 40 feet below grade west of Building 2 (Figure 6, **Appendix I**). There are no available data in this area, and therefore required additional assessment to evaluate the potential presence of VOC impacts. That confirmation drilling is discussed in Section 3.3.9. An area of conductive soil is observed at the north end of line VAR-05, which may correspond to natural biologic activity.

- Line VAR-06 was completed running west to east, north of the building complex. This line indicated an area with elevated resistivity between 10 and 30 feet north of Building 3 (Figure 7, **Appendix I**). This area roughly corresponds to the area of existing monitoring wells OB12-S/DO/BR, which is located closer to Building 3. Data from that well triplet do indicate VOC impact in the deep overburden at OB12-DO (e.g., TCE was 13 mg/L in August 2022). However, groundwater data in bedrock at OB12-BR do not suggest a significant impact of VOCs (e.g., TCE was non-detect in August 2022). The high resistivity returns in bedrock near OB12-BR are likely an indication of dense bedrock and not VOC impact. There is also an area of very conducting returns in both the overburden and bedrock immediately west of the OB12 triplet. This area may indicate active biological activity. Confirmation drilling was conducted in this area to confirm that conclusion. Another area of high resistivity in bedrock was observed in the western end of VAR-06. That area roughly corresponds to the existing well triplet OB11-S/DO/BR. VOC levels at each level in OB11 have consistently been low. For example, TCE was 0.007 mg/L at OB11-BR and 0.07 mg/L at OB11-DO in August 2022.

The results of the ERI study completed in Building 3 Area provide a clearer picture of the extent of elevated VOCs beneath Building 3. The data also did not indicate areas of highly resistive soil in the locations of PSL-3, -4, and -12. This confirms the 2000 Phase II CSA conclusions that these PSLs were not sources of VOC releases to the environment. The results of the confirmation drilling discussed in the following sections provide a further refinement of the ERI study results.

3.3.8 Building 2 Angled Well Installation (July 2022)

Based on the results of the ERI study, one deep angled well was installed in the overburden beneath Building 2. The well was installed to collect assessment data beneath Building 2 and evaluate the potential presence of VOC indicated by an area of elevated resistivity indicated in line VAR-02. Drilling was completed from July 18 through 22, 2022, by Directional Technologies of Wallingford, Connecticut, under the direct supervision of APTIM. Angled well OB57-DO was drilled approximately 143 linear feet from the entry location and was installed with the screened interval roughly 54 to 64 feet below the building floor. The well was installed using a single-entry, mud-rotary directional drilling rig. A copolymer mud specifically designed for directional drilling was used to help stabilize the borehole and aid in well development. The location and the direction of this angled well are shown on **Figure 3-6**.

During soil boring advancement, soil samples were collected for logging purposes and to conduct headspace VOC screening with a PID. Headspace screening results indicated VOC concentrations ranging were non-detect from approximately 34 to 40 feet below the building (see the as-built well diagram in **Appendix B**). Headspace screening indicated detectable levels of VOC from approximately 47 feet beneath the building (roughly 95 linear feet) to a high of 309 ppm at 60 feet below the building (about 130 linear feet). Soil descriptions and headspace screening results are summarized in the drilling logs provided in **Appendix B**. Soil encountered during drilling consisted of dense, silty sand, and gravel (glacial till). A higher percentage of clay was noted in the till just above bedrock.

During drilling, four soil samples were collected from OB57-DO based on elevated soil headspace screening results, observation of soil samples, and the location of resistive soil in the ERI study. These soil samples were submitted to ARA for analysis of VOCs by EPA Method 8260. Methanol field extraction was used for the preservation of each sample. Soil analytical results are summarized in **Table 3-12**, and a complete laboratory analytical report is provided in **Appendix F**.

Soil sampling results from OB57-DO from July 2022 indicated the following:

- TCE was detected at concentrations ranging from 18 mg/kg at 61 feet below the building to 130 mg/kg at 56 feet below the building.
- PCE was detected at concentrations ranging from 2.8 mg/kg at 61 feet below the building to 33 mg/kg at 56 feet below the building.

Following well installation, the well was developed using a pump and surge technique to remove silt and improve the hydraulic connection with the surrounding aquifer.

On August 9, 2022, groundwater samples were collected by low flow method from OB57-DO and submitted for laboratory analysis for VOCs by EPA Method 8260. Analytical results are included in

Table 3-8. A complete laboratory analytical report is provided in **Appendix E**. The August 2022 groundwater sample from OB57-DO indicated a TCE concentration of 0.380 mg/L and a PCE concentration of 0.062 mg/L.

Concentrations of TCE (up to 130 mg/kg) and PCE (up to 33 mg/kg) are present in soil beneath Building 2. However, these concentrations are lower than have been observed in the source area beneath Building 3 where TCE concentrations up to 450 mg/kg and PCE concentrations up to 1,200 mg/kg have been detected. Soil analytical results are summarized in **Table 3-12**. The TCE and PCE concentrations in groundwater beneath Building 2 are significantly lower than what has been recently detected beneath Building 3. For example, TCE over the past few sample rounds has been detected at concentrations up to 4.7 mg/L (AP30R-DO) and 270 mg/L (AP31-DO) in the deep overburden beneath Building 3 compared to 0.38 mg/L at OB57-DO. The TCE level detected at OB57-DO is comparable to the two wells just downgradient of Building 2 in May 2022 (0.24 mg/L at OB19-DO and 0.16 mg/L at OB26-DO), indicating that there likely is no additional source of VOCs beneath Building 2. While there are impacts present, these impacts appear to be related to the migration of VOCs from the upgradient Building 3 area rather than a source at Building 2, given the lower VOC concentrations beneath Building 2 relative to those beneath Building 3. The high soil resistivity in this area may be the result of the combination of dense glacial till with moderate VOC impacts.

3.3.9 Building 2 and 3 Vertical Well Installation (July 2022)

Based on the results of the ERI study, three vertical wells were installed in the area of Buildings 2 and 3 to evaluate the potential presence of VOC indicated by high resistivity reading in soil. Well OB55-BR was installed to the north of Building 3 along Route 128. Well OB58-DO was installed to the southwest of Building 2 and well OB59-DO was installed on the west side of Building 4 near Building 2. The drilling was completed from July 25 through 29, 2022, by Drilex Environmental of Auburn, Massachusetts, under the direct supervision of APTIM. Installation was conducted using hollow-stem auger drilling in the overburden and air rotary drilling in bedrock. The well locations are illustrated on **Figure 1-2**.

During drilling, soil samples were collected at approximately five-foot depth intervals for logging purposes and to conduct headspace VOC screening with a PID. Headspace screening results indicated the following:

- At well OB55-BR, VOC concentrations ranged from non-detect to 12.4 ppm at a depth of approximately 46 feet below grade.
- At well OB58-DO, VOC concentrations ranged from non-detect to 0.6 ppm at depths of approximately 32 and 52 feet below grade.
- At well OB59-DO, VOC concentrations ranged from 0.2 ppm to 1.6 ppm at a depth of approximately 38 feet below grade.

Overburden soils encountered at OB55-BR consisted of dense, silty sand and gravel (glacial till). A layer with primarily clay was noted at between approximately 28 and 34 feet and 48 to 55 feet below grade. Bedrock was encountered at approximately 61 feet below grade at OB55-BR. At OB58-DO, overburden soils consisted of a silty sand and gravel (glacial till). A medium to coarse sand layer was noted at approximately 35 feet below grade. Suspected bedrock was encountered at approximately 56 feet below grade at OB58-DO. At OB59-DO, overburden soils consisted of dense, silty sand and gravel (glacial till). Suspected bedrock was encountered at approximately 53 feet below grade at OB59-DO. The two deep overburden wells were constructed of 10 feet of two-inch diameter PVC well screen (10-slot) set just above bedrock and an appropriate amount of PVC riser to complete the well just below the ground surface. A one-to-two-foot bentonite seal was set above the sand pack. The remaining annulus was sealed with grout. At bedrock well OB55-BR, an air hammer was used to advance through bedrock to approximately 85 feet below grade. Once the final depth was achieved, a 2-inch diameter PVC well with 10 feet of screen and a sand pack was installed at the bottom of the borehole. A one to two-foot bentonite seal was installed from the top of the sand pack, and the remaining annulus was sealed with grout to the surface. Following installation, each well was developed to remove fine-grained sand or silt and improve the hydraulic connection with the surrounding aquifer. Soil descriptions, headspace screening results, and well construction details are summarized in the drilling logs provided in **Appendix B**.

During drilling, two soil samples were collected from each well, OB55-BR, OB58-DO, and OB59-DO. Sample collection was based on soil headspace screening results, observation of soil samples, and the depth of resistive soil in the ERI study. Soil samples were submitted to ARA for analysis of VOCs by EPA Method 8260. Methanol field extraction was used for the preservation of each sample. Soil analytical results are summarized in **Table 3-12** and a complete laboratory analytical report is provided in **Appendix F**. Soil sampling results indicated the following:

- TCE and PCE were detected at 0.97 mg/kg and 0.43 mg/kg, respectively, in a sample collected at approximately 30 feet below grade at OB55-BR. The soil sample collected at approximately 59 feet at OB55-BR did not indicate VOCs above detection limits.
- The soil samples collected at approximately 35 and 55 feet below grade at OB58-BR did not indicate VOCs above detection limits.
- TCE was detected at 0.36 mg/kg in a sample collected at approximately 24 feet below grade at OB59-DO. The soil sample collected at approximately 51 feet at OB59-DO did not indicate VOCs above detection limits.

On August 9 and 10, 2022, groundwater samples were collected by low flow method from wells OB55-BR, OB58-DO, and OB59-DO. The laboratory analysis included VOCs by EPA Method 8260. Analytical results are included in **Table 3-8**. A complete laboratory analytical report is provided in **Appendix E**. Analytical results of these samples indicate the following:

- TCE, PCE, and *cis*-1,2-DCE were detected at concentrations of 0.047 mg/L, 0.003 mg/L, and 0.031 mg/L, respectively at OB55-BR.
- All VOCs were non-detect at deep overburden well OB58-DO
- TCE and *cis*-1,2-DCE were detected at concentrations of 0.005 mg/L and 0.017 mg/L, respectively at OB59-DO.

Well OB55-BR was installed to assess the high conductivity indicated in ERI line VAR-06 area near well triplet OB12. Based on soil and groundwater analytical results, this area does not appear to be significantly impacted by VOCs in the overburden or bedrock. TCE and PCE were present at 30 feet below grade but at concentrations well below what is observed in the Building 3 Source Area. However, VOCs in soil were non-detect just above bedrock. The presence of *cis*-1,2-DCE in bedrock groundwater at OB55-BR indicates biodegradation of VOCs. The relatively low levels of VOCs in this area suggest that if the area of high conductivity revealed by the ERI study is the result of biologic activity, dechlorination of VOCs is likely not the main biologic activity that is occurring.

Well OB58-DO was installed to assess the high resistivity area indicated in ERI line VAR-05 to the southwest. The depth of the high resistive returns was observed from approximately 10 to 30 feet below grade at the location where OB58-DO was installed. Screening of soil samples at that depth did not indicate VOC impacts. Soil and groundwater samples collected from OB58-DO did not indicate detectable levels of TCE, PCE, *cis*-1,2-DCE, or 1,1,1-TCA. This indicates that the high resistivity in this area is not the result of VOC impacts. The high resistivity reading may be the result of dense glacial till and/or boulders in the area.

Well OB59-DO was installed to assess the high resistivity area indicated in ERI line VAR-03 south of Building 2. The depth of the high resistive returns was approximately 10 to 30 feet below grade at the location where OB59-DO was installed. Screening of soil samples at that depth did not indicate significant VOC impacts. A low level of TCE was detected in a soil sample at this location at the depth where elevated resistivity was observed. However, the concentration detected, 0.36 mg/kg, is well below the levels noted in the Building 3 Source Area. PCE in groundwater at OB59-DO was non-detect, and TCE was only present at 0.005 mg/L. Analytical data from this well indicate that the high resistivity in this area is not the result of VOC impacts. The high resistivity reading may be due to dense glacial till and/or boulders in the area.

Based on the results of the ERI study and the confirmation drilling, an estimated treatment area has been developed using soil resistivity measurements greater than 1,000 ohm-m. The estimated Building 3 treatment area is shown on **Figure 3-7**.

3.3.10 Building 5 Shallow Well Installation (August 2022)

As discussed in the January 2022 ROS Report, results of soil vapor sampling inside of Building 5 indicated shallow VOC impacts near soil vapor points BLDG5-SV8 and BLDG5-SV9 (**Figure 3-2**). This area is located upgradient of the shallow bioremediation area beneath Building 5 and is likely contributing to potential VOC migration into indoor air at Building 5. To further assess this area, shallow monitoring well OB60-S was installed inside Building 5 on August 13, 2022. The drilling was completed by Geosearch Environmental Drilling of Sterling, Massachusetts, under the direct supervision of APTIM. Installation was conducted using a low-profile, skid-mounted, hollow-stem auger drilling rig. The well location is illustrated on **Figure 3-2**.

During drilling, soil samples were collected at approximate five-foot depth intervals for logging purposes and to conduct headspace VOC screening with a PID. Headspace screening results indicated VOC concentrations ranging from 29 ppm at seven feet below the floor to 261 ppm at a depth of 17 feet below the building floor. Auger refusal was encountered at 17 feet.

Overburden soils encountered at OB60-S consisted of dense, silty sand and gravel (glacial till). The till material from 12 feet to the bottom of exploration had a higher silt content. The well was constructed of 10 feet of two-inch diameter PVC well screen (10-slot) set at 17 feet and an appropriate amount of PVC riser to complete the well just below the ground surface. A one-to-two-foot bentonite seal was set above the sand pack and the remaining annulus was backfilled with clean native soil. Following installation, the well was developed to remove fine-grained sand or silt and improve the hydraulic connection with the surrounding aquifer. Soil descriptions, headspace screening results, and well construction details are summarized on the drilling log provided in **Appendix B**.

During drilling, two soil samples were collected from OB60-S based on soil headspace screening results. Soil samples were submitted to ARA for analysis of VOCs by EPA Method 8260. Methanol field extraction was used for the preservation of each sample. Soil analytical results are summarized in **Table 3-12**, and a complete laboratory analytical report is provided in **Appendix F**. Soil sampling results indicated the following:

- PCE and *cis*-1,2-DCE were detected at concentrations of 0.58 mg/kg and 0.091 mg/kg, respectively in a sample collected at approximately 7 feet below the building.
- TCE, PCE, and *cis*-1,2-DCE were detected at concentrations of 1.4 mg/kg, 13 mg/kg, and 0.13 mg/kg, respectively, in the sample collected at approximately 16 feet below the building.

On August 16, 2022, a groundwater sample was collected by the low flow method from well OB60-S. Laboratory analysis included VOCs by EPA Method 8260. Analytical results are included in **Table 3-8**. A complete laboratory analytical report is provided in **Appendix E**. Analytical results of the groundwater sample from OB60-S indicate the following:

- TCE and PCE were detected at concentrations of 20 mg/L and 47 mg/L, respectively.
- *Cis*-1,2-DCE, VC, and 1,1-DCE were detected at concentrations of 23 mg/L, 1.0 mg/L, and 0.4 mg/L, respectively.

Results of the groundwater sample from well OB60-S indicate an area of VOC impact that warrants additional treatment to mitigate the potential impact to indoor air.

3.3.11 34 Longview Drive Activities (March, April, and July 2022)

APTIM conducted indoor air sampling at 34 Longview Drive in April and July 2022. In April 2022, samples were collected in the basement and first floor. In July 2022, samples were collected in the basement, on the first floor, and the unoccupied second floor. Samples were collected under normal living conditions at the same locations as previous sampling events. A Summa® canister fitted with a regulator calibrated to collect air over a 24-hour period was used to collect each sample. Canisters were placed at an elevated location to sample air at breathing height. Indoor air samples were analyzed for VOCs at Alpha Analytical by EPA Method TO-15 Selective Ion Monitoring (SIM). Laboratory quality control procedures were conducted in accordance with MassDEP CAM requirements.

Results of indoor air samples collected on April 22, 2022, at 34 Longview Drive indicated that TCE was detected at 0.779 $\mu g/m^3$ in the basement sample and 0.344 $\mu g/m^3$ in the first-floor sample. In April 2022, PCE was detected at 1.2 $\mu g/m^3$ in the basement sample and 0.509 $\mu g/m^3$ in the first-floor sample. Results of indoor air samples collected on July 14, 2022, at 34 Longview Drive indicated that TCE was detected at 0.801 $\mu g/m^3$ in the basement sample. The TCE level was non-detect in both the first-floor and second-floor samples. In July 2022, PCE was detected at 3.55 μg/m^3 in the basement sample, 0.556 μg/m^3 in the first-floor sample, and was non-detect in the second-floor sample. Indoor air results for VOCs associated with the Former Varian Facility Site from 34 Longview Drive are summarized in **Table 3-15**. As indicated in **Table 3-15**, the concentrations of TCE and PCE in the basement exceeded the Residential TVs during this monitoring period. It should be noted that the TVs are not exclusively risk-based limits. The TVs are guidance criteria developed by MassDEP to indicate levels in indoor air that may be above typical background, and which require additional evaluation. None of the additional VOCs potentially associated with the Varian Site were detected above their TVs in April and July 2022. The complete laboratory analytical reports from the April and July 2022 indoor air sampling are provided in **Appendix J**.

To evaluate a potential vapor migration pathway at 34 Longview Drive (**Figure 3-8**) consistent with MassDEP guidance, soil vapor samples were collected beneath the home (sub-slab) and tested. The approximate locations of soil vapor points, which were previously installed, and the basement indoor air sampling location at 34 Longview Drive are shown on **Figure 3-9**.

On April 22 and July 14, 2022, after sampling indoor air, soil vapor samples were collected beneath the 34 Longview Drive home. Each soil vapor sample point was connected to a Summa® canister, and a sample was collected over a two-hour period. Each sample was analyzed for VOCs by Alpha Analytical by EPA Method TO-15 SIM. Laboratory quality control procedures were conducted as detailed in the MassDEP CAM requirements.

Results of soil vapor samples collected on April 22, 2022, at 34 Longview Drive indicate TCE was detected at concentrations of 48.3 μg/m^3 and 4.37 μg/m^3. PCE was detected at concentrations of 4.46 μg/m^3 and 1.49 μg/m^3. The results of soil samples collected on July 14, 2022, at 34 Longview Drive indicate TCE concentrations were 68.3 μg/m^3 and 24.3 μg/m^3. PCE was detected at concentrations of 11 μg/m^3 and 16.6 μg/m^3. Select sub-slab soil vapor results are compared with MassDEP Residential Sub-Slab Soil Gas Screening Levels in **Table 3-16**. The TCE concentrations detected at location 34-LON-SV01 during both events exceeded the residential sub-slab soil gas screening level of 28 μg/m^3. All other results for VOCs associated with the Former Varian Facility Site were below the sub-slab screening values. It should be noted that the sub-slab screening levels are guidance criteria developed by MassDEP to be used in a lines of evidence evaluation and to indicate if additional assessment may be warranted. They are based on the TVs and a generic sub-slab soil gas to indoor air attenuation factor. Complete laboratory analytical reports are provided in **Appendix J**.

To assess potential preferential pathways for sub-slab vapor migration into the basement, soil vapor samples were collected at three locations on March 9, 2022. These included inside two sub-slab vaults that each contained sewer cleanouts and inside the basement sump. Both sewer cleanouts were capped during sampling. It should be noted that water has not been noted in the basement sump at this home during any of the sampling events completed. These grab vapor samples were collected over a 15-minute period using a Summa® canister. Each sample was submitted for laboratory analysis of VOCs at Alpha Analytical by EPA Method TO-15 SIM. Laboratory quality control procedures were conducted as detailed in the MassDEP CAM requirements.

Results of the soil vapor samples collected on March 22, 2022, are summarized in **Table 3-16** The data indicate:

- TCE was detected at concentrations ranging from 0.586 μg/m^3 to 67.2 μg/m^3 at the eastern sewer cleanout vault.
- PCE was detected at concentrations ranging from 1.48 μg/m^3 to 14 μg/m^3 at the eastern sewer cleanout vault.
- *Cis*-1,2-DCE was detected at concentrations ranging from 0.103 μg/m^3 to 9.44 μg/m^3 at the eastern sewer cleanout vault.

A vapor mitigation system will be installed in this home.

3.3.12 Irrigation Well Sampling (July 2022)

On July 14, 2022, a groundwater sample was collected from a shallow irrigation well located at 21 Shortmeadow Road. This property is located near the existing well triplet CL8-S/DO/BR. Groundwater sampling conducted at these wells since the 1990s has not indicated the presence of VOCs. Based upon discussion with the property owner, the shallow well is a well point that was installed to approximately 15 feet below grade and is only used for irrigation. A sample was collected from the shallow well using a low flow sampling method. The laboratory analysis included VOCs by EPA Method 8260. All VOCs were non-detect in the sample collected from the 21 Shortmeadow Road shallow irrigation well. A complete laboratory analytical report is provided in **Appendix K**.

4.0 SITE HYDROGEOLOGICAL CHARACTERISTICS [310 CMR 40.0385(4)(d)]

This section provides a description of the hydrogeological conditions of the Site. A summary of recent geologic investigation work conducted in 2022 is presented in Section 3.3.

4.1 General Characterization of Geologic and Hydrogeologic Conditions

The principal geological and hydrogeological characteristics of the Site were identified based upon the analysis and interpretation of the drilling, geophysical, and hydrogeological data generated throughout the 2000 Phase II investigations. Additional investigation activities conducted since 2000 have provided more details in some areas of the Site. However, those data have not substantially changed the Site geologic and hydrogeologic characteristics and geologic interpretations as described in the 2000 Phase II CSA. Those interpretations are generally described below.

The Site hydrogeology is characterized by the presence of two aquifers, the overburden and bedrock aquifers. The thickness of the overburden aquifer ranges from approximately 20 to 100 feet. The Site is typically underlain by till, sand and gravel, and silt and clay deposits. These soils generally increase in thickness from south to north and are characterized by six major lithological units: 1) till, 2) gravel, 3) medium to coarse sand, 4) fine sand, 5) silty sand/sandy silt, and 6) clay. The thickness, continuity, geographical distribution, and stratigraphic relations of these six lithological units are highly variable throughout the Site since they were put in place in rapidly changing glacial, postglacial, and coastal depositional environments.

The depth to bedrock is highly variable throughout the Site as a result of the erosion and sedimentation episodes caused by a series of glacial advances and retreats over the last three million years as shown on a bedrock surface contour map (**Figure 4-1**). The bedrock topography map has been updated to reflect the results of the assessment completed since the completion of the 2000 Phase II CSA. The Site is underlain by two major rock units: a gabbro in the western half of the Site and a granite in the eastern half (U.S. Geological Survey [USGS], 1964). Groundwater flow in both bedrock units occurs almost exclusively through the secondary porosity represented by networks of joints, fractures, faults, and geologic contacts. Observations on the bedrock fracturing indicate that the sub-horizontal sheeting fractures in the granite represent the major groundwater flow pathway coupled with three groups of sub-vertical fractures trending N-S, ENE-WSW, and NNW-SSE and coincident with lineaments transecting the Site in like directions.

The groundwater from the upper and lower parts of the overburden aquifer and from the bedrock flows with the same general pattern: 1) westerly flow from the former Varian facility property, 2) northwesterly flow from the north side of Route 128, and 3) southerly flow along the valley of the Unnamed Stream and Stream A west of Tozer Road. An approximately east-west groundwater divide, located to the north of and parallel with Route 128, diverts the westerly flow into a northwesterly flow component toward the drainage basin of Wenham Lake and into a southerly flow component toward the drainage basin of the Bass River. Groundwater contour maps of the shallow overburden, deep overburden and bedrock aquifers are provided as **Figures 4-2**, **4-3**, and **4-4**.

In the bedrock aquifer, groundwater flows through interconnected fractures and faults in directions generally like those of the overburden aquifer. The overburden and bedrock aquifers are locally in communication. As a result, in addition to horizontal flow, which occurs primarily at the top of the overburden aquifer, a component of the groundwater flow at the base of the overburden aquifer and in the bedrock aquifer is vertical. It is generally downward from the overburden to the bedrock at the facility and to the north but is also upward from the bedrock to the overburden in the vicinity of the streams to the west and to the south of the facility. This is observed at BR-6 on Hill Street and at BR-7 located at 39 Tozer Road (see Section 4.4.4).

The local influence on the water table configuration of Stream A and the Unnamed Stream crossing the area is evident on the groundwater contour maps included in the 2000 Phase II report and on figures generated with data from May 2022 (**Figures 4-2**, **4-3**, and **4-4**). Data presented in the 2000 Phase II CSA show that the streams appear to be generally in a gaining mode (i.e., the shallow groundwater discharges to the streams). An evaluation of the water elevations in the streams and in the nearby shallow hand-auger wells and an evaluation of the stream flow measurements, reveal that certain sections of the Unnamed Stream, including the culvert sections, are gaining water from the shallow overburden aquifer while other sections are marginally losing water. Stream A appears to be in a gaining mode both upstream and downstream of its confluence with the Unnamed Stream. Those gains or losses are a function of the local topographical configuration, seasonal fluctuations, and important storm events.

4.2 Description of Subsurface Geological and Hydrogeological Investigations

As presented in the 2000 Phase II CSA, single-well constant-rate pumping, and recovery tests were performed on five overburden wells in 1996 and one bedrock well in 1997. Between 1996 and 1998, slug tests were performed on 32 overburden wells and 14 bedrock wells. These tests were conducted to calculate the hydraulic conductivity (K) and transmissivity (T) of shallow and deeper sections of the overburden and bedrock aquifers. For the bedrock aquifer, the hydraulic conductivity of 31 fracture zones isolated with a double packer and five open-hole bedrock wells were tested in the granite. In the gabbro, 16 double packer slug tests and one slug test in a screened bedrock well were performed. The fracture zones selected from caliper logs, video logs, and drilling logs were essentially sub-horizontal fractures. Therefore, the tests essentially measured the ability of the sub-horizontal fractures to transmit water.

Based on these aquifer tests, for the overburden aquifer the fine to coarse sand of the shallow overburden can be characterized by medium-high hydraulic conductivity in the 30 to 50 feet per day range. The fine to coarse sand, silty sand, and silt layers characteristic of the deep overburden aquifer exhibit low to medium-high hydraulic conductivity in a wider range of 0.6 to 30 feet per day. For the bedrock aquifer, the average hydraulic conductivity values for the granite and the gabbro can be from approximately 4 to 10 times less permeable than the overlying deep overburden. In summary, the fractured granite exhibits low to medium hydraulic conductivity in the 4 to 12 feet per day range. The gabbro, less fractured, can be characterized by low K values ranging between 1 and 6 feet per day.

Additional aquifer pumping tests in the bedrock and overburden aquifers were conducted in 2000, as reported in the Phase III RAP (IT, 2000b). This was conducted to evaluate the aquifer characteristics in the area of 28 Tozer Road for use in a groundwater containment system. The results of the bedrock aquifer testing indicated that the transmissivity of the bedrock aquifer is approximately 26 square feet per day (over the depth of recovery wells RW-19 and RW-21) with a leakance coefficient of 0.75 feet per day per foot. The estimated transmissivity corresponds to an average hydraulic conductivity of 0.35 feet per day. These values were found to be within the range of expected values for fractured bedrock with a hydraulic connection to a transmissive overburden. For the overburden testing, due to the lack of stabilization of drawdown during the testing, the analytical methods used only provided rough estimates, rather than reliable calculations, of transmissivity and specific yield based on the pumping test results. The estimated transmissivity was 9,945 square feet per day and a specific yield of 0.3. Based on the results of this testing, groundwater pumping was not selected as a remedial measure for this area of the Site. This high transmissivity is consistent with the sand and gravel overburden aquifer observed along Tozer Road. The transmissivity in the bedrock aquifer is substantially lower than the overburden aquifer, meaning that most of the groundwater flow occurs in the overburden.

4.3 Bedrock Surface Topography

Using depth to bedrock measurements collected during additional subsurface investigations conducted since 2000, a bedrock surface topographic map has been prepared for the Site to include the new data. As shown on **Figure 4-1**, the bedrock surface topography beneath the Site area is quite variable but is consistent with the general morphology of the area, which consists of elongated NW-SE hills, ridges, and valleys. Two of the highest bedrock elevations (elevation of 60 to 90 feet MSL) are found at the small granite cliffs located to the north of the high school at 100 Sohier Road and under the open field at the southern end of the former Varian facility. The lowest bedrock elevations (-165 feet and -96 feet) occur, respectively, at the easternmost area of the Site (well CL1-BR) and the southernmost end of the Site (cone penetrometer test location CPT-31 on Herrick Street). The deep bedrock depression, along with the very steep bedrock slope east of the Site to CL1-BR, likely reflects the presence of an NW-SE fault zone revealed by the lineament and fracture analysis (IT, 2000a).

Starting from one of the highest bedrock elevations, 70 to 80 feet to the south of the former Varian facility property, the bedrock surface slopes to the north-northwest and forms a gentle ridge. The north-northwest ridge continues to the northwest across Route 128 toward Commons Drive (CL9-BR) and Arlington Avenue (BR-4), where the bedrock surface is found at -30 feet in elevation. Overall, this bedrock ridge exhibits a 2 to 2.5 percent gentle slope which is consistent with the slope of the elongated axis of the northwest-southeast topographic hills characteristic of the region.

Along the ridge, a slight bedrock depression is noted beneath Building 5. The bedrock elevations around Building 5 are between 30 and 20 feet. However, a bedrock elevation of 8 feet is observed at well OB53-BR. Continuing along the ridge in the Building 3 area, the ridge is transected by a shallow, east-west trending depression that gently dips to the west to Building 7. As described above, there is a steep bedrock slope along the east side of Building 3 with bedrock depths adjacent to the building of –22 to -28 feet in elevation. Bedrock elevations beneath the north end of the building and just west of this steep slope range from 9 to 14 feet elevation with a low of 4 feet along the west side of Building 3. Bedrock then slightly rises a few feet west of Building 7.

The west side of the north-northwest and northwest gentle slope is flanked by a valley that was carved in the bedrock. This valley starts fairly wide along a northwest-southeast direction from Conant Street (Well CL7-BR) to CL3-BR on Tozer Road just west of Building 7. This valley holds a gentle depression just to the west of Tozer Road, extending from Sonning Road (CPT-3) to Tozer Road (CL3-BR). From the area of CL3-BR on Tozer Road, the bedrock valley becomes narrower and turns to and slopes toward a south-southeast direction. Based on the data available, this northwest valley turns to the south-southeast marks, and was carved at, the granite and gabbro contact. This contact was a major weak discontinuity in the bedrock that was susceptible to glacial erosion. The inferred granite and gabbro contact based on the USGS mapping of the area (1964) is shown on **Figure 4-1**.

This main and long bedrock valley is, in turn, flanked on its west side by a northwest-southeast bedrock ridge, which is at its highest in the area of P-21 (29 feet) and BR-6 (30 feet). The ridge extends from about CL8-BR on Short Meadow Road to CPT-13 at 39 Tozer Road, where the bedrock culminates at -25 feet in elevation. Continuing west, a second deep west-northwest-southeast depression is found where the bedrock is as deep at -72 feet in elevation at CPT-20 on Lexington Drive and –70 feet at CPT-11 on Gray Road. To the west the bedrock surface rises again and forms a north-northwest ridge, culminating at 11 feet in elevation at CPT-29 on Columbia Road. To the southeast and south, the bedrock valley deepens to –80 feet at BR-8 near Russel Street and then to –96 feet at CPT-31 at Herrick Street. Bedrock (gabbro) outcrops to the west of these deep valleys have estimated elevations of 60 to 90 feet.

4.4 Groundwater Flow

Groundwater occurs at the Site in two distinct aquifers: the overburden aquifer and the bedrock aquifer. These two aquifers are fundamentally distinguished by different characteristics of groundwater occurrence, flow, recharge, and discharge. These characteristics are presented and compared when relevant, in this and subsequent sections. Analysis of groundwater level data supporting the discussions below is included in **Table 3-7**.

Many years of groundwater elevation data are available for the Site. A historical shallow groundwater contour map that provides data across all points at the time is provided as **Figure 4-5**. Groundwater contour maps generated from this data have been consistent in illustrating flow direction. Depth to groundwater measurements collected during the May 2022 sampling event (**Table 3-7**) were used to develop groundwater elevation contour maps for the shallow overburden, deep overburden, and bedrock aquifers in the Site vicinity **(Figures 4-2**, **4-3**, and **4-4**, respectively). These figures show groundwater flow northwesterly across the facility. The majority of Site groundwater in each aquifer generally flows from the facility property to the west/southwest, following the regional groundwater flow pattern, which is south and west toward Shoe Pond and the Bass River. The gradient in each aquifer is moderate to steep east of Tozer Road and very flat to the west of Tozer Road. In the shallow and deep overburden, there are indications of limited northerly and easterly groundwater flow in the contours at the northern end of the Site. Overall, the groundwater gradients shown on **Figures 4-2**, **4-3**, and **4-4** are consistent with historical data from the Site.

Groundwater occurrence and flow in the overburden and bedrock aquifers are discussed below and are consistent with historic groundwater flow maps. The gradients and area-wide groundwater flow regimes beyond the immediate Site area, as discussed below, are from the 2000 Phase II CSA. As with the groundwater flow direction, there is no reason to believe that the horizontal or vertical gradients or general regional flow patterns have changed.

4.4.1 Shallow Overburden Aquifer

Groundwater in the shallow overburden at the Site generally occurs in and flows under water table conditions through the porous space between the grains and particles of the glacial and marine deposits. Although thick deposits of marine clay were encountered to the south, localized confined groundwater conditions exist in more permeable layers of soil beneath the clay deposits. The overburden aquifer is recharged directly by infiltration of rainwater and surface runoff through unpaved areas. It typically discharges at depth to the bedrock aquifer and to the surface in portions of the local streams. The groundwater flow conditions for the shallow water table in the Site area are shown on **Figure 4-2**.

Groundwater occurs at its highest elevation at the southerly end of 150 Sohier Road and flows northwesterly across the facility. The general flow direction changes to a westerly direction following the steeper westerly topographic slope that starts at Bomac (Salem Water Works) Road and subsequently follows the drainage and discharge pattern induced by the Unnamed Stream. This stream transects the Site in an east-west direction from Sohier Road to Tozer Road.

From Tozer Road, at the base of the steep westerly topographic slope, the groundwater flows in a general southerly direction following the courses of the Unnamed Stream and Stream A, which are the major surface water drainage features at the Site.

From the northern end of the facility property and continuing north of Route 128, the groundwater flow direction gradually changes from westerly to northwesterly in a general direction toward Wenham Lake, part of a different drainage basin than the Bass River basin. This divide is most evident in the deep overburden and bedrock groundwater contour maps.

4.4.2 Deep Overburden Aquifer

As in the shallow overburden, groundwater in the deep overburden occurs at its highest elevation at the southerly end of 150 Sohier Road and flows northwesterly across the facility (**Figure 4-3**). From the former Varian facility property to Tozer Road, groundwater flows in the deep overburden aquifer to the west with fairly low and regular horizontal hydraulic gradient components between 0.02 and 0.03 feet per foot (ft/ft).

To the north of the facility and north of Route 128, the westerly groundwater flow gradually changes to a northwesterly direction toward wells CL7-DO to the northwest and well MW-35 to the north. Horizontal hydraulic gradient components are lower (in the 0.007 to 0.01 ft/ft range).

A groundwater divide oriented approximately east-west originates near Commons Drive to the north of Route 128 and extends west toward Interchange 20 (Dodge Street) of Route 128. This divide diverts part of the westerly flows from the north of the former Varian facility gradually to the northwest and to the south.

To the west of Tozer Road and moving to the south, groundwater flow changes from a westerly direction with fairly low horizontal gradients (0.02 to 0.03 ft/ft) to a southerly flow with very low horizontal gradients (0.003 to 0.007 ft/ft), consistent with the regional southerly flow.

4.4.3 Bedrock Aquifer

Given the very low permeability of the gabbro and granite matrix, zones of fracturing serve as the primary groundwater flow pathways in the bedrock. Depending on the complexity of the fractures' network, groundwater in the bedrock may flow locally in slightly different directions and at different rates than groundwater in the overlying overburden. On an area-wide or regional scale, groundwater flow directions in the bedrock are the same as in the overburden aquifer. The contours shown on **Figure 4-4** therefore only show the potential for groundwater flow in the bedrock aquifer.

The groundwater flow pattern in the bedrock aquifer follows closely that of the deep section of the overburden aquifer (**Figure 4-4**). Groundwater flows in the bedrock in a westerly direction from the former Varian facility property to Tozer Road with low and regular hydraulic gradients ranging from 0.01 to 0.015 ft/ft. North of the former Varian facility and of Route 128, the westerly groundwater flow gradually changes to a northwesterly direction toward wells CL7-BR, BR-4, and BR-3. Hydraulic gradients decrease to a 0.007 to 0.009 ft/ft range.

A similar east-west groundwater divide, roughly parallel with Route 128, exists in the bedrock aquifer. As with the overburden aquifer, this divide diverts the westerly flows from the north of the former Varian facility gradually to the northwest and to the south.

West of Tozer Road and to the south, groundwater flow changes from a westerly direction to a southerly flow with a very low hydraulic gradient (0.002 ft/ft). However, further south, the hydraulic gradient in the bedrock seems to increase toward the southernmost bedrock well BR-8 (from 0.004 to 0.007 ft/ft).

4.4.4 Vertical Component of Groundwater Flow

In addition to flow in horizontal directions, a component of the groundwater system can flow in a vertical direction either downward from the overburden to the bedrock or upward from the bedrock to the overburden. The direction of vertical flow is a function of the relative head difference between two aquifers or portions of aquifers. For the 2000 Phase II CSA, measurements of groundwater levels at clusters of 10 wells were conducted on several occasions at the Site. Hydraulic vertical gradients were determined as follows: when the hydraulic head at a particular well or intake zone of a multi-level bedrock well is greater than the head at its associated deeper well or intake zone, the head is positive (+). In such cases, there is a tendency for a downward groundwater flow and the vertical hydraulic gradient is determined to be downward. When the hydraulic head difference between a shallower and deeper well or intake zone, the head is negative (-). In such cases, there is a tendency for an upward groundwater flow, and the vertical hydraulic gradient is deemed to be upward. A compilation of vertical hydraulic gradients is found in **Table 4-1**. These conclusions were supported by a series of hydrographs from 10 well clusters included in the 2000 Phase III CSA.

In the three central and western clusters of wells including CL1 (east of 150 Sohier Road), CL3/BR-5 (28 Tozer Road), and CL8 (Shortmeadow Road), the hydraulic vertical gradient between the upper part of the overburden aquifer (i.e., in the shallow "S" wells) and the bottom of the overburden (i.e., in the deep "DO" wells) is negative (i.e., upward). For example, it is characterized by a very weak to negligible vertical upward gradient of -0.0007 ft/ft at cluster CL8-S/DO (or only a head difference of 0.03 feet, which is within the range of field measurements' imprecision and instruments' inaccuracy). At CL3-S/DO, the gradient in the overburden is also weak but consistently upward. At the pair CL1-S/DO, the gradient is very weak upward, but is inconsistent since it is downward on some events. An overall weak upward gradient is also noted at clusters CL3 and CL8 within the bedrock and from the bedrock to the overburden. As explained in **Table 4-1**, the bedrock/overburden gradient cannot be established at CL1- DO/BR.

In the four northern clusters, CL2 (16 Tozer Road), CL6 (Walden Street), CL7 (Conant Street), and CL9 (Commons Drive), the hydraulic head differences between the shallow wells and the deep overburden wells are the highest, between 1 and 3 feet. This results in a strong, consistent downward gradient. The calculated vertical downward hydraulic gradients are weak from +0.01 ft/ft in cluster CL9-S/DO to fairly strong +0.05 ft/ft in cluster MW-2R/CL2-DO. The vertical gradients between the overburden and the bedrock are, however, irregular. They are slightly upward to negligible in CL2, CL6, and CL7 well clusters (< 0.1 feet of head difference) to strongly upward at cluster CL9 (1.6 feet). At BR3, the northernmost bedrock well, the gradient between the overburden and the bedrock is also downward at +0.02 ft/ft, or a head difference of 3 feet. Prominent upward gradients within the bedrock are observed at wells BR-3 and

CL9-BR (- 0.03 to - 0.15 ft/ft), with head differences of as much as almost 4 feet between the two deepest bedrock zones at BR-3. On the other hand, very weak, inconsistent, and negligible gradients exist in the bedrock at wells BR-1 (Walden Street), BR-2 16 Tozer Road) and BR-4 (Arlington Avenue), with either positive or negative head differences of only 0.02 to 0.06 feet between bedrock zones (**Table 4-1**).

At the southern cluster CL-4 (30 Tozer Road) and the two southernmost bedrock wells, BR-7 (39 Tozer Road) and BR-8 (Russell Street), the vertical gradients are overall very weak downward from the deep overburden to the bedrock and within the bedrock unit, with head differences of only 0.1 to 0.2 feet, which can be considered negligible (**Table 4-1**). However upward gradients between the upper bedrock and/or deep overburden and the shallow overburden are noted at BR-6 (28 Hill Street) and BR-7. At BR-6, which is located on a bedrock knoll where the bedrock was encountered at less than 10 feet below grade, there is a strong upward gradient from the upper bedrock to the shallow overburden. A negative head difference of almost 3.5 feet exists between the first bedrock zone at BR-6 and nearby piezometer P-9. This results in the highest upward vertical hydraulic gradient of -0.1 ft/ft measured in the area (**Table 4-1**). Further south, where wells BR-7 and BR-8 were drilled, the thickest central section of the overburden consists almost entirely of marine clay deposits. The clay acts as an aquitard. Consequently, the groundwater at the base of the overburden aquifer and in the bedrock is under confined conditions. This was observed during drilling when artesian conditions were found in the bedrock well BR-7, located at 39 Tozer Road. The data show that the groundwater elevations in the deep overburden (MW-34) and bedrock aquifers (BR-7) are consistently 7 to 9 feet higher than those in the shallow aquifer (P-17). This results in a strong consistent upward gradient from the bedrock and deep overburden to the shallow overburden aquifer in this area.

Results of monitoring well gauging conducted in 2020 to 2022 are summarized in **Table 3-7**. These wells include well clusters OB-12 S/DO/BR, AP-13 S/DO and RW-3 (BR), OB-19 S/DO/BR, and AP-12 S/DO/BR located in the Building 3 Source Area and OB-45 S/DO/BR and AP-36-S, OB-38 DO/BR located in the Building 5 Source Area. Data from these source area wells reveal a moderate downward flow vertical gradient in both source areas between the overburden and bedrock aquifers. Hydraulic head differences in the Building 3 area range from 1 to 7 feet in the overburden and 2 to 6 feet between the deep overburden and bedrock. In the Building 5 area the hydraulic head differences range from 2.5 to 4 feet in the overburden to 4 to 11 feet between the deep overburden and bedrock.

The vertical hydraulic gradients within and between the aquifers can be summarized as follows:

- Central and Western Wells: Weak, inconsistent upward gradients within the overburden (up to 0.1 feet of head difference) accompanied by weak, inconsistent upward gradients from the bedrock to the overburden and within the bedrock.
- Northern Wells: Consistent downward gradients in the overburden, sometimes strong, with up to 3 feet of head difference. The gradients between the bedrock and the overburden and within the bedrock do not exhibit a common pattern. Very strong upward (up to 4 feet of head difference) or very weak and inconsistently upward or downward (with 0.1 to 0.2 feet of head difference) vertical gradients have been observed.

- Southern Wells: Overall weak and somewhat inconsistent downward gradients from the deep overburden to the bedrock and within the bedrock (0.1 to 0.2 feet of head difference). The exception to this is seen at BR-6 where there is a thin overburden and a strong upward gradient from the upper bedrock to the shallow overburden, and at BR-7 where there is a thick marine clay deposit and a strong upward gradient from the deep overburden to the shallow overburden.
- Source Area Wells: Consistent downward gradients from the overburden to the bedrock (with 2 to 11 feet of head difference).

4.5 Evaluation and Description of Potential for Flooding

To determine the potential for flooding in the Site area, the Federal Emergency Management Agency (FEMA) flood map for the Site area was viewed on FEMA's on-line Flood Map Service Center. As determined, the majority of the former Varian facility at 150 Sohier Road is located in an area designated as an area of minimal flood hazard (no shading). A small, paved area along the east side of Buildings 3 and 4 is designated as a moderate flood hazard area (between the limits of the 100-year and the 500-year flood). In the Site area, portions of the neighborhood to the west of the facility, including Sonning Road and Stream A to the south of 39 Tozer Road, are also mapped as areas of minimal flood hazard. The Unnamed Stream after the confluence with Stream A to the south of the facility is identified as a high risk of flooding or Special Flood Hazard Area (mapped as Zone AE or within the 100-year flood zone). Copies of FIRMette Maps for the Site area are included in **Appendix L**.

5.0 ENVIRONMENTAL FATE AND TRANSPORT OF OIL AND/OR HAZARDOUS MATERIALS [310 CMR 40.0835(4)(e)]

Significant discussion regarding the environmental fate and transport of COCs for the Site was provided in the 2000 Phase II report including the transport and attenuation factors that have resulted in the observed chemical distribution at the Site. Many factors contribute to where and how chlorinated solvents migrate in the vicinity of the Site. The dominant factors discussed in 2000 were dispersion, molecular diffusion, adsorption, chemical transformation, variable permeability of the overburden and bedrock zones, and the hydraulic gradients in the aquifer and stream transport systems.

Subsequent Site investigation over the past two decades has not revealed new COCs for the Site or new migration pathways. However, there have been COCs detected along the migration pathways that have enhanced our understanding of the fate and transport of COCs in downgradient areas of the Site. The following sections generally describe the COCs, the general physical characteristics, and the migration pathways at the Site.

5.1 Contaminants of Concern

Information regarding historical industrial processes at the former Varian facility and subsurface investigations conducted have confirmed that the COCs at the Site are chlorinated VOCs. TCE, PCE and 1,1,1-TCA were the three primary chlorinated solvents historically used at Varian's former facility. In addition to the primary VOCs, five other chlorinated VOCs are frequently found in groundwater including: two isomers *cis*-1,2-DCE and *trans*-1,2-DCE, and 1,1-DCE, 1,1-DCA, and VC. The presence of these five compounds is the result of degradation of the parent compounds TCE, PCE, and 1,1,1-TCA. These three chemicals and their degradation products have been identified in the subsurface at different areas of the 150 Sohier Road facility by historical investigations.

As discussed in the 2000 Phase II CSA, samples of DNAPL were obtained from recovery well RW-2 and RW-4 in 1993 and in 1997, respectively. An analysis revealed the DNAPL to be composed of TCE and PCE in equal proportion. No further measurement of DNAPL has been reported since 1997. This has included at least semiannual gauging of Site wells in the source areas with an interphase probe to the present time. This suggests that the DNAPL that was released is no longer mobile as a DNAPL. The residual solvent, however, will slowly dissolve into the groundwater and provide a long-term source for VOCs in groundwater. This slow release from the soil is likely a key reason for the long treatment time that has been observed during the implementation of Comprehensive Response Actions.

5.2 Characteristics of Contaminants of Concern

The chemical and physical properties of the eight COCs were discussed in the 2000 Phase II CSA. The main characteristics of these chlorinated VOCs are:

- Liquid as pure phase products at ambient temperature. (Except VC, which is a gas)
- Denser than water as pure phase products [ranging from 1.17 grams per cubic centimeter (g/cm3) to 1.63 g/cm3 compared to the density of water = 1 g/cm3]
- Less viscous than water [0.36 centipoise (cP) < viscosity of the compound < 0.9 cP; viscosity of water = 1 cP]
- Relatively soluble in water (200 mg/L to 6,300 mg/L)
- Relatively mobile in groundwater as indicated by low retardation coefficients (1 to 1.63, but 2.8 for PCE).

A retardation coefficient or retardation factor is the ratio of the velocity of the groundwater to the velocity of the VOC plume in groundwater. The retardation coefficient varies with aquifer characteristics, particularly the fraction of organic carbon (*foc*). The apparent velocity of a dissolved compound is often slower than the groundwater velocity. This is caused by the adsorption of some fraction of the dissolved compound to the solid geologic material. Sample retardation coefficients for the Site COCs in overburden, with an assumed *foc* of 0.0007, and range from 1.01 for VC to 2.81 for PCE. Actual retardation values at the Site will vary due to differences in *foc*, soil density, and porosity.

5.2.1 Degradation and Natural Attenuation of the Contaminants of Concern

In evaluating the presence and distribution of the eight individual COCs, the three parent compounds, PCE, TCE, and 1,1,1-TCA, are degrading into their daughter compounds. Natural attenuation means the processes that act on a compound to reduce its concentration in the environment through naturally existing mechanisms. Natural attenuation is the combined effect of dilution, volatilization, sorption, and biotic and abiotic degradation of dissolved compounds in groundwater. The combined effect of these processes can result in a concentration reduction in some compounds (the parent compounds) with a corresponding increase in the degradation compounds (the daughter compounds). Intrinsic biodegradation is the subset of these processes induced by naturally occurring microorganisms in the soil and groundwater.

Under anaerobic conditions, PCE is reductively dehalogenated, yielding in succession TCE and both *cis*-1,2-DCE and *trans*-1,2-DCE (with a very high ratio of the *cis*-isomer to the *trans*-isomer). That natural attenuation is occurring at the Site is confirmed by the frequency of detection of these two compounds in groundwater. The final steps of the reductive dehalogenation are the degradation of the 1,2-DCE isomers into VC, and further the degradation of VC into ethene. Under the same processes, 1,1,1-TCA degrades primarily to 1,1-DCA and chloroethane, and finally ethane and, to a lesser extent, 1,1-DCE, VC, and ethene. The rates of degradation may vary considerably from compound to compound in different areas of an aquifer.

As detailed in the 2000 Phase II CSA, evaluation of natural attenuation of dissolved PCE, TCE, 1,1,1-TCA and their related daughter compounds in groundwater has been conducted at the Site by comparing the mole ratios of parent and daughter compounds along the plume migration pathway and evaluating water quality parameters that are indicative of natural attenuation. The results of the evaluation support the conclusion that natural attenuation is occurring at the Site for the chemicals PCE, TCE, and 1,1,1-TCA. Anaerobic conditions in the aquifer and the presence of daughter products and natural attenuation by-products confirm that natural biological activity is occurring that is effecting changes in the groundwater chemistry. The conclusions from the natural attenuation assessment suggest that natural attenuation will play a role in the long-term fate and transport of VOCs in groundwater and aid the effectiveness of remedial efforts at the Site.

As noted above, a significant amount of bioremediation has been conducted at the Site in source areas. That treatment technology uses additives to enhance the microorganism's ability to degrade the VOC in groundwater. Bioremediation at the Site has had success in a shallow groundwater area near Building and adjacent to the Unnamed Stream and in shallow groundwater beneath Building 5. Monitoring in those areas has shown the complete degradation of VOCs to ethene and ethane. Bioremediation in the deep overburden near Building 3 has had mixed success. While Site data have shown that active reductive dechlorination is occurring, elevated levels of TCE and *cis*-1,2-DCE remain in some wells.

5.3 Existing and Potential Migration Pathways including Indoor Air

Based on extensive assessment of the Site, the existing and potential migration pathways have been well documented and include groundwater (flow through overburden and bedrock aquifers), surface water (nearby streams), utilities, sediment, soil vapor, and indoor air. Evaluation of the groundwater pathway has been ongoing through continual groundwater monitoring and additional well installation activities after the 2000 Phase II CSA. Since the 2000 Phase 2, the potential indoor air pathway has become a more significant focus for investigation. This has included evaluations of potential migration into indoor air in residential areas, at commercial properties, and on-site facility buildings, as previously reported. In addition, surface water and sediment sampling of the Unnamed Stream and Stream A was conducted in 2021, to further evaluate that potential migration pathway.

6.0 NATURE AND EXTENT OF CONTAMINATION [310 CMR 40.0835(4)(f)]

The nature and current extent of VOCs in soil, groundwater, surface water, and sediment are discussed in this section. The discussion is based on Site data collected during investigations and sampling events conducted over recent years (soil) and over the past two years (groundwater, surface water, and sediment).

6.1 VOCs in Soil

The nature and extent of VOCs in soil at the Site was determined based on the results of PID field screening recorded during drilling activities and laboratory analysis of soil samples collected at the Site.

Soil impacts are noted in the three main source areas at 150 Sohier Road. These include the Building 3 Area (encompassing Buildings 1, 2, 3, and 6), the Building 5 Area, and PSL-10. VOC soil impacts have not been observed in downgradient areas. The following sections provide a summary of the extent of soil impacts in each area. **Table 6-1** summarizes soil data (1995-2019) for the Building 3 area, **Table 6-2** summarizes soil data (1995-2022) for the Building 5 area, and **Table 6-3** summarizes soil data (1999-2011) for the PSL-10 area.

6.1.1 Building 3 Area Soil Impacts

Soil Impacts in the Building 3 Area are characterized by concentrations of TCE and PCE at their highest beneath or adjacent to the building.

Shallow Overburden

In the shallow overburden the highest VOC levels since 2012 are noted at the following locations:

- In the western part of Building 3, PCE was detected at 22 mg/kg at 11 feet below the floor in 2013 (**Figure 6-1**).
- In the eastern part of Building 3, the TCE concentration was 28 mg/kg at 18 feet below grade in 2019 at OB-50S, located just outside of the building (**Figure 6-2**). PCE concentrations in this area were detected at concentrations ranging from 110 mg/kg (10 feet at OB51-S) to 320 mg/kg (16 feet at OB49-S). These wells are in the northeast corner of Building 3 near a former drain line from the Building 3 Lab.

Historically (prior to 2012), the highest PCE concentration at Building 3 was detected in 1995 in the western part of the building near the exterior inspection sump (PSL-9), associated with the former Building 3 Lab waste lines (PCE at 1,200 mg/kg). However, significant treatment has been conducted in that area after the sample was collected, and as a result, the 1995 concentration is not indicative of current Site conditions. Treatment has also been conducted since soil samples were collected in the eastern part of Building 3 in the area of OB49-S through OB51-S, so the concentrations detected in 2019 at these locations are also not likely indicative of current conditions. At the western edge of Building 3 concentrations of TCE and PCE in shallow soils were low (<0.03 mg/kg) in 2012 and 2013, indicating the extent on shallow impacts.

Deep Overburden

The highest concentrations of VOCs at depth are at well AP35-DO, which is located at the northeast corner of Building 3. TCE and PCE were detected at 450 mg/kg and 740 mg/kg, respectively in 2013 at approximately 34 feet below grade. A TCE concentration of 110 mg/kg was detected in a sample from 41 feet below the eastern part of Building 3 at well OB43-DO. Based on soil headspace screening results (e.g., >1,000 ppm), elevated soil concentrations have also been present beneath the easter part of Building 3 at wells AP30R-DO, AP31-DO, and AP32-DO. Treatment has also been conducted at depth in both these areas, therefore, these VOC concentrations are also not likely indicative of current conditions.

At depth, soil impacts in the Building 3 area extends to the west and southwest towards Buildings 1 and 2 with the major groundwater flow pathway. Results of the ERI study discussed in Section 3.3.7 suggest that VOC impacts in soil do extend to the top of bedrock directly beneath Building 3. Beneath Building 2 soil impacts were detected at 56 feet below the building (TCE 130 mg/kg at angled well OB57-DO). However, based on soil screening results at this location, soil impacts are non-detect shallower than 40 feet below Building 2. To the west, soil impacts are defined by low PID and analytical results in the overburden wells OB52-S and OB45-DO. To the south, soil impacts are defined by low PID and analytical results in the overburden wells OB58-DO and OB59-DO.

6.1.2 Building 5 Area Soil Impacts

Overall soil impacts in the Building 5 Area are an order of magnitude lower than seen in the Building 3 Area. Soil Impacts in the Building 5 Area are characterized by concentrations of TCE and PCE at their highest beneath Building 5 itself.

Shallow Overburden

In the shallow overburden the highest VOC concentrations are noted at the following locations.

- At well OB44-S, PCE was detected at 10 mg/kg and 14 mg/kg at 9.5 and 17.5 feet below the floor, respectively in 2013. See **Figure 6-3**. TCE was detected at 0.27 mg/kg and 6.2 mg/kg at 9.5 and 17.5 feet below the floor, respectively in 2013.
- At well AP39-S, TCE and PCE were detected at 2.5 mg/kg and 13 mg/kg, respectively at 16.5 feet below the floor in 2018.
- At well OB60-S, TCE and PCE were detected at 1.4 mg/kg and 13 mg/kg, respectively at 16 feet below the floor in 2022.

Significant treatment has been conducted in Building 5 after soil sampling at both OB44-S and AP39-S. Therefore, the result of soil samples from these locations are not likely indicative of current conditions. The downgradient extent of soil impacts in the shallow overburden in the Building 5 source area are defined by PID soil screening results from wells OB45-S and OB39-BR. The extent of soil impacts to the north in this area are defined by PID screening results and laboratory data collected at BLDG-SV-4. The extent of soil impacts to the south are defined by low soil vapor concentrations noted at BLDG5-SV12 and BLDG5-SV13.

Deep Overburden

The highest concentrations of VOCs at depth are noted at well OB53-BR, an angled well installed beneath the building. TCE and PCE were detected at 35 mg/kg and 11 mg/kg, respectively, in 2022 at approximately 42 feet below grade but decreased to non-detect at approximately 64 feet below grade and west of the previous sample. Downgradient to the northwest, the extents of soil impacts are defined by low soil screening or analytical results from wells OB45-S/DO, OB45-BR, and OB39-DO.

6.1.3 PSL-10 Area Soil Impacts

Soil Impacts in the PSL-10 Area are characterized by concentrations of PCE between 1 and 2 mg/kg in a limited area at the west side of the 150 Sohier Road property and east edge of the 32 Tozer Road property. Impacts are limited to shallow soils with the highest PCE concentration 1.8 mg/kg at soil boring 150 SOH-02 at a sample depth of 2 feet bgs (see **Figure 6-4**). Downgradient to the west, soil impacts are defined by low soil screening or analytical results in the overburden at wells MW1-32 Tozer, MW4-32 Tozer, and B2-32 Tozer.

6.2 VOCs in Groundwater

The current nature and extent of the COCs in groundwater in both the overburden and bedrock aquifers was evaluated using data collected from monitoring wells over two years of sampling, May 2020 through May 2022, as presented in **Table 3-8**. As shown, the primary COCs in groundwater are TCE, PCE, and *cis*-1,2 DCE. Results for TCE, PCE and *cis*-1,2-DCE from samples collected in May and August 2022 are summarized on **Figures 3-3**, **3-4**, and **3-5**. Each of the COCs has a similar distribution, with *cis*-1,2-DCE indicating a more variable distribution, which may be indicative of its higher mobility in groundwater compared to TCE and PCE.

To illustrate the current Site conditions for VOCs, recent concentrations (May 2021 and early 2022 for new wells) were used to construct isoconcentration maps (**Figures 6-5** and **6-6**) and a data posting map (**Figure 6-7**) that show the current configuration of the dissolved-phase TCE in the shallow overburden, deep overburden, and bedrock aquifers, respectively. The following sections discuss the current nature and extent of TCE at the Site and within each aquifer.

6.2.1 VOCs in Shallow Groundwater

The current detection of dissolved TCE in the shallow overburden aquifer, as defined by as the top 10 to 15 feet of the water table, is shown on **Figure 6-5**. The distribution of TCE is currently characterized by several non-continuous plumes. The non-continuous nature of the shallow plume is likely the result of treatment over the years and, as discussed below, vertical gradients or releases not associated with 150 Sohier Road.

The shallow plume from the Building 3 Source Area follows the shallow groundwater flow direction to the southwest to just beyond Tozer Road to the 27 Tozer Road property. The highest concentrations (3.5 and 4 mg/L) occur in two areas of this plume including the northeast area of Building 3 (AP-12-S) and along the north side of the 30 Tozer Road building and just south of the Unnamed Stream (OB-42-S). Beyond this plume are several isolated, smaller areas of lower dissolved TCE detections (ranging from 0.008 to 0.2 mg/L), located to the southwest and south of the main plume but also to the north across Route 128 and to the east of Building 3.

A much smaller area of shallow TCE impact is found beneath Building 5. This area is characterized by a TCE concentration of 20 mg/L at well OB60-S. However, due to active treatment that area, shallow impacts decrease in a short distance to 0.2 mg/L at monitoring well OB-44-S.

At PSL-10, the TCE levels are low, and plume area is small. It is characterized by detection of 0.015 mg/L at CL10-S located at 32 Tozer Road. Wells downgradient of CL10-S exhibit non-detect concentrations of TCE.

The current northern extent of the plume extends from the former Varian facility to an isolated location at MW-005R (0.008 mg/L), located at 16 Tozer Road property. However, the plume does not appear to be continuous to this northern extent since non-impacted well MW-002R exists between well OB-51-S and the other impacted shallow wells in the Building 3 Source Area.

To the west, the extent of the TCE plume in the shallow overburden is defined by non-detect results at multiple wells on Sonning Road.

A zone of shallow TCE impact is found at 39 Tozer Road on the west side of the Unnamed Stream. There, TCE was found at 0.029 mg/L at well OB-41S and 0.021 mg/L at OB-08-S. At the couplet OB8-S and OB8-DO, a strong upward vertical flow is noted. For example, an upward flow gradient with a 5-foot hydraulic head difference was indicated in April 2021 and May 2022 water level elevations (**Table 3-7**). As discussed above, a strong upward vertical gradient is noted to the south on 39 Tozer near wells MW-34 and BR7. The TCE concentration at OB8-DO was 2.2 mg/L in May 2022. The higher VOC levels noted in the deep overburden and the strong upward vertical gradient indicate the shallow TCE impacts at OB8-S and OB41-S are the result of vertical migration from the deep overburden.

An isolated detection (0.014 mg/L at P-19A) is found to the west of Stream A on Hill Street. TCE has ranged between non-detect and 0.014 mg/L since 2016. *Cis*-1,2-DCE is generally detected at P-19A at a concentration ranging from 0.002 mg/L to 0.089 mg/L over this period. In this area, the shallow groundwater flow direction is to the south-southeast, a direction parallel with Stream A. As discussed above, a very strong upward vertical gradient is noted between the bedrock and the thin overburden in the area of wells P-9R and BR-6 on Hill Street. Over a decade of monitoring at the shallowest interval at BR-6 has not indicated detectable levels of TCE. Since 2016, the concentration of *cis*-1,2-DCE at the shallowest interval at BR-6 has ranged from non-detect to 0.12 mg/L. At shallow well P-9R, located next to BR-6, TCE has also been non-detect for over a decade except for May 2022 when it was detected at a concentration of 0.004 mg/L.

To the south the extent of VOC impact in the shallow overburden is defined by non-detect results at wells P-23 Lexington Drive), P-31 (Tudor Road), P-5R (Windsor Road), and P-4R (Jordan Street).

6.2.2 VOCs in Deep Overburden Groundwater

The current detection of dissolved TCE in the deep overburden, as defined by the bottom 10 to 15 feet of the overburden aquifer, is shown on **Figure 6-6**. The presence of TCE is currently characterized by a main plume extending from the Building 3 Source Area to the west to Tozer Road and then to the south along the approximate path of the Massachusetts Bay Transportation Authority tracks and west of Tozer Road. Unlike the shallow aquifer, the distribution of TCE is generally continuous. The plume follows the deep overburden flow of groundwater and reflects the slope of the bedrock surface and bedrock valley. The highest TCE concentrations in the deep overburden aquifer are found in four areas, including 1) the northeast area of Building 3, 2) beneath Building 5, 3) the north-south area west of Building 7 along Tozer Road, and 4) a northwest to southeast area north of the 39 Tozer Road property. The first two of these areas are associated with source areas at Building 3 and Building 5. The last two of these areas coincide with bedrock depressions.

In the Building 3 Source Area, the highest VOCs in the overburden aquifer are detected, including 210 mg/L (AP-13-DO), 190 mg/L (AP-31-DO), and 99 mg/L (AP-43-DO) located in the northeastern area of Building 3. These concentrations imply the presence of DNAPL in the vicinity of those wells. The historical presence of DNAPL has been observed and samples were recovered on two occasions, from recovery well RW-2 in 1992 and RW-4 in 1997. No further measurement of DNAPL has been reported in regular monitoring since 1997. Additional discussion of potential DNAPL is discussed in Section 6.3. TCE concentrations in the Building 3 area are detected immediately downgradient of these source detections, including 21 mg/L (OB-37-DO) to the south and 13 mg/L (OB-25-DO) to the west. To the east of Building 3, only low concentrations of VOCs are present in the deep overburden (RW-3 and OB-09-DO), even though there is a major bedrock depression to the east of the facility (near CL-1 cluster).

West of the Building 3 area, elevated TCE concentrations are present in the Building 7 area. The plume then migrates to the west of Building 7 to Tozer Road. West of Tozer Road in the deep bedrock valley, TCE concentrations are low to moderate, with the higher concentrations of 0.59 mg/L detected in OB-05-DO and 2 mg/L at OB-08-DO located at 39 Tozer Road. These TCE levels west of Building 7 define the central north-south axis of the deep overburden plume, which is aligned along the main north-south trough observed on top of the bedrock at the zone of contact between the granite and the gabbro (Section 4.3). This bedrock feature appears to have been filled with relatively more permeable sand and gravel sediments. This represents a southerly pathway of preferential migration for dissolved VOCs in the deep overburden aquifer. The southern limit of the TCE plume in the deep overburden was determined to be in the area of the stream confluence (0.05 mg/L at MW-034). The results of groundwater samples from cone penetrometer sampling detailed in the 2000 Phase II indicated non-detect TCE levels in the deep overburden on Windsor Road and Jordan Street. Since the VOC levels at MW-34 have decreased since the 2000 Phase II CSA, is expected that VOCs in the deep overburden on Windsor Road and Jordan Street would still be non-detect.

There are isolated detections of TCE in the deep overburden aquifer the Building 5 area (8.3 mg/L in OB-35-DO) and east of the 32 Tozer Road building in the PSL-10 area (0.083 mg/L in CL10-DO). A low concentration of TCE is also detected north of the main plume (0.006 mg/L at OB17-DO).

6.2.3 VOCs in Bedrock Groundwater

The current detection of dissolved TCE in the bedrock aquifer is shown on **Figure 6-7**. Unlike in the deep overburden, the highest concentrations currently in bedrock at 150 Sohier Road are observed between the Building 3 and Building 5 areas at wells OB54-BR and OB45-BR. The highest TCE levels are seen around and beneath Building 3 in the deep overburden at 150 Sohier Road.

Historically, higher concentrations of TCE were observed in bedrock at RW-3, located east side of Building 3, where TCE was detected at up to 61 mg/L before permanganate treatment was conducted (with last treatment completed in 2002). VOC levels in bedrock at RW-3 have declined significantly and have remained low as a result of treatment conducted in the area of this well, with TCE at RW-3 detected at a concentration of 0.002 mg/L in May 2021.

Like the deep overburden, TCE in the bedrock aquifer is present to the west in the bedrock valley along Tozer Road. Overall, the northern, southern, eastern, and western extents of the plume in bedrock are comparable to what is seen in the deep overburden. There are two areas of moderate to low TCE concentrations along Tozer Road, one of which is located on the north side of Route 128, which is not observed in the deep overburden aquifer plume map. TCE is present at CL9 at a concentration of 0.17 mg/L. The second area to the south exhibits a lower TCE level bedrock at OB21-BR (0.01 mg/L), located near the railroad west of Tozer Road.

The western extent of TCE in the bedrock aquifer is defined by non-detect results at OB20-BR and P21-BR. The southern extent of TCE impact is characterized by non-detect concentrations at BR7 located on 39 Tozer Road.

6.3 Potential DNAPL

Site wells, including those with the highest VOC concentrations, have been monitored for DNAPL with an interphase probe at least twice yearly since the start of the comprehensive response action. This monitoring has not detected DNAPL in Site wells since 1997. Groundwater concentrations and persistent groundwater plumes suggest that DNAPL is or was present and has migrated into the deep overburden and potentially into fractured bedrock. Given the age of the DNAPL and lack of DNAPL presence in monitoring wells since 1997, DNAPL in the overburden is likely present residually in discontinuous ganglia or globules and not mobile, while any DNAPL that is present in bedrock is likely present in fractures, many of which are small and poorly connected to other fractures, thereby limiting DNAPL mobility.

6.3.1 Building 3 Area

A further evaluation of the potential presence of DNAPL in the Building 3 Area was conducted by a review of current groundwater concentrations, generally from February 2020 to May 2022, as well as data collected from new wells installed in August 2022. While dated guidance from EPA in the 1990s indicates a rule of thumb that concentrations of individual solvents in excess of 1% of the solubility limit indicate DNAPL is present, current industry practice and thinking in the research community is that comparison to the 1% solubility limit is a tool to suggests that DNAPL may be present upgradient of a well and that additional assessment should be considered. The 1% rule of thumb should not be used in isolation to establish the presence of DNAPL. The EPA guidance (EPA, 1993) that discusses the 1% rule of thumb also indicates that groundwater concentrations of 1 to 3% of solubility only suggest a “medium” degree of likelihood that DNAPL is present. Regardless, a comparison was made to average groundwater concentrations at wells in the Building 3 Area to 1%, 5 %, and 10% of the solubility limit for TCE, PCE, and 1,1,1-TCA to assess areas where DNAPL may be present. The results of this evaluation are presented on **Figure 6-8** and are consistent with those presented in a report dated June 30, 2021. This recent evaluation included wells located beneath and near Buildings 3 and 6 and indicated the following:

- A deep overburden area next to the northeast corner of Building 3 where DNAPL is likely present (i.e., well AP13-DO)
- A deep overburden area beneath the west end of Building 3 where DNAPL is likely present (i.e., wells AP31-DO and AP32-DO)
- A deep overburden area beneath the northeast corner of Building 3 where DNAPL may be potentially present (i.e., AP43-DO)

Based on the most recent data, the conclusions from the June 2021 report are still relevant, except for well OB50-S. Bioremediation has reduced VOCs in the shallow overburden in this area such that the concentrations of PCE at OB49-S, OB50-S, and OB51-S are now below 1% of solubility.

The results of the ERI study conducted in April 2022 provided an estimate of the potential extent of the elevated levels of VOCs beneath Building 3 based on a resistivity of >1,000 ohm-m (**Figure 3-7**). This does not correspond to an area of DNAPL. Areas with a resistivity >10,000 ohm-m are more likely to suggest the presence of DNAPL. However, that is not always the case based on analytical results from the confirmation sampling. For example, the April 2022 ERI study indicated an area of resistivity >10,000 ohm-m beneath Building 2. While soil impacts were noted in this area, the detected concentrations of TCE and PCE in groundwater from the area of resistivity >10,000 ohm-m was well below the 1 percent solubility (0.380 mg/L of TCE detected in groundwater compared to an 1% solubility of approximately 11 mg/L). The treatment area identified on **Figure 3-7** does encompass areas where both the ERI study and analytical test results suggest DNAPL may be present.

6.3.2 Building 5 Area

An evaluation of the potential presence of DNAPL in the Building 5 Area was conducted by a review of current groundwater concentrations, generally using data collected from February 2020 to May 2022, as well as data collected from new wells installed in August 2022. The results of the evaluation are presented on **Figure 6-9**. This evaluation included wells located beneath and near Building 5 and indicated the following:

- A shallow overburden area beneath the north end of Building 5 where DNAPL may be potentially present (i.e., OB60-S).
- A deep overburden area just north of OB60-S beneath Building 5 and a bedrock zone downgradient side of Building 5 where DNAPL may be potentially present (i.e., wells OB35-DO and OB45-BR).

Well OB60-S was installed in August 2022. Concentrations of TCE and PCE in groundwater at this well in the first sampling event were 20 mg/L and 47 mg/L, respectively, in August 2022. These levels in groundwater indicate that DNAPL is potentially present. This well was sampled most recently in December 2022, with TCE and PCE detected at lower levels (6.8 mg/L and 5.8 mg/L, respectively). Both sets of results have been incorporated into the solubility calculations. However, this well has only been sampled twice, with results that varied by almost an order of magnitude. Therefore, conclusions regarding conditions in the overburden in this area are limited and require additional monitoring.

In bedrock on the western side of Building 5, sampling data from bedrock wells OB-45-BR and OB-54-BR suggest the potential for DNAPL to be present in fractures. The results of bedrock assessment of well OB-45-BR indicates that there are only limited water bearing fractures present in bedrock at this location, suggesting limited potential for migration.

To the north of OB45-BR, at recently installed well OB54-BR and as shown on **Figure 6-8**, groundwater data indicated a TCE level that also suggests that DNAPL is potentially present in the fractures at this well. However, this well has only been sampled twice. Therefore, conclusions regarding conditions in bedrock groundwater at OB54-BR are limited and require further evaluation.

Except for well OB45-BR and OB54-BR, groundwater data from overburden and bedrock wells on the downgradient side of Building 5 do not indicate elevated levels of VOCs. This indicates that, if DNAPL is present, its extent is limited. Additional assessment will be conducted prior to remediation of this area to determine if the elevated VOC concentrations in OB54-BR are connected to OB45-BR.

6.4 VOCs in Surface Water and Sediment

The Unnamed Stream flows through Varian's former facility property, and Stream A flows on the western side of the Site area. Both streams generally flow from north to south. The two streams converge at the southern part of the Site at 39 Tozer Road. On the northern side of the Site, both streams have little (less than 50 gpm) flow. Moving downstream, both streams increase in base flow (i.e., stream flow not directly associated with precipitation events). This increase in baseflow is attributed to groundwater discharge into both streams directly, or indirectly via building footing drains and a stormwater line originating from the Brimbal Avenue area, Tozer Road, and various properties. The current nature and extent of VOCs in surface water and sediment was evaluated using surface water and sediment samples collected from Stream A and the Unnamed Stream in March, May, September, and/or November 2021 and as previously reported. The sampling locations are listed below and include three locations (GDS-01, GDS-02, and GDS-03) where groundwater appears to be discharging to Stream A. Sample locations are listed below and depicted on **Figure 6-10**.

SURFACE WATER AND SEDIMENT SAMPLES 2021		
SAMPLE ID	**MEDIA SAMPLED**	**SAMPLE LOCATION**
GDS-01	GW	Stream A, Sonning Road
GDS-02	GW	Stream A, Sonning Road
GDS-03	GW	Stream A, Patton Park Field
STR-1	SED	Unnamed Stream, 150 Sohier Road
STR-2	SW	Unnamed Stream, 30 Tozer Road
STR-3	SW	Unnamed Stream, 150 Sohier Road
STR-5	SW	Unnamed Stream, 30 Tozer Road
STR-11	SW/SED	Stream A, Hill Street
STR-14	SW	Stream A, Lexington Drive
STR-17	SW	Stream A, 39 Tozer Road
STR-18	SW/SED	Stream A, Hill Street
STR-19	SW/SED	Stream A, Patton Park Field
STR-20	SW/SED	Stream A, Sonning Road
STR-21	SW/SED	Stream A, Sonning Road
STR-22	SED	Unnamed Stream, 16 Tozer Road
STR-24	SED	Unnamed Stream, Containment Pond
STR-26	SED	Unnamed Stream, 32 Tozer Road
STR-27	SED	Unnamed Stream, 39 Tozer Road
STR-28	SW/SED	Unnamed Stream, Kittredge Street
STRHA-02	SW	Unnamed Stream, 30 Tozer Road
STRHA-04	SW	Unnamed Stream, 32 Tozer Road
STRHA-07A	SW	Stream A, 39 Tozer Road
STRHA-07B	SW	Unnamed Stream, 39 Tozer Road
STRHA-08	SW/SED	Unnamed Stream, Russell Street
STRMH-02	SW	Unnamed Stream, 30 Tozer Road
STRM-A-SCDS	SW/SED	Stream A, Patton Park Field
UNNAMED STREAM	SW	Unnamed Stream, 150 Sohier Road
UPSTREAM-SED	SED	Unnamed Stream, 150 Sohier Road
DOWNSTREAM-SED	SED	Unnamed Stream, 150 Sohier Road
MIDSTREAM-SED	SED	Unnamed Stream, 150 Sohier Road
CULVERT OUTFALL	SW	Stream A, 39 Tozer Road

Notes: GW = groundwater sampled; SW = surface water sampled; SED = sediment sampled

Samples collected in March, May, September, and/or November 2021

6.4.1 VOCs in Sediment

The nature and current extent of VOCs in sediment was evaluated using sediment samples collected in 2021 from 16 locations, including ten from the Unnamed Stream and six from Stream A. Analytical results for these samples are presented on **Figure 6-11**. Results of these samples are summarized in **Table 6-4**.

Analytical results for the sediment samples collected from the Unnamed Stream indicate VOCs were only detected in three locations, including two in the northeast corner of the facility property. VOCs including TCE, PCE, and *cis*-1,2-DCE, were present in samples collected at UPSTREAM_SED and MIDSTREAM_SED sampling locations at total VOC concentrations of 11.23 mg/kg and 12 mg/kg, respectively. No VOCs were detected in samples collected immediately downstream of these locations (DOWNSTREAM_SED). No VOCs were detected upstream of these locations including a sample collected north of Route 128 (STR-22) and a sample collected from a retention pond across Sohier Road (STR-24). A low concentration (1.1 mg/kg) was detected in a sediment sample (STR-26) located adjacent to Tozer Road south of the 32 Tozer Road property. Based on these results, the VOC extent in the Unnamed Stream is characterized by limited impacts to sediment in the northeast corner of the facility where historical discharges from the facility to the stream likely impacted the sediments the greatest. However, the majority of the residual VOCs in sediment in this area would have vaporized over the years as they were exposed to variable weather conditions. The downstream extent of VOC impacts to sediment in the Unnamed Stream is defined by non-detect results at STR-27.

Analytical results for sediment samples collected from Stream A indicate that VOCs were only detected at low concentrations in two samples (STR-19 and STR-11) at total VOC concentrations of 0.17 mg/kg and 0.48 mg/kg, respectively. Both locations where VOCs were detected are located near the Patton Park Field and directly downstream of a potential groundwater discharge point (GDS-03). VOCs detected in water samples from that potential discharge are likely the source of the trace VOCs in sediment in this isolated area of Stream A.

6.4.2 VOCs in Surface Water

The nature and extent of VOCs in surface water was evaluated using samples collected from 23 locations along Stream A and Unnamed Stream in March, May, September, and November 2021, with some locations sampled during multiple events. The VOC analytical results are summarized in **Table 3-11**. The primary VOCs detected in surface water include the COCs, TCE, PCE, and *cis*-1,2-DCE. The results for these compounds are posted on **Figure 6-12**, the most recent results posted for those locations sampled more than once in 2021.

As shown on **Figure 6-12**, analytical results for the samples collected from the Unnamed Stream indicate that only trace *cis*-1,2-DCE was detected in one surface water sample (STR-3) collected in the northeast corner of the facility property. At the six downstream locations, from the 30 Tozer Road property to the confluence with Stream A, TCE, PCE, and *Cis*-1,2-DCE were detected at low concentrations (ranging from 0.003 mg/L to 0.028 mg/L). The highest concentration (0.028 mg/L TCE) was detected at the confluence with Stream A (STRHA-7B). The two surface water samples (STRHA-8A and STR-28) collected downgradient of the confluence of the Unnamed Stream and Stream A indicated low concentrations of TCE, PCE, and *Cis*-1,2-DCE, ranging from 0.002 mg/L to 0.01 mg/L. The downstream extent of VOCs is defined by historic sampling at STRHA-9 where VOCs were below or just at the analytical detection limit.

Analytical results for surface water samples collected from Stream A, indicate that none of the COCs were detected at the four samples collected from the upper portion of the stream in the Sonning Road area (**Figure 6-12**), including two locations where groundwater appears to be discharging to the stream (GDS-01 and GDS-02). The eight surface water sample locations at and downstream of Patton Park exhibited low concentrations of TCE, PCE, and *Cis*-1,2-DCE ranging from 0.002 mg/L to 0.019 mg/L. The highest concentration (0.019 mg/L *cis*-1,2-DCE) was detected at STR-18, a location at Hill Street, downstream from the potential groundwater discharge GDS-03. The water sample at GDS-03, which is located on the west bank of Stream A (opposite the Site) indicated concentrations of 0.061 mg/L for TCE, 0.003 mg/L for PCE, and 0.02 mg/L for *cis*-1,2-DCE, but that shallow well P-20R, also located west of Stream A, was non-detect for TCE (**Figure 3-3**), not the 0.061 mg/L in the seep. The TCE concentration in Stream A is relatively consistent flowing down stream to the confluence with the Unnamed Stream (ranging from 0.006 mg/L at four sample points to 0.013 mg/L at STRHA-7A). PCE is detected at similar low concentrations (0.002 to 0.003 mg/L) along the stream flow and *cis*-1,2-DCE exhibited higher concentrations along the mid-stream (0.011 to 0.02 mg/L) and decreased downstream (0.004 and 0.005 mg/L).

6.5 Conceptual Site Model

This section presents the current conceptual site model (CSM) based on historical and recent investigations, remedial efforts, and analytical data collected for the Site. The predominant groundwater transport mechanisms at Varian's former facility involve the transfer of VOCs in the soil to the groundwater as dissolved compounds. The dissolved chlorinated solvents (PCE, TCE, and 1,1,1-TCA) then begin to migrate by advection and dispersion. Along their migration pathways they undergo chemical degradation to DCE, DCA, VC, ethane, and ethene. In addition, remedial activities have reduced concentrations along the flow paths. These migration pathways and degradation processes are critical in the development of a CSM around which risk assessments and remediation approaches can be developed. The CSM addresses both surface and subsurface conditions that control the movement and occurrence of the COCs.

The essential elements of the Site conceptual model are as follows:

- The VOCs at 150 Sohier Road are the result of the historical use of chlorinated solvents at Varian's former facility. The primary compounds released at the facility are PCE and TCE, with a lesser amount of 1,1,1-TCA. These VOC releases resulted from historical manufacturing operations and former waste disposal practices. Daughter products from the breakdown of the VOCs released are also present at the Site. VOC releases appear to have occurred in PSL-5, PSL-6, and PSL-11. These PSLs are included in the Building 3 Source Area. Releases of VOCs appear to have occurred at PSL-7, which is referred to as the Building 5 Source Area.

Additionally, releases of VOCs appear to have occurred at PSL-10, primarily on the western property line near 32 Tozer Road. This location is referred to as the PSL-10 Source Area.

- Site wells, including those with the highest VOC concentrations, have been monitored for DNAPL with an interphase probe at least twice per year since the start of the comprehensive response action. This monitoring has not detected DNAPL in Site wells since 1997. Some wells in the Building 3 area exhibit concentrations of TCE or PCE exceeding 5% or 10% of solubility limits, suggesting that DNAPL may be present 40 to 60 feet below the building. Groundwater concentrations and persistent groundwater plumes suggest that DNAPL is or was present and has migrated into the deep overburden and potentially into fractured bedrock. Given the age of the DNAPL and lack of DNAPL presence in monitoring wells since 1997, DNAPL in the overburden is likely present residually in discontinuous ganglia or globules and not mobile, while any DNAPL that is present in bedrock is likely present in fractures, many of which are small and poorly connected to other fractures, thereby limiting DNAPL mobility. This residual solvent will slowly dissolve into the groundwater and provide a long-term source for VOCs in groundwater. This slow release from the soil is demonstrated in the slow decline in VOC concentrations in the source area following multiple rounds of treatment. As a result, these areas, including the area of Building 3, are identified as areas for future source treatment. One well bedrock well (OB45-BR) in the Building 5 area exhibits concentrations of TCE exceeding 5% of solubility limit, suggesting that DNAPL may be present 60 to 95 feet below grade. Geophysical data from OB45-BR indicates very little fracturing and low water flow from this area. This suggests that migration of VOCs from this area would be limited. TCE was also detected in well OB54-BR at concentrations up to 53 mg/L. Additional assessment will be conducted prior to the remediation of this area to determine if the elevated concentrations of TCE in OB54-BR are connected to OB45-BR.

- Based on the levels of VOCs present in the Building 3 Source Area and the Building 5 Source Area, additional remediation is warranted to limit potential downgradient migration of VOCs in groundwater. These two areas will be a focus of additional remediation at the Site. While the levels of VOCs present at PSL-10 are much lower than both Building 3 and 5, remediation may be conducted in that area to limit potential downgradient migration of VOCs in groundwater.

- The former Varian facility at 150 Sohier Road is located on a topographically elevated area. As a result, the dissolved plume is observed to migrate from the Building 3 Source Area with the predominant groundwater flow direction to the west, with some limited migration to the north. From the Building 5 Source Area, the predominant flow is to the northwest, then towards the west. The groundwater flow directions in both the shallow and deep overburden aquifers at the Site generally follow the topography. The groundwater flows in both the shallow and deep overburden aquifers downgradient of Varian's former facility and has horizontal components to the west and then to the south. A downward vertical flow gradient in both the Building 3 and Building 5 areas is also observed. At the eastern end of Hill Street and 39 Tozer Road, an upward vertical gradient is observed.

- The main physical properties of the chlorinated VOCs at the Site that affect their distribution and migration are density, solubility, and mobility. These compounds are denser than water and tend to sink in an aquifer. The compounds are relatively soluble and therefore are present in a dissolved-phase and are transported by groundwater. The potential mobility of these chemicals as reflected by their retardation coefficients indicates that in the overburden aquifer acts to limit migration. As a result, the VOCs migrate at a velocity slower than the groundwater flow.

- VOC migration is controlled by the permeability of the various hydrogeologic units at the Site. In the release areas, little horizontal spreading occurred through the overburden (till), as evidenced by the relatively small area of elevated groundwater concentrations in the shallow aquifer. The downward vertical gradient in both the Building 3 and Building 5 area likely also contributed to the relatively limited horizontal spread in the source areas. From the source area, VOCs migrated primarily to the west following the steep change in topography and the groundwater flow towards former Building 7 and Tozer Road. The transmissivity of the overburden hydrogeological unit is orders of magnitude higher than that of the bedrock unit, indicating that most groundwater flow, and thus VOC migration, occurs in the overburden aquifer. Some limited VOC migration occurred to the north, following the lesser groundwater flow component. An even more limited VOC transport also occurred just to the east of Building 3, even though there is a major bedrock depression to the east of the facility (near CL-1 cluster).

- Upon reaching Tozer Road, VOC transport continued to follow the regional groundwater flow direction, which in this area changes to become predominantly to the south. VOC migration in the Tozer Road area also shows the effect of the sand and gravel unit that runs approximately north/south in this area. This is particularly observed in the deep overburden isoconcentration map for TCE (**Figure 6-6**). This figure shows that VOCs migrated along this north-south axis along a sand and gravel deposit. This sand and gravel unit, coupled with the presence of the nearby groundwater divide, appears to have resulted in some VOC migration to the north in the area of OB-17-DO.

- In the source areas (areas of Buildings 3, 5, and PSL-10) and along the overburden flow path, some of the VOCs continued to migrate vertically downward through the fractures in the bedrock. Transport in the bedrock aquifer occurs through fractures. Observations made on the bedrock fracturing at the Site indicate that the sub-horizontal sheeting fractures in the granite represent the primary groundwater flow pathway in bedrock coupled with three groups of sub- vertical fractures trending N-S, ENE-WSW, and NNW-SSE and coincident with lineaments transecting the Site in like directions. The low transmissivity of the bedrock unit indicates that less contaminant migration occurs in this unit than in the overburden. While some bedrock at the Site indicates fracturing with water-bearing fractures, a few locations have limited observed fracturing and with little water present. Well OB45-BR is one location which indicates little fracturing and water flow. That location indicates some of the higher VOC concentrations in bedrock. However, the VOCs present in that area are likely trapped and have limited ability to migrate to downgradient areas. The potentiometric head in the bedrock aquifer generally follows flow directions seen in the overburden. However, because flow in the bedrock aquifer occurs along fractures, the actual pathway that the groundwater travels cannot be determined on a micro-scale. The contours shown on **Figure 4-4**, therefore, only show the potential for groundwater flow in the bedrock aquifer.

- At Varian's former facility, residual VOCs in the vadose zone and dissolved phase VOCs in the groundwater beneath facility buildings in the Building 3 and Building 5 areas are likely the source of the TCE and PCE vapors detected in soil gas beneath the buildings. These vapors may have resulted in impacted indoor air in these buildings. However, the operation of the two SVE systems at the Site have provided treatment to the vadose zone and mitigated potential migration through the indoor air pathway.

- In downgradient areas on Tozer Road and the residential areas further to the west and south, results of indoor air testing have either not identified a Significant Risk or have shown that indoor air is not a significant pathway of concern. At the one location on Longview Drive where test results cannot rule out indoor air as a significant pathway of concern, additional assessment is planned, which will be used to implement potential mitigation measures. Shallow groundwater monitoring will continue in downgradient areas.

- A portion of the Unnamed Stream located at the northeast corner of Varian's former facility received wastewater discharges containing VOCs from the former Building 3 laboratory. While historical discharges to the stream likely impacted sediments, current data suggests that only limited VOC impacts remain due to the volatility of the chemicals. The majority of any residual VOCs in sediment would have volatilized over the years as they were exposed to variable weather conditions.

- There are two small streams within the Site area: the Unnamed Stream and Stream A. Both streams generally flow from north to south and, moving downstream, both streams increase in base flow (i.e., stream flow not directly associated with precipitation events). This increase is attributed to groundwater discharge into both streams directly, or indirectly via building footing drains and stormwater lines originating from Brimbal Avenue to the east and Tozer Road.

- Several VOCs have been detected in surface water samples, with PCE and TCE being the two chemicals most commonly detected. As discussed in the January 2022 ROS Report, VOC concentrations in surface water samples collected in 2021 remained relatively consistent or decreased, when compared with historical results. A likely source of the VOCs identified in both streams is the discharge of groundwater containing VOCs either from 150 Sohier Road or a non-Varian source.

- The 2000 Phase II CSA concluded that shallow groundwater VOC contamination that was detected at the 31 Tozer Road Properties was likely the result of impacts associated with the former location of the Unnamed Stream. This stream was historically located along the current location of Tozer Road, adjacent to 31 Tozer Road. Shallow overburden impacts in this area could be the result of historical discharges to the Unnamed Stream that were transported down the hill from the former Varian facility, dissolved in stream water, and settled in this area as the stream flowed through a former highly vegetated area (as observed in historical aerial photographs). These VOC impacts have been remediated, and only low levels of VOCs are detected in isolated regions of this downgradient location. However, subsequent data indicates that a component of the shallow impacts at 31 Tozer Road may also be the result of the upward vertical gradient noted at 31 Tozer Road and 39 Tozer Road. That said, shallow treatment conducted at 31 Tozer Road in 2002 and 2003 reduced VOC concentrations in the shallow overburden groundwater in this area. VOC concentrations at 31 Tozer Road in 2022 remain well below pretreatment levels (e.g.,>85% reduction in TCE at shallow well AP15-S). It should be noted that permanganate treatment was not conducted at well AP15-S, indicating upgradient treatment at 31 Tozer Road has resulted in the decreased concentrations of VOCs.

- Remediation activities conducted over the past 20 years are summarized in Sections 3.1 and 3.2. As documented in trend graphs provided in prior ROS reports, those activities have reduced VOC concentrations in some source areas as well as downgradient areas. This has resulted in a much-reduced VOC plume extent in the shallow overburden and bedrock aquifers. Less of a reduction is noted in the deep overburden. Residual VOCs in groundwater in the Building 3 area and to a lesser extent at Building 5 area remain. Significant effort has been made to assess areas beneath both the Building 3 complex and Building 5. However, the building structures limit access and create uncertainty regarding the delineation and extent of VOC impacts.

7.0 EXPOSURE ASSESSMENT AND RISK CHARACTERIZATION [310 CMR 40.0825(4)(g) and h)]

A characterization of the risk of harm to human health, safety, public welfare, and the environment is required as part of a Phase II CSA under the MCP. This risk characterization has been conducted for the former Varian site, as described in previous sections, in accordance with 310 CMR 40.0900, and associated MassDEP guidance.

This risk assessment was conducted using a Method 3 approach, as specified in 310 CMR 40.0942(3). The MCP allows for Method 3 to be conducted at any site. This Method uses existing standards, Upper Concentrations Limits in soil and groundwater, quantitative estimates of cancer and non-cancer risks to human health, and quantitative or qualitative evaluations of risk to public welfare, safety, and the environment.

The human health risk assessment includes the following components:

- Identification of the contaminants present at the site and COCs (Hazard Identification)

- Identification of current and foreseeable use of the site, identification of receptors who may be exposed currently or in the future, identification of exposure pathways, identification of soil and groundwater categories, identification of locations or areas where exposure may occur (exposure points), and identification of exposure point concentrations (Exposure

Assessment)

- Identification of toxicity values to be used in the risk characterization (Dose Response Evaluation)
- Development of exposure and cumulative risk/hazard estimates for each receptor and comparison to MCP Risk Limits, and comparison of site concentrations to applicable or suitably analogous standards (Risk Characterization)

In order to evaluate the risk of harm to public welfare and the environment, a Method 3 risk characterization combines site-specific information on contaminant distribution, contaminant toxicity, and receptor exposure in a site-specific assessment of the risk of harm to both public welfare and the environment (habitats and biota) from the OHM at this site, and compares the concentrations in the environmental media to the applicable or suitably analogous standards and to the Upper Concentration Limits (UCLs) specified in the MCP. For evaluations of the risk of harm to public welfare, the Method 3 evaluation considers the potential for nuisance conditions (310 CMR 40.0994(4)(a)) or adverse impacts to the community (310 CMR 40.0994(2)) to exist currently or in the future. A level of No Significant Risk of harm to public welfare exists or has been achieved if no nuisance conditions exist or will result from the release or threat of release of OHM, and soil and groundwater concentrations and LNAPL thicknesses are less than the UCLs. In addition to the comparison of soil and groundwater concentrations to UCLs, a Stage I Environmental Screening is conducted as part of a Method 3 environmental risk assessment in order to determine whether or not the site poses a significant risk to the environment, or whether a Stage II environmental risk assessment is necessary. The risk of harm to safety is characterized by comparing current and reasonably foreseeable conditions at the disposal site and in the surrounding environment to MCP criteria and applicable or suitably analogous safety standards. A level of No Significant Risk to safety exists or has been achieved if the conditions at the site, which are related to a release of OHM, do not currently and will not in the foreseeable future pose a threat of physical harm or bodily injury to people.

A discussion of the uncertainty associated with the evaluation of the risk to health, safety, public welfare, and the environment (uncertainty analysis), and a discussion of the conclusions are also presented.

7.1 Background

This Phase II Addendum has been prepared to provide an update to the original Phase II CSA submitted to the MassDEP in 2000 (IT, 2000a). The 2000 Phase II CSA was based on assessment investigations conducted between 1995 and 1998 and included a Method 3 risk characterization based on the understanding of the site at that time. This Phase II Addendum presents a characterization of *current site conditions,* including the nature and extent of VOCs, which were determined to be the primary OHM released at the Site, and provides an updated evaluation of risk based on the current site conditions.

The former Varian facility is described in Section 2.2.1 in terms of the locations and uses of various buildings. In addition, areas affected or potentially affected through groundwater or surface water migration include downgradient commercial buildings on Tozer Road and nearby residential areas

(Sonning Road, Jordan Road, Longview Drive, Longview Terrace, Hill Street, and Lexington Drive (see **Figure 1-2**).

7.2 Hazard Identification

Analytical laboratory and field data collected at the site and representative of current site conditions have been presented and discussed in detail in previous sections of this report, and include groundwater, soil, surface water, sediment, and indoor air. Extensive sampling of soil vapor was also conducted under site buildings, as well as downgradient commercial and residential buildings. Since indoor air data is available for almost all buildings evaluated, the soil vapor data is not discussed in this section as it is not an exposure medium except to evaluate whether indoor air concentrations could potentially result from vapor intrusion. This section identifies the constituents that were detected in the relevant media at the site. Multiple figures discussed in prior sections of this Phase II Addendum present the sampling locations for the site in soil, groundwater, surface water and sediment, and indoor air.

7.2.1 Chemicals Detected at the Site

7.2.1.1 Soil

Soil analytical data were collected from across the site in areas of potential concern from 1995 to the present. **Table 7-1** provides summary statistics of the soil data collected at this site from 1995 to 2022. While some of this data represents older samples from areas where remedial actions have been conducted, and may not be indicative of current conditions, these data have been included as more recent data from these locations has not yet been collected. This table includes samples collected from all depths and locations that were not identified as upgradient or offsite. Most of these samples were collected from the former Varian facility, as this was the original source area. Some of these samples were collected from below the water table and are affected by dissolved VOCs in groundwaters. The table presents each constituent detected, the frequency of detection, the maximum concentration, the minimum concentration, and the average concentration. Where MassDEP (2002) has established a natural background concentration, this value is also shown in **Table 7-1**. Concentrations and frequency of detection of chemicals in soil were considered in identifying COCs in accordance with risk assessment guidance (MassDEP, 1995). Most of the VOCs were detected infrequently, with the exception of PCE, TCE, and cis-1,2-DCE, which were detected in 62, 39, and 13% of the samples, respectively. The 2000 Phase 2 CSA noted that the maximum concentration of PCE (1200 mg/kg) was detected in one sample collected from PSL-5 (B2-PSL5, 10-12 feet bgs) outside of Building 3 during the 1995 sampling. This sample was not, however, considered a discrete area of contamination because the results of an additional sample (B3-PSL5, 10-11 feet bgs) collected at the same depth in the same vicinity in 1999 did not verify the existence of a discrete area. The concentration detected in 1999 was significantly less (39 mg/kg). All detected VOCs in soil are identified as COCs except 1,1,1-TCA, which was only detected in 3 samples; 2-butanone, which was only detected in one sample; and bromomethane, which was only detected in one sample. The maximum concentrations of chemicals eliminated as COCs based on the low frequency of detection were well below the MCP S-1 direct contact standard, as shown in **Table 7-1**.

A number of metals were also detected, as shown in **Table 7-1**. Maximum concentrations of arsenic, cadmium, chromium, lead, mercury, and selenium were equal to or less than the natural background and are not considered COCs for Varian. In addition, the maximum concentration for beryllium (detected in one sample), and nickel were slightly greater than the background concentration. As a result, neither are identified as contaminants of potential concern for the site. Average concentrations of both metals are well below established background concentrations. The maximum and average site concentrations of copper are both greater than the established background; however, copper is not identified as a COC. MassDEP has not established Method 1 Standards for this metal, and the Regional Screening Level established for copper by EPA (2022) is 310 mg/kg, three times the maximum detected concentration.

Table 7-1 does not include soil sample results collected from 32 Tozer Road/PSL10. These data are presented in **Table 6-3** and discussed in Section 6.1. This area will be considered as a potential exposure point in the risk characterization.

7.2.1.2 Groundwater

Groundwater samples have been collected from site monitoring wells since at least 1988. In order to provide a representation of current site groundwater conditions, this evaluation includes data collected from July 2020 to the present. There are varying numbers of rounds included for each sampling location. The most recent sampling was conducted in August 2022, which included a few newly installed wells, with the most recent comprehensive sampling completed in May 2022.

Table 7-2 provides a summary of statistics for groundwater data collected at the former Varian facility as well as downgradient areas from all depth intervals. It also includes shallow groundwater samples collected as grab samples at surface water discharge locations (GDS-01, 02, and 03). These statistics do not include upgradient locations or other locations determined not to be impacted by releases from Varian. Concentrations and frequency of detection of chemicals in groundwater were considered in identifying COCs in groundwater in accordance with risk assessment guidance (MassDEP, 1995). Chemicals with a low frequency of detection (less than three samples) were eliminated as COCs. In addition, chemicals with a low frequency of detection (< 10%) were eliminated as COCs if their maximum concentrations were low. Low concentrations were identified as being less than 10 times the Method 1 GW-1 standards, even though GW-1 standards are not applicable at this Site. This summary shows that cis-1,2-DCE, TCE, PCE, and vinyl chloride were the most frequently detected VOCs in groundwater at the site. Metals were infrequently sampled, and the three samples analyzed for arsenic, iron, and manganese were the groundwater discharge samples (GDS-01, 02, and 03), which are not representative of groundwater in general. Most other metals detected are considered essential nutrients (calcium, magnesium, potassium, sodium, and iron). Chloroform, benzene, and toluene were also eliminated as COCs in groundwater based on the lack of a historical source of this chemical, and the potential that other sources could be present.

7.2.1.3 Surface Water and Sediment

Surface water and sediment have been collected historically in the area of the Varian Site; however, a comprehensive sampling program was undertaken in 2021, and sampling continued in 2022 in both Stream A and the Unnamed Stream. This investigation and results of the risk characterization for human health and the environment are presented in **Appendix F** of the January to June 2021 ROS Status Report (APTIM, 2021d). As a result, this information will only be discussed as a summary in this report.

The sampling locations are shown in **Figures 6-11** and **6-12**. No additional sediment data have been collected since this time. Surface water in Stream A and the Unnamed Stream was subsequently sampled in September and November 2021 as well as May 2022. These data are presented in **Table 3-11** and discussed in Section 6.4.2. Since the more recent data on surface water collected is similar to the March and May 2021 data used in the risk assessment included in the ROS report, this evaluation will not be updated in this report.

7.2.1.4 Indoor Air

Indoor air data has been collected from numerous buildings on the former Varian property, downgradient commercial buildings on Tozer Road, as well as in residential buildings. These data have been evaluated in detail with consideration of associated soil vapor data, as well as nearby shallow groundwater data, to determine if the vapor intrusion exposure pathways are complete. Discussion of these results for three areas are provided: former Varian facility buildings, Tozer Road commercial buildings, and downgradient residential buildings.

Former Varian Facility Buildings

Complete pathways have been identified in Building 3 and Building 5 that have resulted in the implementation of remedial measures in these areas, as described in Section 3.3. Indoor air data from recent sampling for Building 3 is provided in **Table 3-13** and soil vapor data is provided in **Table 3-14**. Indoor air data for Building 5 has been reported in ROS Status reports, with the most recent data being October 2021 (APTIM, 2022a). The data used in this evaluation for Building 3 are the samples collected in March, June, September, and December 2021. While indoor air samples were collected during 2022, these results were not used in the risk characterization because they were collected during an approximate six-month shutdown, after which the system was turned on due to increasing concentrations in indoor air. As a result, the 2022 indoor air samples are not representative of site conditions over time. The most recent Building 5 indoor air samples were collected in August 2019, April 2020, July 2020, and October 2021. Sampling conducted during the Building 3 and Building 5 events occurred during a two-week shutdown of the site systems, which were otherwise operating. The summary statistics for indoor air at these former Varian facility buildings is provided in **Table 7-3**. In order to identify COCs for former facility buildings, soil vapor results were considered, and the table either indicates that the VOC was not detected in soil vapor or shows the maximum detected concentration in soil vapor over the time frame evaluated for indoor air. Indoor air COCs for former Varian Buildings are identified if there are concentrations in indoor air similar to or less than those detected in soil vapor. TCE, PCE, and cis-1,2-DCE were identified as COCs in the indoor air of the former facility buildings.

Tozer Road Commercial Buildings

Indoor air has been sampled at the following locations, with the data included as shown:

- 28 Tozer Road (sampled only in December 2020 by MassDEP)
- 30 Tozer Road (samples included are MassDEP in December 2020, and sampling conducted in April 2021 and December 2021)
- 31 Tozer Road (all samples available are included - March 2021 and December 2021)

- 32 Tozer Road (most recent samples included – October 2014 and April 2015)
- 39 Tozer Road (all samples available are included – March 2021 and January 2022).

The results from the December 2021 indoor air sampling of 30 Tozer Road and 31 Tozer Road and the results from the January 2022 of 39 Tozer Road are shown in **Table 3-2.** The summary statistics for all Tozer Road samples described above is provided in **Table 7-4**. Of the chemicals that are also associated with the Varian site groundwater, PCE, TCE, and cis-1,2-DCE are the most frequently detected. Each of the above buildings are discussed below:

27 Tozer Road – Soil vapor samples were collected at this property in February 2019 and May 2021. The most recent samples were reported in the January – June 2021 ROS Status Report (APTIM, 2021d). Permission to sample indoor air was not provided by the owner. No soil vapor results exceeded screening values, and it was concluded that vapor intrusion was not a significant pathway at this location.

28 Tozer Road – Indoor air samples were collected by MassDEP at this location in December 2020. PCE was the only VOC detected, at a maximum concentration of 0.81 µg/m^3. MassDEP concluded, based on a comparison to the Residential TV of 1.4 µg/m^3, that a vapor intrusion pathway of concern was unlikely to be present. These results were reported in Appendix G of the July – December 2020 ROS Status report (APTIM, 2021b).

30 Tozer Road – One indoor air sample was collected by MassDEP in December 2020, and three samples in both April and December 2021. These results were reported in Appendix G of the July – December 2020 ROS Status report (APTIM, 2021b) and the August 2021 ROS report (APTIM, 2021d). The December 2021 results are reported in **Table 3-2** of this report. The compounds 1,3,5-trimethylbenzene, 2-butanone, acetone, benzene, carbon tetrachloride, ethylbenzene, xylenes, styrene, and toluene were detected but are likely to be attributable to indoor air sources. In addition, VOCs that are also associated with the Varian site groundwater were detected, as shown below, compared to commercial/industrial (C/I) TVs.

Chemicals Detected – 30 Tozer Road	Maximum Detected Concentration (µg/m^3)	C/I TV (µg/m^3)
cis-1,2-DCE	0.079	5.3
PCE	0.98	4.1
trans-1,2-DCE	0.484	53
TCE	1.1	1.8

MassDEP concluded that a vapor intrusion pathway was identified in this building, but indoor air does not pose a significant risk to health. Subsequent sampling showed lower concentrations than those detected in the December 2020 sampling, so their conclusion is still valid. It should be noted that a sub-slab depressurization system is operated at this location.

31 Tozer Road – Indoor air samples were collected in March and December 2021 at four locations. The March 2021 results were reported in the August 2021 ROS Report (APTIM, 2021a). The December 2021 results are reported in **Table 3-2** of this report. As reported for 30 Tozer Road, a number of chemicals were detected in indoor air that were not likely attributable to Varian releases (acetone, benzene, carbon tetrachloride, chlorobenzene, ethylbenzene, styrene, xylenes, and toluene). VOCs that are also associated with the Varian site groundwater are shown below compared to C/I TVs.

Chemicals Detected – 31 Tozer Road	**Maximum Detected Concentration (μg/m^3)**	**C/I TV (μg/m^3)**
cis-1,2-DCE	0.081	5.3
PCE	0.814	4.1
TCE	0.656	1.8

While cis-1,2-DCE was not detected in sub-slab vapor in either round, PCE and TCE were, suggesting that a vapor intrusion pathway may be complete. However, the above comparison shows that indoor air does not pose a significant risk to health.

32 Tozer Road – Indoor air samples were collected at 32 Tozer Road at three locations in various rounds from 2013 to 2015. An evaluation of four rounds of data was completed and presented in the April to September ROS Report (CB&I, 2014). This evaluation concluded that a condition of No Significant risk existed at this property and also noted that the TCE concentrations in indoor air at 32 Tozer Road have consistently been less than 8 μg/m^3, which MassDEP has specified as the long-term remediation target for situations where workplace indoor air has been impacted by vapor intrusion to be protective of developmental toxicity as well as other potential effects. In the two most recent rounds (October 2014 and April 2015), cis-1,2-DCE was detected at similar concentrations to the earlier rounds. However, PCE was detected at lower concentrations, and TCE was not detected. Therefore, the conclusions regarding 32 Tozer Road from the earlier sampling are still valid,

39 Tozer Road – Indoor air samples were collected at 39 Tozer Road at three locations in March 2021 and January 2022. The March 2021 results were reported in the August 2021 ROS Report (APTIM, 2021a). In the first round, TCE was detected at low concentrations in all indoor air samples collected. In one sample, 39-TOZ-01, TCE was detected at 1.96 μg/m^3, which is above MassDEP's C/I TV of 1.8 μg/m^3. However, a review of chemicals in that part of the building indicated the presence of a background source of TCE (ZEP Power Solv), which contains this compound. Additionally, the concentration of TCE detected in soil vapor beneath this portion of the building was much less than the MassDEP soil vapor screening value, indicating that vapor intrusion into the building is not likely, although soil vapor concentrations in one of the other sub-slab locations was greater than the sub-slab screening level (486 μg/m^3 at 39-TOZ-SV02). Concentrations of cis-1,2-DCE and PCE were also greater than other rounds in this sampling event and location, but did not exceed the C/I TV. PCE concentrations for all the indoor air samples were below MassDEP's C/I TV for indoor workplaces of 4.1 μg/m^3. Other VOCs detected were 2-butanone, acetone, benzene, carbon tetrachloride, chloroform, ethylbenzene, naphthalene, styrene, toluene, *trans*-1,2-DCE, and xylenes were not identified as COCs because other sources were identified, the VOC was not a COC in groundwater or indoor air of former Varian buildings, or because all concentrations were less than the C/I TV. The recommendation from this round was to remove the background source of TCE and resample. The next sampling round was conducted in January 2022 (see results in **Tables 3-2** and **3-3**). Sub-slab vapor concentrations were all well below C/I sub-slab screening levels, including PCE and TCE. In particular, the TCE concentration at 39-TOZ-SV02 was 0.473 µg/m^3, substantially lower than that reported in March 2021. However, indoor air concentrations of TCE were all greater than the C/I TV of 1.8 µg/m^3, ranging from 1.9 to 3.17 µg/m^3. No explanation has been identified for the higher sub-slab vapor concentration of TCE in March 2021 compared to January 2022 at 39-TOZ-SV02. The indoor air concentrations are more similar at the different locations and rounds, although concentrations appear to be higher in the January 2022 rounds, however, this is not associated with a corresponding increase in the sub-slab vapor concentrations. Varian is currently coordinating access to this building to collect a third round of soil vapor and indoor air samples.

Based on the above discussions regarding Tozer Road Buildings, no further evaluation of indoor air for these buildings is included in this risk characterization. Sampling and evaluations for most of these buildings has shown that either a vapor intrusion pathway is not complete, or it is potentially complete but does not pose an unacceptable health risk. Additional sampling at 39 Tozer Road is planned to resolve discrepancies in previous sampling results (indoor source, and conflicting sub-slab vapor and indoor air results).

Residential Buildings

Indoor air in a number of residential buildings has been sampled in recent years, starting in 2020. During the week of December 7, 2020, MassDEP collected indoor air grab samples at 47 residential homes. These included homes on Sonning Road, Longview Drive, Longview Terrace, Lexington Drive, Jordan Street, Tudor Road, Windsor Road, and Wendgail Court. The sampling was completed in order to supplement and update previous information and data on indoor air quality, and in response to concerns expressed by neighborhood residents and city officials. Based on the data collected, MassDEP determined that there is no evidence that contaminants from the Varian site are impacting any of the 47 homes that were sampled (MassDEP, 2020). However, 24-hour testing was conducted at a subset of the homes to provide further assurance that there are no impacts to homes from the Site. Subsequent sampling was conducted at some locations by APTIM. **Table 7-5** summarizes the results of these investigations and provides the references for the data.

Of all the residential homes tested, the only one in which a potentially complete vapor intrusion pathway was identified was 34 Longview Drive. As discussed in Section, 3.3.1, an IRA has been initiated at this property to confirm whether indoor air conditions are a result of a complete vapor intrusion pathway, and if so, to determine the degree of hazard associated with this condition, as described in the IRA Plan (APTIM, 2022b). Three rounds of data were collected at the time of the IRA Plan. Those data were used to complete an Imminent Hazard Evaluation included in the IRA Plan, in accordance with 310 CMR40.0950. The cumulative risk (using maximum detected concentrations and an exposure period of 5 years to evaluate an imminent hazard) is 6.2E-07, less than 10% of the imminent hazard criterion for cancer risk of 1E-05. The estimated Hazard Index is 0.53, primarily due to the presence of TCE, which is less than the Imminent Hazard limit of 1 for chemicals, such as TCE, with the potential to cause serious effects following short-term exposures. In addition, MassDEP (2014) has established in IH Level for TCE in residential settings of 6 µg/m^3 and all detected concentrations of TCE in indoor air are less than this level. As a result, the conditions at 34 Longview Drive do not pose an IH in accordance with the criteria described in 310 CMR40.0955(1) through (3). The IRA Plan included the collection of sub-slab vapor and indoor air samples at 34 Longview Drive on a quarterly basis, including the sampling of sump water if present. The indoor air and sub-slab vapor results from this location are provided in **Tables 3-15** and **3-16**, respectively. Based on the last four rounds of data (November 2021 to July 2022), a complete vapor intrusion pathway cannot be ruled out, and this location will be included in the risk characterization. Concentrations of both PCE and TCE exceeded their residential TVs in one or more samples and are considered COCs. As discussed in section 6.2.1, the TCE source in the Longview Drive area is not certain. The compound cis-1,2-DCE was detected, but concentrations were well below the TVs, and sub-slab vapor results were well below screening values. Therefore, this compound is not considered a COC for indoor air at this location. A complete vapor intrusion pathway was not identified for any of the other VOCs detected in indoor air.

7.2.2 Selection of COCs

The MCP requires that all chemicals detected at a site be considered as COCs unless there is a specific, justifiable rationale for eliminating them from the risk characterization. The rationale for exclusion may include such considerations as laboratory contamination, low frequency of detection, and site-specific background concentrations (MADEP, 1995). **Table 7-6** provides a summary of the COCs identified. Previous sections provide the basis for inclusion/exclusion.

7.3 Exposure Assessment

Under the MCP (310 CMR 40.0920), exposure assessment is the process of identifying potential human and environmental receptors at the site based on site activities and uses and characterizing the nature of their contact with OHM detected on site. The MCP requires the identification of receptors, site activities and uses, exposure points, and exposure point concentrations.

7.3.1 Current and Foreseeable Future Use of the Site

As discussed in *Section 2.2.1*, the Site currently has a wide variety of uses, including industrial/ commercial use in the area of the former Varian Facility and nearby Tozer Road locations. In addition, the site includes areas used for recreational, educational, and residential use.

In terms of the current use of groundwater, the site and surrounding properties are supplied by municipal water. Based on all information available, there are no private drinking water wells known to exist within 500 feet of the disposal site. According to an online review of the MassDEP GIS mapping system, there are no areas of critical environmental concern, sole source aquifers, potentially productive aquifers, or Zone II or interim wellhead protection areas within 500 feet of the disposal Site. Therefore, there is no current or foreseeable future use of groundwater for drinking water purposes at the site or in the immediate area.

7.3.2 Receptor Identification and Pathways of Exposure

A receptor is a group of persons, habitats, or biota that may potentially be exposed to contaminants at or from the site. Current receptors in the industrial/commercial areas of the site are site workers and utility workers. Trespassers are also possible receptors in these areas; however, their exposure is likely to be less than full-time workers and will not be evaluated. Future receptors in these areas could include residents. Potential exposure to soil by future residents will be evaluated, but exposures to indoor air in future residential buildings cannot be evaluated based on the current data in industrial/commercial areas, as they are not representative of such future conditions. Current and future receptors in educational areas (28 Tozer) are teachers and students, as well as other staff, and current and future receptors in residential areas are residents. Current and future receptors in the PSL10 area are nearby residents and workers.

The exposure profiles developed for this site are summarized in **Table 7-7,** including the receptors, the medium, the exposure point, as well as the exposure route.

7.3.3 Soil and Groundwater Categories

7.3.3.1 Soil Categories Applicable at the Site

The soil at a site can be classified as S-1, S-2, or S-3 based upon the potential for human exposure to the soil (310 CMR 40.0933). Category S-1 soil represents the highest potential for exposure because it assumes the unrestricted use of the site (i.e., residential). Category S-3 soil represents the lowest potential for exposure. Specific criteria - frequency of use, intensity of use, and accessibility of the soil - have been established for each category (310 CMR 40.0933(4)). These criteria must be evaluated under both current and reasonably foreseeable future site activities and uses.

Soil impacts are identified in two areas of the Varian site:

- The former Varian facility. Impacts in these areas are located within soil located at the surface and to depths greater than 50 feet below grade. The surface of the former Varian facility is generally paved, covered by buildings, and unpaved areas are limited. Soil down to 15 feet deep under the pavement is considered potentially accessible. Soil down to 3 feet deep in the unpaved areas is considered accessible, and soil from 3 to 15 feet deep is considered potentially accessible. Soil deeper than 15 feet at the site or under the building is considered isolated. Children are unlikely to be present at the former Varian facility, and the frequency of use for adults is considered to be low. For facility workers, the intensity is considered to also be low; however, for landscapers, it could be high. As a result, accessible soil (unpaved 0-3 feet below grade) is categorized as S-2, and potentially accessible and isolated soil is categorized as S-3.

- The PSL10 – As described in the Phase II CSA (IT, 2000a), the PSL10 is an area south of the Varian facility and the easter edge of the 32 Tozer Road property where waste liquids were reported to have been historically disposed of. This area was investigated as described in both the 2000 Phase II CSA and in this Phase II addendum (Section 6.1.3). Soil samples taken in PSL10 were relatively shallow. This area includes a grass field as well as paved and landscaped areas. This area could be used by children and could be at a high frequency and intensity at least during the summer months. As a result, soil from 0-3 feet in this area is considered S-1, and 3-15 feet is considered S-2.

The MCP (310 CMR 40.1012) requires that all soil to a depth of fifteen feet below grade at a site be evaluated as S-1 for unrestricted use unless an Activity and Use Limitation (AUL) is placed on the property. An AUL is a deed restriction that sets forth allowable uses for the site and restricts specific site uses. Since there is not an AUL in place, the soil between grade and 15 feet below grade is also classified as S-1 to address potential future changes in land use that could result in an increased frequency and intensity of use.

7.3.3.2 Groundwater Categories Applicable at the Site

Under the MCP (310 CMR 40.0932), there are three categories for groundwater (GW-1, GW-2, and GW-3), which can apply to a specified volume of groundwater or to an aquifer taken as a whole. These categories are based on current or potential exposure conditions as described below:

> **GW-1** applies to groundwater that is a current or potential source of drinking water.
>
> **GW-2** applies to groundwater considered to be a potential source of vapors that could migrate through the soil into the indoor air of buildings. This applies to groundwater that is less than 15 feet below grade and within 30 feet of an existing or planned building that is or will be occupied.
>
> **GW-3** applies to groundwater that is assumed to discharge to surface water. All groundwater in Massachusetts is classified as GW-3.

As discussed in Section 7.2.1, groundwater beneath the site does not meet the GW-1 criteria.

Groundwater at the Site is less than 15 feet below grade at most locations around Site buildings (the 150 Sohier Road facility and downgradient areas). As a result, groundwater in proximity to site buildings is considered GW-2.

Since all groundwater in the Commonwealth of Massachusetts is assumed to ultimately discharge to surface water, all groundwater at the site is classified as GW-3. Therefore, groundwater is classified as GW-2 (in a portion of the site) and GW-3 for the entire Site.

7.3.4 Exposure Point Locations and Concentrations

An exposure point is a location of potential contact between a receptor and COC identified at the site. Site-specific exposure points were identified to conservatively estimate the potential for receptors to contact OHM present in soil and groundwater.

For each chemical, the Exposure Point Concentration (EPC) is the concentration of hazardous material in a single medium with which a receptor may come into contact at that exposure point location. Hot spots are also considered for both soil and groundwater. Hot spots are defined as areas with average concentrations greater than 10 and less than 100 times the area around them unless the potential exposures are similar in both areas. In all cases, exposures are similar in potential hot spots as compared to the surrounding areas. As a result, for this evaluation, hot spots are defined as areas with concentrations more than 100 times those in the surrounding areas.

Hot spots were identified at the former Varian Facility for both soil and groundwater. The hot spots were identified by concentrations of TCE and PCE since they were the predominant compound with elevated concentrations. In soil, three hot spots were identified, Hotspot 1 is the Building 3 chemistry lab area, Hotspot 2 is the northeast corner of Building 3, and Hotspot 3 is the Building 5 area.

7.3.4.1 Soil

As discussed previously, soil contamination is largely confined to the former Varian facility and PSL10, which includes a portion of the 32 Tozer Road area. As a result, exposure points are defined for these two areas. In soil, three hot spots were identified, Hotspot 1 is the Building 3 chemistry lab area, Hotspot 2 is the northeast corner of Building 3, and Hotspot 3 is the Building 5 area. **Table 7-8** shows the samples included in the various soil hot spots, based on VOC concentrations greater than 100 mg/kg for Building 3, and 10 mg/kg for Building 5.

For current exposures, the exposure point is unpaved soils to a depth of three feet. This area is represented by the following three samples: AP-26-DO, B1-PSL5. B2-PSL5. Of these, the only detection was 1,1,1-trichlorethane at 0.065 mg/kg. This concentration is much lower than the Method 2 S-1 standard for this compound of 500 mg/kg. Due to the limited unpaved area and the unlikelihood that VOC concentrations would persist at this depth, as verified by the limited results, current risks to site workers associated with exposure to surface soils are not estimated but are assumed to be insignificant.

For the current soil exposure point for utility workers (0-6 feet below grade in the former Varian facility), the arithmetic mean soil concentration of each COC was used to represent the EPC (**Table 7-9**). In accordance with 310 CMR 40.0926(3), arithmetic means used as exposure point concentrations must be a conservative estimate of the average concentrations likely to be contacted by site receptors. **Table 7-9** shows that the detection frequency for VOCs was low. Since a value of one-half the reporting limit is used in calculating the arithmetic mean concentration, the resultant mean is likely to be biased high. In addition, for these substances, the average concentration is no more than ten times less than the maximum concentration, indicating that the range of concentrations is relatively small. Based on these data characteristics, it is concluded that using the arithmetic mean for the current soil exposure point concentrations is a conservative estimate of the average exposure concentration. As shown in **Table 7-9**, the estimated EPCs for utility workers are less than 1 mg/kg for each COC. As a point of comparison, the Method 2 S-1 standards are included in **Table 7-9**, and the estimated EPCs are much lower than these standards, which are based on chronic exposure. The exposure frequency for this receptor is expected to be a matter of days and is unlikely to be repeated by the same receptor. This is considered an acute exposure. The Agency for Toxic Substances and Disease Registry (ATSDR, 2022) establishes Minimal Risk Levels for many chemicals. These levels are intended to provide an estimate of the amount of a chemical that a person can eat, drink, or breath each day without a detectable risk to health. They consider health effects other than cancer for acute exposures (about 1-14 days), intermediate exposures (from 15 to 364 days), and chronic exposure (greater than 364 days). For the COCs shown in **Table 7-9**, the acute minimum risk levels, when established, are not greater than those based on intermediate or chronic exposure. Therefore, the comparison of the EPCs to the Method 2 S-1 standard should provide a conservative evaluation of the acute exposures expected for utility workers. Based on this comparison, the exposures and risks to utility workers are not estimated but are assumed to be insignificant.

The current exposure point for PSL-10 is surface soil (0-3 feet). The 1995 and 1999 samples taken from this area were evaluated in 2000 CSA and risk characterization. It was concluded that COCs were not present in surface soils, and only very low concentrations of TCE, cis-1,2-DCE, and PCE were detected in the soil samples. As a result, this area was not considered an exposure point or evaluated in the 2000 risk characterization. However, additional sampling in this area was conducted in 2011, as discussed in Section 3.1, and shown in **Table 3-6**. This area is considered an exposure point, and will be evaluated in this risk characterization. Due to the small number of samples available, the maximum detected concentration of the COCs from **Table 3-6** is used as the exposure point concentration.

For future residents, site workers, and construction workers, the soil exposure point is defined as soil from the surface to 15 feet below grade, as there is no AUL currently in effect. This includes all samples shown in **Table 7-8** with depths of 15 feet or less. Since this is a future exposure and the site is assumed to be disturbed and redeveloped (since soil is now assumed to be accessible), the samples identified as hot spots are assumed to no longer be discrete areas. The arithmetic mean (**Table 7-10**) is used as the exposure point concentration for this exposure point, and these receptors will be evaluated in the risk characterization. These concentrations are considered representative of average exposures for the same reasons identified above for shallow soils. It should be noted that the maximum detected concentration of PCE of 1200 mg/kg is included in the EPC derivation even though this concentration was not verified by subsequent sampling, as discussed in Section 7.1.1.1. Additionally, significant remediation was conducted in the area of this sample after collection.

7.3.4.2 Groundwater

As discussed in Section 7.2.1, there is no direct exposure of human receptors to groundwater evaluated in this risk assessment. Future construction workers could be exposed to groundwater in areas where groundwater is at a depth of fewer than 15 feet. This would be dermal exposure (through the skin), which would be limited by clothing. Shallow groundwater samples are generally from 15 feet or less in depth and are used to evaluate this receptor. Groundwater Hot Spots have been identified in shallow overburden, deep overburden, and bedrock groundwater, based on current concentrations of TCE of approximately 0.1 mg/L or greater (see **Figures 6-5**, **6-6**, and **6-7)**, respectively. Locations included in the groundwater evaluation for groundwater and hot spots in the three depth intervals are identified in **Table 7-11**. Samples identified as upgradient or offsite (not impacted by Varian releases) are not included in the site exposure point concentrations. Exposure point concentrations for shallow groundwater and the shallow groundwater hot spot are provided in **Tables 7-12** and **7-13**, respectively. For shallow groundwater, the area included is relatively small, and while it is not shown on **Figure 6-**5 to be completely contiguous, the areas with higher concentrations are in close proximity and were evaluated as a single hot spot. Average concentrations are used as the EPCs in both cases, calculated as described above for soil. In the case of groundwater, multiple samples were collected in most locations, with more sampling rounds conducted in areas where remedial systems are in place. Since these areas are likely to have higher concentrations, especially the earlier rounds, the inclusion of varying rounds in the averages biases the results high and results in a conservative estimate of potential exposure.

7.3.4.3 Indoor Air

Current and future users of the site buildings are potentially exposed to site contaminants via vapor intrusion and inhalation. Measured indoor air concentrations are used in all cases to evaluate current exposures. They are also used to evaluate future exposures in cases where the future use remains the same as the current use. However, future residential use in buildings that are now commercial or industrial cannot be evaluated with indoor air sampling results from the existing buildings. As discussed in Section 7.1.1.4, indoor air at the former Varian buildings and the residential location 34 Longview Drive are evaluated. Vapor intrusion at the Tozer Road commercial buildings has either been shown not to be a complete pathway, or has been demonstrated to pose no unacceptable risk to human health, with the exception of 39 Tozer Road. Additional sampling at this location is planned at this location to provide a better understanding of the vapor intrusion pathway. Of all the residential homes tested, the only one in which a potentially complete vapor intrusion pathway was identified was 34 Longview Drive, as discussed in Section 7.1.1.4. This location will be evaluated, and the EPCs will be based on the four most recent rounds of data collected. The EPCs are shown in **Table 7-14**.

In the case of Building 3 sample locations, each one is representative of a separate room. Site workers generally are assigned to specific duties such that they work in a particular room. As a result, EPCs for this building have been developed for each room separately using the rounds identified in Section 7.1.1.4. Bld 2-6 and Bld 3-3 are the locations sampled over the four rounds evaluated. These EPCs are provided in **Table 7-14**. The Building 5 EPCs include all locations, as the workers are not confined to any of these rooms. Locations 5-1 and 5-2 were sampled over the last four rounds in this building. The EPCs are based on all data for the different rooms conducted during the period identified in Section 7.1.1.4. These EPCs are also shown on **Table 7-14**. Since the remedial systems were operating at the time of sampling (except for the two-week period of sampling), the use of the EPCs based on this data for future conditions assumes that the systems will continue to operate.

7.3.5 Exposure Estimation

For this risk characterization, exposure and risk estimates were derived using available spreadsheets from MassDEP (short forms) and EPA (Regional Screening Level [RSL] Calculator to the extent possible. In general, information/assumptions included in these spreadsheets was retained unless it was clearly not applicable. The spreadsheets are provided in **Appendix M** and document the assumptions used. The equations used are provided at: https://www.epa.gov/risk/regional-screening-levels-rsls-equations in the case of the RSL Calculator, and in the short form documentation for each exposure point within the results provided in **Appendix M**. The assumptions used are provided in each spreadsheet in **Appendix M**.

7.3.5.1 Soil

Current soil exposures at the former Varian facility to site workers or utility workers were not estimated and are assumed to be insignificant based on limited area of exposure (for site workers) and low concentrations detected in soil that would be contacted by utility workers.

The only current soil exposure pathway evaluated is visitors exposed to soil at PSL10, including the grass field. The recreator is assumed to be a receptor that visits this area on a regular basis and has contact with soil. Dermal contact and Ingestion exposures are assumed. The receptor was evaluated using the EPA RSL Calculator (Recreator) and is assumed to be exposed for 90 days per year (3 days per week for 30 weeks), similar to the MassDEP park visitor short form. Exposure is assumed to occur for 26 years from ages 2 to 28; exposure is not expected to occur for the 0-2-year-old in this setting. Other assumptions are provided in **Table M-1**. The Recreator Calculator also includes the evaluation of inhalation exposure; however, this pathway was not evaluated as it was assumed to be minimal for this exposure point. The exposure estimates are not shown specifically in the RSL spreadsheets, only the resultant cancer risks and non-cancer hazards (**Table M-2**), which will be discussed in Section 4.5.

Future soil exposures at the former Varian facility were evaluated for future residents and construction workers. Soil exposures to future site workers was not evaluated as they are assumed to be less than future residents. These exposures and risks were also developed using the EPA RSL Calculator for Residents and Construction Workers, respectively. Exposure for future residents is assumed to occur for 350 days per year for 16 years. Ingestion and dermal exposures are estimated, and other assumptions are provided in **Table M-3**. The Residential Soil Calculator also includes inhalation exposures, however the methods used are theoretical requiring numerous assumptions, and have not been included. This represents an uncertainty to the results for this receptor and pathway. The results are provided in Table **M-4**.

The future construction worker exposures to soil at the former Varian facility were also evaluated using the EPA RSL Calculator. Exposures for future construction workers were evaluated using the MassDEP Construction Worker ShortForm, including ingestion, dermal, and inhalation exposures. The Short Form was used rather than the RSL Calculator, as the method for estimating air concentrations in the short Form is based on assumptions described in MassDEP (2008), which describes methods for estimating exposure to soil particulates based on assumed particulate levels in air during construction activities. The EPA RSL Calculator estimates air concentrations based either on assumed traffic patterns at the construction site, or the derivation of particulate emission factors based on soil properties and the size of the source area. Given that the exposures are expected to occur in the future, there is little basis for any of these assumptions. As a result, the methods used by MassDEP are expected to be more realistic, and are used for evaluating this pathway. The construction worker exposure is assumed to occur over a six month period (182 days) for 5 days per week and 8 hours per day. Other assumptions are provided in **Tables M-5** though **M-9**.

7.3.5.2 Groundwater

As discussed in Section 7.2.4.2, construction workers are the only receptors with potential exposure to groundwater. The exposure points evaluated are the Groundwater Hot Spot area and the Groundwater Non-Hot Spot Area, for groundwater depths of 15 feet or less. Neither the MassDEP ShortForm nor the EPA RSL Calculator spreadsheets consider this type of groundwater exposure. Therefore, a site-specific spreadsheet was developed for this pathway, which includes the estimation of dermal and inhalation exposure. The methods used and associated spreadsheets are provided in Appendix M (**Tables M-10** to **M-13**. It should be noted that the methods used do not estimate inhalation exposures during construction activities that may result from volatilization from groundwater. This represents an uncertainty to the risk estimates developed.

7.3.5.3 Indoor Air

Indoor air exposures were estimated using the RSL Calculator for Current Workers in Buildings 3 and 5, as well as residents of 34 Longview Drive. The exposure points evaluated, and concentrations are discussed in Section 7.2.4.3. Site workers are assumed to be exposed for 25 years, 250 days per year, for 8 hours per day. Results for Bld 3-6, Bld 3-3, and Bld 5 are provided in **Tables M-14** through **M-17**.

Indoor Air exposures for 34 Longview Drive were also estimated using the RSL Calculator. They are assumed to be exposed for a total of 26 years, 350 days per year for 24 hours per day. Results for this Building are provided in **Tables M-18** and **M-19**.

7.4 Dose Response Assessment

The dose response assessment is a representation of the relationship between the dose of a constituent and the occurrence of adverse effects in the exposed populations. Carcinogenic effects (cancer-causing effects) are evaluated separately from non-carcinogenic effects. Carcinogenic effects are assumed to have no threshold (i.e., any level of exposure has an associated risk). However, adverse effects other than cancer are assumed to have a threshold (i.e., a level below which toxic effects are not expected to occur). For exposures via the ingestion and dermal exposure pathways, slope factors for carcinogens, and reference dose values (RfD) for toxic effects other than cancer (noncarcinogenic effects) are used. Toxicity values were obtained from the Integrated Risk Information system (IRIS – EPA 2022), MassDEP (2019). Toxicity values used for each pathway and receptor are provided in **Appendix M**.

Some cancer-causing chemicals operate by a mutagenic mode of action for carcinogenesis. Chemicals with a mutagenic mode of action would be expected to cause irreversible changes to DNA. As a result, these chemicals would likely exhibit a greater effect in early-life versus later-life exposure. EPA (2005) evaluated this issue and recommended adjustments reflecting the potential that early life exposures make a greater contribution to cancers appearing later in life.

The only COC which has been identified for early-life exposure (younger than 16 years) is TCE in soil for current receptors at PSL 10 and future residential receptors at the former Varian facility. When there is sufficient weight of evidence to conclude that a carcinogen operates through a mutagenic mode of action, and in absence of chemical-specific data on age-specific susceptibility, EPA (2005) advises that increased early-life susceptibility be assumed and recommends that default age-dependent adjustment factors (ADAF) be applied to adjust for this potential increased susceptibility from early-life exposure. In accordance with EPA (2005) guidance, the following ADAFs are recommended: 10 for ages 0 to 2 years, 3 for ages 2 to 16 years, and 1 (i.e., no adjustment) for 16 years and older. In the case of TCE, the inhalation unit risk and oral slope factor estimates are based on the lifetime risk of cancer at multiple sites, however, a mutagenic mode of action has only been established for one of these sites, the kidney (EPA, 2011). As a result, the results provided in **Appendix M** for soil exposure at PSL 10 and for future residential receptors at the former Varian facility reflect the addition of exposure adjusted by these ADAFs for which risk is evaluated using the cancer risk values based on the kidney endpoint.

7.5 Human Health Risk Characterization

This section presents estimates of risk for the relevant pathways and receptors at this site, as described in previous sections. Risks associated with exposures to chemicals associated with both non-cancer and cancer health effects are estimated.

7.5.1 Cumulative Non-Cancer Health Risks

In order to assess the potential for non-carcinogenic health effects (such as developmental, reproductive, neurobehavioral, and other physiological functions) to each receptor identified at this site, the estimated average daily dose (or exposure) received by such receptors and acceptable daily dose or exposure concentration for each chemical (the toxicity value; RfD) are compared. For each chemical, the ratio of the estimated exposure to the acceptable daily dose or exposure is defined as the Hazard Quotient (HQ). In order to account for exposures that a receptor may receive from multiple chemicals and exposure routes, the cumulative non-cancer risk estimate, known as the Hazard Index (HI), is calculated as the sum of the chemical-specific HQs for all exposure routes. As shown in the following two equations, the cumulative HI is calculated by summing the chemical-specific HQs for each route of exposure (Equation 1a); and then by summing the route-specific HIs (Equation 1b).

Equation 1a: $\text{Total}_{\text{HIroute-specific}} = \sum \text{HQ}_{\text{chemical-specific}}$

Equation 1b: $\text{Cumulative HI} = \sum \text{Total HI}_{\text{route-specific}}$

The cumulative HI is then compared with cumulative receptor non-cancer risk limit of 1 (310 CMR 40.0993(6)). If the HI is less than or equal to 1, a condition of no significant risk of harm to human health exists for the site (310 CMR 40.0993(7)). All risk and hazard estimates are provided in Appendix M, and a summary is provided in **Table 7-15**.

The total estimated non-cancer risks shown in these tables assume no difference in the toxic mechanisms of action between the constituents. While this is not the case, it was assumed in order to determine if additional refinement of the HI was necessary (i.e., separation of constituents by their toxic endpoint). The only receptor for which the MCP non-cancer limit is exceeded is future construction workers exposed to groundwater in the identified Hot Spot. As shown in **Table M-12**, this HI is primarily due to TCE. Therefore, a condition of No Significant Risk of harm has been demonstrated for current and most future site receptors site based on non-cancer health effects. However, a condition of No Significant Risk of harm has not been demonstrated for future construction workers exposure to groundwater in the Hot Spot locations.

7.5.2 Cumulative Cancer Risk

Some of the chemicals detected at this site are considered to be probable or known carcinogens by the oral or inhalation routes of exposure. For the ingestion and dermal pathways, the carcinogenic risk posed by these chemicals was estimated by multiplying the estimated daily intake for a given chemical and exposure route over a lifetime by the oral potency value for the chemical. A summary of cancer risk estimates is provided in **Table 7-15.**

The MCP (310 CMR 40.0993) requires that at multi-media disposal sites, the cumulative cancer risk be used to evaluate carcinogenic health risks. In determining whether a condition of No Significant Risk exists, the total Estimated Cancer Risk is compared to the Cumulative Cancer Risk Limit, which is an excess lifetime cancer risk of one-in-one hundred thousand (1 x 10^{-5}, also expressed as 1E-05). The cumulative cancer risk estimates are summarized by receptor in **Table 7-15**, which are all less than the Cumulative Cancer Risk Limit. Therefore, a condition of No Significant Risk of harm to current and future site receptors exists at this site based on cancer health effects.

7.5.3 Comparison to Applicable or Suitably Analogous Standards

A Method 3 Risk Characterization requires the comparison of site concentrations to applicable or suitably analogous standards. The only applicable or suitably analogous standards for this site are OSHA Permissible Exposure Limits (PELs) for workers in the building. These values are shown in **Table 7-16**. No estimated indoor air concentrations exceed these standards.

7.6 Risk to Safety

The MCP requires that the risk of harm to safety be characterized based on information collected during the site investigations and the exposure information identified in this report. The MCP states the risk of harm to safety shall compare current and future foreseeable site conditions to applicable or suitably analogous health standards, if available. However, for this site, no applicable or suitable analogous safety standards were identified.

In 310 CMR 40.0960, the MCP has identified several additional criteria that need to be considered in the evaluation of safety, including:

- The presence of rusted or corroded drums or containers, open pits, lagoons, or other dangerous structures (310 CMR 40.0960(3)(a))
- The threat of fire or explosion (310 CMR 40.0960(3)(b))
- Uncontained material that exhibits the characteristics of corrosivity, reactivity, or flammability, as described in 310 CMR 40.0347

These materials and/or conditions were not observed during visits to the Varian site. Based upon the above evaluation, a condition of No Significant Risk of harm to safety exists at the site, because no threat of physical harm or bodily injury to people was observed at the site or within the surrounding area (310 CMR 40.0960).

7.7 Risk to Public Welfare

The characterization of the risk of harm to public welfare for current and foreseeable future site activities is presented in this section. The purpose of the characterization of risk to public welfare is to identify and evaluate nuisance conditions, which may be localized, and to identify and evaluate significant community effects. This is done by considering such factors as nuisance conditions, loss of active or passive property use, and non-pecuniary effects that may result from the degradation of public or private resources that are directly attributable to releases of OHM at this site (310 CMR 40.0094(2). In addition, the risk of harm to public welfare is evaluated by comparing site concentrations of OHM to UCLs in soil and groundwater (310 CMR 40.0996). During numerous site visits, no odors or other nuisance conditions have been identified at the site. In addition, no other public welfare impacts on the surrounding community related to releases at the site have been identified in accordance with the criteria specified at 310 CMR 40.0994(4).

The soil and groundwater concentrations were compared to the appropriate UCLs in **Tables 7-16** to **7-25.** Hot spots were identified for evaluation of shallow, overburden, and bedrock areas of the site. For shallow groundwater, as discussed in Section 7.2.4, one hot spot was identified. For overburden, hot spots were identified for Building 3, Building 5, and downgradient areas, based on distributions of TCE concentrations shown in **Figure 6-6**, For bedrock, based on the distribution of TCE concentrations shown in **Figure 6-7**, one hot spot was identified. These tables present the following:

- **Table 7-16** presents the UCL evaluation for Varian Facility soils from 0-15 feet (including Hot Spot 1)
- **Table 7-17** presents the UCL evaluation for Varian Facility soils in Hot Spot 2 greater than 15 feet
- **Table 7-18** presents the UCL evaluation for Varian Facility soils in Hot Spot 3 greater than 15 feet
- **Table 7-19** presents the UCL evaluation for Varian Facility soils greater than 15 feet (excluding Hot Spots).
- **Table 7-20** presents the UCL evaluation for Varian Site shallow groundwater hot spot
- **Table 7-21** presents the UCL evaluation for Varian Site shallow groundwater (excluding shallow hot spot)
- **Table 7-22** presents the UCL evaluation for Building 3 deep overburden groundwater hot spot
- **Table 7-23** presents the UCL evaluation for Building 5 deep overburden groundwater hot spot
- **Table 7-24** presents the UCL evaluation for downgradient deep overburden groundwater hot spot
- **Table 7-25** presents the UCL evaluation for Varian Site deep overburden groundwater (excluding deep overburden hot spots)
- **Table 7-26** presents the UCL evaluation for Varian Site bedrock groundwater hotspot
- **Table 7-27** presents the UCL evaluation for Varian Site bedrock groundwater (excluding bedrock hot spot)

These tables show that no average or maximum concentration soil for hot spot or non-hot spot areas exceeded a UCL. No average or maximum concentration in shallow groundwater hot spot or non-spot areas exceeded a UCL. The maximum concentrations in the Building 3 deep overburden groundwater hot spot were greater than the UCLs for TCE and cis-1,2-DCE. In addition, maximum concentrations of vinyl chloride and cis-1,2-DCE were greater than the UCLs in the deep overburden non-hot spot area. The maximum concentration of TCE in the bedrock groundwater hot spot was greater than the UCL, as was the maximum concentration of TCE in the bedrock non hot spot area. However, no average concentrations in the deep overburden and bedrock hot spots and non-hot spots exceeded a UCL.

Based on the above evaluation, it can be concluded that a level of No Significant Risk of harm to public welfare and the environment has been achieved based on the consideration of UCLs.

7.8 Risk to the Environment

A comprehensive sampling program was undertaken in 2021, and sampling continued in 2022 in both Stream A and the Unnamed Stream. This investigation and results of the risk characterization for the environment are presented in **Appendix F** of the January to June 2021 ROS Status Report (APTIM, 2021d). This Stage I Screening of Stream A and the Unnamed Stream concluded that the potential pathways of exposure of environmental receptors to surface water and sediment do not pose a significant risk associated with releases from the former Varian Facility Site, and a Stage II Environmental Risk Characterization is not needed to further evaluate this pathway.

7.9 Uncertainty Analysis

The general approach used in this risk assessment has been to use conservative assumptions regarding exposure, so that potential risks will not be underestimated. Exposure point concentrations using arithmetic mean concentrations incorporate values of one-half the reporting limit for the majority of the values used in estimating mean concentrations. This could result in the overestimation of exposure point concentrations.

It is assumed that the concentrations in the site media are not changing over time. This is a conservative assumption as remedial activities have been conducted, and concentrations will likely continue to decrease. This conservative approach may result in an overestimation of the risk for the future receptors considered in this assessment, given that some of the chemicals detected may attenuate (e.g., dilution, biodegradation).

For the most part, arithmetic mean concentrations are used as exposure point concentrations. These are likely to overestimate exposure since sampling has focused on areas with higher concentrations. In addition, groundwater exposure point concentrations were determined by the inclusion of all sampling rounds during a given period. However, some locations have more sampling rounds than others within the period included, likely locations with higher concentrations. As a result, the groundwater exposure point concentrations may be biased high.

This risk characterization includes exposure pathways that are more difficult to estimate than others. Specifically, dermal contact with groundwater and soil pathways relies on assumptions about the extent and frequency of contact and the extent of transfer from the medium onto the skin and absorbed into the body. The assumptions regarding the extent and frequency of contact are likely to be overestimated, however, the extent of transfer and absorption may be over- or under-estimated. In addition, construction worker exposure to soil and groundwater could include inhalation exposures were the VOCs in these media to volatize during construction activity. These exposures are not estimated in this risk characterization due to the high uncertainty in the assumptions necessary. However, construction activities are assumed for depths up to 15 feet, and the highest concentrations in soil are typically found at greater depths.

Uncertainty exists in the toxicity values for each substance (EPA, 1989). Dose response relationships for most OHM are derived from animal studies using high doses. Exposure to humans occurs at low dose levels. The use of conservative high to low-dose extrapolation models as well as the assumption of linearity at low doses, may result in an overestimation of risk. In addition, extrapolating results of toxicity studies from animals to humans may introduce error and uncertainty, and may involve inadequate consideration of differences in absorption, pharmacokinetics, target organ systems, and variability in population sensitivity. Toxicity values are subject to change as new evidence becomes available, which may result in over- or underestimation of risk. The use of these values could over- or under-estimate risk.

8.0 CONCLUSIONS AND FINDINGS [310 CMR 40.0835(4)(l)]

- In 2000, Varian submitted an MCP Phase II CSA for the Former Varian facility located at 150 Sohier Road in Beverly, Massachusetts (IT, 2000a). This report documented the data and results of a comprehensive assessment of the site conducted from 1995 to 1999 to define the source, nature, and extent of the OHM releases at the property, including the investigation of 19 PSLs. Based on the 2000 Phase II CSA, remediation was recommended to address soil and groundwater impacts. Varian submitted a Phase IV Remedy Implementation Plan (Phase IV Plan; IT, 2001) in December 2001. Initial implementation of the Comprehensive Response Action, including injection of permanganate (a common oxidant), began in July 2002. Response actions at the Site continued under the MCP in ROS from 2002 through 2022. Semiannual ROS reports documented the cleanup activities at the Site. Activities included supplementing the cleanup plan with bioremediation and SVE, installation of multiple injection wells, and further assessment of source areas.

- In a letter dated February 18, 2022, MassDEP requested the completion of an amended Phase II CSA. MassDEP indicated that the 2000 Phase II CSA had not adequately assessed the extent of VOC impacts associated with the Site. These concerns were originally outlined in a January 2021 MassDEP report summarizing their evaluation of investigations, remedial activities, and response actions at the Site. In that January 2021 report, MassDEP concluded that some data gaps exist and requested further investigative work. In response, Varian issued a work plan dated February 9, 2021, that included additional well installation, surface water sampling, and sediment sampling activities. The February 2021 work plan was approved by MassDEP, with conditions, in a letter dated February 26, 2021. The results of those assessment activities and other information requested by MassDEP were presented in reports titled Vapor Intrusion Assessment Report dated April 29, 2021, Phase V ROS Report dated August 4, 2021, Building 3 and 5 Source Area Assessment Summary, dated June 30, 2021, and Summary of In-situ Chemical Oxidation and Soil vapor Extraction dated September 28, 2021. Subsequent sampling data were presented in the report titled Phase V Remedy Operation Status report, dated January 31, 2022. Information in those reports largely addressed MassDEP’s concerns prior to the February 2022 letter.

- Information about historical industrial processes and subsurface analytical data from PSL investigations indicated that the COCs at the Site are chlorinated VOCs. TCE, PCE, and 1,1,1-TCA were the three primary chlorinated solvents historically used at Varian’s former facility.

Eight COCs were identified for the Site, including the three parent compounds, TCE, PCE, 1,1,1-TCA, and five common degradation (“daughter”) compounds, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1-DCE, 1,1-DCA, and VC. Results of assessment activities conducted since the 2000 Phase II CSA have not identified additional COCs.

- Releases of VOCs appear to have occurred in PSL-5 (former Building 1 septic tank/leach field), PSL-6 (former septic tank/leach field beneath Building 6), and PSL-11 (Building 3 chemical laboratory). These PSLs are collectively referred to as the Building 3 Source Area. Releases of VOCs appear to have also occurred at PSL-7 (Building 5 chemical laboratory), which is referred to as the Building 5 Source Area. Additionally, releases of VOCs appear to have occurred at PSL-10 (open field), primarily on the western property line near 32 Tozer Road. This location is referred to as the PSL-10 Source Area. While assessment activities conducted since the 2000 Phase II CSA provide a better understanding of the release areas, no new release areas have been identified.

- Based on the levels of VOCs present in the Building 3 Source Area and the Building 5 Source Area, additional remediation is warranted to limit potential downgradient migration of VOCs in groundwater. These two areas will be a focus of additional remediation at the Site. While the levels of VOCs present at PSL-10 are much lower than both Building 3 and 5, remediation may be conducted in that area to limit potential downgradient migration of VOCs in groundwater.

- The results of the field investigations indicated that impacts to soil were predominantly at locations at 150 Sohier Road, Varian's former facility. Beyond Varian's former facility property, VOCs were present in groundwater, soil gas, and surface water samples. Results of assessment activities since the 2000 Phase II CSA continue to support those conclusions.

- A significant amount of additional investigation has been conducted since the 2000 Phase II CSA. Although this has developed more information about specific areas at the Site, none of the major conclusions regarding site geology and hydrogeology have changed since the 2000 Phase II CSA.

  Site hydrogeology is characterized by the presence of two aquifers. The overburden aquifer is composed of unconsolidated sediments laid in glacial, post-glacial, and coastal depositional environments. The Site is typically underlain by dense till, sand and gravel, and silt and clay deposits. The bedrock aquifer is characterized by fractured granite and gabbro formations. The depths to bedrock between the overburden and the bedrock are highly variable throughout the Site.

  In the shallow overburden aquifer, groundwater flows at variable rates in a general southerly to southwesterly direction toward the Bass River. The overburden aquifer discharges into the two local streams: the Unnamed Stream that transects the facility and Stream A, located further to the west of Varian's former facility. A component of groundwater flow from Varian's former facility is also to the north-northwest.

In the bedrock aquifer, groundwater flows through interconnected fractures and faults in directions generally similar to those of the overburden aquifer. The two aquifers are locally in communication. Transmissivity of the bedrock aquifer is orders of magnitude lower than the overburden aquifer, indicating most groundwater flow is in the overburden aquifer.

- The vertical hydraulic gradients within and between the aquifers can be summarized as follows.

  - Source Area Wells: Consistent downward gradients from the overburden to the bedrock (with 2 to 11 feet of head difference).
  - Central and Western Wells: Weak, inconsistent upward gradients within the overburden (up to 0.1 feet of head difference) accompanied by weak, inconsistent upward gradients from the bedrock to the overburden and within the bedrock.
  - Northern Wells: Consistent downward gradients in the overburden, sometimes strong, with up to 3 feet of head difference. The gradients between the bedrock and the overburden and within the bedrock do not exhibit a common pattern. Very strong upward (up to 4 feet of head difference) or very weak and inconsistently upward or downward (with 0.1 to 0.2 feet of head difference) vertical gradients have been observed.
  - Southern Wells: Overall weak and somewhat inconsistent downward gradients from the deep overburden to the bedrock and within the bedrock (0.1 to 0.2 feet of head difference). The exception to this is seen at BR-6 and BR-7 where there is a strong upward gradient from the upper bedrock to the overburden.

- Extensive sampling has been conducted to evaluate potential vapor infiltration into buildings at the 150 Sohier Road property, at commercial properties on Tozer Road, and in downgradient residential areas. At Varian's former facility, residual VOCs in the vadose zone and/or dissolved-phase VOCs in the groundwater beneath facility buildings in the Building 3 and Building 5 areas are likely the source of the TCE and PCE vapors detected in soil gas beneath the buildings. These vapors may have resulted in impacted indoor air in these buildings. However, the operation of the two SVE systems at the Site have provided treatment to the vadose zone and mitigated potential migration through the indoor air pathway. In downgradient areas on Tozer Road and the residential areas further to the west and south, results of extensive indoor air sampling have either not identified a Significant Risk or have shown that indoor air is not a significant pathway of concern. At the one location on Longview Drive and one location on Tozer Road where sampling results cannot rule out indoor air as a significant pathway of concern, additional sampling is planned. Mitigation measures are planned at the Longview Drive property. If warranted, mitigation measures may also be implemented at the Tozer Road property. Shallow groundwater monitoring will continue in downgradient areas.

- The 2000 Phase II CSA concluded that shallow groundwater VOC contamination detected at the 31 Tozer Road Properties was likely the result of impacts associated with the former location of the Unnamed Stream. However, subsequent data indicate that a component of the shallow impacts at 31 Tozer Road may also be the result of the upward vertical gradient noted at

31 Tozer Road and 39 Tozer Road. That said, shallow treatment conducted at 31 Tozer Road in 2002 and 2003 reduced VOC concentrations in the shallow overburden groundwater in this area. VOC concentrations at 31 Tozer Road in 2022 remain well below pretreatment levels (e.g., >85% reduction in TCE at shallow well AP15-S). It should be noted that permanganate injections were not conducted at well AP15-S, indicating upgradient treatment at 31 Tozer Road has resulted in the decreased concentrations of VOCs.

- The 2000 Phase II CSA concluded that DNAPL, as defined by the regulations at the time, was not present. The definition of nonaqueous phase liquid has changed since 2000 and the current MCP no longer defines it as a measurable thickness in a well. As outlined in a report titled Building 3 and 5 Source Area Assessment Summary, dated June 30, 2021, groundwater concentrations were evaluated to assess the potential presence of DNAPL. That evaluation did identify wells in the Building 3 area where DNAPL is likely present in the vicinity of the wells. In addition, the June 2021 report and subsequent sampling of groundwater at the Building 5 area did indicate that there is likely DNAPL in bedrock near one well. Groundwater concentrations and persistent groundwater plumes at the Site suggest that DNAPL is or was present and has migrated into the deep overburden and potentially into fractured bedrock. Given the age of the release and absence of DNAPL detection in monitoring wells since 1997, DNAPL in the overburden is likely present residually (e.g., in discontinuous droplets) but is not mobile, while any DNAPL that is present in bedrock is likely present in fractures, many of which are small and poorly connected to other fractures, thereby limiting DNAPL mobility. This is particularly noted at well OB45-BR, where geophysical data indicates very little fracturing and low water flow from this area. TCE was also detected in well OB54-BR at concentrations up to 53 mg/L. Additional assessment will be conducted prior to remediation of this area to assess if the elevated concentrations of TCE in OB54-BR are connected to OB45-BR.

- To further assess the potential extent of VOC impacts, additional bedrock wells were installed in the Building 5 area in March and April 2022. The results of sampling and monitoring at these new wells and other site wells provide definition of the potential extent of VOC impacts to soil and the extent of VOCs detected in bedrock groundwater that suggest DNAPL presence nearby.

- To further assess the potential extent of elevated VOCs beneath and adjacent to the Building 3 complex, an electrical resistivity imaging (ERI) study and confirmation drilling were conducted in summer 2022. The results of that assessment work provide a clearer picture of the extent of elevated VOCs in the Building 3 Source Area. The data have been used to estimate the area of elevated VOC impacts that may warrant additional treatment.

- The current nature and extent of the COCs in groundwater in both the overburden and bedrock aquifers was evaluated using data collected from monitoring wells over 2 years of sampling, May 2020 through May 2022. The highest VOC concentrations are detected in groundwater on the former Varian facility property. Groundwater sampling results from 2022 indicate:

  - Concentrations of TCE range from non-detect to 260 mg/L, with the greatest concentration located beneath Building 3 (well AP31-DO).
  - Concentrations of PCE range from non-detect to 43 mg/L, with the greatest concentration located beneath Building 5 (well OB35-DO).
  - Concentrations of *cis*-1,2-DCE range from non-detect to 500 mg/L, with the greatest concentration located just east of Building 3 (well AP33-DO).
  - Concentrations of 1,1,1-TCA range from non-detect to 41 mg/L, with the greatest concentration located just east of Building 3 (well AP24-DO).

- Several VOCs have been detected in surface water samples, with PCE and TCE being the two chemicals most commonly detected. As discussed in the January 2022 ROS Report, VOC concentrations in surface water samples collected in 2021 remained relatively consistent or decreased, when compared with historical results. A likely source of the VOCs identified in both streams is from the discharge of groundwater containing VOCs either from 150 Sohier Road or different non-Varian source.

- The August 4, 2021, semiannual ROS report included an evaluation of human health and environmental risk posed by VOCs detected in surface water and sediment at the Site. Based on data collected in 2021, No Significant Risk to human health was identified. It was also demonstrated that further assessment of environmental risk was not warranted. In addition, the report provided a screening of potential risk to pets that may drink surface water. The maximum levels of VOCs in surface water were below the screening levels used to assess potential risk to pets.

- Remediation activities conducted over the past 20 years are summarized in this report. As documented in trend graphs provided in prior ROS reports, those activities have reduced VOC concentrations in some source areas as well as downgradient areas. This has resulted in a much-reduced VOC plume extent in the shallow overburden and bedrock aquifers. Less of a reduction is noted in the deep overburden. Residual VOCs in groundwater beneath the Building 3 area and to a lesser extent at the Building 5 area remain. Significant effort has been made to assess areas beneath both the Building 3 complex and Building 5. However, the building structures limit access and create uncertainty regarding the delineation and extent of VOC impacts.

- As required by the MCP and Site conditions, a Method 3 Risk Assessment was conducted. That assessment evaluated the potential health effect of possible exposure to VOCs associated with the former Varian facility Site. Receptors, or people potentially exposed included workers at the 150 Sohier Road facility, workers in off-property commercial/industrial buildings along Tozer Road, and residents in areas to the west and south of Tozer Road. The result of that assessment indicated there is no current or future Significant Risk to residents, including children playing in the stream. No Significant Risk to workers on Tozer Road was identified. No Significant Risk was identified to workers in the 150 Sohier Road buildings with the operation of the existing SVE systems. However, a condition of No Significant Risk of harm has not been demonstrated for future construction workers who could potentially be exposed to groundwater in certain areas at the 150 Sohier Road property. The risk assessment demonstrated that a current condition of No Significant Risk of harm to safety, public welfare and the environment exists at the Site.

Based on the conclusions and findings of this Phase II CSA Addendum, Comprehensive Remedial Actions are necessary at the Site to achieve a Permanent or Temporary Solution, therefore a Phase III evaluation will be conducted in accordance with the MCP, 310 CMR 40.0850, to evaluate the remedial options for the Site. Results of this evaluation including the selection of the recommended remedial action alternative, will be presented in a Phase III RAP report.

9.0 REFERENCES

Aestus, LLC, 2022. Aestus Geotrax CSM+™ Ultra-High Resolution Remedial Design Characterization and Conceptual Site Model Update Process Final Report, Former Varian Facility, Beverly, Massachusetts, USA. November 11, 2022.

Agency for Toxic Substances and Disease Registry (ATSDR), 2022, Minimal Risk Levels (MRLs), https://www.atsdr.cdc.gov/minimalrisklevels/index.html

Aptim Environmental & Infrastructure, LLC (APTIM), 2020. Phase V Remedy Operation Status Inspection and Monitoring Report, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. June 30, 2020.

APTIM, 2021a. Indoor Air Sampling Work Plan, Downgradient Residential Areas, Former Varian Facility Site. January 25, 2021.

APTIM, 2021b. Phase V Remedy Operation Status Inspection and Monitoring Report, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. February 24, 2021.

APTIM, 2021c. Vapor Intrusion Assessment Report, Downgradient Residential Areas. Former Varian Facility Site Beverly, Massachusetts, RTN 3-0485. April 29, 2021.

APTIM, 2021d. Phase V Remedy Operation Status Inspection and Monitoring Report, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. August 4, 2021.

Camp Dresser & McKee, 1970, "City of Beverly, Massachusetts Report on Storm Drainage," December 1970.

Clean Harbors Environmental Services, Inc., 1993. Phase IIA - Comprehensive Site Assessment Proposed Scope of Work, December 10, 1993.

Environmental Protection Agency (EPA), 1989, Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A), Interim Final, Office of Emergency and Remedial Response, Washington, D.C., EPA/540/1-89/002.

EPA, 1993. Evaluation of the Likelihood of DNAPL Presence at NPL Sites, United States Environmental Protection Agency, EPA 540R-93-073. September 1993.

EPA, 2005, Agency (EPA), 2005, Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. Risk Assessment Forum, EPA/630/R-03/003F, March.

EPA, 2011, IRIS Toxicological Review of Trichloroethylene (Interagency Science Discussion Draft). U.S. Environmental Protection Agency, Washington, DC, EPA/635/R-09/011D.

EPA, 2022, Regional Screening Levels (RSLs) Generic Tables, May. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Environmental Reclamation, LLC, 2022. Remedy Operation Status Inspection & Monitoring Report, 33-71 Dodge Street, Beverly, Massachusetts, RTN 3-3981. July 2022.

IT Corporation, Inc. (IT), 2000a. Phase II Comprehensive Site Assessment, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. June 2000.

IT, 2000b. Phase III – Remedial Action Plan, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. September 2000

IT, 2001. Phase IV Remedy Implementation Plan, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. December 2001.

Massachusetts Department of Environmental Protection (MassDEP), 1995, Guidance for Disposal Site Risk Characterization in Support of the Massachusetts Contingency Plan, Interim Final Policy #WSC/ORS-95-141, July.

MassDEP, 2002, Technical Update, Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil, Update to Section 2.3 Guidance for Disposal Site Risk Characterization – In support of the Massachusetts Contingency Plan, May.

MassDEP, 2004. Conducting Feasibility Evaluations under the Massachusetts Contingency Plan (MCP), Policy WSC-04-160. July 16, 2004.

MassDEP, 2008. Technical Update, Characterization of Risks Due to Inhalation of Particulates by Construction Workers, Update to: Section 7.3 and Appendix B of the MA DEP Guidance for Disposal Site Risk Characterization – In Support of the Massachusetts Contingency Plan, July.

MassDEP, 2014. US EPA Trichloroethylene Toxicity Values and Office of Research and Standards Recommendations Regarding Remediation Targets and Timeframes to Address Potential Developmental Risks, August 15.

MassDEP, 2016. Vapor Intrusion Guidance: Site Assessment, Mitigation and Closure, Policy WSC-16-435. October 14, 2016.

MassDEP, 2020. MassDEP FAST Indoor Air Sampling Effort Neighborhoods Surrounding Former Varian Facility Site Report. December 2020.

MassDEP, 2021. Massachusetts Department of Environmental Protection Letter, Re Former Varian Site. February 2, 2021.

MassDEP, 2022. Termination of Remedy Operation Status / Notice of Non-Compliance Letter to Varian Medical Systems, Inc., Regarding Beverly, MA, 150 Sohier Road, RTN 3-0000485. February 18, 2022.

Roux Environmental (ROUX), 2021. Permanent Solution Report, Communications & Power Industries LLC, 150 Sohier Road, Beverly, Massachusetts, RTN 3-36528. October 2021.

Shaw Environmental & Infrastructure, LLC (Shaw), 2002a. Phase IV As-Built Construction and Final Inspection Report, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. October 2002.

Shaw, 2002b. Remedy Operation Status Opinion, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. December 16, 2002.

Shaw, 2006. Phase V Remedy Operation Status Inspection and Monitoring Report, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. October 4, 2006.

Shaw, 2010. Phase V Remedy Operation Status Inspection and Monitoring Report, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. October 30, 2010.

Shaw, 2012a. Modification of the Phase III Remedial Action Plan (RAP) and Phase IV Remedy Implementation Plan (Phase IV Plan) to address the Building 5 Area, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. December 17, 2012.

Shaw, 2012b. Massachusetts Contingency Plan, Phase II – Comprehensive Site Assessment, Building 3 Site, a Portion of the Former Varian Facility Site, 150 Sohier Road, Beverly, MA, RTN 3-28531. May 29, 2012.

Shaw, 2012c. Massachusetts Contingency Plan, Phase III – Remedial Action Plan, Building 3 Site, a Portion of the Former Varian Facility Site, 150 Sohier Road, Beverly, MA, RTN 3-28531. May 31, 2012.

Shaw, 2013a. Phase V Remedy Operation Status Inspection and Monitoring Report, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-0485. October 31, 2013.

Shaw, 2013b. Immediate Response Action Completion Report, Phase IV Remedy Implementation Plan, Phase IV Completion Statement, and Phase V Remedy Operation Status Opinion, Building 3, Former Varian Facility Site, 150 Sohier Road, Beverly, Massachusetts, RTN 3-28531. February 28, 2013.

U.S. Geological Survey (USGS), 1964. Bulletin 1163-A, Bedrock Geology of the Salem Quadrangle and Vicinity, Massachusetts (Plate 1), 1964.

10.0 LIMITATIONS ON WORK PRODUCT

The information contained in this report, including its conclusions, is based upon the information that was made available to Aptim Environmental and Infrastructure, LLC (APTIM) during the investigation and obtained from the services described, which were performed within time and budgetary restraints.

APTIM makes no representation concerning the legal significance of its findings or of the value of the property investigated. APTIM has no contractual liability to any third parties for the information or opinions contained in this report.

Unless and until the parties agree otherwise in writing, the use of this report or any information contained therein by any third party shall be at such third party's sole risk. Such use shall constitute an agreement to release, defend and indemnify Varian Medical Systems, Inc. and APTIM from and against any and all liability in connection therewith.

Tables

Table 3-1
Monitoring Well Summary
Wells Installed 2000-2022

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Well ID	Date Of Install	Screen Interval (ft bgs)	Total Well Depth (ft bgs)
Shallow Overburden Monitoring Wells			
AP-01	1/18/2000	7.3-17.3	17.25
AP-12-S	1/7/2002	10-30	30
AP-13-S	4/9/2002	5-18	18
AP-14-S	12/28/2001	15-35	35.5
AP-15-S	8/26/2002	5-15	15
AP-17-S	8/26/2002	2-12	12
AP-36-S	7/26/2018	10-18	18
AP-37-S	7/26/2018	10-18	18
AP-38-S	7/25/2018	10-18	18
AP-39-S	7/23/2018	10-18	18
BW-01	7/9/2003	5-15	15
BW-02	7/9/2003	5-15	15
BW-03	7/9/2003	6-16	16
BW-04	7/9/2003	4-14	14
BW-05	7/9/2003	6-16	16
BW-06	7/9/2003	5-15	15
BW-07	7/9/2003	5-15	15
BW-08	7/10/2003	5-15	15
BW-09	7/10/2003	3-13	13.5
BW-10	7/10/2003	5-15	15
CL12-S1	4/4/2000	5.0-25	25
CL12-S2	4/4/2000	10.0-30	30
CL13-S	12/29/2000	5.5-20.5	20.5
OB-04-S	5/8/2002	5-25	25
OB-06-S	4/19/2021	4-14	14
OB-05-S	3/12/2002	10-30	30
OB-08-S	8/6/2002	2-15	15
OB-09-S	4/4/2002	10-30	32
OB-10-S	1/2/2002	10-30	30
OB-11-S	1/15/2002	10-30	30
OB-12-S	1/18/2002	10-30	30
OB-15-S	4/3/2002	10-20	20
OB-16-S	1/24/2002	7.5-17.5	17.5
OB-18-S	8/5/2002	2-15	15
OB-19-S	4/17/2002	15-35	35
OB-20-S	8/30/2004	3-13	13
OB-24-S	5/2/2002	0-3	3
OB-41-S	3/15/2011	3-15	15
OB-42-S	3/15/2011	3-15	15
OB-43-S	10/3/2011	5-17	15
OB-44-S	12/30/2013	4-19	19
OB-45-S	4/14/2014	5-15	15
OB-46-S	3/13/2015	5 -15	15
OB-47-S	3/14/2015	10 - 25	25
OB-48-S	3/13/2015	5 - 20	20
OB-49-S	12/17/2019	9 - 19	19

Table 3-1
Monitoring Well Summary
Wells Installed 2000-2022
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Well ID	Date Of Install	Screen Interval (ft bgs)	Total Well Depth (ft bgs)
OB-50-S	12/18/2019	9 - 19	19
OB-51-S	12/28/2019	9 - 19	19
OB-52-S	5/17/2021	5-15	15.5
OB-60-S	8/13/2022	5-15	17
P-4R	4/20/2021	1.5-11.5	11.5
P-5R	4/20/2021	5-15	15
P-9R	7/20/2005	2-5.5	5.5
P-11R	10/23/2008	2-10	10
P-13R	4/19/2021	4-14	14
P-14R	4/19/2021	4-14	14
P-19A	1/9/2002	3.5-10.5	11
P-20R	7/20/2005	2-12	12
P-30	4/19/2021	4-14	14
P-31	4/20/2021	1.5-11.5	11.5
Deep Overburden Monitoring Wells			
AP-02	7/12/2000	35.5-55.5	55.5
AP-03-DO	8/11/2004	25-45	45
AP-04-DO	8/11/2004	25-45	45
AP-06-DO	3/13/2002	24-44	48.5
AP-08-DO	8/7/2003	25-40	40
AP-09-DO	8/7/2003	25-40	40
AP-12-DO	1/7/2002	38-58	58
AP-13-DO	4/8/2002	41-61	61
AP-19	5/13/2002	25-30	30
AP-20	5/14/2002	15-20	20
AP-21	5/14/2002	25-30	30
AP-22	5/14/2002	15-20	20
AP-23-DO	9/21/2004	32-52	52
AP-24-DO	8/2/2004	32.5-52.5	52.5
AP-25-DO	9/22/2004	32-52	52
AP-26-DO	7/19/2004	45-65	65
AP-27-DO	7/16/2004	42-62	62
AP-28-DO	8/13/2004	20-45	45
AP-29-DO	9/13/2004	20-45	45
AP-33-DO	9/10/2013	20-40	40
AP-34-DO	9/11/2013	19.5-39.5	39.5
AP-35-DO	9/12/2013	20-40	50
CL12-DO	4/4/2000	70.5-75.5	75.5
CL13-DO	12/28/2000	45-55	55
OB-04-DO	5/8/2002	50-70	70
OB-05-DO	3/21/2002	66-86	86
OB-06-DO	4/11/2002	56-76	77
OB-07-DO	8/5/2002	30-40	40
OB-08-DO	8/6/2002	70-80	80
OB-09-DO	4/3/2002	76-96	97
OB-10-DO	12/27/2001	29.5-49.5	49.5
OB-11-DO	1/15/2002	42-62	62
OB-12-DO	1/18/2002	40-60	60

Table 3-1
Monitoring Well Summary
Wells Installed 2000-2022
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Well ID	Date Of Install	Screen Interval (ft bgs)	Total Well Depth (ft bgs)
OB-14-DO	1/3/2002	39.5-59.5	59.5
OB-17-DO	3/14/2002	23-43	43
OB-18-DO	8/5/2002	20-30	30
OB-19-DO	3/5/2002	45-65	65
OB-20-DO	8/24/2004	58-78	78
OB-21-DO	8/17/2004	66.5-86.5	86.5
OB-22-DO	1/28/2002	39-59	59
OB-25-DO	6/12/2003	60-70	70
OB-26-DO	6/26/2003	46-66	66
OB-27-DO	6/19/2003	43-63	63
OB-28-DO	6/26/2003	45-65	65
OB-29-DO	8/7/2003	25-40	40
OB-30-DO	12/9/2003	59-69	69
OB-31-DO	12/11/2003	54-64	64
OB-32-DO	12/17/2003	51-61	61
OB-33-DO	1/5/2004	46-56	56
OB-34-DO	1/7/2004	54-64	64
OB-35-DO	12/29/2003	53-63	63
OB-36-DO	12/26/2003	52-62	62
0B-37-DO	11/27/2003	52-62	62
OB-38-DO	7/9/2004	35-55	55
OB-39-DO	7/8/2004	35-55	55
OB-40-DO	7/6/2004	49-69	69
OB-45-DO	4/15/2014	34-49	49
OB-52-DO	5/17/2021	40-50	50
OB-58-DO	7/28/2022	45-55	55
OB-59-DO	7/26/2022	43-53	53
P-21-DO	3/1/2022	12-17	17
Bedrock Monitoring Wells			
APBIO-1	7/25/2005	69-79	79
AP-03-BR	7/29/2005	88-108	108
AP-04-BR	7/18/2005	100.5-120.5	120.5
AP-06-BR	3/25/2002	47-98.5	98.5
AP-12-BR	1/3/2002	62-82	83
OB-04-BR	5/6/2002	75-90	90
OB-05-BR	3/12/2002	90-110	110
OB-06-BR	4/10/2002	91-102	102
OB-09-BR	4/30/2002	102-122	122
OB-10-BR	12/21/2001	56 -76	76
OB-11-BR	1/9/2002	65.5-85.5	87
OB-12-BR	1/16/2002	68-88	88
OB-16-BR	1/23/2002	23-33	33
OB-17-BR	3/28/2002	48-98	98
OB-19-BR	3/5/2002	72-92	92
OB-20-BR	9/1/2004	80-101	101
OB-21-BR	8/18/2004	94-104	104
OB-22-BR	1/25/2002	36-43 (uncased)	43
OB-23-BR	4/1/2002	42.5-98	98

Table 3-1
Monitoring Well Summary
Wells Installed 2000-2022

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Well ID	Date Of Install	Screen Interval (ft bgs)	Total Well Depth (ft bgs)
OB-25-BR	6/3/2003	80-100.5(uncased)	100.5
OB-26-BR	6/4/2003	76-96 (uncased)	96
OB-27-BR	6/6/2003	67-87	87
OB-28-BR	6/11/2003	74-94 (uncased)	94
OB-38-BR	5/13/2021	60-75 (uncased)	75
OB-39-BR	5/13/2021	68-83 (uncased)	83
OB-42-BR	4/7/2022	65-80	80
OB-45-BR	5/13/2021	60-96 (uncased)	96
OB-52-BR	5/17/2021	69-86 (uncased)	86
OB-54-BR	4/5/2022	65-95	95
OB-55-BR	7/25/2022	75-85	85
P-21-BR	2/28/2022	30-66 (uncased)	66
Angled Wells		**Screen Interval (Linear**	**Drill Length and Angle (Total well depth in ft bgs)**
AP-30R-DO	10/7/2010	40-90	90 linear ft at a 40 degree angle (58ft)
AP-31-DO	1/28/2010	40-90	90 linear ft at a 40 degree angle (58ft)
AP-32-DO	2/4/2010	40-90	90 linear ft at a 40 degree angle (58ft)
AP-40-S	5/1/2019	42-72	72 linear ft (21.8ft below slab)
AP-41-S	5/3/2019	55-85	85 linear ft (25.9ft below slab)
AP-42-DO	9/18/2020	65-105	105 linear ft at a 40 to 67 degree angle (65 ft below slab)
AP-43-DO	9/18/2020	50-95	95 linear ft at a 42 to 48 degree angle (45ft below slab)
OB-53-BR	3/30/2022	115-130	130 linear ft at a 50 degree angle (100ft)
OB-57-DO	7/18/2022	123-142	142 linear ft at a 30 to 50 degree angle (65ft)

Notes:
ft bgs = feet below ground surface
linear ft = total distance drilled in ft at specified angle(s)

Table 3-2
Indoor Air Analytical Results
Tozer Road Properties

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

		Location Code	30-TOZ-04		30-TOZ-06		30-TOZ-07		31-TOZ-01		31-TOZ-02		31-TOZ-03		31-TOZ-04		39-TOZ-01		39-TOZ-02		39-TOZ-03	
		Sample ID	30-TOZ-04-20210408	30TOZER-4-20211229	30-TOZ-06-20210408	30TOZER-6-20211229	30-TOZ-07-20210408	30TOZER-7-20211229	31-TOZ01-20210330	31 TOZER 01-20211220	31-TOZ02-20210330	31 TOZER 02-20211220	31-TOZ03-20210330	31 TOZER 03-20211220	31-TOZ04-20210330	31 TOZER 04-20211220	39-TOZ-01-20210318	39-TOZ-01-20220106	39-TOZ-02-20210319	39-TOZ-02-20220106	39-TOZ-03-20210319	39-TOZ-03-20220106
		Sample Date	4/8/2021	12/29/2021	4/8/2021	12/29/2021	4/8/2021	12/29/2021	3/30/2021	12/20/2021	3/30/2021	12/20/2021	3/30/2021	12/20/2021	3/30/2021	12/20/2021	3/18/2021	1/6/2022	3/19/2021	1/6/2022	3/19/2021	1/6/2022
Parameter	Units	TV-C/I	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES																						
1,1,1-Trichloroethane	ug/m3	4400	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	0.142	< 0.109	< 0.109
1,1,2,2-Tetrachloroethane	ug/m3	0.2	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137
1,1,2-Trichloroethane	ug/m3	0.72	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109
1,1-Dichloroethane	ug/m3	710	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081
1,1-Dichloroethene	ug/m3	180	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079
1,2,4-Trichlorobenzene	ug/m3	3.4	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371	< 0.371
1,2-Dibromoethane (EDB)	ug/m3	0.038	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154	< 0.154
1,2-Dichlorobenzene	ug/m3	710	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	0.15	< 0.12	< 0.12
1,2-Dichloroethane	ug/m3	0.44	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	0.081	< 0.081	< 0.081	< 0.081	0.081	< 0.081	< 0.081	< 0.081	0.085	< 0.081	0.198	< 0.081	0.316	0.13
1,2-Dichloroethene (total)	ug/m3	NV	---	---	---	---	---	---	---	< 0.079	---	< 0.079	---	< 0.079	---	< 0.079	---	---	---	---	---	---
1,2-Dichloropropane	ug/m3	0.6	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092
1,3-Dichlorobenzene	ug/m3	710	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
1,4-Dichlorobenzene	ug/m3	1.7	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	0.126	< 0.12	0.301	< 0.12	< 0.12
1,4-Dioxane	ug/m3	2.8	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
2-Butanone	ug/m3	4400	2.69	< 1.47	2.46	< 1.47	2.24	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	4.13	6.69	3.07	5.87	< 1.47	1.73
4-Methyl-2-pentanone	ug/m3	2700	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05	< 2.05
Acetone	ug/m3	710	27.6	37.1	25.9	34	23.5	33	10.4	8.86	7.32	3.59	15.3	5.13	12.1	11.4	50.8	144	273	227	45.4	21.6
Benzene	ug/m3	11	< 0.319	0.549	< 0.319	0.508	< 0.319	0.505	0.348	0.39	< 0.319	0.348	0.323	0.364	0.348	0.399	0.875	0.815	0.508	1.24	0.39	0.626
Bromodichloromethane	ug/m3	0.65	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134
Bromoform	ug/m3	10	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207
Bromomethane	ug/m3	4.4	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078
Carbontetrachloride	ug/m3	1.9	0.352	0.377	0.421	0.371	0.371	0.421	0.415	0.409	0.44	0.421	0.415	0.428	0.421	0.415	0.415	0.497	< 0.126	0.623	0.365	0.51
Chlorobenzene	ug/m3	44	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461
Chloroform	ug/m3	3	1.84	0.327	1.35	0.381	1.56	0.42	0.127	0.176	< 0.098	0.098	< 0.098	< 0.098	0.273	0.547	0.366	0.342	0.107	0.288	< 0.098	0.166
cis-1,2-Dichloroethene	ug/m3	5.3	< 0.079	0.079	< 0.079	0.079	< 0.079	< 0.079	0.151	< 0.079	0.111	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	0.567	0.92	0.159	0.69	0.099	0.262
cis-1,3-Dichloropropene	ug/m3	NV	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091
Dibromochloromethane	ug/m3	0.48	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17
Dichloromethane	ug/m3	530	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	4.93	< 1.74	< 1.74	1.9	< 1.74	< 1.74
Ethylbenzene	ug/m3	880	0.274	0.217	0.248	0.204	0.239	0.191	0.113	0.096	< 0.087	< 0.087	0.1	0.148	0.139	0.104	1.11	12.7	2.55	65.2	0.843	16.3
Hexachlorobutadiene	ug/m3	4.6	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533	< 0.533
m,p-xylene	ug/m3	NV	1	0.691	0.873	0.604	0.843	0.582	0.291	0.23	0.226	< 0.174	0.23	0.482	0.417	0.295	1.91	48.6	9.12	283	2.94	69.9
Methyltert-butylether	ug/m3	2700	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721	< 0.721
Naphthalene	ug/m3	2.7	< 0.262	< 0.262	< 0.262	< 0.262	< 0.262	< 0.262	< 0.262	< 0.262	< 0.262	< 0.262	< 0.262	< 0.262	< 0.262	< 0.262	0.273	0.299	2.22	0.519	< 0.262	0.278
o-Xylene	ug/m3	NV	0.43	0.269	0.395	0.256	0.369	0.261	0.117	0.096	0.087	< 0.087	0.1	0.182	0.169	0.13	0.751	16.5	2.44	101	0.834	24.3
Styrene	ug/m3	20	0.294	0.153	0.2	0.136	0.226	0.136	< 0.085	< 0.085	< 0.085	< 0.085	< 0.085	< 0.085	< 0.085	0.128	10.6	14.6	0.724	2.59	0.264	0.545
Tetrachloroethene	ug/m3	4.1	0.298	0.366	0.319	0.427	0.319	0.353	0.814	0.746	0.441	0.393	0.339	0.264	0.285	0.217	1.63	1.66	1.21	2.03	0.448	0.583
Toluene	ug/m3	4400	5.01	1.58	4.48	1.43	4.3	1.36	0.479	0.396	0.373	< 0.377	0.403	0.381	0.614	0.505	8.22	9.46	3.3	9.04	1.93	2.26
trans-1,2-Dichloroethene	ug/m3	53	0.476	0.107	0.484	0.087	0.468	0.091	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	0.119	0.301	0.278	0.079	0.095
Trans-1,3-Dichloropropene	ug/m3	NV	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091
Trichloroethene	ug/m3	1.8	0.801	0.516	0.822	0.527	0.656	0.511	0.656	0.247	0.586	0.183	0.306	< 0.107	0.285	< 0.107	1.96	3.17	0.618	2.27	0.392	1.9
Vinyl chloride	ug/m3	1.3	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	0.064	< 0.051	< 0.051	< 0.051	< 0.051
Xylene (total)	ug/m3	88	1.43	0.96	1.27	0.86	1.21	0.843	0.408	0.326	0.313	< 0.087	0.33	0.665	0.586	0.426	2.66	---	11.6	---	3.77	---

Notes:

Samples collected from 30 Tozer Road, 31 Tozer Road, 39 Tozer Road.

ug/m3 = microgram per cubic meter

< indicates chemical not detected, and concentration is less than reporting limit (value shown).

TV-C/I = MassDEP Threshold Values for Industrial Commercial Indoor Air

--- = Parameter not sampled for.

BOLD = result is above Threshold Value

Table 3-3
Soil Vapor Analytical Results
Tozer Road Properties

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

		Location Code	30-TOZ-SV07		30-TOZ-SV08		30-TOZ-SV09		31-TOZ-SV01		31-TOZ-SV02		39-TOZ-SV01		39-TOZ-SV02		39-TOZ-SV03	
		Sample ID	30-TOZ-SV07-20210409	SV7-30TOZER-20211229	30-TOZ-SV08-20210409	SV8-30TOZER-20211229	30-TOZ-SV09-20210409	SV9-30TOZER-20211229	31-TOZ-SV01-20210331	31 TOZ-SV01-20211221	31-TOZ-SV02-20210331	31 TOZ-SV02-20211221	39-TOZ-SV01-20210325	39-TOZ-SV-01-20220107	39-TOZ-SV02-20210325	39-TOZ-SV-02-20220107	39-TOZ-SV03-20210325	39-TOZ-SV-03-20220107
		Sample Date	4/9/2021	12/29/2021	4/9/2021	12/29/2021	4/9/2021	12/29/2021	3/31/2021	12/21/2021	3/31/2021	12/21/2021	3/25/2021	1/7/2022	3/25/2021	1/7/2022	3/25/2021	1/7/2022
Parameter	Units	I/C SS Screening	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES																		
1,1,1-Trichloroethane	ug/m3	310000	< 0.109	< 0.188	0.125	< 0.165	< 7.97	< 0.78	3.86	4.84	1.43	9.93	< 1.71	< 0.109	< 0.303	< 0.109	< 0.109	< 0.109
1,1,2,2-Tetrachloroethane	ug/m3	14	< 0.137	< 0.237	< 0.137	< 0.208	< 10	< 0.982	< 0.528	< 0.137	< 0.343	< 0.137	< 2.16	< 0.137	< 0.382	< 0.137	< 0.137	< 0.137
1,1,2-Trichloroethane	ug/m3	50	< 0.109	< 0.188	< 0.109	< 0.165	< 7.97	< 0.78	< 0.42	< 0.109	< 0.273	< 0.109	< 1.71	< 0.109	0.303	< 0.109	< 0.109	< 0.109
1,1-Dichloroethane	ug/m3	50000	< 0.081	< 0.14	< 0.081	< 0.123	< 5.91	< 0.579	< 0.311	< 0.081	< 0.202	< 0.081	< 1.27	< 0.081	1	< 0.081	0.858	0.247
1,1-Dichloroethene	ug/m3	12000	< 0.079	< 0.137	< 0.079	< 0.12	< 5.79	< 0.567	< 0.305	< 0.079	< 0.198	< 0.079	< 1.24	< 0.079	< 0.22	< 0.079	< 0.079	< 0.079
1,2,4-Trichlorobenzene	ug/m3	240	< 0.371	< 0.64	< 0.371	< 0.563	< 27	< 2.65	< 1.43	< 0.371	< 0.928	< 0.371	< 5.83	< 0.371	< 1.03	< 0.371	< 0.371	< 0.371
1,2-Dibromoethane (EDB)	ug/m3	2.7	< 0.154	< 0.265	< 0.154	< 0.233	< 11.2	< 1.1	< 0.591	< 0.154	< 0.384	< 0.154	< 2.41	< 0.154	< 0.427	< 0.154	< 0.154	< 0.154
1,2-Dichlorobenzene	ug/m3	50000	< 0.12	< 0.207	< 0.12	< 0.182	< 8.78	< 0.86	< 0.462	< 0.12	< 0.301	< 0.12	< 1.89	< 0.12	< 0.334	< 0.12	< 0.12	< 0.12
1,2-Dichloroethane	ug/m3	31	< 0.081	< 0.14	< 0.081	< 0.123	< 5.91	< 0.579	< 0.311	< 0.081	< 0.202	< 0.081	< 1.27	< 0.081	< 0.225	< 0.081	< 0.081	< 0.081
1,2-Dichloroethene (total)	ug/m3	NV	---	---	---	---	---	---	---	< 0.079	---	< 0.079	---	---	---	---	---	---
1,2-Dichloropropane	ug/m3	42	< 0.092	< 0.159	0.18	< 0.14	< 6.75	< 0.661	< 0.355	< 0.092	< 0.231	< 0.092	< 1.45	< 0.092	< 0.257	< 0.092	< 0.092	< 0.092
1,3-Dichlorobenzene	ug/m3	50000	< 0.12	< 0.207	< 0.12	< 0.182	< 8.78	< 0.86	< 0.462	0.77	0.872	1.02	< 1.89	0.559	< 0.334	0.421	< 0.12	0.758
1,4-Dichlorobenzene	ug/m3	120	< 0.12	< 0.207	< 0.12	< 0.182	< 8.78	< 0.86	< 0.462	< 0.12	< 0.301	< 0.12	< 1.89	< 0.12	< 0.334	< 0.12	< 0.12	< 0.12
1,4-Dioxane	ug/m3	200	< 0.36	< 0.62	< 0.36	< 0.548	< 26.3	< 2.57	< 1.39	< 0.36	< 0.901	< 0.36	22.2	< 0.36	< 1	< 0.36	< 0.36	< 0.36
2-Butanone	ug/m3	310000	4.54	13.3	4.54	23.9	< 107	20.8	11	1.52	6.19	2.09	31.3	5.04	24.1	2.21	7.49	2.12
4-Methyl-2-pentanone	ug/m3	190000	< 2.05	< 3.53	< 2.05	< 3.11	< 149	< 14.6	29.6	< 2.05	< 5.12	< 2.05	< 32.2	4.39	< 5.7	2.83	< 2.05	3.77
Acetone	ug/m3	50000	39.2	62.9	15.8	88.1	466	63.4	149	10.9	105	11.9	442	60.8	69.8	35.2	23.8	19.8
Benzene	ug/m3	800	0.476	0.706	1.35	0.652	< 23.3	< 2.28	< 1.23	0.677	1.06	0.965	< 5.02	1.32	2.39	1.59	< 0.319	0.783
Bromodichloromethane	ug/m3	45	< 0.134	< 0.231	< 0.134	< 0.203	< 9.78	< 0.958	< 0.515	< 0.134	< 0.335	< 0.134	< 2.1	< 0.134	< 0.372	< 0.134	< 0.134	< 0.134
Bromoform	ug/m3	730	< 0.207	< 0.357	< 0.207	< 0.313	< 15.1	< 1.48	< 0.795	< 0.207	< 0.517	< 0.207	< 3.25	< 0.207	< 0.575	< 0.207	< 0.207	< 0.207
Bromomethane	ug/m3	310	< 0.078	< 0.134	< 0.078	< 0.118	< 5.67	< 0.555	< 0.299	< 0.078	< 0.194	< 0.078	< 1.22	< 0.078	< 0.216	< 0.078	< 0.078	< 0.078
Carbontetrachloride	ug/m3	130	0.359	0.412	0.22	0.438	< 9.18	< 0.9	< 0.484	0.264	0.409	0.352	< 1.98	0.629	0.437	0.547	0.359	0.616
Chlorobenzene	ug/m3	3100	< 0.461	< 0.792	< 0.461	< 0.7	< 33.6	< 3.29	< 1.77	< 0.461	< 1.15	< 0.461	< 7.23	< 0.461	< 1.28	< 0.461	< 0.461	< 0.461
Chloroform	ug/m3	210	1.21	0.193	0.645	0.207	12.8	3.8	0.938	1.57	0.586	1.49	< 1.53	0.225	0.434	0.127	0.22	0.269
cis-1,2-Dichloroethene	ug/m3	370	0.662	< 0.137	0.079	0.138	103	4.76	< 0.305	< 0.079	< 0.198	< 0.079	< 1.24	0.282	40.8	0.123	10.6	2.58
cis-1,3-Dichloropropene	ug/m3	NV	< 0.091	< 0.157	< 0.091	< 0.138	< 6.63	< 0.649	< 0.349	< 0.091	< 0.227	< 0.091	< 1.43	< 0.091	< 0.252	< 0.091	< 0.091	< 0.091
Dibromochloromethane	ug/m3	33	< 0.17	< 0.294	< 0.17	< 0.258	< 12.4	< 1.22	< 0.655	< 0.17	< 0.426	< 0.17	< 2.68	< 0.17	< 0.474	< 0.17	< 0.17	< 0.17
Dichloromethane	ug/m3	37000	< 1.74	< 2.99	< 1.74	< 2.63	< 126	< 12.4	< 6.67	< 1.74	< 4.34	< 1.74	< 27.3	< 1.74	< 4.83	< 1.74	< 1.74	< 1.74
Ethylbenzene	ug/m3	62000	0.213	0.582	0.447	0.973	< 6.34	0.743	5.91	0.534	10.8	0.486	8.38	1.46	1.88	1.32	0.391	0.721
Hexachlorobutadiene	ug/m3	320	< 0.533	< 0.919	< 0.533	< 0.809	< 38.8	< 3.81	< 2.05	< 0.533	< 1.33	< 0.533	< 8.37	< 0.533	< 1.48	< 0.533	< 0.533	< 0.533
m,p-xylene	ug/m3	NV	0.673	1.86	1.69	3.27	< 12.7	2.48	6.69	1.49	12.6	1.42	27.7	4.91	2.85	4.91	1.35	2.18
Methyltert-butylether	ug/m3	190000	< 0.721	< 1.24	< 0.721	< 1.09	< 52.6	< 5.16	< 2.77	< 0.721	< 1.8	< 0.721	< 11.3	< 0.721	< 2	< 0.721	< 0.721	< 0.721
Naphthalene	ug/m3	190	< 0.262	< 0.452	< 0.262	< 0.397	< 19.1	< 1.87	< 1.01	< 0.262	< 0.655	< 0.262	< 4.12	< 0.262	< 0.729	< 0.262	< 0.262	< 0.262
o-Xylene	ug/m3	NV	0.308	0.547	1.52	0.995	< 6.34	0.808	3.06	0.808	5.91	0.738	4.02	1.51	0.99	1.26	0.517	0.712
Styrene	ug/m3	1400	0.128	0.161	3.56	0.336	< 6.22	< 0.609	< 0.327	0.149	0.426	0.141	2.01	1.87	< 0.237	0.179	0.132	0.136
Tetrachloroethene	ug/m3	290	0.732	0.245	7.8	0.841	1210	76.6	787	292	28.1	166	5.53	0.78	105	0.271	24.6	1.8
Toluene	ug/m3	310000	1.91	1.32	1.37	2.08	< 13.7	< 2.69	3.6	2.2	6.75	2.22	105	< 0.377	3.77	3.47	0.705	2.44
trans-1,2-Dichloroethene	ug/m3	3700	0.666	0.28	0.226	0.252	35.8	8.37	< 0.305	< 0.079	< 0.198	< 0.079	< 1.24	< 0.079	3.61	0.111	1.51	0.385
Trans-1,3-Dichloropropene	ug/m3	NV	< 0.091	< 0.157	< 0.091	< 0.138	< 6.63	< 0.649	< 0.349	< 0.091	< 0.227	< 0.091	< 1.43	< 0.091	< 0.252	< 0.091	< 0.091	< 0.091
Trichloroethene	ug/m3	120	4.57	0.435	0.559	0.645	13900	2190	7.09	4.1	2.3	6.72	2.78	0.742	486	0.473	65	11.1
Vinyl chloride	ug/m3	91	< 0.051	< 0.088	< 0.051	< 0.078	< 3.73	< 0.366	< 0.197	< 0.051	0.192	< 0.051	< 0.803	< 0.051	< 0.142	< 0.051	< 0.051	< 0.051
Xylene (total)	ug/m3	6200	0.982	2.41	3.21	4.27	< 6.34	3.29	9.77	2.29	18.5	2.16	31.7	---	3.84	---	1.86	---

Notes:

Samples collected from 30 Tozer Road, 31 Tozer Road, 39 Tozer Road.

ug/m3 = microgram per cubic meter

< indicates chemical not detected, and concentration is less than reporting limit (value shown).

I/C SS Screening = MassDEP industrial/commercial sub-slab soil gas screening value

BOLD =Result exceeds I/C SS

--- = Parameter not sampled for.

Table 3-4

Groundwater and Surface Water Sample Summary

February 2022

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Sample Location	Location	Rationale for Sampling	Analysis Performed
STRHA-07A	29 Tozer Road	Monitor VOC trends, also Con Comm request	VOCs
STRHA-07B	29 Tozer Road	Monitor VOC trends, also Con Comm request	VOCs
AP-13-DO	East Building 3	Monitor remediation and VOC trends	Methane, Ethane, Ethene, VOCs, TOC
AP-23-DO	East Building 3	Monitor remediation and VOC trends	Methane, Ethane, Ethene, VOCs, TOC
AP-24-DO	East Building 3	Monitor remediation and VOC trends	Methane, Ethane, Ethene, VOCs, TOC
AP-25-DO	East Building 3	Monitor remediation and VOC trends	Methane, Ethane, Ethene, VOCs
AP-30R-DO	Beneath Building 3	Monitor VOC/confirm no adverse downgradient impact	Methane, Ethane, Ethene, VOCs, TOC
AP-31-DO	Beneath Building 3	Monitor remediation and VOC trends	Methane, Ethane, Ethene, VOCs, TOC
AP-32-DO	Beneath Building 3	Monitor remediation and VOC trends	Methane, Ethane, Ethene, VOCs, TOC
AP-33-DO	East Building 3	Monitor remediation and VOC trends	Methane, Ethane, Ethene, VOCs, TOC
AP-34-DO	East Building 3	Monitor remediation and VOC trends	Methane, Ethane, Ethene, VOCs, TOC
AP-35-DO	East Building 3	Monitor remediation and VOC trends	Methane, Ethane, Ethene, VOCs, TOC
AP-36-S	Inside Building 5	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs, TOC
AP-37-S	Inside Building 5	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs, TOC
AP-38-S	Inside Building 5	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs, TOC
AP-39-S	Inside Building 5	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs, TOC
BW-05	By Unnamed Stream	Monitor shallow VOC trends	VOCs
BW-08	By Unnamed Stream	Monitor shallow VOC trends	VOCs
OB-49-S	Building 3, North Side	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs, TOC
OB-50-S	Building 3, North Side	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs, TOC
OB-51-S	Building 3, North Side	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs, TOC
OB-52-BR	South Building 7	Quarterly Bio Per MassDEP Approved Plan	Methane, Ethane, Ethene, VOCs
OB-52-DO	South Building 7	Quarterly Bio Per MassDEP Approved Plan	Methane, Ethane, Ethene, VOCs
OB-52-S	South Building 7	Quarterly Bio Per MassDEP Approved Plan	Methane, Ethane, Ethene, VOCs
OB-35-DO	Inside Building 5	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs, TOC
OB-38-BR	East Building 5	Per MassDEP Approved Plan	VOCs
OB-39-BR	West Building 5	Quarterly Bio Per MassDEP Approved Plan	VOCs
OB-44-S	Inside Building 5	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs, TOC
OB-45-BR	West Building 5	Quarterly Bio Per MassDEP Approved Plan	VOCs
GDS-03	Unnamed Stream	Monitor VOC Trends	VOCs
STR-02	Unnamed Stream	Per MassDEP Approved Plan	VOCs

Table 3-4

Groundwater and Surface Water Sample Summary

February 2022

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Sample Location	Location	Rationale for Sampling	Analysis Performed
STR-05	Unnamed Stream	Per MassDEP Approved Plan	VOCs
STR-14	Stream A	Per MassDEP Approved Plan	VOCs
STR-18	Stream A	Per MassDEP Approved Plan	VOCs
STR-19	Stream A	Per MassDEP Approved Plan	VOCs
STR-20	Stream A	Per MassDEP Approved Plan	VOCs
STR-28	Unnamed Stream	Per MassDEP Approved Plan	VOCs
STRHA-04	Unnamed Stream	Per MassDEP Approved Plan	VOCs
STRHA-08	Unnamed Stream	Per MassDEP Approved Plan	VOCs
STRMH-02	Unnamed Stream	Per MassDEP Approved Plan	VOCs
P-13R	Sonning Road	Monitor VOC Trends	VOCs
P-30	Sonning Road	Monitor VOC Trends	VOCs
P-31	Tudor Road	Monitor VOC Trends	VOCs
STRM-A-SCDS	East of Longview Terrace	Monitor VOC trends, also Con Comm request	VOCs
OB-06-S	Sonning Road	Monitor Site conditions	VOCs
P-04R	Jordan Street	Monitor VOC Trends	VOCs
P-05R	Windsor Street	Monitor VOC Trends	VOCs
P-14R	Sonning Road	Monitor VOC Trends	VOCs

Notes:

TOC = Total Organic Carbon, analysis by EPA Method 5310C

VOC = Volatile Organic Compounds, analysis by EPA Method 8260D

Methane, ethane, ethene analysis by Method 8015B Modified

Table 3-5
Groundwater and Surface Water Sample Summary
May 2022

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Sample Location	Location	Rationale for Sampling	Analysis Performed
AP-15-S	31 Tozer Road	Monitor Site conditions	VOCs
BR-7_ZONE1	39 Tozer Road	Sentry Wells	VOCs
BR-7_ZONE2	39 Tozer Road	Sentry Wells	VOCs
BR-7_ZONE3	39 Tozer Road	Sentry Wells	VOCs
CULVERT_OUTFALL	39 Tozer Road	Sentry Wells	VOCs
GZ-4	31 Tozer Road	Monitor Site conditions	VOCs
MW-034	39 Tozer Road	Monitor Site conditions	VOCs
OB-08-DO	39 Tozer Road	Monitor Site conditions	VOCs
OB-18-DO	31 Tozer Road	Monitor Site conditions	VOCs
OB-18-S	31 Tozer Road	Monitor Site conditions	VOCs
OB-41-S	39 Tozer Road	Monitor VOC Trends	VOCs
STRHA-07A	29 Tozer Road	Monitor VOC trends, also Con Comm request	VOCs
STRHA-07B	29 Tozer Road	Monitor VOC trends, also Con Comm request	VOCs
AP-12-BR	East Building 6	Monitor injection & Site conditions	VOCs
AP-12-DO	East Building 6	Monitor injection & Site conditions	VOCs
AP-12-S	East Building 6	Monitor injection & Site conditions	VOCs
AP-13-DO	East Building 3	Monitor remediation and VOC trends	VOCs
AP-23-DO	East Building 3	Monitor remediation and VOC trends	VOCs
AP-24-DO	East Building 3	Monitor remediation and VOC trends	VOCs
AP-26-DO	West Building 1 and 2	Monitor remediation and VOC trends	VOCs
AP-30R-DO	Beneath Building 3	Monitor VOC/confirm no adverse downgradient impact	VOCs
AP-31-DO	Beneath Building 3	Monitor remediation and VOC trends	VOCs
AP-32-DO	Beneath Building 3	Monitor remediation and VOC trends	VOCs
AP-36-S	Inside Building 5	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs
AP-37-S	Inside Building 5	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs
AP-38-S	Inside Building 5	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs
AP-39-S	Inside Building 5	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs
AP-42-DO	Building 3, North Side	Monitor remediation and VOC trends	VOCs
AP-43-DO	Building 3, North Side	Monitor remediation and VOC trends	VOCs
CL11-DO	Southwest Building 7	Monitor injection & Site conditions	VOCs
MW-009	Near Bldg. 9 and Unnamed Stream	Monitor VOC Trends	VOCs
MW-013	North Building 3 by Rte. 128	Monitor injection & Site conditions	VOCs
MW-014A	North Building 1	Monitor injection & Site conditions	VOCs
MW-016	South Building 4	Monitor VOC Trends	VOCs
OB-09-BR	By Unnamed Stream	Monitor VOC Trends	VOCs
OB-09-DO	By Unnamed Stream	Monitor VOC Trends	VOCs
OB-09-S	By Unnamed Stream	Monitor VOC Trends	VOCs
OB-10-BR	East Building 4	Monitor VOC Trends	VOCs
OB-10-S	East Building 4	Monitor VOC Trends	VOCs
OB-12-DO	North Building 3 by Rte. 128	Monitor injection & Site conditions	VOCs

Table 3-5
Groundwater and Surface Water Sample Summary
May 2022

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Sample Location	Location	Rationale for Sampling	Analysis Performed
OB-14-DO	North Building 1	Monitor injection & Site conditions	VOCs
OB-15-S	Near Bldg. 9 and Unnamed Stream	Monitor VOC trends in shallow bioremediation area	VOCs
OB-19-BR	West Building 1 and 2	Monitor remediation	VOCs
OB-19-DO	West Building 1 and 2	Monitor remediation	VOCs
OB-25-BR	West Building 1 and 2	Monitor remediation and VOC trends	VOCs
OB-25-DO	West Building 1 and 2	Monitor remediation and VOC trends	VOCs
OB-26-BR	West Building 1 and 2	Monitor remediation and VOC trends	VOCs
OB-26-DO	West Building 1 and 2	Monitor remediation and VOC trends	VOCs
OB-27-BR	West Building 7	Monitor remediation and VOC trends	VOCs
OB-28-BR	West Building 1 and 2	Monitor remediation and VOC trends	VOCs
OB-28-DO	West Building 1 and 2	Monitor remediation and VOC trends	VOCs
OB-32-DO	North Building 3	Monitor VOC Trends	VOCs
OB-34-DO	North Building 3	Monitor VOC Trends	VOCs
OB-36-DO	Inside Building 6	Monitor VOC Trends	VOCs
OB-37-DO	Inside Building 6	Monitor VOC Trends	VOCs
OB-50-S	Building 3, North Side	Monitor VOC Trends	VOCs
OB-51-S	Building 3, North Side	Monitor VOC Trends	VOCs
STR-03	Unnamed Stream	Monitor VOC trends, also Con Comm request	VOCs
UNNAMED_STREAM	Unnamed stream	Monitor VOC trends, also Con Comm request	VOCs
AP-27-DO	East Building 5	Monitor remediation and VOC trends	VOCs
OB-35-DO	Inside Building 5	Monitor VOC Trends	VOCs
OB-38-BR	East Building 5	Per MassDEP Approved Plan	VOCs
OB-38-DO	East Building 5	Monitor VOC Trends	VOCs
OB-39-BR	West Building 5	Quarterly Bio Per MassDEP Approved Plan	VOCs
OB-44-S	Inside Building 5	Monitor VOC Trends	Methane, Ethane, Ethene, VOCs
OB-45-BR	West Building 5	Quarterly Bio Per MassDEP Approved Plan	VOCs
OB-53-BR	Under Building 5	Monitor VOC Trends	VOCs
OB-54-BR	Under Building 5	Monitor VOC Trends	VOCs
GDS-03	Unnamed Stream	Monitor VOC Trends	VOCs
STR-14	Stream A	Per MassDEP Approved Plan	VOCs
STR-19	Stream A	Per MassDEP Approved Plan	VOCs
STRMH-02	Unnamed Stream	Per MassDEP Approved Plan	VOCs
P-09	Hill Street	Monitor VOC Trends	VOCs
P-20	SCDS Field	Monitor VOC Trends	VOCs
BR-6_ZONE3	Hill Street	Monitor VOC Trends	VOCs
OB-20-BR	East of Longview Terrace	Monitor remediation	VOCs
OB-20-DO	East of Longview Terrace	Monitor remediation	VOCs
P-19A	Hill Street	Monitor VOC Trends	VOCs
P-21	Hill Street	Monitor VOC Trends	VOCs
P-21-BR	Longview Drive	Per MassDEP Approved Plan	VOCs
P-21-DO	Longview Drive	Per MassDEP Approved Plan	VOCs

Table 3-5
Groundwater and Surface Water Sample Summary
May 2022

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Sample Location	Location	Rationale for Sampling	Analysis Performed
STRM-A-SCDS	East of Longview Terrace	Monitor VOC trends, also Con Comm request	VOCs
AP-19	PSL 10	Monitor residual permanganate and VOC trends	VOCs
AP-20	PSL 10	Monitor residual permanganate and VOC trends	VOCs
AP-21	PSL 10	Monitor residual permanganate and VOC trends	VOCs
AP-22	PSL 10	Monitor residual permanganate and VOC trends	VOCs
CL04-BR	30 Tozer Road	Monitor VOC Trends	VOCs
CL04-DO	30 Tozer Road	Monitor VOC Trends	VOCs
CL10-BR	32 Tozer Road	Monitor VOC Trends	VOCs
CL10-DO	32 Tozer Road	Monitor VOC Trends	VOCs
CL10-S	32 Tozer Road	Monitor VOC Trends	VOCs
MW-2_32-TOZER	32 Tozer Road	Monitor VOC Trends	VOCs
BR-1_ZONE3	Walden Street	Monitor Site conditions	VOCs
CL02-BR	16 Tozer Road	Monitor injection & Site conditions	VOCs
CL06-BR	Walden Street	Monitor Site conditions	VOCs
CL06-DO	Walden Street	Monitor Site conditions	VOCs
CL09-BR_ZONE3	Commons Drive	Monitor VOC Trends	VOCs
MW-003R	16 Tozer Road	Monitor Site conditions	VOCs
MW-005R	16 Tozer Road	Monitor Site conditions	VOCs
OB-17-BR	Commons Drive	Monitor Site conditions	VOCs
OB-17-DO	Commons Drive	Monitor Site conditions	VOCs
OB-23-BR	16 Tozer Road	Monitor Site conditions	VOCs
BR-5_ZONE3	28 Tozer Road	Monitor VOC Trends	VOCs
CL03-DO	28 Tozer Road	Monitor VOC Trends	VOCs
CL08-BR_ZONE3	Longmeadow Road	Sentry Wells	VOCs
CL08-DO	Longmeadow Road	Monitor VOC Trends	VOCs
GFS-03	28 Tozer Road	Monitor VOC Trends	VOCs
OB-04-DO	28 Tozer Road	Monitor Site conditions	VOCs
OB-05-BR	27 Tozer Road	Monitor Site conditions	VOCs
OB-05-DO	27 Tozer Road	Monitor Site conditions	VOCs
OB-06-BR	Sonning Road	Monitor Site conditions	VOCs
OB-06-DO	Sonning Road	Monitor Site conditions	VOCs
OB-42-BR	30 Tozer Road	Monitor VOC Trends	VOCs
OB-42-S	30 Tozer Road	Monitor VOC Trends	VOCs
OB-43-S	30 Tozer Road	Monitor VOC Trends	VOCs

Notes:

VOC = Volatile Organic Compounds, analysis by EPA Method 8260D

Methane, ethane, ethene analysis by Method 8015B Modified

Table 3-6
Groundwater Sample Summary
August 2022

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Sample Location	Location	Rationale for Sampling	Analysis Performed
RW-22	North Building 1	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-57-DO	Under Building 2	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-58-DO	West of Building 2/4	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-59-DO	West of Building 2/5	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-11-BR	North Building 3 by Rte. 128	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-11-DO	North Building 3 by Rte. 128	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-11-S	North Building 3 by Rte. 128	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-12-BR	North Building 3 by Rte. 128	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-12-DO	North Building 3 by Rte. 128	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-12-S	North Building 3 by Rte. 128	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-14-DO	North Building 1	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-55-BR	North Building 3 by Rte. 128	Monitor Site conditions	Calcium, Magnesium, Potassium, Sodium, Methane, Ethane, Ethene, VOCs, DHC,Chloride, Nitrate as N, Sulfate, Alkalinity, Ammonia
OB-60-S	Inside Building 5	Monitor Site conditions	VOCs
OB-60-S	Inside Building 5	Monitor Site conditions	VOCs

Notes:

Alkalinity analysis by SM2320B
Ammonia analysis by SM4500NH3-D
Calcium, Magnesium, Potassium, Sodium analysis by 6020
Chloride, Nitrate as N and Sulfate analysis by 300.0A
VOC = Volatile Organic Compounds, analysis by EPA Method 8260D
Methane, ethane, ethene analysis by Method 8015B Modified
DHC = Dehalococcoides sp. analysis by polymerase chain reaction (PCR)

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
AP-12-BR	4/22/2020	71.32	17.50	53.82	DTB = 74.10 FT
AP-12-BR	5/6/2020	71.32	17.34	53.98	
AP-12-BR	11/9/2020	71.32	18.95	52.37	DTB = 74.10 FT
AP-12-BR	11/25/2020	71.32	19.08	52.24	
AP-12-BR	4/28/2021	71.32	11.28	60.04	DTB = 48.65 FT
AP-12-BR	5/12/2021	71.32	17.90	53.42	
AP-12-BR	10/28/2021	71.32	17.51	53.81	DTB = 49.40 FT
AP-12-BR	11/11/2021	71.32	17.62	53.70	
AP-12-BR	4/25/2022	71.32	18.20	53.12	DTB = 75.08 FT
AP-12-BR	5/9/2022	71.32	18.68	52.64	
AP-12-DO	4/22/2020	71.30	11.05	60.25	DTB = 48.25 FT
AP-12-DO	5/6/2020	71.30	11.02	60.28	
AP-12-DO	11/9/2020	71.30	12.25	59.05	DTB = 48.30 FT
AP-12-DO	11/25/2020	71.30	11.87	59.43	
AP-12-DO	4/28/2021	71.30	18.28	53.02	DTB = 78.43 FT
AP-12-DO	5/12/2021	71.30	11.02	60.28	
AP-12-DO	10/28/2021	71.30	10.60	60.70	DTB = 48.37 FT
AP-12-DO	11/11/2021	71.30	11.45	59.85	
AP-12-DO	4/25/2022	71.30	11.95	59.35	DTB = 48.35 FT
AP-12-DO	5/9/2022	71.30	12.35	58.95	
AP-12-S	4/22/2020	71.44	8.41	63.03	DTB = 27.30 FT
AP-12-S	5/6/2020	71.44	8.34	63.10	
AP-12-S	11/9/2020	71.44	9.08	62.36	DTB = 27.30 FT
AP-12-S	11/25/2020	71.44	9.18	62.26	
AP-12-S	4/28/2021	71.44	8.80	62.64	DTB = 27.38 FT
AP-12-S	5/12/2021	71.44	8.09	63.35	
AP-12-S	10/28/2021	71.44	7.36	64.08	DTB = 27.26 FT
AP-12-S	11/11/2021	71.44	8.31	63.13	
AP-12-S	4/25/2022	71.44	9.18	62.26	DTB = 27.33 FT
AP-12-S	5/9/2022	71.44	9.96	61.48	
AP-13-DO	1/30/2020	68.85	12.40	56.45	DTB = 43.61 FT
AP-13-DO	2/14/2020	68.85	14.52	54.33	DTB = 43.61 FT
AP-13-DO	4/21/2020	68.85	11.82	57.03	DTB = 43.85 FT
AP-13-DO	5/5/2020	68.85	11.57	57.28	
AP-13-DO	8/6/2020	68.85	14.10	54.75	DTB = 43.95 FT
AP-13-DO	8/20/2020	68.85	14.30	54.55	
AP-13-DO	2/4/2021	68.85	11.94	56.91	
AP-13-DO	4/27/2021	68.85	11.88	56.97	
AP-13-DO	5/20/2021	68.85	12.30	56.55	
AP-13-DO	8/23/2021	68.85	9.12	59.73	DTB = 44.00 FT
AP-13-DO	9/9/2021	68.85	11.87	56.98	
AP-13-DO	10/25/2021	68.85	12.88	55.97	DTB = 43.50 FT
AP-13-DO	11/9/2021	68.85	9.03	59.82	DTB = 44.05 FT
AP-13-DO	1/26/2022	68.85	11.02	57.83	
AP-13-DO	2/15/2022	68.85	12.24	56.61	DTB = 44.24 FT
AP-13-DO	4/25/2022	68.85	12.04	56.81	DTB = 43.87 FT
AP-13-DO	5/12/2022	68.85	13.16	55.69	
AP-13-S	1/15/2020	68.98	9.97	59.01	DTB = 13.86 FT
AP-13-S	3/16/2020	68.98	11.22	57.76	
AP-13-S	3/20/2020	68.98	11.22	57.76	
AP-13-S	3/25/2020	68.98	11.04	57.94	
AP-13-S	4/21/2020	68.98	9.55	59.43	DTB = 13.85 FT
AP-13-S	5/5/2020	68.98	9.40	59.58	
AP-13-S	8/6/2020	68.98	12.05	56.93	DTB = 13.90 FT
AP-13-S	8/20/2020	68.98	12.56	56.42	
AP-13-S	11/9/2020	68.98	10.50	58.48	
AP-13-S	11/24/2020	68.98	9.78	59.20	
AP-13-S	2/4/2021	68.98	9.40	59.58	
AP-13-S	4/27/2021	68.98	9.95	59.03	

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
AP-13-S	5/12/2021	68.98	9.62	59.36	
AP-14-S	5/7/2020	74.97	10.85	64.12	
AP-15-S	4/22/2020	45.88	4.70	41.18	DTB = 13.32 FT
AP-15-S	5/6/2020	45.88	4.71	41.17	
AP-15-S	4/30/2021	45.88	4.70	41.18	DTB = 13.26 FT
AP-15-S	5/18/2021	45.88	5.20	40.68	
AP-15-S	4/27/2022	45.88	4.96	40.92	DTB = 13.26 FT
AP-15-S	5/11/2022	45.88	5.12	40.76	
AP-19	4/20/2020	81.30	11.52	69.78	DTB = 25.04 FT
AP-19	5/4/2020	81.30	11.03	70.27	
AP-19	11/9/2020	81.30	13.50	67.80	DTB = 25.00 FT
AP-19	11/25/2020	81.30	13.53	67.77	
AP-19	4/29/2021	81.30	11.86	69.44	DTB = 25.09 FT
AP-19	5/17/2021	81.30	11.80	69.50	
AP-19	10/26/2021	81.30	12.53	68.77	DTB = 29.22 FT
AP-19	11/10/2021	81.30	12.21	69.09	
AP-19	4/25/2022	81.30	11.62	69.68	DTB = 25.00 FT
AP-19	5/9/2022	81.30	11.86	69.44	
AP-20	4/20/2020	81.43	10.21	71.22	DTB = 15.04 FT
AP-20	5/4/2020	81.43	9.56	71.87	
AP-20	11/9/2020	81.43	13.80	67.63	DTB = 15.60 FT
AP-20	11/25/2020	81.43	13.50	67.93	
AP-20	4/29/2021	81.43	10.68	70.75	DTB = 15.48 FT
AP-20	5/17/2021	81.43	10.65	70.78	
AP-20	10/26/2021	81.43	12.55	68.88	DTB = 15.72 FT
AP-20	11/10/2021	81.43	11.18	70.25	
AP-20	4/25/2022	81.43	10.53	70.90	DTB = 15.20 FT
AP-20	5/9/2022	81.43	11.21	70.22	
AP-21	4/20/2020	81.50	11.96	69.54	DTB = 23.18 FT
AP-21	5/4/2020	81.50	11.25	70.25	
AP-21	11/9/2020	81.50	15.30	66.20	DTB = 23.35 FT
AP-21	11/25/2020	81.50	14.83	66.67	
AP-21	4/29/2021	81.50	11.51	69.99	DTB = 23.25 FT
AP-21	5/17/2021	81.50	11.52	69.98	
AP-21	10/26/2021	81.50	13.78	67.72	DTB = 23.28 FT
AP-21	11/10/2021	81.50	11.62	69.88	
AP-21	4/25/2022	81.50	11.37	70.13	DTB = 23.30 FT
AP-21	5/9/2022	81.50	12.24	69.26	
AP-22	4/20/2020	81.96	13.38	68.58	DTB = 21.84 FT
AP-22	5/4/2020	81.96	12.55	69.41	
AP-22	11/9/2020	81.96	17.95	64.01	DTB = 21.80 FT
AP-22	11/25/2020	81.96	17.46	64.50	
AP-22	4/29/2021	81.96	12.44	69.52	DTB = 21.77 FT
AP-22	5/17/2021	81.96	13.85	68.11	
AP-22	10/26/2021	81.96	16.23	65.73	DTB = 29.87 FT
AP-22	11/10/2021	81.96	11.82	70.14	
AP-22	4/25/2022	81.96	12.80	69.16	DTB = 21.80 FT
AP-22	5/9/2022	81.96	14.05	67.91	
AP-23-DO	1/30/2020	69.46	11.97	57.49	DTB = 47.93 FT
AP-23-DO	2/14/2020	69.46	11.84	57.62	DTB = 47.93 FT
AP-23-DO	3/16/2020	69.46	12.55	56.91	
AP-23-DO	3/20/2020	69.46	12.18	57.28	
AP-23-DO	3/25/2020	69.46	11.60	57.86	
AP-23-DO	4/21/2020	69.46	11.70	57.76	DTB = 47.60 FT
AP-23-DO	5/5/2020	69.46	11.47	57.99	
AP-23-DO	8/6/2020	69.46	14.30	55.16	DTB = 47.65 FT
AP-23-DO	8/20/2020	69.46	14.66	54.80	
AP-23-DO	11/9/2020	69.46	13.03	56.43	
AP-23-DO	11/24/2020	69.46	12.15	57.31	

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
AP-23-DO	2/4/2021	69.46	12.38	57.08	
AP-23-DO	4/27/2021	69.46	12.02	57.44	
AP-23-DO	8/23/2021	69.46	11.40	58.06	DTB = 47.25 FT
AP-23-DO	9/9/2021	69.46	13.96	55.50	
AP-23-DO	10/25/2021	69.46	12.85	56.61	DTB = 47.49 FT
AP-23-DO	11/9/2021	69.46	12.75	56.71	DTB = 47.75 FT
AP-23-DO	1/26/2022	69.46	12.50	56.96	DTB = 47.55 FT
AP-23-DO	2/15/2022	69.46	12.36	57.10	DTB = 47.69 FT
AP-23-DO	4/25/2022	69.46	12.15	57.31	DTB = 47.40 FT
AP-23-DO	5/12/2022	69.46	13.06	56.40	
AP-24-DO	1/30/2020	69.56	10.92	58.64	DTB = 45.61 FT
AP-24-DO	2/14/2020	69.56	10.90	58.66	DTB = 45.61 FT
AP-24-DO	4/21/2020	69.56	10.36	59.20	DTB = 45.80 FT
AP-24-DO	5/5/2020	69.56	10.15	59.41	
AP-24-DO	8/6/2020	69.56	12.70	56.86	DTB = 45.85 FT
AP-24-DO	8/20/2020	69.56	12.92	56.64	
AP-24-DO	11/9/2020	69.56	11.49	58.07	
AP-24-DO	11/24/2020	69.56	11.82	57.74	
AP-24-DO	2/4/2021	69.56	11.39	58.17	
AP-24-DO	4/27/2021	69.56	10.68	58.88	
AP-24-DO	5/20/2021	69.56	10.42	59.14	
AP-24-DO	8/23/2021	69.56	10.84	58.72	DTB = 46.02 FT
AP-24-DO	9/10/2021	69.56	10.49	59.07	
AP-24-DO	10/25/2021	69.56	11.16	58.40	DTB = 46.18 FT
AP-24-DO	11/9/2021	69.56	10.07	59.49	DTB = 47.77 FT
AP-24-DO	1/26/2022	69.56	11.02	58.54	DTB = 43.85 FT
AP-24-DO	2/15/2022	69.56	13.62	55.94	DTB = 44.51 FT
AP-24-DO	4/25/2022	69.56	9.93	59.63	DTB = 45.60 FT
AP-24-DO	5/12/2022	69.56	10.51	59.05	
AP-25-DO	1/30/2020	65.58	6.03	59.55	DTB = 47.71 FT
AP-25-DO	2/14/2020	65.58	5.70	59.88	DTB = 47.71 FT
AP-25-DO	4/21/2020	65.58	5.55	60.03	DTB = 47.50 FT
AP-25-DO	5/5/2020	65.58	5.45	60.13	
AP-25-DO	8/6/2020	65.58	8.20	57.38	DTB = 47.60 FT
AP-25-DO	8/20/2020	65.58	8.55	57.03	
AP-25-DO	11/9/2020	65.58	7.05	58.53	
AP-25-DO	11/24/2020	65.58	6.78	58.80	
AP-25-DO	2/4/2021	65.58	5.54	60.04	
AP-25-DO	4/27/2021	65.58	5.98	59.60	
AP-25-DO	5/12/2021	65.58	6.05	59.53	
AP-25-DO	8/23/2021	65.58	5.23	60.35	DTB = 47.54 FT
AP-25-DO	9/10/2021	65.58	4.40	61.18	
AP-25-DO	10/25/2021	65.58	1.18	64.40	DTB = 47.50 FT
AP-25-DO	11/8/2021	65.58	6.25	59.33	DTB = 47.44 FT
AP-25-DO	1/26/2022	65.58	6.62	58.96	DTB = 47.53 FT
AP-25-DO	2/15/2022	65.58	5.49	60.09	DTB = 47.52 FT
AP-25-DO	5/13/2022	65.58	10.58	55.00	
AP-26-DO	4/22/2020	73.99	12.85	61.14	DTB = 60.50 FT
AP-26-DO	5/8/2020	73.99	13.00	60.99	
AP-26-DO	5/14/2020	73.99	13.09	60.90	
AP-26-DO	11/9/2020	73.99	15.50	58.49	DTB = 60.50 FT
AP-26-DO	11/25/2020	73.99	15.57	58.42	
AP-26-DO	4/29/2021	73.99	13.48	60.51	DTB = 64.60 FT
AP-26-DO	10/28/2021	73.99	13.05	60.94	DTB = 60.60 FT
AP-26-DO	11/11/2021	73.99	13.05	60.94	
AP-26-DO	4/25/2022	73.99	13.36	60.63	DTB = 63.70 FT
AP-27-DO	4/22/2020	77.34	13.62	63.72	DTB = 57.35 FT
AP-27-DO	5/6/2020	77.34	13.76	63.58	
AP-27-DO	11/9/2020	77.34	18.55	58.79	DTB = 57.40 FT

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
AP-27-DO	11/25/2020	77.34	18.46	58.88	
AP-27-DO	4/30/2021	77.34	12.80	64.54	DTB = 45.30 FT
AP-27-DO	5/14/2021	77.34	14.55	62.79	
AP-27-DO	10/26/2021	77.34	15.79	61.55	DTB = 57.00 FT
AP-27-DO	11/10/2021	77.34	15.05	62.29	
AP-27-DO	4/25/2022	77.34	15.17	62.17	DTB = 58.00 FT
AP-27-DO	5/11/2022	77.34	15.89	61.45	
AP-30R-DO	5/12/2022	74.83	5.09	69.74	
AP-31-DO	5/9/2022	75.13	0.99	74.14	
AP-32-DO	5/9/2022	75.65	18.25	57.40	
AP-33-DO	1/30/2020	66.49	7.74	58.75	DTB = 36.40 FT
AP-33-DO	2/14/2020	66.49	7.51	58.98	DTB = 36.40 FT
AP-33-DO	4/21/2020	66.49	7.36	59.13	DTB = 35.50 FT
AP-33-DO	5/5/2020	66.49	7.20	59.29	
AP-33-DO	8/6/2020	66.49	9.69	56.80	DTB = 35.50 FT
AP-33-DO	8/20/2020	66.49	9.97	56.52	
AP-33-DO	11/9/2020	66.49	8.53	57.96	
AP-33-DO	11/23/2020	66.49	8.21	58.28	
AP-33-DO	2/4/2021	66.49	7.31	59.18	
AP-33-DO	4/27/2021	66.49	7.63	58.86	
AP-33-DO	5/13/2021	66.49	7.79	58.70	
AP-33-DO	8/23/2021	66.49	9.33	57.16	DTB = 38.50 FT
AP-33-DO	9/9/2021	66.49	8.11	58.38	
AP-33-DO	10/25/2021	66.49	8.42	58.07	DTB = 35.65 FT
AP-33-DO	11/9/2021	66.49	8.09	58.40	DTB = 37.75 FT
AP-33-DO	1/26/2022	66.49	8.18	58.31	DTB = 35.65 FT
AP-33-DO	5/13/2022	66.49	8.27	58.22	DTB = 35.51 FT
AP-34-DO	1/30/2020	68.33	9.49	58.84	DTB = 36.76 FT
AP-34-DO	2/14/2020	68.33	9.40	58.93	DTB = 36.76 FT
AP-34-DO	4/21/2020	68.33	9.21	59.12	DTB = 37.03 FT
AP-34-DO	5/5/2020	68.33	9.05	59.28	
AP-34-DO	8/6/2020	68.33	11.54	56.79	DTB = 37.08 FT
AP-34-DO	8/20/2020	68.33	11.89	56.44	
AP-34-DO	11/9/2020	68.33	10.43	57.90	
AP-34-DO	11/24/2020	68.33	11.85	56.48	
AP-34-DO	2/4/2021	68.33	9.25	59.08	
AP-34-DO	4/27/2021	68.33	9.55	58.78	
AP-34-DO	5/13/2021	68.33	9.66	58.67	
AP-34-DO	8/23/2021	68.33	9.18	59.15	DTB = 37.06 FT
AP-34-DO	9/9/2021	68.33	9.95	58.38	
AP-34-DO	10/25/2021	68.33	10.35	57.98	DTB = 36.30 FT
AP-34-DO	11/9/2021	68.33	9.88	58.45	DTB = 37.15 FT
AP-34-DO	1/26/2022	68.33	9.90	58.43	DTB = 37.00 FT
AP-34-DO	5/13/2022	68.33	10.17	58.16	DTB = 37.09 FT
AP-35-DO	1/30/2020	68.92	10.07	58.85	DTB = 33.52 FT
AP-35-DO	2/14/2020	68.92	10.02	58.90	DTB = 33.52 FT
AP-35-DO	3/16/2020	68.92	10.62	58.30	
AP-35-DO	3/20/2020	68.92	10.19	58.73	
AP-35-DO	3/25/2020	68.92	9.74	59.18	
AP-35-DO	4/21/2020	68.92	9.85	59.07	DTB = 33.95 FT
AP-35-DO	5/5/2020	68.92	9.65	59.27	
AP-35-DO	8/6/2020	68.92	12.05	56.87	DTB = 33.90 FT
AP-35-DO	8/20/2020	68.92	12.49	56.43	
AP-35-DO	11/9/2020	68.92	11.05	57.87	
AP-35-DO	11/24/2020	68.92	10.22	58.70	
AP-35-DO	2/4/2021	68.92	10.34	58.58	
AP-35-DO	4/27/2021	68.92	10.16	58.76	
AP-35-DO	5/13/2021	68.92	10.25	58.67	
AP-35-DO	8/23/2021	68.92	9.21	59.71	DTB = 32.67 FT

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
AP-35-DO	9/9/2021	68.92	13.95	54.97	
AP-35-DO	10/25/2021	68.92	10.88	58.04	DTB = 34.00 FT
AP-35-DO	11/9/2021	68.92	10.47	58.45	DTB = 33.82 FT
AP-35-DO	1/26/2022	68.92	10.61	58.31	
AP-35-DO	2/15/2022	68.92	10.05	58.87	DTB = 35.09 FT
AP-35-DO	5/13/2022	68.92	10.74	58.18	DTB = 33.89 FT
AP-36-S	1/30/2020	81.50	5.90	75.60	DTB = 16.63 FT
AP-36-S	2/13/2020	81.50	5.77	75.73	DTB = 16.63 FT
AP-36-S	4/22/2020	81.50	5.38	76.12	DTB = 17.05 FT
AP-36-S	5/5/2020	81.50	5.19	76.31	
AP-36-S	8/7/2020	81.50	8.10	73.40	DTB = 17.50 FT
AP-36-S	8/21/2020	81.50	7.70	73.80	
AP-36-S	11/10/2020	81.50	6.79	74.71	
AP-36-S	11/23/2020	81.50	6.78	74.72	
AP-36-S	2/4/2021	81.50	6.13	75.37	
AP-36-S	2/22/2021	81.50	5.93	75.57	
AP-36-S	4/28/2021	81.50	5.78	75.72	
AP-36-S	5/13/2021	81.50	6.15	75.35	
AP-36-S	8/23/2021	81.40	5.55	75.85	Resurveyed June 2021, DTB = 16.73 FT
AP-36-S	9/10/2021	81.40	5.42	75.98	
AP-36-S	10/25/2021	81.40	6.21	75.19	DTB = 17.02 FT
AP-36-S	11/9/2021	81.40	5.68	75.72	
AP-36-S	1/26/2022	81.40	6.08	75.32	DTB = 17.15 FT
AP-36-S	2/10/2022	81.40	6.30	75.10	DTB = 16.93 FT
AP-36-S	4/26/2022	81.40	5.77	75.63	DTB = 16.80 FT
AP-36-S	5/12/2022	81.40	6.44	74.96	
AP-37-S	1/30/2020	81.58	4.64	76.94	DTB = 17.22 FT
AP-37-S	2/13/2020	81.58	4.58	77.00	DTB = 17.22 FT
AP-37-S	4/22/2020	81.58	4.42	77.16	DTB = 17.70 FT
AP-37-S	5/5/2020	81.58	4.35	77.23	
AP-37-S	8/7/2020	81.58	5.72	75.86	DTB = 17.60 FT
AP-37-S	8/21/2020	81.58	6.02	75.56	
AP-37-S	11/10/2020	81.58	5.28	76.30	
AP-37-S	11/23/2020	81.58	5.28	76.30	
AP-37-S	2/4/2021	81.58	4.90	76.68	
AP-37-S	2/22/2021	81.58	4.58	77.00	
AP-37-S	4/28/2021	81.58	4.70	76.88	
AP-37-S	5/13/2021	81.58	5.10	76.48	
AP-37-S	8/23/2021	81.52	4.72	76.80	Resurveyed June 2021, DTB = 17.39 FT
AP-37-S	9/10/2021	81.52	4.83	76.69	
AP-37-S	10/25/2021	81.52	4.92	76.60	DTB = 17.83 FT
AP-37-S	11/9/2021	81.52	4.67	76.85	
AP-37-S	1/26/2022	81.52	4.74	76.78	DTB = 17.62 FT
AP-37-S	2/10/2022	81.52	4.58	76.94	DTB = 17.68 FT
AP-37-S	2/22/2022	81.52	4.39	77.13	DTB = 17.52 FT
AP-37-S	4/26/2022	81.52	4.87	76.65	DTB = 17.50 FT
AP-37-S	5/12/2022	81.52	5.41	76.11	
AP-38-S	1/30/2020	81.48	6.18	75.30	DTB = 17.16 FT
AP-38-S	2/13/2020	81.48	6.05	75.43	DTB = 17.16 FT
AP-38-S	4/22/2020	81.48	5.83	75.65	DTB = 17.60 FT
AP-38-S	5/5/2020	81.48	5.64	75.84	
AP-38-S	6/1/2020	81.48	10.10	71.38	DTB = 18.00 FT
AP-38-S	8/7/2020	81.48	7.44	74.04	DTB = 16.97 FT
AP-38-S	8/21/2020	81.48	8.09	73.39	
AP-38-S	11/10/2020	81.48	7.73	73.75	
AP-38-S	11/24/2020	81.48	7.28	74.20	
AP-38-S	2/4/2021	81.48	7.03	74.45	
AP-38-S	2/22/2021	81.48	6.69	74.79	
AP-38-S	4/28/2021	81.48	7.20	74.28	

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
AP-38-S	8/23/2021	81.47	6.05	75.42	Resurveyed June 2021, DTB = 17.30 FT
AP-38-S	9/10/2021	81.47	5.98	75.49	
AP-38-S	10/25/2021	81.47	6.44	75.03	DTB = 17.62 FT
AP-38-S	11/9/2021	81.47	6.11	75.36	
AP-38-S	1/26/2022	81.47	6.57	74.90	
AP-38-S	2/10/2022	81.47	6.25	75.22	DTB = 17.56 FT
AP-38-S	4/26/2022	81.47	6.19	75.28	DTB = 17.34 FT
AP-38-S	5/12/2022	81.47	6.86	74.61	
AP-39-S	1/30/2020	81.48	4.60	76.88	DTB = 17.41 FT
AP-39-S	2/13/2020	81.48	4.22	77.26	DTB = 17.41 FT
AP-39-S	4/22/2020	81.48	4.19	77.29	DTB = 17.42 FT
AP-39-S	5/5/2020	81.48	4.13	77.35	
AP-39-S	8/7/2020	81.48	5.58	75.90	DTB = 17.30 FT
AP-39-S	8/21/2020	81.48	5.91	75.57	
AP-39-S	11/10/2020	81.48	5.62	75.86	
AP-39-S	11/23/2020	81.48	5.30	76.18	
AP-39-S	2/4/2021	81.48	4.44	77.04	
AP-39-S	2/22/2021	81.48	4.38	77.10	
AP-39-S	4/28/2021	81.48	4.35	77.13	
AP-39-S	5/13/2021	81.48	4.45	77.03	
AP-39-S	8/23/2021	81.32	4.40	76.92	Resurveyed June 2021, DTB = 16.99 FT
AP-39-S	9/10/2021	81.32	4.33	76.99	
AP-39-S	10/25/2021	81.32	4.71	76.61	DTB = 17.02 FT
AP-39-S	11/9/2021	81.32	4.25	77.07	
AP-39-S	1/26/2022	81.32	4.42	76.90	
AP-39-S	2/10/2022	81.32	4.50	76.82	DTB = 17.23 FT
AP-39-S	4/26/2022	81.32	4.36	76.96	DTB = 17.00 FT
AP-39-S	5/12/2022	81.32	4.82	76.50	
AP-41-S	8/20/2020	72.80	0.00	0.00	Dry
AP-42-DO	5/9/2022	71.80	31.03	40.77	
AP-43-DO	5/9/2022	70.75			Could not determine DTW
B-2	5/13/2022	80.30	2.83	77.47	DTB = 12.37 FT
B-3	1/15/2020	66.23	7.52	58.71	DTB = 13.45 FT
B-3	5/7/2020	66.23	7.20	59.03	
B-3	10/26/2021	66.23	7.23	59.00	DTB = 13.44 FT
B-3	11/16/2021	66.23	7.38	58.85	DTB = 13.53 FT
BR-1_ZONE3	5/13/2022	58.60	9.45	49.15	
BR-3_ZONE1	5/7/2020	62.36	9.36	53.00	
BR-3_ZONE2	5/7/2020	62.36	12.05	50.31	
BR-3_ZONE3	5/7/2020	62.36	15.66	46.70	
BR-6_ZONE3	5/4/2020	38.33	0.00	38.33	
BR-6_ZONE3	11/25/2020	38.33	0.11	38.22	
BW-05	4/22/2020	65.17	10.30	54.87	DTB = 16.60 FT
BW-05	5/6/2020	65.17	6.26	58.91	
BW-05	8/6/2020	65.17	8.20	56.97	DTB = 10.33 FT
BW-05	8/20/2020	65.17	8.50	56.67	
BW-05	11/10/2020	65.17	7.46	57.71	
BW-05	11/24/2020	65.17	6.77	58.40	
BW-05	2/4/2021	65.17	6.65	58.52	
BW-05	4/28/2021	65.17	6.64	58.53	
BW-05	5/12/2021	65.17	6.59	58.58	
BW-05	8/23/2021	65.17	6.78	58.39	DTB = 10.37 FT
BW-05	9/10/2021	65.17	7.14	58.03	
BW-05	10/25/2021	65.17	6.93	58.24	DTB = 10.40 FT
BW-05	11/8/2021	65.17	6.69	58.48	DTB = 10.21 FT
BW-05	1/26/2022	65.17	7.02	58.15	
BW-05	2/11/2022	65.17	7.82	57.35	DTB = 12.95 FT
BW-05	5/13/2022	65.17	7.16	58.01	DTB = 10.10 FT
BW-08	4/22/2020	65.44	7.08	58.36	DTB = 19.70 FT

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
BW-08	5/6/2020	65.44	6.95	58.49	
BW-08	8/6/2020	65.44	8.10	57.34	DTB = 14.75 FT
BW-08	8/20/2020	65.44	8.87	56.57	
BW-08	11/10/2020	65.44	7.95	57.49	
BW-08	11/25/2020	65.44	7.35	58.09	
BW-08	2/4/2021	65.44	7.22	58.22	
BW-08	4/28/2021	65.44	7.15	58.29	
BW-08	5/12/2021	65.44	7.09	58.35	
BW-08	8/23/2021	65.44	7.13	58.31	DTB = 14.50 FT
BW-08	9/10/2021	65.44	7.12	58.32	
BW-08	10/25/2021	65.44	7.30	58.14	DTB = 14.48 FT
BW-08	11/8/2021	65.44	7.23	58.21	DTB = 14.51 FT
BW-08	1/26/2022	65.44	7.58	57.86	
BW-08	2/11/2022	65.44	8.10	57.34	DTB = 14.41 FT
BW-08	5/13/2022	65.44	7.64	57.80	DTB = 14.51 FT
CL02-BR	4/22/2020	62.79	5.82	56.97	DTB = 79.00 FT
CL02-BR	5/7/2020	62.79	5.95	56.84	
CL02-BR	4/30/2021	62.79	5.77	57.02	DTB = 60.85 FT
CL02-BR	5/14/2021	62.79	6.30	56.49	
CL02-BR	4/26/2022	62.79	6.40	56.39	DTB = 79.80 FT
CL02-BR	5/11/2022	62.79	6.95	55.84	
CL03-DO	4/20/2020	50.40	8.85	41.55	DTB = 77.00 FT
CL03-DO	5/4/2020	50.40	8.66	41.74	
CL03-DO	4/30/2021	50.40	8.16	42.24	DTB = 76.22 FT
CL03-DO	5/19/2021	50.40	9.12	41.28	
CL03-DO	4/25/2022	50.40	9.07	41.33	DTB = 75.85 FT
CL03-DO	5/11/2022	50.40	9.41	40.99	
CL04-BR	4/20/2020	47.78	5.52	42.26	DTB = 59.22 FT
CL04-BR	5/4/2020	47.78	4.79	42.99	
CL04-BR	4/29/2021	47.78	5.86	41.92	DTB = 52.27 FT
CL04-BR	5/17/2021	47.78	5.70	42.08	
CL04-BR	4/25/2022	47.78	5.75	42.03	DTB = 56.20 FT
CL04-BR	5/10/2022	47.78	5.93	41.85	DTB = 54.60 FT
CL04-DO	4/20/2020	47.42	4.96	42.46	DTB = 28.90 FT
CL04-DO	5/4/2020	47.42	5.29	42.13	
CL04-DO	4/29/2021	47.42	5.31	42.11	DTB = 28.61 FT
CL04-DO	5/17/2021	47.42	5.22	42.20	
CL04-DO	4/25/2022	47.42	5.05	42.37	DTB = 28.70 FT
CL04-DO	5/10/2022	47.42	5.40	42.02	DTB = 28.50 FT
CL06-BR	4/20/2020	58.41	9.07	49.34	DTB = 71.23 FT
CL06-BR	5/6/2020	58.41	8.79	49.62	
CL06-BR	4/29/2021	58.41	9.23	49.18	DTB = 69.94 FT
CL06-BR	5/14/2021	58.41	8.84	49.57	
CL06-BR	4/26/2022	58.41	9.43	48.98	DTB = 70.20 FT
CL06-BR	5/10/2022	58.41	9.55	48.86	DTB = 67.30 FT
CL06-DO	4/20/2020	58.75	8.53	50.22	DTB = 41.51 FT
CL06-DO	5/6/2020	58.75	8.38	50.37	
CL06-DO	4/29/2021	58.75	9.38	49.37	DTB = 41.72 FT
CL06-DO	5/14/2021	58.75	8.44	50.31	
CL06-DO	4/26/2022	58.75	8.98	49.77	DTB = 41.80 FT
CL06-DO	5/10/2022	58.75	9.30	49.45	DTB = 41.40 FT
CL06-S	4/29/2021	58.62	9.02	49.60	DTB = 15.96 FT
CL06-S	5/17/2021	58.62	8.40	50.22	
CL06-S	5/10/2022	58.62	9.90	48.72	DTB = 15.60 FT
CL08-BR_ZONE1	5/7/2020	48.28	6.86	41.42	
CL08-BR_ZONE1	5/12/2022	48.28	5.80	42.48	Obstruction
CL08-BR_ZONE2	5/7/2020	48.28	5.32	42.96	
CL08-BR_ZONE2	5/12/2022	48.28	5.80	42.48	Obstruction
CL08-BR_ZONE3	5/7/2020	48.28	5.05	43.23	

Table 3-7

WATER LEVEL MONITORING DATA

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
CL08-BR_ZONE3	5/12/2022	48.28	5.80	42.48	Obstruction
CL08-DO	4/20/2020	47.85	5.45	42.40	DTB = 53.20 FT
CL08-DO	5/7/2020	47.85	5.47	42.38	
CL08-DO	4/30/2021	47.85	5.41	42.44	DTB = 52.81 FT
CL08-DO	5/18/2021	47.85	5.78	42.07	
CL08-DO	4/25/2022	47.85	5.85	42.00	DTB = 52.68 FT
CL08-DO	5/10/2022	47.85	6.20	41.65	DTB = 52.70 FT
CL08-S	4/30/2021	47.62	4.79	42.83	DTB = 13.10 FT
CL08-S	5/18/2021	47.62	5.50	42.12	
CL08-S	5/10/2022	47.62	5.95	41.67	DTB = 13.05 FT
CL09-BR_ZONE3	5/7/2020	47.65	0.83	46.82	
CL09-DO	5/13/2022	47.43	5.60	41.83	DTB = 33.87 FT
CL09-S	4/30/2021	47.08	2.72	44.36	DTB = 13.41 FT
CL09-S	5/17/2021	47.08	4.20	42.88	
CL09-S	5/13/2022	47.08	4.85	42.23	DTB = 13.20 FT
CL10-BR	4/20/2020	72.28	0.92	71.36	DTB = 46.00 FT
CL10-BR	5/4/2020	72.28	0.45	71.83	
CL10-BR	4/29/2021	72.28	1.83	70.45	DTB = 46.31 FT
CL10-BR	5/17/2021	72.28	2.00	70.28	
CL10-BR	4/26/2022	72.28	3.40	68.88	DTB = 45.68 FT
CL10-BR	5/10/2022	72.28	4.01	68.27	
CL10-DO	4/20/2020	72.54	4.24	68.30	DTB = 31.48 FT
CL10-DO	5/4/2020	72.54	3.78	68.76	
CL10-DO	11/9/2020	72.54	6.60	65.94	DTB = 31.45 FT
CL10-DO	11/25/2020	72.54	6.33	66.21	
CL10-DO	4/29/2021	72.54	4.45	68.09	DTB = 31.56 FT
CL10-DO	5/17/2021	72.54	4.47	68.07	
CL10-DO	10/26/2021	72.54	5.78	66.76	DTB = 31.55 FT
CL10-DO	11/10/2021	72.54	5.29	67.25	
CL10-DO	4/26/2022	72.54	4.75	67.79	DTB = 31.45 FT
CL10-DO	5/10/2022	72.54	4.81	67.73	
CL10-S	4/20/2020	72.54	4.14	68.40	DTB = 13.48 FT
CL10-S	5/4/2020	72.54	5.75	66.79	
CL10-S	11/9/2020	72.54	5.55	66.99	DTB = 13.23 FT
CL10-S	11/25/2020	72.54	5.34	67.20	
CL10-S	4/29/2021	72.54	4.30	68.24	DTB = 13.27 FT
CL10-S	5/17/2021	72.54	2.05	70.49	
CL10-S	10/26/2021	72.54	5.03	67.51	DTB = 13.22 FT
CL10-S	11/10/2021	72.54	4.55	67.99	
CL10-S	4/26/2022	72.54	4.07	68.47	DTB = 13.20 FT
CL10-S	5/10/2022	72.54	4.52	68.02	
CL11-DO	4/20/2020	68.72	18.60	50.12	DTB = 50.50 FT
CL11-DO	5/8/2020	68.72	18.63	50.09	
CL11-DO	5/17/2020	68.72	18.85	49.87	
CL11-DO	4/29/2021	68.72	19.31	49.41	DTB = 50.82 FT
CL11-DO	4/25/2022	68.72	19.17	49.55	DTB = 50.40 FT
GFS-03	4/20/2020	NM	9.37	NA	DTB = 17.01 FT
GFS-03	5/4/2020	NM	9.19	NA	
GFS-03	4/30/2021	NM	9.62	NA	DTB = 17.06 FT
GFS-03	5/19/2021	NM	9.42	NA	
GFS-03	10/28/2021	NM	8.80	NA	DTB = 17.00 FT
GFS-03	11/8/2021	NM	9.27	NA	DTB = 16.95 FT
GFS-03	4/25/2022	NM	9.62	NA	DTB = 16.97 FT
GFS-03	5/9/2022	NM	9.80	NA	DTB = 16.70 FT
GZ-4	4/20/2020	45.13	4.65	40.48	DTB = 11.30 FT
GZ-4	5/6/2020	45.13	4.56	40.57	
GZ-4	4/30/2021	45.13	3.13	42.00	DTB = 11.24 FT
GZ-4	5/18/2021	45.13	4.95	40.18	
GZ-4	4/25/2022	45.13	4.92	40.21	DTB = 11.28 FT

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
GZ-4	5/10/2022	45.13	5.50	39.63	
MW-002	4/30/2021	80.08	10.65	69.43	DTB = 34.18 FT
MW-002	5/14/2021	80.08	12.40	67.68	
MW-002R	5/13/2022	62.59	NM	NA	Could not locate
MW-003R	4/20/2020	61.28	2.22	59.06	DTB = 30.70 FT
MW-003R	5/4/2020	61.28	3.12	58.16	
MW-003R	4/30/2021	61.28	1.47	59.81	DTB = 30.60 FT
MW-003R	5/14/2021	61.28	2.29	58.99	
MW-003R	4/25/2022	61.28	0.88	60.40	DTB = 9.28 FT
MW-003R	5/11/2022	61.28	1.11	60.17	
MW-005R	4/20/2020	62.96	3.64	59.32	DTB = 12.71 FT
MW-005R	5/4/2020	62.96	3.40	59.56	
MW-005R	4/30/2021	62.96	3.03	59.93	DTB = 17.65 FT
MW-005R	5/14/2021	62.96	3.69	59.27	
MW-005R	4/25/2022	62.96	4.06	58.90	DTB = 17.61 FT
MW-005R	5/11/2022	62.96	4.78	58.18	
MW-009	4/22/2020	63.48	4.50	58.98	DTB = 20.75 FT
MW-009	5/6/2020	63.48	4.51	58.97	
MW-009	11/9/2020	63.48	5.55	57.93	DTB = 21.25 FT
MW-009	11/25/2020	63.48	4.45	59.03	
MW-009	4/28/2021	63.48	4.46	59.02	DTB = 21.30 FT
MW-009	5/12/2021	63.48	4.43	59.05	
MW-009	4/25/2022	63.48	4.84	58.64	DTB = 20.78
MW-009	5/9/2022	63.48	5.17	58.31	
MW-013	4/22/2020	69.11	4.77	64.34	DTB = 42.10 FT
MW-013	5/8/2020	69.11	9.90	59.21	
MW-013	4/29/2021	69.11	10.21	58.90	DTB = 42.17 FT
MW-013	5/17/2021	69.11	10.12	58.99	
MW-013	10/28/2021	69.11	9.63	59.48	DTB = 42.11 FT
MW-013	11/11/2021	69.11	10.35	58.76	
MW-013	4/25/2022	69.11	10.09	59.02	DTB = 41.85 FT
MW-013	5/9/2022	69.11	10.78	58.33	
MW-014A	4/22/2020	69.11	14.42	54.69	DTB = 59.70 FT
MW-014A	5/7/2020	69.11	14.25	54.86	
MW-014A	4/29/2021	69.11	15.50	53.61	DTB - 59.63 FT
MW-014A	5/17/2021	69.11	14.77	54.34	
MW-014A	4/25/2022	69.11	15.59	53.52	DTB = 59.60 FT
MW-014A	5/9/2022	69.11	16.12	52.99	
MW-016	4/25/2022	66.82	14.04	52.78	DTB = 35.85 FT
MW-016	5/9/2022	66.82	14.25	52.57	
MW-030	4/30/2021	79.87	6.91	72.96	DTB = 20.08 FT
MW-030	5/14/2021	79.87	7.45	72.42	
MW-030	5/13/2022	79.85	10.33	69.52	DTB = 19.87 FT
MW-034	4/20/2020	35.30	0.00	35.30	DTB = 64.50 FT
MW-034	5/7/2020	35.30	0.00	35.30	
MW-034	4/30/2021	35.30	0.00	35.30	DTB = 66.68 FT
MW-034	5/14/2021	35.30	60.78	(25.48)	
MW-034	4/26/2022	35.30	0.00	35.30	Artesian, DTB = 64.58 FT
MW-034	5/10/2022	35.30	(0.50)	35.80	
MW-036	4/20/2020	52.64	0.00	52.64	DTB = 9.23 FT
MW-036	4/30/2021	52.64	10.68	41.96	Obstruction at 10.96 FT
MW-036	4/25/2022	52.64	NM	NA	Obstructed, DTB = 11.03 FT
MW-036	5/11/2022	52.64	NM	NA	Obstructed, DTB = 11.06 FT
MW-2_32-TOZER	4/20/2020	70.83	4.92	65.91	DTB = 15.27 FT
MW-2_32-TOZER	5/4/2020	70.83	3.65	67.18	
MW-2_32-TOZER	11/9/2020	70.83	7.70	63.13	DTB = 15.10 FT
MW-2_32-TOZER	11/25/2020	70.83	7.48	63.35	
MW-2_32-TOZER	4/29/2021	70.83	5.38	65.45	DTB = 15.27 FT
MW-2_32-TOZER	5/17/2021	70.83	5.20	65.63	

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
MW-2_32-TOZER	10/26/2021	70.83	6.48	64.35	DTB = 15.13 FT
MW-2_32-TOZER	11/10/2021	70.83	5.25	65.58	
MW-2_32-TOZER	4/26/2022	70.83	5.19	65.64	DTB = 15.22 FT
MW-2_32-TOZER	5/10/2022	70.83	5.64	65.19	
OB-04-DO	4/20/2020	54.35	12.50	41.85	DTB = 68.45 FT
OB-04-DO	5/4/2020	54.35	11.99	42.36	
OB-04-DO	11/9/2020	54.35	13.15	41.20	DTB = 67.70 FT
OB-04-DO	11/25/2020	54.35	12.78	41.57	
OB-04-DO	4/30/2021	54.35	11.67	42.68	DTB = 68.34 FT
OB-04-DO	5/19/2021	54.35	12.31	42.04	
OB-04-DO	10/26/2021	54.35	12.73	41.62	DTB = 68.63 FT
OB-04-DO	11/10/2021	54.35	12.40	41.95	
OB-04-DO	4/25/2022	54.35	12.55	41.80	DTB = 67.97 FT
OB-04-DO	5/11/2022	54.35	12.92	41.43	
OB-05-BR	4/20/2020	49.01	7.57	41.44	DTB = 91.60 FT
OB-05-BR	5/6/2020	49.01	7.42	41.59	
OB-05-BR	4/30/2021	49.01	7.52	41.49	DTB = 96.40 FT
OB-05-BR	5/18/2021	49.01	7.72	41.29	
OB-05-BR	4/25/2022	49.01	7.76	41.25	DTB = 95.38 FT
OB-05-BR	5/10/2022	49.01	7.98	41.03	
OB-05-DO	4/20/2020	49.06	7.80	41.26	DTB = 82.62 FT
OB-05-DO	5/6/2020	49.06	7.70	41.36	
OB-05-DO	11/9/2020	49.06	8.33	40.73	DTB = 82.05 FT
OB-05-DO	11/25/2020	49.06	8.08	40.98	
OB-05-DO	4/30/2021	49.06	7.08	41.98	DTB = 82.08 FT
OB-05-DO	5/18/2021	49.06	7.97	41.09	
OB-05-DO	10/26/2021	49.06	8.02	41.04	DTB = 83.04 FT
OB-05-DO	11/10/2021	49.06	8.19	40.87	
OB-05-DO	4/25/2022	49.06	7.93	41.13	DTB = 82.35 FT
OB-05-DO	5/10/2022	49.06	8.28	40.78	
OB-05-S	4/30/2021	49.34	7.35	41.99	DTB = 26.10 FT
OB-05-S	5/18/2021	49.34	8.25	41.09	
OB-06-BR	4/20/2020	48.70	7.48	41.22	DTB = 95.30 FT
OB-06-BR	5/4/2020	48.70	6.84	41.86	
OB-06-BR	4/29/2021	48.70	7.53	41.17	DTB = 91.93 FT
OB-06-BR	5/18/2021	48.70	7.32	41.38	
OB-06-BR	4/25/2022	48.70	7.38	41.32	DTB = 91.83 FT
OB-06-BR	5/9/2022	48.70	7.60	41.10	
OB-06-DO	4/20/2020	49.21	7.64	41.57	DTB = 67.40 FT
OB-06-DO	5/4/2020	49.21	7.41	41.80	
OB-06-DO	4/29/2021	49.21	7.41	41.80	DTB = 74.45 FT
OB-06-DO	5/18/2021	49.21	21.62	27.59	
OB-06-DO	4/25/2022	49.21	7.90	41.31	DTB = 66.56 FT
OB-06-DO	5/9/2022	49.21	8.15	41.06	
OB-06-S	4/29/2021	49.39	7.48	41.91	DTB = 13.57 FT
OB-06-S	5/18/2021	49.39	7.61	41.78	
OB-06-S	10/28/2021	49.39	7.10	42.29	DTB = 13.90 FT
OB-06-S	11/8/2021	49.39	7.55	41.84	DTB = 13.81 FT
OB-06-S	1/26/2022	49.39	8.17	41.22	DTB = 13.88 FT
OB-06-S	2/10/2022	49.39	7.48	41.91	DTB = 13.90 FT
OB-06-S	5/9/2022	49.39	8.18	41.21	DTB = 13.55 FT
OB-08-DO	4/20/2020	38.29	0.00	38.29	DTB = 79.93 FT
OB-08-DO	5/6/2020	38.29	0.00	38.29	
OB-08-DO	4/30/2021	38.29	0.00	38.29	DTB = 79.88 FT
OB-08-DO	4/27/2022	38.29	0.00	38.29	DTB = 78.90 FT
OB-08-DO	5/11/2022	38.29	0.00	38.29	
OB-08-S	4/30/2021	38.36	5.30	33.06	DTB = 12.76 FT
OB-08-S	5/14/2021	38.36	5.60	32.76	
OB-08-S	5/13/2022	38.36	5.92	32.44	DTB = 12.76 FT

Table 3-7

WATER LEVEL MONITORING DATA

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
OB-09-BR	4/22/2020	65.25	8.45	56.80	DTB = 102.60 FT
OB-09-BR	11/9/2020	65.25	9.90	55.35	DTB = 117.80 FT
OB-09-BR	11/25/2020	65.25	17.31	47.94	
OB-09-BR	4/28/2021	65.25	8.91	56.34	DTB = 104.90 FT
OB-09-BR	5/12/2021	65.25	8.41	56.84	
OB-09-BR	10/28/2021	65.25	8.60	56.65	DTB = 104.90 FT
OB-09-BR	11/15/2021	65.25	8.70	56.55	DTB = 104.50 FT
OB-09-BR	4/25/2022	65.25	8.90	56.35	DTB = 102.95 FT
OB-09-BR	5/9/2022	65.25	9.40	55.85	
OB-09-DO	4/22/2020	65.11	8.36	56.75	DTB = 91.50 FT
OB-09-DO	11/25/2020	65.11	9.40	55.71	DTB = 91.12
OB-09-DO	4/28/2021	65.11	8.89	56.22	DTB = 92.68 FT
OB-09-DO	5/12/2021	65.11	8.36	56.75	
OB-09-DO	10/28/2021	65.11	8.61	56.50	DTB = 92.21 FT
OB-09-DO	11/16/2021	65.11	8.68	56.43	
OB-09-DO	4/25/2022	65.11	5.56	59.55	DTB = 93.25 FT
OB-09-DO	5/9/2022	65.11	9.31	55.80	
OB-09-S	4/22/2020	65.22	7.08	58.14	DTB = 21.10 FT
OB-09-S	11/9/2020	65.22	7.70	57.52	DTB = 21.00 FT
OB-09-S	11/25/2020	65.22	7.16	58.06	
OB-09-S	4/28/2021	65.22	7.00	58.22	DTB = 21.11 FT
OB-09-S	5/12/2021	65.22	6.89	58.33	
OB-09-S	10/28/2021	65.22	6.68	58.54	DTB = 21.19 FT
OB-09-S	11/15/2021	65.22	6.90	58.32	DTB = 21.09 FT
OB-09-S	4/25/2022	65.22	7.00	58.22	DTB = 21.15 FT
OB-09-S	5/9/2022	65.22	6.93	58.29	
OB-10-BR	4/22/2020	71.04	18.30	52.74	DTB = 74.00 FT
OB-10-BR	5/6/2020	71.04	17.19	53.85	
OB-10-BR	11/9/2020	71.04	18.70	52.34	DTB = 73.92 FT
OB-10-BR	11/25/2020	71.04	18.61	52.43	
OB-10-BR	4/28/2021	71.04	18.00	53.04	DTB = 74.25 FT
OB-10-BR	5/12/2021	71.04	17.25	53.79	
OB-10-BR	10/28/2021	71.04	17.88	53.16	DTB = 74.65 FT
OB-10-BR	11/15/2021	71.04	17.55	53.49	DTB = 74.00 FT
OB-10-BR	4/25/2022	71.04	17.86	53.18	DTB = 74.50 FT
OB-10-BR	5/9/2022	71.04	18.24	52.80	
OB-10-DO	10/28/2021	71.00	11.68	59.32	DTB = 46.97 FT
OB-10-DO	11/15/2021	71.00	11.80	59.20	DTB = 47.00 FT
OB-10-S	4/22/2020	70.91	8.88	62.03	DTB = 30.12 FT
OB-10-S	5/6/2020	70.91	8.28	62.63	
OB-10-S	4/28/2021	70.91	9.40	61.51	DTB = 30.11 FT
OB-10-S	5/12/2021	70.91	11.29	59.62	
OB-10-S	4/25/2022	70.91	9.72	61.19	DTB = 30.05 FT
OB-10-S	5/9/2022	70.91	10.12	60.79	
OB-11-BR	8/8/2022	75.37	23.49	51.88	DTB = 64.70 FT
OB-11-DO	8/8/2022	75.50	21.55	53.95	DTB = 60.85 FT
OB-11-S	5/7/2020	75.51	20.72	54.79	
OB-11-S	8/8/2022	75.51	14.27	61.24	DTB = 29.76 FT
OB-12-BR	8/8/2022	73.67	21.85	51.82	DTB = 84.81 FT
OB-12-DO	4/22/2020	73.54	14.20	59.34	DTB = 48.70 FT
OB-12-DO	5/8/2020	73.54	14.30	59.24	
OB-12-DO	4/29/2021	73.54	14.76	58.78	DTB = 48.59 FT
OB-12-DO	5/17/2021	73.54	14.50	59.04	
OB-12-DO	10/28/2021	73.54	14.90	58.64	DTB = 48.79 FT
OB-12-DO	11/1/2021	73.54	11.63	61.91	
OB-12-DO	4/25/2022	73.54	14.97	58.57	DTB = 48.60 FT
OB-12-DO	5/9/2022	73.54	15.42	58.12	
OB-12-DO	8/8/2022	73.54	17.60	55.94	DTB = 47.78 FT
OB-12-S	1/15/2020	73.46	12.32	61.14	DTB = 27.05 FT

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
OB-12-S	5/7/2020	73.46	12.05	61.41	
OB-12-S	8/8/2022	73.46	15.58	57.88	DTB = 27.25 FT
OB-14-DO	4/22/2020	75.05	12.45	62.60	DTB = 56.45 FT
OB-14-DO	5/8/2020	75.05	12.35	62.70	
OB-14-DO	4/29/2021	75.05	12.92	62.13	DTB = 56.38 FT
OB-14-DO	5/17/2021	75.05	12.70	62.35	
OB-14-DO	4/25/2022	75.05	13.34	61.71	DTB = 56.44 FT
OB-14-DO	5/9/2022	75.05	13.90	61.15	
OB-14-DO	8/8/2022	75.05	23.56	51.49	DTB = 33.93 FT
OB-15-S	1/15/2020	63.26	4.50	58.76	DTB = 18.87 FT
OB-15-S	4/22/2020	63.26	4.25	59.01	DTB = 18.95 FT
OB-15-S	5/6/2020	63.26	4.18	59.08	
OB-15-S	4/29/2021	63.26	4.54	58.72	DTB = 18.81 FT
OB-15-S	5/17/2021	63.26	4.51	58.75	
OB-15-S	4/26/2022	63.26	4.68	58.58	DTB = 18.88 FT
OB-15-S	5/9/2022	63.26	4.94	58.32	
OB-16-BR	5/13/2022	67.61	NM	NA	Could not open
OB-17-BR	4/20/2020	49.19	1.64	47.55	DTB = 96.80 FT
OB-17-BR	5/7/2020	49.19	1.97	47.22	
OB-17-BR	4/29/2021	49.19	3.16	46.03	DTB = 47.76 FT
OB-17-BR	5/14/2021	49.19	1.62	47.57	
OB-17-BR	4/25/2022	49.19	2.32	46.87	DTB = 96.48 FT
OB-17-BR	5/11/2022	49.19	4.10	45.09	
OB-17-DO	4/20/2020	48.86	6.42	42.44	DTB = 41.52 FT
OB-17-DO	5/7/2020	48.86	5.28	43.58	
OB-17-DO	4/29/2021	48.86	5.70	43.16	DTB = 41.71 FT
OB-17-DO	5/14/2021	48.86	5.34	43.52	
OB-17-DO	4/25/2022	48.86	5.79	43.07	DTB = 41.44 FT
OB-17-DO	5/11/2022	48.86	6.31	42.55	
OB-18-DO	4/20/2020	45.10	3.75	41.35	DTB = 24.87 FT
OB-18-DO	5/6/2020	45.10	3.60	41.50	
OB-18-DO	4/30/2021	45.10	2.69	42.41	DTB = 24.81 FT
OB-18-DO	5/18/2021	45.10	3.87	41.23	
OB-18-DO	4/27/2022	45.10	3.80	41.30	DTB = 24.86 FT
OB-18-DO	5/11/2022	45.10	4.17	40.93	
OB-18-S	4/20/2020	44.98	3.77	41.21	DTB = 12.23 FT
OB-18-S	5/6/2020	44.98	3.81	41.17	
OB-18-S	4/30/2021	44.98	2.70	42.28	DTB = 12.17 FT
OB-18-S	5/18/2021	44.98	4.08	40.90	
OB-18-S	4/27/2022	44.98	3.99	40.99	DTB = 12.30 FT
OB-18-S	5/11/2022	44.98	4.26	40.72	
OB-19-BR	4/22/2020	74.26	21.75	52.51	DTB = 71.60 FT
OB-19-BR	5/8/2020	74.26	21.75	52.51	
OB-19-BR	4/28/2021	74.26	21.84	52.42	DTB = 84.39 FT
OB-19-BR	5/12/2021	74.26	21.75	52.51	
OB-19-BR	10/28/2021	74.26	22.20	52.06	DTB = 83.40 FT
OB-19-BR	11/15/2021	74.26	22.05	52.21	DTB = 83.50 FT
OB-19-BR	4/25/2022	74.26	22.38	51.88	DTB = 84.74
OB-19-BR	5/11/2022	74.26	22.86	51.40	
OB-19-DO	4/22/2020	74.28	15.25	59.03	DTB = 57.80 FT
OB-19-DO	5/8/2020	74.28	15.25	59.03	
OB-19-DO	11/9/2020	74.28	17.55	56.73	DTB = 57.75 FT
OB-19-DO	11/25/2020	74.28	17.55	56.73	
OB-19-DO	4/28/2021	74.28	15.26	59.02	DTB = 57.75 FT
OB-19-DO	5/12/2021	74.28	15.10	59.18	
OB-19-DO	10/28/2021	74.28	15.80	58.48	DTB = 57.80 FT
OB-19-DO	11/15/2021	74.28	15.70	58.58	DTB = 57.90 FT
OB-19-DO	4/25/2022	74.28	16.33	57.95	DTB = 57.82 FT
OB-19-DO	5/11/2022	74.28	17.23	57.05	

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
OB-19-S	1/15/2020	73.96	8.26	65.70	DTB = 33.72 FT
OB-19-S	5/7/2020	73.96	7.60	66.36	
OB-20-BR	4/20/2020	43.85	2.54	41.31	DTB = 85.88 FT
OB-20-BR	5/4/2020	43.85	2.36	41.49	
OB-20-BR	4/8/2021	43.85	2.95	40.90	DTB = 66.31 FT
OB-20-BR	4/26/2022	43.85	2.87	40.98	DTB = 74.18 FT
OB-20-BR	5/11/2022	43.85	3.16	40.69	
OB-20-DO	4/20/2020	43.98	2.70	41.28	DTB = 75.15 FT
OB-20-DO	5/4/2020	43.98	2.48	41.50	
OB-20-DO	11/9/2020	43.98	3.35	40.63	DTB = 74.50 FT
OB-20-DO	11/25/2020	43.98	3.16	40.82	
OB-20-DO	4/8/2021	43.98	3.16	40.82	DTB = 74.33 FT
OB-20-DO	10/28/2021	43.98	2.02	41.96	DTB = 74.13 FT
OB-20-DO	11/11/2021	43.98	2.86	41.12	
OB-20-DO	4/26/2022	43.98	2.97	41.01	DTB = 74.46 FT
OB-20-DO	5/11/2022	43.98	3.33	40.65	
OB-21-BR	4/8/2021	43.88	3.04	40.84	DTB = 99.32 FT
OB-21-DO	4/8/2021	43.28	2.39	40.89	DTB = 79.85 FT
OB-23-BR	4/20/2020	56.48	8.35	48.13	DTB = 85.15 FT
OB-23-BR	5/4/2020	56.48	8.04	48.44	
OB-23-BR	4/30/2021	56.48	7.96	48.52	DTB = 86.15 FT
OB-23-BR	5/14/2021	56.48	8.34	48.14	
OB-23-BR	4/25/2022	56.48	8.81	47.67	DTB = 84.81 FT
OB-23-BR	5/11/2022	56.48	8.15	48.33	
OB-25-BR	4/29/2021	74.26	23.45	50.81	DTB = 86.62 FT
OB-25-BR	5/12/2021	74.26	22.15	52.11	
OB-25-BR	4/25/2022	74.26	23.32	50.94	DTB = 81.30 FT
OB-25-BR	5/11/2022	74.26	25.81	48.45	
OB-25-DO	1/30/2020	74.52	22.07	52.45	DTB = 68.93 FT
OB-25-DO	2/14/2020	74.52	22.13	52.39	DTB = 68.93 FT
OB-25-DO	4/21/2020	74.52	21.50	53.02	DTB = 68.80 FT
OB-25-DO	5/5/2020	74.52	21.30	53.22	
OB-25-DO	11/9/2020	74.52	23.00	51.52	DTB = 68.70 FT
OB-25-DO	11/25/2020	74.52	22.96	51.56	
OB-25-DO	4/29/2021	74.52	22.00	52.52	DTB = 69.70 FT
OB-25-DO	5/12/2021	74.52	21.45	53.07	
OB-25-DO	10/28/2021	74.52	21.80	52.72	DTB = 68.70 FT
OB-25-DO	11/11/2021	74.52	14.50	60.02	
OB-25-DO	4/25/2022	74.52	22.14	52.38	DTB = 69.60 FT
OB-26-BR	4/22/2020	74.44	20.70	53.74	DTB = 93.95 FT
OB-26-BR	5/8/2020	74.44	20.65	53.79	
OB-26-BR	4/28/2021	74.44	21.32	53.12	DTB = 95.60 FT
OB-26-BR	5/12/2021	74.44	20.64	53.80	
OB-26-BR	4/25/2022	74.44	21.32	53.12	DTB = 94.93 FT
OB-26-BR	5/11/2022	74.44	21.53	52.91	
OB-26-DO	4/22/2020	74.48	13.28	61.20	DTB = 59.85 FT
OB-26-DO	5/8/2020	74.48	13.08	61.40	
OB-26-DO	11/9/2020	74.48	15.95	58.53	DTB = 59.90 FT
OB-26-DO	11/25/2020	74.48	15.84	58.64	
OB-26-DO	4/28/2021	74.48	13.67	60.81	DTB = 59.83 FT
OB-26-DO	5/12/2021	74.48	13.25	61.23	
OB-26-DO	10/28/2021	74.48	13.82	60.66	DTB = 59.90 FT
OB-26-DO	11/11/2021	74.48	21.10	53.38	
OB-26-DO	4/25/2022	74.48	14.41	60.07	DTB = 60.88 FT
OB-26-DO	5/11/2022	74.48	65.05	9.43	
OB-27-BR	5/7/2020	71.68	25.97	45.71	DTB = 74.25 FT
OB-27-BR	11/9/2020	71.68	26.90	44.78	DTB = 73.30 FT
OB-27-BR	11/25/2020	71.68	10.51	61.17	
OB-27-BR	4/28/2021	71.68	27.45	44.23	DTB = 73.12 FT

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
OB-27-BR	5/12/2021	71.68	47.61	24.07	
OB-27-BR	10/28/2021	71.68	15.90	55.78	DTB = 73.00 FT
OB-27-BR	11/11/2021	71.68	26.85	44.83	
OB-27-BR	4/25/2022	71.68	9.03	62.65	DTB = 7.00 FT
OB-27-BR	5/11/2022	71.68	27.38	44.30	
OB-28-BR	4/22/2020	74.35	20.60	53.75	DTB = 90.55 FT
OB-28-BR	5/8/2020	74.35	20.53	53.82	
OB-28-BR	4/28/2021	74.35	28.19	46.16	DTB = 91.52 FT
OB-28-BR	5/12/2021	74.35	20.55	53.80	
OB-28-BR	4/25/2022	74.34	21.22	53.12	DTB = 75.68 FT
OB-28-BR	5/11/2022	74.34	21.75	52.59	
OB-28-DO	5/9/2022	74.69	15.40	59.29	
OB-32-DO	4/22/2020	75.70	11.36	64.34	DTB = 47.20 FT
OB-32-DO	5/8/2020	75.70	11.25	64.45	
OB-32-DO	4/29/2021	75.70	11.63	64.07	DTB = 46.21 FT
OB-32-DO	5/12/2021	75.70	10.98	64.72	
OB-32-DO	4/25/2022	75.70	11.25	64.45	DTB = 47.10 FT
OB-32-DO	5/9/2022	75.70	12.15	63.55	
OB-34-DO	4/22/2020	75.10	15.20	59.90	DTB = 59.15 FT
OB-34-DO	5/8/2020	75.10	15.10	60.00	
OB-34-DO	11/9/2020	75.10	17.30	57.80	DTB = 48.78 FT
OB-34-DO	11/25/2020	75.10	17.55	57.55	
OB-34-DO	4/29/2021	75.10	17.02	58.08	DTB = 48.83 FT
OB-34-DO	5/12/2021	75.10	13.40	61.70	
OB-34-DO	10/28/2021	75.10	16.72	58.38	DTB = 59.40 FT
OB-34-DO	11/11/2021	75.10	16.38	58.72	
OB-34-DO	4/25/2022	75.10	15.53	59.57	DTB = 59.08 FT
OB-34-DO	5/9/2022	75.10	17.04	58.06	
OB-35-DO	1/30/2020	81.41	9.20	72.21	DTB = 48.02 FT
OB-35-DO	2/13/2020	81.41	9.61	71.80	DTB = 48.02 FT
OB-35-DO	4/22/2020	81.41	9.84	71.57	DTB = 48.60 FT
OB-35-DO	5/5/2020	81.41	10.07	71.34	
OB-35-DO	8/7/2020	81.41	13.51	67.90	DTB = 47.82 FT
OB-35-DO	8/21/2020	81.41	14.13	67.28	
OB-35-DO	11/10/2020	81.41	13.71	67.70	
OB-35-DO	11/23/2020	81.41	13.78	67.63	
OB-35-DO	2/4/2021	81.41	12.00	69.41	
OB-35-DO	2/22/2021	81.41	12.66	68.75	
OB-35-DO	4/28/2021	81.41	11.94	69.47	
OB-35-DO	5/13/2021	81.41	11.98	69.43	
OB-35-DO	8/23/2021	81.41	12.05	69.36	DTB = 47.55 FT
OB-35-DO	9/9/2021	81.41	11.36	70.05	
OB-35-DO	10/25/2021	81.41	12.12	69.29	DTB = 47.78 FT
OB-35-DO	11/9/2021	81.41	10.42	70.99	
OB-35-DO	1/26/2022	81.41	10.82	70.59	DTB = 47.85 FT
OB-35-DO	2/10/2022	81.41	10.43	70.98	DTB = 47.78 FT
OB-35-DO	4/26/2022	81.41	10.25	71.16	DTB = 47.72 FT
OB-35-DO	5/12/2022	81.41	11.57	69.84	
OB-36-DO	4/22/2020	75.92	16.97	58.95	DTB = 30.82 FT
OB-36-DO	5/8/2020	75.92	16.99	58.93	
OB-36-DO	11/9/2020	75.92	18.42	57.50	DTB = 33.60 FT
OB-36-DO	11/25/2020	75.92	17.71	58.21	
OB-36-DO	4/30/2021	75.92	16.31	59.61	DTB = 33.83 FT
OB-36-DO	5/19/2021	75.92	17.29	58.63	
OB-36-DO	10/28/2021	75.92	16.62	59.30	DTB = 34.04 FT
OB-36-DO	11/11/2021	75.92	19.34	56.58	
OB-36-DO	4/26/2022	75.92	17.92	58.00	DTB = 34.84 FT
OB-36-DO	5/12/2022	75.92	20.54	55.38	DTB = 35.22 FT
OB-37-DO	4/22/2020	75.86	18.35	57.51	DTB = 44.25 FT

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
OB-37-DO	5/8/2020	75.86	18.20	57.66	
OB-37-DO	11/9/2020	75.86	19.90	55.96	DTB = 45.30 FT
OB-37-DO	11/25/2020	75.86	19.78	56.08	
OB-37-DO	4/30/2021	75.86	18.61	57.25	DTB = 45.45 FT
OB-37-DO	5/19/2021	75.86	18.68	57.18	
OB-37-DO	10/28/2021	75.86	18.78	57.08	DTB = 45.39 FT
OB-37-DO	11/11/2021	75.86	20.85	55.01	
OB-37-DO	4/26/2022	75.86	18.92	56.94	DTB = 45.36 FT
OB-37-DO	5/12/2022	75.86	21.45	54.41	DTB = 45.47 FT
OB-38-BR	6/1/2021	77.62	13.88	63.74	DTB = 74.90 FT
OB-38-BR	8/23/2021	77.62	15.81	61.81	DTB = 63.66 FT
OB-38-BR	9/10/2021	77.62	16.31	61.31	
OB-38-BR	10/25/2021	77.62	17.00	60.62	DTB = 63.83 FT
OB-38-BR	11/8/2021	77.62	15.45	62.17	DTB = 75.91 FT
OB-38-BR	1/26/2022	77.62	16.07	61.55	DTB = 47.85 FT
OB-38-BR	2/10/2022	77.62	17.02	60.60	DTB = 67.00 FT
OB-38-BR	4/26/2022	77.62	15.66	61.96	DTB = 74.85 FT
OB-38-BR	5/11/2022	77.62	16.55	61.07	
OB-38-DO	4/22/2020	77.45	0.30	77.15	DTB = 44.70 FT
OB-38-DO	5/6/2020	77.45	4.31	73.14	
OB-38-DO	4/30/2021	77.45	1.68	75.77	DTB = 45.29 FT
OB-38-DO	10/26/2021	77.67	3.93	73.74	DTB = 44.54 FT
OB-38-DO	11/16/2021	77.67	4.60	73.07	DTB = 44.45 FT
OB-38-DO	4/25/2022	77.67	3.97	73.70	DTB = 44.15 FT
OB-38-DO	5/11/2022	77.67	5.34	72.33	
OB-39-BR	6/1/2021	78.67	17.09	61.58	DTB = 85.11 FT
OB-39-BR	8/23/2021	78.67	17.70	60.97	DTB = 54.00 FT
OB-39-BR	9/10/2021	78.67	17.35	61.32	
OB-39-BR	10/25/2021	78.67	17.57	61.10	DTB = 84.53 FT
OB-39-BR	11/8/2021	78.67	15.10	63.57	DTB = 86.00 FT
OB-39-BR	1/26/2022	78.67	16.52	62.15	DTB = 90.11 FT
OB-39-BR	2/10/2022	78.67	16.02	62.65	DTB = 76.70 FT
OB-39-BR	4/26/2022	78.67	16.20	62.47	DTB = 84.00 FT
OB-39-BR	5/10/2022	78.67	16.80	61.87	DTB = 83.30 FT
OB-39-DO	4/30/2021	79.01	16.52	62.49	DTB = 54.23 FT
OB-39-DO	5/14/2021	79.01	16.10	62.91	
OB-39-DO	5/10/2022	78.96	17.30	61.66	DTB = 53.25 FT
OB-40-DO	5/13/2022	80.26	18.31	61.95	DTB = 69.03 FT
OB-41-S	4/20/2020	33.26	3.95	29.31	DTB = 14.32 FT
OB-41-S	5/6/2020	33.26	3.94	29.32	
OB-41-S	11/9/2020	33.26	3.92	29.34	DTB = 14.32 FT
OB-41-S	11/25/2020	33.26	3.83	29.43	
OB-41-S	4/30/2021	33.26	3.64	29.62	DTB = 14.38 FT
OB-41-S	5/14/2021	33.26	4.81	28.45	
OB-41-S	10/26/2021	33.26	3.84	29.42	DTB = 14.42 FT
OB-41-S	11/10/2021	33.26	3.98	29.28	
OB-41-S	4/27/2022	33.26	4.04	29.22	DTB = 14.37 FT
OB-41-S	5/11/2022	33.26	4.07	29.19	
OB-42-BR	4/26/2022	52.02	7.35	44.67	DTB = 80.72 FT
OB-42-BR	5/11/2022	52.02	7.96	44.06	
OB-42-S	4/20/2020	51.40	5.41	45.99	DTB = 14.50 FT
OB-42-S	5/8/2020	51.40	5.28	46.12	
OB-42-S	11/9/2020	51.40	5.95	45.45	DTB = 14.45 FT
OB-42-S	11/25/2020	51.40	5.82	45.58	
OB-42-S	4/30/2021	51.40	4.82	46.58	DTB = 14.42 FT
OB-42-S	5/19/2021	51.40	5.30	46.10	
OB-42-S	10/26/2021	51.40	5.52	45.88	DTB = 14.52 FT
OB-42-S	11/10/2021	51.40	5.19	46.21	
OB-42-S	4/25/2022	51.40	9.62	41.78	DTB = 16.97 FT

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
OB-42-S	5/11/2022	51.40	6.58	44.82	
OB-43-S	4/20/2020	52.58	11.37	41.21	DTB = 17.00 FT
OB-43-S	5/8/2020	52.58	11.31	41.27	
OB-43-S	11/9/2020	52.58	11.92	40.66	DTB = 16.95 FT
OB-43-S	11/25/2020	52.58	11.68	40.90	
OB-43-S	4/30/2021	52.58	10.53	42.05	DTB = 12.01 FT
OB-43-S	5/19/2021	52.58	11.42	41.16	
OB-43-S	10/26/2021	52.58	12.55	40.03	DTB = 16.97 FT
OB-43-S	11/15/2021	52.58	11.45	41.13	DTB = 17.08 FT
OB-43-S	4/25/2022	52.58	11.58	41.00	DTB = 17.07 FT
OB-43-S	5/11/2022	52.58	11.88	40.70	
OB-44-S	1/30/2020	81.49	6.60	74.89	DTB = 18.30 FT
OB-44-S	2/13/2020	81.49	7.55	73.94	DTB = 18.30 FT
OB-44-S	4/22/2020	81.49	6.37	75.12	DTB = 16.88 FT
OB-44-S	5/5/2020	81.49	6.16	75.33	
OB-44-S	8/7/2020	81.49	8.50	72.99	DTB = 16.40 FT
OB-44-S	8/21/2020	81.49	10.40	71.09	
OB-44-S	11/10/2020	81.49	7.74	73.75	
OB-44-S	11/23/2020	81.49	6.93	74.56	
OB-44-S	2/4/2021	81.49	7.28	74.21	
OB-44-S	2/22/2021	81.49	11.15	70.34	
OB-44-S	4/28/2021	81.49	7.24	74.25	
OB-44-S	5/13/2021	81.49	7.10	74.39	
OB-44-S	8/23/2021	81.49	6.50	74.99	DTB = 18.53 FT
OB-44-S	9/9/2021	81.49	7.35	74.14	
OB-44-S	10/25/2021	81.49	7.30	74.19	DTB = 14.48 FT
OB-44-S	11/10/2021	81.49	7.65	73.84	DTB = 15.34 FT
OB-44-S	1/26/2022	81.49	7.13	74.36	DTB = 14.16 FT
OB-44-S	2/10/2022	81.49	7.08	74.41	DTB = 16.95 FT
OB-44-S	4/26/2022	81.49	7.07	74.42	DTB = 15.00 FT
OB-44-S	5/12/2022	81.49	7.86	73.63	
OB-45-BR	6/1/2021	75.66	18.11	57.55	DTB = 96.88 FT
OB-45-BR	8/23/2021	75.66	17.95	57.71	DTB = 96.20 FT
OB-45-BR	9/10/2021	75.66	16.02	59.64	
OB-45-BR	10/25/2021	75.66	17.80	57.86	DTB = 97.45 FT
OB-45-BR	11/10/2021	75.66	14.45	61.21	DTB = 96.54 FT
OB-45-BR	1/26/2022	75.66	19.33	56.33	
OB-45-BR	2/10/2022	75.66	4.47	71.19	DTB = 96.20 FT
OB-45-BR	4/26/2022	75.66	18.47	57.19	DTB = 91.12 FT
OB-45-BR	5/10/2022	75.66	18.30	57.36	
OB-45-DO	4/30/2021	76.48	12.45	64.03	DTB = 40.93 FT
OB-45-DO	5/14/2021	76.48	13.90	62.58	
OB-45-DO	5/10/2022	76.48	14.90	61.58	DTB = 40.50 FT
OB-45-S	5/10/2022	76.57	10.70	65.87	DTB = 14.35 FT
OB-46-S	1/30/2020	77.24	1.63	75.61	DTB = 13.65 FT
OB-46-S	2/13/2020	77.24	0.10	77.14	DTB = 13.65 FT
OB-47-S	4/22/2020	78.54	12.42	66.12	DTB = 24.46 FT
OB-47-S	5/5/2020	78.54	11.58	66.96	
OB-47-S	4/30/2021	78.54	12.16	66.38	DTB = 24.33 FT
OB-47-S	5/14/2021	78.54	12.99	65.55	
OB-47-S	10/26/2021	78.54	15.21	63.33	DTB = 24.39 FT
OB-47-S	11/10/2021	78.54	12.25	66.29	DTB = 24.56 FT
OB-47-S	5/13/2022	79.13	17.03	62.10	DTB = 24.44 FT
OB-48-S	10/26/2021	75.70	7.75	67.95	DTB = 20.91 FT
OB-48-S	11/15/2021	75.70	19.15	56.55	
OB-48-S	5/13/2022	76.01	NM	NA	Dry, DTB = 19.56 FT
OB-49-S	1/15/2020	73.56	14.27	59.29	DTB = 17.91 FT
OB-49-S	3/16/2020	73.56	14.82	58.74	
OB-49-S	3/20/2020	73.56	14.42	59.14	

Table 3-7

WATER LEVEL MONITORING DATA

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
OB-49-S	3/25/2020	73.56	13.56	60.00	
OB-49-S	4/21/2020	73.56	13.60	59.96	DTB = 17.90 FT
OB-49-S	5/5/2020	73.56	13.90	59.66	
OB-49-S	8/6/2020	73.56	16.40	57.16	DTB = 17.85 FT
OB-49-S	8/20/2020	73.56	16.83	56.73	DTB = 17.84 FT
OB-49-S	11/9/2020	73.56	15.34	58.22	
OB-49-S	11/24/2020	73.56	12.67	60.89	
OB-49-S	2/4/2021	73.56	14.13	59.43	
OB-49-S	4/12/2021	73.50	0.00	73.50	Dry, DTB = 8.99 FT
OB-49-S	4/26/2021	73.50	0.00	73.50	Dry, DTB = 8.91 FT
OB-49-S	4/28/2021	73.56	14.31	59.25	
OB-49-S	5/13/2021	73.56	14.05	59.51	
OB-49-S	5/24/2021	73.50	14.80	58.70	DTB = 17.75 FT
OB-49-S	6/10/2021	73.50	14.95	58.55	DTB = 17.74 FT
OB-49-S	6/28/2021	73.50	15.45	58.05	DTB = 17.61 FT
OB-49-S	7/12/2021	73.50	12.78	60.72	DTB = 17.47 FT
OB-49-S	8/9/2021	73.50	14.83	58.67	DTB = 17.72 FT
OB-49-S	8/23/2021	73.50	13.90	59.60	Resurveyed June 2021, DTB = 17.70 FT
OB-49-S	9/9/2021	73.50	14.31	59.19	
OB-49-S	9/23/2021	73.50	14.66	58.84	DTB = 17.78 FT
OB-49-S	10/6/2021	73.50	13.91	59.59	DTB = 17.66 FT
OB-49-S	10/25/2021	73.50	7.40	66.10	DTB = 17.71 FT
OB-49-S	11/9/2021	73.50	14.43	59.07	DTB = 17.81 FT
OB-49-S	1/13/2022	73.50	14.72	58.78	DTB = 17.88 FT
OB-49-S	1/26/2022	73.50	14.90	58.60	DTB = 17.70 FT
OB-49-S	1/27/2022	73.50	14.91	58.59	DTB = 17.77 FT
OB-49-S	2/8/2022	73.50	13.62	59.88	DTB = 17.54 FT
OB-49-S	2/15/2022	73.50	14.13	59.37	DTB = 17.81 FT
OB-49-S	5/10/2022	73.50	14.90	58.60	DTB = 17.90 FT
OB-50-S	1/15/2020	73.17	13.77	59.40	DTB = 17.76 FT
OB-50-S	3/16/2020	73.17	14.42	58.75	
OB-50-S	3/20/2020	73.17	14.07	59.10	
OB-50-S	3/25/2020	73.17	12.78	60.39	
OB-50-S	4/21/2020	73.17	13.80	59.37	DTB = 18.00 FT
OB-50-S	5/5/2020	73.17	13.65	59.52	
OB-50-S	8/6/2020	73.17	16.20	56.97	DTB = 17.75 FT
OB-50-S	8/20/2020	73.17	16.58	56.59	DTB = 17.87 FT
OB-50-S	11/24/2020	73.17	14.27	58.90	
OB-50-S	2/4/2021	73.17	13.87	59.30	
OB-50-S	4/12/2021	73.22	0.00	73.22	Dry, DTB = 8.85 FT
OB-50-S	4/26/2021	73.22	0.00	73.22	Dry, DTB = 8.81 FT
OB-50-S	4/28/2021	73.17	13.98	59.19	
OB-50-S	5/13/2021	73.17	13.75	59.42	
OB-50-S	5/24/2021	73.22	14.50	58.72	DTB = 17.63 FT
OB-50-S	6/10/2021	73.22	14.63	58.59	DTB = 17.75 FT
OB-50-S	6/28/2021	73.22	14.99	58.23	DTB = 17.63 FT
OB-50-S	7/12/2021	73.22	10.05	63.17	DTB = 17.78 FT
OB-50-S	8/9/2021	73.22	14.38	58.84	DTB = 17.64 FT
OB-50-S	8/23/2021	73.22	13.70	59.52	Resurveyed June 2021, DTB = 17.68 FT
OB-50-S	9/9/2021	73.22	13.80	59.42	
OB-50-S	9/23/2021	73.22	14.19	59.03	DTB = 17.68 FT
OB-50-S	10/6/2021	73.22	13.52	59.70	DTB = 17.65 FT
OB-50-S	10/25/2021	73.22	8.53	64.69	DTB = 17.72 FT
OB-50-S	11/9/2021	73.22	14.01	59.21	DTB = 17.73 FT
OB-50-S	1/13/2022	73.22	14.55	58.67	DTB = 17.75 FT
OB-50-S	1/26/2022	73.22	14.50	58.72	DTB = 17.65 FT
OB-50-S	1/27/2022	73.22	14.68	58.54	DTB = 17.72 FT
OB-50-S	2/8/2022	73.22	13.57	59.65	DTB = 17.51 FT
OB-50-S	2/15/2022	73.22	13.92	59.30	DTB = 17.85 FT

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
OB-50-S	4/26/2022	73.22	14.10	59.12	DTB = 17.65 FT
OB-50-S	5/10/2022	73.22	14.50	58.72	DTB = 17.70 FT
OB-51-S	1/15/2020	72.04	12.69	59.35	DTB = 16.69 FT
OB-51-S	3/16/2020	72.04	14.26	57.78	
OB-51-S	3/20/2020	72.04	12.61	59.43	
OB-51-S	3/25/2020	72.04	12.43	59.61	
OB-51-S	4/21/2020	72.04	12.55	59.49	DTB = 17.30 FT
OB-51-S	5/5/2020	72.04	12.40	59.64	
OB-51-S	8/6/2020	72.04	14.90	57.14	DTB = 17.30 FT
OB-51-S	8/20/2020	72.04	15.25	56.79	
OB-51-S	11/9/2020	72.04	13.75	58.29	
OB-51-S	11/24/2020	72.04	14.52	57.52	
OB-51-S	2/4/2021	72.04	12.43	59.61	
OB-51-S	4/12/2021	71.92	13.02	58.90	DTB = 17.23 FT
OB-51-S	4/26/2021	71.92	12.24	59.68	DTB = 17.19 FT
OB-51-S	4/28/2021	72.04	12.70	59.34	
OB-51-S	5/13/2021	72.04	12.41	59.63	
OB-51-S	5/24/2021	71.92	13.08	58.84	DTB = 17.22 FT
OB-51-S	6/10/2021	71.92	13.25	58.67	DTB = 17.26 FT
OB-51-S	6/28/2021	71.92	14.78	57.14	DTB = 17.18 FT
OB-51-S	7/12/2021	71.92	11.81	60.11	DTB = 17.28 FT
OB-51-S	8/9/2021	71.92	13.05	58.87	DTB = 17.21 FT
OB-51-S	8/23/2021	71.92	12.27	59.65	Resurveyed June 2021, DTB = 17.24 FT
OB-51-S	9/9/2021	71.92	12.72	59.20	
OB-51-S	9/23/2021	71.92	13.20	58.72	DTB = 17.30 FT
OB-51-S	10/6/2021	71.92	12.25	59.67	DTB = 17.33 FT
OB-51-S	10/25/2021	71.92	9.05	62.87	DTB = 17.23 FT
OB-51-S	11/9/2021	71.92	12.82	59.10	DTB = 17.31 FT
OB-51-S	1/13/2022	71.92	13.35	58.57	DTB = 17.25 FT
OB-51-S	1/26/2022	71.92	13.30	58.62	DTB = 17.30 FT
OB-51-S	1/27/2022	71.92	13.25	58.67	DTB = 17.42 FT
OB-51-S	2/8/2022	71.92	12.09	59.83	DTB = 17.02 FT
OB-51-S	2/11/2022	71.92	12.32	59.60	DTB = 17.24 FT
OB-51-S	4/26/2022	71.92	12.84	59.08	DTB = 17.14 FT
OB-51-S	5/10/2022	71.92	13.30	58.62	DTB = 17.35 FT
OB-52-BR	6/1/2021	71.73	21.56	50.17	DTB = 87.60 FT
OB-52-BR	8/23/2021	71.73	20.80	50.93	DTB = 87.12 FT
OB-52-BR	9/10/2021	71.73	20.72	51.01	
OB-52-BR	10/25/2021	71.73	21.48	50.25	DTB = 85.65 FT
OB-52-BR	11/8/2021	71.73	20.75	50.98	DTB = 87.35 FT
OB-52-BR	1/26/2022	71.73	21.42	50.31	DTB = 85.71 FT
OB-52-BR	2/10/2022	71.73	20.90	50.83	DTB = 86.00 FT
OB-52-BR	5/10/2022	71.73	21.50	50.23	DTB = 85.80 FT
OB-52-DO	6/1/2021	71.78	12.98	58.80	DTB = 49.88 FT
OB-52-DO	8/23/2021	71.78	13.11	58.67	DTB = 49.95 FT
OB-52-DO	9/10/2021	71.78	12.82	58.96	
OB-52-DO	10/25/2021	71.78	13.93	57.85	DTB = 49.88 FT
OB-52-DO	11/8/2021	71.78	14.17	57.61	DTB = 49.81 FT
OB-52-DO	1/26/2022	71.78	13.82	57.96	DTB = 50.21 FT
OB-52-DO	2/10/2022	71.78	10.67	61.11	DTB = 50.50 FT
OB-52-DO	5/10/2022	71.78	13.98	57.80	DTB = 50.10 FT
OB-52-S	6/1/2021	72.09	6.73	65.36	DTB = 14.28 FT
OB-52-S	8/23/2021	72.09	6.93	65.16	DTB = 14.28 FT
OB-52-S	9/10/2021	72.09	6.55	65.54	
OB-52-S	10/25/2021	72.09	8.30	63.79	DTB = 14.31 FT
OB-52-S	11/8/2021	72.09	7.04	65.05	DTB = 14.26 FT
OB-52-S	1/26/2022	72.09	8.27	63.82	
OB-52-S	2/10/2022	72.09	6.80	65.29	DTB = 14.25 FT
OB-52-S	5/10/2022	72.09	7.95	64.14	DTB = 14.00 FT

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
OB-53-BR	5/10/2022	78.27	22.56	55.71	
OB-54-BR	4/26/2022	74.84	22.90	51.94	DTB = 99.55 FT
OB-54-BR	5/10/2022	74.84	23.08	51.76	DTB = 94.00 FT
OB-55-BR	8/8/2022	NM	22.21	NA	DTB = 84.72 FT
OB-58-DO	8/9/2022	NM	18.97	NA	DTB = 53.41 FT
OB-59-DO	8/9/2022	NM	17.75	NA	DTB = 52.62 FT
OB-60-S	8/16/2022	NM	6.30	NA	DTB = 14.77 FT
P-04	12/9/2020	23.39	0.00	23.39	Well clogged with sediment, DTB = 0.15 FT
P-04R	4/29/2021	23.78	2.88	20.90	DTB = 11.04 FT
P-04R	5/18/2021	23.78	2.85	20.93	
P-04R	10/28/2021	23.78	2.30	21.48	DTB = 11.00 FT
P-04R	11/8/2021	23.78	2.68	21.10	DTB = 10.98 FT
P-04R	1/26/2022	23.78	3.00	20.78	DTB = 10.95 FT
P-04R	2/10/2022	23.78	2.35	21.43	DTB = 11.00 FT
P-04R	5/9/2022	23.78	3.05	20.73	DTB = 10.70 FT
P-05	12/9/2020	33.46	6.59	26.87	DTB = 8.31 FT
P-05R	4/30/2021	33.74	6.74	27.00	DTB = 14.12 FT
P-05R	5/18/2021	33.74	6.94	26.80	
P-05R	10/28/2021	33.74	6.70	27.04	DTB = 14.10 FT
P-05R	11/8/2021	33.74	3.51	30.23	DTB = 14.78 FT
P-05R	1/26/2022	33.74	7.17	26.57	DTB = 14.03 FT
P-05R	2/10/2022	33.74	6.75	26.99	DTB = 14.12 FT
P-05R	5/9/2022	33.74	7.10	26.64	DTB = 13.80 FT
P-09R	12/9/2020	37.86	1.62	36.24	DTB = 4.18 FT
P-09R	4/29/2021	37.86	2.80	35.06	DTB = 4.43 FT
P-09R	5/19/2021	37.86	3.22	34.64	
P-09R	10/28/2021	37.86	1.70	36.16	DTB = 4.37 FT
P-09R	11/11/2021	37.86	2.05	35.81	
P-09R	4/26/2022	37.86	2.84	35.02	DTB = 4.25 FT
P-09R	5/10/2022	37.86	2.92	34.94	
P-11R	4/20/2020	47.92	6.09	41.83	DTB = 9.45 FT
P-11R	5/4/2020	47.92	5.78	42.14	
P-11R	12/9/2020	47.92	6.15	41.77	DTB = 9.30 FT
P-11R	2/4/2021	47.92	6.65	41.27	
P-11R	4/29/2021	47.92	6.68	41.24	DTB = 9.22 FT
P-11R	5/19/2021	47.92	6.65	41.27	
P-11R	4/26/2022	47.92	6.59	41.33	DTB = 8.25 FT
P-11R	5/10/2022	47.92	NM	NA	Dry
P-13R	4/29/2021	47.05	5.52	41.53	DTB = 13.44 FT
P-13R	5/18/2021	47.05	5.50	41.55	
P-13R	10/28/2021	47.05	4.65	42.40	DTB = 13.75 FT
P-13R	11/8/2021	47.05	5.15	41.90	DTB = 13.70 FT
P-13R	1/26/2022	47.05	5.73	41.32	DTB = 13.77 FT
P-13R	2/10/2022	47.05	4.90	42.15	DTB = 13.72 FT
P-13R	5/9/2022	47.05	5.70	41.35	DTB = 13.40 FT
P-14R	4/29/2021	47.52	5.61	41.91	DTB = 13.79 FT
P-14R	5/18/2021	47.52	5.62	41.90	
P-14R	10/28/2021	47.52	5.72	41.80	DTB = 13.70 FT
P-14R	11/8/2021	47.52	5.50	42.02	DTB = 13.60 FT
P-14R	1/26/2022	47.52	6.01	41.51	DTB = 13.71 FT
P-14R	2/15/2022	47.52	4.20	43.32	DTB = 13.66 FT
P-14R	5/9/2022	47.52	6.00	41.52	DTB = 13.35 FT
P-19A	4/20/2020	47.51	7.33	40.18	DTB = 10.45 FT
P-19A	5/4/2020	47.51	7.05	40.46	
P-19A	11/9/2020	47.51	8.20	39.31	DTB = 10.40 FT
P-19A	11/25/2020	47.51	7.01	40.50	
P-19A	12/9/2020	47.51	6.99	40.52	DTB = 10.02 FT
P-19A	2/4/2021	47.51	7.76	39.75	
P-19A	4/29/2021	47.51	6.76	40.75	DTB = 10.41 FT

Table 3-7
WATER LEVEL MONITORING DATA
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
P-19A	5/19/2021	47.51	7.63	39.88	
P-19A	10/28/2021	47.51	7.12	40.39	DTB = 10.40 FT
P-19A	11/16/2021	47.51	7.55	39.96	DTB = 10.40 FT
P-19A	4/26/2022	47.51	7.98	39.53	DTB = 10.40 FT
P-19A	5/10/2022	47.93	8.13	39.80	
P-20	4/8/2021	42.82	2.26	40.56	DTB = 5.55 FT
P-20	10/28/2021	42.82	0.10	42.72	DTB = 75.54 FT
P-20R	11/11/2021	43.56	1.09	42.47	
P-20R	4/26/2022	43.56	2.84	40.72	DTB = 5.31 FT
P-20R	5/11/2022	43.56	2.62	40.94	
P-21	4/20/2020	47.95	6.81	41.14	DTB = 9.02 FT
P-21	5/8/2020	47.95	6.57	41.38	
P-21	11/9/2020	47.95	7.55	40.40	DTB = 9.35 FT
P-21	11/25/2020	47.95	6.11	41.84	
P-21	12/9/2020	47.95	6.50	41.45	DTB = 6.50 FT
P-21	2/4/2021	47.95	7.04	40.91	
P-21	4/29/2021	47.95	7.28	40.67	DTB = 9.41 FT
P-21	5/19/2021	47.95	5.58	42.37	
P-21	3/7/2022	47.95	6.81	41.14	DTB = 10.19 FT
P-21	4/25/2022	47.95	7.03	40.92	DTB = 10.12 FT
P-21	5/10/2022	47.95	7.42	40.53	
P-21-BR	3/7/2022	48.27	8.91	39.36	DTB = 67.19 FT
P-21-BR	4/25/2022	48.27	7.13	41.14	DTB = 66.37 FT
P-21-BR	5/13/2022	48.27	7.71	40.56	
P-21-DO	3/7/2022	48.33	6.98	41.35	DTB = 16.69 FT
P-21-DO	4/25/2022	48.33	7.08	41.25	DTB = 16.70 FT
P-21-DO	5/13/2022	48.33	8.10	40.23	DTB = 16.72 FT
P-23	12/9/2020	39.86	17.31	22.55	
P-23	4/29/2021	39.86	7.86	32.00	DTB = 9.86 FT
P-23	5/19/2021	39.86	7.64	32.22	
P-23	5/9/2022	39.86	8.10	31.76	DTB = 9.45 FT
P-30	4/29/2021	48.18	7.10	41.08	DTB = 13.14 FT
P-30	5/18/2021	48.18	7.05	41.13	
P-30	10/28/2021	48.18	6.20	41.98	DTB = 13.10 FT
P-30	11/8/2021	48.18	4.05	44.13	DTB = 12.97 FT
P-30	1/26/2022	48.18	7.19	40.99	DTB = 13.10 FT
P-30	2/10/2022	48.18	6.60	41.58	DTB = 13.10 FT
P-30	5/9/2022	48.18	7.30	40.88	DTB = 12.80 FT
P-31	4/30/2021	30.77	3.06	27.71	DTB = 10.96 FT
P-31	5/18/2021	30.77	4.45	26.32	
P-31	10/28/2021	30.77	3.60	27.17	DTB = 11.20 FT
P-31	11/8/2021	30.77	4.05	26.72	DTB = 11.20 FT
P-31	1/26/2022	30.77	4.77	26.00	DTB - 11.38 FT
P-31	2/15/2022	30.77	4.76	26.01	DTB - 11.29 FT
P-31	5/9/2022	30.77	4.75	26.02	DTB = 11.00 FT
RW-01_MW-18	1/30/2020	63.32	5.62	57.70	DTB = 41.20 FT
RW-01_MW-18	2/14/2020	63.32	10.51	52.81	DTB = 41.20 FT
RW-01_MW-18	4/21/2020	63.32	8.30	55.02	DTB = 40.90 FT
RW-01_MW-18	5/5/2020	63.32	8.25	55.07	
RW-01_MW-18	8/6/2020	63.32	10.85	52.47	DTB =- 41.25 FT
RW-01_MW-18	8/20/2020	63.32	11.02	52.30	
RW-01_MW-18	11/10/2020	63.32	5.32	58.00	
RW-01_MW-18	11/24/2020	63.32	8.88	54.44	
RW-01_MW-18	2/4/2021	63.32	4.22	59.10	
RW-01_MW-18	4/27/2021	63.32	4.92	58.40	
RW-01_MW-18	5/12/2021	63.32	3.96	59.36	
RW-03	1/30/2020	60.80	9.01	51.79	DTB = 54.80 FT
RW-03	2/14/2020	60.80	12.67	48.13	DTB = 54.80 FT
RW-03	4/21/2020	60.80	5.81	54.99	DTB = 55.50 FT

Table 3-7
WATER LEVEL MONITORING DATA

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Groundwater Elevation (Feet)	Note
RW-03	5/5/2020	60.80	5.70	55.10	
RW-03	8/6/2020	60.80	8.55	52.25	DTB = 55.65 FT
RW-03	8/20/2020	60.80	8.91	51.89	
RW-03	11/10/2020	60.80	3.51	57.29	
RW-03	11/24/2020	60.80	4.95	55.85	
RW-03	2/4/2021	60.80	1.41	59.39	
RW-03	4/27/2021	60.80	2.72	58.08	
RW-03	5/12/2021	60.80	2.20	58.60	
RW-22	8/8/2022	75.15	28.55	46.60	DTB = 107.91 FT
STRMH-02	5/9/2022	51.51	6.40	45.11	

Notes:

Feet = Measured below surface grade
NM = Not Measured
NA = Not Applicable
DTB = Depth to Bottom in Feet (FT)

Table 3-8
Water Quality Data - VOC Results
2020 to Present
Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
AP-12-BR	05/06/2020	73.1	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.21	1.6	0.01 U	0.01 U	1.7	0.01 U
AP-12-BR	11/25/2020	73	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.17	1.3	0.01 U	0.01 U	1.5	0.01 U
AP-12-BR	05/12/2021	77	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.12	1.2	0.01 U	0.01 U	1.3	0.01 U
AP-12-BR	11/11/2021	48.2	0.01 U	0.01 U	0.006	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.15	1.6	0.01 U	0.01 U	2.2	0.01 U
AP-12-BR	05/09/2022	74	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.06	0.41	0.01 U	0.01 U	0.46	0.01 U
AP-12-DO	05/06/2020	47.25	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.16	0.04 U	0.04 U	8.5	9.6	0.04 U	0.04 U	5.7	0.04 U
AP-12-DO	11/25/2020	47	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	11	8.7	0.1 U	0.1 U	3.7	0.1 U
AP-12-DO	05/12/2021	48	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	7.6	8.4	0.1 U	0.1 U	3.2	0.1 U
AP-12-DO	11/11/2021	47.1	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.11	0.1 U	0.1 U	6.4	11	0.1 U	0.1 U	5.3	0.1 U
AP-12-DO	05/09/2022	47	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	6.3	9.7	0.1 U	0.1 U	4.4	0.1 U
AP-12-S	05/06/2020	26.3	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.98	2	0.01 U	0.01 U	1.6	0.032
AP-12-S	11/25/2020	26	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.92	1.7	0.01 U	0.01 U	2.3	0.051
AP-12-S	05/12/2021	19	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	6	4	0.02 U	0.02 U	0.024	0.02 U
AP-12-S	11/11/2021	8.5	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	3.6	2.9	0.02 U	0.02 U	0.02 U	0.02 U
AP-12-S	05/09/2022	10.5	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	5.2	3.2	0.1 U	0.1 U	0.1 U	0.1 U
AP-13-DO	02/14/2020	42.6	16	2 U	2.8	2 U	10 U	2 U	2 U	2 U	2 U	2 U	11	120	2 U	2 U	210	2 U
AP-13-DO	05/05/2020	43	26	1.9	3.1	1 U	7.9	1 U	1 U	1.2	1 U	1 U	33	370	1 U	1.9	43	1 U
AP-13-DO	08/20/2020	46.5	16	2 U	2.1	2 U	10 U	2 U	2 U	2 U	2 U	2 U	26	200	2 U	2 U	33	2 U
AP-13-DO	02/23/2021	43	21	2	2.9	1 U	9.1	1 U	1 U	1.2	1 U	1 U	35	270	1 U	1 U	20	1 U
AP-13-DO	05/20/2021	43	15	2 U	2.8	2 U	10 U	2 U	2 U	2 U	2 U	2 U	16	210	2 U	2 U	15	2 U
AP-13-DO	09/09/2021	45	13	2 U	2.6	2 U	10 U	2 U	2 U	2 U	2 U	2 U	8.4	170	2 U	2 U	20	2 U
AP-13-DO	11/09/2021	42.5	13	2 U	2.4	2 U	10 U	2 U	2 U	2 U	2 U	2 U	3.5	45	2 U	2 U	180	2 U
AP-13-DO	02/15/2022	NA	15	2 U	2.8	2 U	10 U	2 U	2 U	2 U	2 U	2 U	17	150	2 U	2 U	140	2 U
AP-13-DO	05/12/2022	43	10	1.1	2.5	0.8 U	4 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	15	130	0.8 U	0.8 U	120	0.8 U
AP-13-S	05/05/2020	13	0.002 U	0.002 U	0.001 U	0.002 U	0.04 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.002 U	0.002 U	0.17	0.034	0.002 U
AP-13-S	08/20/2020	14	0.002 U	0.002 U	0.001 U	0.002 U	0.035 J U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U
AP-13-S	11/24/2020	15	0.002 U	0.002 U	0.001 U	0.002 U	0.018	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U
AP-13-S	02/19/2021	15	0.002 U	0.002 U	0.001 U	0.002 U	0.079	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-13-S	05/12/2021	10.95	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-15-S	05/06/2020	12.3	0.002 U	0.002 U	0.001 U	0.002 U	0.13	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U
AP-15-S	05/18/2021	5.7	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U	0.002 U	0.002 U	0.002 U
AP-15-S	05/11/2022	6	0.002 U	0.002 U	0.001 U	0.002 U	0.029 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.018	0.002 U	0.002 U	0.004	0.002 U
AP-19	05/04/2020	24	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.007	0.002 U	0.002 U	0.026	0.002 U
AP-19	11/25/2020	24	0.002 U	0.002 U	0.001 U	0.002 U	0.016 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008	0.002 U
AP-19	05/17/2021	24	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.004	0.002 U	0.002 U	0.016	0.002 U
AP-19	11/10/2021	23	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.002 U
AP-19	05/09/2022	12.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.013	0.002 U
AP-20	05/04/2020	14	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	1.4	0.11	0.002 U	0.002 U	1	0.002 U
AP-20	11/25/2020	15.5	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.57	0.13	0.01 U	0.01 U	2.3	0.01 U
AP-20	05/17/2021	14.8	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.22	0.029	0.002 U	0.002 U	0.19	0.002 U
AP-20	11/10/2021	14.5	0.002 U	0.002 U	0.001 U	0.002 U	0.014	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.015	0.005	0.002 U	0.003	0.027	0.002 U
AP-20	05/09/2022	11.5	0.002 U	0.002 U	0.001 U	0.002 U	0.011 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.12	0.02	0.002 U	0.002 U	0.12	0.002 U
AP-21	05/04/2020	22	0.002 U	0.033	0.001 U	0.002 U	0.011 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-21	11/25/2020	22	0.002 U	0.03	0.001 U	0.002 U	0.024 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-21	05/17/2021	22	0.002 U	0.048	0.001 U	0.002 U	0.01 U	0.002 U	0.002	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-21	11/10/2021	22	0.002 U	0.014	0.001 U	0.002 U	0.01	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-21	05/09/2022	12.5	0.002 U	0.013	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-22	05/04/2020	20.8	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.28	0.036	0.002 U	0.002 U	0.094	0.002 U
AP-22	11/25/2020	21	0.02 U	0.02 U	0.015	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	1.1	1.2	0.02 U	0.02 U	1.9	0.02 U
AP-22	05/17/2021	13.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.31	0.04	0.002 U	0.002 U	0.11	0.002 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
AP-22	11/10/2021	23.5	0.002 U	0.003 J	0.005	0.002 U	0.01 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.62	0.63	0.002 U	0.002 U	1	0.002 U
AP-22	05/09/2022	14	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.18	0.065	0.002 U	0.002 U	0.087	0.002 U
AP-23-DO	02/14/2020	46.9	2 U	2 U	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	37	220	2 U
AP-23-DO	05/05/2020	46.5	2 U	2 U	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	47	210	2 U
AP-23-DO	08/20/2020	43	2 U	2 U	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	4.7	4.9	2 U	79	190	2 U
AP-23-DO	11/24/2020	47	2 U	2 U	1 U	2 U	10 U UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	75	130	2 U
AP-23-DO	02/23/2021	46	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	100	140	1.5
AP-23-DO	05/20/2021	NA	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	4.5	37	0.4 U
AP-23-DO	09/09/2021	46	0.2 U	0.2 U	0.25	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	100	220	1.6
AP-23-DO	11/09/2021	46	2 U	2 U	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	130	250	2 U
AP-23-DO	02/15/2022	NA	2 U	2 U	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	81	240	2 U
AP-23-DO	05/12/2022	46	2 U	2 U	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	50	130	2 U
AP-24-DO	02/14/2020	44.6	32	3.2	3.2	1 U	5 U	1 U	1 U	1 U	1 U	1 U	2.9	15	1 U	1 U	160	1 U
AP-24-DO	05/05/2020	44.8	40	2.6	3.5	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	7.7	1 U	1 U	170	1 U
AP-24-DO	08/20/2020	45	30	3.1	3	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	6.2	1 U	1 U	150	1 U
AP-24-DO	11/24/2020	45	22 J J	2.3	3.2	1 U	5 U UJ	1 U	1 U	1 U	1 U	1 U	1 U	6.4	1 U	1 U	180	1 U
AP-24-DO	02/23/2021	46	52	3.4	5.1	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	5.8	1 U	1.4	220	1 U
AP-24-DO	05/20/2021	45	20	3.1	3.2	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1.8	1 U	1 U	160	2.9
AP-24-DO	09/10/2021	45	20	3.8	4.3	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1.3	1 U	1.2	190	1 U
AP-24-DO	11/09/2021	45	38	3.1	4.6	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1.3	1 U	2.3	230	1 U
AP-24-DO	02/15/2022	NA	41	3.9	5.1	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	240	2 U
AP-24-DO	05/12/2022	44.5	11	2.6	2.2	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	130	2 U
AP-25-DO	02/14/2020	45.5	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.18	2.9	0.04 U	0.045	4.6	0.04 U
AP-25-DO	05/05/2020	46.5	0.04 U	0.04 U	0.021	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.33	4.2	0.04 U	0.04 U	5.1	0.04 U
AP-25-DO	08/20/2020	46.5	0.045	0.04 U	0.1	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.078	1.7	0.04 U	1.7	17	0.04 U
AP-25-DO	11/24/2020	47	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.35	5.7	0.2 U	0.69	10	0.2 U
AP-25-DO	02/19/2021	46	0.01 U	0.01 U	0.005	0.01 U	0.071 D	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.067	0.33	0.01 U	0.01 U	1.6	0.01 U
AP-25-DO	05/12/2021	46	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.069	0.41	0.01 U	0.01 U	1.5	0.01 U
AP-25-DO	09/10/2021	45.5	0.016	0.016	0.031	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.011	0.01	0.01 U	1.5	7.4	0.032
AP-25-DO	11/08/2021	46.5	0.04 U	0.04 U	0.025	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.041	0.55	0.04 U	0.33	7.1	0.04 U
AP-25-DO	02/10/2022	46.5	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.11	1.2	0.02 U	0.02 U	1.7	0.02 U
AP-26-DO	05/08/2020	59.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	1.6	4.5	0.002 U	0.002 U	0.013	0.006
AP-26-DO	11/25/2020	59	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	1.4	5.5	0.02 U	0.02 U	0.02 U	0.02 U
AP-26-DO	05/14/2021	63.6	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	1.9	6.5	0.04 U	0.04 U	0.04 U	0.04 U
AP-26-DO	11/11/2021	59.6	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.11	0.48	0.01 U	0.01 U	0.017	0.01 U
AP-26-DO	05/11/2022	62	0.002 U	0.002 U	0.001 U	0.002 U	0.046 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.015	0.07	0.002 U	0.002 U	0.003	0.002 U
AP-27-DO	05/06/2020	56.3	0.002 U	0.002 U	0.001 U	0.002 U	0.024 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.12	2.9	0.002 U	0.002 U	0.038	0.011
AP-27-DO	11/25/2020	56	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.27	16	0.02 U	0.02 U	0.26	0.077
AP-27-DO	05/14/2021	44	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	2.2	0.04 U	0.04 U	0.074	0.04 U
AP-27-DO	11/10/2021	56	0.002 U	0.002 U	0.002	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.029	3.8	0.002 U	0.002 U	0.078	0.021
AP-27-DO	05/11/2022	57	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.24	29	0.1 U	0.1 U	0.25	0.1 U
AP-30R-DO	02/13/2020	45	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	5.1	19	0.2 U	0.2 U	22	0.2 U
AP-30R-DO	05/05/2020	45	0.02 U	0.02 U	0.096	0.02 U	0.33	0.02 U	0.02 U	0.34	0.02 U	0.02 U	0.19	2.4	0.02 U	0.02 U	75	0.4
AP-30R-DO	08/21/2020	45	0.8 U	0.8 U	0.4 U	0.8 U	4 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.85	0.8 U	0.8 U	110	0.8 U
AP-30R-DO	11/24/2020	NA	0.8 U	0.8 U	0.4 U	0.8 U	4 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	1.8	0.8 U	0.8 U	180	0.8 U
AP-30R-DO	02/23/2021	NA	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	53	1 U	1 U	170	1 U
AP-30R-DO	05/20/2021	NA	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	42	1 U	1 U	100	2
AP-30R-DO	09/09/2021	NA	0.2 U	0.2 U	0.52	0.2 U	1 U	0.2 U	0.2 U	0.26	0.2 U	0.2 U	0.2 U	0.66	0.2 U	0.61	150	0.36
AP-30R-DO	11/09/2021	NA	2 U	2 U	1.2	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	420	2 U
AP-30R-DO	02/15/2022	NA	2 U	2 U	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	4.7	2 U	2 U	160	2 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

			1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	Acetone	Carbon Tetra-chloride	Chloro-benzene	Chloroform	Chloroethane	Methylene chloride	PCE	TCE	Trichlorofluor-methane	VC	cis-1,2-DCE	trans-1,2-DEC
Location	Date	Depth	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	mg/L	mg/L
AP-30R-DO	05/12/2022	NA	0.4 U	0.4 U	0.23	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.41	0.4 U	0.4 U	69	0.4 U
AP-31-DO	02/13/2020	45	0.8 U	0.8 U	0.4 U	0.8 U	4 U	0.8 U	0.8 U	1.5	0.8 U	0.8 U	23	84	0.8 U	0.8 U	3.4	0.8 U
AP-31-DO	05/05/2020	45	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	2	1 U	1 U	17	100	1 U	1 U	6.6	1 U
AP-31-DO	08/21/2020	45	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	2.1	1 U	1 U	23	130	1 U	1 U	2.2	1 U
AP-31-DO	02/23/2021	NA	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	2.4	1 U	1 U	21	160	1 U	1 U	1.8	1 U
AP-31-DO	05/13/2021	NA	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	2.6	1 U	1 U	16	190	1 U	1 U	1 U	1 U
AP-31-DO	09/09/2021	NA	2 U	2 U	1 U	2 U	10 U	2 U	2 U	5	2 U	2 U	27	270	2 U	2 U	15	2 U
AP-31-DO	11/09/2021	NA	2 U	2 U	1 U	2 U	10 U	2 U	2 U	6.4	2 U	2 U	15	270	2 U	2 U	21	2 U
AP-31-DO	02/11/2022	NA	2 U	2 U	1 U	2 U	10 U	2 U	2 U	3	2 U	2 U	6.7	250	2 U	2 U	17	2 U
AP-31-DO	05/09/2022	NA	2 U	2 U	1 U	2 U	10 U	2 U	2 U	7.2	2 U	2 U	9.8	260	2 U	2 U	79	2 U
AP-32-DO	02/13/2020	45	0.81	0.8 U	0.4 U	0.8 U	4 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	49	140	0.8 U	0.8 U	21	0.8 U
AP-32-DO	05/05/2020	45	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	53	150	1 U	1 U	17	1 U
AP-32-DO	08/21/2020	45	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	65	140	1 U	1 U	8	1 U
AP-32-DO	02/23/2021	NA	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	14	22	0.2 U	0.2 U	8.4	0.2 U
AP-32-DO	05/13/2021	NA	0.2 U	0.2 U	0.18	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	7.5	10	0.2 U	0.38	68	0.2 U
AP-32-DO	09/09/2021	NA	0.4 U	0.4 U	0.21	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	7.6	11	0.4 U	0.5	96	0.4 U
AP-32-DO	11/10/2021	NA	0.4 U	0.4 U	0.23	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	2.4	3.7	0.4 U	0.82	150	0.4 U
AP-32-DO	02/11/2022	NA	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1.3	1.8	1 U	1 U	150	1 U
AP-32-DO	05/09/2022	NA	1 U	1 U	0.54	1 U	5 U	1 U	1 U	1 U	1 U	1 U	5	6.8	1 U	1.4	320	1 U
AP-33-DO	02/14/2020	35.4	15	2 U	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	7.6	34	2 U	5.6	240	2 U
AP-33-DO	05/05/2020	34.5	9.1	2.1	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	13	220	1 U
AP-33-DO	08/20/2020	34.5	9.8	1.7	0.59	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	9.9	220	1 U
AP-33-DO	11/23/2020	35	11	2	0.8	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	8.6	330	1 U
AP-33-DO	02/23/2021	35	0.005	0.003	0.001 U	0.002 U	0.082	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.38	0.002 U
AP-33-DO	05/13/2021	35	13	4 U	2 U	4 U	20 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	10	350	4 U
AP-33-DO	09/09/2021	37.5	13	2.8	1.1	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	29	340	2 U
AP-33-DO	11/09/2021	34.6	13	3	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	33	330	2 U
AP-33-DO	02/11/2022	34.6	12	2.8	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	25	500	2 U
AP-34-DO	02/14/2020	35.7	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	3.6	1 U	27	110	1 U
AP-34-DO	05/05/2020	36	0.19	0.56	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.16	0.1 U	0.1 U	0.1 U	0.41	0.1 U	12	6.5	0.2
AP-34-DO	08/20/2020	36	0.18	0.42	0.056	0.1 U	0.5 U	0.1 U	0.1 U	0.13	0.1 U	0.1 U	0.1 U	0.35	0.1 U	9.9	12	0.16
AP-34-DO	11/24/2020	36	0.1 U	0.35	0.054	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.17	0.1 U	10	9.3	0.15
AP-34-DO	02/23/2021	36	0.2	0.72	0.078	0.1 U	0.5 U	0.1 U	0.1 U	0.21	0.1 U	0.1 U	0.1 U	0.15	0.1 U	20	13	0.27
AP-34-DO	05/13/2021	36	0.18	0.72	0.11	0.1 U	0.5 U	0.1 U	0.1 U	0.16	0.1 U	0.1 U	0.1 U	0.24	0.1 U	17	35	0.26
AP-34-DO	09/09/2021	36	0.4	1.1	0.31	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	28	61	0.4 U
AP-34-DO	11/09/2021	35	0.4	1.1	0.31	0.4 U	2 U	0.4 U	0.4 U	0.52	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	28	75	0.4 U
AP-34-DO	02/11/2022	36	0.4 U	0.8	0.23	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	20	88	0.4 U
AP-35-DO	02/14/2020	46.7	0.002 U	0.002 U	0.001 U	0.002 U	0.038	0.002 U	0.002 U	0.002 U	0.016	0.003	0.002 U	0.002 U	0.002 U	0.04	0.004	0.02
AP-35-DO	05/05/2020	33	0.002 U	0.002 U	0.001 U	0.002 U	0.032 U	0.002 U	0.002 U	0.002 U	0.018	0.003	0.002 U	0.004	0.002 U	0.054	0.008	0.017
AP-35-DO	08/20/2020	32	0.002 U	0.002	0.001 U	0.002	0.067 J U	0.002 U	0.002 U	0.002 U	0.014	0.003	0.002 U	0.004	0.002 U	0.079	0.016	0.013
AP-35-DO	11/24/2020	33	0.002 U	0.019	0.001 U	0.006 J	0.049	0.002 U	0.002 U	0.002 U	0.041	0.005	0.002 U	0.006	0.002 U	0.32	0.085	0.047
AP-35-DO	02/23/2021	33	0.002 U	0.005	0.001 U	0.003	0.093 D	0.002 U	0.002 U	0.002 U	0.015	0.002	0.002 U	0.004	0.002 U	0.041	0.011	0.011
AP-35-DO	05/13/2021	33	0.002 U	0.003	0.001 U	0.004	0.018 J J	0.002 U	0.002 U	0.002 U	0.012	0.002 U	0.002 U	0.002 U	0.002 U	0.042	0.021	0.01
AP-35-DO	09/09/2021	32.5	0.002 U	0.023	0.001 U	0.009	0.029	0.002 U	0.002 U	0.002 U	0.026	0.004	0.002 U	0.002	0.002 U	0.4	0.052	0.044
AP-35-DO	11/09/2021	33	0.002	0.19	0.067	0.022	0.15	0.002 U	0.002 U	0.04	0.035	0.004	0.002	0.16	0.002 U	38	23	0.15
AP-35-DO	02/15/2022	NA	0.02 U	0.068	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.039	0.029	0.02 U	0.02 U	0.02	0.02 U	2.9	0.52	0.073
AP-36-S	02/13/2020	15.6	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.002 U	0.002 U	0.015	0.057	0.004
AP-36-S	05/05/2020	16	0.002 U	0.002 U	0.001 U	0.002 U	0.037 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.02	0.003
AP-36-S	08/21/2020	16.5	0.002 U	0.002 U	0.001 U	0.002 U	0.032 J J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-36-S	09/09/2020	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.009	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.001 U	0.001 U	0.002 U	0.003	0.002	0.001

Table 3-8
Water Quality Data - VOC Results
2020 to Present

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
AP-36-S	11/23/2020	16	0.002 U	0.002 U	0.001 U	0.002 U	0.019	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.007	0.002 U
AP-36-S	01/26/2021	NA	0.001	0.001	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.021	0.001
AP-36-S	02/22/2021	16	0.002 U	0.002 U	0.001 U	0.002 U	0.014	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.003	0.002
AP-36-S	05/13/2021	6.78	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.003	0.002 U
AP-36-S	09/10/2021	6.55	0.002 U	0.002 U	0.001 U	0.002 U	0.016	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-36-S	11/09/2021	7.3	0.002 U	0.002 U	0.001 U	0.002 U	0.02	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-36-S	02/10/2022	7.2	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-36-S	05/12/2022	7	0.002 U	0.002 U	0.001 U	0.002 U	0.026 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002	0.002 U	0.004	0.012	0.002 U
AP-37-S	02/13/2020	16.2	0.002 U	0.007	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002	0.002 U
AP-37-S	05/05/2020	16.7	0.002 U	0.011	0.001 U	0.002 U	0.058 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.004	0.002
AP-37-S	08/21/2020	16.5	0.002 U	0.009	0.001 U	0.002 U	0.03 J J	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-37-S	09/09/2020	NA	0.02 U	0.022	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.04 U	0.04 U	0.02 U	0.02 U	0.04 U	1.9	2	0.077
AP-37-S	11/23/2020	16	0.002 U	0.013	0.001 U	0.002 U	0.02	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.002 U	0.002 U	1.3	0.21	0.013
AP-37-S	01/26/2021	NA	0.001	0.022	0.009	0.001	0.009	0.001	0.001	0.001	0.003	0.001	0.001	0.001	0.001	2.64	2.67	0.001
AP-37-S	02/22/2021	16	0.002 U	0.009	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.004	0.002 U
AP-37-S	05/13/2021	5.7	0.002 U	0.018	0.004	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U	1.6	0.56	0.002 U
AP-37-S	09/10/2021	5.8	0.02 U	0.038	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	5.2	1.8	0.02 U
AP-37-S	11/09/2021	6	0.01 U	0.048	0.007	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	2.2	0.74	0.01 U
AP-37-S	02/22/2022	5.75	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4.3	6.9	0.1 U
AP-37-S	05/12/2022	6	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	6.4	7.5	0.1 U
AP-38-S	02/13/2020	16.4	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.003	0.003
AP-38-S	05/05/2020	16.6	0.002 U	0.002 U	0.001 U	0.002 U	6.7	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.16	0.17	0.004
AP-38-S	06/01/2020	16.6	0.01 U	0.01 U	0.005 U	0.01 U	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.15	0.24	0.01 U
AP-38-S	08/21/2020	16	0.04 U	0.04 U	0.02 U	0.04 U	2.9 J J	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.043	0.04 U	0.18	0.29	0.04 U
AP-38-S	09/09/2020	NA	0.5 U	0.5 U	0.5 U	0.5 U	78	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
AP-38-S	11/24/2020	16	0.002 U	0.002 U	0.001 U	0.002 U	0.024	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.008	0.004
AP-38-S	01/26/2021	NA	0.001	0.001	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.006	0.004
AP-38-S	02/22/2021	17	0.002 U	0.002 U	0.001 U	0.002 U	0.013	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.012	0.007	0.004
AP-38-S	05/20/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.007	0.003
AP-38-S	09/10/2021	7	0.002 U	0.002 U	0.001 U	0.002 U	0.011	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-38-S	11/09/2021	7.6	0.002 U	0.002 U	0.001 U	0.002 U	0.01	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.004	0.004
AP-38-S	02/10/2022	7.57	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U	0.019	0.02	0.014
AP-38-S	05/12/2022	7.5	0.002 U	0.002 U	0.001 U	0.002 U	0.028 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U
AP-39-S	02/13/2020	16.4	0.002 U	0.007	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U
AP-39-S	05/05/2020	16.4	0.002 U	0.01	0.001 U	0.002 U	0.052 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.004	0.002 U
AP-39-S	08/21/2020	16	0.002 U	0.007	0.001 U	0.002 U	0.04 J J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-39-S	09/09/2020	NA	0.001 U	0.003	0.001 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.001 U	0.001 U	0.002 U	0.009	0.006	0.001 U
AP-39-S	11/23/2020	16	0.002 U	0.012	0.001 U	0.002 U	0.02	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U	0.16	0.044	0.008
AP-39-S	01/26/2021	NA	0.001	0.002	0.001	0.001	0.038	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.004	0.013	0.001
AP-39-S	02/22/2021	14	0.002 U	0.012	0.001 U	0.002 U	0.013	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.003	0.002 U	0.006	0.009	0.003
AP-39-S	05/13/2021	5.35	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U
AP-39-S	09/10/2021	5.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002	0.002 U
AP-39-S	11/09/2021	5.8	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.002 U	0.002 U
AP-39-S	02/10/2022	5.5	0.002 U	0.015	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.003	0.003
AP-39-S	05/12/2022	5.5	0.002 U	0.002 U	0.001 U	0.002 U	0.024 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-40-S	02/13/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.038	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.1	0.015	0.002 U	0.002 U	0.033	0.002 U
AP-40-S	05/05/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.033 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.085	0.011	0.002 U	0.002 U	0.029	0.002 U
AP-40-S	08/20/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.086 J U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.011	0.003	0.002 U	0.006	0.47	0.002 U
AP-40-S	11/24/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.021	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.014	0.005	0.002 U
AP-40-S	02/22/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.023	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.004	0.002 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
AP-40-S	05/13/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.018	0.002 U
AP-40-S	09/10/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-40-S	11/10/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008	0.004	0.002 U
AP-41-S	02/13/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.13	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.003	0.002 U	0.002 U	0.061	0.002 U
AP-41-S	05/05/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.11	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.11	0.083	0.002 U	0.002	0.41	0.002 U
AP-41-S	11/24/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.013	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.025	0.009	0.002 U	0.002 U	0.009	0.002 U
AP-41-S	02/22/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.002 U	0.006	0.002 U
AP-41-S	05/20/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-41-S	09/10/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-41-S	11/10/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
AP-42-DO	09/23/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.21	0.002 U	0.002 U	0.023	0.002 U	0.002 U	0.16	1.7	0.002 U	0.002 U	0.011	0.002 U
AP-42-DO	11/24/2020	NA	0.02 U	0.02 U	0.09	0.02 U	1.9	0.02 U	0.02 U	0.095	0.02 U	0.02 U	3.7	65 H J	0.02 U	0.02 U	0.077	0.02 U
AP-42-DO	02/22/2021	NA	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	2.5	35	0.4 U	0.4 U	0.4 U	0.4 U
AP-42-DO	05/13/2021	NA	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	5.2	60	0.4 U	0.4 U	0.4 U	0.4 U
AP-42-DO	09/10/2021	NA	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	2.5	23	0.4 U	0.4 U	0.57	0.4 U
AP-42-DO	11/10/2021	NA	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	2.1	24	0.4 U	0.4 U	0.4 U	0.4 U
AP-42-DO	05/09/2022	85	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	2.1	22	0.4 U	0.4 U	0.4 U	0.4 U
AP-43-DO	09/23/2020	NA	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	24	160	1 U	1 U	12	1 U
AP-43-DO	02/22/2021	NA	1 U	1 U	1	1 U	5 D	1 U	1 U	1.3	1 U	1 U	3.3	230	1 U	1 U	210	1 U
AP-43-DO	05/13/2021	NA	1 U	1 U	1.1	1 U	6.4	1 U	1 U	1 U	1 U	1 U	2.5	99	1 U	1 U	390	1 U
AP-43-DO	09/09/2021	NA	2 U	2 U	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	43	2 U	2 U	230	2 U
AP-43-DO	11/10/2021	NA	2 U	2 U	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	67	2 U	2.6	330	2 U
AP-43-DO	05/09/2022	NA	2 U	2 U	1 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	13	2 U	11	380	2 U
B-3	11/16/2021	8.1	0.026	0.002 U	0.002	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.005	0.002 U	0.002 U	0.002	0.002 U
B-3 (LF)	11/16/2021	8.5	0.023	0.002 U	0.001	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.005	0.002 U	0.002 U	0.002	0.002 U
BR-1_ZONE3	05/07/2020	105	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-1_ZONE3	05/19/2021	105	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-1_ZONE3	05/13/2022	105	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-3_ZONE1	05/07/2020	226	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-3_ZONE1	05/19/2021	226	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-3_ZONE2	05/07/2020	200	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-3_ZONE2	05/19/2021	200	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-3_ZONE3	05/07/2020	167	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-3_ZONE3	05/19/2021	167	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-5_ZONE3	05/07/2020	133	0.002 U	0.002 U	0.001 U	0.002 U	0.011 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U
BR-5_ZONE3	05/20/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-5_ZONE3	05/13/2022	133	0.002 U	0.002	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-6_ZONE3	05/04/2020	42	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U
BR-6_ZONE3	11/25/2020	42	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U UJ	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-6_ZONE3	05/19/2021	42	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U
BR-6_ZONE3	11/16/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.038 D J	0.12	0.002 U
BR-6_ZONE3	05/13/2022	42	0.002 U	0.002 U	0.001 U	0.002 U	0.013	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.04	0.035	0.002 U
BR-7_ZONE1	05/07/2020	152	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-7_ZONE1	05/14/2021	152	0.002 U	0.002	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-7_ZONE1	05/13/2022	152	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-7_ZONE2	05/07/2020	112	0.002 U	0.002 U	0.001 U	0.002 U	0.022 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-7_ZONE2	05/14/2021	112	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-7_ZONE2	05/13/2022	112	0.002 U	0.002 U	0.001 U	0.002 U	0.12	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-7_ZONE3	05/07/2020	69	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BR-7_ZONE3	05/14/2021	69	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005 # J	0.002 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present
Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
BR-7_ZONE3	05/13/2022	69	0.002 U	0.002 U	0.001 U	0.002 U	0.02	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BW-05	05/06/2020	9.3	0.002 U	0.002 U	0.006	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.002 U	0.002 U	0.59	2.4	0.002 U
BW-05	08/20/2020	10	0.002 U	0.002 U	0.001 U	0.002 U	0.031 J U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.092	0.076	0.002 U
BW-05	11/24/2020	10	0.002 U	0.002 U	0.001 U	0.002 U	0.024	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.014	0.038	0.002 U
BW-05	02/19/2021	10	0.002 U	0.002 U	0.001 U	0.002 U	0.028	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.048	0.002 U
BW-05	05/12/2021	7.7	0.002 U	0.002 U	0.005	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.011	0.002 U	0.18	1.3	0.002 U
BW-05	09/10/2021	7.9	0.002 U	0.002	0.001 U	0.002 U	0.015 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.39	0.22	0.002 U
BW-05	11/08/2021	8	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BW-05	02/11/2022	8.1	0.002 U	0.002 U	0.001	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.15	0.15	0.002 U
BW-08	05/06/2020	13.7	0.002 U	0.002 U	0.001 U	0.002 U	0.043 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.04	0.33	0.002 U
BW-08	08/20/2020	12	0.002 U	0.002 U	0.004	0.002 U	0.03 J U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.72	1.1	0.002 U
BW-08	11/25/2020	14	0.002 U	0.002 U	0.001 U	0.002 U	0.019	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
BW-08	02/19/2021	14	0.002 U	0.003	0.001 U	0.002 U	0.027	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.029	0.043	0.002 U
BW-08	05/12/2021	8.1	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.025	0.002 U
BW-08	09/10/2021	8	0.002 U	0.002 U	0.001 U	0.002 U	0.013 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.087	0.047	0.002 U
BW-08	11/08/2021	8.6	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.027	0.006	0.002 U
BW-08	02/11/2022	8.6	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002	0.002 U
CL02-BR	05/07/2020	78	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U	0.038	0.3	0.008
CL02-BR	05/17/2021	NA	0.002 U	0.002 U	0.001	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.005	0.29	0.038
CL02-BR	05/11/2022	78.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.011	0.1	0.016
CL03-DO	05/04/2020	76	0.002 U	0.026	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL03-DO	05/19/2021	75.22	0.002 U	0.019	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.22	0.25	0.002 U	0.002 U	0.087	0.002 U
CL03-DO	05/11/2022	74.8	0.01 U	0.025	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	1.2	0.43	0.01 U	0.01 U	0.21	0.01 U
CL04-BR	05/04/2020	58.2	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.02	0.002 U	0.002 U	0.011	0.002 U
CL04-BR	05/17/2021	51	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008	0.035	0.002
CL04-BR	05/10/2022	55	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003
CL04-DO	05/04/2020	27.9	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.064	0.003
CL04-DO	05/17/2021	27.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.016	0.002 U	0.002 U	0.006	0.002 U
CL04-DO	05/10/2022	27.7	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.012	0.002 U	0.002 U	0.008	0.002 U
CL06-BR	05/06/2020	70.2	0.002 U	0.002 U	0.001 U	0.002 U	0.013 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL06-BR	05/14/2021	68.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL06-BR	05/10/2022	69	0.002 U	0.002 U	0.001 U	0.002 U	0.02 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL06-DO	05/06/2020	40.5	0.002 U	0.002 U	0.001 U	0.002 U	0.032 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL06-DO	05/14/2021	40.7	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL06-DO	05/10/2022	40.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL06-S	05/14/2021	10	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL08-BR_ZONE1	05/07/2020	159	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL08-BR_ZONE1	05/19/2021	159	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL08-BR_ZONE2	05/07/2020	102	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL08-BR_ZONE2	05/19/2021	102	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL08-BR_ZONE3	05/07/2020	70	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL08-BR_ZONE3	05/19/2021	70	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL08-BR_ZONE3	05/12/2022	70	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL08-DO	05/07/2020	52	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL08-DO	05/18/2021	51.81	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL08-DO	05/10/2022	51.6	0.002 U	0.002 U	0.001 U	0.002 U	0.03 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL08-S	05/18/2021	5.79	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL09-BR_ZONE3	05/07/2020	81	0.01 U	0.01 U	0.005	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.11	0.4	0.01 U	0.09	2.8	0.013
CL09-BR_ZONE3	05/17/2021	81	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.061	0.17	0.02 U	0.085	2.3	0.032

Table 3-8
Water Quality Data - VOC Results
2020 to Present
Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	Acetone	Carbon Tetra-chloride	Chloro-benzene	Chloroform	Chloroethane	Methylene chloride	PCE	TCE	Trichlorofluor-methane	VC	cis-1,2-DCE	trans-1,2-DEC
			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	mg/L	mg/L
CL09-BR_ZONE3	05/12/2022	81	0.02 U	0.02 U	0.011	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.64	4.8	0.02 U
CL09-S	05/17/2021	3.9	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL10-BR	05/04/2020	45	0.002 U	0.002 U	0.001 U	0.002 U	0.011 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.002 U	0.002 U
CL10-BR	05/17/2021	45	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U
CL10-BR	05/10/2022	44.6	0.002 U	0.002 U	0.001 U	0.002 U	0.026 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL10-DO	05/04/2020	30.48	0.002 U	0.004	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.39	0.003	0.002 U	0.002 U	0.002 U	0.002 U
CL10-DO	11/25/2020	30	0.002 U	0.003	0.001 U	0.002 U	0.065	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.5	0.003	0.002 U	0.002 U	0.002 U	0.002 U
CL10-DO	05/17/2021	30	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	1.5	0.083	0.01 U	0.01 U	0.013	0.01 U
CL10-DO	11/10/2021	30.5	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	1.2	0.51	0.02 U	0.02 U	0.05	0.02 U
CL10-DO	05/10/2022	30.5	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	2.9	1.3	0.01 U	0.01 U	0.15	0.01 U
CL10-S	05/04/2020	12.4	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	1.1	0.12	0.002 U	0.004	0.16	0.002 U
CL10-S	11/25/2020	12	0.002 U	0.002 U	0.001 U	0.002 U	0.069	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.019	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL10-S	05/17/2021	12.2	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.22	0.015	0.002 U	0.002 U	0.017	0.002 U
CL10-S	11/10/2021	6	0.002 U	0.002 U	0.001 U	0.002 U	0.012	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.053	0.004	0.002 U	0.002 U	0.003	0.002 U
CL10-S	05/10/2022	5	0.002 U	0.002 U	0.001 U	0.002 U	0.042 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.27	0.009	0.002 U	0.002 U	0.01	0.002 U
CL11-DO	05/17/2021	49.82	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
CL11-DO	05/11/2022	49	0.002 U	0.006	0.009	0.002 U	0.025 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.042	0.002 U	0.002 U	0.002 U	0.002 U
GFS-03	05/04/2020	16	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.024	0.002 U	0.002 U	0.005	0.002 U
GFS-03	05/14/2021	10.6	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.049	0.002 U	0.002 U	0.01	0.002 U
GFS-03	11/08/2021	10	0.002 U	0.002 U	0.001 U	0.002 U	0.035 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.061	0.002 U	0.002 U	0.02	0.002 U
GFS-03	05/09/2022	10.6	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.017	0.11	0.002 U	0.002 U	0.021	0.002 U
GZ-4	05/06/2020	10.3	0.002 U	0.002 U	0.001 U	0.002 U	0.024 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.007	0.002 U
GZ-4	05/18/2021	4.13	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
GZ-4	05/10/2022	5.9	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.012	0.002 U
MW-002R	05/14/2021	33	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
MW-003R	05/04/2020	29.7	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
MW-003R	05/14/2021	29	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.006	0.002 U
MW-003R	05/11/2022	1.9	0.002 U	0.002 U	0.001 U	0.002 U	0.019 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
MW-005R	05/04/2020	17.71	0.002 U	0.002 U	0.001 U	0.002 U	0.013 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.015	0.002 U	0.002 U	0.006	0.002 U
MW-005R	05/14/2021	4	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008	0.002 U	0.002 U	0.003	0.002 U
MW-005R	05/11/2022	5.1	0.002 U	0.002 U	0.001 U	0.002 U	0.021 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.002 U	0.002 U
MW-009	05/06/2020	19.5	0.002 U	0.002 U	0.002	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.006	0.002 U	0.002 U	0.003	0.002 U	0.18	0.32	0.002 U
MW-009	11/25/2020	20	0.002 U	0.002 U	0.001 U	0.002 U	0.011 J	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.002 U	0.002 U	0.009	0.013	0.002 U
MW-009	05/12/2021	5.46	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.007	0.002 U	0.002 U	0.002	0.002 U	0.11	0.14	0.002 U
MW-009	05/09/2022	6	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.007	0.002 U	0.002 U	0.002 U	0.002 U	0.087	0.039	0.002 U
MW-013	05/08/2020	41	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	10	4.4	0.1 U	0.1 U	0.49	0.1 U
MW-013	05/17/2021	41.17	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	8.7	4.1	0.1 U	0.1 U	0.36	0.1 U
MW-013	11/11/2021	41	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.043	0.04 U	0.04 U	9.2	6.1	0.04 U	0.04 U	0.36	0.04 U
MW-013	05/09/2022	40.5	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04	0.04 U	0.04 U	5.5	5.8	0.04 U	0.04 U	0.33	0.04 U
MW-014A	05/17/2021	58.63	0.002 U	0.002 U	0.001	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.08	0.002 U	0.005	0.25	0.016
MW-014A	05/09/2022	58.5	0.002 U	0.002 U	0.001	0.002 U	0.031 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.085	0.002 U	0.014	0.26	0.022
MW-016	05/09/2022	34.5	0.002 U	0.012	0.003	0.002 U	0.01 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U	0.14	0.002 U	0.003	0.14	0.002 U
MW-030	05/14/2021	19	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
MW-034	05/07/2020	63.5	0.01 U	0.01 U	0.018	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.051	0.01 U	0.017	2	0.012
MW-034	05/14/2021	65.68	0.01 U	0.011	0.016	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05	0.01 U	0.014	1.9	0.012
MW-034	05/10/2022	63.5	0.02 U	0.02 U	0.017	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.043	0.02 U	0.02 U	1.8	0.02 U
MW-2_32-TOZER	05/04/2020	14.27	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008	0.006	0.002 U	0.002 U	0.014	0.002 U
MW-2_32-TOZER	11/25/2020	14	0.002 U	0.002 U	0.001 U	0.002 U	0.03 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.014	0.002 U	0.004	0.043	0.002 U
MW-2_32-TOZER	05/17/2021	6.38	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.064	0.026	0.002 U	0.002 U	0.027	0.002 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present
Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
MW-2_32-TOZER	11/10/2021	7.3	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
MW-2_32-TOZER	05/10/2022	6	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.011	0.013	0.002 U	0.002 U	0.015	0.002 U
OB-04-DO	05/04/2020	67.5	0.002 U	0.002 U	0.002	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.14	0.34	0.002 U	0.049	0.52	0.002 U
OB-04-DO	11/25/2020	66	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.24	0.68	0.01 U	0.099	0.85	0.01 U
OB-04-DO	05/14/2021	68.34	0.002 U	0.002 U	0.002	0.002 U	0.014 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.13	0.37	0.002 U	0.04	0.42	0.002 U
OB-04-DO	11/10/2021	67.5	0.002 U	0.002 U	0.002	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.13	0.37	0.002 U	0.03	0.3	0.002 U
OB-04-DO	05/11/2022	66.9	0.002 U	0.002 U	0.003	0.002 U	0.044 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.16	0.53	0.002 U	0.063	0.58	0.002 U
OB-05-BR	05/06/2020	90.6	0.002 U	0.002 U	0.001	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.39	0.26	0.002 U
OB-05-BR	05/18/2021	95.4	0.002 U	0.004	0.004	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.009	0.002 U	1.2	0.28	0.013
OB-05-BR	05/10/2022	94.1	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.73	0.067	0.01 U
OB-05-DO	05/06/2020	81.6	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.11	2.8	0.02 U
OB-05-DO	11/25/2020	81	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U UJ	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.084	1.7	0.02 U
OB-05-DO	05/18/2021	81.08	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.2	0.59	0.02 U	0.034	1.1	0.032
OB-05-DO	11/10/2021	82	0.002 U	0.002 U	0.001 U	0.002 U	0.01	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U
OB-05-DO	05/10/2022	81.3	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.18	0.6	0.02 U	0.061	1.5	0.02 U
OB-05-S	05/18/2021	8.35	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-06-BR	05/04/2020	94.3	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.019	0.046	0.002 U	0.002 U	0.023	0.002 U
OB-06-BR	05/18/2021	90.93	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.022	0.037	0.002 U	0.002 U	0.013	0.002 U
OB-06-BR	05/09/2022	90.8	0.002 U	0.002 U	0.001 U	0.002 U	0.052 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.012	0.032	0.002 U	0.002 U	0.019	0.002 U
OB-06-DO	05/04/2020	66.4	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.027	0.002 U	0.006	0.17	0.002 U
OB-06-DO	05/18/2021	73.45	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.015	0.002 U	0.003	0.1	0.003
OB-06-DO	05/09/2022	65.5	0.002 U	0.002 U	0.001 U	0.002 U	0.028 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.012	0.002 U	0.005	0.11	0.002 U
OB-06-S	05/18/2021	8.98	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-06-S	08/19/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-06-S	11/08/2021	8	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-06-S	02/10/2022	9.4	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-08-DO	05/06/2020	78.9	0.01 U	0.014	0.025	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.48	2.7	0.01 U	0.01 U	2.3	0.011
OB-08-DO	05/14/2021	78.88	0.02 U	0.02 U	0.016	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.27	2	0.02 U	0.02 U	2.1	0.02 U
OB-08-DO	05/11/2022	77.5	0.02 U	0.02 U	0.015	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.28	2.2	0.02 U	0.02 U	1.4	0.02 U
OB-08-S	05/14/2021	6.3	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.021	0.002 U	0.002 U	0.009 # J	0.002 U
OB-09-BR	11/25/2020	116	0.02 U	0.02 U	0.044	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.77	1.4	0.02 U	0.28	6.2	0.027
OB-09-BR	05/12/2021	104	0.04 U	0.04 U	0.042	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.52	0.6	0.04 U	0.41	4.4	0.04 U
OB-09-BR	11/15/2021	103.5	0.04 U	0.04 U	0.034	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	1.9	2.2	0.04 U	0.045	4.7	0.04 U
OB-09-BR (LF)	11/15/2021	103	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.057 D J	0.63	0.01 U
OB-09-BR	05/09/2022	102	0.04 U	0.04 U	0.058	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.2	8.1	0.04 U
OB-09-DO	11/25/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U
OB-09-DO	05/12/2021	92	0.002 U	0.002 U	0.003	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.003	0.002 U	0.091	0.16	0.002 U
OB-09-DO	11/16/2021	91	0.002 U	0.002 U	0.01	0.002 U	0.012	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.32	0.67	0.002 U
OB-09-DO (LF)	11/16/2021	91	0.002 U	0.002 U	0.025	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.11	0.093	0.002 U	0.51 E	1.7	0.002 U
OB-09-DO	05/09/2022	92	0.01 U	0.01 U	0.019	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.33	1.1	0.01 U
OB-09-S	11/25/2020	20	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U UJ	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.006	0.002 U
OB-09-S	05/12/2021	20	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.03	0.028	0.002 U
OB-09-S	11/15/2021	7.68	0.002 U	0.002 U	0.001 U	0.002 U	0.01	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U
OB-09-S (LF)	11/15/2021	8	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008	0.011	0.002 U
OB-09-S	05/09/2022	8	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.026	0.011	0.002 U
OB-10-BR	05/06/2020	73	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.41	5.9	0.04 U	0.04 U	2.1	0.04 U
OB-10-BR	11/25/2020	72	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U UJ	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.53	4.7	0.04 U	0.04 U	1.7	0.04
OB-10-BR	05/12/2021	73	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.2	2.3	0.02 U	0.02 U	0.67	0.02 U
OB-10-BR	11/15/2021	73.5	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.085	1.7	0.02 U	0.02 U	2.1	0.047
OB-10-BR (LF)	11/15/2021	73	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.016	0.002 U	0.002 U	0.004	0.002 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
OB-10-BR	05/09/2022	73.5	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	1.2	0.04 U	0.04 U	3.2	0.054
OB-10-DO	11/15/2021	45.5	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01	0.78	0.01 U	0.01 U	0.24	0.15
OB-10-DO (LF)	11/15/2021	45	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.23	0.002 U	0.002 U	0.074	0.038
OB-10-S	05/06/2020	29	0.002 U	0.002 U	0.001 U	0.002 U	0.033 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U
OB-10-S	05/12/2021	10.4	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-10-S	05/09/2022	10.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.005	0.002 U	0.002 U	0.002 U	0.002 U
OB-11-BR	08/08/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.002 U	0.008	0.042	0.015
OB-11-DO	08/08/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.07	0.002 U	0.002 U	0.02	0.002 U
OB-11-S	08/08/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-12-BR	08/08/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U
OB-12-DO	05/08/2020	47.7	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1.6	9.5	0.1 U	0.1 U	2.8	0.1 U
OB-12-DO	05/17/2021	47.59	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1.8	16	0.1 U	0.1 U	6.1	0.1 U
OB-12-DO	11/11/2021	47.5	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.91	14	0.1 U	0.1 U	5.9	0.1 U
OB-12-DO	05/09/2022	47.5	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1	14	0.1 U	0.1 U	5	0.1 U
OB-12-DO	08/08/2022	NA	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.92	13	0.1 U	0.1 U	6.1	0.1 U
OB-12-S	08/08/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.11	0.072	0.002 U	0.002 U	0.002	0.002 U
OB-14-DO	05/08/2020	55.5	0.002 U	0.002 U	0.001	0.002 U	0.024	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.15	1.8	0.002 U	0.002 U	0.12	0.002 U
OB-14-DO	05/17/2021	55.38	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.12	1.5	0.02 U	0.02 U	0.16	0.02 U
OB-14-DO	05/09/2022	55.5	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.14	2.1	0.01 U	0.01 U	0.096	0.01 U
OB-14-DO	08/08/2022	NA	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.11	1.2	0.02 U	0.02 U	0.1	0.02 U
OB-15-S	05/06/2020	18	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.002 U
OB-15-S	05/17/2021	6	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.18	0.29	0.002
OB-15-S	05/09/2022	5.7	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.004	0.002 U
OB-17-BR	05/07/2020	95.8	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-17-BR	05/14/2021	46.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-17-BR	05/11/2022	95	0.002 U	0.002 U	0.001 U	0.002 U	0.02 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-17-DO	05/07/2020	40.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.009	0.01	0.002 U	0.002 U	0.002 U	0.002 U
OB-17-DO	05/14/2021	40.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.006	0.002 U	0.002 U	0.002 U	0.002 U
OB-17-DO	05/11/2022	40	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.005	0.002 U	0.002 U	0.002 U	0.002 U
OB-18-DO	05/06/2020	23.8	0.002 U	0.002 U	0.001 U	0.002 U	0.045 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.002 U	0.002 U
OB-18-DO	05/18/2021	23.81	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.008	0.044	0.002 U
OB-18-DO	05/11/2022	23.8	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.007	0.031	0.002 U
OB-18-S	05/06/2020	11.2	0.002 U	0.002 U	0.001 U	0.002 U	0.02 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-18-S	05/18/2021	3.7	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-18-S	05/11/2022	5	0.002 U	0.002 U	0.001 U	0.002 U	0.025 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-19-BR	05/08/2020	70.6	0.04 U	0.04 U	0.076	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.59	6.5	0.04 U	3.7	18	0.072
OB-19-BR	05/12/2021	83.39	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.59	6.4	0.4 U	3.1	28	0.4 U
OB-19-BR	11/15/2021	82.4	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.75	9.9	0.4 U	4	31	0.4 U
OB-19-BR (LF)	11/15/2021	82	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008	0.002 U	0.006	0.068	0.002 U
OB-19-BR	05/11/2022	83	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.88	12	0.4 U	4.3	27	0.4 U
OB-19-DO	05/08/2020	57	0.002 U	0.002 U	0.002	0.002 U	0.022 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.15	1.2	0.002 U	0.03	0.69	0.047
OB-19-DO	11/25/2020	56	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.061	0.66	0.01 U	0.034	0.91	0.059
OB-19-DO	05/12/2021	57	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.074	0.45	0.01 U	0.019	0.5	0.042
OB-19-DO	11/15/2021	56.8	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.028	0.93	0.045
OB-19-DO (LF)	11/15/2021	57	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.01	0.002 U	0.011	0.15	0.037
OB-19-DO	05/11/2022	56.5	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.058	0.24	0.02 U	0.038	4.2	0.057
OB-20-BR	05/04/2020	84.88	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.013	0.039	0.002 U
OB-20-BR	04/08/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U
OB-20-BR	05/11/2022	73	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetrachloride mg/L	Chlorobenzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluormethane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
OB-20-DO	05/04/2020	74.15	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.036	0.093	0.002 U
OB-20-DO	11/25/2020	73	0.002 U	0.002 U	0.001 U	0.002 U	0.011 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-20-DO	04/08/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.11	0.002 U
OB-20-DO	11/11/2021	73	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U
OB-20-DO	05/11/2022	73.5	0.002 U	0.002 U	0.001 U	0.002 U	0.012 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.048	0.015	0.002 U
OB-21-BR	04/08/2021	NA	0.002 U	0.003	0.003	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.021	0.1	0.002 U	0.012	0.28	0.008
OB-21-DO	04/08/2021	NA	0.002 U	0.008	0.011	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.24	1.1	0.002 U	0.005	1	0.004
OB-23-BR	05/04/2020	84	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.02	0.021	0.002 U
OB-23-BR	05/14/2021	85	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.11	0.063 # J	0.002 U
OB-23-BR	05/11/2022	83.7	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-25-BR	05/12/2021	85.62	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.076	0.85	0.04 U	0.64	4.7	0.04 U
OB-25-BR	05/11/2022	80	0.04 U	0.04 U	0.088	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	1.5	6.3	0.04 U	6	19	0.13
OB-25-DO	02/14/2020	68	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.54	10	0.1 U	0.1 U	3.6	0.1 U
OB-25-DO	05/05/2020	68	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.43	13	0.1 U	0.1 U	3.2	0.1 U
OB-25-DO	11/25/2020	67	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.065	3.9	0.04
OB-25-DO	05/12/2021	68.7	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.52	13	0.02 U	0.041	1.6	0.02 U
OB-25-DO	11/11/2021	67.7	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.51	4.5	0.02 U	0.02 U	0.13	0.02 U
OB-25-DO	05/11/2022	68	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.43	14	0.1 U	0.1 U	2.9	0.1 U
OB-26-BR	05/07/2020	93	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.014	0.01 U	0.088	2.4	0.01 U
OB-26-BR	05/12/2021	94.6	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.03	0.02 U	0.13	3.8	0.02 U
OB-26-BR	05/11/2022	93	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U	0.019	0.4	0.002 U
OB-26-DO	05/07/2020	59	0.002 U	0.002 U	0.001 U	0.002 U	0.048 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.068	0.002 U	0.002 U	0.026	0.002 U
OB-26-DO	11/25/2020	58	0.002 U	0.002 U	0.001 U	0.002 U	0.011 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.09	0.002 U	0.002 U	0.027	0.002 U
OB-26-DO	05/12/2021	59	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.066	0.002 U	0.002 U	0.02	0.002 U
OB-26-DO	11/11/2021	58.9	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.57	15	0.2 U	0.2 U	0.89	0.2 U
OB-26-DO	05/11/2022	59	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.16	0.002 U	0.002 U	0.037	0.003
OB-27-BR	05/07/2020	70	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-27-BR	11/25/2020	72	0.002 U	0.002 U	0.001 U	0.002 U	0.015 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-27-BR	05/19/2021	72.12	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-27-BR	11/11/2021	72	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-27-BR	05/11/2022	72	0.002 U	0.002	0.006	0.002 U	0.026 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.042	0.63	0.002 U	0.42	1.3	0.002 U
OB-28-BR	05/07/2020	89.5	0.002 U	0.002 U	0.001 U	0.002 U	0.028 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.025	0.002 U	0.002 U	0.022	0.002 U
OB-28-BR	05/12/2021	90.52	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4.6	0.1 U	0.18	8.5	0.1
OB-28-BR	05/11/2022	74	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.22	8.4	0.1 U	0.15	9	0.13
OB-28-DO	05/09/2022	55	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.23	0.02 U	0.02 U	3.7	0.045
OB-32-DO	05/08/2020	46.2	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.003	0.002 U	0.006	0.002 U	0.002 U	0.14	0.048	0.002 U	0.002 U	0.002 U	0.002 U
OB-32-DO	05/12/2021	45.21	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.073	0.013	0.002 U	0.002 U	0.002 U	0.002 U
OB-32-DO	05/09/2022	46	0.002 U	0.002 U	0.001 U	0.002 U	0.023 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.88	7.7	0.002 U	0.002 U	0.002 U	0.002 U
OB-34-DO	05/08/2020	58	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	1	6.9	0.04 U	0.04 U	0.64	0.04 U
OB-34-DO	11/25/2020	18	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.88	6.3	0.1 U	0.1 U	0.49	0.1 U
OB-34-DO	05/12/2021	47.83	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.061	0.13	0.002 U	0.002 U	0.006	0.002 U
OB-34-DO	11/11/2021	58.1	0.002 U	0.002 U	0.001	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.31	1.3	0.002 U	0.002 U	0.049	0.002 U
OB-34-DO	05/09/2022	58	0.01 U	0.01 U	0.005 U	0.01 U	0.087 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.34	0.74	0.01 U	0.01 U	0.031	0.01 U
OB-35-DO	02/13/2020	47	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	28	0.2 U
OB-35-DO	05/05/2020	33	0.04 U	0.04 U	0.037	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	7.9	6.9	0.04 U	0.4	22	0.052
OB-35-DO	08/21/2020	47	0.04 U	0.04 U	0.022	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	14	6.5	0.04 U	0.18	7	0.04 U
OB-35-DO	11/23/2020	47	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	14	7.2	0.1 U	0.1 U	3.8	0.1 U
OB-35-DO	02/22/2021	47	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	21	7.4	0.1 U	0.1 U	3.4	0.1 U
OB-35-DO	05/13/2021	47	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	14	8.3	0.1 U	0.1 U	5.6	0.1 U
OB-35-DO	09/09/2021	53	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	22	11	0.1 U	0.44 J	7.5	0.1 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present
Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
OB-35-DO	11/09/2021	46.5	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	14	10	0.1 U	0.38	7.5	0.1 U
OB-35-DO	02/10/2022	46.5	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	22	10	0.1 U	0.12	6.5	0.1 U
OB-35-DO	05/12/2022	46.5	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	43	11	0.2 U	0.27	6.6	0.2 U
OB-36-DO	05/08/2020	29.8	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	3.1	6.2	0.02 U	0.02 U	0.02	0.02 U
OB-36-DO	11/25/2020	32	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	2.6	5.6	0.04 U	0.04 U	0.04 U	0.04 U
OB-36-DO	05/19/2021	32.83	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	3	5.3	0.04 U	0.04 U	0.04 U	0.04 U
OB-36-DO	11/11/2021	33	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	2.1	4.5	0.04 U	0.04 U	0.04 U	0.04 U
OB-36-DO	05/12/2022	33.5	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	1.6	2.9	0.04 U	0.04 U	0.04 U	0.04 U
OB-37-DO	05/08/2020	43.25	0.003	0.002 U	0.004	0.002 U	0.081	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.38	3.5	0.002 U	0.002 U	0.005	0.002 U
OB-37-DO	11/25/2020	44	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U UJ	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	2.8	12	0.04 U	0.04 U	0.04 U	0.04 U
OB-37-DO	05/19/2021	44.45	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4.8	21	0.1 U	0.1 U	0.1 U	0.1 U
OB-37-DO	11/11/2021	46.1	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4.7	21	0.1 U	0.1 U	0.1 U	0.1 U
OB-37-DO	05/12/2022	44.5	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	3.6	18	0.2 U	0.2 U	0.2 U	0.2 U
OB-38-BR	06/01/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.041	0.14	0.002 U	0.002 U	0.048	0.002 U
OB-38-BR	09/10/2021	62.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.004	0.002 U	0.002 U	0.13	0.002 U
OB-38-BR	11/08/2021	62.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.019	0.002 U	0.002 U	0.014	0.002 U
OB-38-BR	02/10/2022	66	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.012	0.049	0.002 U	0.002 U	0.051	0.002 U
OB-38-BR	05/11/2022	60	0.002 U	0.002 U	0.001 U	0.002 U	0.022 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.02	0.07	0.002 U	0.002 U	0.085	0.002 U
OB-38-BR	05/11/2022	72	0.002 U	0.002 U	0.001 U	0.002 U	0.033 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.013	0.076	0.002 U	0.002 U	0.064	0.002 U
OB-38-DO	05/06/2020	43.7	0.002 U	0.002 U	0.001 U	0.002 U	0.04	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.002 U	0.002 U	0.039	0.002 U
OB-38-DO	05/14/2021	44	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.011	0.002 U	0.002 U	0.082 # J	0.002 U
OB-38-DO	11/16/2021	43.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U	0.003	0.064	0.002 U
OB-38-DO (LF)	11/16/2021	43	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U	0.002 U	0.024	0.002 U
OB-38-DO	05/11/2022	43	0.002 U	0.002 U	0.001 U	0.002 U	0.016 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U	0.008	0.024	0.002 U
OB-39-BR	06/01/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002 U	0.002 U
OB-39-BR	09/10/2021	53	0.002 U	0.002	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.006	0.002 U
OB-39-BR	11/08/2021	83.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-39-BR	02/10/2022	75.5	0.002 U	0.002 U	0.001 U	0.002 U	0.013	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-39-BR	05/10/2022	83	0.002 U	0.002 U	0.001 U	0.002 U	0.021 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-39-DO	05/14/2021	53	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.006	0.002 U
OB-41-S	05/06/2020	13.3	0.002 U	0.002 U	0.002	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.048	0.26	0.002 U	0.002 U	0.083	0.002 U
OB-41-S	11/25/2020	13	0.002 U	0.002 U	0.001	0.002 U	0.01 U UJ	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.033	0.16	0.002 U	0.002 U	0.048	0.002 U
OB-41-S	05/14/2021	4.6	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.029	0.002 U	0.002 U	0.019 # J	0.002 U
OB-41-S	11/10/2021	4.9	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.015	0.054	0.002 U	0.002 U	0.019	0.002 U
OB-41-S	05/11/2022	5	0.002 U	0.002 U	0.001	0.002 U	0.011 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.024	0.15	0.002 U	0.002 U	0.051	0.002 U
OB-42-BR	05/11/2022	68	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.3	4.9	0.04 U	0.04 U	1.1	0.04 U
OB-42-BR	05/11/2022	78	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.34	4.2	0.04 U	0.04 U	1.1	0.04 U
OB-42-S	05/04/2020	13.5	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.11	4	0.02 U	0.02 U	1.4	0.02 U
OB-42-S	11/25/2020	13	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.055	1.2	0.02 U	0.02 U	0.26	0.02 U
OB-42-S	05/14/2021	5.8	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.099	3.5	0.02 U	0.02 U	0.57	0.021
OB-42-S	11/10/2021	6.6	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.1	3.4	0.02 U	0.02 U	0.29	0.02 U
OB-42-S	05/11/2022	10.7	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.06	2	0.02 U	0.02 U	0.09	0.02 U
OB-43-S	05/06/2020	16	0.002 U	0.002 U	0.001 U	0.002 U	0.054 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.012	0.039	0.002 U	0.002 U	0.009	0.002 U
OB-43-S	11/25/2020	10	0.002 U	0.002 U	0.001 U	0.002 U	0.01 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.01	0.045	0.002 U	0.002 U	0.011	0.002 U
OB-43-S	05/14/2021	11.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.019	0.002 U	0.002 U	0.005	0.002 U
OB-43-S (LF)	05/20/2021	11.53	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.016	0.05	0.002 U	0.002 U	0.016	0.002 U
OB-43-S	11/15/2021	13.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.015	0.002 U	0.002 U	0.005	0.002 U
OB-43-S (LF)	11/15/2021	13.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.013	0.002 U	0.002 U	0.004	0.002 U
OB-43-S	05/11/2022	12.5	0.002 U	0.002 U	0.001 U	0.002 U	0.037 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.011	0.041	0.002 U	0.002 U	0.009	0.002 U
OB-44-S	02/13/2020	17.3	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	20	0.2 U	0.2 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
OB-44-S	05/05/2020	15.8	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	13	5.6	0.1 U
OB-44-S	08/21/2020	15.5	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	12	11	0.1 U
OB-44-S	09/09/2020	NA	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U	0.2 U	0.2 U	0.4 U	13	19	0.2 U
OB-44-S	11/23/2020	15	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	6.8	22	0.1 U
OB-44-S	01/26/2021	NA	0.001	0.001	0.011	0.001	0.005	0.001	0.001	0.001	0.001	0.001	0.25	0.096	0.001	0.807	8.15	0.013
OB-44-S	02/22/2021	16	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.2	17	0.2 U
OB-44-S	05/13/2021	8.24	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1.2	14	0.2 U
OB-44-S	09/09/2021	7.5	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	3.5	17	0.1 U
OB-44-S	11/10/2021	8.5	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	5	24	0.1 U
OB-44-S (LF)	11/10/2021	11.96	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1.6	14	0.1 U
OB-44-S	02/22/2022	8.2	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.6	28	0.2 U
OB-44-S	05/12/2022	8	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.31	0.2 U	0.2 U	4.4	35	0.2 U
OB-45-BR	06/01/2021	NA	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.74	13	0.2 U	0.2 U	3.4	0.2 U
OB-45-BR	09/10/2021	95	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1.7	60	0.1 U	0.1 U	3.2	0.1 U
OB-45-BR	11/10/2021	96	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	3.9	600	1 U	1 U	6.7	1 U
OB-45-BR (LF)	11/10/2021	95.5	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.27	11	0.1 U	0.1 U	2.5	0.1 U
OB-45-BR	02/10/2022	95	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19	12	0.1 U	0.1 U	0.65	0.1 U
OB-45-BR	05/10/2022	70	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.71	23	0.4 U	0.4 U	0.61	0.4 U
OB-45-BR	05/10/2022	90	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.99	27	0.2 U	0.2 U	0.59	0.2 U
OB-45-DO	05/14/2021	30.9	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-46-S	02/13/2020	12.6	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-47-S	05/05/2020	23.4	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.015	0.009	0.002 U	0.002 U	0.002 U	0.002 U
OB-47-S	05/19/2021	23	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.015	0.01	0.002 U	0.002 U	0.002 U	0.002 U
OB-47-S (LF)	05/19/2021	23	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.017	0.025	0.002 U	0.002 U	0.016	0.002 U
OB-47-S	11/10/2021	16	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.015	0.019	0.002 U	0.002 U	0.003	0.002 U
OB-47-S (LF)	11/10/2021	16	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.021	0.025	0.002 U	0.002 U	0.004	0.002 U
OB-49-S	01/15/2020	14.27	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	9.9	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
OB-49-S	05/05/2020	17	0.002 U	0.002 U	0.001 U	0.002 U	0.025 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.11	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-49-S	08/20/2020	17	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.26	0.1 U	0.1 U	7.1	0.1 U
OB-49-S	11/24/2020	17	0.04 U	0.04 U	0.14	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	9.5	9.2	0.04 U	0.46	53	0.83
OB-49-S	02/22/2021	17	0.002 U	0.002 U	0.001 U	0.002 U	0.033	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.002 U	0.002	0.002 U
OB-49-S	05/13/2021	15.3	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.007	0.19	0.002 U	0.006	0.4	0.002
OB-49-S	09/09/2021	14.9	0.002 U	0.002 U	0.006	0.002 U	0.014	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.11	0.002 U	0.079	3	0.015
OB-49-S	11/09/2021	8.5	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.071	0.02 U	0.02 U	1.7	0.02 U
OB-49-S	02/15/2022	NA	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.18	4.7	0.1 U
OB-50-S	01/15/2020	13.77	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	44	2.2	0.4 U	0.4 U	0.4 U	0.4 U
OB-50-S	05/05/2020	17	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-50-S	08/20/2020	17	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1.8	11	0.1 U	0.1 U	0.1 U	0.1 U
OB-50-S	11/24/2020	NA	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	5.8	4.5	0.1 U	0.1 U	26	0.32
OB-50-S	02/22/2021	17	0.002 U	0.002 U	0.001 U	0.002 U	0.01 D	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-50-S	05/13/2021	15	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	3.6	0.1 U	0.1 U	6.5	0.1 U
OB-50-S	09/09/2021	14.5	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.58	0.1 U	0.1 U	12	0.1 U
OB-50-S	11/09/2021	9.6	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19	0.1 U	0.43	14	0.1 U
OB-50-S	02/15/2022	NA	0.1 U	0.1 U	0.11	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.29	0.1 U	1.4	38	0.14
OB-50-S	05/10/2022	15	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.33	0.55	0.1 U	0.1 U	7.2	0.1 U
OB-51-S	01/15/2020	12.69	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	13	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
OB-51-S	05/05/2020	16	0.02 U	0.02 U	0.01 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	3.1	2.9	0.02 U	0.02 U	0.02 U	0.02 U
OB-51-S	08/20/2020	17	0.037	0.02 U	0.01	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	2.5	48	0.02 U	0.047	2.9	0.34
OB-51-S	11/24/2020	16	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
OB-51-S	02/22/2021	16	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.16	0.04 U	0.35	3.1	0.04 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present
Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
OB-51-S	05/13/2021	13.7	0.02 U	0.02 U	0.031	0.02 U	0.1 U	0.02 U	0.02 U	0.031	0.02 U	0.02 U	0.2	0.94	0.02 U	0.46	4.3	0.027
OB-51-S	09/09/2021	13.5	0.04 U	0.04 U	0.028	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.58	0.04 U	0.53	5.3	0.04 U
OB-51-S	11/09/2021	10.2	0.04 U	0.04 U	0.05	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.11	0.28	0.04 U	2	12	0.045
OB-51-S	02/11/2022	NA	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1	0.21	0.1 U	2.1	8.6	0.1 U
OB-51-S	05/10/2022	14	0.4 U	0.4 U	0.2 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	2.4	21	0.4 U
OB-52-BR	06/01/2021	NA	0.04 U	0.04 U	0.02 U	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.89	3.4	0.04 U	0.6	3.3	0.058
OB-52-BR	09/10/2021	86	0.04 U	0.04 U	0.086	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	5.9	19	0.04 U	5.5	15	0.04 U
OB-52-BR	11/08/2021	84.5	0.02 U	0.02 U	0.014	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.27	1.1	0.02 U	0.55	3.5	0.02 U
OB-52-BR	02/10/2022	84.5	0.04 U	0.04 U	0.041	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	5.3	9.6	0.04 U	1	8.5	0.04 U
OB-52-DO	06/01/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.016	0.12	0.002 U	0.002 U	0.01	0.002 U
OB-52-DO	09/10/2021	48.5	0.002 U	0.002 U	0.001 U	0.002 U	0.012	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-52-DO	11/08/2021	48.5	0.002 U	0.002 U	0.001 U	0.002 U	0.024 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-52-DO	02/10/2022	49	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-52-S	06/01/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.034	0.3	0.002 U	0.002 U	0.028	0.002 U
OB-52-S	09/10/2021	8	0.002 U	0.002 U	0.001 U	0.002 U	0.013 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-52-S	11/08/2021	9.4	0.002 U	0.002 U	0.001 U	0.002 U	0.024	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-52-S	02/10/2022	9.4	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-53-BR	05/10/2022	80	0.01 U	0.01 U	0.005 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.016	0.58	0.01 U	0.01 U	0.049	0.01 U
OB-54-BR	05/10/2022	70	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1.4	53	1 U	1 U	12	1 U
OB-54-BR	05/10/2022	90	1 U	1 U	0.5 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	49	1 U	1 U	10	1 U
OB-55-BR	08/08/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.047	0.002 U	0.002 U	0.031	0.002 U
OB-57-DO	08/09/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.019	0.002 U	0.002 U	0.036	0.002 U	0.003	0.062	0.38	0.002 U	0.002 U	0.002 U	0.002 U
OB-58-DO	08/09/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
OB-59-DO	08/09/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.005	0.002 U	0.002 U	0.017	0.002 U
OB-60-S	08/16/2022	NA	0.4 U	0.4 U	0.4	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	47	20	0.4 U	1	23	0.4 U
P-04R	05/18/2021	3.88	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-04R	08/20/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-04R	11/08/2021	3.3	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-04R	02/10/2022	4	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-05R	05/18/2021	7.74	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-05R	08/20/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-05R	11/08/2021	7.7	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-05R	02/10/2022	8	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-09	05/10/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.005	0.002 U
P-09R	12/09/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-09R	05/19/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-09R	08/20/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-09R	11/11/2021	2.37	0.002 U	0.002 U	0.001 U	0.002 U	0.021 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-11R	05/04/2020	8.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-11R	12/09/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-11R	02/19/2021	9	0.002 U	0.002 U	0.001 U	0.002 U	0.013	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-11R	05/19/2021	9	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-11R	08/20/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-13R	05/18/2021	6.52	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-13R	08/19/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-13R	11/08/2021	5.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-13R	02/10/2022	6.75	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-14R	05/18/2021	6.61	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-14R	08/19/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present
Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
P-14R	11/08/2021	7	0.002 U	0.002 U	0.001 U	0.002 U	0.031 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-14R	02/15/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-19A	05/04/2020	9.4	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U
P-19A	11/25/2020	10	0.002 U	0.002 U	0.001 U	0.002 U	0.015 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.054	0.002 U
P-19A	12/09/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.012	0.002 U
P-19A	02/19/2021	10	0.002 U	0.002 U	0.001 U	0.002 U	0.02	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005 # J	0.002 U
P-19A	05/19/2021	7.7	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.012	0.002 U
P-19A (LF)	05/19/2021	7.7	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.014	0.002 U	0.002 U	0.015	0.002 U
P-19A	08/19/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-19A	11/16/2021	8.2	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U
P-19A (LF)	11/16/2021	8	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U
P-19A	05/10/2022	9.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-20	05/11/2022	5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-20R	04/08/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-20R	08/20/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-20R	11/11/2021	1.2	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-21	05/08/2020	8.5	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U
P-21	11/25/2020	9	0.002 U	0.002 U	0.001 U	0.002 U	0.072 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-21	12/09/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.016	0.002 U
P-21	02/19/2021	9	0.002 U	0.002 U	0.001 U	0.002 U	0.033	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-21	05/19/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-21	08/20/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-21	12/07/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-21	03/07/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-21	05/10/2022	9	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.003	0.002 U
P-21-BR	03/07/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.014	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.14	0.002 U
P-21-BR	05/13/2022	65.2	0.002 U	0.002 U	0.001 U	0.002 U	0.013 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.16	0.002 U
P-21-DO	03/07/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.002	0.002 U
P-21-DO	05/13/2022	15.7	0.002 U	0.002 U	0.001 U	0.002 U	0.014 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.002	0.002 U
P-23	12/09/2020	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-23	05/19/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-23	08/19/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-30	05/18/2021	8.1	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-30	08/20/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-30	11/08/2021	7.25	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-30	02/10/2022	8.3	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-31	05/18/2021	4.06	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-31	08/20/2021	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-31	11/08/2021	4.6	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
P-31	02/15/2022	NA	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
RW-01_MW-18	02/14/2020	40.2	0.2 U	0.2 U	0.1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1.8	1.4	0.2 U	2.3	16	0.22
RW-01_MW-18	05/05/2020	40	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2	0.2	0.1 U	2.7	15	0.13
RW-01_MW-18	08/20/2020	40	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2	1.7	0.1 U	2.5	20	0.24
RW-01_MW-18	11/24/2020	43	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1.4	1.5	0.1 U	2.2	20	0.22
RW-01_MW-18	02/19/2021	35	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.81	0.97	0.1 U	2.9	19	0.25
RW-01_MW-18	05/12/2021	36	0.1 U	0.1 U	0.05 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1.8	1.6	0.1 U	2.6	21	0.25
RW-03	02/14/2020	53.8	0.004	0.01	0.003	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.049	0.002 U	0.091	0.34	0.002 U
RW-03	05/05/2020	54.5	0.002 U	0.005	0.001 U	0.002 U	0.048 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.022	0.1	0.002 U
RW-03	08/20/2020	54.5	0.04 U	0.11	0.05	0.04 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	1.1	6.1	0.04 U
RW-03	11/24/2020	45	0.012	0.07	0.018	0.01 U	0.056	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.042	0.01 U	0.49	1.3	0.01 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	Depth	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DEC mg/L
RW-03	02/19/2021	51	0.004	0.017	0.005	0.002 U	0.06	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.004	0.002 U	0.14	0.4	0.002 U
RW-03	05/12/2021	51	0.002	0.008	0.001	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.045	0.12	0.002 U
RW-22	08/08/2022	NA	0.01 U	0.01 U	0.005 U	0.01 U	0.43	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.045	0.49	0.01 U

Table 3-8
Water Quality Data - VOC Results
2020 to Present
Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Notes:

Analytical results presented in milligrams per liter (mg/l).

Analytical results are reported by the laboratory in micrograms per liter (ug/l). Results are presented without changing the number of significant figures reported by the laboratory.

Bedrock wells BR-1 through BR-8, CL8-BR and CL9-BR each have a multilevel groundwater monitoring system present within the bedrock portion of the well. Zone 1 refers to the deepest sample interval, Zone 2 refers to the middle sampling zone and Zone 3 refers to the sampling zone closest to the ground surface.

1,1,2-Trichloroethane, 1,2-dichloropropane, dichloromethane and dichlorodifluoromethane are compounds which have been detected but are not included on the table.

Sample depths are in feet below grade. A sample depth of NA indicates that the sample was not collected at a discrete depth.

DCA - Dichloroethane
DCE - Dichloroethene
PCE - Tetrachloroethene
TCA - Trichloroethane
TCE - Trichloroethene
VC - Vinyl Chloride
NA = discreet sample depth not applicable.
D - Indicates that the result is reported from a secondary dilute sample.
E - Estimated concentration
H - Sample analyzed past method hold time.
J - Estimated concentration
U - Determined to be non-detect at indicated detection limit, lab qualifier or through expert validation protocol.
= The percent recovery for this compound was above the acceptance criteria in the LCS/D, as a result of carryover from aprevious analysis.
(LF) - duplicate sample collected using modified low flow technique.
--- = constituent not analyzed

Samples AP-36-S, AP-37-S, AP-38-S, AP-39-S and OB-44-S sampled on 09/09/2020 and 1/26/2021 sampled by Roux Associates.

Table 3-9

Water Quality Data

Bioremediation Parameters

2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-13-DO 2/14/2018	AP-13-DO 5/8/2018	AP-13-DO 2/14/2019	AP-13-DO 4/29/2019	AP-13-DO 8/21/2019	AP-13-DO 11/18/2019	AP-13-DO 2/14/2020	AP-13-DO 5/5/2020	AP-13-DO 8/20/2020	AP-13-DO 2/23/2021	AP-13-DO 5/20/2021	AP-13-DO 9/9/2021	AP-13-DO 11/9/2021	AP-13-S 11/24/2020	AP-13-S 5/12/2021
Total Metals																
Iron	mg/L	1,400	590	48	---	---	---	---	---	---	---	---		---	---	---
Manganese	mg/L	110	4.8	12	---	---	---	---	---	---	---	---		---	---	---
Sulfate	mg/L	3,200	1,400J	<5	< 5	---	---	---	---	---	---	---		---	---	---
Nitrate	mg/L	<0.1	<1.0	<5	< 1 UH	---	---	---	---	---	---	---		---	---	---
Nitrate/Nitrogen	mg/L	---	---	---		---	---	---	---	---	---	---		---	---	---
Metabolic Acids																
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---		---		
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---		---		
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---		---		
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---		---		
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---		---		
Miscellaneous Analyses																
Methane	ug/L	<10	<10	200	710 J	340 J	140	76	23	11	< 10	11	11	<10	19	1100
Ethane	ug/L	<20	<20	<20	< 20 UJ	< 20 UJ	< 20	< 20	< 20	< 20	21	20	29	34	< 20	< 20
Ethene	ug/L	61	<20	<20	< 20 UJ	< 20 UJ	< 20	< 20	20	< 20	< 20	24	34	23	< 20	< 20
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	650	26	2,400	2,300 J	1,800	1,500	1,100	520	530	38,000	24,000 J J	36,000 J	26,000J	---	---
Dehalococcoides sp.	cells/ml	3.0J	<0.5	186	704	2,360	644	588	460	502	80,000	249	332	---	---	---
Field Parameters																
pH	--	7.07	2.99	5.89	6.13	6.27	6.71	6.56	6.35	6.98	3.44	4.37	3.45	5.4	6.53	6.8
ORP	mV	-20.4	51.9	-97.7	-53.7	-88.5	-78.9	-122.3	-107	-115.2	156.2	-41.8	-135.4	-13.1	-118.9	-42.3
Dissolved Oxygen	mg/L	3.22	6.95	0.08	0.37	1.35	5.28	1.2	0.38	0.5	0.13	1.1	0.02	0.55	1.12	4.27
Specific Conductivity	ms/cm	3.411	1.468	4.292	4.021	5.625	5.231	5.546	5.795	6.597	2.273	2.989	2.093	4.184	3.871	0.016

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-23-DO 2/14/2018	AP-23-DO 5/8/2018	AP-23-DO 2/14/2019	AP-23-DO 4/29/2019	AP-23-DO 8/21/2019	AP-23-DO 11/18/2019	AP-23-DO 2/14/2020	AP-23-DO 5/5/2020	AP-23-DO 8/20/2020	AP-23-DO 11/24/2020	AP-23-DO 2/23/2021	AP-23-DO 5/20/2021	AP-23-DO 9/9/2021	AP-23-DO 11/9/2021
Total Metals															
Iron	mg/L	1,500	550	320	---	--	--	---	---	---	---	---	---	---	---
Manganese	mg/L	80	5.3	66	---	--	--	---	---	---	---	---	---	---	---
Sulfate	mg/L	970	1,400	12	18	---	---	---	---	---	1.2	---	---	---	---
Nitrate	mg/L	<0.1	<0.1	<5.0	< 1 UH	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids															
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses															
Methane	ug/L	15	12	61 J	250 J	770 J	970 J	1,700	1,200	520	69	160	290	100	110
Ethane	ug/L	<20	<20	<20 UJ	< 20 UJ	< 100 UJ	< 100 UJ	< 100	< 100	< 100	< 20	< 20	< 20	< 20	< 20
Ethene	ug/L	29	<20	<20 UJ	41 J	610 J	1,100 J	3,300	4,100	4,200	790	2,000	9,100	2,200	2,500
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	49	40	16,000 J	9,000 J	4,100 J	2,900 J	2,100	1,500	1,300 J	320 J	570	870	610	500
Dehalococcoides sp.	cells/ml	<10.0	18	5,660	5,700	459,000	402,000	1,080,000	243,000	2,490,000	89,200	442,000	4,010,000	2,600,000	---
Field Parameters															
pH	--	6.93	4.57	6.03	6.53	6.3	7.02	6.63	6.61	7.41	6.49	7.3	6.85	6.84	6.28
ORP	mV	45.2	140.9	-155.1	-145.8	-84.6	-89.1	-124.7	-166.7	-84.9	-99.8	-126	-56.8	-102.7	-89.5
Dissolved Oxygen	mg/L	2.96	2.13	0.08	0.08	1.86	6.36	0.14	0.5	0.42	0.68	3.51	4.17	0.04	0.51
Specific Conductivity	ms/cm	4.418	1.327	21.22	13.38	10.13	8.031	5.269	5.718	5.931	4.792	2.669	5.645	5.658	5.355

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-24-DO 2/14/2018	AP-24-DO 5/8/2018	AP-24-DO 2/14/2019	AP-24-DO 4/29/2019	AP-24-DO 8/21/2019	AP-24-DO 11/18/2019	AP-24-DO 2/14/2020	AP-24-DO 5/5/2020	AP-24-DO 8/20/2020	AP-24-DO 11/24/2020	AP-24-DO 2/23/2021	AP-24-DO 5/20/2021	AP-24-DO 9/10/2021	AP-24-DO 11/9/2021
Total Metals															
Iron	mg/L	3900	710	48	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	120	12	12	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	11000	2100	<50	< 10	---	---	---	---	---	< 2.5	---	---	---	---
Nitrate	mg/L	<1.0	<1.0	<50	< 2 UH	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids															
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses															
Methane	ug/L	<10	<10	34 J	48 J	60 J	42 J	48	42	29 J	29	17 J	27 J	< 10	<10
Ethane	ug/L	<20	<20	<20 UJ	< 20 UJ	< 20 UJ	< 20 UJ	< 20	< 20	< 20 UJ	< 20	< 20 UJ	< 20 UJ	< 20	<20
Ethene	ug/L	<20	<20	<20 UJ	20 J	27 J	24 J	31	28	25 J	42	39 J	67 J	23	26
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	190	47	11,000 J	8,500 J	6,000 J	4,800 J	4,100	3,200 J	3,300 J	2,800 J	2,300	2,200	1,900	1,600
Dehalococcoides sp.	cells/ml	<10.0	0.2J	208	334	272	76	162	164	340	3,680	2,570	3,600	2,370	---
Field Parameters															
pH	--	7.16	4.57	6.12	6.46	6.26	6.52	6.3	6.34	6.78	6.52	6.54	6.54	6.73	8.26
ORP	mV	92.6	144.1	-138.9	-129.5	-94.6	-84.9	-121.3	-172.6	-97.3	-116.5	-121.3	-85.9	-127.1	-125.3
Dissolved Oxygen	mg/L	2.73	1.4	0.09	0.06	1.94	4.94	0.6	0.44	0.4	1.09	0.13	0.2	0.16	0.21
Specific Conductivity	ms/cm	4.286	1.267	13.82	10.93	10.42	8.83	7.123	6.291	6.57	5.535	4.597	5.462	5.359	5.117

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-25-DO 2/15/2018	AP-25-DO 5/9/2018	AP-25-DO 1/30/2019	AP-25-DO 4/29/2019	AP-25-DO 8/5/2019	AP-25-DO 10/29/2019	AP-25-DO 1/30/2020	AP-25-DO 4/21/2020	AP-25-DO 8/6/2020	AP-25-DO 8/6/2020	AP-25-DO 2/4/2021	AP-25-DO 9/10/2021	AP-25-DO 11/8/2021	AP-30R-DO 2/15/2019	AP-30R-DO 8/22/2019
Total Metals																
Iron	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids																
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses																
Methane	ug/L	<10	<10	---	< 10	---	---	---	---	---	---	---	---	---	<10	400 J
Ethane	ug/L	<20	<20	---	< 20	---	---	---	---	---	---	---	---	---	<20	< 20 UJ
Ethene	ug/L	<20	21	---	< 20	---	---	---	---	---	---	---	---	---	<20	20 J
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	1.2	7.4	---	1.7	---	---	---	---	---	---	---	---	---	---	3,700
Dehalococcoides sp.	cells/ml	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3,320
Field Parameters																
pH	--	7.36	6.25	7.81	8.26	7.62	8.1	7.79	7.56	7.88	6.81	7.05	8.2	8.04	---	9.36
ORP	mV	15.2	57	183.5	81.1	-65.4	-8.4	75.8	57.1	-56.2	-81.4	-5.8	-35.5	-38.4	---	131.4
Dissolved Oxygen	mg/L	3.03	5.46	7.2	6.82	2.49	6.73	7.37	4.68	0.74	3.33	4.91	6.33	7.04	---	0.14
Specific Conductivity	ms/cm	4.65	0.157	0.115	0.136	0.13	0.113	0.151	0.178	0.285	0.089	0.093	0.07	0.081	---	7.806

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-30R-DO 11/19/2019	AP-30R-DO 2/13/2020	AP-30R-DO 5/5/2020	AP-30R-DO 8/21/2020	AP-30R-DO 11/24/2020	AP-30R-DO 2/23/2021	AP-30R-DO 9/9/2021	AP-30R-DO 11/9/2021	AP-31-DO 2/15/2019	AP-31-DO 5/2/2019	AP-31-DO 8/27/2019	AP-31-DO 11/19/2019	AP-31-DO 2/13/2020	AP-31-DO 5/5/2020
Total Metals															
Iron	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	---	---	---	3.5	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids															
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses															
Methane	ug/L	99 J	130	150	20	12	11	< 10	< 10	<10	40	< 10	< 10	33	< 10
Ethane	ug/L	< 20 UJ	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 20	< 20	< 20
Ethene	ug/L	< 20 UJ	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 20	< 20	< 20
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	3,500 J	2,800	2,100	1,300 J	780 J	460	130 J	58	---	---	4.5	2.5	4.9	11
Dehalococcoides sp.	cells/ml	2,340	889	478	2,600	2,720	1,100	1,450	---	---	654	328	160	188	3,200
Field Parameters			---											---	
pH	--	9.84	9.05	8.12	7.8	7.14	6.78	6.09	6.13	---	8.26	6.69	7.07	6.7	6.89
ORP	mV	-78.9	2.6	-83.9	98.6	-27.8	-33.7	-58.2	63.1	---	81.1	105.4	19.7	15.3	60.2
Dissolved Oxygen	mg/L	0.71	0.43	0.65	0.97	0.68	-0.03	1.18	0.55	---	6.82	3.11	4.18	1.01	1.79
Specific Conductivity	ms/cm	9.5	6.881	6.836	6.073	5.383	5.288	4.455	4.159	---	0.136	1.269	1.038	1.697	2.182

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-31-DO 8/21/2020	AP-31-DO 2/23/2021	AP-31-DO 9/9/2021	AP-31-DO 11/9/2021	AP-32-DO 11/8/2018	AP-32-DO 11/27/2018	AP-32-DO 2/14/2019	AP-32-DO 5/2/2019	AP-32-DO 8/27/2019	AP-32-DO 11/19/2019	AP-32-DO 2/13/2020	AP-32-DO 5/5/2020	AP-32-DO 8/21/2020	AP-32-DO 2/23/2021
Total Metals															
Iron	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids															
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses															
Methane	ug/L	< 10	< 10	< 10	<10	---	---	120	86	30	< 10	45	< 10	< 10	< 10
Ethane	ug/L	< 20	< 20	27	<20	---	---	<20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Ethene	ug/L	< 20	< 20	< 20	<20	---	---	<20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	4.2 J	130,000	85,000	97,000	---	---	---	---	8.8	5	6.6	8.5	4.2 J	110,000
Dehalococcoides sp.	cells/ml	23.1	15,900	938	---	---	---	2,140	5,200	127,000	23,400	47,000	509,000	8,380	11,500
Field Parameters															
pH	--	7.37	4.61	4.92	16.9	6.42	6.92	---	---	6.89	7.19	6.79	7.3	7.49	5
ORP	mV	53.4	45.9	-68.4	-131.2	-34.3	228.2	---	---	-38.8	26.4	-23.8	57.9	40.9	30
Dissolved Oxygen	mg/L	1.29	-0.11	1.95	0.19	6.76	0.89	---	---	0.65	1.88	0.66	1.54	0.75	0.1
Specific Conductivity	ms/cm	2.105	2.984	3.036	2.325	9.859	3.089	---	---	0.949	0.9	0.801	0.916	0.875	4

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-32-DO 9/92021	AP-32-DO 11/10/2021	AP-33-DO 2/14/2018	AP-33-DO 5/8/2018	AP-33-DO 2/14/2019	AP-33-DO 4/29/2019	AP-33-DO 8/21/2019	AP-33-DO 11/18/2019	AP-33-DO 2/14/2020	AP-33-DO 5/5/2020	AP-33-DO 8/20/2020	AP-33-DO 11/23/2020	AP-33-DO 2/23/2021	AP-33-DO 5/13/2021	AP-33-DO 9/92021
Total Metals																
Iron	mg/L	---	---	3200	480	200	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	45	3.2	14	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	---	11000	1600	<50	< 10	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	---	---	<1.0	<1.0	<50	< 2 UH	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids																
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses																
Methane	ug/L	< 10	< 10	220	30	84 J	580 J	110 J	1,600 J	1,000	1,200	760 J	480	140	690	1,500 J
Ethane	ug/L	< 20	< 20	<20	<20	<20 UJ	< 20 UJ	< 20 UJ	< 100 UJ	< 100	< 100	< 100 UJ	< 20	< 20	< 20	< 20 UJ
Ethene	ug/L	< 20	< 20	270	44	75 J	240 J	38 J	290 J	160	930	1,900 J	1,200	160	930	3,400 J
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	47,000	20,000	140	52	4,300 J	5000 J	120	2,700 J	630	2,400	2,500 J	380 J	20	450	930
Dehalococcoides sp.	cells/ml	1,900	1,450	<10.0	<0.8	3,770	15,500	851	578	176	7.6	16.6	4.4	810	3,480	78,300
Field Parameters																
pH	--	5	5	8.18	3.27	6	6.69	6.33	6.54	6.32	6.25	6.56	6.43	7.01	6.46	6.89
ORP	mV	-34	-30	25.7	159.6	-107.4	-110.8	-119.3	-50.3	-118.5	-120.5	-103.6	-126	-164.8	-71	-118.4
Dissolved Oxygen	mg/L	2	0.2	2.66	1.87	0.09	0.79	2.66	2.46	1.19	0.53	0.34	1.73	0.69	0.23	0.76
Specific Conductivity	ms/cm	4	3	8.755	0.983	6.48	7.74	10.25	7.697	5.072	6.946	7.466	2.668	0.512	2.057	5.49

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-33-DO 11/9/2021	AP-34-DO 2/14/2018	AP-34-DO 5/8/2018	AP-34-DO 2/14/2019	AP-34-DO 4/29/2019	AP-34-DO 8/21/2019	AP-34-DO 11/18/2019	AP-34-DO 2/14/2020	AP-34-DO 5/5/2020	AP-34-DO 8/20/2020	AP-34-DO 11/24/2020	AP-34-DO 2/23/2021	AP-34-DO 5/13/2021	AP-34-DO 9/9/2021	AP-34-DO 11/9/2021
Total Metals																
Iron	mg/L	---	110	730	180	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	8.2	7.9	22	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	120	1500	<25	< 5	---	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	---	<0.1	<0.1	<5	< 1 UH	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids																
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses																
Methane	ug/L	800 J	12	460	1,900 J	3,000 J	4,100 J	2,900 J	2,800	2,400	3,000	2,700	3600 J	2,400	2400 J	3400 J
Ethane	ug/L	<20 UJ	<20	<20	<100 UJ	< 100 UJ	< 100 UJ	< 100 UJ	< 100	< 100	< 100	< 20	110 J	< 20	110 J	110 J
Ethene	ug/L	2200 J	<20	45	<100 UJ	150 J	< 100 UJ	< 100 UJ	< 100	< 100	230	< 20	100 J	230	270 J	360 J
Chloride	mg/L	---	---	---	---		---	---	---	---	---	---	---	---	---	---
TOC	mg/L	730	29	110	9,800 J	3,600 J	910 J	440 J	450	440 J	420 J	270 J	240	220	270 J	260
Dehalococcoides sp.	cells/ml	---	<10.0	2.2	90,400	2,640,000	3,380,000	262,000	210,000	90,000	101,000	47,000	48,000	20,200	93,200	---
Field Parameters																
pH	--	6.48	6.95	4.6	6.46	7.03	6.6	7.22	7.06	6.76	6.69	6.97	7.04	6.84	7.34	6.58
ORP	mV	-118	-95.1	138.1	-147.5	-186.2	-123.4	-159.4	-184.1	-120.7	-115.7	-136	-162	-73.9	-157.1	-151.8
Dissolved Oxygen	mg/L	0.68	3.08	1.22	0.15	0.1	1.19	4.34	1.29	0.54	0.41	1.42	0.0	1	0.14	0.38
Specific Conductivity	ms/cm	5.262	4.007	1.078	16.14	9.525	13.38	5.488	5.076	10.02	13.365	8.974	3	9	4	5

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-35-DO 2/14/2018	AP-35-DO 5/8/2018	AP-35-DO 2/14/2019	AP-35-DO 4/29/2019	AP-35-DO 8/21/2019	AP-35-DO 11/18/2019	AP-35-DO 2/14/2020	AP-35-DO 5/5/2020	AP-35-DO 8/20/2020	AP-35-DO 11/24/2020	AP-35-DO 2/23/2021	AP-35-DO 5/13/2021	AP-35-DO 9/9/2021	AP-35-DO 11/9/2021	AP-40-S 5/9/2019
Total Metals																
Iron	mg/L	17	6.4	270	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	0.69	0.17	36	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	72	13	<5	< 5	---	---	---	---	---	---	---	---	---	---	140
Nitrate	mg/L	<0.1	1.2	<5	< 1 UH	---	---	---	---	---	---	---	---	---	---	0.4
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids																
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses																
Methane	ug/L	82	81	1,900 J	970	2,600 J	2,900 J	3,800	3,000	3,300 J	2,600	2800 J	2,400	4,300	4700 J	< 10
Ethane	ug/L	<20	<20	<100 UJ	< 100	< 100 UJ	< 100 UJ	< 100	< 100	< 100 UJ	110	150 J	130	290	320 J	< 20
Ethene	ug/L	<20	<20	190 J	< 100	< 100 UJ	280 J	530	190	440 J	130	190 J	210	550	590 J	< 20
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	10	5.8	5,900 J	310 J	3,800 J	1,400 J	1,100	720 J	750 J J	470 J	470 J	480 J	110	100	28
Dehalococcoides sp.	cells/ml	3.8J	1	115,000	5,760	2,320,000	4,510,000	8,940,000	8,650,000	3,860,000	12,000,000	4,110,000	1,220,000	1,780,000	---	---
Field Parameters																
pH	--	7.12	5.76	5.83	6.53	6.26	7.12	7.26	7.22	7.43	6.99	7.25	7.15	7.49	6.67	11.73
ORP	mV	-125.3	48.8	-16.5	-136.1	-116.3	-148.8	-284.1	-196.8	-175.2	-136.3	-181.2	-88.6	-177.7	-141.8	-93.4
Dissolved Oxygen	mg/L	2.56	1.87	0.5	0.05	2.27	6.13	0.29	0.44	0.17	0.89	0.01	0.33	0.05	0.39	3.34
Specific Conductivity	ms/cm	3.124	0.251	1.838	11.15	13.07	9.747	8.07	7.519	8.131	6.002	5.46	6.661	6.549	3.932	1.791

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-40-S 8/22/2019	AP-40-S 11/18/2019	AP-40-S 2/13/2020	AP-40-S 5/5/2020	AP-40-S 8/20/2020	AP-40-S 11/24/2020	AP-40-S 2/22/2021	AP-40-S 9/10/2021	AP-40-S 11/10/2021	AP-41-S 5/9/2019	AP-41-S 8/22/2019	AP-41-S 11/18/2019	AP-41-S 2/13/2020	AP-41-S 5/5/2020
Total Metals															
Iron	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	---	---	---	---	6.9	---	---	---	200	---	---	---	---
Nitrate	mg/L	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids															
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses															
Methane	ug/L	< 10	< 10	< 10	31 J	740 J	5,500	3,800	---	4,500	< 10	< 10	< 10	7,200	8,600
Ethane	ug/L	< 20	< 20	< 20	< 20 UJ	< 20 UJ	< 20	< 20	---	<20	< 20	< 20	< 20	< 200	< 200
Ethene	ug/L	< 20	< 20	< 20	< 20 UJ	< 20 UJ	< 20	< 20	---	<20	< 20	< 20	< 20	< 200	< 200
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	5.8	150	310	310 J J	590 J	56 J	8	---	9.3	150	6.9	130 J	190	39
Dehalococcoides sp.	cells/ml	126	2.8	8.8	1.8	141	194,000	10,300	---	1,200	---	64.2	79.6	14	1.5
Field Parameters															
pH	--	10.68	5.5	5.88	7.4	7.06	6.99	6.84	6.44	6.9	11.81	11.88	7.31	6.7	6.84
ORP	mV	159.3	42.4	-17.3	-132.6	-101	-135.7	-110.7	-130.4	-57.9	-44.5	-17.5	-78	-66.4	-74.9
Dissolved Oxygen	mg/L	4.51	1.58	0.22	1.06	0.69	0.37	0.09	3.42	0.07	5.68	0.69	0.81	0.25	0.88
Specific Conductivity	ms/cm	0.319	28.65	0.589	14.73	3.43	0.76	0.242	0.081	0.2412	3.199	1.789	7.458	1.236	0.944

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-41-S 11/24/2020	AP-41-S 2/22/2021	AP-41-S 9/10/2021	AP-41-S 11/10/2021	AP-42-DO 11/24/2020	AP-42-DO 2/22/2021	AP-42-DO 9/10/2021	AP-42-DO 11/10/2021	AP-43-DO 2/22/2021	AP-43-DO 9/9/2021	AP-43-DO 11/10/2021	OB-11-BR 8/8/2022	OB-11-DO 8/8/2022	OB-11-S 8/8/2022
Total Metals															
Iron	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	---	---	---	65	---	---	---	---	---	---	14	23	14
Nitrate	mg/L	---	---	---	---	---	---	---	---	---	---	---	< 0.1 UD	0.2 D	0.8 D
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids															
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses															
Methane	ug/L	6,300	6,900	---	2,800	< 10	< 10	---	<10	< 10	< 10	< 10	30	< 10	< 10
Ethane	ug/L	< 20	< 20	---	<20	< 20	< 20	---	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Ethene	ug/L	< 20	< 20	---	<20	< 20	< 20	---	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	14 D	25 D	18 D
TOC	mg/L	16 J	10	---	5.2	12 J	7.7	---	8.3	51	130	160			
Dehalococcoides sp.	cells/ml	12,400	1,790	---	8,740	0.8	< 0.6	---	1.7	77	71.6	31,900	203	< 0.5	< 0.5
Field Parameters															
pH	--	7.2	7.62	6.36	6.48	13.44	13.11	11.5	9.87	6.17	5.59	5.64	7.23	6.94	6.24
ORP	mV	-135.6	-130.9	-114.2	-67	-122.4	-101.7	-17.8	68.6	-86	-95.8	-18.4	-123.6	150.2	199.1
Dissolved Oxygen	mg/L	0.39	0.11	0.63	1.27	0.59	3.76	1.03	0.12	0.04	1.14	0.55	1.97	1.61	3.31
Specific Conductivity	ms/cm	0.595	1.01	0.296	0.1774	7.584	2.31	0.901	0.645	2.47	0.948	1.362	0.2	0.205	0.144

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	OB-12-BR 8/8/2022	OB-12-DO 8/8/2022	OB-12-S 8/8/2022	OB-14-DO 8/8/2022	OB-25-DO 11/11/2021	OB-32-DO 2/14/2019	OB-32-DO 4/29/2019	OB-49-S 5/5/2020	OB-49-S 8/6/2020	OB-49-S 8/20/2020	OB-49-S 11/24/2020	OB-49-S 2/22/2021	OB-49-S 5/13/2021	OB-49-S 9/9/2021
Total Metals															
Iron	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	8.1	33	18	22	---	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	< 0.1 UD	< 0.1 UD	1.7 D	< 0.1 UD	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids															
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses															
Methane	ug/L	59	< 10	< 10	68	<10	<10	< 10	< 10	---	26	3600	120	270	740
Ethane	ug/L	< 20	< 20	< 20	< 20	<20	<20	< 20	< 20	---	< 20	< 20	< 20	< 20	< 20
Ethene	ug/L	< 20	< 20	< 20	< 20	<20	<20	< 20	< 20	---	< 20	480	< 20	31	96
Chloride	mg/L	25 D	45 D	130 D	55 D	---	---	---	---	---	---	---	---	---	---
TOC	mg/L					---	---	---	460	---	120 J	590 J	190	200	100
Dehalococcoides sp.	cells/ml	< 0.5	< 0.5	< 0.5	14	---	1.00	0.450 J	2,700	---	23.8	424	18.5	2940	21,200
Field Parameters															
pH	--	9.05	7.59	7.36	7.97	---	9.41	8.45	6.95	7.58	6.61	6.15	6.23	6.35	7.11
ORP	mV	92	160.2	156.9	-2	---	433.2	425.3	-107.3	-108.6	-98.1	-74.9	-73.9	-39.6	-74.2
Dissolved Oxygen	mg/L	0.35	2.17	1.84	0.48	---	2.16	3.08	0.34	2.5	0.31	0.28	0	3.31	1.13
Specific Conductivity	ms/cm	0.203	0.377	0.527	0.404	---	0.498	0.432	2.419	2.108	0.561	0.53	0.536	0.222	0.288

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	OB-49-S 11/9/2021	OB-50-S 5/5/2020	OB-50-S 8/6/2020	OB-50-S 8/20/2020	OB-50-S 11/24/2020	OB-50-S 2/22/2021	OB-50-S 5/13/2021	OB-50-S 9/9/2021	OB-50-S 11/9/2021	OB-51-S 5/5/2020	OB-51-S 8/20/2020	OB-51-S 11/24/2020	OB-51-S 2/22/2021	OB-51-S 5/13/2021	OB-51-S 9/9/2021
Total Metals																
Iron	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	---	---	---	---	---	---	---	---	---	---	< 0.5	---	---	---
Nitrate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids																
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses																
Methane	ug/L	1100	43	---	21	140	86	360	1,700	2,000	390	4,000	1,300	1,200	3,400	1,900
Ethane	ug/L	<20	< 20	---	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 100	< 20	< 20	< 20	< 20
Ethene	ug/L	120	< 20	---	< 20	< 20	< 20	29	150	250	< 20	< 100	< 20	200	840	300
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	120	210	---	540	750 J	150	130	93	110	500	340 J	270 J	160	180	86
Dehalococcoides sp.	cells/ml	---	3,480	---	24.7	5.6	6	672	2,550	---	316	734	918	50,400	1,340	53,600
Field Parameters																
pH	--	6.31	5.82	6.82	6.42	6.05	5.87	5.7	6.56	6.21	5.95	7.28	5.91	6.34	6.02	6.9
ORP	mV	-50.6	29.8	-84.1	-88.7	-29.1	-33.8	14.3	-69.8	-41.6	-21.2	-71.8	-57.9	-71.8	-18.1	-122.5
Dissolved Oxygen	mg/L	0.46	0.62	0.75	0.51	1.93	0	0.48	0.86	0.57	0.63	0.8	0.35	0.31	0.79	0.34
Specific Conductivity	ms/cm	0.7	0.615	3.323	1.967	1.701	1.062	0.406	0.707	0.721	0.965	1.637	1.35	0.829	0.384	1.11

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	OB-51-S 11/9/2021	OB-52-BR 11/8/2021	OB-52-DO 11/8/2021	OB-55-BR 8/8/2022	OB-57-DO 8/9/2022	OB-58-DO 8/9/2022	OB-59-DO 8/9/2022	RW-01_MW-18 2/15/2018	RW-01_MW-18 5/9/2018
Total Metals										
Iron	mg/L	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	---	---	14	42	24	20	---	---
Nitrate	mg/L	---	---	---	< 0.1 UD	0.2	< 0.1	< 0.1	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---
Metabolic Acids										
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses										
Methane	ug/L	2,000	<10	<10	< 10	28	28	170	4,000	5,500
Ethane	ug/L	<20	<10	<20	< 20	< 20	< 20	< 20	160	<200
Ethene	ug/L	480	38	<20	< 20	< 20	< 20	< 20	320	450
Chloride	mg/L	---	---	---	14 D	50	17	28	---	---
TOC	mg/L	110	---	---	---	---	---	---	12.0	6.2
Dehalococcoides sp.	cells/ml	---	---	---	< 0.5	< 0.7	< 0.6	32.7	---	---
Field Parameters										
pH	--	6.04	---	---	7.72	11.59	8.21	8.02	8.81	6.16
ORP	mV	-56.9	---	---	-25.1	34.6	-30.6	217.1	-135.6	43.1
Dissolved Oxygen	mg/L	0.43	---	---	2.02	7.61	0.62	2.96	0.18	1.52
Specific Conductivity	ms/cm	0.513	---	---	0.262	4.351	0.313	0.388	4.529	0.465

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	RW-01_MW-18 2/14/2019	RW-01_MW-18 4/29/2019	RW-01_MW-18 8/5/2019	RW-01_MW-18 1/30/2020	RW-01_MW-18 4/21/2020	RW-01_MW-18 8/6/2020	RW-01_MW-18 11/10/2020	RW-01_MW-18 2/4/2021	RW-01_MW-18 4/27/2021	RW-03 2/15/2018	RW-03 5/9/2018	RW-03 11/16/2018
Total Metals													
Iron	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Metabolic Acids													
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses													
Methane	ug/L	3,900	5600	---	---	---	---	---	---	---	<10	390	3,200
Ethane	ug/L	<200	< 200	---	---	---	---	---	---	---	<20	<20	<20
Ethene	ug/L	230	< 200	---	---	---	---	---	---	---	<20	65	200
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	4.4	2.1	---	---	---	---	---	---	---	---	---	---
Dehalococcoides sp.	cells/ml	---	---	---	---	---	---	---	---	---	---	---	---
Field Parameters													
pH	--	6.24	5.77	7.01	7.44	9.22	9.14	8.73	6.2	5.69	7.98	6.12	7.06
ORP	mV	56	-22.8	-92.7	-177.9	-185	-29.15	-39.2	-88.1	53.1	-200.1	103.7	-132.8
Dissolved Oxygen	mg/L	0.85	0	0.5	1.19	0.61	0.22	0.48	0	0.35	1.17	3.08	0.62
Specific Conductivity	ms/cm	0.304	0.238	2.37	2.153	3.309	3.852	2.222	0.121	0.185	0.784	0.767	1.68

Table 3-9
Water Quality Data
Bioremediation Parameters
2018 to Present Building 3 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	RW-03 2/14/2019	RW-03 8/5/2019	RW-03 10/29/2019	RW-03 1/30/2020	RW-03 4/21/2020	RW-03 8/6/2020	RW-03 11/10/2020	RW-03 2/4/2021	RW-03 4/27/2021	RW-22 8/8/2022
Total Metals											
Iron	mg/L	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	---	---	---	---	---	---	---	---	38
Nitrate	mg/L	---	---	---	---	---	---	---	---	---	< 0.1 UD
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---
Metabolic Acids											
Acetic acid	mg/L	---	---	---	---	---	---	---	---	---	---
Lactic Acid	mg/L	---	---	---	---	---	---	---	---	---	---
n-Butanoic acid	mg/L	---	---	---	---	---	---	---	---	---	---
Propionic acid	mg/L	---	---	---	---	---	---	---	---	---	---
Pyruvic Acid	mg/L	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses											
Methane	ug/L	760	---	---	---	---	---	---	---	---	43
Ethane	ug/L	<20	---	---	---	---	---	---	---	---	< 20
Ethene	ug/L	<20	---	---	---	---	---	---	---	---	< 20
Chloride	mg/L	---	---	---	---	---	---	---	---	---	21 D
TOC	mg/L	---	---	---	---	---	---	---	---	---	
Dehalococcoides sp.	cells/ml	---	---	---	---	---	---	---	---	---	< 0.5
Field Parameters											
pH	--	7.35	7.12	8.04	7.28	7.42	7.32	6.92	7.75	7.19	11.36
ORP	mV	163.4	-105	-22.2	52.7	-52.6	-124.2	-118.1	33	82.2	-83.7
Dissolved Oxygen	mg/L	0.32	0.48	2.75	2.94	0.34	0.34	0.23	2.13	0.88	0.24
Specific Conductivity	ms/cm	0.453	1.277	0.541	0.438	0.233	0.845	0.658	0.359	0.417	1.046

Notes:
< = Less than detection limit
--- = Not analyzed
mg/L = Milligrams per liter
ug/L = Micrograms per liter
mV = Millivolt
ms/cm = Millisiemen per centimeter
TOC = total organic carbon
cells/ml = cells per milliliter
Field parameter results reported are from the closest date to the analytical sampling
* = Sample BW-03 collected on 1/28/2010 but was broken in transit, not analyzed.
D = Result reported is from a diluted sample
J - Estimated concentration
U = Non-detect at indicated detection limit due to validation protocol.

Table 3-10
Water Quality Data
Bioremediation Parameters
2018 to Present Building 5 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-36-S 8/14/2018	AP-36-S 11/15/2018	AP-36-S 2/14/2019	AP-36-S 4/29/2019	AP-36-S 8/21/2019	AP-36-S 11/18/2019	AP-36-S 2/13/2020	AP-36-S 5/5/2020	AP-36-S 8/21/2020	AP-36-S 11/23/2020	AP-36-S 2/22/2021	AP-36-S 5/13/2021	AP-36-S 9/10/2021	AP-36-S 11/9/2021	AP-36-S 5/12/2022
Dissolved Metals																
Iron	mg/L	<0.05	48	86	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	0.55	26	28	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	30	<5.0	<5.0	< 5	---	---	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	<0.1	<1.0	<1.0	< 1	---	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses																
Methane	ug/L	15	12J	2,300 J	2,800 J	4,400 J	2,500	4,300	1,400 J	2,700 J	3,400	3,200	1500 J	1,600	1,700	1,300
Ethane	ug/L	<20	<20	<100 UJ	< 100 UJ	< 100 UJ	< 100	< 100	< 100 UJ	< 100 UJ	< 20	< 20	< 20 UJ	< 20	<20	< 20
Ethene	ug/L	<20	<20	130 J	< 100 UJ	< 100 UJ	< 100	< 100	< 100 UJ	< 100 UJ	< 20	< 20	< 20 UJ	< 20	<20	100
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	6.5	4,300	3,200 J	1,300	180 J	150	150	1,500 J	220 J	170 J	100	91	110 J	64	---
Dehalococcoides sp.	cells/ml	0.5J	4,920	1,720	4,160,000	530,000	22,800	21,800	75	4.4	14,600	3,100	9,360	1,840	---	---
Field Parameters																
pH	--	7.34	5.99	6.22	7.36	7.22	7.81	7.03	6.8	7.44	7.3	7.0	7.1	7.2	7.2	---
ORP	mV	40.6	-108.8	-45.9	-151.9	-84.3	-59.3	-125.2	-110.5	-168.8	-141.4	-104.0	-126.4	-123.0	-143.7	---
Dissolved Oxygen	mg/L	6.52	0.42	1.48	0.02	0.79	3.99	0.73	0.77	0.35	0.61	0.39	0.15	0.91	0.73	---
Specific Conductivity	ms/cm	0.437	8.117	6.077	5.075	4.01	3.389	2.551	6.753	5.148	3.44	2.765	2.039	2.538	2.151	---

Table 3-10

Water Quality Data

Bioremediation Parameters

2018 to Present Building 5 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-37-S 8/14/2018	AP-37-S 11/15/2018	AP-37-S 2/14/2019	AP-37-S 4/29/2019	AP-37-S 8/21/2019	AP-37-S 11/18/2019	AP-37-S 2/13/2020	AP-37-S 5/5/2020	AP-37-S 8/21/2020	AP-37-S 11/23/2020	AP-37-S 2/2/2021	AP-37-S 5/13/2021	AP-37-S 9/10/2021	AP-37-S 11/9/2021	AP-37-S 5/12/2022
Dissolved Metals																
Iron	mg/L	<0.05	49	95	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	0.44	13	24	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	29	<5.0	<5.0	< 5	---	---	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	<0.1	<1.0	<1.0	< 1	---	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses																
Methane	ug/L	22	<10	2,500 J	3,500	3,000 J	2,400	3,000	3,400	3,400	1,600	1,300	1,800	1,800	1,900	3,100
Ethane	ug/L	<20	<20	<100 UJ	< 100	240 J	470	740	810	870	390	360	420	460	520	910
Ethene	ug/L	31	<20	140 J	260	< 100 UJ	< 100	< 100	510	750	520	620	980	1,200	1,400	2,200
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	6.3	4,800	2,300 J	1,000	140 J	110	91	82	73 J J	58 J	42	43	42	47	---
Dehalococcoides sp.	cells/ml	0.7	4,520	59,200	450,000	2,170,000	500,000	403,000	194,000	69,000	984,000	295,000	160,000	93,400	---	---
Field Parameters																
pH	--	7.2	6.08	6.16	7.4	7.6	8.07	6.99	7.26	7.34	6.97	7.14	7.01	7.23	7.11	---
ORP	mV	47.6	-122.3	-41	-110.6	-31.6	-42.1	-125.6	-136.3	-148.5	-125.2	-80.8	-102.9	-113.5	-126.9	---
Dissolved Oxygen	mg/L	6.14	0.34	2.84	0.72	1.83	4.36	1.01	0.81	0.41	0.48	1.06	0.34	0.6	1.05	---
Specific Conductivity	ms/cm	0.564	7.703	7.171	4.889	4.44	4.336	3.072	3.398	3.492	2.158	2.156	1.88	2.333	2.22	---

Table 3-10
Water Quality Data
Bioremediation Parameters
2018 to Present Building 5 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-38-S 8/14/2018	AP-38-S 11/15/2018	AP-38-S 2/14/2019	AP-38-S 4/29/2019	AP-38-S 8/21/2019	AP-38-S 11/18/2019	AP-38-S 2/13/2020	AP-38-S 5/5/2020	AP-38-S 8/21/2020	AP-38-S 11/24/2020	AP-38-S 2/22/2021	AP-38-S 5/20/2021	AP-38-S 9/10/2021	AP-38-S 11/9/2021	AP-38-S 5/12/2022
Dissolved Metals																
Iron	mg/L	<0.05	41	80	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	0.29	21	28	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	39	<5.0	<5.0	< 5	---	---	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	<0.1	<1.0	<1.0	< 1	---	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses																
Methane	ug/L	11	35J	1,600 J	3,800	3,600 J	2,500	4,700	3,300	4,300	4,000	2,500	3,400	3700 J	2,100	1,600
Ethane	ug/L	<20	<20	<100 UJ	< 100	150 J	380	900	210	< 100	< 20	130	< 20	< 20 J	<20	< 20
Ethene	ug/L	<20	<20	120 J	740	< 100 UJ	< 100	< 100	300	< 100	< 20	160	< 20	< 20 J	<20	< 20
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	13	4,300	3,300 J	1,600	160 J	110	150	2,500	770 J	290 J	170	160	150	130	---
Dehalococcoides sp.	cells/ml	1.6	1,260	112,000	1,620,000	1,280,000	38,200	22,000	2,260	1,480	10,000	8,540	10,000	1,930	---	---
Field Parameters																
pH	--	7.51	6.12	6.24	6.79	7.14	7.71	7.04	6.24	7.09	7.06	6.64	6.79	7.58	6.89	---
ORP	mV	44.5	-142.3	-51.3	-90.3	-98.4	-86.3	-128.6	-63	-127.7	-123.5	-43.6	-100.7	-136.9	-121.8	---
Dissolved Oxygen	mg/L	6.05	0.46	1.66	0.07	0.86	4.16	0.5	0.68	0.43	2.72	0	0.17	0.73	0.5	---
Specific Conductivity	ms/cm	0.499	8.122	6.179	5.469	4.829	3.718	2.714	3.521	2.874	2.239	2.289	2.005	2.377	2.553	---

Table 3-10
Water Quality Data
Bioremediation Parameters
2018 to Present Building 5 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	AP-39-S 8/14/2018	AP-39-S 11/15/2018	AP-39-S 2/14/2019	AP-39-S 4/29/2019	AP-39-S 8/21/2019	AP-39-S 11/18/2019	AP-39-S 2/13/2020	AP-39-S 5/5/2020	AP-39-S 8/21/2020	AP-39-S 11/23/2020	AP-39-S 2/22/2021	AP-39-S 5/13/2021	AP-39-S 9/10/2021	AP-39-S 11/9/2021	AP-39-S 5/12/2022
Dissolved Metals																
Iron	mg/L	0.21	130	52	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	0.29	14	5.9	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	52	<5.0	<5.0	< 5	---	---	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	<0.1	<1.0	<1.0	< 1	---	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses																
Methane	ug/L	<10	<10	3,100 J	2,500	2,900 J	1,800	4,100	2,500	3,900	1,100	1,400	1,100	1,100	550	220
Ethane	ug/L	<20	<20	<20 UJ	< 100	200 J	280	1,100	490	880	240	330	280	330	170	47
Ethene	ug/L	<20	21J	180 J	< 100	< 100 UJ	< 100	< 100	< 100	< 100	< 20	< 20	< 20	< 20	<20	26
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	7.8	4,700	1,700 J	260 J	220 J	190	190	110	110 J J	98 J	61	45	44	38	---
Dehalococcoides sp.	cells/ml	1.6	246	4,940,000	744,000	628,000	18,400	27,500	510	6,920	20,900	2,100	1,560	5,130	---	---
Field Parameters																
pH	--	7.43	6.25	7.1	7.5	7.07	7.8	7.05	7.32	7.5	7.23	7.23	7.64	8.13	7.66	---
ORP	mV	-52.6	-117.7	-160.9	-158.8	-23.8	-38.7	-149.6	-139.1	-149.2	-137.1	-137.1	-86	-138.9	-136.5	---
Dissolved Oxygen	mg/L	5.93	0.48	2.07	0.08	1.03	5.15	1.05	0.83	0.5	1.04	1.04	0.56	0.39	0.79	---
Specific Conductivity	ms/cm	0.537	9.005	6.965	5.404	4.866	4.344	3.391	2.734	3.151	2.132	2.132	1.514	1.86	1.932	---

Table 3-10
Water Quality Data
Bioremediation Parameters
2018 to Present Building 5 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	OB-35-DO 2/27/2018	OB-35-DO 8/15/2018	OB-35-DO 11/15/2018	OB-35-DO 2/14/2019	OB-35-DO 4/29/2019	OB-35-DO 8/21/2019	OB-35-DO 11/18/2019	OB-35-DO 2/13/2020	OB-35-DO 5/5/2020	OB-35-DO 8/21/2020	OB-35-DO 11/23/2020	OB-35-DO 2/22/2021	OB-35-DO 5/13/2021	OB-35-DO 9/9/2021	OB-35-DO 11/9/2021
Dissolved Metals																
Iron	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses																
Methane	ug/L	160	180	81	210 DJ	270	370	230	260	300	29	120	210	230	390	310
Ethane	ug/L	<20	<20	<20	<100 UJ	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20
Ethene	ug/L	<20	<20	<20	180	< 20	24	< 20	23	34	< 20	< 20	< 20	< 20	28	37
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	---	---	---	3,300	---	---	---	---	---	---	7.4 J	2.4	12	7.1	6
Dehalococcoides sp.	cells/ml	---	---	---	---	---	---	---	---	---	---	250	912	22.6	145	---
Field Parameters																
pH	--	---	8.18	---	8.02	8.23	8.38	7.31	7.54	7.51	7.64	8.43	7.4	7.56	---	7.88
ORP	mV	---	26.1	---	-28.7	-129	-41.7	-77.2	-118.5	-40.3	-120.4	-47.1	-44.3	-38.4	---	-53.5
Dissolved Oxygen	mg/L	---	5.85	---	2.45	0.03	0.82	5.23	0.28	1.33	0.29	3.27	9.05	1.69	---	1.11
Specific Conductivity	ms/cm	---	0.76	---	0.717	0.702	0.711	0.656	0.783	0.461	2.311	0.775	0.001	0.598	---	0.774

Table 3-10
Water Quality Data
Bioremediation Parameters
2018 to Present Building 5 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	OB-44-S 2/14/2018	OB-44-S 5/8/2018	OB-44-S 8/14/2018	OB-44-S 11/15/2018	OB-44-S 2/14/2019	OB-44-S 4/29/2019	OB-44-S 8/21/2019	OB-44-S 11/18/2019	OB-44-S 2/13/2020	OB-44-S 5/5/2020	OB-44-S 8/21/2020	OB-44-S 11/23/2020	OB-44-S 2/22/2021	OB-44-S 5/13/2021	OB-44-S 9/9/2021	OB-44-S 11/10/2021
Dissolved Metals																	
Iron	mg/L	0.14	0.09	0.23	<0.5	0.36	---	---	---	---	---	---	---	---	---	---	---
Manganese	mg/L	0.09	0.24	0.66	0.3	0.36	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	67	74	64	77	73	91	---	---	---	---	---	---	---	---	---	---
Nitrate	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	---	---	---	---	---	---	---	---	---	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses																	
Methane	ug/L	<10	<10	<10	<10	10	49	74	29	< 10	95	58	61	< 10	13	50	35
Ethane	ug/L	<20	<20	<20	<20	<20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20
Ethene	ug/L	33	38	<20	<20	<20	< 20	21	< 20	< 20	680	690	350	55	62	250	190
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	4.1	3.3	11	2.6	4.6	3.5 J	12 J	11	200	66	17 J J	4.8 J	3.5	5.3	4.5	5.6
Dehalococcoides sp.	cells/ml	<10.0	21.4	180	31.7	205	377	2,540	545	5,100,000	372,000	707,000	27,200	16,600	2,840	14,200	38,600
Field Parameters																	
pH	--	7.46	6.98	7.42	6.84	6.98	7.7	8.42	7.77	7.01	7.11	7.87	7.14	7.5	7.1	7.36	7.33
ORP	mV	-112.3	59.6	11.3	-43.3	54.1	-12.7	-31.9	-53.2	-122.3	-25.1	-106.8	-56.7	-71.3	-63.3	-106.1	-107.8
Dissolved Oxygen	mg/L	4.01	1.27	3.16	0.74	5.03	1.1	1.02	4.18	0.92	1.22	1.78	5.57	5.88	1.58	1.22	1.87
Specific Conductivity	ms/cm	0.505	0.698	0.655	1.84	0.683	0.715	0.835	3.318	2.266	0.35	1.021	0.823	0.804	0.735	2.163	0.932

Table 3-10
Water Quality Data
Bioremediation Parameters
2018 to Present Building 5 Area Wells

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	OB-44-S 5/12/2022	OB-46-S 2/14/2018	OB-46-S 5/8/2018	OB-46-S 8/14/2018	OB-46-S 11/15/2018	OB-46-S 2/14/2019	OB-46-S 4/29/2019	OB-46-S 8/5/2019	OB-46-S 10/29/2019	OB-46-S 1/30/2020	OB-47-S 2/18/2016	OB-47-S 5/26/2016	OB-47-S 2/21/2017	OB-47-S 5/2/2017
Dissolved Metals															
Iron	mg/L	---	1.6	0.14	2	7.6	6.8	---	---	---	---	2.9	0.05	<0.05	<0.05
Manganese	mg/L	---	0.07	0.03	2	4.6	3.1	---	---	---	---	0.52	0.02	<0.01	<0.01
Sulfate	mg/L	---	20	10	8.9	<0.5	7.4	11	---	---	---	22	24	17	24
Nitrate	mg/L	---	0.6	<0.1	<0.1	<0.1	<0.1	< 0.1	---	---	---	4.7	2.5	1.4	1.3
Nitrate/Nitrogen	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous Analyses															
Methane	ug/L	60	<10	<10	120	700	760	560	---	---	---	<10	<10	<10	<10
Ethane	ug/L	< 20	<20	<20	<20	<20	<20	< 20	---	---	---	<20	<20	<20	<20
Ethene	ug/L	220	<20	<20	25	42	<20	< 20	---	---	---	<20	<20	<20	<20
Chloride	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC	mg/L	---	14	8.9	8.2	48	14	4.8 J	---	---	---	2.3	2.0	1.7	1
Dehalococcoides sp.	cells/ml	---	<10.0	722	142	7,790	25,100	654	---	---	---	20	<10	---	6J
Field Parameters															
pH	--	---	7.83	6.84	7.57	7.14	7.38	8.04	7.73	8.75	8.27	7.06	6.41	7.92	6.64
ORP	mV	---	-75.2	81.2	-96.5	-192.4	-74	144.3	46.2	-62.4	-15.9	64.1	188	85	55.3
Dissolved Oxygen	mg/L	---	3.93	2.56	3.88	0.37	1.21	0.56	0.56	5.17	6.39	8.18	8.19	3.66	4.4
Specific Conductivity	ms/cm	---	0.404	3.056	4.115	4.313	3.969	0.891	1.593	0.444	0.689	0.504	0.011	0.381	0.426

Table 3-10
Water Quality Data
Bioremediation Parameters
2018 to Present Building 5 Area Wells
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

CONSTITUENT	UNITS	OB-47-S 8/3/2017	OB-47-S 11/16/2017	OB-47-S 2/14/2018	OB-47-S 05/08/218	OB-47-S 11/10/2021
Dissolved Metals						
Iron	mg/L	0.3	<0.25	6.3	<0.05	---
Manganese	mg/L	0.01	<0.05	0.15	<0.01	---
Sulfate	mg/L	23	25	23	24J	---
Nitrate	mg/L	<1.0	<1.0	2.7	2.7J	---
Nitrate/Nitrogen	mg/L	---	---	---	---	---
Miscellaneous Analyses						
Methane	ug/L	<10	<10	<10	<10	---
Ethane	ug/L	<20	<20	<20	<20	---
Ethene	ug/L	<20	<20	<20	<20	---
Chloride	mg/L	---	---	---	---	---
TOC	mg/L	1.4	1.8	1.5	1.2	---
Dehalococcoides sp.	cells/ml	8J	<10.0	4.0J	<2.9	---
Field Parameters						
pH	--	6.5	6.6	8.15	3.24	6.52
ORP	mV	113.2	147.8	79	68.4	48.8
Dissolved Oxygen	mg/L	2.6	2.85	3.55	6.52	1.86
Specific Conductivity	ms/cm	0.529	0.636	0.366	0.432	0.562

Notes:
< = Less than detection limit
--- = Not analyzed
mg/L = Milligrams per liter
ug/L = Micrograms per liter
mV = Millivolt
ms/cm = Millisiemen per centimeter
TOC = total organic carbon
cells/ml = cells per milliliter
Field parameter results reported are from the closest date to the analytical sampling
* = Sample BW-03 collected on 1/28/2010 but was broken in transit, not analyzed.
D = Result reported is from a diluted sample
J - Estimated concentration
U = Non-detect at indicated detection limit due to validation protocol.

Table 3-11
Stream and Surface Water Results
2020 to Present

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Location	Date	1,1,1-TCA mg/L	1,1-DCA mg/L	1,1-DCE mg/L	1,2-DCA mg/L	Acetone mg/L	Carbon Tetra-chloride mg/L	Chloro-benzene mg/L	Chloroform mg/L	Chloroethane mg/L	Methylene chloride mg/L	PCE mg/L	TCE mg/L	Trichlorofluor-methane mg/L	VC mg/L	cis-1,2-DCE mg/L	trans-1,2-DCE mg/L
CULVERT_OUTFALL	05/06/2020	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.043	0.002 U	0.002 U	0.059	0.002 U
CULVERT_OUTFALL	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.002 U	0.002 U	0.002 U	0.002 U
CULVERT_OUTFALL	05/09/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.005	0.002 U
GDS-01 (1)	03/26/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
GDS-02 (1)	03/26/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
GDS-03 (1)	03/26/2021	0.002 U	0.002 U	0.003	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.045	0.13	0.002 U	0.003	0.27	0.002 U
GDS-03 (1)	05/12/2021	0.002 U	0.002 U	0.002	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.048	0.14	0.002 U	0.003	0.25	0.002 U
GDS-03 (1)	09/10/2021	0.002 U	0.002 U	0.002	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.05	0.14	0.002 U	0.003	0.21	0.002 U
GDS-03 (1)	02/10/2022	0.002 U	0.002 U	0.002	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.066	0.21	0.002 U	0.003	0.27	0.002 U
GDS-03 (1)	05/09/2022	0.002 U	0.002 U	0.003	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.076	0.24	0.002 U	0.004	0.3	0.002 U
STR-02	05/13/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008	0.002 U
STR-02	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U
STR-02	11/16/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U
STR-02	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U
STR-03	05/06/2020	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
STR-03	11/25/2020	0.002 U	0.002 U	0.001 U	0.002 U	0.018 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
STR-03	11/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U
STR-03	05/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
STR-05	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.012	0.067	0.002 U	0.002 U	0.02	0.002 U
STR-05	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.009	0.038	0.002 U	0.002 U	0.013	0.002 U
STR-05	11/16/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.012	0.05	0.002 U	0.002 U	0.016	0.002 U
STR-05	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.01	0.045	0.002 U	0.002 U	0.012	0.002 U
STR-11	03/26/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.011	0.002 U	0.002 U	0.023	0.002 U
STR-11	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.006	0.002 U	0.002 U	0.016	0.002 U
STR-14	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.006	0.002 U	0.002 U	0.016	0.002 U
STR-14	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.006	0.002 U	0.002 U	0.015	0.002 U
STR-14	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.006	0.002 U	0.002 U	0.013	0.002 U
STR-14	05/09/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.01	0.002 U	0.002 U	0.02	0.002 U
STR-17	11/09/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.002 U	0.002 U	0.008	0.002 U
STR-18	03/26/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.013	0.002 U	0.002 U	0.026	0.002 U
STR-18	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.006	0.002 U	0.002 U	0.014	0.002 U
STR-18	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.006	0.002 U	0.002 U	0.016	0.002 U
STR-18	11/16/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.009	0.002 U	0.002 U	0.019	0.002 U
STR-18	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.008	0.002 U	0.002 U	0.014	0.002 U
STR-19	03/26/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.006	0.002 U	0.002 U	0.007	0.002 U
STR-19	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.005	0.002 U	0.002 U	0.007	0.002 U
STR-19	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U	0.002 U	0.006	0.002 U
STR-19	11/16/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.008	0.002 U	0.002 U	0.011	0.002 U
STR-19	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.002 U	0.002 U	0.006	0.002 U
STR-19	05/09/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.01	0.002 U	0.002 U	0.015	0.002 U
STR-20	03/26/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
STR-20	05/13/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
STR-20	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
STR-20	11/16/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
STR-20	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
STR-21	03/26/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
STR-21	05/13/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
STR-28	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.011	0.002 U	0.002 U	0.006	0.002 U
STR-28	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.011	0.002 U	0.002 U	0.006	0.002 U
STR-28	11/16/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.009	0.002 U	0.002 U	0.004	0.002 U

Table 3-11
Stream and Surface Water Results
2020 to Present
Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

		1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	Acetone	Carbon Tetra-chloride	Chloro-benzene	Chloroform	Chloroethane	Methylene chloride	PCE	TCE	Trichlorofluor-methane	VC	cis-1,2-DCE	trans-1,2-DCE
Location	Date	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	mg/L	mg/L
STR-28	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.015	0.002 U	0.002 U	0.007	0.002 U
STREAM-A-57	12/14/2020	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
STRHA-02	11/16/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.009	0.002 U	0.002 U	0.006	0.002 U
STRHA-04	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.038	0.002 U	0.002 U	0.012	0.002 U
STRHA-04	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.02	0.002 U	0.002 U	0.008	0.002 U
STRHA-04	11/16/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.019	0.002 U	0.002 U	0.007	0.002 U
STRHA-04	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.028	0.002 U	0.002 U	0.008	0.002 U
STRHA-07A	05/06/2020	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.012	0.002 U	0.002 U	0.018	0.002 U
STRHA-07A	11/25/2020	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U UJ	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.014	0.002 U	0.002 U	0.019	0.002 U
STRHA-07A	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.009	0.002 U	0.002 U	0.011 # J	0.002 U
STRHA-07A	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.017	0.002 U	0.002 U	0.012	0.002 U
STRHA-07A	11/09/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.013	0.002 U	0.002 U	0.011	0.002 U
STRHA-07A	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.011	0.002 U	0.002 U	0.013	0.002 U
STRHA-07A	05/09/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.01	0.002 U	0.002 U	0.011	0.002 U
STRHA-07B	05/06/2020	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.009	0.043	0.002 U	0.002 U	0.016	0.002 U
STRHA-07B	11/25/2020	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U UJ	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.01	0.044	0.002 U	0.002 U	0.018	0.002 U
STRHA-07B	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.009	0.035	0.002 U	0.002 U	0.015 # J	0.002 U
STRHA-07B	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008	0.033	0.002 U	0.002 U	0.013	0.002 U
STRHA-07B	11/09/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.007	0.028	0.002 U	0.002 U	0.012	0.002 U
STRHA-07B	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.009	0.038	0.002 U	0.002 U	0.015	0.002 U
STRHA-07B	05/09/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008	0.034	0.002 U	0.002 U	0.012	0.002 U
STRHA-08	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.012	0.002 U	0.002 U	0.006	0.002 U
STRHA-08	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.011	0.002 U	0.002 U	0.006	0.002 U
STRHA-08	11/09/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.01	0.002 U	0.002 U	0.005	0.002 U
STRHA-08	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.016	0.002 U	0.002 U	0.007	0.002 U
STRM-A-SCDS	05/04/2020	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.004	0.002 U
STRM-A-SCDS	11/25/2020	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U UJ	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.006	0.002 U	0.002 U	0.007	0.002 U
STRM-A-SCDS	03/26/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.007	0.002 U	0.002 U	0.008	0.002 U
STRM-A-SCDS	05/12/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.006	0.002 U	0.002 U	0.007	0.002 U
STRM-A-SCDS	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004	0.002 U	0.002 U	0.006	0.002 U
STRM-A-SCDS	11/16/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.002 U	0.002 U	0.008	0.002 U
STRM-A-SCDS	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.005	0.002 U
STRM-A-SCDS	05/09/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.008	0.002 U	0.002 U	0.012	0.002 U
STRMH-02	05/13/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.012	0.068	0.002 U	0.002 U	0.021	0.002 U
STRMH-02	09/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.006	0.018	0.002 U	0.002 U	0.01	0.002 U
STRMH-02	02/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003	0.002 U	0.002 U	0.003	0.002 U
STRMH-02	05/09/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.008	0.002 U	0.002 U	0.005	0.002 U
UNNAMED_STREAM	05/06/2020	0.002 U	0.002 U	0.01	0.002 U	0.023 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.009	0.002 U	0.21	1.5	0.008
UNNAMED_STREAM	11/25/2020	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005	0.003	0.002 U	0.004	0.026	0.002 U
UNNAMED_STREAM	05/13/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.014	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.03	0.1	0.002 U
UNNAMED_STREAM	11/10/2021	0.002 U	0.002 U	0.001 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
UNNAMED_STREAM	05/10/2022	0.002 U	0.002 U	0.001 U	0.002 U	0.023	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

Table 3-11
Stream and Surface Water Results
2020 to Present

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

Notes:

Analytical results presented in milligrams per liter (mg/l).

Analytical results are reported by the laboratory in micrograms per liter (ug/l). Results are presented without changing the number of significant figures reported by the laboratory.

DCA - Dichloroethane
DCE - Dichloroethene
PCE - Tetrachloroethene
TCA - Trichloroethane
TCE - Trichloroethene
VC - Vinyl Chloride
NA = discreet sample depth not applicable.
J - Estimated concentration
U - Determined to be non-detect at indicated detection limit, lab qualifier or through expert validation protocol.
= The percent recovery for this compound was above the acceptance criteria in the LCS/D, as a result of carryover from aprevious analysis.
--- = constituent not analyzed
(1) = GDS-1 GDS-2 and GDS-3 are groundwater discharge point sample locations, results are not indicative of surface water or groundwater concentrations.

Table 3-12
Soil VOC Analytical Results
April, July, August 2022 Well Installation
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

	Location Code	OB-42-BR		OB-53-BR			OB-54-BR	OB-55-BR		OB-57-DO				OB-58-DO		OB-59-DO		OB-60-S	
	Sample ID	OB-42-BR(25-30')-20220407	OB-42-BR(45-50')	OB-53-BR-(25'')-20220331	OB-53-BR-(50-55)-20220331	OB-53-BR-(80-85')-20220401	OB-54-BR(40-45')-20220405	OB-55-BR-30.0-220725	OB-55-BR-59.0-220726	OB-57-DO-53.5-220722	OB-57-DO-56.0-220722	OB-57-DO-58.5-220722	OB-57-DO-61.0-220726	OB-58-DO-35-220729	OB-58-DO-55-220729	OB-59-DO-24.0-220727	OB-59-DO-51-220728	OB-60-S-7-20220813	OB-60-S-16-20220813
	Sample Date	4/7/2022	4/8/2022	3/31/2022	3/31/2022	4/1/2022	4/5/2022	7/25/2022	7/26/2022	7/22/2022	7/22/2022	7/22/2022	7/26/2022	7/29/2022	7/29/2022	7/27/2022	7/28/2022	8/13/2022	8/13/2022
	Depth (ft)	25 - 30	45 - 50	19.5 - 19.5	41.5 - 41.5	64 - 64	40 - 45	30 - 30	59 - 59	53.5 - 53.5	56 - 56	58.5 - 58.5	61 - 61	35 - 35	55 - 55	24 - 24	51 - 51	7 - 7	16 - 16
Parameter	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES																			
1,1,1,2-Tetrachloroethane	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,1,1-Trichloroethane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
1,1,2,2-Tetrachloroethane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
1,1,2-Trichloroethane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
1,1-Dichloroethane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
1,1-Dichloroethene	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
1,1-Dichloropropene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,2,3-Trichlorobenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,2,3-Trichloropropane	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,2,4-Trichlorobenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,2,4-Trimethylbenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,2-Dibromoethane (EDB)	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,2-Dichlorobenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,2-Dichloroethane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
1,2-Dichloropropane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
1,3,5-Trimethylbenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,3-Dichlorobenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,3-Dichloropropane	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,4-Dichlorobenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
1,4-Dioxane	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 1.7	< 1.7
2,2-dichloropropane	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
2-Butanone	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.2	< 0.2
2-Hexanone	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.34	< 0.34
4-Isopropyltoluene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
4-Methyl-2-pentanone	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.31	< 0.3
Acetone	mg/kg	< 1.6	< 2.2	< 8.9	< 9.7	< 2.3	< 1.7	< 2.1	< 1.7	< 8.2	< 42	< 20	< 1.7	< 2	< 2	< 1.9	< 1.8	< 1.7	< 1.7
Benzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Bromobenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Bromodichloromethane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
Bromoform	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
Bromomethane	mg/kg	< 0.16	< 0.22	< 0.89	< 0.97	< 0.23	< 0.17	< 0.21	< 0.17	< 0.82	< 4.2	< 2	< 0.17	< 0.2	< 0.2	< 0.19	< 0.18	< 0.17	< 0.17
Carbondisulfide	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Carbontetrachloride	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
Chlorobenzene	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
Chlorobromomethane	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Chloroethane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
Chloroform	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
Chloromethane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
cis-1,2-Dichloroethene	mg/kg	< 0.064	< 0.088	< 0.35	0.46 J	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	0.091	0.13
cis-1,3-Dichloropropene	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
DBCP	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Dibromochloromethane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
Dibromomethane	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Dichlorodifluoromethane	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Dichloromethane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.17	< 0.17
Diethyl ether	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.34	< 0.34
Diisopropyl Ether	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Ethylbenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Hexachlorobutadiene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Isopropylbenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067

Table 3-12
Soil VOC Analytical Results
April, July, August 2022 Well Installation

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

	Location Code	OB-42-BR		OB-53-BR			OB-54-BR	OB-55-BR		OB-57-DO				OB-58-DO		OB-59-DO		OB-60-S	
	Sample ID	OB-42-BR(25-30')-20220407	OB-42-BR(45-50')	OB-53-BR-(25'')-20220331	OB-53-BR-(50-55)-20220331	OB-53-BR-(80-85')-20220401	OB-54-BR(40-45')-20220405	OB-55-BR-30.0-220725	OB-55-BR-59.0-220726	OB-57-DO-53.5-220722	OB-57-DO-56.0-220722	OB-57-DO-58.5-220722	OB-57-DO-61.0-220726	OB-58-DO-35-220729	OB-58-DO-55-220729	OB-59-DO-24.0-220727	OB-59-DO-51-220728	OB-60-S-7-20220813	OB-60-S-16-20220813
	Sample Date	4/7/2022	4/8/2022	3/31/2022	3/31/2022	4/1/2022	4/5/2022	7/25/2022	7/26/2022	7/22/2022	7/22/2022	7/22/2022	7/26/2022	7/29/2022	7/29/2022	7/27/2022	7/28/2022	8/13/2022	8/13/2022
	Depth (ft)	25 - 30	45 - 50	19.5 - 19.5	41.5 - 41.5	64 - 64	40 - 45	30 - 30	59 - 59	53.5 - 53.5	56 - 56	58.5 - 58.5	61 - 61	35 - 35	55 - 55	24 - 24	51 - 51	7 - 7	16 - 16
Parameter	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
m,p-xylene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Methyltert-butylether	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Naphthalene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.17	< 0.17
n-Butylbenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
n-Propylbenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
o-Chlorotoluene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
o-Xylene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
p-Chlorotoluene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
sec-Butylbenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Styrene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
tert-AmylMethyl Ether	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
tert-Butylalcohol	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 1.7	< 1.7
tert-Butylbenzene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
tert-ButylEthyl Ether	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
Tetrachloroethene	mg/kg	< 0.064	< 0.088	11 J	11 J	< 0.09	0.46	0.43	< 0.07	11	33	10	2.8	< 0.08	< 0.082	< 0.076	< 0.073	0.58	13
Tetrahydrofuran	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.34	< 0.34
Toluene	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.068	< 0.067
trans-1,2-Dichloroethene	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
Trans-1,3-Dichloropropene	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
Trichloroethene	mg/kg	< 0.064	< 0.088	< 0.35	35 J	< 0.09	0.79	0.97	< 0.07	37	130	70	18	< 0.08	< 0.082	0.36	< 0.073	< 0.068	1.4
Trichlorofluoromethane	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067
Vinyl chloride	mg/kg	< 0.064	< 0.088	< 0.35	< 0.39	< 0.09	< 0.069	< 0.085	< 0.07	< 0.33	< 1.7	< 0.79	< 0.069	< 0.08	< 0.082	< 0.076	< 0.073	< 0.068	< 0.067

Notes:

ft = feet
mg/kg = milligrams per kilogram
--- = Parameter not sampled for.

Table 3-13

Building 3 Area Indoor Air Results

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

		Location Code	BLDG2-6						BLDG3-1		BLDG3-2	
		Sample ID	BLDG2-6-20210325	BLDG2-6-20210624	BLDG2-6-20210921	BLDG2-6-20211222	BLDG2-6-20220309	BLDG2-6-20220607	BLDG3-1-20220309	BLDG3-1-20220607	BLDG3-2-20220309	BLDG3-2-20220607
		Sample Date	3/25/2021	6/24/2021	9/21/2021	12/22/2021	3/9/2022	6/7/2022	3/9/2022	6/7/2022	3/9/2022	6/7/2022
Parameter	Units	TVCIA	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES												
1,1,1-Trichloroethane	ug/m3	4400	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	0.229	0.125
1,1,2,2-Tetrachloroethane	ug/m3	0.2	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137
1,1,2-Trichloroethane	ug/m3	0.72	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109
1,1-Dichloroethane	ug/m3	710	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081
1,1-Dichloroethene	ug/m3	180	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079
1,2-Dichloroethane	ug/m3	0.44	0.121	0.138	0.089	< 0.081	0.093	0.125	< 0.081	< 0.081	0.121	0.085
1,2-Dichloropropane	ug/m3	0.6	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092
Acetone	ug/m3	710	128	245	238	73.2	470	283	4440	1170	2380	1570
Bromodichloromethane	ug/m3	0.65	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	0.141	< 0.134
Bromoform	ug/m3	10	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207
Bromomethane	ug/m3	4.4	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078
Carbontetrachloride	ug/m3	1.9	0.396	0.44	0.478	0.403	0.686	0.535	0.598	0.566	0.679	0.56
Chlorobenzene	ug/m3	44	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461
Chloroethane	ug/m3	NV	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264
Chloroform	ug/m3	3	0.215	0.347	0.22	0.181	0.532	0.19	615	0.386	3010	1.78
Chloromethane	ug/m3	NV	1.08	0.954	1.04	1.01	1.39	1.46	1.29	1.4	1.32	1.42
cis-1,2-Dichloroethene	ug/m3	5.3	0.337	0.309	0.599	0.404	0.515	0.852	0.167	< 0.079	0.464	0.202
cis-1,3-Dichloropropene	ug/m3	NV	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091
Dibromochloromethane	ug/m3	0.48	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17
Dichloromethane	ug/m3	530	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	7.12	5.87	< 1.74	2.91	< 1.74
Tetrachloroethene	ug/m3	4.1	1.93	0.746	0.841	1.06	0.807	1.21	0.298	0.766	0.61	1.32
trans-1,2-Dichloroethene	ug/m3	53	20.7	83.3	543	300	278	563	108	28.8	266	126
Trans-1,3-Dichloropropene	ug/m3	NV	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091
Trichloroethene	ug/m3	1.8	1.27	0.924	0.951	1.15	1.14	1.28	0.172	0.258	0.602	0.559
Trichlorofluoromethane	ug/m3	NV	1.1	1.3	1.26	1.21	1.84	1.51	1.82	1.33	1.72	1.36
Vinyl chloride	ug/m3	1.3	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051

Notes:

ug/m^3 - micrograms per meter cubed

< 0.109 - not detected above reporting limit

TVCIA = Threshold Value (Industrial/Commercial) - MassDEP Industrial/Commercial threshold value

BOLD = Result is greater than Threshold Value

Table 3-13

Building 3 Area Indoor Air Results

Former Varian Facility Site

150 Sohier Road

Beverly, Massachusetts

	Location Code		BLDG3-3						BLDG3-5		BLDG6-2	
	Sample ID		BLDG3-3-20210325	BLDG3-3-20210624	BLDG3-3-20210921	BLDG3-3-20211222	BLDG3-3-20220309	BLDG3-3-20220607	BLDG3-5-20220309	BLDG3-5-20220607	BLDG6-2-20220309	BLDG6-2-20220607
	Sample Date		3/25/2021	6/24/2021	9/21/2021	12/22/2021	3/9/2022	6/7/2022	3/9/2022	6/7/2022	3/9/2022	6/7/2022
Parameter	Units	TVCIA	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES												
1,1,1-Trichloroethane	ug/m3	4400	0.164	0.125	0.131	< 0.109	0.262	0.267	< 0.109	< 0.109	0.131	< 0.109
1,1,2,2-Tetrachloroethane	ug/m3	0.2	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137	< 0.137
1,1,2-Trichloroethane	ug/m3	0.72	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109
1,1-Dichloroethane	ug/m3	710	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081
1,1-Dichloroethene	ug/m3	180	0.155	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079
1,2-Dichloroethane	ug/m3	0.44	< 0.081	< 0.081	< 0.081	< 0.081	0.089	0.081	0.113	< 0.081	0.109	< 0.081
1,2-Dichloropropane	ug/m3	0.6	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	0.116
Acetone	ug/m3	710	205	223	280	165	302	161	16.4	24.7	1020	5530
Bromodichloromethane	ug/m3	0.65	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134	< 0.134
Bromoform	ug/m3	10	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207	< 0.207
Bromomethane	ug/m3	4.4	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078
Carbontetrachloride	ug/m3	1.9	0.377	0.434	0.434	0.409	0.66	0.541	0.66	0.547	0.654	0.554
Chlorobenzene	ug/m3	44	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461	< 0.461
Chloroethane	ug/m3	NV	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264	< 0.264
Chloroform	ug/m3	3	0.22	0.303	0.225	0.112	0.977	0.2	1.2	0.244	0.22	0.161
Chloromethane	ug/m3	NV	1.02	0.979	1.02	0.971	1.41	1.44	1.38	1.42	1.41	1.47
cis-1,2-Dichloroethene	ug/m3	5.3	< 0.079	< 0.079	< 0.079	< 0.079	0.301	0.135	< 0.079	< 0.079	0.492	0.119
cis-1,3-Dichloropropene	ug/m3	NV	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091
Dibromochloromethane	ug/m3	0.48	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17
Dichloromethane	ug/m3	530	< 1.74	90	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74	< 1.74
Tetrachloroethene	ug/m3	4.1	2.12	3.61	3.83	0.922	2.5	21.4	0.393	0.509	1	1.26
trans-1,2-Dichloroethene	ug/m3	53	18.6	4.4	27.4	39.6	195	16.2	7.45	3.54	368	79.3
Trans-1,3-Dichloropropene	ug/m3	NV	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091
Trichloroethene	ug/m3	1.8	0.473	0.855	0.919	0.312	0.747	7.42	< 0.107	< 0.107	0.446	0.339
Trichlorofluoromethane	ug/m3	NV	0.938	1.12	1.11	1.12	2.01	1.34	1.73	1.32	1.78	1.38
Vinyl chloride	ug/m3	1.3	< 0.051	< 0.051	< 0.051	< 0.051	0.284	0.976	< 0.051	< 0.051	< 0.051	< 0.051

Notes:

ug/m^3 - micrograms per meter cubed

< 0.109 - not detected above reporting limit

TVCIA = Threshold Value (Industrial/Commercial) - MassDEP Industrial/Commercial threshold value

BOLD = Result is greater than Threshold Value

Table 3-14
Soil Vapor Results
Buildings 2 and 3

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

		Location Code	BLDG2-SV1						BLDG3-VP1			
		Sample ID	BLDG2-SV1-20210326	BLDG2-SV1-20210625	BLDG2-SV1-20210922	BLDG2-SV1-20211223	BLDG2-SV1-20220310	BLDG2-SV1-20220608	BLDG3-VP1-20210326	BLDG3-VP1-20210625	BLDG3-VP1-20210922	BLDG3-VP1-20211223
		Sample Date	3/26/2021	6/25/2021	9/22/2021	12/23/2021	3/10/2022	6/8/2022	3/26/2021	6/25/2021	9/22/2021	12/23/2021
		Depth	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
		Sample Purpose	N	N	N	N	N	N	N	N	N	N
Parameter	Units	I/C SS Screening	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES												
1,1,1-Trichloroethane	ug/m3	310000	< 0.911	< 1.09	< 2.54	1.63	< 0.454	< 1.36	0.507	1.6	0.971	2.3
1,1,2,2-Tetrachloroethane	ug/m3	14	< 1.15	< 1.37	< 3.19	< 0.137	< 0.572	< 1.72	< 0.137	< 0.137	< 0.137	< 0.137
1,1,2-Trichloroethane	ug/m3	50	< 0.911	< 1.09	< 2.54	< 0.109	< 0.454	< 1.36	< 0.109	< 0.109	< 0.109	< 0.109
1,1-Dichloroethane	ug/m3	50000	< 0.676	< 0.809	< 1.88	< 0.081	< 0.337	< 1.01	< 0.081	< 0.081	< 0.081	< 0.081
1,1-Dichloroethene	ug/m3	12000	< 0.662	< 0.793	< 1.84	< 0.079	< 0.33	< 0.991	< 0.079	< 0.079	< 0.079	0.69
1,2-Dichloroethane	ug/m3	31	< 0.676	< 0.809	< 1.88	< 0.081	< 0.337	< 1.01	< 0.081	< 0.081	< 0.081	< 0.081
1,2-Dichloropropane	ug/m3	42	< 0.772	< 0.924	< 2.15	< 0.092	< 0.385	< 1.16	< 0.092	< 0.092	< 0.092	< 0.092
Acetone	ug/m3	50000	< 19.8	< 23.8	< 55.3	14.1	753	37.3	108	53.4	30.9	29
Bromodichloromethane	ug/m3	45	< 1.12	4.22	< 3.12	< 0.134	< 0.558	< 1.67	< 0.134	< 0.134	< 0.134	< 0.134
Bromoform	ug/m3	730	< 1.73	< 2.07	< 4.81	< 0.207	< 0.861	< 2.58	< 0.207	< 0.207	< 0.207	< 0.207
Bromomethane	ug/m3	310	< 0.648	< 0.777	< 1.81	< 0.078	< 0.323	< 0.971	< 0.078	< 0.078	< 0.078	< 0.078
Carbontetrachloride	ug/m3	130	< 1.05	1.51	3.22	1.31	0.944	2.28	0.459	0.604	0.635	0.566
Chlorobenzene	ug/m3	3100	< 3.84	< 4.61	< 10.7	< 0.461	< 1.92	< 5.76	< 0.461	< 0.461	< 0.461	< 0.461
Chloroethane	ug/m3	NV	< 2.2	< 2.64	< 6.15	< 0.264	< 1.1	< 3.3	< 0.264	< 0.264	< 0.264	< 0.264
Chloroform	ug/m3	210	7.33	14	31.9	13	1.59	8.01	0.977	2.08	2.49	1.15
Chloromethane	ug/m3	NV	< 3.45	< 4.13	< 9.6	< 0.413	< 1.72	< 5.16	< 0.413	< 0.413	< 0.413	< 0.413
cis-1,2-Dichloroethene	ug/m3	370	4.16	5.67	10.5	9.08	0.975	6.03	0.242	0.258	0.21	0.234
cis-1,3-Dichloropropene	ug/m3	NV	< 0.758	< 0.908	< 2.11	< 0.091	< 0.378	< 1.13	< 0.091	< 0.091	< 0.091	< 0.091
Dibromochloromethane	ug/m3	33	< 1.42	< 1.7	< 3.96	< 0.17	< 0.71	< 2.13	< 0.17	< 0.17	< 0.17	< 0.17
Dichloromethane	ug/m3	37000	< 14.5	< 17.4	< 40.3	< 1.74	< 7.23	46.6	< 1.74	< 1.74	< 1.74	< 1.74
Tetrachloroethene	ug/m3	290	1570	2740	9220	1340	< 0.565	2880	31	35.8	133	69.2
trans-1,2-Dichloroethene	ug/m3	3700	11.3	7.18	77.3	75.3	488	109	15.8	2.36	21.3	20.1
Trans-1,3-Dichloropropene	ug/m3	NV	< 0.758	< 0.908	< 2.11	< 0.091	< 0.378	< 1.13	< 0.091	< 0.091	< 0.091	< 0.091
Trichloroethene	ug/m3	120	197	369	881	326	0.871	308	27.1	36.8	54.3	43.9
Trichlorofluoromethane	ug/m3	NV	< 2.34	< 2.81	< 6.52	1.28	1.83	< 3.51	0.995	1.03	1.28	0.972
Vinyl chloride	ug/m3	91	< 0.427	< 0.511	< 1.19	< 0.051	< 0.213	< 0.639	< 0.051	< 0.051	< 0.051	3.17

Table 3-14
Soil Vapor Results
Buildings 2 and 3

Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

		Location Code	BLDG3-VP1		BLDG3-VP2		BLDG3-VP3		BLDG3-VP7	
		Sample ID	BLDG3-VP1-20220310	BLDG3-VP1-20220608	BLDG3-VP2-20220310	BLDG3-VP2-20220608	BLDG3-VP3-20220310	BLDG3-VP3-20220608	BLDG3-VP7-20220310	BLDG3-VP7-20220608
		Sample Date	3/10/2022	6/8/2022	3/10/2022	6/8/2022	3/10/2022	6/8/2022	3/10/2022	6/8/2022
		Depth	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
		Sample Purpose	N	N	N	N	N	N	N	N
Parameter	Units	I/C SS Screening	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES										
1,1,1-Trichloroethane	ug/m3	310000	1.67	0.6	160	468	2.46	4.96	0.66	0.911
1,1,2,2-Tetrachloroethane	ug/m3	14	< 0.299	< 0.137	< 6.11	< 43.5	< 0.982	< 0.137	< 0.137	< 0.137
1,1,2-Trichloroethane	ug/m3	50	< 0.237	< 0.109	< 4.86	< 34.5	< 0.78	< 0.109	< 0.109	< 0.109
1,1-Dichloroethane	ug/m3	50000	< 0.176	< 0.081	< 3.6	< 25.6	< 0.579	< 0.081	< 0.081	< 0.081
1,1-Dichloroethene	ug/m3	12000	< 0.172	< 0.079	140	452	0.65	1.54	0.087	0.353
1,2-Dichloroethane	ug/m3	31	< 0.176	< 0.081	< 3.6	< 25.6	< 0.579	< 0.081	0.376	< 0.081
1,2-Dichloropropane	ug/m3	42	< 0.201	< 0.092	< 4.11	< 29.3	< 0.661	< 0.092	< 0.092	< 0.092
Acetone	ug/m3	50000	66.5	182	< 106	< 751	< 17	203	222	189
Bromodichloromethane	ug/m3	45	< 0.291	< 0.134	< 5.96	< 42.4	< 0.958	< 0.134	2.21	2.33
Bromoform	ug/m3	730	< 0.45	< 0.207	< 9.2	< 65.4	< 1.48	< 0.207	0.321	0.837
Bromomethane	ug/m3	310	< 0.169	< 0.078	< 3.46	< 24.6	< 0.555	< 0.078	< 0.078	< 0.078
Carbontetrachloride	ug/m3	130	0.78	0.472	10.9	< 39.8	1.3	0.975	0.679	0.472
Chlorobenzene	ug/m3	3100	< 0.999	< 0.461	< 20.5	< 146	< 3.29	< 0.461	< 0.461	< 0.461
Chloroethane	ug/m3	NV	< 0.573	< 0.264	< 11.7	< 83.4	< 1.88	< 0.264	< 0.264	< 0.264
Chloroform	ug/m3	210	2.99	3.35	8.69	32.4	14.2	10.5	45.4	24
Chloromethane	ug/m3	NV	< 0.898	< 0.413	< 18.4	< 131	< 2.95	< 0.413	0.535	< 0.413
cis-1,2-Dichloroethene	ug/m3	370	0.404	0.385	62.2	416	18.3	19.9	32.2	131
cis-1,3-Dichloropropene	ug/m3	NV	< 0.197	< 0.091	< 4.04	< 28.7	< 0.649	< 0.091	< 0.091	< 0.091
Dibromochloromethane	ug/m3	33	< 0.371	< 0.17	< 7.58	< 53.9	< 1.22	< 0.17	0.375	0.477
Dichloromethane	ug/m3	37000	< 3.79	< 1.74	< 77.1	< 549	< 12.4	1.97	< 1.74	13.9
Tetrachloroethene	ug/m3	290	387	112	8540	75300	1390	271	82.1	180
trans-1,2-Dichloroethene	ug/m3	3700	96.7	8.64	14.3	94	16.4	15	119	42.4
Trans-1,3-Dichloropropene	ug/m3	NV	< 0.197	< 0.091	< 4.04	< 28.7	< 0.649	< 0.091	< 0.091	< 0.091
Trichloroethene	ug/m3	120	130	100	2540	37500	329	191	56.4	107
Trichlorofluoromethane	ug/m3	NV	1.67	1.14	< 12.5	< 88.8	< 2.01	1.17	1.67	1.14
Vinyl chloride	ug/m3	91	0.183	0.084	5930 J	6370	5.83	4.88	1.24	0.171

Table 3-14
Soil Vapor Results
Buildings 2 and 3
Former Varian Facility Site
150 Sohier Road
Beverly, Massachusetts

Notes:
Samples collected from 30 Tozer Road, 31 Tozer Road, 39 Tozer Road.
ug/m3 = microgram per cubic meter
< indicates chemical not detected, and concentration is less than reporting limit (value shown).
I/C SS Screening = MassDEP industrial/commercial sub-slab soil gas screening value
BOLD =Result exceeds I/C SS
--- = Parameter not sampled for.
J = estimated concentration

Table 3-15
Select Residential Indoor Air Results
34 Longview Drive

Varian Medical Systems
Beverly, Massachusetts

	Location	Basement Indoor Air							First Floor Indoor Air						Second Floor Indoor
	Sample ID	ID-4	34-LON-B-20210225	34-LON-B-20211025	34-LON-B-20211115	34-LON-B-20220113	34-LON-B-20220422	34-LON-B-20220713	34-LON-01-20210225	34-LON-01-20211025	34-LON-01-20211115	34-LON-01-20220113	34-LON-01-20220422	34-LON-01-20220713	34-LON-02-20220713
	Sample Date	12/7/2020	2/26/2021	10/26/2021	11/16/2021	1/14/2022	4/22/2022	7/14/2022	2/26/2021	10/26/2021	11/16/2021	1/14/2022	4/22/2022	7/14/2022	7/14/2022
Parameter	Threshold Value (Res)	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES (ug/m^3)															
1,1,1-Trichloroethane	3	< 1.092	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109	< 0.109
1,1-Dichloroethane	0.8	< 0.81	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081
1,1-Dichloroethene	0.8	< 0.794	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079
cis-1,2-Dichloroethene	0.8	< 0.794	0.083	0.127	0.131	0.17	0.139	0.095	< 0.079	0.087	< 0.079	0.111	< 0.079	< 0.079	< 0.079
Tetrachloroethene	1.4	0.96	0.888	0.868	1.23	1.19	1.2	3.55	0.597	0.542	0.427	0.841	0.509	0.556	<0.136
trans-1,2-Dichloroethene	0.8	---	< 0.079	0.103	< 0.079	0.143	< 0.079	< 0.079	< 0.079	0.111	< 0.079	0.131	< 0.079	0.139	0.115
Trichloroethene	0.4	< 1.074	0.398	0.914	1	1.1	0.779	0.801	0.215	0.548	0.355	0.688	0.344	<0.107	<0.107
Vinyl chloride	0.27	< 0.516	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051	< 0.051

Notes:

ug/m^3 - micrograms per meter cubed

< 0.794 - not detected above reporting limit

Threshold Value (Res) - MassDEP residential threshold value

BOLD = Result is greater than Threshold Value

Table 3-16
Select Sub-Slab Soil Vapor Results
34 Longview Drive

Varian Medical Systems
Beverly, Massachusetts

	Location	Sub-Slab Soil Vapor Point 34LON-SV01						Sub-Slab Soil Vapor Point 34LON-SV02						34-LON-SV03	34-LON-SV04	34-LON-SV05
	Sample ID	34-LON-SV01 20210226	34-LON-SV01-20211026	34-LON-SV-01-20211116	34-LON-SV01-20220114	34-LON-SV01-20220422	34-LON-SV-01-20220714	34-LON-SV02 20210226	34-LON-SV02-20211026	34-LON-SV-02-20211116	34-LON-SV02-20220114	34-LON-SV02-20220422	34LON-SV-02-20220714	34-LON-SV03-20220309	34-LON-SV04-20220309	34-LON-SV05-20220309
	Sample Date	2/26/2021	10/26/2021	11/16/2021	1/14/2022	4/22/2022	7/14/22	2/26/2021	10/26/2021	11/16/2021	1/14/2022	4/22/2022	7/14/22	3/9/2022	3/9/2022	3/9/2022
Parameter	Res Sub-slab Screening	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES (ug/m^3)																
1,1,1-Trichloroethane	210	< 0.109	0.131	0.142	< 0.109	0.109	< 0.109	< 0.546	0.824	0.835	0.251	0.256	0.917	< 0.109	< 0.109	< 0.109
1,1-Dichloroethane	56	< 0.081	< 0.081	< 0.081	< 0.081	0.085	< 0.081	< 0.405	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	0.117	< 0.081
1,1-Dichloroethene	56	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.396	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079
cis-1,2-Dichloroethene	56	0.297	0.515	0.646	0.436	0.523	0.42	< 0.396	< 0.079	< 0.079	0.167	< 0.079	< 0.079	0.103	9.44	0.535
Tetrachloroethene	98	0.393	12.2	36.3	3.02	4.46	11	0.949	3.26	10.4	1.16	1.49	16.6	1.75	14	1.48
trans-1,2-Dichloroethene	56	< 0.079	0.167	< 0.079	< 0.079	< 0.079	0.123	< 0.396	0.091	< 0.079	< 0.079	< 0.079	0.083	0.155	< 0.079	0.083
Trichloroethene	28	2.31	65.6	106	31.8	48.3	68.3	1.56	10.3	14	4.46	4.37	24.3	0.586	67.2	4.73
Vinyl chloride	19	0.225	< 0.051	< 0.051	< 0.051	< 0.051	0.151	0.409	< 0.051	< 0.051	< 0.051	< 0.051	0.084	< 0.051	< 0.051	< 0.051

Notes:

ug/m^3 - micrograms per meter cubed

< 0.109 - not detected above reporting limit

Res Sub-slab Screening - MassDEP residential sub-slab soil gas screening value

BOLD = Result is greater than Screening Value

Table 4-1
Vertical Hydraulic Gradients Between Overburden and Bedrock Wells
2000 Phase II Comprehensive Site Assessment Report
Former Varian Facility Site, Beverly, MA

Central and Western Clusters of Wells
CL1, CL3 / BR5 and CL8

CL1 Cluster		October 5, 1998 Groundwater Data					Overall Vertical Hydraulic Gradient † Between Oct-95 and Oct-98		
Well No.	(Screen or Intake Zone, in ft bgs)	GW Elev (in ft)	GW Elev. Δ (in ft)	Vertical Gradient †			Aquifer	D. or U	Remarks
				D. or U.	+ or -	VALUE			
CL1-S	(10-25')	57.15	--				SO	↘ ↗	Weak inconsistent (<0.1') upward or downward gradient within the overburden
CL1-DO	(200-210')	57.53	-0.38	↑	-	-0.002	DO		* Gradient between overburden and bedrock cannot be determined. CL1-BR, the deepest bedrock well, has been consistently observed during sampling events to be extremely slow to recharge. The wide range of groundwater elevations measured in this well strongly suggests that it is often in a recovery phase and, therefore, static water level conditions were seldom encountered (See Figure 5-25)
CL1-BR *	(240-280')	-34.06 *	91.59 *	--	--	--	BR	--	

CL3/BR-5 Cluster		October 5, 1998 Groundwater Data					Overall Vertical Hydraulic Gradient † Between Oct-95 and Oct-98		
Well No.	(Screen or Intake Zone, in ft bgs)	GW Elev (in ft)	GW Elev. Δ (in ft)	Vertical Gradient †			Aquifer	D. or U	Remarks
				D. or U.	+ or -	VALUE			
CL3-S	(5-20')	40.62	--				SO	↗	Very weak but consistent upward gradient within the overburden, up to 0.1'
CL3-DO	(65-80')	40.72	-0.10	↑	-	-0.002	DO	↗	Overall weak upward gradient from the bedrock to the overburden of 0.2' to 0.3'. Inconsistent upward gradient within the bedrock, with a strong upward gradient of more than 3' noted between Zone 2 and Zone 3 in October 1998.
CL3-BR	(91-111')	40.98	-0.26	↑	-	-0.01	BR		
BR-5 Zone3	(124.5-133')	41.05	-0.07	↑	-	-0.002	BR Z3		
BR-5 Zone2	(164-172.5')	44.46	-3.41	↑	-	-0.08	BR Z2		
BR-5 Zone1	(198.5-209')	44.48	-0.02	↑	-	-0.006	BR Z1		

CL8 Cluster		October 5, 1998 Groundwater Data					Overall Vertical Hydraulic Gradient † Between Aug-98 and Oct-98		
Well No.	(Screen or Intake Zone, in ft bgs)	GW Elev (in ft)	GW Elev. Δ (in ft)	Vertical Gradient †			Aquifer	D. or U	Remarks
				D. or U.	+ or -	VALUE			
CL8-S	(5-10')	40.19	--				SO	↗	Very weak but consistent upward gradient within the overburden, up to 0.1'
CL8-DO	(43-53')	40.22	-0.03	↑	-	-0.0007	DO	↗	Overall weak upward gradient from the bedrock to the overburden of up to 0.1' and weak upward gradient within the bedrock up to 0.2'
CL8-BR Zone3	(60.5-70')	40.29	-0.07	↑	-	-0.004	BR Z3		
CL8-BR Zone2	(93-101.5')	40.33	-0.04	↑	-	-0.001	BR Z2		
CL8-BR Zone1	(150.5-159')	40.07	0.26	↓	+	0.004	BR Z1		

Table 4-1
Vertical Hydraulic Gradients Between Overburden and Bedrock Wells
2000 Phase II Comprehensive Site Assessment Report
Former Varian Facility Site, Beverly, MA

Northern Clusters of Wells
CL2, CL6, CL7, CL9, BR3 and BR4

CL2 Cluster	October 5, 1998 Groundwater Data					Overall Vertical Hydraulic Gradient †		
Well No. (Screen or Intake Zone, in ft bgs)	GW Elev (in ft)	GW Elev. Δ (in ft)	Vertical Gradient †			Between Oct-95 and Oct-98		
			D. or U.	+ or -	VALUE	Aquifer	D. or U	Remarks
MW-2R (4-14')	56.51	--				SO	↙	Strong consistent downward gradient within the overburden, from 2' to 3'
CL2-DO (33-43')	54.18	2.33	↓	+	0.08034	DO		Very weak (<0.1') inconsistent upward and downward gradient within the bedrock and between the bedrock and the deep overburden aquifer. (* : Gradient calculated between CL2-DO and BR2/Zone3)
CL2-BR (54-82.5')	54.20	-0.02	↑	-	-0.0007	BR		
BR-2 Zone3 * (64.5-74')	54.29	-0.09	↑	-	-0.003	BR Z3	↘ ↗	
BR-2 Zone2 (108-117.5')	54.25	0.04	↓	+	0.0009	BR Z2		
BR-2 Zone1 (136.5-146')	54.26	-0.01	↑	-	-0.00036	BR Z1		

CL6 Cluster	October 5, 1998 Groundwater Data					Overall Vertical Hydraulic Gradient †		
Well No. (Screen or Intake Zone, in ft bgs)	GW Elev (in ft)	GW Elev. Δ (in ft)	Vertical Gradient †			Between Nov-97 and Oct-98		
			D. or U.	+ or -	VALUE	Aquifer	D. or U	Remarks
CL6-S (10-20')	48.33	--				SO	↙	Strong consistent downward gradient within the overburden, from 1' to 2'
CL6-DO (34-44')	47.20	1.13	↓	+	0.05	DO		Very weak (= <0.1') and inconsistent downward gradient within the bedrock and between the bedrock and the deep overburden aquifer
CL6-BR (60-70')	47.22	-0.02	↑	-	-0.0008	BR		
BR-1 Zone3 (95-104.5')	47.10	0.12	↓	+	0.003	BR Z3	↘ ↗	
BR-1 Zone2 (142.5-152')	47.06	0.04	↓	+	0.0009	BR Z2		
BR-1 Zone1 (195-204.5')	47.11	-0.05	↑	-	-0.001	BR Z1		

CL7 Cluster	October 5, 1998 Groundwater Data					Overall Vertical Hydraulic Gradient †		
Well No. (Screen or Intake Zone, in ft bgs)	GW Elev (in ft)	GW Elev. Δ (in ft)	Vertical Gradient †			Between Aug-98 and Oct-98		
			D. or U.	+ or -	VALUE	Aquifer	D. or U	Remarks
CL7-S (9-19')	41.46	--				SO	↙	Strong consistent downward gradient within the overburden of 1.5'
CL7-DO (78-88')	40.10	1.36	↓	+	0.02	DO		Overall weak (=<0.1') but consistent upward gradient from the bedrock to the overburden
CL7-BR (97-107')	40.19	-0.09	↑	-	-0.005	BR	↗	

CL9 Cluster	October 5, 1998 Groundwater Data					Overall Vertical Hydraulic Gradient †		
Well No. (Screen or Intake Zone, in ft bgs)	GW Elev (in ft)	GW Elev. Δ (in ft)	Vertical Gradient †			Between Aug-98 and Oct-98		
			D. or U.	+ or -	VALUE	Aquifer	D. or U	Remarks
CL9-S (5-15')	40.96	--				SO	↙	Weak but consistent downward gradient within the overburden, from 0.1' to 0.2'
CL9-DO (25.5-35.5')	40.70	0.26	↓	+	0.01	DO		Strong consistent upward gradient from the bedrock to the overburden of up to 1.5' and strong upward gradient within the bedrock of up to 3.5'
CL9-BR Zone3 (72-81.5')	42.33	-1.63	↑	-	-0.03	BR Z3		
CL9-BR Zone2 (109.5-119')	44.22	-1.89	↑	-	-0.07	BR Z2	↗	
CL9-BR Zone1 (150-159.5')	45.81	-1.59	↑	-	-0.03	BR Z1		

BR-3 and BR-4 Wells	October 5, 1998 Groundwater Data					Overall Vertical Hydraulic Gradient †		
Well No. (Screen or Intake Zone, in ft bgs)	GW Elev (in ft)	GW Elev. Δ (in ft)	Vertical Gradient †			Between Aug-98 and Oct-98		
			D. or U.	+ or -	VALUE	Aquifer	D. or U	Remarks
MW-35 (10-57')	36.00	--				DO	↙	Inconsistent downward gradient between the deep overburden and the upper bedrock
BR-3 Zone3 (156-166.5')	32.91	3.09	↓	+	0.02	BR Z3		Strong consistent upward gradient within the bedrock of up to 4'
BR-3 Zone2 (189.5 - 200')	34.29	-1.38	↑	-	-0.04	BR Z2	↗	
BR-3 Zone1 (215-225.5')	38.15	-3.86	↑	-	-0.15	BR Z1		
BR-4 Zone3 (105-115.5')	38.92	--				BR Z3		Very weak (<0.1') inconsistent upward and downward gradient within the bedrock
BR-4 Zone2 (128.5-138')	38.94	-0.02	↑	-	-0.001	BR Z2	↘ ↗	
BR-4 Zone1 (184-194.5')	38.88	0.06	↓	+	0.001	BR Z1		

Table 4-1
Vertical Hydraulic Gradients Between Overburden and Bedrock Wells
2000 Phase II Comprehensive Site Assessment Report
Former Varian Facility Site, Beverly, MA

Southern Clusters of Wells
CL4, BR-6, BR-7 and BR-8

CL4 Cluster		October 5, 1998 Groundwater Data					Overall Vertical Hydraulic Gradient † Between Oct-95 and Oct-98		
Well No.	(Screen or Intake Zone, in ft bgs)	GW Elev (in ft)	GW Elev. Δ (in ft)	Vertical Gradient † D. or U.	+ or -	VALUE	Aquifer	D. or U	Remarks
W-3	(5-10')	40.94	--				SO	↘ ↗	Weak inconsistent (0.1' to 0.5') upward or downward gradient within the overburden
CL4-DO	(19-29')	40.78	0.16	↓	+	0.009	DO		Overall very weak (=<0.1') downward gradient from the overburden to the bedrock
CL4-BR	(31-55')	40.75	0.03	↓	+	0.002	BR	↙	

BR-6 & BR-7 Cluster		October 5, 1998 Groundwater Data					Overall Vertical Hydraulic Gradient † Between Late 97 and Oct-98		
Well No.	(Screen or Intake Zone, in ft bgs)	GW Elev (in ft)	GW Elev. Δ (in ft)	Vertical Gradient † D. or U.	+ or -	VALUE	Aquifer	D. or U	Remarks
P-9	(2-12')	33.07	--				SO	↗	Strong consistent (up to 3.5') upward gradient between the upper bedrock and the overburden
BR-6 Zone3	(32-41.5')	36.55	-3.48	↑	-	-0.1	BR Z3		Overall weak (from 0.2' to 0.3') downward gradient within the bedrock
BR-6 Zone2	(52.5-62')	36.56	-0.01	↑	-	-0.0005	BR Z2	↙	
BR-6 Zone1	(84-93.5')	36.28	0.28	↓	+	0.009	BR Z1		
P-17	(2-12')	23.81	--				SO	↗	Strong consistent upward gradient within the overburden, from 7' to 9'
MW-34	(60-65')	32.38	-8.57	↑	-	-0.16	DO		Overall very weak but somewhat inconsistent downward gradient from the deep overburden to the shallow bedrock up to 0.1' and within the bedrock, from 0.1' to 0.2'
BR-7 Zone3	(59-68.5')	32.31	0.07	↓	+	0.014	BR Z3	↙	
BR-7 Zone2	(101.5-112')	32.10	0.21	↓	+	0.005	BR Z2	↙	
R-7 Zone1	(142-151.5')	32.15	-0.05	↑	-	-0.001	BR Z1		

BR-8 Well		October 5, 1998 Groundwater Data					Overall Vertical Hydraulic Gradient † Between Aug-98 and Oct-98		
Well No.	(Screen or Intake Zone, in ft bgs)	GW Elev (in ft)	GW Elev. Δ (in ft)	Vertical Gradient † D. or U.	+ or -	VALUE	Aquifer	D. or U	Remarks
BR-8 Zone3	(172-182.5')	15.17	--				BR Z3		
BR-8 Zone2	(194.5-205')	15.09	0.08	↓	+	0.003	BR Z2	↘ ↗	Weak inconsistent upward or downward gradient within the bedrock, from 0.1' to 0.2'
BR-8 Zone1	(211-221.5')	15.03	0.06	↓	+	0.004	BR Z1		

Notes:

D.:	Downward Hydraulic Gradient	
U.:	Upward Hydraulic Gradient	
SO :	Shallower portion of the overburden aquifer	
DO :	Deeper portion of the overburden aquifer at or near the contact of the overburdenand the bedrock	
BR :	Bedrock aquifer	
BR Z3 :	Bedrock aquifer Zone 3	Shallowest intake zone
BR Z2 :	Bedrock aquifer Zone 2	Intermediate depth intake zone
BR Z1 :	Bedrock aquifer Zone 1	Deepest intake zone

† : Hydraulic vertical gradients iv are calculated as follows: difference in piezometric head between the screen/intake zone considered and the next deeper screen/intake zone divided by the difference in elevations of the two mid-points' screen/intake zones.

i_v = Δh / Δ mid-screen/intake elevations

Table 6-1
Building 3 Area Soil Sample Results
Former Varian Facility
Beverly, Massachusetts

	Location Code	AP-33-DO		AP-34-DO		AP-35-DO	AP-40-S			AP-41-S			AP-42-DO		AP-43-DO	B2-PSL5	B2-PSL5	B3-PSL5	B4-PSL5	BLDG3-LAB	BLDG3-SB100	BLDG3-SB101	BLDG3-SB102
	Sample ID	AP-33-DO(22-24)-20130910	AP-33-DO(24-26)-20130910	AP-34-DO(21-23)-20130911	AP-34-DO(34-36)-20130911	AP-35-DO(33-35)-20130912	AP40S-11-13	AP40S-29-31	AP40S-35-37	AP41S-0	AP41S-19-21	AP41S-33-35	AP42DO-45-47-20200916	AP42DO-55-57-20200916	AP43-40-42-20200917	B2-PSL5(0.5-0.5)-19950322	B2-PSL5(10-12)-19950322	B3-PSL5(10-11)-19991227	B4-PSL5-19991227	BLDG3-LAB(10-12)-19950329	BLDG3-SB100(8-10)-20120317	BLDG3-SB101(7-9)-20120317	BLDG3-SB102(11-11)-20120318
	Sample Date	9/10/2013	9/10/2013	9/11/2013	9/11/2013	9/12/2013	4/30/2019	4/30/2019	4/30/2019	5/1/2019	5/2/2019	5/2/2019	9/16/2020	9/16/2020	9/17/2020	3/22/1995	3/22/1995	12/27/1999	12/27/1999	3/29/1995	3/17/2012	3/17/2012	3/18/2012
	Depth (ft)	22 - 24	24 - 26	21 - 23	34 - 36	33 - 35	16.1 - 16.1	20.8 - 20.8	21.8 - 21.8	15.1 - 15.1	22 - 22	24.2 - 24.2	45 - 47	55 - 57	40 - 42	0.5 - 0.5	10 - 12	10 - 11	10 - 11	10 - 12	8 - 10	7 - 9	11 - 11
Parameter	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES																							
1,1,1,2-Tetrachloroethane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0052	< 0.0039	< 0.0041
1,1,1-Trichloroethane	mg/kg	2	1.7	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	< 0.08	< 5.6	< 0.43	< 0.0039	< 0.0041
1,1,2,2-Tetrachloroethane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.0038	< 0.0039	< 0.0041
1,1,2-Trichloroethane	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.0038	< 0.0039	< 0.0041
1,1-Dichloroethane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	< 0.08	< 5.6	< 0.43	< 0.0039	< 0.0041
1,1-Dichloroethene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	< 0.08	< 5.6	< 0.0038	< 0.0039	< 0.0041
1,1-Dichloropropene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
1,2,3-Trichlorobenzene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
1,2,3-Trichloropropane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
1,2,4-Trichlorobenzene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
1,2,4-Trimethylbenzene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
1,2-Dibromoethane (EDB)	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
1,2-Dichlorobenzene	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	< 0.006	< 56	---	---	< 5.6	< 0.0038	< 0.0039	< 0.0041
1,2-Dichloroethane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.0038	< 0.0039	< 0.0041
1,2-Dichloropropane	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.0038	< 0.0039	< 0.0041
1,3,5-Trimethylbenzene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
1,3-Dichlorobenzene	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	< 0.006	< 56	---	---	< 5.6	< 0.43	< 0.0039	< 0.0041
1,3-Dichloropropane	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
1,4-Dichlorobenzene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	< 0.006	< 56	---	---	< 5.6	< 0.43	< 0.0039	< 0.0041
1,4-Dioxane	mg/kg	< 6.2	< 3.3	< 5.6	< 31	< 530	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 8.5	< 0.078	< 0.081
2,2-dichloropropane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
2-Butanone	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	< 0.012	< 110	---	---	< 11	< 0.43	< 0.0039	< 0.0041
2-Hexanone	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	< 0.012	< 110	---	---	< 11	< 0.0038	< 0.0039	< 0.0041
4-Isopropyltoluene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
4-Methyl-2-pentanone	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	< 0.012	< 110	---	---	< 11	< 0.43	< 0.0039	< 0.0041
Acetone	mg/kg	< 0.31	0.19	< 0.28	12	< 26	< 2	< 1.7	< 1.8	< 1.7	< 1.7	< 1.7	< 11	< 9.2	< 21	< 0.024	< 220	---	---	< 22	< 0.43	0.056	0.0066
Acrolein	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.024	< 220	---	---	< 22	---	---	---
Acrylonitrile	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.024	< 220	---	---	< 22	---	---	---
Benzene	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	< 0.006	< 56	---	---	< 5.6	< 0.43	< 0.0039	< 0.0041
Bromobenzene	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
Bromodichloromethane	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.0038	< 0.0039	< 0.0041
Bromoform	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.0038	< 0.0039	< 0.0041
Bromomethane	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	< 0.2	< 0.17	< 0.18	< 0.17	< 0.17	< 0.17	< 1.1	< 0.92	< 2.1	< 0.012	< 110	< 0.5	---	< 11	< 0.43	< 0.0039	< 0.0041
Carbondisulfide	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	< 0.006	< 56	---	---	< 5.6	< 0.0038	< 0.0039	< 0.0041
Carbontetrachloride	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.43	< 0.0039	< 0.0041
Chlorobenzene	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.43	< 0.0039	< 0.0041
Chlorobromomethane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
Chloroethane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.012	< 110	< 0.8	---	< 11	< 0.43	< 0.0039	< 0.0041
Chloroform	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.43	< 0.0039	< 0.0041
Chloromethane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.012	< 110	< 0.8	---	< 11	< 0.43	< 0.0039	< 0.0041
cis-1,2-Dichloroethene	mg/kg	0.42	1.7	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	0.12	< 5.6	< 0.43	< 0.0039	< 0.0041
cis-1,3-Dichloropropene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.0038	< 0.0039	< 0.0041
DBCP	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
Dibromochloromethane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.0038	< 0.0039	< 0.0041
Dibromomethane	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
Dichlorodifluoromethane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
Dichloromethane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.012	< 110	< 0.2	---	< 11	< 0.0038	< 0.0039	< 0.0041
Diethyl ether	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
Diisopropyl Ether	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
Ethene,(2-chloroethoxy)-	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.006	< 56	---	---	< 5.6	---	---	---
Ethylbenzene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	< 0.006	< 56	---	---	< 5.6	< 0.43	< 0.0039	< 0.0041
Hexachlorobutadiene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
Isopropylbenzene	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041

Table 6-1
Building 3 Area Soil Sample Results
Former Varian Facility
Beverly, Massachusetts

	Location Code	AP-33-DO		AP-34-DO		AP-35-DO	AP-40-S			AP-41-S			AP-42-DO		AP-43-DO	B2-PSL5	B2-PSL5	B3-PSL5	B4-PSL5	BLDG3-LAB	BLDG3-SB100	BLDG3-SB101	BLDG3-SB102
	Sample ID	AP-33-DO(22-24)-20130910	AP-33-DO(24-26)-20130910	AP-34-DO(21-23)-20130911	AP-34-DO(34-36)-20130911	AP-35-DO(33-35)-20130912	AP40S-11-13	AP40S-29-31	AP40S-35-37	AP41S-0	AP41S-19-21	AP41S-33-35	AP42DO-45-47-20200916	AP42DO-55-57-20200916	AP43-40-42-20200917	B2-PSL5(0.5-0.5)-19950322	B2-PSL5(10-12)-19950322	B3-PSL5(10-11)-19991227	B4-PSL5-19991227	BLDG3-LAB(10-12)-19950329	BLDG3-SB100(8-10)-20120317	BLDG3-SB101(7-9)-20120317	BLDG3-SB102(11-11)-20120318
	Sample Date	9/10/2013	9/10/2013	9/11/2013	9/11/2013	9/12/2013	4/30/2019	4/30/2019	4/30/2019	5/1/2019	5/2/2019	5/2/2019	9/16/2020	9/16/2020	9/17/2020	3/22/1995	3/22/1995	12/27/1999	12/27/1999	3/29/1995	3/17/2012	3/17/2012	3/18/2012
	Depth (ft)	22 - 24	24 - 26	21 - 23	34 - 36	33 - 35	16.1 - 16.1	20.8 - 20.8	21.8 - 21.8	15.1 - 15.1	22 - 22	24.2 - 24.2	45 - 47	55 - 57	40 - 42	0.5 - 0.5	10 - 12	10 - 11	10 - 11	10 - 12	8 - 10	7 - 9	11 - 11
Parameter	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
m,p-xylene	mg/kg	< 0.62	< 0.33	< 0.56	< 3.1	< 53	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0077	< 0.0078	< 0.0081
Methyltert-butylether	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	< 0.006	< 56	---	---	< 5.6	< 0.43	< 0.0039	< 0.0041
Naphthalene	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
n-Butylbenzene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
n-Propylbenzene	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
o-Chlorotoluene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
o-Xylene	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
p-Chlorotoluene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
sec-Butylbenzene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.078	< 0.081
Styrene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	< 0.006	< 56	---	---	< 5.6	< 0.0038	< 0.0039	< 0.0041
tert-AmylMethyl Ether	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
tert-Butylbenzene	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
tert-ButylEthyl Ether	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.0038	< 0.0039	< 0.0041
Tetrachloroethene	mg/kg	< 0.31	0.29	< 0.28	52	740	170	0.95	0.44	0.071	0.38	0.62	14	8.8	12	< 0.006	1200	39	7.8	120	15 D	0.0072	0.047
Tetrahydrofuran	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.43	< 0.0039	< 0.0041
Toluene	mg/kg	< 0.31	< 0.17	< 0.28	---	< 26	---	---	---	---	---	---	---	---	---	< 0.006	< 56	---	---	< 5.6	< 0.43	< 0.0039	< 0.0041
trans-1,2-Dichloroethene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	< 0.08	< 5.6	< 0.0038	< 0.0039	< 0.0041
Trans-1,3-Dichloropropene	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.006	< 56	< 0.08	---	< 5.6	< 0.43	< 0.0039	< 0.0041
Trichloroethene	mg/kg	< 0.31	< 0.17	< 0.28	70 D	450	0.16	0.098	0.079	< 0.068	< 0.069	1.2	54	42	110	< 0.006	< 56	0.23	0.8	< 5.6	< 0.43	< 0.0039	< 0.0041
Trichlorofluoromethane	mg/kg	< 0.31	< 0.17	< 0.28	< 1.6	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	---	---	< 0.8	---	---	< 0.0038	< 0.0039	< 0.0041
Vinyl acetate	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.012	< 110	---	---	< 11	---	---	---
Vinyl chloride	mg/kg	< 0.31	0.52	< 0.28	---	< 26	< 0.08	< 0.067	< 0.073	< 0.068	< 0.069	< 0.069	< 0.44	< 0.37	< 0.86	< 0.012	< 110	< 0.2	< 0.2	< 11	< 0.0038	< 0.0039	< 0.0041
Xylene (total)	mg/kg	< 0.62	< 0.33	< 0.56	< 6.2	< 53	---	---	---	---	---	---	---	---	---	< 0.006	< 56	---	---	< 5.6	< 0.0077	< 0.0078	< 0.0081
GEN CHEMISTRY																							
Cyanide	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.56	---	---	< 0.56	---	---	---
METALS																							
Antimony	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.56	---	---	< 0.22	---	---	---
Arsenic	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	7.3	---	---	8.4	---	---	---
Beryllium	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.56	---	---	< 0.56	---	---	---
Cadmium	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 1.7	---	---	2	---	---	---
Chromium	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17	---	---	23	---	---	---
Copper	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	56	---	---	110	---	---	---
Lead	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 5.6	---	---	6.9	---	---	---
Mercury	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.11	---	---	< 0.025	---	---	---
Nickel	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13	---	---	16	---	---	---
Selenium	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.22	---	---	< 0.22	---	---	---
Silver	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 2.2	---	---	< 2.2	---	---	---
Thallium	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 0.56	---	---	< 0.22	---	---	---
Zinc	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	33	---	---	40	---	---	---
TPH																	---						
TPH	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	< 11	---	---	< 11	---	---	---

Notes:
ft = feet
mg/kg = milligrams per kilogram
--- = Parameter not sampled for.
TPH = total petroleum hydrocarbons

Table 6-1
Building 3 Area Soil Sample Results
Former Varian Facility
Beverly, Massachusetts

	Location Code	BLDG3-SB103	BLDG3-SB104		BLDG3-SB105		BLDG3-SB106		BLDG3-SB107		BLDG3-SB108		OB-49-S	OB-50-S	OB-51-S
	Sample ID	BLDG3-SB103(11-11)-20120318	BLDG3-SB104-01(5-6)-20130724	BLDG3-SB104-02(8-9)-20130724	BLDG3-SB105-01(5-7)-20130725	BLDG3-SB105-02(11-11.8)-20130725	BLDG3-SB106-01(4-5)-20130726	BLDG3-SB106-02(7-9)-20130726	BLDG3-SB107-01(5-7)-20130726	BLDG3-SB107-02(7-8.5)-20130726	BLDG3-SB108-01(4-5)-20130729	BLDG3-SB108-02(9-9.6)-20130729	OB49S-121719-15-17	OB50S-121819-17-19	OB51S-121819-9-11
	Sample Date	3/18/2012	7/24/2013	7/24/2013	7/25/2013	7/25/2013	7/26/2013	7/26/2013	7/26/2013	7/26/2013	7/29/2013	7/29/2013	12/17/2019	12/18/2019	12/18/2019
	Depth (ft)	11 - 11	5 - 6	8 - 9	5 - 7	11 - 11.8	4 - 5	7 - 9	5 - 7	7 - 8.5	4 - 5	9 - 9.6	15 - 17	17 - 19	9 - 11
Parameter	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES															
1,1,1,2-Tetrachloroethane	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,1,1-Trichloroethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
1,1,2,2-Tetrachloroethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
1,1,2-Trichloroethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
1,1-Dichloroethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
1,1-Dichloroethene	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
1,1-Dichloropropene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2,3-Trichlorobenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2,3-Trichloropropane	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2,4-Trichlorobenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2,4-Trimethylbenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2-Dichlorobenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2-Dichloroethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
1,2-Dichloropropane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
1,3,5-Trimethylbenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,3-Dichlorobenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,3-Dichloropropane	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,4-Dichlorobenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
1,4-Dioxane	mg/kg	< 0.074	---	---	---	---	---	---	---	---	---	---	---	---	---
2,2-dichloropropane	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Butanone	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Hexanone	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
4-Isopropyltoluene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
4-Methyl-2-pentanone	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Acetone	mg/kg	0.013	0.0076	0.0037	0.0081	< 0.31	0.0055	0.0045	0.0042	0.0093	< 0.0022	0.0032	< 88	< 86	< 22
Acrolein	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Acrylonitrile	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Bromobenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Bromodichloromethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Bromoform	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Bromomethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 8.8	< 8.6	< 2.2
Carbondisulfide	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Carbontetrachloride	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Chlorobenzene	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Chlorobromomethane	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Chloroethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Chloroform	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Chloromethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
cis-1,2-Dichloroethene	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
cis-1,3-Dichloropropene	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
DBCP	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Dibromochloromethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Dibromomethane	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Dichlorodifluoromethane	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Dichloromethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Diethyl ether	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Diisopropyl Ether	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethene,(2-chloroethoxy)-	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethylbenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Hexachlorobutadiene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Isopropylbenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---

Table 6-1
Building 3 Area Soil Sample Results
Former Varian Facility
Beverly, Massachusetts

	Location Code	BLDG3-SB103	BLDG3-SB104		BLDG3-SB105		BLDG3-SB106		BLDG3-SB107		BLDG3-SB108		OB-49-S	OB-50-S	OB-51-S
	Sample ID	BLDG3-SB103(11-11)-20120318	BLDG3-SB104-01(5-6)-20130724	BLDG3-SB104-02(8-9)-20130724	BLDG3-SB105-01(5-7)-20130725	BLDG3-SB105-02(11-11.8)-20130725	BLDG3-SB106-01(4-5)-20130726	BLDG3-SB106-02(7-9)-20130726	BLDG3-SB107-01(5-7)-20130726	BLDG3-SB107-02(7-8.5)-20130726	BLDG3-SB108-01(4-5)-20130729	BLDG3-SB108-02(9-9.6)-20130729	OB49S-121719-15-17	OB50S-121819-17-19	OB51S-121819-9-11
	Sample Date	3/18/2012	7/24/2013	7/24/2013	7/25/2013	7/25/2013	7/26/2013	7/26/2013	7/26/2013	7/26/2013	7/29/2013	7/29/2013	12/17/2019	12/18/2019	12/18/2019
	Depth (ft)	11 - 11	5 - 6	8 - 9	5 - 7	11 - 11.8	4 - 5	7 - 9	5 - 7	7 - 8.5	4 - 5	9 - 9.6	15 - 17	17 - 19	9 - 11
Parameter	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
m,p-xylene	mg/kg	< 0.0074	---	---	---	---	---	---	---	---	---	---	---	---	---
Methyltert-butylether	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Naphthalene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butylbenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Propylbenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
o-Chlorotoluene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
o-Xylene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
p-Chlorotoluene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
sec-Butylbenzene	mg/kg	< 0.074	---	---	---	---	---	---	---	---	---	---	---	---	---
Styrene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
tert-AmylMethyl Ether	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
tert-Butylbenzene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
tert-ButylEthyl Ether	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Tetrachloroethene	mg/kg	0.028	< 0.0034	< 0.0026	0.018	22 D	< 0.0021	0.01	0.045	0.0085	< 0.0022	0.021	320	260	110
Tetrahydrofuran	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
Toluene	mg/kg	< 0.0037	---	---	---	---	---	---	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Trans-1,3-Dichloropropene	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Trichloroethene	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	0.0027	< 0.0024	< 0.0022	< 0.0022	< 3.5	28	< 0.89
Trichlorofluoromethane	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.78	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Vinyl acetate	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Vinyl chloride	mg/kg	< 0.0037	< 0.0034	< 0.0026	< 0.0022	< 0.31	< 0.0021	< 0.0025	< 0.0018	< 0.0024	< 0.0022	< 0.0022	< 3.5	< 3.4	< 0.89
Xylene (total)	mg/kg	< 0.0074	---	---	---	---	---	---	---	---	---	---	---	---	---
GEN CHEMISTRY															
Cyanide	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
METALS															
Antimony	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Arsenic	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Beryllium	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cadmium	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Copper	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lead	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Mercury	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nickel	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Selenium	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Silver	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Thallium	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Zinc	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TPH															
TPH	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Notes:
ft = feet
mg/kg = milligrams per kilogram
--- = Parameter not sampled for.
TPH = total petroleum hydrocarbons

Table 6-2

Building 5 Area Soil Sample Results

Former Varian Facility
Beverly, Massachusetts

	Location Code	AP-36-S	AP-37-S	AP-38-S	AP-39-S	BLD5-SHIP	BLDG5-SV4	OB-39-BR	OB-44-S		OB-45-BR		OB-53-BR			OB-60-S	
	Sample ID	AP-36-S(16-16.9)-20180726	AP-37-S(6-6.8)-20180726	AP-38-S(6-6.8)-20180725	AP-39-S(16-17)-20180724	BLD5-SHIP-19950401	BLDG5-SV4(6-7.5)-20131230	OB39-BR(37)-20210429	OB-44-S(9-10)-20131230	OB-44-S(17-18)-20131230	OB45-BR(15)-20210507	OB45-BR(35)-20210507	OB-53-BR-(25")-20220331	OB-53-BR-(50-55)-20220331	OB-53-BR-(80-85')-20220401	OB-60-S-7-20220813	OB-60-S-16-20220813
	Sample Date	7/26/2018	7/26/2018	7/25/2018	7/24/2018	4/1/1995	12/30/2013	4/29/2021	12/30/2013	12/30/2013	5/7/2021	5/7/2021	3/31/2022	3/31/2022	4/1/2022	8/13/2022	8/13/2022
	Depth	16 - 16.9	6 - 6.8	6 - 6.8	16 - 17	11 - 13	6 - 7.5	37	9 - 10	17 - 18	15	35	19.5 - 19.5	41.5 - 41.5	64 - 64	7 - 7	16 - 16
Parameter	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES																	
1,1,1,2-Tetrachloroethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,1,1-Trichloroethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.56	< 0.052	< 0.071	< 0.039	< 0.15	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
1,1,2,2-Tetrachloroethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.078	< 0.15	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
1,1,2-Trichloroethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.078	< 0.15	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
1,1-Dichloroethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.56	< 0.052	< 0.071	< 0.039	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
1,1-Dichloroethene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.56	< 0.052	< 0.071	< 0.078	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
1,1-Dichloropropene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,2,3-Trichlorobenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,2,3-Trichloropropane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,2,4-Trichlorobenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,2,4-Trimethylbenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,2-Dibromoethane (EDB)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,2-Dichlorobenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,2-Dichloroethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.039	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
1,2-Dichloropropane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.039	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
1,3,5-Trimethylbenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,3-Dichlorobenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,3-Dichloropropane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,4-Dichlorobenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
1,4-Dioxane	mg/kg	< 2	< 2	< 2	< 2	---	---	< 1.8	---	---	< 1.9	< 1.8	---	---	---	< 1.7	< 1.7
2,2-dichloropropane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
2-Butanone	mg/kg	1	< 0.2	< 0.2	< 0.2	---	---	< 0.21	---	---	< 0.23	< 0.22	---	---	---	< 0.2	< 0.2
2-Hexanone	mg/kg	< 0.3	< 0.4	< 0.3	< 0.3	---	---	< 0.35	---	---	< 0.38	< 0.36	---	---	---	< 0.34	< 0.34
4-Isopropyltoluene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
4-Methyl-2-pentanone	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	---	---	< 0.32	---	---	< 0.35	< 0.33	---	---	---	< 0.31	< 0.3
Acetone	mg/kg	< 2	< 2	< 2	< 2	---	< 0.26	< 1.8	< 0.2	< 0.19	< 1.9	< 1.8	< 8.9	< 9.7	< 2.3	< 1.7	< 1.7
Benzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Bromobenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Bromodichloromethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.078	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
Bromoform	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.078	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
Bromomethane	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	---	< 0.024 B U	< 0.18	0.095 BD	< 0.15	< 0.19	< 0.18	< 0.89	< 0.97	< 0.23	< 0.17	< 0.17
Carbondisulfide	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Carbontetrachloride	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.078	< 0.15	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
Chlorobenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.039	< 0.15	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
Chlorobromomethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Chloroethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.039	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
Chloroform	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.078	< 0.15	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
Chloromethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.039	< 0.15	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
cis-1,2-Dichloroethene	mg/kg	0.2	0.4	< 0.1	0.3	< 0.56	< 0.052	< 0.071	< 0.078	0.057	< 0.077	< 0.073	< 0.35	0.46 J	< 0.09	0.091	0.13
cis-1,3-Dichloropropene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.039	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
DBCP	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Dibromochloromethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.039	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
Dibromomethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Dichlorodifluoromethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Dichloromethane	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	---	< 0.052	< 0.18	< 0.039	< 0.15	< 0.19	< 0.18	< 0.35	< 0.39	< 0.09	< 0.17	< 0.17
Diethyl ether	mg/kg	< 0.3	< 0.4	< 0.3	< 0.3	---	---	< 0.35	---	---	< 0.38	< 0.36	---	---	---	< 0.34	< 0.34
Diisopropyl Ether	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Ethylbenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067

Table 6-2

Building 5 Area Soil Sample Results

Former Varian Facility
Beverly, Massachusetts

	Location Code	AP-36-S	AP-37-S	AP-38-S	AP-39-S	BLD5-SHIP	BLDG5-SV4	OB-39-BR	OB-44-S		OB-45-BR		OB-53-BR			OB-60-S	
	Sample ID	AP-36-S(16-16.9)-20180726	AP-37-S(6-6.8)-20180726	AP-38-S(6-6.8)-20180725	AP-39-S(16-17)-20180724	BLD5-SHIP-19950401	BLDG5-SV4(6-7.5)-20131230	OB39-BR(37)-20210429	OB-44-S(9-10)-20131230	OB-44-S(17-18)-20131230	OB45-BR(15)-20210507	OB45-BR(35)-20210507	OB-53-BR-(25")-20220331	OB-53-BR-(50-55)-20220331	OB-53-BR-(80-85')-20220401	OB-60-S-7-20220813	OB-60-S-16-20220813
	Sample Date	7/26/2018	7/26/2018	7/25/2018	7/24/2018	4/1/1995	12/30/2013	4/29/2021	12/30/2013	12/30/2013	5/7/2021	5/7/2021	3/31/2022	3/31/2022	4/1/2022	8/13/2022	8/13/2022
	Depth	16 - 16.9	6 - 6.8	6 - 6.8	16 - 17	11 - 13	6 - 7.5	37	9 - 10	17 - 18	15	35	19.5 - 19.5	41.5 - 41.5	64 - 64	7 - 7	16 - 16
Parameter	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Hexachlorobutadiene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Isopropylbenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
m,p-xylene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Methyltert-butylether	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Naphthalene	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	---	---	< 0.18	---	---	< 0.19	< 0.18	---	---	---	< 0.17	< 0.17
n-Butylbenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
n-Propylbenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
o-Chlorotoluene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
o-Xylene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
p-Chlorotoluene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
sec-Butylbenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Styrene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
tert-AmylMethyl Ether	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
tert-Butylalcohol	mg/kg	< 2	< 2	< 2	< 2	---	---	< 1.8	---	---	< 1.9	< 1.8	---	---	---	< 1.7	< 1.7
tert-Butylbenzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
tert-ButylEthyl Ether	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
Tetrachloroethene	mg/kg	0.1	1.8	0.1	13	1	< 0.052	< 0.071	10 D	14 D	< 0.077	< 0.073	11 J	11 J	< 0.09	0.58	13
Tetrahydrofuran	mg/kg	< 0.3	< 0.4	< 0.3	< 0.3	---	---	< 0.35	---	---	< 0.38	< 0.36	---	---	---	< 0.34	< 0.34
Toluene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	< 0.071	---	---	< 0.077	< 0.073	---	---	---	< 0.068	< 0.067
trans-1,2-Dichloroethene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.56	< 0.052	< 0.071	< 0.078	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
Trans-1,3-Dichloropropene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.078	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
Trichloroethene	mg/kg	0.4	0.3	< 0.1	2.5	3.5	< 0.052	< 0.071	0.27 D	6.2 D	< 0.077	< 0.073	< 0.35	35 J	< 0.09	< 0.068	1.4
Trichlorofluoromethane	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	< 0.052	< 0.071	< 0.078	< 0.038	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
Vinyl chloride	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 1.1	< 0.052	< 0.071	< 0.078	< 0.15	< 0.077	< 0.073	< 0.35	< 0.39	< 0.09	< 0.068	< 0.067
Xylene (total)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	---	---	---	---	---	---	---	---	---	---	---	---
GEN CHEMISTRY																	
Cyanide	mg/kg	---	---	---	---	< 0.56	---	---	---	---	---	---	---	---	---	---	---
METALS																	
Antimony	mg/kg	---	---	---	---	< 0.22	---	---	---	---	---	---	---	---	---	---	---
Arsenic	mg/kg	---	---	---	---	5.1	---	---	---	---	---	---	---	---	---	---	---
Beryllium	mg/kg	---	---	---	---	< 0.56	---	---	---	---	---	---	---	---	---	---	---
Cadmium	mg/kg	---	---	---	---	< 1.7	---	---	---	---	---	---	---	---	---	---	---
Chromium	mg/kg	---	---	---	---	24	---	---	---	---	---	---	---	---	---	---	---
Copper	mg/kg	---	---	---	---	12	---	---	---	---	---	---	---	---	---	---	---
Lead	mg/kg	---	---	---	---	15	---	---	---	---	---	---	---	---	---	---	---
Mercury	mg/kg	---	---	---	---	< 0.025	---	---	---	---	---	---	---	---	---	---	---
Nickel	mg/kg	---	---	---	---	10	---	---	---	---	---	---	---	---	---	---	---
Selenium	mg/kg	---	---	---	---	0.34	---	---	---	---	---	---	---	---	---	---	---
Silver	mg/kg	---	---	---	---	< 2.2	---	---	---	---	---	---	---	---	---	---	---
Thallium	mg/kg	---	---	---	---	< 0.22	---	---	---	---	---	---	---	---	---	---	---
Zinc	mg/kg	---	---	---	---	44	---	---	---	---	---	---	---	---	---	---	---
TPH																	
TPH	mg/kg	---	---	---	---	< 11	---	---	---	---	---	---	---	---	---	---	---

Notes:

ft = feet
mg/kg = milligrams per kilogram
--- = Parameter not sampled for.
TPH = total petroleum hydrocarbons

Table 6-3
Soil Analytical Results
PSL-10 Area
Former Varian Facility
Beverly, Massachusetts

	Location Code	150_SOH-02		B-2_32-Tozer	MW-1_32-Tozer	MW-2_32-Tozer	MW-4_32-Tozer	MW-5_32-Tozer	PSL10-GP-16
	Sample ID	150_SOH-02-19991201-A	150_SOH-02-19991201-B	B-2_32-TOZER-20110216	MW-1_32-TOZER-20110215	MW-2_32-TOZER-20110215	MW-4_32-TOZER-20111103	MW-5_32-TOZER-20111103	PSL10-GP-16-19991201
	Sample Date	12/1/1999	12/1/1999	2/16/2011	2/15/2011	2/15/2011	11/3/2011	11/3/2011	12/1/1999
	Depth	1 - 3	4 - 6	11.5 - 11.5	20.5 - 20.5	16 - 16	2 - 2	2 - 2	3 - 4
	Sample Purpose	N	N	N	N	N	N	N	N
Parameter	Units	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES									
1,1,1-Trichloroethane	mg/kg	0.08	< 0.05	< 0.0077	< 0.0061	< 0.0053	< 0.0061	< 0.0049	< 0.05
1,1-Dichloroethane	mg/kg	< 0.05	< 0.05	< 0.0077	< 0.0061	< 0.0053	< 0.0061	< 0.0049	< 0.05
1,1-Dichloroethene	mg/kg	< 0.05	< 0.05	< 0.0077	< 0.0061	< 0.0053	< 0.0061	< 0.0049	< 0.05
Acetone	mg/kg	---	---	< 0.0765	< 0.061	< 0.0533	< 0.0605	< 0.0488	---
cis-1,2-Dichloroethene	mg/kg	< 0.05	< 0.05	< 0.0077	< 0.0061	0.0636	< 0.0061	< 0.0049	< 0.05
Naphthalene	mg/kg	---	---	< 0.0077	< 0.0061	< 0.0053	< 0.0061	< 0.0049	---
Tetrachloroethene	mg/kg	1.8	0.37	< 0.0077	< 0.0061	1.49	< 0.0061	< 0.0049	0.15
trans-1,2-Dichloroethene	mg/kg	< 0.05	< 0.05	< 0.0077	< 0.0061	< 0.0053	< 0.0061	< 0.0049	< 0.05
Trichloroethene	mg/kg	0.57	0.06	< 0.0077	0.0869	0.185	< 0.0061	< 0.0049	1.1

Notes:
mg/kg = milligrams per kilogram
--- = Parameter not sampled for

Table 6-4
Summary of Sediment Sample Results
Former Varian Facility
Beverly, Massachusetts

	Location Code	DOWNSTREAM-SED	MIDSTREAM-SED	STR-11	STR-18	STR-19	STR-20	STR-21	STR-22	STR-23	STR-24	STR-26	STR-27	STR-28	STRHA-08	STRM-A-SCDS
	Sample ID	DOWNSTREAM SED-20210513	MIDSTREAM SED-20210513	STR-11-20210326-SOLID	STR-18-20210326-SOLID	STR-19-20210326-SOLID	STR-20-20210326-SOLID	STR-21-20210326-SOLID	STR-22-20210513	STR-23-20210518	STR-24-20210514	STR-26-20210512	STR-27-20210512	STR-28-20210512-S	STRHA-8-20210512-S	STREAM-A-SCDS-20210326-SOLID
	Sample Date	5/13/2021	5/13/2021	3/26/2021	3/26/2021	3/26/2021	3/26/2021	3/26/2021	5/13/2021	5/18/2021	5/14/2021	5/12/2021	5/12/2021	5/12/2021	5/12/2021	3/26/2021
	Depth (ft)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Parameter	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES																
1,1,1-Trichloroethane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
1,1,2,2-Tetrachloroethane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
1,1,2-Trichloroethane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
1,1-Dichloroethane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
1,1-Dichloroethene	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
1,2-Dichloroethane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
1,2-Dichloropropane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Acetone	mg/kg	< 13	< 21	< 4.9	< 3	< 2.9	< 2.8	< 2.6	< 6	< 13	< 3.3	< 24	< 4	< 4	< 4.4	< 2.5
Bromodichloromethane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Bromoform	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Bromomethane	mg/kg	< 1.3	< 2.1	< 0.49	< 0.3	< 0.29	< 0.28	< 0.26	< 0.6	< 1.3	< 0.33	< 2.4	< 0.4	< 0.4	< 0.44	< 0.25
Carbontetrachloride	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Chlorobenzene	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Chloroethane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Chloroform	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Chloromethane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
cis-1,2-Dichloroethene	mg/kg	< 0.5	12	0.24	< 0.12	0.17	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
cis-1,3-Dichloropropene	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Dibromochloromethane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Dichloromethane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Tetrachloroethene	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
trans-1,2-Dichloroethene	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Trans-1,3-Dichloropropene	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Trichloroethene	mg/kg	< 0.5	< 0.83	0.24	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	1.1	< 0.16	< 0.16	< 0.18	< 0.1
Trichlorofluoromethane	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
Vinyl chloride	mg/kg	< 0.5	< 0.83	< 0.19	< 0.12	< 0.11	< 0.11	< 0.1	< 0.24	< 0.52	< 0.13	< 0.97	< 0.16	< 0.16	< 0.18	< 0.1
METALS																
Antimony	mg/kg	3	5.6	---	---	---	---	---	1.2	6.8	0.49	3.8	< 0.5	< 0.46	< 0.44	---
Arsenic	mg/kg	8.2	12	8.5	14	4.3	3.9	4	12 M	7.9	5.1	32	3.1	4.5	7.7	6.2
Barium	mg/kg	45	110	---	---	---	---	---	45	69	19	580	61	52	68	---
Beryllium	mg/kg	< 0.71	< 0.99	---	---	---	---	---	< 0.64	< 0.8	< 0.47	< 1.3	0.79	< 0.46	< 0.44	---
Cadmium	mg/kg	< 0.71	1.9	---	---	---	---	---	< 0.64	1.4	0.55	1.7	< 0.5	< 0.46	< 0.44	---
Chromium	mg/kg	36	71	---	---	---	---	---	25	74	9.6	46	13	6.2	12	---
Iron	mg/kg	---	---	13000	17000	8500	9300	10000	---	---	---	---	---	---	---	17000
Lead	mg/kg	160	110	---	---	---	---	---	120	130	18	74	9.4	5.8	7	---
Manganese	mg/kg	---	---	320	800	130	91	72	---	---	---	---	---	---	---	130
Mercury	mg/kg	< 0.27	< 0.36	---	---	---	---	---	< 0.19	< 0.31 M	< 0.15	< 0.51	< 0.19	< 0.14	< 0.16	---
Nickel	mg/kg	14	25	8.8	4.9	5.6	< 5.6	6.3	13	28	8.8	65	5.9	13	11	7.4
Selenium	mg/kg	< 7.1	< 9.9	---	---	---	---	---	< 6.4 UM	< 8	< 4.7	< 13	< 5	< 4.6	< 4.4	---
Silver	mg/kg	< 3.5	< 5	---	---	---	---	---	< 3.2	< 4	< 2.3	< 6.3	< 2.5	< 2.3	< 2.2	---
Thallium	mg/kg	< 0.71	< 0.99	---	---	---	---	---	< 0.64	< 0.8	< 0.47	< 1.3	< 0.5	< 0.46	< 0.44	---
Vanadium	mg/kg	28	48	---	---	---	---	---	42 D	46	17	33	16	7.9	14	---
Zinc	mg/kg	250	340	---	---	---	---	---	100 M	340	60	430	130	36	44	---

Notes:
ft = feet
mg/kg = milligrams per kilogram
--- = Parameter not sampled for.

Table 7-1
Summary Statistics - Soil
Former Varian Facility Site

Compound	Units	#Samples	# Hits	% Hits	Minimum	Min Location	Min Depth	Maximum	Background	Max Location	Max Depth	S-1 DC STD	Average
Metals													
Arsenic	mg/kg	7	7	100	2.1	B1-PSL7-19950308	5-7	9.6	20	B1-PSL5-19950322	14-15		5.96
Beryllium	mg/kg	7	1	14	0.55	B1-PSL8A(10-12)-19950320	10-12	0.55	0.5	B1-PSL8A(10-12)-19950320	10-12		0.32
Cadmium	mg/kg	7	1	14	2	BLDG3-LAB(10-12)-19950329	10-12	2	2	BLDG3-LAB(10-12)-19950329	10-12		1.00
Chromium	mg/kg	7	7	100	9.8	B1-PSL7-19950308	5-7	24	30	BLD5-SHIP-19950401	11-13		17.69
Copper	mg/kg	7	7	100	8.4	B1-PSL7-19950308	5-7	110	40	BLDG3-LAB(10-12)-19950329	10-12		41.34
Lead	mg/kg	7	3	43	6.1	B1-PSL7-19950308	5-7	15	100	BLD5-SHIP-19950401	11-13		5.57
Mercury	mg/kg	7	4	57	0.064	B1-PSL5-19950322	14-15	0.17	0.3	B1-PSL8A(10-12)-19950320	10-12		0.07
Nickel	mg/kg	7	7	100	8.4	B1-PSL7-19950308	5-7	22	20	B1-PSL5-19950322	14-15		12.84
Selenium	mg/kg	7	2	29	0.23	B1-PSL5-19950322	14-15	0.34	0.5	BLD5-SHIP-19950401	11-13		0.16
Zinc	mg/kg	7	7	100	21	B1-PSL7-19950308	5-7	44	100	B1-PSL5-19950322 BLD5-SHIP-19950401	14-15 and 11-13		35.57
VOCs													
1,1,1-Trichloroethane	mg/kg	75	3	4	0.065	AP-26-DO(0-0)-20080424	0	2		AP-33-DO(22-24)-20130910	22-24	500	0.76
2-Butanone	mg/kg	27	1	4	1	AP-36-S(16-16.9)-20180726	16-16.9	1		AP-36-S(16-16.9)-20180726	16-16.9		2.86
Acetone	mg/kg	66	13	20	0.0032	BLDG3-SB108-02(9-9.6)-20130729	9-9.6	12		AP-34-DO(34-36)-20130911	34-36	500	5.08
Bromomethane	mg/kg	68	1	1	0.095	OB-44-S(9-10)-20131230	9-10	0.095		OB-44-S(9-10)-20131230	9-10	90	1.38
cis-1,2-Dichloroethene	mg/kg	75	10	13	0.057	OB-44-S(17-18)-20131230	17-18	1.7		AP-33-DO(24-26)-20130910	24-26		0.78
Tetrachloroethene	mg/kg	74	46	62	0.0072	BLDG3-SB101(7-9)-20120317	7-9	1200		B2-PSL5(10-12)-19950322	10-12		43.62
Trichloroethene	mg/kg	74	29	39	0.0027	BLDG3-SB107-01(5-7)-20130726	5-7	450		AP-35-DO(33-35)-20130912	33-35		14.84
Vinyl chloride	mg/kg	74	1	1	0.52	AP-33-DO(24-26)-20130910	24-26	0.52		AP-33-DO(24-26)-20130910	24-26		1.12

Background - MassDEP, 2002, Technical Update, Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil, Update to Section 2.3 Guidance for Disposal Site Risk Characterization -
In support of the Massachusetts Contingency Plan, May.
Average concentrations calculated using detects and 1/2 the reporting limit for nondetects.
S-1 DC STD denotes S-1 Direct Contact Standard per the MCP
mg/kg = milligrams per kilogram

Table 7-2
Summary Statistics - Groundwater
Former Varian Facility Site

Compound	Units	#Samples	# Hits	% Hits	Maximum	Max Location	Max Date	GW-1 std	Average	COC	Reason
Metals											
Arsenic	mg/L	3	2	67	0.019	GDS-03-20210326	3/26/2021	0.01	0.01	No	NR
Calcium	mg/L	11	11	100	350	OB-57-DO-20220809	08/09/22	na	61.69	No	EN
Iron	mg/L	3	3	100	34	GDS-01-20210326	3/26/2021	na	29.00	No	EN
Magnesium	mg/L	11	11	100	17	OB-12-S-20220808	8/8/2022	na	6.87	No	EN
Manganese	mg/L	3	3	100	7.2	GDS-02-20210326	3/26/2021	na	5.47	No	EN
Potassium	mg/L	11	11	100	62	OB-57-DO-20220809	8/9/2022	na	9.26	No	EN
Sodium	mg/L	11	11	100	140	OB-57-DO-20220809	8/9/2022	na	34.09	No	EN
Arsenic	mg/L	3	1	33	0.013	GDS-03-20210326	3/26/2021	0.01	0.01	No	NR
Iron	mg/L	3	3	100	31	GDS-01-20210326	3/26/2021	NA	26.00	No	EN
Manganese	mg/L	3	3	100	7	GDS-02-20210326	3/26/2021	NA	5.27	No	NR
VOCs											
1,1,1-Trichloroethane	mg/L	563	36	6	52	AP-24-DO-20210223	2/23/2021	0.2	0.78	Yes	
1,1,2,2-Tetrachloroethane	mg/L	563	2	0.4	0.21	AP-23-DO-20210909	9/9/2021	0.005	0.09	No	LF
1,1,2-Trichloroethane	mg/L	563	2	0.4	0.026	AP-35-DO-20211109	11/9/2021	0.005	0.026	No	LF
1,1-Dichloroethane	mg/L	563	69	12	3.9	AP-24-DO-20220215	2/15/2022	0.07	0.15	Yes	
1,1-Dichloroethene	mg/L	563	103	18	5.1	Multiple		0.007	0.13	Yes	
1,2,4-Trimethylbenzene	mg/L	26	1	4	0.004	OB-59-DO-20220809	8/9/2022	NA	0.004	No	LF
1,2-Dichloroethane	mg/L	563	6	1	0.022	AP-35-DO-20211109	11/092021	0.005	0.022	No	LF
1,2-Dichloropropane	mg/L	563	3	1	0.014	OB-10-DO-20211115	11/15/2021	0.005	0.014	No	LF
2-Butanone	mg/L	26	2	8	0.0271	AP-36-S-20210126	1/26/2021	4	0.027	No	LF
Acetone	mg/L	563	77	14	78	AP-38-S-20200909	9/9/2020	6.3	0.60	Yes	
Benzene	mg/L	26	5	19	0.003	OB-59-DO-20220809	8/9/2022	0.005	0.003	No	OS
Bromodichloromethane	mg/L	563	2	0.4	0.0064	OB-57-DO-20220809	8/9/2022	0.003	0.0064	No	LF
Chlorobenzene	mg/L	563	3	1	0.003	AP-22-20211110, MW-016-20220509	11/10/2021, 05/09/2022	0.1	0.003	No	LF
Chloroethane	mg/L	563	24	4	0.041	AP-35-DO-20201124	11/24/2020	NA	0.041	No	LF
Chloroform	mg/L	563	27	5	7.2	AP-31-DO-20220509	5/9/2022	0.07	0.13	No	OS
Chloromethane	mg/L	563	8	1	0.005	Multiple		NA	0.005	No	LF
cis-1,2-Dichloroethene	mg/L	563	404	72	500	AP-33-DO-20220211	2/11/2022	0.07	18.86	Yes	
Dibromochloromethane	mg/L	563	1	0.2	0.002	AP42DO-20200923	9/23/2020	0.002	0.002	No	LF
Dichloromethane	mg/L	563	8	1	0.62	AP-23-DO-20210909	9/9/2021	0.005	0.22	No	LF
Diisopropyl Ether	mg/L	21	1	5	0.002	OB-59-DO-20220809	8/9/2022	NA	0.002	No	LF
Ethylbenzene	mg/L	26	1	4	0.004	OB-59-DO-20220809	8/9/2022	0.7	0.004	No	LF
m,p-xylene	mg/L	26	1	4	0.012	OB-59-DO-20220809	8/9/2022	10	0.012	No	LF
o-Xylene	mg/L	26	1	4	0.006	OB-59-DO-20220809	8/9/2022	10	0.006	No	LF
Tetrachloroethene	mg/L	563	240	43	65	AP-32-DO-20200821	8/21/2020	0.005	1.44	Yes	
Tetrahydrofuran	mg/L	26	6	23	0.25	AP-36-S-20200909	9/9/2020	NA	0.05	Yes	
Toluene	mg/L	26	3	12	0.015	OB-11-DO-20220808	8/8/2022	1	0.015	No	OS
trans-1,2-Dichloroethene	mg/L	563	81	14	2.9	AP-24-DO-20210520	5/20/2021	0.1	0.11	Yes	
Trichloroethene	mg/L	563	315	56	600	OB-45-BR-20211110	11/10/2021	0.005	9.61	Yes	
Vinyl chloride	mg/L	563	210	37	130	AP-23-DO-20211109	11/9/2021	0.002	1.96	Yes	

Notes:

mg/L denotes milligrams per liter

GW-1 denotes GW-1 groundwater standard per the MCP

COC denotes Contaminant of Concern

LF denotes low frequency (detected in less 3 samples) or less than 10% of the samples and low concentration (maximum concentration < 10 times the GW-1 Standard)

OS denotes "other source" of compound identified

NR denotes data not representative

EN denotes essential nutrient

Average concentrations are calculated using the detected concentrations and 1/2 the reporting limit for the nondetect results. If the calculated average was greater than the maximum detected concentration, the maximum detected concentration was used as the average (highlighted in green)

Table 7-3
Summary Statistics - Facility Building Indoor Air
Former Varian Facility Site

Compound	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	CI/TV
1,1,1-Trichloroethane	ug/m3	18	7	0.125	BLDG3-3-20210624	06/24/21	0.284	BLDG5-1-20211007	10/07/21	0.19	4400
1,1-Dichloroethene	ug/m3	18	1	0.155	BLDG3-3-20210325	03/25/21	0.155	BLDG3-3-20210325	03/25/21	0.11	180
1,2-Dichloroethane	ug/m3	18	3	0.089	BLDG2-6-20210921	09/21/21	0.138	BLDG2-6-20210624	06/24/21	0.11	NA GW
Acetone	ug/m3	18	18	73.200	BLDG2-6-20211222	12/22/21	610	BLDG5-1-20200402	04/02/20	245.61	NA
Carbontetrachloride	ug/m3	18	15	0.377	BLDG3-3-20210325	03/25/21	0.516	BLDG5-2-20211007	10/07/21	0.47	NA GW
Chloroform	ug/m3	18	15	0.112	BLDG3-3-20211222	12/22/21	0.576	BLDG5-3-20211007	10/07/21	0.29	NA GW
Chloromethane	ug/m3	18	16	0.740	BLDG5-1-20200402	04/02/20	1.8	BLDG2-6-20210325	03/25/21	0.96	NA GW
cis-1,2-Dichloroethene	ug/m3	18	12	0.309	BLDG2-6-20210624	06/24/21	2.3	BLDG5-2-20200708	07/08/20	0.72	5.3
Dichloromethane	ug/m3	18	7	0.760	BLDG5-2-20190827	08/27/19	90	BLDG3-3-20210624	06/24/21	6.20	NA GW
Tetrachloroethene	ug/m3	18	18	0.746	BLDG2-6-20210624	06/24/21	10	BLDG5-2-20190827	08/27/19	3.63	4.1
trans-1,2-Dichloroethene	ug/m3	18	16	0.896	BLDG5-2-20211007	10/07/21	543	BLDG2-6-20210921	09/21/21	59.13	NA
Trichloroethene	ug/m3	18	18	0.312	BLDG3-3-20211222	12/22/21	8.6	BLDG5-2-20190827	08/27/19	3.15	1.8
Trichlorofluoromethane	ug/m3	18	18	0.938	BLDG3-3-20210325	03/25/21	4.4	BLDG5-2-20190827	08/27/19	2.30	NA GW
Vinyl chloride	ug/m3	18	3	0.056	BLDG5-3-20211007	10/07/21	0.074	BLDG5-1-20211007	10/07/21	0.08	1.3

Notes:

Samples include the most recent four rounds for Buildings 3 and 5, although 2022 results for Building 3 are excluded due to the long term shutdown starting in January.

ug/m3 denotes micrograms per cubic meter

Average calculated using detected values and 1/2 the reporting limit for nondetect results

C/I TV denotes Commercial/Industrial Threshold Values (MassDEP, 2016)

NA denotes chemicals excluded based on known source in Building 3

NA GW denotes chemicals excluded because chemical not identified in groundwater

▨ denotes chemical identified as COC in air (Varian buildings)

ug/m3 = micrograms per meter cubed

Table 7-4
Summary Statistics - Tozer Road Indoor Air
Former Varian Facility Site

Compound	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	C/I TV	COC	Comment
1,1,1-Trichloroethane	ug/m3	29	1	0.142	39-TOZ-02-20220106	01/06/22	0.142	39-TOZ-02-20220106	01/06/22	0.20	4400	No	Not detected in soil vapor at 39 Tozer in 2022 sampling
1,1,2-Trichloroethane	ug/m3	23	1	0.24	SK-28	12/08/20	0.24	SK-28	12/08/20	0.11	0.72	No	Not a COC in groundwater or in Varian IA
1,2,4-Trimethylbenzene	ug/m3	3	2	0.24	SK-28	12/08/20	0.31	SK-16	12/07/20	0.35	NA	No	Not a COC in groundwater or in Varian IA
1,2-Dichlorobenzene	ug/m3	23	1	0.15	39-TOZ-02-20220106	01/06/22	0.15	39-TOZ-02-20220106	01/06/22	0.34	710	No	Not detected in soil vapor at 39 Tozer in 2022 sampling
1,2-Dichloroethane	ug/m3	23	6	0.081	31-TOZ01-20210330, 31-TOZ03-20210330	3/30/2021, 3/30/2021	0.316	39-TOZ-03-20210319	03/19/21	0.33	0.44	No	All concentrations less than C/I TV
1,3,5-Trimethylbenzene	ug/m3	3	1	0.36	SK-16	12/07/20	0.36	SK-16	12/07/20	1.76	NA	No	Not a COC in groundwater or in Varian IA
1,4-Dichlorobenzene	ug/m3	23	2	0.126	39-TOZ-01-20220106	01/06/22	0.301	39-TOZ-02-20220106	01/06/22	0.35	1.7	No	Not detected in soil vapor at 39 Tozer in 2022 sampling
2-Butanone	ug/m3	20	8	1.73	39-TOZ-03-20220106	01/06/22	6.69	39-TOZ-01-20220106	01/06/22	1.89	4400	No	Not a COC in groundwater or in Varian IA
Acetone	ug/m3	20	20	3.59	31 TOZER 02-20211220	12/20/21	273	39-TOZ-02-20210319	03/19/21	50.85	710	No	Other source identified
Benzene	ug/m3	23	19	0.323	31-TOZ03-20210330	03/30/21	1.24	39-TOZ-02-20220106	01/06/22	0.50	11	No	Not a COC in groundwater or in Varian IA
Carbontetrachloride	ug/m3	23	22	0.3	SK-28	12/08/20	0.623	39-TOZ-02-20220106	01/06/22	0.40	1.9	No	Not a COC in groundwater or in Varian IA
Chloroform	ug/m3	23	18	0.098	31 TOZER 02-20211220	12/20/21	3.6	SK-16	12/07/20	0.56	3	No	Not a COC in groundwater or in Varian IA
cis-1,2-Dichloroethene	ug/m3	29	13	0.079	30TOZER-4-20211229, 30TOZER-6-20211229	12/29/2021, 12/29/2021	2	32 TOZER-1-20150416, 32 TOZER-2-20150416	4/16/2015, 4/16/2015	0.38	5.3	No	All concentrations less than C/I TV
Dichloromethane	ug/m3	23	4	0.26	SK-29	12/08/20	4.93	39-TOZ-01-20210318	03/18/21	1.08	530	No	Not a COC in groundwater or in Varian IA
Ethylbenzene	ug/m3	23	21	0.096	31 TOZER 01-20211220	12/20/21	65.2	39-TOZ-02-20220106	01/06/22	4.43	880	No	Not a COC in groundwater or in Varian IA
m,p-xylene	ug/m3	23	22	0.19	SK-29	12/08/20	283	39-TOZ-02-20220106	01/06/22	18.44	88	No	Not a COC in groundwater or in Varian IA
Naphthalene	ug/m3	20	5	0.273	39-TOZ-01-20210318	03/18/21	2.22	39-TOZ-02-20210319	03/19/21	0.28	2.7	No	Not a COC in groundwater or in Varian IA
o-Xylene	ug/m3	23	21	0.087	31-TOZ02-20210330	03/30/21	101	39-TOZ-02-20220106	01/06/22	6.54	88	No	Not a COC in groundwater or in Varian IA
Styrene	ug/m3	23	16	0.128	31 TOZER 04-20211220	12/20/21	14.6	39-TOZ-01-20220106	01/06/22	1.70	20	No	Not a COC in groundwater or in Varian IA
Tetrachloroethene	ug/m3	29	27	0.217	31 TOZER 04-20211220	12/20/21	7	32 TOZER-1-20150416	04/16/15	1.04	4.1	NA	Previously evaluated (see text)
Toluene	ug/m3	23	21	0.373	31-TOZ02-20210330	03/30/21	9.46	39-TOZ-01-20220106	01/06/22	2.90	4400	No	Not a COC in groundwater or in Varian IA
trans-1,2-Dichloroethene	ug/m3	26	11	0.079	39-TOZ-03-20210319	03/19/21	0.484	30-TOZ-06-20210408	04/08/21	0.21	53	No	All concentrations less than C/I TV
Trichloroethene	ug/m3	29	19	0.183	31 TOZER 02-20211220	12/20/21	3.17	39-TOZ-01-20220106	01/06/22	0.75	1.8	No	Concentrations in indoor air not attributed to VI (see text)
Vinyl chloride	ug/m3	29	1	0.064	39-TOZ-01-20220106	01/06/22	0.064	39-TOZ-01-20220106	01/06/22	0.18	1.3	No	Not detected in soil vapor at 39 Tozer in 2022 sampling
Xylene (total)	ug/m3	17	16	0.313	31-TOZ02-20210330	03/30/21	11.6	39-TOZ-02-20210319	03/19/21	1.63	88	No	Not a COC in groundwater or in Varian IA

Notes:

See Section 7.1.1.4 for rounds included.

COCs = Contaminants of Concern

ug/m3 = micrograms per meter cubed

C/I TV denotes Commercial/Industrial Threshold Values (MassDEP, 2016)

Table 7-5
Residential Indoor Air Sampling Summary
Former Varian Facility Site

Location	Indoor Air Sampling Dates	No. Locations Per Event	Sump Sampled?	VI Pathway Complete?	Notes	Reference
1 Longview Terrace	12/7/2020, 2/25/2021	1-3	None present	No		MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
2 Longview Terrace	12/7/2020	1	No	No		MassDEP (2020)
3 Longview Terrace	12/7/2020	1	No	No		MassDEP (2020)
9 Longview Terrace	12/7/2020	1	No	No		MassDEP (2020)
10 Longview Terrace	12/7/2020	1	No	No		MassDEP (2020)
11 Longview Terrace	12/7/2020	1	No	No		MassDEP (2020)
29 Longview Drive	3/4/2021	3	None present	No		Vapor Intrusion Assessment Report (APTIM, 2021c)
30 Longview Drive	12/7/2020	1	No	No		MassDEP (2020)
31 Longview Drive	12/8/2020	1	No	No		MassDEP (2020)
33 Longview Drive	12/7/2020, 3/2/2021	1-3	Dry	No		MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
34 Longview Drive	12/7/2020, 2/26/21, 10/26/21, 11/16/21, 1/14/22, 4/22/22, 7/14/22	2-3	Dry	Potentially	Potential background sources in basement identified in 2/2021, removed for next round. SRM condition identified and IRA initiated; Quarterly soil vapor and indoor air samples collected.	MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c); APTIM (2022) Phase V ROS Report July-Dec. 2021; APTIM (2022) IRA Status (draft)
23 Jordan Street	12/7/2020	1	No	No		MassDEP (2020)
26 Jordan St.	2/23/21, 11/3/21	3	Yes	No	Background source of TCE in first round, removed for second round.	Vapor Intrusion Assessment Report (APTIM, 2021c); APTIM (2022) Phase V ROS Report July-Dec. 2021
29 Jordan St.	12/8/2020	1	No	No		MassDEP (2020)
32 Jordan St.	12/8/2020	1	No	No		MassDEP (2020)
40 Jordan St.	12/7/2021	1	No	No		MassDEP (2020)
26 Lexington Drive	12/7/2020	1	No	No		MassDEP (2020)
32 Lexington Drive	3/5/2021	3	Dry	No		Vapor Intrusion Assessment Report (APTIM, 2021c)
33 Lexington Drive	12/8/2020, 2/11/2021	1-3	None present	No		MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
34 Lexington Drive	2/18/2021	3	Not accessible	No	Potential background source of PCE	Vapor Intrusion Assessment Report (APTIM, 2021c)
36 Lexington Drive	2/19/21, 10/26/21	3	Not accessible	No	Background source of TCE in first round, removed for second round.	Vapor Intrusion Assessment Report (APTIM, 2021c); APTIM (2022) Phase V ROS Report July-Dec. 2021
38 Lexington Drive	12/7/2020, 2/12/2021	1-4	None present	No		MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
40 Lexington Drive	12/8/2020	1	No	No		MassDEP (2020)
3 Sonning Road	12/7/2020	1	No	No		MassDEP (2020)
27 Sonning Road	12/7/2020, 2/25/2021	1-2	None present	No		MassDEP (2020); Vapor Intrusion Assessment Report ATIM (2021c)
28 Sonning Road	12/7/2020	1	No	No		MassDEP (2020)
30 Sonning Road	12/8/2020, 3/12/21, 10/26/21	1-3	Yes	No	PCE in second floor attributed to indoor source.	MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c); APTIM (2022) Phase V ROS Report July-Dec. 2021
31 Sonning Road	12/7/2020, 3/11/2021	1-3	Yes	No	Background source of PCE identified in upper floors	MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
32 Sonning Road	12/8/2020, 2/19/2021	1-2	Yes	No		MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
33 Sonning Road	12/9/2020	1	No	No		MassDEP (2020)
34 Sonning Road	12/8/2020, 2/19/2021	1-3	None present	No		MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
36 Sonning Road	12/8/2020	1	No	No		MassDEP (2020)
39 Sonning Road	12/7/2020, 3/2/2021	1-2	Dry	No		MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
40 Sonning Road	12/7/2020, 2/26/2021	1-2	None present	No		MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
41 Sonning Road	12/7/2020, 3/12/2021	1-3	Dry	No		MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
42 Sonning Road	12/8/2020	1	No	No		MassDEP (2020)
43 Sonning Road	12/8/2020, 2/23/2021	1-2	None present	No		MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
46 Sonning Road	12/7/2020	1	No	No		MassDEP (2020)
47 Sonning Road	12/7/2020	1	No	No		MassDEP (2020)
49 Sonning Road	12/8/2020	1	No	No		MassDEP (2020)
55 Sonning Road	12/7/2020	1	No	No		MassDEP (2020)
57 Sonning Road	12/7/2020	1	No	No		MassDEP (2020)
61 Sonning Road	12/7/2020, 12/23/2021	1-2	None present		Concentrations greater than the C/I TV in the basement, but attributed to background sources identified. No vapor sampling allowed by owner.	MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
63 Sonning Road	12/7/2020, 2/12/2021	1-3	Yes	No		MassDEP (2020); Vapor Intrusion Assessment Report (APTIM, 2021c)
65 Sonning Road	12/8/2020	1-3	No	No		MassDEP (2020)

Notes:
VI = vapor intrusion

Table 7-6
Contaminants of Concern
Former Varian Facility Site

COCs by Exposure Medium				
Chemical	Soil	Groundwater	Indoor Air (Former Varian Buildings)	Indoor Air 34 Longview Drive
1,1,1-Trichloroethane	X	X		
1,1-Dichloroethane		X		
1,1-Dichloroethene		X		
cis-1,2-Dichloroethene	X	X	X	
Acetone	X	X		
Tetrachloroethene	X	X	X	X
Tetrahydrofuran		X		
trans-1,2-Dichloroethene		X		
Trichloroethene	X	X	X	X
Vinyl chloride	X	X		

Notes:

COCs = Contaminants of Concern

Table 7-7
Exposure Profiles
Former Varian Facility Site

Time Frame	Receptor	Medium	Exposure Point	Exposure Route	Evaluated?	Rationale
Current	Facility Workers	Soil	Unpaved surface soil (0-3') at 150 Sohier Road	Ingestion Dermal Contact	No	Limited area of exposure, low concentrations
		Indoor Air	Facility buildings – with systems on	Inhalation	Yes	NA
	Utility workers - Facility	Soil	Soil - 0-6’ 150 Sohier Road	Ingestion Dermal Contact	No	Assumed to be insignificant -see text
	Workers/Facility Visitors/Landscapers, recreational use	Soil	Unpaved surface soil (0-3') – PSL10, grass field	Ingestion Dermal Contact	Yes	NA
	Downgradient site workers	Indoor Air	Various Commercial Buildings	Inhalation	No	Shown to be Incomplete pathway or No Significant Risk
	Downgradient Residents	Surface Water	Unnamed Stream and Stream A (older children wading)	Dermal Contact	No	Previously Evalulated (APTIM, 2021a)
		Indoor Air	Various Residential Dwellings	Inhlation	No except 34 Longview Dr.	Shown to be Incomplete pathway or No Significant Risk (except 34 Longview Dr.)
Future	Facility Workers	Soil	Soil 0-15' 150 Sohier Road	Ingestion Dermal Contact	No	Would be less than future residents
		Indoor Air	Same as current	NA	NA	NA
	Future Residents - 150 Sohier Road	Soil	Soil 0-15' 150 Sohier Road	Ingestion Dermal Contact	Yes	NA
		Indoor Air	Not evaluated	NA	NA	Exposure point concentrations cannot be derived
	Construction Workers	Soil	Soil 0-15' 150 Sohier Road	Ingestion, Dermal Contact	Yes	NA
		Groundwater	Groundwater (0-15') – 150 Sohier Road	Dermal Contact	Yes	NA
	Workers/Site Visitors/Landscapers, recreational use	Soil	Soil (0-15') – PSL10, grass field - same as current	NA	NA	NA
	Downgradient Site Workers	Indoor air	same as current	NA	NA	NA
	Downgradient Residents	Surface Water	same as current	NA	NA	NA
		Indoor Air	same as current	NA	NA	NA

Table 7-8
Soil Samples Used in Risk Characterization
Former Varian Facility Site

All Non Hot Spot Samples

Sample ID	Location	Sample ID	Location
OB-42-BR(45-50')	30 Tozer	AP41S-0	150 Sohier Road
OB-42-BR(25-30')-20220407	30 Tozer	AP41S-19-21	150 Sohier Road
AP-26-DO(0-0)-20080424	150 Sohier Road	AP42DO-45-47-20200916	150 Sohier Road
AP-33-DO(22-24)-20130910	150 Sohier Road	AP42DO-55-57-20200916	150 Sohier Road
AP-33-DO(24-26)-20130910	150 Sohier Road	OB39-BR(37)-20210429	150 Sohier Road
AP-34-DO(21-23)-20130911	150 Sohier Road	OB45-BR(15)-20210507	150 Sohier Road
AP-36-S(16-16.9)-20180726	150 Sohier Road	OB45-BR(35)-20210507	150 Sohier Road
AP-37-S(6-6.8)-20180726	150 Sohier Road	OB52-BR(45)-20210426	150 Sohier Road
AP-38-S(6-6.8)-20180725	150 Sohier Road	OB50S-121819-17-19	150 Sohier Road
B1-PSL8(10-12)-19950309	150 Sohier Road	B1-PSL5-19950322	150 Sohier Road
B1-PSL8A(0-0)-19950320	150 Sohier Road	B1-PSL5-19950322-S	150 Sohier Road
B1-PSL8A(10-12)-19950320	150 Sohier Road	B1-PSL7-19950308	150 Sohier Road
B2-PSL5(0.5-0.5)-19950322	150 Sohier Road	B2-PSL7-19991108	150 Sohier Road
B2-PSL8(13-15)-19960301	150 Sohier Road	OB-53-BR-(50-55)-20220331	150 Sohier Road
B3-PSL8(10-12)-19991108	150 Sohier Road	OB-54-BR(40-45')-20220405	150 Sohier Road
B4-PSL8(10-12)-19991108	150 Sohier Road	OB-59-DO-51-220728	150 Sohier Road
BLDG3-SB101(7-9)-20120317	150 Sohier Road	OB-55-BR-30.0-220725	150 Sohier Road
BLDG3-SB102(11-11)-20120318	150 Sohier Road	OB-57-DO-53.5-220722	150 Sohier Road
BLDG3-SB103(11-11)-20120318	150 Sohier Road	OB-57-DO-56.0-220722	150 Sohier Road
BLDG3-SB104-01(5-6)-20130724	150 Sohier Road	OB-57-DO-58.5-220722	150 Sohier Road
BLDG3-SB104-02(8-9)-20130724	150 Sohier Road	OB-58-DO-35-220729	150 Sohier Road
BLDG3-SB105-01(5-7)-20130725	150 Sohier Road	OB-58-DO-55-220729	150 Sohier Road
BLDG3-SB106-01(4-5)-20130726	150 Sohier Road	OB-55-BR-59.0-220726	150 Sohier Road
BLDG3-SB106-02(7-9)-20130726	150 Sohier Road	OB-57-DO-61.0-220726	150 Sohier Road
BLDG3-SB107-01(5-7)-20130726	150 Sohier Road	OB-59-DO-24.0-220727	150 Sohier Road
BLDG3-SB107-02(7-8.5)-20130726	150 Sohier Road	OB-60-S-7-20220813	150 Sohier Road
BLDG3-SB108-01(4-5)-20130729	150 Sohier Road	B4-PSL5-19991227	150 Sohier Road
BLDG3-SB108-02(9-9.6)-20130729	150 Sohier Road		
BLDG5-SV4(6-7.5)-20131230	150 Sohier Road		
AP40S-29-31	150 Sohier Road		
AP40S-35-37	Varian site		

Hot Spot Samples

Hot Spot 1 - Building 3 Chem Lab

B2-PSL5(10-12)-19950322
B3-PSL5(10-11)-19991227
BLDG3-LAB(10-12)-19950329
BLDG3-SB105-02(11-11.8)-20130725

Hot Spot 2 - Building 3 Northeast Corner

AP-34-DO(34-36)-20130911
AP-35-DO(33-35)-20130912
BLDG3-SB100(8-10)-20120317
AP40S-11-13
AP41S-33-35
AP43-40-42-20200917
OB49S-121719-15-17
OB51S-121819-9-11

Hot Spot 3 - Building 5

AP-39-S(16-17)-20180724
OB-44-S(17-18)-20131230
OB-44-S(9-10)-20131230
BLD5-SHIP-19950401
OB-53-BR-(25")-20220331
OB-53-BR-(80-85')-20220401
OB-60-S-16-20220813

Table 7-9
Soil Exposure Point Concentrations - 0-6 feet
Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Depth	Maximum	Max Location	Max Depth	Average	Method 1 S-1 Standard
1,1,1-Trichloroethane	mg/kg	14	1	0.065	AP-26-DO(0-0)-20080424	0-0	0.065	AP-26-DO(0-0)-20080424	0-0	0.017	500
Acetone	mg/kg	10	4	0.0042	BLDG3-SB107-01(5-7)-	5-7	0.0081	BLDG3-SB105-01(5-7)-20130725	5-7	0.22	500
cis-1,2-Dichloroethene	mg/kg	14	1	0.4	AP-37-S(6-6.8)-20180726	6-6.8	0.4	AP-37-S(6-6.8)-20180726	6-6.8	0.18	100
Tetrachloroethene	mg/kg	13	4	0.018	BLDG3-SB105-01(5-7)-	5-7	1.8	AP-37-S(6-6.8)-20180726	6-6.8	0.16	30
Trichloroethene	mg/kg	13	2	0.0027	BLDG3-SB107-01(5-7)-	5-7	0.3	AP-37-S(6-6.8)-20180726	6-6.8	0.032	30

Notes:

COC denotes contaminant of concern

mg/kg denotes milligrams per kilogram

Average calculated using detected values and 1/2 the reporting limit for nondetect results

Method 1 S-1 Standard = Massachusetts Contingency Plan Method 1 standard for soil classified as S-1

Table 7-10
Soil Exposure Point Concentration - 0-15 Feet
Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Depth	Maximum	Max Location	Max Depth	Average
1,1,1-Trichloroethane	mg/kg	39	1	0.065	AP-26-DO(0-0)-20080424	0-0	0.065	AP-26-DO(0-0)-20080424	0-0	0.87
Acetone	mg/kg	30	11	0.0032	BLDG3-SB108-02(9-9.6)-20130729	9-9.6	0.056	BLDG3-SB101(7-9)-20120317	7-9	6.09
cis-1,2-Dichloroethene	mg/kg	39	3	0.091	OB-60-S-7-20220813	7-7	0.4	AP-37-S(6-6.8)-20180726	6-6.8	0.94
Tetrachloroethene	mg/kg	38	21	0.0072	BLDG3-SB101(7-9)-20120317	7-9	1200	B2-PSL5(10-12)-19950322	10-12	48.62
Trichloroethene	mg/kg	38	7	0.0027	BLDG3-SB107-01(5-7)-20130726	5-7	3.5	BLD5-SHIP-19950401	11-13	1.03

Notes:

COC denotes contaminant of concern

mg/kg denotes milligrams per kilogram

Average calculated using detected values and 1/2 the reporting limit for nondetect results

Table 7-11
Groundwater Sampling Locations Included in Risk Characterization
Former Varian Facility Site

Sample Location	Location	Site Area	Depth	Hot Spot
AP-12-BR	150 Sohier Road	Bld 3	BR	HS-BR
MW-016	150 Sohier Road	Bld 3	BR	HS-BR
OB-09-BR	150 Sohier Road	Bld 3	BR	HS-BR
OB-10-BR	150 Sohier Road	Bld 3	BR	HS-BR
OB-19-BR	150 Sohier Road	Bld 3	BR	HS-BR
OB-25-BR	150 Sohier Road	Bld 3	BR	HS-BR
OB-28-BR	150 Sohier Road	Bld 3	BR	HS-BR
OB-38-BR	150 Sohier Road	Bld 5	BR	HS-BR
OB-45-BR	150 Sohier Road	Bld 5	BR	HS-BR
OB-52-BR	150 Sohier Road	Bld 3	BR	HS-BR
OB-11-BR	150 Sohier Road	Bld 3	BR	NO
OB-12-BR	150 Sohier Road	Bld 3	BR	NO
OB-26-BR	150 Sohier Road	Bld 3	BR	NO
OB-26-DO	150 Sohier Road	Bld 3	BR	NO
OB-27-BR	150 Sohier Road	Bld 3	BR	NO
OB-39-BR	150 Sohier Road	Bld 5	BR	NO
OB-53-BR	150 Sohier Road	Bld 5	BR	NO
OB-54-BR	150 Sohier Road	Bld 3	BR	NO
OB-55-BR	150 Sohier Road	Bld 3	BR	NO
RW-22	150 Sohier Road	Bld 3	BR	NO
AP-12-DO	150 Sohier Road	Bld 3	DO	HS-DO
AP-13-DO	150 Sohier Road	Bld 3	DO	HS-DO
AP-24-DO	150 Sohier Road	Bld 3	DO	HS-DO
AP-25-DO	150 Sohier Road	Bld 3	DO	HS-DO
AP-26-DO	150 Sohier Road	Bld 3	DO	HS-DO
AP-27-DO	150 Sohier Road	Bld 5	DO	HS-DO
AP-30R-DO	150 Sohier Road	Bld 3	DO	HS-DO
AP-31-DO	150 Sohier Road	Bld 3	DO	HS-DO
AP-32-DO	150 Sohier Road	Bld 3	DO	HS-DO
AP-34-DO	150 Sohier Road	Bld 3	DO	HS-DO
AP-42-DO	150 Sohier Road	Bld 3	DO	HS-DO
AP-43-DO	150 Sohier Road	Bld 3	DO	HS-DO
MW-013	150 Sohier Road	Bld 3	DO	HS-DO
OB-04-DO	150 Sohier Road	Bld 3	DO	HS-DO
OB-12-DO	150 Sohier Road	Bld 3	DO	HS-DO
OB-14-DO	150 Sohier Road	Bld 3	DO	HS-DO
OB-19-DO	150 Sohier Road	Bld 3	DO	HS-DO
OB-25-DO	150 Sohier Road	Bld 3	DO	HS-DO
OB-34-DO	150 Sohier Road	Bld 3	DO	HS-DO
OB-35-DO	150 Sohier Road	Bld 5	DO	HS-DO
OB-37-DO	150 Sohier Road	Bld 3	DO	HS-DO
OB-38-DO	150 Sohier Road	Bld 5	DO	HS-DO

Table 7-11
Groundwater Sampling Locations Included in Risk Characterization
Former Varian Facility Site

Sample Location	Location	Site Area	Depth	Hot Spot
OB-52-DO	150 Sohier Road	Bld 3	DO	HS-DO
RW-01_MW-18	150 Sohier Road	Bld 3	DO	HS-DO
AP-23-DO	150 Sohier Road	Bld 3	DO	NO
AP-33-DO	150 Sohier Road	Bld 3	DO	NO
AP-35-DO	150 Sohier Road	Bld 3	DO	NO
MW-014A	150 Sohier Road	Bld 3	DO	NO
MW-030	150 Sohier Road	Bld 5	DO	NO
OB-09-DO	150 Sohier Road	Bld 3	DO	NO
OB-10-DO	150 Sohier Road	Bld 3	DO	NO
OB-10-DO	150 Sohier Road	Bld 3	DO	NO
OB-11-DO	150 Sohier Road	Bld 3	DO	NO
OB-26-BR	150 Sohier Road	Bld 3	DO	NO
OB-32-DO	150 Sohier Road	Bld 3	DO	NO
OB-36-DO	150 Sohier Road	Bld 3	DO	NO
OB-39-DO	150 Sohier Road	Bld 5	DO	NO
OB-45-DO	150 Sohier Road	Bld 5	DO	NO
OB-57-DO	150 Sohier Road	Bld 3	DO	NO
OB-58-DO	150 Sohier Road	Bld 3	DO	NO
OB-59-DO	150 Sohier Road	Bld 3	DO	NO
RW-03	150 Sohier Road	Bld 3	DO	NO
AP-12-S	150 Sohier Road	Bld 3	S	HS-S
OB-49-S	150 Sohier Road	Bld 3	S	HS-S
OB-50-S	150 Sohier Road	Bld 3	S	HS-S
OB-51-S	150 Sohier Road	Bld 3	S	HS-S
OB-52-S	150 Sohier Road	Bld 3	S	HS-S
OB-60-S	150 Sohier Road		S	HS-S
AP-13-S	150 Sohier Road	Bld 3	S	NO
AP-36-S	150 Sohier Road	Bld 5	S	NO
AP-37-S	150 Sohier Road	Bld 5	S	NO
AP-38-S	150 Sohier Road	Bld 5	S	NO
AP-39-S	150 Sohier Road	Bld 5	S	NO
AP-40-S	150 Sohier Road	Bld 3	S	NO
AP-41-S	150 Sohier Road	Bld 3	S	NO
B-3	150 Sohier Road	Bld 5	S	NO
BW-05	150 Sohier Road	Bld 3	S	NO
BW-08	150 Sohier Road	Bld 3	S	NO
MW-009	150 Sohier Road	Bld 3	S	NO
OB-09-S	150 Sohier Road	Bld 3	S	NO
OB-10-S	150 Sohier Road	Bld 3	S	NO
OB-11-S	150 Sohier Road	Bld 3	S	NO
OB-12-S	150 Sohier Road	Bld 3	S	NO
OB-15-S	150 Sohier Road	Bld 3	S	NO

Table 7-11
Groundwater Sampling Locations Included in Risk Characterization
Former Varian Facility Site

Sample Location	Location	Site Area	Depth	Hot Spot
OB-44-S	150 Sohier Road	Bld 5	S	NO
OB-47-S	150 Sohier Road	Bld 5	S	NO
OB-05-BR	27 Tozer Road		BR	NO
OB-05-DO	27 Tozer Road		DO	DHS-DO
OB-43-S	27 Tozer Road		S	HS-S
OB-05-S	27 Tozer Road		S	NO
BR-5_ZONE3	28 Tozer Road		BR	NO
CL03-DO	28 Tozer Road		DO	DHS-DO
CL11-DO	28 Tozer Road		DO	NO
GFS-03	28 Tozer Road		S	HS-S
CL04-BR	30 Tozer Road		BR	NO
OB-42-BR	30 Tozer Road		BR	NO
CL04-DO	30 Tozer Road		DO	NO
OB-42-S	30 Tozer Road		S	HS-S
OB-18-DO	31 Tozer Road		DO	NO
AP-15-S	31 Tozer Road		S	NO
GZ-4	31 Tozer Road		S	NO
OB-18-S	31 Tozer Road		S	NO
CL10-BR	32 Tozer Road		BR	NO
AP-19	32 Tozer Road		DO	NO
AP-20	32 Tozer Road		DO	NO
AP-21	32 Tozer Road		DO	NO
AP-22	32 Tozer Road		DO	NO
CL10-DO	32 Tozer Road		DO	NO
MW-2_32-TOZER	32 Tozer Road		DO	NO
CL10-S	32 Tozer Road		S	NO
BR-7_ZONE1	39 Tozer Road		BR	NO
BR-7_ZONE2	39 Tozer Road		BR	NO
BR-7_ZONE3	39 Tozer Road		BR	NO
OB-08-DO	39 Tozer Road		DO	DHS-DO
MW-034	39 Tozer Road		DO	NO
OB-08-S	39 Tozer Road		S	NO
OB-41-S	39 Tozer Road		S	NO
BR-6_ZONE3	Downgradient Res.		BR	NO
OB-06-BR	Downgradient Res.		BR	NO
OB-20-BR	Downgradient Res.		BR	NO
OB-21-BR	Downgradient Res.		BR	NO
P-21-BR	Downgradient Res.		BR	NO
OB-21-DO	Downgradient Res.		DO	DHS-DO
OB-06-DO	Downgradient Res.		DO	NO
OB-20-DO	Downgradient Res.		DO	NO

Table 7-11
Groundwater Sampling Locations Included in Risk Characterization
Former Varian Facility Site

Sample Location	Location	Site Area	Depth	Hot Spot
P-21-DO	Downgradient Res.		DO	NO
OB-06-S	Downgradient Res.		S	NO
P-04R	Downgradient Res.		S	NO
P-05R	Downgradient Res.		S	NO
P-09	Downgradient Res.		S	NO
P-09R	Downgradient Res.		S	NO
P-11R	Downgradient Res.		S	NO
P-13R	Downgradient Res.		S	NO
P-14R	Downgradient Res.		S	NO
P-19A	Downgradient Res.		S	NO
P-20	Downgradient Res.		S	NO
P-20R	Downgradient Res.		S	NO
P-21	Downgradient Res.		S	NO
P-23	Downgradient Res.		S	NO
P-30	Downgradient Res.		S	NO
P-31	Downgradient Res.		S	NO
BR-1_ZONE3	North of Rt 128		BR	NO
CL02-BR	North of Rt 128		BR	NO
CL06-BR	North of Rt 128		BR	NO
CL09-BR_ZONE3	North of Rt 128		BR	NO
OB-17-BR	North of Rt 128		BR	NO
OB-23-BR	North of Rt 128		BR	NO
CL06-DO	North of Rt 128		DO	NO
MW-003R	North of Rt 128		DO	NO
OB-17-DO	North of Rt 128		DO	NO
CL06-S	North of Rt 128		S	NO
CL09-S	North of Rt 128		S	NO
MW-002R	North of Rt 128		S	NO
MW-005R	North of Rt 128		S	NO
BR-3_ZONE1	Off-Site		BR	NO
BR-3_ZONE2	Off-Site		BR	NO

Table 7-11
Groundwater Sampling Locations Included in Risk Characterization
Former Varian Facility Site

Sample Location	Location	Site Area	Depth	Hot Spot
BR-3_ZONE3	Off-Site		BR	NO
CL08-BR_ZONE1	Off-Site		BR	NO
CL08-BR_ZONE2	Off-Site		BR	NO
CL08-BR_ZONE3	Off-Site		BR	NO
CL08-DO	Off-Site		DO	NO
CL08-S	Off-Site		S	NO

Notes:

BR denotes bedrock groundwater

DO denotes deep overburden groundwater

HS denotes Hot Spot

DHS denotes Downgradient Hot Spot

No denotes location is not in a Hot Spot

S denotes Shallow groundwater

Upgradient and offsite samples are not included in site evaluation

Table 7-12

Groundwater Summary Statistics - Shallow Excluding Hot Spot

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	EPC	UCL
1,1,1-Trichloroethane	mg/L	181	2	0.023	B-3-20211116-LF	11/16/21	0.026	B-3-20211116	11/16/21	0.0075	100
1,1-Dichloroethane	mg/L	181	16	0.00164	AP-39S-202110106	01/26/21	0.048	AP-37-S-20211109	11/09/21	0.0083	100
1,1-Dichloroethene	mg/L	181	11	0.001	Multiple	Multiple	0.011	OB-44-S-20210126	01/26/21	0.0048	100
cis-1,2-Dichloroethene	mg/L	181	98	0.002	Multiple	Multiple	35	OB-44-S-20220512	05/12/22	1.3	100
Acetone	mg/L	181	38	0.00581	AP-36-S-20210126	01/26/21	78	AP-38-S-20200909	09/09/20	0.48	100
Tetrachloroethene	mg/L	181	29	0.00123	AP-36-S-20210126	01/26/21	0.31	OB-44-S-20220512	05/12/22	0.015	100
Tetrahydrofuran	mg/L	13	6	0.00899	AP-39S-202110106	01/26/21	0.25	AP-36-S-20200909	09/09/20	0.10	NV
trans-1,2-Dichloroethene	mg/L	181	16	0.001	AP-36-S-20200909	09/09/20	0.077	AP-37-S-20200909	09/09/20	0.0079	100
Trichloroethene	mg/L	181	34	0.002	Multiple	Multiple	0.16	OB-41-S-20201125	11/25/20	0.012	50
Vinyl chloride	mg/L	181	67	0.002	Multiple	Multiple	13	OB-44-S-20200909	09/09/20	0.45	100

Notes:

EPC denotes Exposure Point Concentrations, derived as arithmetic mean of detect values and one half the reporting limits for non-detects

mg/L denotes milligrams per liter

NV denotes no value available

UCL denotes Upper Concentration Limit (groundwater) per 310 CMR 40.0996(6)

Table 7-13

Groundwater Summary Statistics - Shallow Hot Spot

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	EPC
1,1,1-Trichloroethane	mg/L	44	1	0.037	OB-51-S-20200820	08/20/20	0.037	OB-51-S-20200820	08/20/20	0.026
1,1-Dichloroethene	mg/L	44	8	0.006	OB-49-S-20210909	09/09/21	0.4	OB-60-S-20220816	08/16/22	0.026
Acetone	mg/L	44	5	0.01	Multiple	Multiple	0.033	OB-49-S-20210222	02/22/21	0.127
cis-1,2-Dichloroethene	mg/L	44	36	0.002	OB-49-S-20201124	11/24/20	53	OB-49-S-20210222	02/22/21	5.7
Tetrachloroethene	mg/L	44	29	0.002	OB-49-S-20210222	02/22/21	47	OB-60-S-20220816	08/16/22	1.91
trans-1,2-Dichloroethene	mg/L	44	10	0.002	OB-49-S-20210513	05/13/21	0.83	OB-49-S-20201124	11/24/20	0.062
Trichloroethene	mg/L	44	36	0.013	OB-43-S-20211115-LF	11/15/21	48	OB-51-S-20200820	08/20/20	2.8
Vinyl chloride	mg/L	44	13	0.006	OB-49-S-20210513	05/13/21	2.4	OB-51-S-20220510	05/10/22	0.22

Notes:

Shallow hot spot is located in groundwater under Building 3 and 5 of the former Varian facility (see Table 7-11)

EPC denotes Exposure Point Concentrations, derived as arithmetic mean of detect values and one half the reporting limits for non-detects

mg/L denotes milligrams per liter

NV denotes no value available

Table 7-14
Buildings 3 and 5 Indoor Air Exposure Point Concentrations

Former Varian Facility Site
150 Sohier Road, Beverly, Massachusetts

COC	Units	EPC Bldg 3-3	EPC Bldg 2-6	EPC Bldg 5 All Locations
cis-1,2-Dichloroethene	ug/m3	ND	0.41	1.12
Tetrachloroethene	ug/m3	2.6	1.14	5.02
trans-1,2-Dichloroethene	ug/m3	22.5	237	2.74
Trichloroethene	ug/m3	0.64	1.1	5.00

Notes:

Samples include the most recent four rounds for Buildings 3 and 5, although 2022 results for Building 3 are excluded due to the long term shutdown starting in January.

COC denotes contaminant of concern

ug/m3 denotes micrograms per cubic meter

EPC denotes exposure point concentration is arithmethic mean using detects and 1/2 the reporting limit for non-detect results

ND denotes not detected in this location in the sampling rounds evaluated

Table 7-15
Risk Summary
Former Varian Facility Site

Time Frame	Receptor	Medium	Exposure Point	Comment	Estimated Risk (ELCR)	Estimated Hazard (HI)
Current	Varian Site Workers	Soil	Unpaved surface soil (0-3') on Varian site	Limited area of exposure, low concentrations	Not Evaluated	Not Evaluated
		Indoor Air	Varian buildings – with systems on	Bld 2-6	6.5E-07	0.92
				Bld 3-3	8.5E-07	0.16
				Bld 5	2.9E-06	0.65
	Utility workers - Varian site	Soil	Soil - 0-6’ Varian site	Assumed to be insignificant -see text	Not Evaluated	Not Evaluated
	Downgradient Site Workers/Site Visitors/Landscapers, recreational use	Soil	Unpaved surface soil (0-3') – PSL10, grass field		3.1E-08	0.0059
	Downgradient site workers	Indoor Air	Various Commercial Buildings	Shown to be Incomplete pathway or No Significant Risk	Not Evaluated	Not Evaluated
	Downgradient Residents	Surface Water	Unnamed Stream	Previously Evaluated (APTIM, 2021a)	3.0E-07	0.05
		Sediment	Unnamed Stream		Not Evaluated	0.0084
		Total	Unnamed Stream		3.0E-07	0.058
		Surface Water	Stream A		1.2E-07	0.024
		Sediment	Stream A		1.3E-09	0.00031
		Total	Stream A		1.2E-07	0.024
		Indoor Air	Various Residential Dwellings	34 Longview Dr. - Shown to be Incomplete pathway or No Significant Risk for other locations	3.9E-06	0.48
Future	Site workers - Former Varian Site	Soil	Soil 0-15' Varian site	Would be less than future residents	Not Evaluated	Not Evaluated
		Indoor Air	Same as current			
	Future Residents - Former Varian Site	Soil	Soil 0-15' Varian site		1.7E-06	0.15
		Indoor Air	Not Evaluated	Exposure point concentrations cannot be derived	Not Evaluated	Not Evaluated
	Construction Workers	Soil	Soil 0-15' Varian site		1.2E-08	0.02
		Groundwater	Groundwater (0-15') – Non-Hot Spot		9.3E-07	0.13
		Groundwater	Groundwater (0-15') – Hot Spot		1.4E-06	5.9
		Total	Soil + Non-Hot Spot GW		9.4E-07	0.15
		Total	Soil + Hot Spot GW		1.4E-06	5.9
	Downgradient Site Workers/Site Visitors/Landscapers, recreational use	Soil	Soil (0-15') – PSL10, grass field - same as current			
	Downgradient Site Workers	Indoor air	same as current			
	Downgradient Residents	Surface Water	same as current			
		Indoor Air	same as current			

Notes:

ELCR denotes Estimated Lifetime Cancer Risk

HI denotes Hazard Index

Table 7-16
Soil Upper Concentration Comparison - 0-15 Feet
Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Depth	Maximum	Max Location	Max Depth	Average	UCL
1,1,1-Trichloroethane	mg/kg	39	1	0.065	AP-26-DO(0-0)-20080424	0-0	0.065	AP-26-DO(0-0)-20080424	0-0	0.87	10,000
cis-1,2-Dichloroethene	mg/kg	39	3	0.091	OB-60-S-7-20220813	7-7	0.4	AP-37-S(6-6.8)-20180726	6-6.8	0.94	5,000
Tetrachloroethene	mg/kg	38	21	0.0072	BLDG3-SB101(7-9)-20120317	7-9	1200	B2-PSL5(10-12)-19950322	10-12	48.62	10,000
Trichloroethene	mg/kg	38	7	0.0027	BLDG3-SB107-01(5-7)-20130726	5-7	3.5	BLD5-SHIP-19950401	11-13	1.03	600

Notes:

COC denotes contaminant of concern

mg/kg denotes milligrams per kilogram

UCL denotes Upper Concentration Limit per 310 CMR 40.0996(6)

Table 7-17
Soil 15 feet and Greater - Hot Spot 2 UCL Comparison
Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	UCL
Acetone	mg/kg	7	1	12	AP-34-DO(34-36)-20130911	09/11/13	12	AP-34-DO(34-36)-20130911	09/11/13	13.19	10,000
Tetrachloroethene	mg/kg	7	7	0.62	AP41S-33-35	05/02/19	740	AP-35-DO(33-35)-20130912	09/12/13	200.66	10,000
Trichloroethene	mg/kg	7	5	0.16	AP40S-11-13	04/30/19	450	AP-35-DO(33-35)-20130912	09/12/13	90.51	600

Notes:

COC denotes contaminant of concern

mg/kg denotes milligrams per kilogram

UCL denotes Upper Concentration Limit per 310 CMR 40.0996(6)

Table 7-18
Soil 15 feet and Greater - Hot Spot 3 - UCL Comparison
Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	UCL
cis-1,2-Dichloroethene	mg/kg	5	3	0.057	OB-44-S(17-18)-20131230	12/30/13	0.3	AP-39-S(16-17)-20180724	07/24/18	0.1414	5,000
Tetrachloroethene	mg/kg	5	4	11	OB-53-BR-(25")-20220331	03/31/22	14	OB-44-S(17-18)-20131230	12/30/13	10.209	10,000
Trichloroethene	mg/kg	5	3	1.4	OB-60-S-16-20220813	08/13/22	6.2	OB-44-S(17-18)-20131230	12/30/13	2.064	600

Notes:

COC denotes contaminant of concern

mg/kg denotes milligrams per kilogram

UCL denotes Upper Concentration Limit per 310 CMR 40.0996(6)

Table 7-19
Soil 15 Feet and Greater - No Hot Spots - UCL Comparison
Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	UCL
1,1,1-Trichloroethane	mg/kg	27	2	1.7	AP-33-DO(24-26)-20130910	09/10/13	2	AP-33-DO(22-24)-20130910	09/10/13	0.30	10,000
Acetone	mg/kg	27	1	0.19	AP-33-DO(24-26)-20130910	09/10/13	0.19	AP-33-DO(24-26)-20130910	09/10/13	4.03	10,000
cis-1,2-Dichloroethene	mg/kg	27	4	0.2	AP-36-S(16-16.9)-20180726	07/26/18	1.7	AP-33-DO(24-26)-20130910	09/10/13	0.26	5,000
Tetrachloroethene	mg/kg	27	16	0.071	AP41S-0	05/01/19	260	OB50S-121819-17-19	12/18/19	13.12	10,000
Trichloroethene	mg/kg	27	14	0.079	OB-54-BR(40-45')-20220405	04/05/22	130	OB-57-DO-56.0-220722	07/22/22	15.46	600
Vinyl chloride	mg/kg	27	1	0.52	AP-33-DO(24-26)-20130910	09/10/13	0.52	AP-33-DO(24-26)-20130910	09/10/13	0.19	600

Notes:

COC denotes contaminant of concern

mg/kg denotes milligrams per kilogram

UCL denotes Upper Concentration Limit per 310 CMR 40.0996(6)

Table 7-20

Shallow Groundwater Hot Spot - UCL Comparison
Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	UCL
1,1,1-Trichloroethane	mg/L	44	1	0.037	OB-51-S-20200820	08/20/20	0.037	OB-51-S-20200820	08/20/20	0.026	100
1,1-Dichloroethene	mg/L	44	8	0.006	OB-49-S-20210909	09/09/21	0.4	OB-60-S-20220816	08/16/22	0.026	100
Acetone	mg/L	44	5	0.01	Multiple	Multiple	0.033	OB-49-S-20210222	02/22/21	0.127	100
cis-1,2-Dichloroethene	mg/L	44	36	0.002	OB-49-S-20201124	11/24/20	53	OB-49-S-20210222	02/22/21	5.66	100
Tetrachloroethene	mg/L	44	29	0.002	OB-49-S-20210222	02/22/21	47	OB-60-S-20220816	08/16/22	1.91	100
trans-1,2-Dichloroethene	mg/L	44	10	0.002	OB-49-S-20210513	05/13/21	0.83	OB-49-S-20201124	11/24/20	0.062	100
Trichloroethene	mg/L	44	36	0.013	OB-43-S-20211115-LF	11/15/21	48	OB-51-S-20200820	08/20/20	2.80	50
Vinyl chloride	mg/L	44	13	0.006	OB-49-S-20210513	05/13/21	2.4	OB-51-S-20220510	05/10/22	0.22	100

Table 7-21
Shallow Groundwater - Excluding Hot Spot - UCL Comparison
Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	UCL
1,1,1-Trichloroethane	mg/L	181	2	0.023	B-3-20211116-LF	11/16/21	0.026	B-3-20211116	11/16/21	0.0075	100
1,1-Dichloroethane	mg/L	181	16	0.00164	AP-39S-202110106	01/26/21	0.048	AP-37-S-20211109	11/09/21	0.0083	100
1,1-Dichloroethene	mg/L	181	11	0.001	Multiple	Multiple	0.011	OB-44-S-20210126	01/26/21	0.0048	100
Acetone	mg/L	181	38	0.00581	AP-36-S-20210126	01/26/21	78	AP-38-S-20200909	09/09/20	0.48	100
cis-1,2-Dichloroethene	mg/L	181	98	0.002	Multiple	Multiple	35	OB-44-S-20220512	05/12/22	1.3	100
Tetrachloroethene	mg/L	181	29	0.00123	AP-36-S-20210126	01/26/21	0.31	OB-44-S-20220512	05/12/22	0.015	100
Tetrahydrofuran	mg/L	13	6	0.00899	AP-39S-202110106	01/26/21	0.25	AP-36-S-20200909	09/09/20	0.10	NV
trans-1,2-Dichloroethene	mg/L	181	16	0.001	AP-36-S-20200909	09/09/20	0.077	AP-37-S-20200909	09/09/20	0.0079	100
Trichloroethene	mg/L	181	34	0.002	Multiple	Multiple	0.16	OB-41-S-20201125	11/25/20	0.012	50
Vinyl chloride	mg/L	181	67	0.002	Multiple	Multiple	13	OB-44-S-20200909	09/09/20	0.45	100

Notes:
COC denotes contaminant of concern
mg/L denotes milligrams per liter
UCL denotes Upper Concentration Limit

Table 7-22

Deep Overburden Groundwater Building 3 Hot Spot - UCL Comparison

Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	UCL
1,1,1-Trichloroethane	mg/L	111	22	0.016	AP-25-DO-20210910	09/10/21	52	AP-24-DO-20210223	02/23/21	3.218	100
1,1-Dichloroethane	mg/L	111	18	0.016	AP-25-DO-20210910	09/10/21	3.9	AP-24-DO-20220215	02/15/22	0.515	100
1,1-Dichloroethene	mg/L	111	40	0.001	OB-34-DO-20211111	11/11/21	5.1	Multiple	Multiple	0.568	100
Acetone	mg/L	111	8	0.012	OB-52-DO-20210910	09/10/21	9.1	AP-13-DO-20210223	02/23/21	1.498	100
cis-1,2-Dichloroethene	mg/L	111	97	0.003	AP-26-DO-20220511	05/11/22	420	AP-30R-DO-20211109	11/09/21	57.264	100
Tetrachloroethene	mg/L	111	79	0.011	AP-25-DO-20210910	09/10/21	65	AP-24-DO-20210520	05/20/21	4.440	100
trans-1,2-Dichloroethene	mg/L	111	18	0.032	AP-25-DO-20210910	09/10/21	2.9	AP-24-DO-20210520	05/20/21	0.325	100
Trichloroethene	mg/L	111	100	0.01	Multiple	Multiple	270	Multiple	Multiple	37.234	50
Vinyl chloride	mg/L	111	36	0.011	OB-19-DO-20211115-LF	11/15/21	28	Multiple	Multiple	1.752	100

Table 7-23

Deep Overburden Groundwater Building 5 Hot Spot - UCL Comparison

Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	UCL
1,1-Dichloroethene	mg/L	16	2	0.002	AP-27-DO-20211110	11/10/21	0.022	OB-35-DO-20200821	08/21/20	0.017	100
cis-1,2-Dichloroethene	mg/L	16	16	0.024	Multiple	Multiple	7.5	Multiple	Multiple	3.047	100
Tetrachloroethene	mg/L	16	11	0.029	AP-27-DO-20211110	11/10/21	43	OB-35-DO-20220512	05/12/22	10.285	100
trans-1,2-Dichloroethene	mg/L	16	2	0.021	AP-27-DO-20211110	11/10/21	0.077	AP-27-DO-20201125	11/25/20	0.037	100
Trichloroethene	mg/L	16	16	0.005	Multiple	Multiple	29	AP-27-DO-20220511	05/11/22	7.652	50
Vinyl chloride	mg/L	16	7	0.003	OB-38-DO-20211116	11/16/21	0.44	OB-35-DO-20210909	09/09/21	0.102	100

Table 7-24

Deep Overburden Groundwater Downgradient Hot Spot - UCL Comparison

Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	UCL
1,1-Dichloroethane	mg/L	9	3	0.008	OB-21-DO-20210408	04/08/21	0.025	CL03-DO-20220511	05/11/22	0.011	100
1,1-Dichloroethene	mg/L	9	3	0.011	OB-21-DO-20210408	04/08/21	0.016	OB-08-DO-20210514	05/14/21	0.007	100
Acetone	mg/L	9	1	0.01	OB-05-DO-20211110	11/10/21	0.01	OB-05-DO-20211110	11/10/21	0.010	100
cis-1,2-Dichloroethene	mg/L	9	8	0.087	CL-03-DO-20210519	05/19/21	2.1	OB-08-DO-20210514	05/14/21	1.011	100
Tetrachloroethene	mg/L	9	7	0.18	OB-05-DO-20220510	05/10/22	1.2	CL03-DO-20220511	05/11/22	0.289	100
trans-1,2-Dichloroethene	mg/L	9	2	0.004	OB-21-DO-20210408	04/08/21	0.032	OB-05-DO-20210518	05/18/21	0.009	100
Trichloroethene	mg/L	9	7	0.25	CL-03-DO-20210519	05/19/21	2.2	OB-08-DO-20220511	05/11/22	0.798	50
Vinyl chloride	mg/L	9	5	0.003	OB-05-DO-20211110	11/10/21	0.084	OB-05-DO-20201125	11/25/20	0.024	100

Notes:
See Table 7-11 for sampling locations included in hot spots and non-hot spot areas
Average concentrations derived as arithmetic mean of detect values and one half the reporting limits for non-detects
COC denotes contaminant of concern
COCs with calculated average concentrations greater than the maximum are shown as the maximum concentrations and highlighted in green
mg/L denotes milligrams per liter
UCL denotes Upper Concentration Limit (groundwater) per 310 CMR 40.0996(6)

Table 7-25
Deep Overburden Groundwater - Non-Hot Spot - UCL Comparison
Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	UCL
1,1,1-Trichloroethane	mg/L	98	11	0.002	Multiple locations	Multiple	13	AP-33-DO	Multiple	0.796	100
1,1-Dichloroethane	mg/L	98	25	0.002	AP-35-DO-20200820	08/20/20	3	AP-33-DO-20211109	11/09/21	0.215	100
1,1-Dichloroethene	mg/L	98	20	0.001	Multiple locations	Multiple	1.1	AP-33-DO-20210909	09/09/21	0.082	100
1,2-Dichloroethane	mg/L	98	6	0.002	AP-35-DO-20200820	08/20/20	0.022	AP-35-DO-20211109	11/09/21	0.022	100
Acetone	mg/L	98	17	0.01	AP-21-20211110	11/10/21	0.15	AP-35-DO-20211109	11/09/21	0.150	100
cis-1,2-Dichloroethene	mg/L	98	74	0.002	Multiple locations	Multiple	500	AP-33-DO-20220211	02/11/22	35.291	100
Tetrachloroethene	mg/L	98	36	0.002	Multiple locations	Multiple	4.7	AP-23-DO-20200820	08/20/20	0.367	100
trans-1,2-Dichloroethene	mg/L	98	16	0.003	Multiple locations	Multiple	1.6	AP-23-DO-20210909	09/09/21	0.155	100
Trichloroethene	mg/L	98	59	0.002	Multiple locations	Multiple	15	OB-26-DO-20211111	11/11/21	0.646	50
Vinyl chloride	mg/L	98	43	0.002	AP-33-DO-20210223	02/23/21	130	AP-23-DO-20211109	11/09/21	7.963	100

Notes:
See Table 7-11 for sampling locations included in hot spots and non-hot spot areas
Average concentrations derived as arithmetic mean of detect values and one half the reporting limits for non-detects
COC denotes contaminant of concern
COCs with calculated average concentrations greater than the maximum are shown as the maximum concentrations and highlighted in green
mg/L denotes milligrams per liter
UCL denotes Upper Concentration Limit (groundwater) per 310 CMR 40.0996(6)

Table 7-26
Bedrock Groundwater Hot Spot - UCL Comparison
Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	UCL
1,1-Dichloroethane	mg/L	39	1	0.012	MW-016-20220509	05/09/22	0.012	MW-016-20220509	05/09/22	0.05	100
1,1-Dichloroethene	mg/L	39	9	0.003	MW-016-20220509	05/09/22	0.088	OB-25-BR-20220511	05/11/22	0.03	100
cis-1,2-Dichloroethene	mg/L	39	39	0.004	OB-10-BR-20211115-LF	11/15/21	31	OB-19-BR-20211115	11/15/21	5.34	100
Tetrachloroethene	mg/L	39	33	0.002	OB-38-BR	Multiple	5.9	OB-52-BR-20210910	09/10/21	0.71	100
trans-1,2-Dichloroethene	mg/L	39	8	0.027	OB-9-BR-20201125	11/25/20	0.13	Multiple	Multiple	0.06	100
Trichloroethene	mg/L	39	37	0.004	OB-38-BR-20210910	09/10/21	600	OB-45-BR-20211110	11/10/21	21.65	50
Vinyl chloride	mg/L	39	17	0.003	MW-016-20220509	05/09/22	6	OB-25-BR-20220511	05/11/22	0.72	10

Table 7-27
Bedrock Groundwater Excluding Hot Spot - UCL Comparison
Former Varian Facility Site

COC	Units	#Samples	# Hits	Minimum	Min Location	Min Date	Maximum	Max Location	Max Date	Average	UCL
1,1-Dichloroethane	mg/L	57	6	0.002	Multiple	Multiple	0.004	OB-05-BR-20210518	05/18/21	0.004	100
1,1-Dichloroethene	mg/L	57	5	0.001	CL02-BR-20210517	05/17/21	0.011	CL09-BR-ZONE3-20220512	05/12/22	0.01	100
Acetone	mg/L	57	8	0.011	OB-26-DO-20201125	11/25/20	0.43	RW-22-20220808	08/08/22	0.11	100
cis-1,2-Dichloroethene	mg/L	57	30	0.002	OB-12-BR-20220808	08/08/22	12	OB-54-BR-70-20220510	05/10/22	0.68	100
Tetrachloroethene	mg/L	57	10	0.004	OB-26-DO-20201125	11/25/20	1.4	OB-54-BR-70-20220510	05/10/22	0.05	100
trans-1,2-Dichloroethene	mg/L	57	9	0.002	CL04-BR-20210517	05/17/21	0.045	OB-28-DO-20220509	05/09/22	0.02	100
Trichloroethene	mg/L	57	20	0.003	Multiple	Multiple	53	OB-54-BR-70-20220510	05/10/22	1.98	50
Vinyl chloride	mg/L	57	16	0.003	BR-6_ZONE3-20210519	05/19/21	1.2	OB-05-BR-20210518	05/18/21	0.08	100

Notes:

See Table 7-11 for sampling locations included in hot spots and non-hot spot areas

Average concentrations derived as arithmetic mean of detect values and one half the reporting limits for non-detects

COC denotes contaminant of concern

COCs with calculated average concentrations greater than the maximum are shown as the maximum concentrations and highlighted in green

mg/L denotes milligrams per liter

UCL denotes Upper Concentration Limit (groundwater) per 310 CMR 40.0996(6)

Figures

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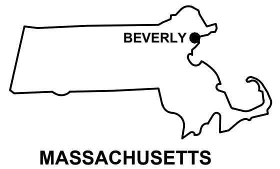

SOURCE:

USGS 7.5 MIN. SERIES SALEM MA, TARGET QUAD, 1985
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X = 250750 m
Y = 925017 m
MA STATE PLANE GRID (meters)

APTIM ENVIRONMENTAL &
INFRASTRUCTURE, INC.
150 ROYALL STREET
CANTON, MASSACHUSETTS
(617) 589–5111

FIGURE 1-1

SITE LOCATION MAP

FORMER VARIAN FACILITY
150 SOHIER ROAD
BEVERLY, MASSACHUSETTS

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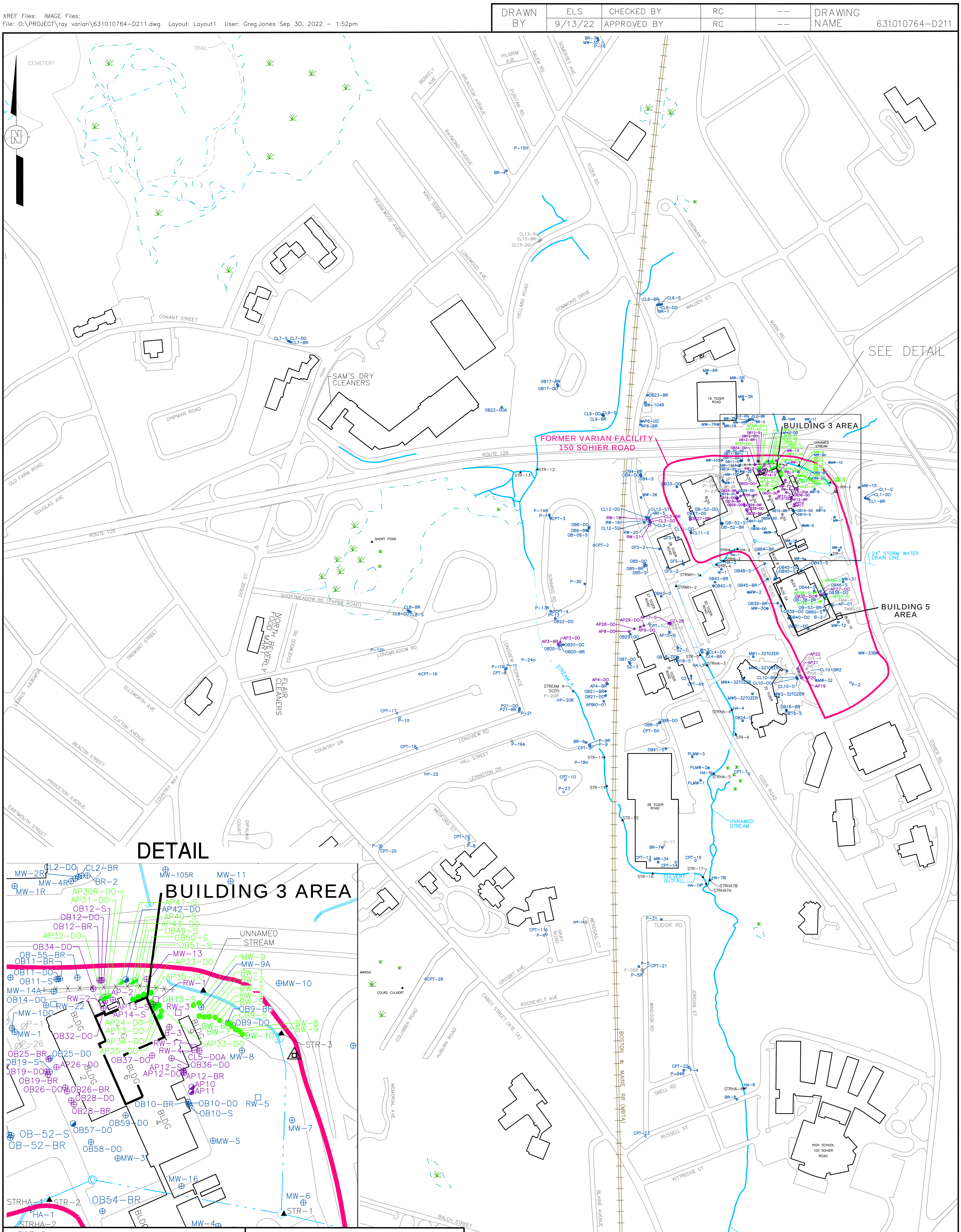


LEGEND:	
⊗	TEMPORARY PERMANGANATE INJECTION POINT
∅	ABANDONED OR DESTROYED WELL
○	PIEZOMETER (P)
△	BENCHMARK LOCATION (MSL)
☐	RECOVERY WELL (RW)
⊕	MONITORING WELL (MW)
◐	ANGLED WELL
●	BIOREMEDIATION INJECTION WELL
▲	SURFACE WATER STREAM (STR) SAMPLE LOCATION
◇	CONE PENETROMETER TESTPOINT (CPT)
△	HAND AUGER SAMPLE LOCATION (HA) ADJACENT TO A STREAM (STRHA)
STRMH	MANHOLE ACCESS TO THE STREAM LOCATED WITHIN A CULVERT
▭	APPROXIMATE BUILDING LOCATION
Ⓓ	APPROXIMATE DRAIN MANHOLE LOCATION
-·-·-	APPROXIMATE LOCATION OF STREAM IN CULVERT
═	APPROXIMATE STREAM LOCATION
~	WATER AND MARSH AREA

⊕ CL4-BR – WELL IDENTIFICATION
MONITORING WELLS SHOWN IN BLUE
PAST AND CURRENT PERMANGANATE INJECTION WELLS SHOWN IN PURPLE
BIOREMEDIATION INJECTION WELLS SHOWN IN GREEN

CL-9	CLUSTER WELL NUMBER S=SHALLOW DO=DEEP OVERBURDEN BR=BEDROCK
STR-6	STREAM SAMPLE LOCATION NUMBER
STRHA-1	STREAM/SURFACE WATER SAMPLE
HA-1	HAND AUGER WELL LOCATION NUMBER
STRMH-1	STREAM/MANHOLE LOCATION NUMBER
MW-5	MONITORING WELL NUMBER
GZ-1	MONITORING WELL NUMBER
PLMW-1	MONITORING WELL NUMBER
BR-1	BEDROCK WELL NUMBER

BEDROCK WELLS BR-1 THROUGH BR-8 AND CL9-BR HAVE MULTILEVEL GROUNDWATER MONITORING SYSTEMS PRESENT WITHIN THE BEDROCK. ZONE 1 REFERS TO THE DEEPEST SAMPLING ZONE, ZONE 2 REFERS IS THE MIDDLE SAMPLING INTERVAL, AND ZONE 3 CLOSEST TO THE GROUND SURFACE.

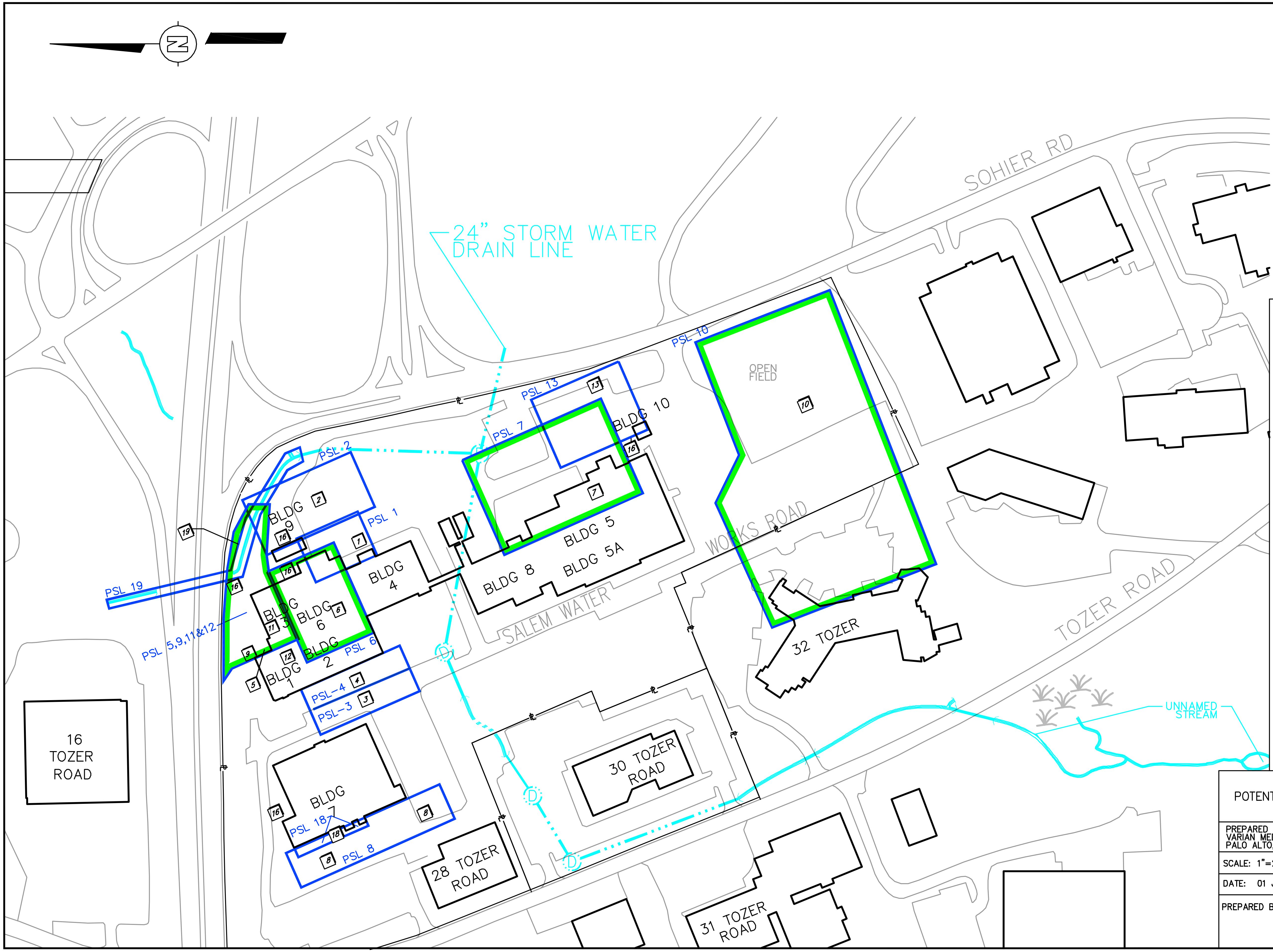
THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004; 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

S C A L E
0 250 500 750 FEET

FIGURE 1-2
EXPANDED SITE PLAN
FORMER VARIAN FACILITY SITE - BEVERLY, MA.

PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC. PALO ALTO, CALIFORNIA	
SCALE: 1" = 250'	DRAFTED BY: ELS
DATE: 9-13-2022	PROJECT NO.: 631010764
PREPARED BY:	

APTIM
APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.



LEGEND:

STRMH	MANHOLE ACCESS TO THE STREAM LOCATED WITHIN A CULVERT
▭	APPROXIMATE BUILDING LOCATION
Ⓓ	APPROXIMATE DRAIN MANHOLE LOCATION
—·—·—	APPROXIMATE LOCATION OF STREAM IN CULVERT
——	APPROXIMATE STREAM LOCATION
—℄—	PROPERTY LINE
PSL 7 ▭	SAMPLE AREA ASSOCIATED WITH INDIVIDUAL POTENTIAL SOURCE (PSL) LOCATION
🟩	CONFIRMED SOURCE AREA, ONGOING INVESTIGATION AND REMEDIATION
3	POTENTIAL SOURCE LOCATION NUMBER

***** POTENTIAL SOURCE LOCATION INDEX *****

1	FORMER 500 GALLON 1,1,1–TRICHLOROETHANE AST
2	POTENTIAL FORMER DRY WELL LOCATION
3	POTENTIAL FORMER DRY WELL LOCATION
4	POTENTIAL FORMER SEPTIC TANK WELL LOCATION
5	POTENTIAL FORMER SEPTIC TANK LOCATION
6	POTENTIAL FORMER SEPTIC TANK AND LEACHING FIELD LOCATION
7	BUILDING 5 LAB
8	BUILDING 7 SUMPS
9	2/26/85 DEP RELEASE NOTIFICATION
10	OPEN FIELD AT 150 SOHIER ROAD AND PARKING LOT – PORTION OF 32 TOZER ROAD
11	BUILDING 3 LAB
12	POTENTIAL FORMER LIME PIT
13	FORMER BEVERLY LANDFILL
16	TRANSFORMERS
18	BUILDING 7 CONCRETE PAD
19	UNNAMED STREAM

SCALE

0 200 400 FEET

FIGURE 2–1
POTENTIAL SOURCE LOCATION SAMPLING AREAS
Phase II Investigation

PREPARED FOR:
VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

LOCATION:
VARIAN'S FORMER FACILITY
150 SOHIER ROAD, BEVERLY, MA.

SCALE: 1"=200'
DRAFTED BY: JC
DATE: 01 JUNE 2000
PROJECT: 768473

PREPARED BY:
APTIM
APTIM ENVIRONMENTAL
& INFRASTRUCTURE, INC.

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Plot Date/Time: Sep 30, 2022 – 7:03am
Plotted By: Greg.Jones

Xref :
Image :

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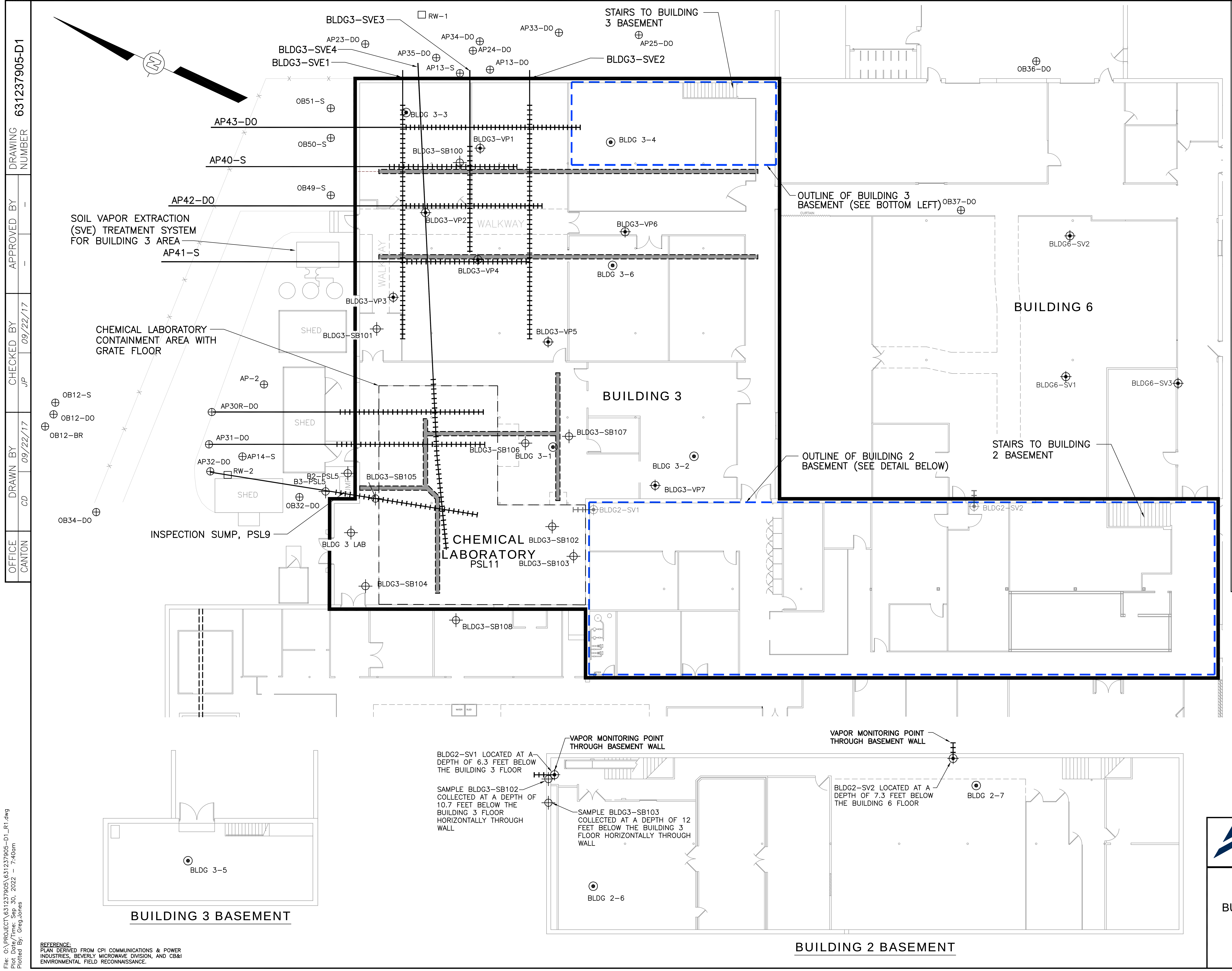
APPROVED BY -

CHECKED BY JP 09/22/17

DRAWN BY CD 09/22/17

OFFICE CANTON



REFERENCE:
PLAN DERIVED FROM CPI COMMUNICATIONS & POWER INDUSTRIES, BEVERLY MICROWAVE DIVISION, AND CB&I ENVIRONMENTAL FIELD RECONNAISSANCE.

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Plotted By: Greg.Jones

LEGEND

—	BUILDING 3 TREATMENT AREA
╫	HORIZONTAL SOIL VAPOR EXTRACTION (SVE) WELL LOCATION
⊕	SUB–SLAB SOIL VAPOR MONITORING POINT
⊕	SOIL BORING LOCATION
⊙	INDOOR AIR SAMPLE LOCATION
⊕	MONITORING WELL
☐	RECOVERY WELL
✳	BUILDING COLUMNS
======	UTILITY TRENCH
▬	FORMER UTILITY TRENCH–FILLED WITH CONCRETE
═	BUILDING WALLS
–×–×–	FENCE LINE
PSL	POTENTIAL SOURCE LOCATION AS DESCRIBED IN PHASE II CSA FOR RTN 3–0485

INDOOR AIR SAMPLE ID	ROOM
BLDG 2–6	ENVIRONMENTAL TESTING ROOM BUILDING 2 BASEMENT
BLDG 2–7	STORAGE ROOM BUILDING 2 BASEMENT
BLDG 3–1	MAIN CHEMICAL LABORATORY
BLDG 3–2	CHEMISTRY LABORATORY BENCH TESTING ROOM
BLDG 3–3	MID STOCK ROOM
BLDG 3–4	BUILDING 3 MACHINE SHOP
BLDG 3–5	BOILER ROOM BUILDING 3 BASEMENT
BLDG 3–6	BUILDING 3 STORAGE ROOM

SCALE
0 10 20 30 FEET

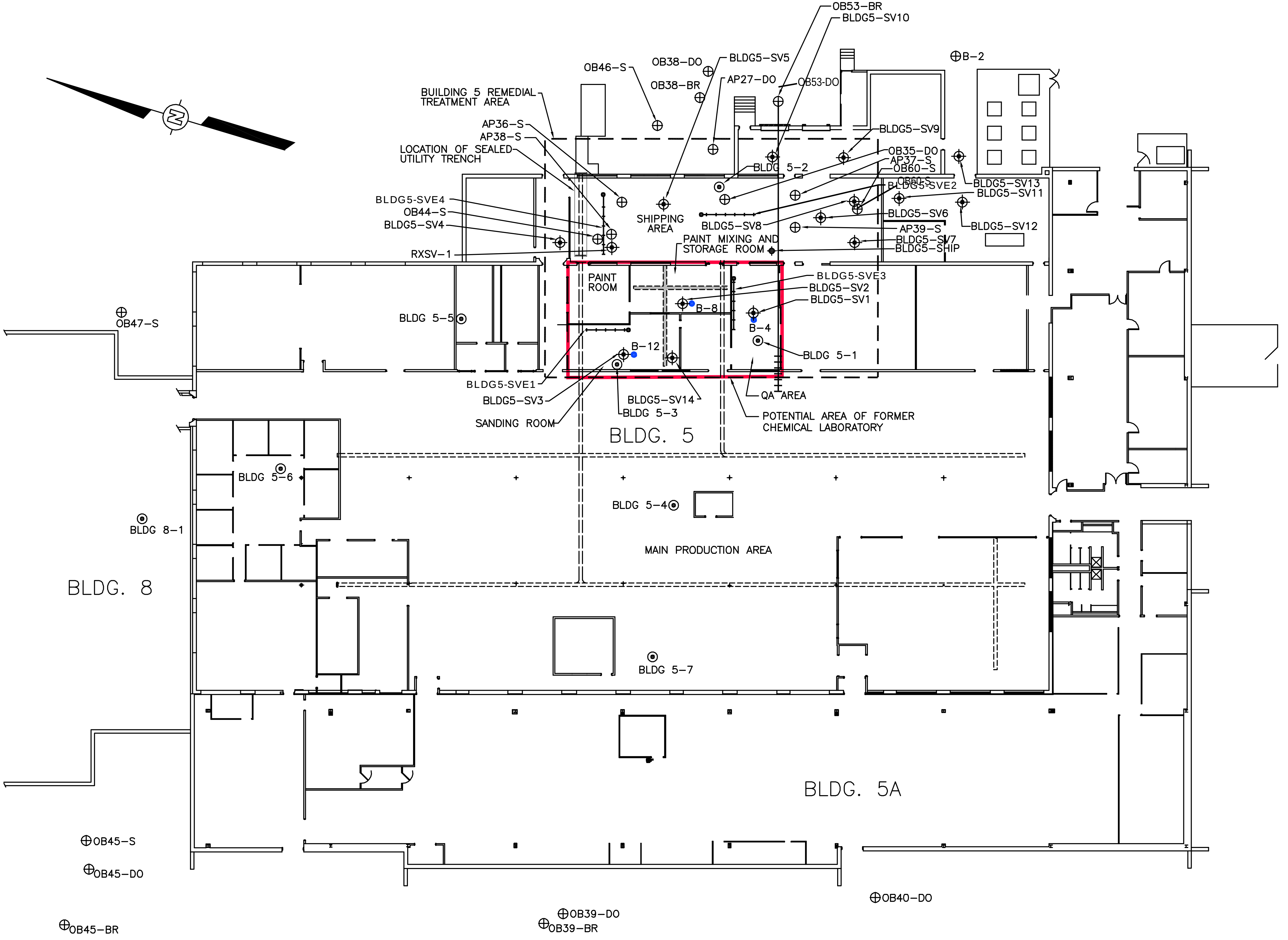
APTIM

APTIM Environmental & Infrastructure, Inc.
150 Royall Street
Canton, Massachusetts
(617) 589-5111

FIGURE 3-1

BUILDING 3 REMEDIAL TREATMENT AREA SAMPLE LOCATIONS

FORMER VARIAN FACILTIY SITE
150 SOHIER ROAD
BEVERLY, MASSACHUSETTS



LEGEND

⊕	SUB–SLAB SOIL VAPOR SAMPLE LOCATION (2011–2014)
◎	INDOOR AIR SAMPLE LOCATION (2011–2014)
●	SUB–SLAB SOIL VAPOR SAMPLE LOCATION (1995)
⊕	MONITORING WELL
◆	SOIL BORING
▭	FORMER UTILITY TRENCH FILLED WITH CONCRETE
▭	UTILITY TRENCH
+–+–●	SVE TRENCH WELL
⊢–⊕	ANGLED WELL AND SCREEN

INDOOR AIR SAMPLE ID RTN 3–0485	ROOM
BLDG 5–1	QA AREA
BLDG 5–2	SHIPPING AREA
BLDG 5–3	SANDING ROOM
BLDG 5–4	PRODUCTION AREA
BLDG 5–5	CATHODE SPRAY ROOM
BLDG 5–6	COMMON OFFICE AREA
BLDG 5–7	DEGREASER AREA
BLDG 8–1	HIGH POWER TESTING BUILDING 8 BASEMENT

REFERENCE:

PLAN DERIVED FROM COMMUNICATIONS & POWER INDUSTRIES MAP, DATED 07/11/03, CLEAN HARBORS ENVIRONMENTAL SERVICES, INC. MAP TITLED "1962–BUILDING 5", CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC. FIELD RECONNAISSANCE, JULY 2012, APRIL 2014 AND AUGUST 2018.

SCALE

0 30 60 FEET

APTIM

APTIM ENVIRONMENTAL &
INFRASTRUCTURE, INC.
150 ROYALL STREET
CANTON, MASSACHUSETTS

FIGURE 3 3-2
BUILDING 5 REMEDIAL TREATMENT AREA
FORMER VARIAN FACILITY
150 SOHIER ROAD
BEVERLY, MASSACHUSETTS

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Plotted By: Greg.Jones

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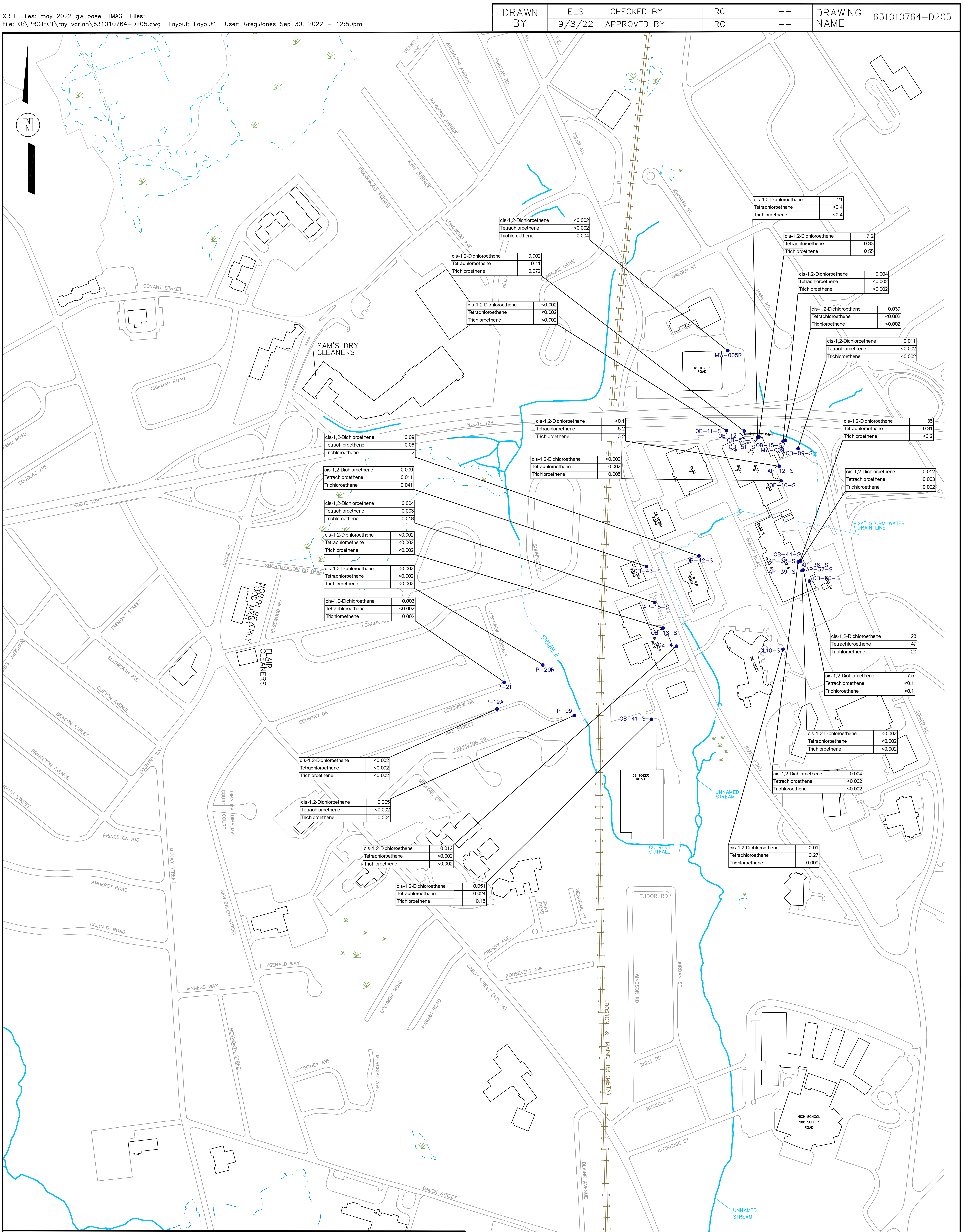

LEGEND:

● OB-18-S SHALLOW OVERBURDEN WELL IDENTIFICATION

EXAMPLE OF OTHER WELLS:

● P-21 MONITORING WELL NUMBER
● AP-39-S MONITORING WELL NUMBER
● MW009 MONITORING WELL NUMBER

APPROXIMATE BUILDING LOCATION
Ⓓ APPROXIMATE DRAIN MANHOLE LOCATION
APPROXIMATE LOCATION OF STREAM IN CULVERT
APPROXIMATE STREAM LOCATION
WATER AND MARSH AREA

NOTES:

1. S=SHALLOW OVERBURDEN
2. <=LESS THAN POSTED DETECTION LIMIT
3. VOC=VOLATILE ORGANIC COMPOUNDS
4. RESULTS IN MILLIGRAMS PER LITER

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004, 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

SCALE
0 250 500 750 FEET

FIGURE 3-3
VOC CONCENTRATIONS IN GROUNDWATER - SHALLOW MAY/AUGUST 2022
FORMER VARIAN FACILITY SITE - BEVERLY, MA.

PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

SCALE: 1" = 250'	DRAFTED BY: ELS
DATE: 9-8-2022	PROJECT NO.: 631010764

PREPARED BY:

APTIM
APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

XREF Files: may 2022 gw base IMAGE Files:
File: O:\PROJECT\ray varian\631010764-D206.dwg Layout: Layout1 User: Greg.Jones Sep 30, 2022 - 2:01pm

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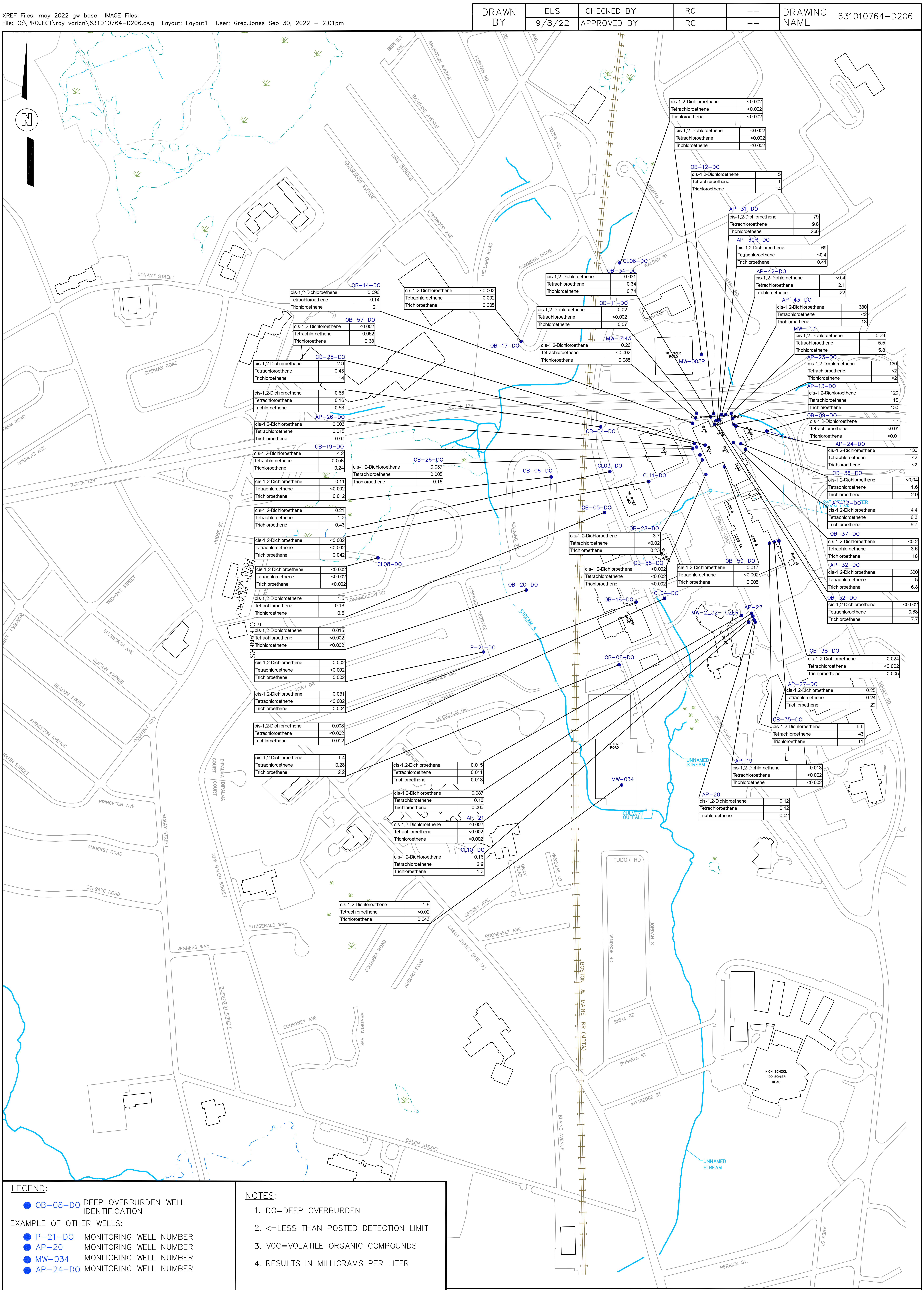
	9/8/22	APPROVED BY	RC	--		



cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

OB-12-DO

cis-1,2-Dichloroethene	5
Tetrachloroethene	1
Trichloroethene	14

AP-31-DO

cis-1,2-Dichloroethene	79
Tetrachloroethene	9.8
Trichloroethene	260

AP-30R-DO

cis-1,2-Dichloroethene	69
Tetrachloroethene	<0.4
Trichloroethene	0.41

AP-42-DO

cis-1,2-Dichloroethene	<0.4
Tetrachloroethene	2.1
Trichloroethene	22

AP-43-DO

cis-1,2-Dichloroethene	380
Tetrachloroethene	<2
Trichloroethene	13

MW-013

cis-1,2-Dichloroethene	0.33
Tetrachloroethene	5.5
Trichloroethene	5.8

AP-23-DO

cis-1,2-Dichloroethene	130
Tetrachloroethene	<2
Trichloroethene	<2

AP-13-DO

cis-1,2-Dichloroethene	120
Tetrachloroethene	15
Trichloroethene	130

OB-09-DO

cis-1,2-Dichloroethene	1.1
Tetrachloroethene	<0.01
Trichloroethene	<0.01

AP-24-DO

cis-1,2-Dichloroethene	130
Tetrachloroethene	<2
Trichloroethene	<2

OB-36-DO

cis-1,2-Dichloroethene	<0.04
Tetrachloroethene	1.6
Trichloroethene	2.9

AP-12-DO

cis-1,2-Dichloroethene	4.4
Tetrachloroethene	6.3
Trichloroethene	9.7

OB-37-DO

cis-1,2-Dichloroethene	<0.2
Tetrachloroethene	3.6
Trichloroethene	18

AP-32-DO

cis-1,2-Dichloroethene	320
Tetrachloroethene	5
Trichloroethene	6.8

OB-32-DO

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	0.88
Trichloroethene	7.7

OB-38-DO

cis-1,2-Dichloroethene	0.024
Tetrachloroethene	<0.002
Trichloroethene	0.005

AP-27-DO

cis-1,2-Dichloroethene	0.25
Tetrachloroethene	0.24
Trichloroethene	29

OB-35-DO

cis-1,2-Dichloroethene	6.6
Tetrachloroethene	43
Trichloroethene	11

AP-19

cis-1,2-Dichloroethene	0.013
Tetrachloroethene	<0.002
Trichloroethene	<0.002

AP-20

cis-1,2-Dichloroethene	0.12
Tetrachloroethene	0.12
Trichloroethene	0.02

OB-14-DO

cis-1,2-Dichloroethene	0.096
Tetrachloroethene	0.14
Trichloroethene	2.1

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	0.002
Trichloroethene	0.005

OB-57-DO

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	0.062
Trichloroethene	0.38

OB-25-DO

cis-1,2-Dichloroethene	2.9
Tetrachloroethene	0.43
Trichloroethene	14

cis-1,2-Dichloroethene	0.58
Tetrachloroethene	0.16
Trichloroethene	0.53

AP-26-DO

cis-1,2-Dichloroethene	0.003
Tetrachloroethene	0.015
Trichloroethene	0.07

OB-19-DO

cis-1,2-Dichloroethene	4.2
Tetrachloroethene	0.058
Trichloroethene	0.24

OB-26-DO

cis-1,2-Dichloroethene	0.037
Tetrachloroethene	0.005
Trichloroethene	0.16

cis-1,2-Dichloroethene	0.11
Tetrachloroethene	<0.002
Trichloroethene	0.012

cis-1,2-Dichloroethene	0.21
Tetrachloroethene	1.2
Trichloroethene	0.43

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	0.042

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	1.5
Tetrachloroethene	0.18
Trichloroethene	0.6

cis-1,2-Dichloroethene	0.015
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	0.002
Tetrachloroethene	<0.002
Trichloroethene	0.002

cis-1,2-Dichloroethene	0.031
Tetrachloroethene	<0.002
Trichloroethene	0.004

cis-1,2-Dichloroethene	0.008
Tetrachloroethene	<0.002
Trichloroethene	0.012

cis-1,2-Dichloroethene	1.4
Tetrachloroethene	0.28
Trichloroethene	2.2

cis-1,2-Dichloroethene	0.015
Tetrachloroethene	0.011
Trichloroethene	0.013

cis-1,2-Dichloroethene	0.087
Tetrachloroethene	0.18
Trichloroethene	0.065

AP-21

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

CL10-DO

cis-1,2-Dichloroethene	0.15
Tetrachloroethene	2.9
Trichloroethene	1.3

cis-1,2-Dichloroethene	1.8
Tetrachloroethene	<0.02
Trichloroethene	0.043

OB-34-DO

cis-1,2-Dichloroethene	0.031
Tetrachloroethene	0.34
Trichloroethene	0.74

OB-11-DO

cis-1,2-Dichloroethene	0.02
Tetrachloroethene	<0.002
Trichloroethene	0.07

MW-014A

cis-1,2-Dichloroethene	0.26
Tetrachloroethene	<0.002
Trichloroethene	0.085

OB-28-DO

cis-1,2-Dichloroethene	3.7
Tetrachloroethene	<0.02
Trichloroethene	0.23

OB-58-DO

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

OB-59-DO

cis-1,2-Dichloroethene	0.017
Tetrachloroethene	<0.002
Trichloroethene	0.005

LEGEND:

● OB-08-DO	DEEP OVERBURDEN WELL IDENTIFICATION

EXAMPLE OF OTHER WELLS:

● P-21-DO	MONITORING WELL NUMBER
● AP-20	MONITORING WELL NUMBER
● MW-034	MONITORING WELL NUMBER
● AP-24-DO	MONITORING WELL NUMBER
▭	APPROXIMATE BUILDING LOCATION
Ⓓ	APPROXIMATE DRAIN MANHOLE LOCATION
-·-·-	APPROXIMATE LOCATION OF STREAM IN CULVERT
═	APPROXIMATE STREAM LOCATION
⁓	WATER AND MARSH AREA

NOTES:

1. DO=DEEP OVERBURDEN
2. <=LESS THAN POSTED DETECTION LIMIT
3. VOC=VOLATILE ORGANIC COMPOUNDS
4. RESULTS IN MILLIGRAMS PER LITER

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004, 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

SCALE
0 250 500 750 FEET

FIGURE 3-4
VOC CONCENTRATIONS IN GROUNDWATER - DEEP MAY/AUGUST 2022
FORMER VARIAN FACILITY SITE - BEVERLY, MA.

PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

SCALE: 1" = 250'
DRAFTED BY: ELS
DATE: 9-8-2022
PROJECT NO.: 631010764

PREPARED BY:
APTIM
APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

XREF Files: may 2022 gw base IMAGE Files:
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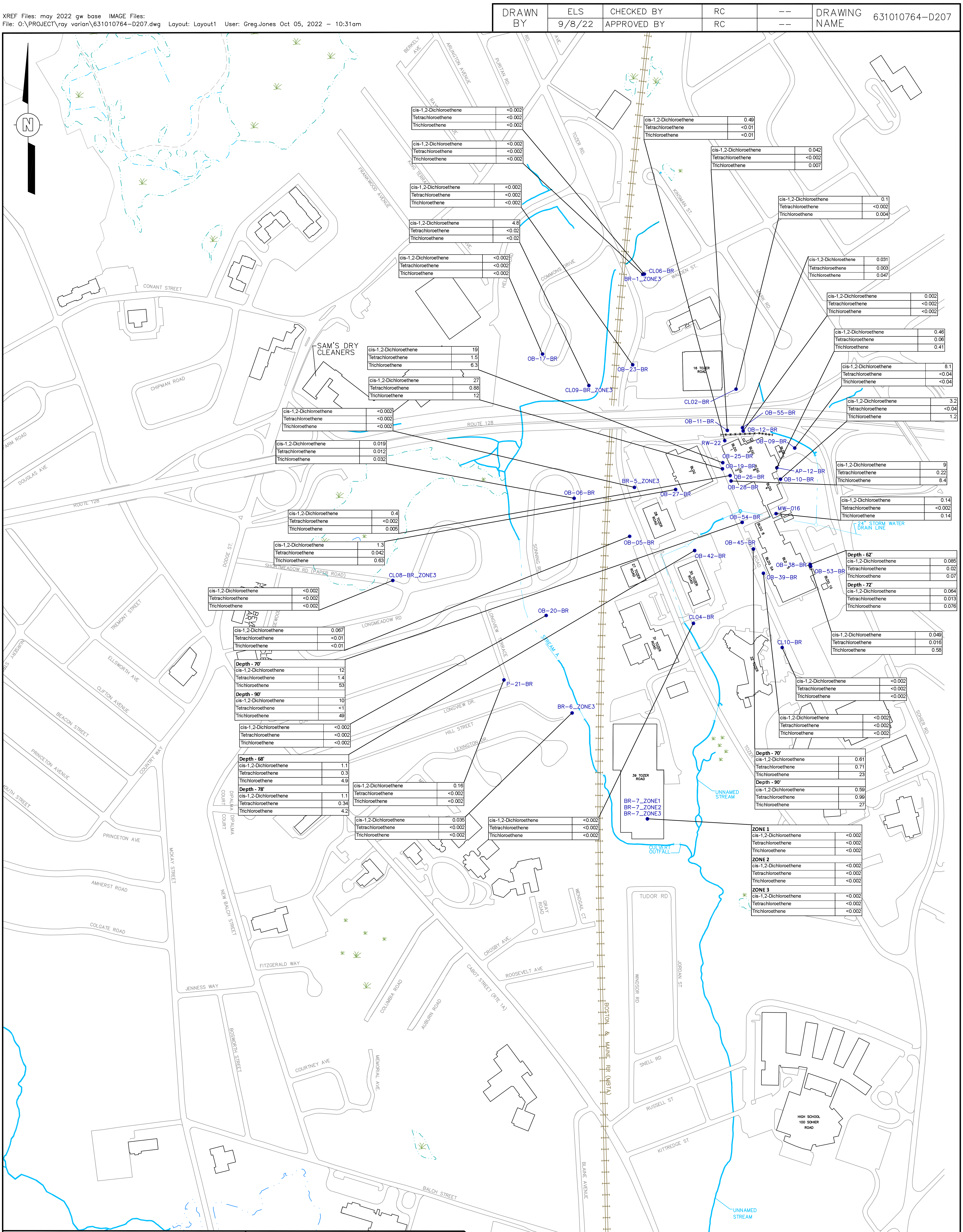
		APPROVED BY	RC	--	



cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	0.49
Tetrachloroethene	<0.01
Trichloroethene	<0.01

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	0.042
Tetrachloroethene	<0.002
Trichloroethene	0.007

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	0.1
Tetrachloroethene	<0.002
Trichloroethene	0.004

cis-1,2-Dichloroethene	4.8
Tetrachloroethene	<0.02
Trichloroethene	<0.02

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	0.031
Tetrachloroethene	0.003
Trichloroethene	0.047

cis-1,2-Dichloroethene	0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	0.46
Tetrachloroethene	0.06
Trichloroethene	0.41

cis-1,2-Dichloroethene	19
Tetrachloroethene	1.5
Trichloroethene	6.3

cis-1,2-Dichloroethene	8.1
Tetrachloroethene	<0.04
Trichloroethene	<0.04

cis-1,2-Dichloroethene	27
Tetrachloroethene	0.88
Trichloroethene	12

cis-1,2-Dichloroethene	3.2
Tetrachloroethene	<0.04
Trichloroethene	1.2

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	0.019
Tetrachloroethene	0.012
Trichloroethene	0.032

cis-1,2-Dichloroethene	9
Tetrachloroethene	0.22
Trichloroethene	8.4

cis-1,2-Dichloroethene	0.14
Tetrachloroethene	<0.002
Trichloroethene	0.14

cis-1,2-Dichloroethene	0.4
Tetrachloroethene	<0.002
Trichloroethene	0.005

cis-1,2-Dichloroethene	1.3
Tetrachloroethene	0.042
Trichloroethene	0.63

Depth - 62'	
cis-1,2-Dichloroethene	0.085
Tetrachloroethene	0.02
Trichloroethene	0.07
Depth - 72'	
cis-1,2-Dichloroethene	0.064
Tetrachloroethene	0.013
Trichloroethene	0.076

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	0.067
Tetrachloroethene	<0.01
Trichloroethene	<0.01

cis-1,2-Dichloroethene	0.049
Tetrachloroethene	0.016
Trichloroethene	0.58

Depth - 70'	
cis-1,2-Dichloroethene	12
Tetrachloroethene	1.4
Trichloroethene	53
Depth - 90'	
cis-1,2-Dichloroethene	10
Tetrachloroethene	<1
Trichloroethene	49

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

Depth - 70'	
cis-1,2-Dichloroethene	0.61
Tetrachloroethene	0.71
Trichloroethene	23
Depth - 90'	
cis-1,2-Dichloroethene	0.59
Tetrachloroethene	0.99
Trichloroethene	27

Depth - 68'	
cis-1,2-Dichloroethene	1.1
Tetrachloroethene	0.3
Trichloroethene	4.9
Depth - 78'	
cis-1,2-Dichloroethene	1.1
Tetrachloroethene	0.34
Trichloroethene	4.2

cis-1,2-Dichloroethene	0.16
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	0.035
Tetrachloroethene	<0.002
Trichloroethene	<0.002

cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

ZONE 1	
cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002
ZONE 2	
cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002
ZONE 3	
cis-1,2-Dichloroethene	<0.002
Tetrachloroethene	<0.002
Trichloroethene	<0.002

LEGEND:

● CL4-BR	BEDROCK WELL IDENTIFICATION

EXAMPLE OF OTHER WELLS:

● CL02-BR	MONITORING WELL NUMBER
● BR-7	MONITORING WELL NUMBER
● P-21-BR	MONITORING WELL NUMBER
● OB-42-BR	MONITORING WELL NUMBER

LOCATED WITHIN A CULVERT
APPROXIMATE BUILDING LOCATION
Ⓓ APPROXIMATE DRAIN MANHOLE LOCATION
APPROXIMATE LOCATION OF STREAM IN CULVERT
APPROXIMATE STREAM LOCATION
WATER AND MARSH AREA

NOTES:

1. BR=BEDROCK
2. <=LESS THAN POSTED DETECTION LIMIT
3. VOC=VOLATILE ORGANIC COMPOUNDS
4. RESULTS IN MILLIGRAMS PER LITER

BEDROCK WELLS BR-1 THROUGH BR-8 AND CL9-BR HAVE MULTILEVEL GROUNDWATER MONITORING SYSTEMS PRESENT WITHIN THE BEDROCK. ZONE 1 REFERS TO THE DEEPEST SAMPLING ZONE, ZONE 2 REFERS TO THE MIDDLE SAMPLING INTERVAL, AND ZONE 3 CLOSEST TO THE GROUND SURFACE.

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004; 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

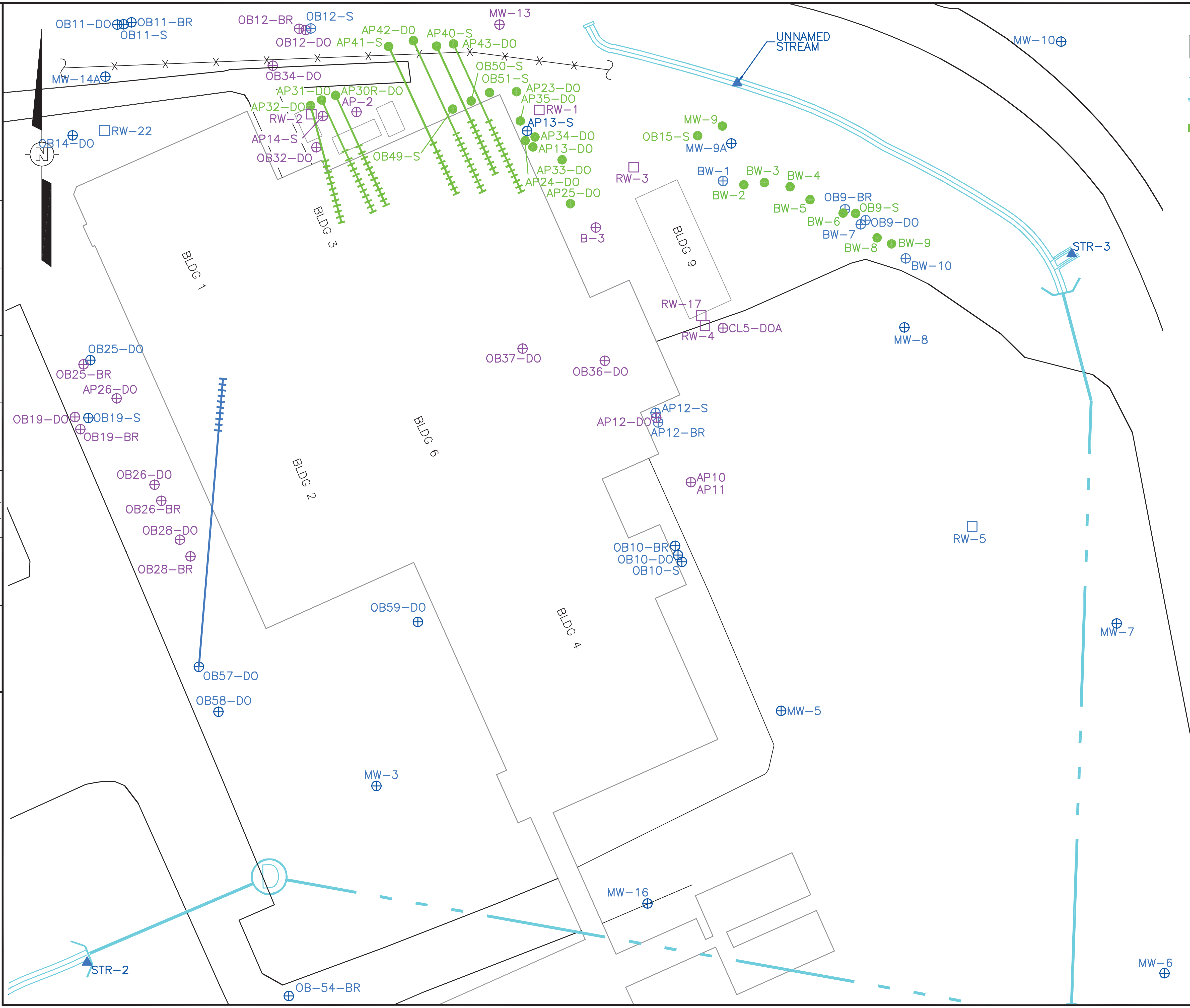
SCALE
0 250 500 750 FEET

FIGURE 3-5
VOC CONCENTRATIONS IN GROUNDWATER - BEDROCK MAY/AUGUST 2022
FORMER VARIAN FACILITY SITE - BEVERLY, MA.

PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

SCALE: 1" = 250'	DRAFTED BY: ELS
DATE: 9/8/2022	PROJECT NO.: 631010764

PREPARED BY:
APTIM
APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.



LEGEND

▭	APPROXIMATE BUILDING LOCATION
—	APPROXIMATE LOCATION OF STREAM IN CULVERT
═	APPROXIMATE STREAM LOCATION
┼┼┼┼—	ANGLED WELL AND SCREEN LOCATION
□	RECOVERY WELL (RW)
⊕	MONITORING WELL (MW)
●	BIOREMEDIATION INJECTION WELL SHOWN IN GREEN (PERMAGANATE INJECTION WELLS SHOWN IN PURPLE)
▲	SURFACE WATER STREAM (STR) SAMPLE LOCATION

⊕ CL4–BR – WELL IDENTIFICATION

CL–9 CLUSTER WELL NUMBER
S=SHALLOW
DO=DEEP OVERBURDEN
BR=BEDROCK

STR–6	STREAM SAMPLE LOCATION NUMBER
STRHA–1	STREAM/SURFACE WATER SAMPLE
HA–1	HAND AUGER WELL LOCATION NUMBER
STRMH–1	STREAM/MANHOLE LOCATION NUMBER
MW–5	MONITORING WELL NUMBER
GZ–1	MONITORING WELL NUMBER
PLMW–1	MONITORING WELL NUMBER
BR–1	BEDROCK WELL NUMBER

BEDROCK WELLS BR–1 THROUGH BR–8 AND CL9–BR HAVE MULTILEVEL GROUNDWATER MONITORING SYSTEMS PRESENT WITHIN THE BEDROCK. ZONE 1 REFERS TO THE DEEPEST SAMPLING ZONE, ZONE 2 REFERS IS THE MIDDLE SAMPLING INTERVAL, AND ZONE 3 CLOSEST TO THE GROUND SURFACE.

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004; 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

SCALE
0 50 100 FEET

APTIM

APTIM ENVIRONMENTAL &
INFRASTRUCTURE, INC.
150 ROYALL STREET
CANTON, MASSACHUSETTS
(617) 589–5111

FIGURE 3-6
BUILDING 1, 2, 3, 4, & 6 Area

FORMER VARIAN FACILITY - BEVERLY, MA

DRAWING NUMBER 631237906-B2
APPROVED BY -- --
CHECKED BY -- RC
DRAWN BY 7/15/19 ELS
OFFICE CANTON, MA

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Plotted By: Greg.Jones

OFFICE
Pittsburgh, PA

DRAWING NUMBER 631010764-D203

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Plot Date/Time: Sep 12, 2022 - 6:32am
Plotted By: Greg.Jones

APTIM

150 Royall Street
Canton, Massachusetts

VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

FIGURE 3-7
ESTIMATED BUILDING 3 TREATMENT AREA
FORMER VARIAN FACILITY SITE - BEVERLY, MA

DESIGNED BY: --
DRAWN BY: --
CHECKED BY: --
APPROVED BY: --
DATE: -/-/--
SCALE: AS SHOWN
DRAWING NO. 631010764-D203
SHEET NO. --

SCALE
0 50 100 FEET

REFERENCE:

REFERENCE ALL DRAWINGS FROM OTHER SOURCES HERE.

APTIM

150 Royall Street
Canton, MA 02021

VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

FIGURE 3-8

34 LONGVIEW DRIVE

FORMER VARIAN FACILITY SITE
BEVERLY, MA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	--/--/--	--	--	--	--	631010764-A1

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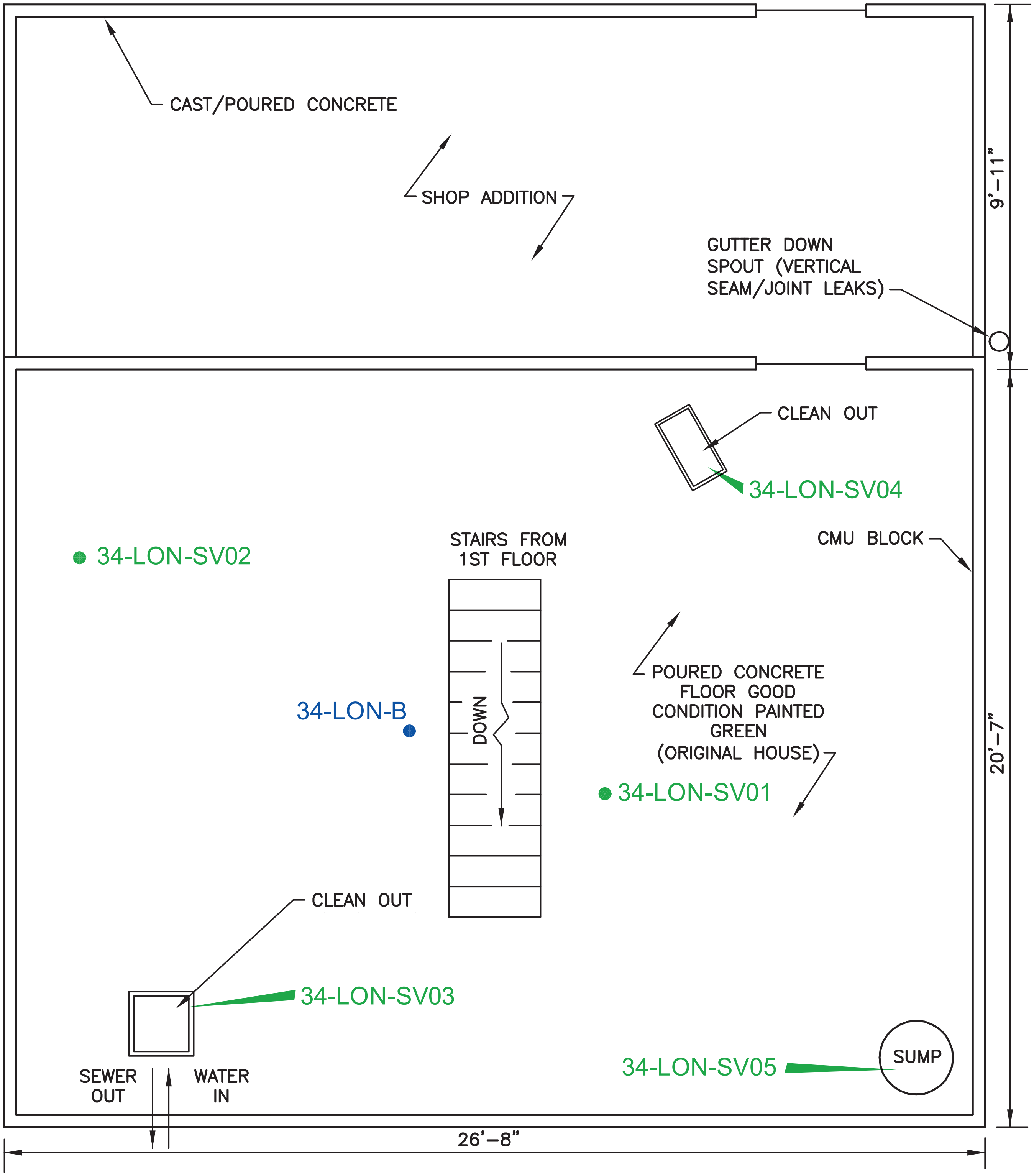
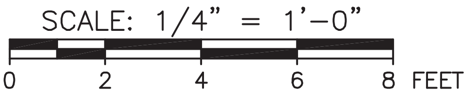
Plotted By: Greg.Jones





REFERENCE:

REFERENCE ALL DRAWINGS FROM OTHER SOURCES HERE.

APTIM

150 Royall Street
Canton, MA 02021

VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

FIGURE 3-9

34 LONGVIEW DRIVE BASEMENT AREA

FORMER VARIAN FACILITY SITE BEVERLY, MA

OFFICE	Pittsburgh, PA
DATE	-/-/--
DESIGNED BY	--
DRAWN BY	--
CHECKED BY	--
APPROVED BY	--
DRAWING NUMBER	631010764-A2

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Plotted By: Greg.Jones

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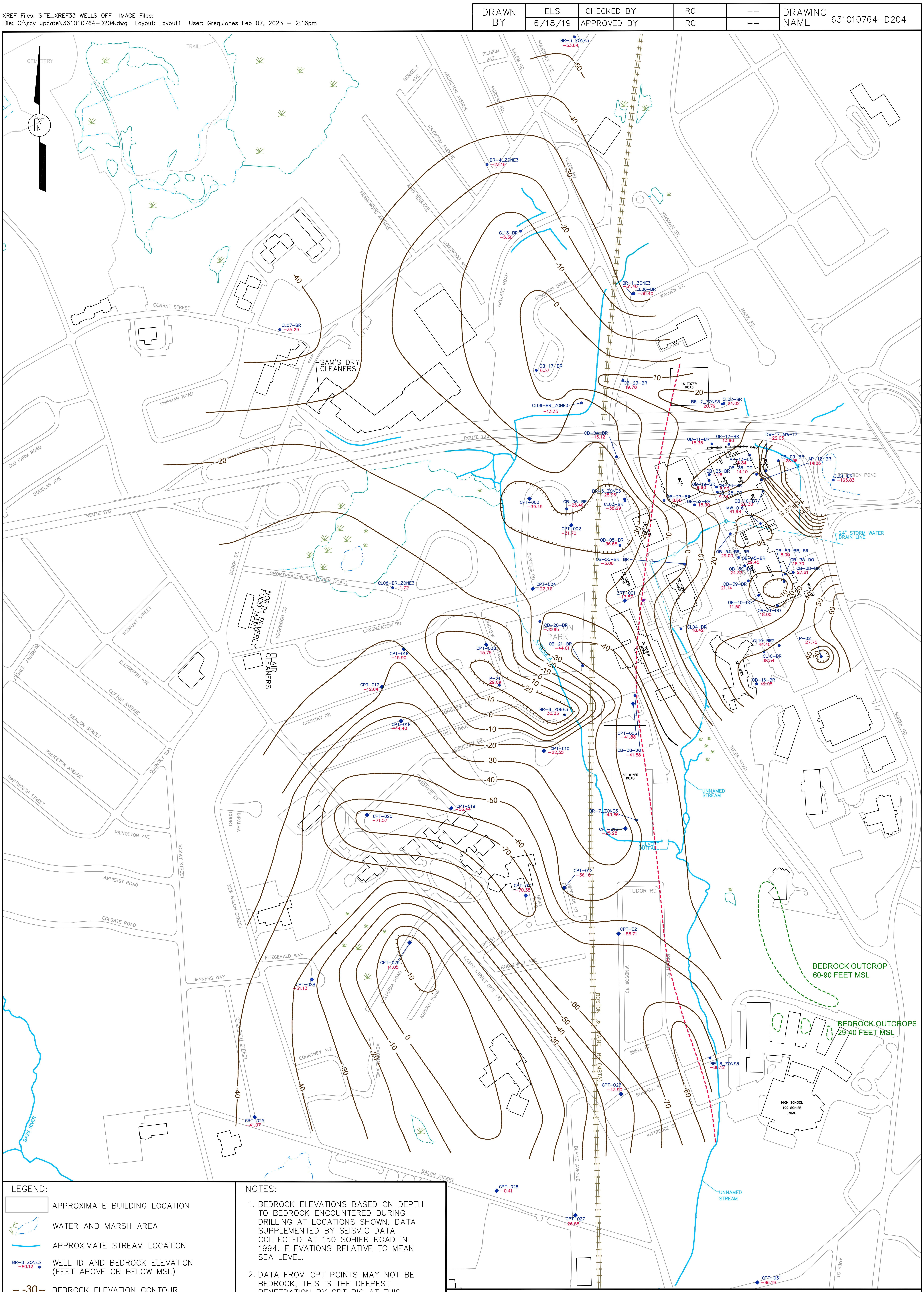
	6/18/19	APPROVED BY	RC	--	



LEGEND:

- ▭ APPROXIMATE BUILDING LOCATION
- WATER AND MARSH AREA
- APPROXIMATE STREAM LOCATION
- BR-8_ZONE3 -80.12 WELL ID AND BEDROCK ELEVATION (FEET ABOVE OR BELOW MSL)
- -30- BEDROCK ELEVATION CONTOUR IN FEET ABOVE OR BELOW MSL
- BEDROCK SURFACE MOUND
- BEDROCK SURFACE DEPRESSION
- BEDROCK OUTCROP SIZE AND SHAPE ARE APPROXIMATE (ELEVATION DATA ESTIMATED)
- APPROXIMATE CONTACT BETWEEN GRANITE (EAST) AND GABBRO (WEST) FORMATIONS BASED ON: BEDROCK GEOLOGY OF THE SALEM QUADRANGLE AND VICINITY, MASSACHUSETTS MAP (USGS, 1964)

NOTES:

1. BEDROCK ELEVATIONS BASED ON DEPTH TO BEDROCK ENCOUNTERED DURING DRILLING AT LOCATIONS SHOWN. DATA SUPPLEMENTED BY SEISMIC DATA COLLECTED AT 150 SOHIER ROAD IN 1994. ELEVATIONS RELATIVE TO MEAN SEA LEVEL.
2. DATA FROM CPT POINTS MAY NOT BE BEDROCK, THIS IS THE DEEPEST PENETRATION BY CPT RIG AT THIS LOCATION.
3. MSL=MEAN SEA LEVEL

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004; 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

S C A L E
0 250 500 750 FEET

FIGURE 4-1
BEDROCK SURFACE ELEVATION CONTOURS
FORMER VARIAN FACILITY SITE - BEVERLY, MA.

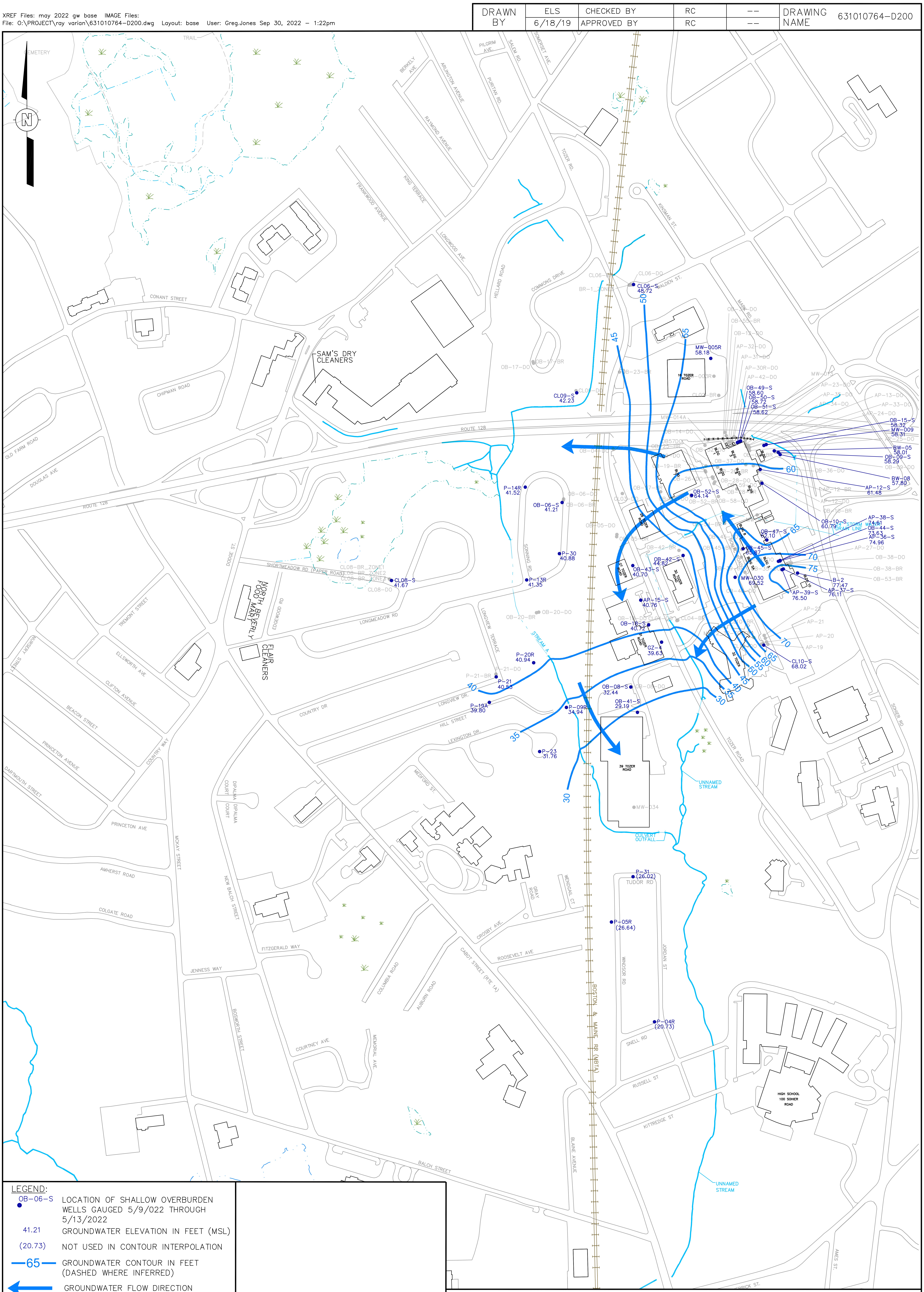
PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

SCALE: 1" = 250'	DRAFTED BY: ELS
DATE: JUNE 18, 2019	PROJECT NO.: 631237906

PREPARED BY:

APTIM
APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

DRAWN BY	ELS	CHECKED BY	RC	--	DRAWING NAME	631010764-D200
	6/18/19	APPROVED BY	RC	--		



LEGEND:

● OB-06-S	LOCATION OF SHALLOW OVERBURDEN WELLS GAUGED 5/9/022 THROUGH 5/13/2022
41.21	GROUNDWATER ELEVATION IN FEET (MSL)
(20.73)	NOT USED IN CONTOUR INTERPOLATION
—65—	GROUNDWATER CONTOUR IN FEET (DASHED WHERE INFERRED)
←	GROUNDWATER FLOW DIRECTION
● OB-20-DO	WELL LOCATIONS S=SHALLOW DO=DEEP OVERBURDEN BR=BEDROCK

ELEVATIONS RELITIVE TO MEAN SEA LEVEL (MSL)

△	BENCHMARK LOCATION (MSL) LOCATED WITHIN A CULVERT
▭	APPROXIMATE BUILDING LOCATION
Ⓓ	APPROXIMATE DRAIN MANHOLE LOCATION
- - -	APPROXIMATE LOCATION OF STREAM IN CULVERT
═	APPROXIMATE STREAM LOCATION
⁓	WATER AND MARSH AREA

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004; 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

SCALE
0 250 500 750 FEET

FIGURE 4-2
GROUNDWATER CONTOURS IN SHALLOW OVERBURDEN AQUIFER FORMER VARIAN FACILITY SITE - BEVERLY, MA.

PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

SCALE: 1" = 250'	DRAFTED BY: ELS
DATE: MAY 9-13, 2022	PROJECT NO.: 631010764

PREPARED BY:
APTIM
APTIM ENVIRONMENTAL & INFRASTRUCTURE, LLC

XREF Files: may 2022 gw base IMAGE Files:
File: O:\PROJECT\ray varian\631010764-D201.dwg Layout: base User: Greg.Jones Sep 30, 2022 - 1:26pm

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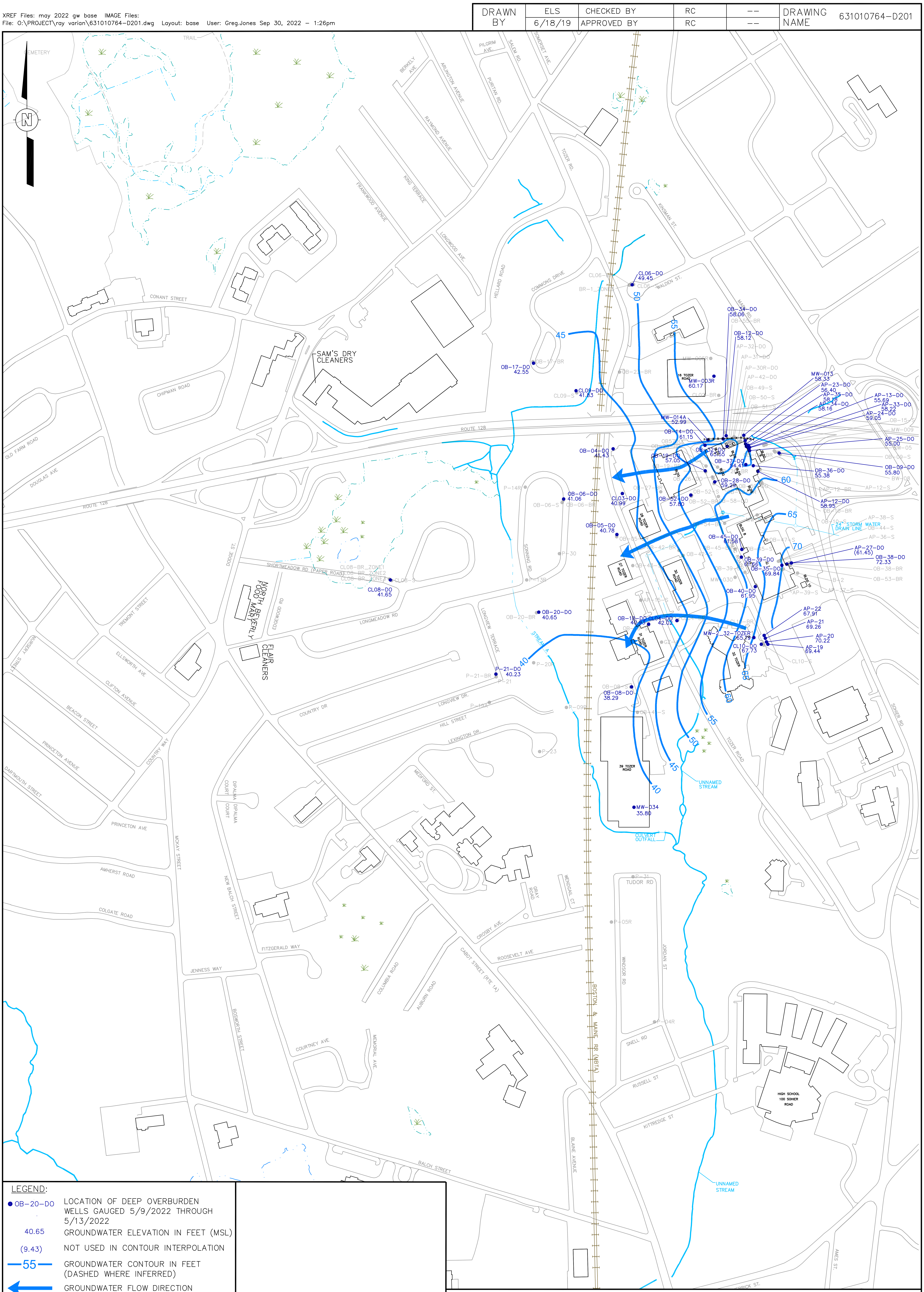
	6/18/19	APPROVED BY	RC	--	



LEGEND:

● OB-20-DO	LOCATION OF DEEP OVERBURDEN WELLS GAUGED 5/9/2022 THROUGH 5/13/2022
40.65	GROUNDWATER ELEVATION IN FEET (MSL)
(9.43)	NOT USED IN CONTOUR INTERPOLATION
—55—	GROUNDWATER CONTOUR IN FEET (DASHED WHERE INFERRED)
←	GROUNDWATER FLOW DIRECTION
● OB-20-BR	WELL LOCATIONS S=SHALLOW DO=DEEP OVERBURDEN BR=BEDROCK

ELEVATIONS RELATIVE TO MEAN SEA LEVEL (MSL)

△	BENCHMARK LOCATION (MSL)
▭	APPROXIMATE BUILDING LOCATION
Ⓓ	APPROXIMATE DRAIN MANHOLE LOCATION
-·-·-	APPROXIMATE LOCATION OF STREAM IN CULVERT
═	APPROXIMATE STREAM LOCATION
⁂	WATER AND MARSH AREA

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004; 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

SCALE
0 250 500 750 FEET

FIGURE 4-3
GROUNDWATER CONTOURS IN DEEP OVERBURDEN AQUIFER
FORMER VARIAN FACILITY SITE - BEVERLY, MA.

PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

SCALE: 1" = 250'	DRAFTED BY: ELS
DATE: MAY 9-13, 2022	PROJECT NO.: 631010764

PREPARED BY:

APTIM

APTIM ENVIRONMENTAL
& INFRASTRUCTURE, LLC

XREF Files: may 2022 gw base IMAGE Files:
File: O:\PROJECT\ray varian\631010764-D202.dwg Layout: base User: Greg.Jones Sep 30, 2022 - 11:11am

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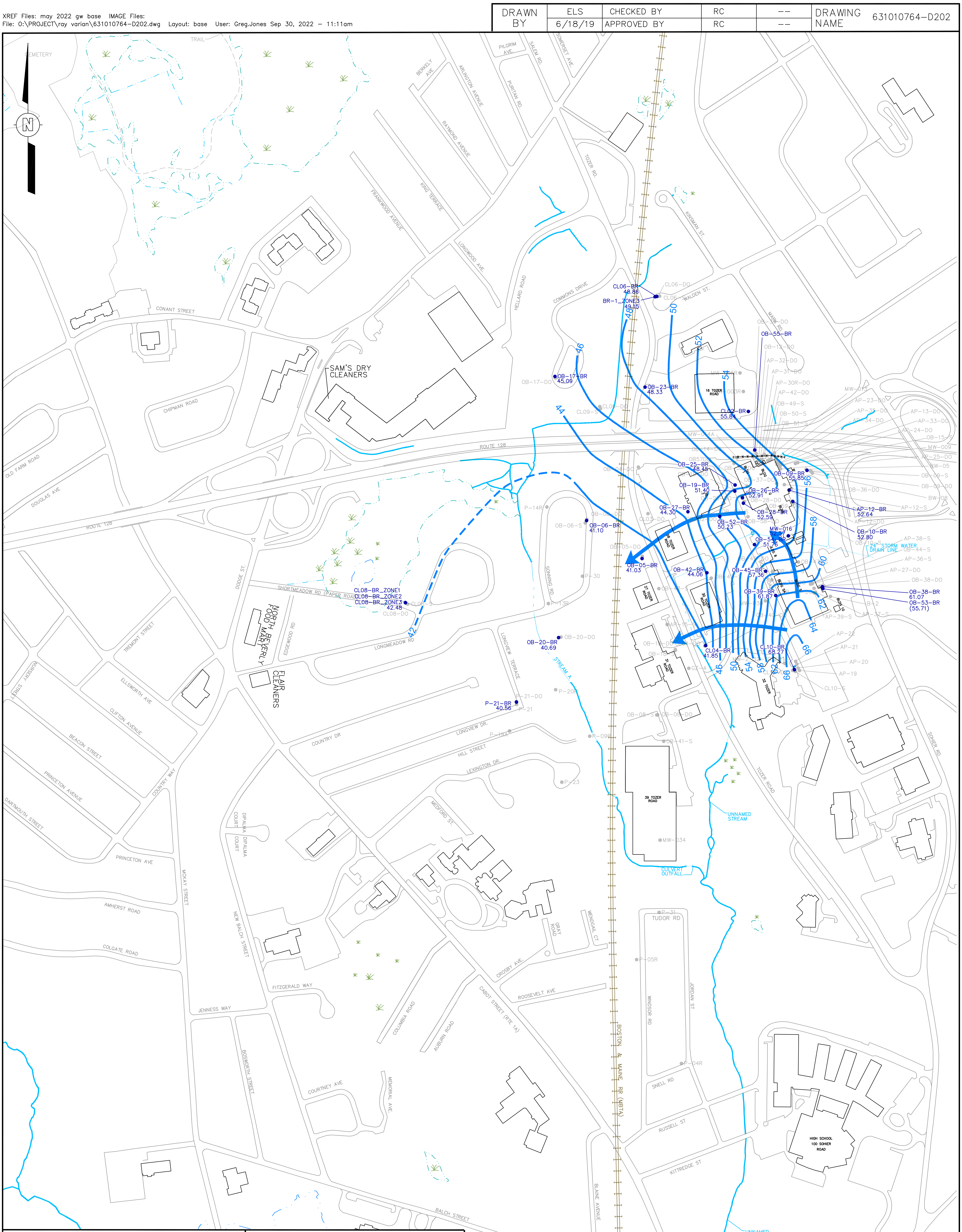

LEGEND:

● OB-20-BR	LOCATION OF BEDROCK WELLS GAUGED 5/9/2022 THROUGH 5/13/2022
40.69	GROUNDWATER ELEVATION IN FEET (MSL)
(55.71)	NOT USED IN CONTOUR INTERPOLATION
—66—	GROUNDWATER CONTOUR IN FEET (DASHED WHERE INFERRED)
←	GROUNDWATER FLOW DIRECTION
● OB-20-DO	WELL LOCATIONS S=SHALLOW DO=DEEP OVERBURDEN BR=BEDROCK

ELEVATIONS RELATIVE TO MEAN SEA LEVEL (MSL)

△	BENCHMARK LOCATION (MSL)
☐	APPROXIMATE BUILDING LOCATION
Ⓓ	APPROXIMATE DRAIN MANHOLE LOCATION
—·—·—	APPROXIMATE LOCATION OF STREAM IN CULVERT
═	APPROXIMATE STREAM LOCATION
	WATER AND MARSH AREA

NOTE:

GROUNDWATER FLOW THROUGH BEDROCK OCCURS MOSTLY THROUGH FRACTURES, THEREFORE THIS MAP REPRESENTS THE GENERAL GROUNDWATER FLOW DIRECTION IN BEDROCK AND NOT THE EXACT PATHWAY DIRECTIONS.

BEDROCK WELLS BR-1 THROUGH BR-8 AND CL9-BR HAVE MULTILEVEL GROUNDWATER MONITORING SYSTEMS PRESENT WITHIN THE BEDROCK. ZONE 1 REFERS TO THE DEEPEST SAMPLING ZONE, ZONE 2 REFERS TO THE MIDDLE SAMPLING INTERVAL, AND ZONE 3 CLOSEST TO THE GROUND SURFACE.

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004; 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

SCALE

0 250 500 750 FEET

FIGURE 4-4
GROUNDWATER CONTOURS IN BEDROCK AQUIFER FORMER VARIAN FACILITY SITE - BEVERLY, MA.

PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

SCALE: 1" = 250'	DRAFTED BY: ELS
DATE: MAY 9–13, 2022	PROJECT NO.: 631010764

PREPARED BY:

APTIM

APTIM ENVIRONMENTAL
& INFRASTRUCTURE, LLC

File: C:\lynn fix\631010764-B201.dwg
Plot Date/Time: Sep 29, 2022 - 9:35am
Plotted By: Greg.Jones
Xref :
Image :

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
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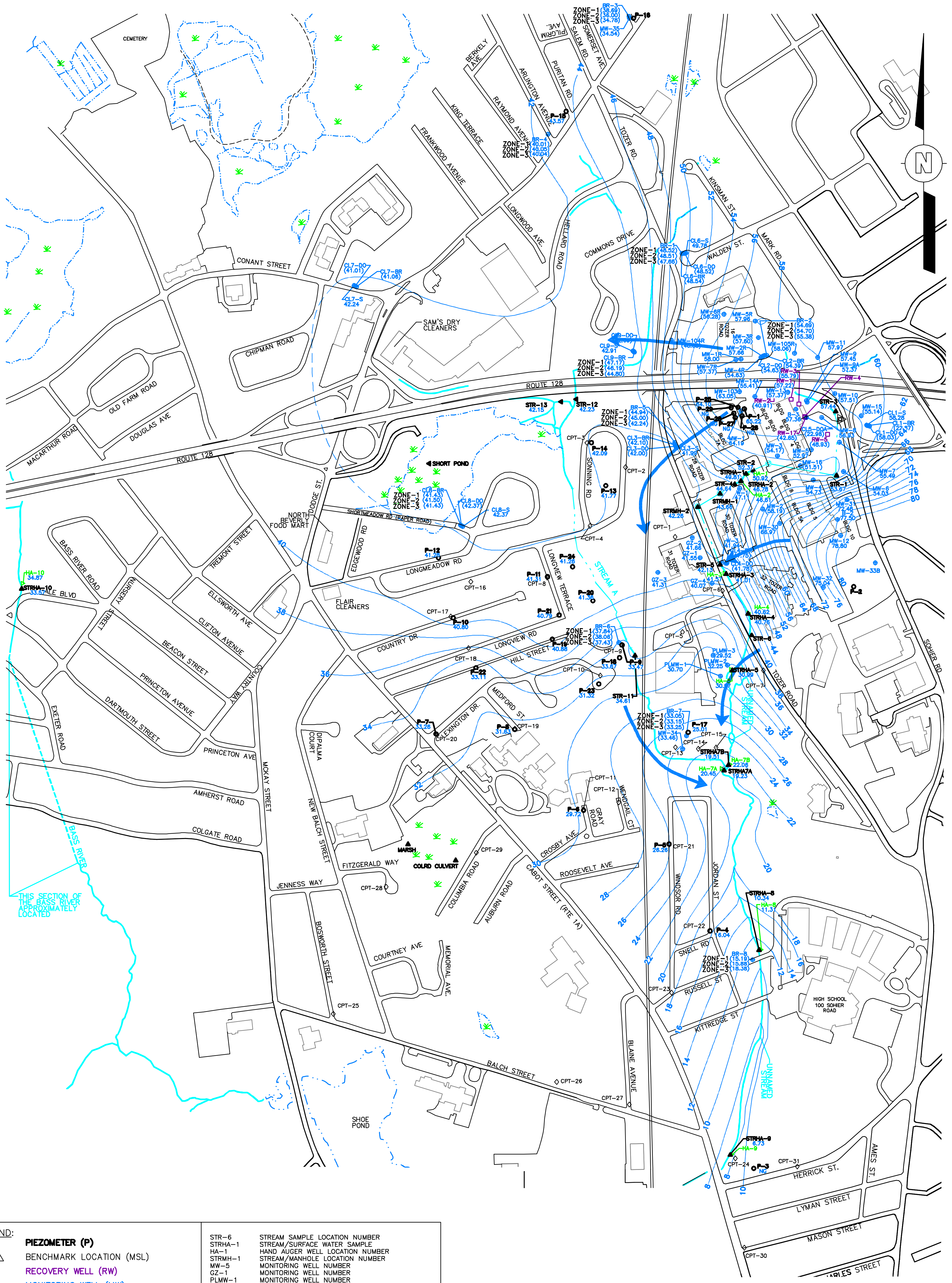


LEGEND:
- ⚬ **PIEZOMETER (P)**
- △ BENCHMARK LOCATION (MSL)
- ☐ RECOVERY WELL (RW)
- ⊕ MONITORING WELL (MW)
- ▲ **SURFACE WATER STREAM (STR) SAMPLE LOCATION**
- ◇ CONE PENETROMETER TESTPOINT (CPT)
- △ HAND AUGER SAMPLE LOCATION (HA) ADJACENT TO A STREAM (STRHA)
- STRMH MANHOLE ACCESS TO THE STREAM LOCATED WITHIN A CULVERT
- ☐ APPROXIMATE BUILDING LOCATION
- Ⓓ APPROXIMATE DRAIN MANHOLE LOCATION APPROXIMATE LOCATION OF STREAM IN CULVERT
- APPROXIMATE STREAM LOCATION
- WATER AND MARSH AREA
- CL-9 CLUSTER WELL NUMBER
  - S=SHALLOW
  - DO=DEEP OVERBURDEN
  - BR=BEDROCK

STR-6	STREAM SAMPLE LOCATION NUMBER
STRHA-1	STREAM/SURFACE WATER SAMPLE
HA-1	HAND AUGER WELL LOCATION NUMBER
STRMH-1	STREAM/MANHOLE LOCATION NUMBER
MW-5	MONITORING WELL NUMBER
GZ-1	MONITORING WELL NUMBER
PLMW-1	MONITORING WELL NUMBER
BR-1	BEDROCK WELL NUMBER

- INTERPRETED GROUNDWATER CONTOUR DASHED WHERE INFERRED
- ← GROUNDWATER FLOW DIRECTION
- ( ) ELEVATION NOT USED IN CONTOUR INTERPOLATION
- NG NOT GAUGED

GROUNDWATER ELEVATIONS FROM BEDROCK WELLS, DEEP OVERBURDEN WELLS, AND RECOVERY WELLS WERE NOT USED FOR THIS WATER TABLE CONTOUR MAP.

BEDROCK WELLS BR-1 THROUGH BR-8 AND CL9-BR HAVE MULTILEVEL GROUNDWATER MONITORING SYSTEMS PRESENT WITHIN THE BEDROCK. ZONE 1 REFERS TO THE DEEPEST SAMPLING ZONE, ZONE 2 REFERS IS THE MIDDLE SAMPLING INTERVAL, AND ZONE 3 CLOSEST TO THE GROUND.

ELEVATIONS ON THIS MAP HAVE BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000 AND FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY IT CORPORATION

SCALE

0 600 1,200

FIGURE 4-5
GROUNDWATER CONTOUR OF SHALLOW OVERBURDEN AQUIFER FOR DECEMBER 6, 1999 PHASE II INVESTIGATION

PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

SCALE: 1" = 600'	DRAFTED BY: JC/MAT
DATE: 26 JANUARY 2000	PROJECT NO.:

PREPARED BY:

APTIM
APTIM ENVIRONMENTAL
& INFRASTRUCTURE, INC.

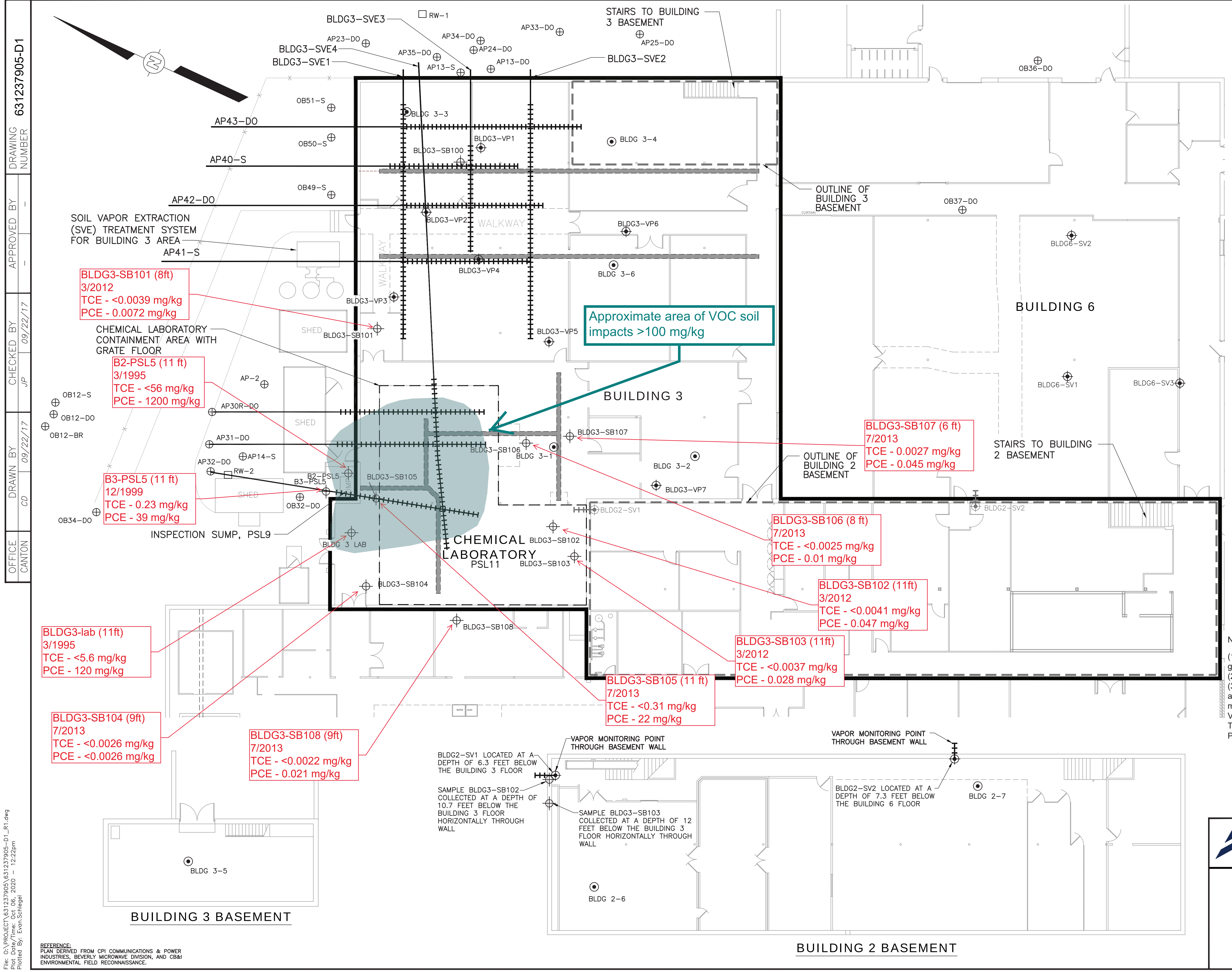
DRAWING NUMBER 631237905-D1

APPROVED BY –

CHECKED BY JP 09/22/17

DRAWN BY CD 09/22/17

OFFICE CANTON



REFERENCE:
PLAN DERIVED FROM CPI COMMUNICATIONS & POWER INDUSTRIES, BEVERLY MICROWAVE DIVISION, AND CB&I ENVIRONMENTAL FIELD RECONNAISSANCE.

File: O:\PROJECT\631237905\631237905–D1_R1.dwg
Plot Date/Time: Oct 06, 2020 – 12:22pm
Plotted By: Evan.Schlegel

LEGEND

- BUILDING 3 TREATMENT AREA
- HORIZONTAL SOIL VAPOR EXTRACTION (SVE) WELL LOCATION
- ⌖ SUB-SLAB SOIL VAPOR MONITORING POINT
- ⌖ SOIL BORING LOCATION
- ⊙ INDOOR AIR SAMPLE LOCATION
- ⊕ MONITORING WELL
- ☐ RECOVERY WELL
- BUILDING COLUMNS
- ====== UTILITY TRENCH
- FORMER UTILITY TRENCH–FILLED WITH CONCRETE
- BUILDING WALLS
- –x–x– FENCE LINE
- PSL POTENTIAL SOURCE LOCATION AS DESCRIBED IN PHASE II CSA FOR RTN 3–0485

INDOOR AIR SAMPLE ID	ROOM
BLDG 2–6	ENVIRONMENTAL TESTING ROOM BUILDING 2 BASEMENT
BLDG 2–7	STORAGE ROOM BUILDING 2 BASEMENT
BLDG 3–1	MAIN CHEMICAL LABORATORY
BLDG 3–2	CHEMISTRY LABORATORY BENCH TESTING ROOM
BLDG 3–3	MID STOCK ROOM
BLDG 3–4	BUILDING 3 MACHINE SHOP
BLDG 3–5	BOILER ROOM BUILDING 3 BASEMENT
BLDG 3–6	BUILDING 3 STORAGE ROOM

Notes:

(1) Soil samples with the highest field screening results were generally submitted for analysis.
(2) Data collection dates range from 1995 to 2013
(3) Due to treatment conducted in this area, posted soil analytical results may not be indicative of current conditions.
mg/kg - milligrams per kilogram
VOC - volatile organic compounds
TCE - trichloroethene
PCE - tetrachloroethene

SCALE
0 10 20 30 FEET

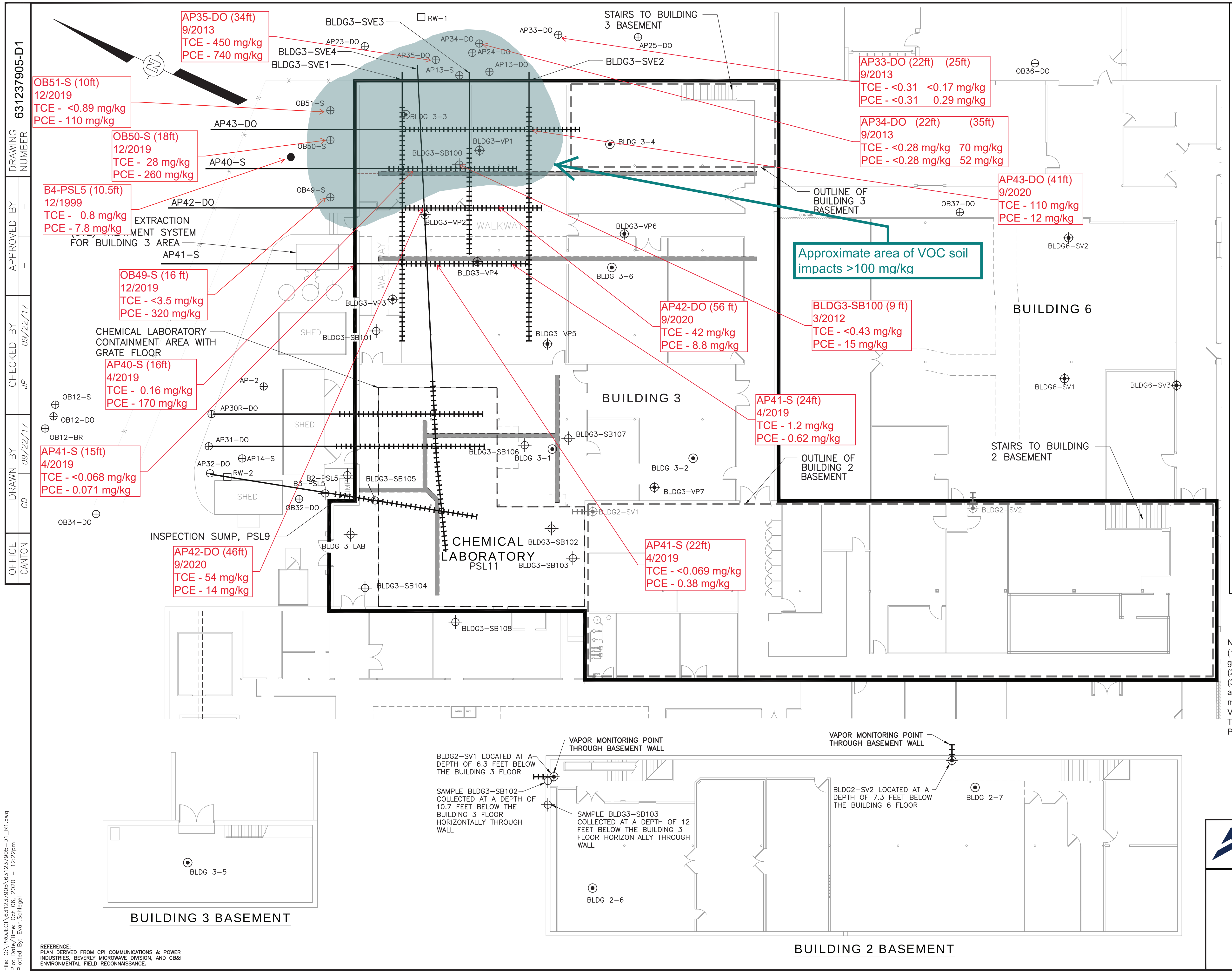
APTIM

APTIM Environmental & Infrastructure, Inc.
150 Royall Street
Canton, Massachusetts
(617) 589-5111

Figure 6-1
Summary of Soil Assessment Results, Building 3 West

FORMER VARIAN FACILTIY SITE
150 SOHIER ROAD
BEVERLY, MASSACHUSETTS

DRAWING NUMBER 631237905-D1
APPROVED BY – –
CHECKED BY JP 09/22/17
DRAWN BY CD 09/22/17
OFFICE CANTON



REFERENCE:
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File: O:\PROJECT\631237905\631237905-D1_R1.dwg
Plot Date/Time: Oct 06, 2020 - 12:22pm
Plotted By: Evan.Schlegel

LEGEND

—	BUILDING 3 TREATMENT AREA
┼┼┼┼┼—	HORIZONTAL SOIL VAPOR EXTRACTION (SVE) WELL LOCATION
⊕	SUB-SLAB SOIL VAPOR MONITORING POINT
⊕	SOIL BORING LOCATION
⊙	INDOOR AIR SAMPLE LOCATION
⊕	MONITORING WELL
□	RECOVERY WELL
▫	BUILDING COLUMNS
=======	UTILITY TRENCH
▬▬▬	FORMER UTILITY TRENCH–FILLED WITH CONCRETE
═══	BUILDING WALLS
—×—×—	FENCE LINE
PSL	POTENTIAL SOURCE LOCATION AS DESCRIBED IN PHASE II CSA FOR RTN 3-0485

INDOOR AIR SAMPLE ID	ROOM
BLDG 2-6	ENVIRONMENTAL TESTING ROOM BUILDING 2 BASEMENT
BLDG 2-7	STORAGE ROOM BUILDING 2 BASEMENT
BLDG 3-1	MAIN CHEMICAL LABORATORY
BLDG 3-2	CHEMISTRY LABORATORY BENCH TESTING ROOM
BLDG 3-3	MID STOCK ROOM
BLDG 3-4	BUILDING 3 MACHINE SHOP
BLDG 3-5	BOILER ROOM BUILDING 3 BASEMENT
BLDG 3-6	BUILDING 3 STORAGE ROOM

Notes:
(1) Soil samples with the highest field screening results were generally submitted for analysis.
(2) Data collection dates range from 1995 to 2020.
(3) Due to treatment conducted in this area, posted soil analytical results may not be indicative of current conditions.
mg/kg - milligrams per kilogram
VOC - volatile organic compounds
TCE - trichloroethene
PCE - tetrachloroethene

SCALE
0 10 20 30 FEET

APTIM

APTIM Environmental &
Infrastructure, Inc.
150 Royall Street
Canton, Massachusetts
(617) 589-5111

Summary of Soil Assessment Results Building 3 East

Figure 6-2

FORMER VARIAN FACILTIY SITE
150 SOHIER ROAD
BEVERLY, MASSACHUSETTS

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
CANTON, MA	CD/ES 9/16/22	RC 9/16/22	-- --	146898-SITE PLAN

XREF Files: IMAGE Files:
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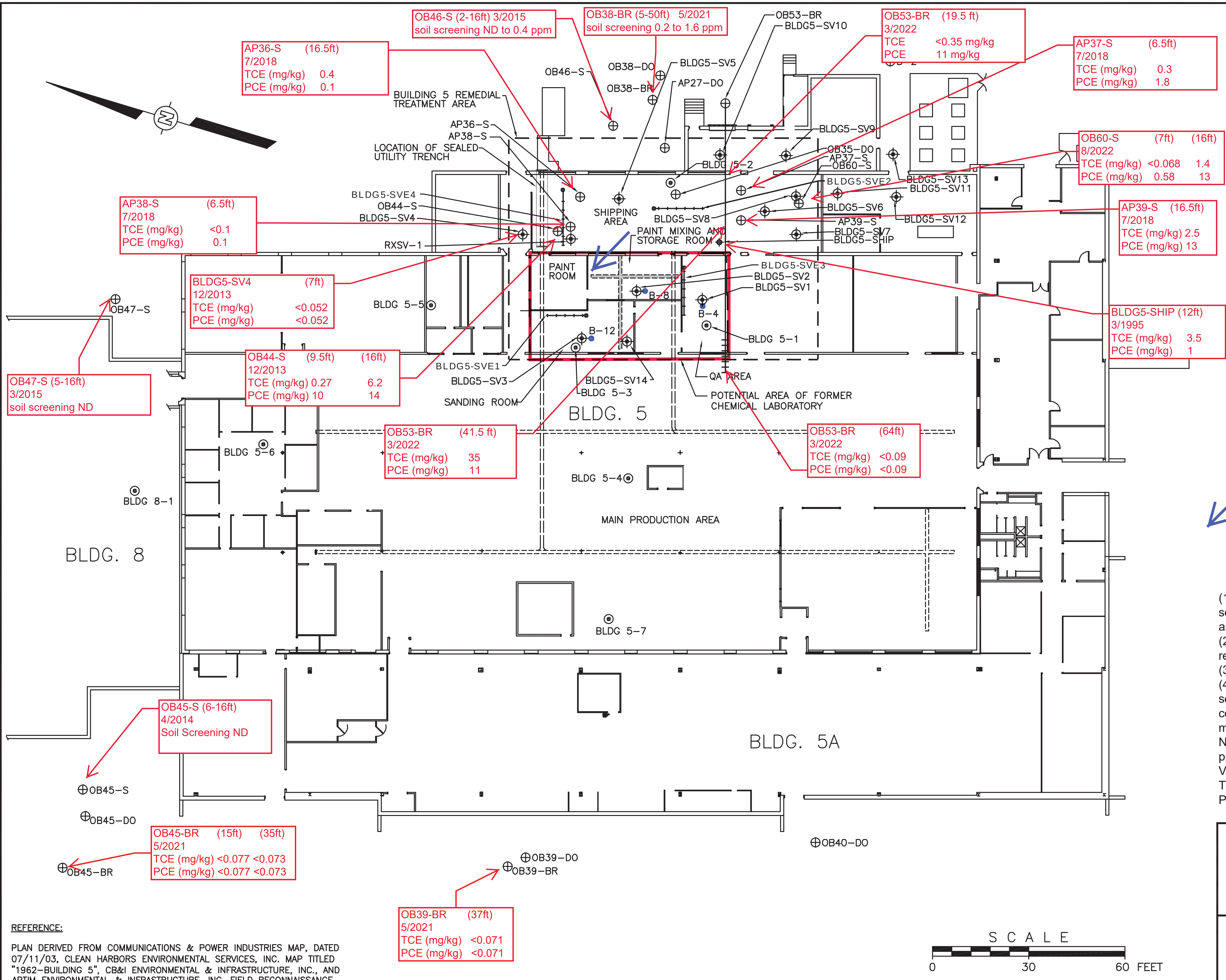
Plotted By: Greg.Jones



REFERENCE:

PLAN DERIVED FROM COMMUNICATIONS & POWER INDUSTRIES MAP, DATED 07/11/03, CLEAN HARBORS ENVIRONMENTAL SERVICES, INC. MAP TITLED "1962-BUILDING 5", CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC. FIELD RECONNAISSANCE, JULY 2012, APRIL 2014 AND AUGUST 2018.

LEGEND

⊕	SUB-SLAB SOIL VAPOR SAMPLE LOCATION (2011-2014)
◎	INDOOR AIR SAMPLE LOCATION (2011-2014)
●	SUB-SLAB SOIL VAPOR SAMPLE LOCATION (1995)
⊕	MONITORING WELL
◆	SOIL BORING
▭	FORMER UTILITY TRENCH FILLED WITH CONCRETE
▭	UTILITY TRENCH
⊕	SVE TRENCH WELL
⊕	ANGLED WELL AND SCREEN

INDOOR AIR SAMPLE ID RTN 3-0485	ROOM
BLDG 5-1	QA AREA
BLDG 5-2	SHIPPING AREA
BLDG 5-3	SANDING ROOM
BLDG 5-4	PRODUCTION AREA
BLDG 5-5	CATHODE SPRAY ROOM
BLDG 5-6	COMMON OFFICE AREA
BLDG 5-7	DEGREASER AREA
BLDG 8-1	HIGH POWER TESTING BUILDING 8 BASEMENT

↙ Approximate direction of shallow groundwater flow

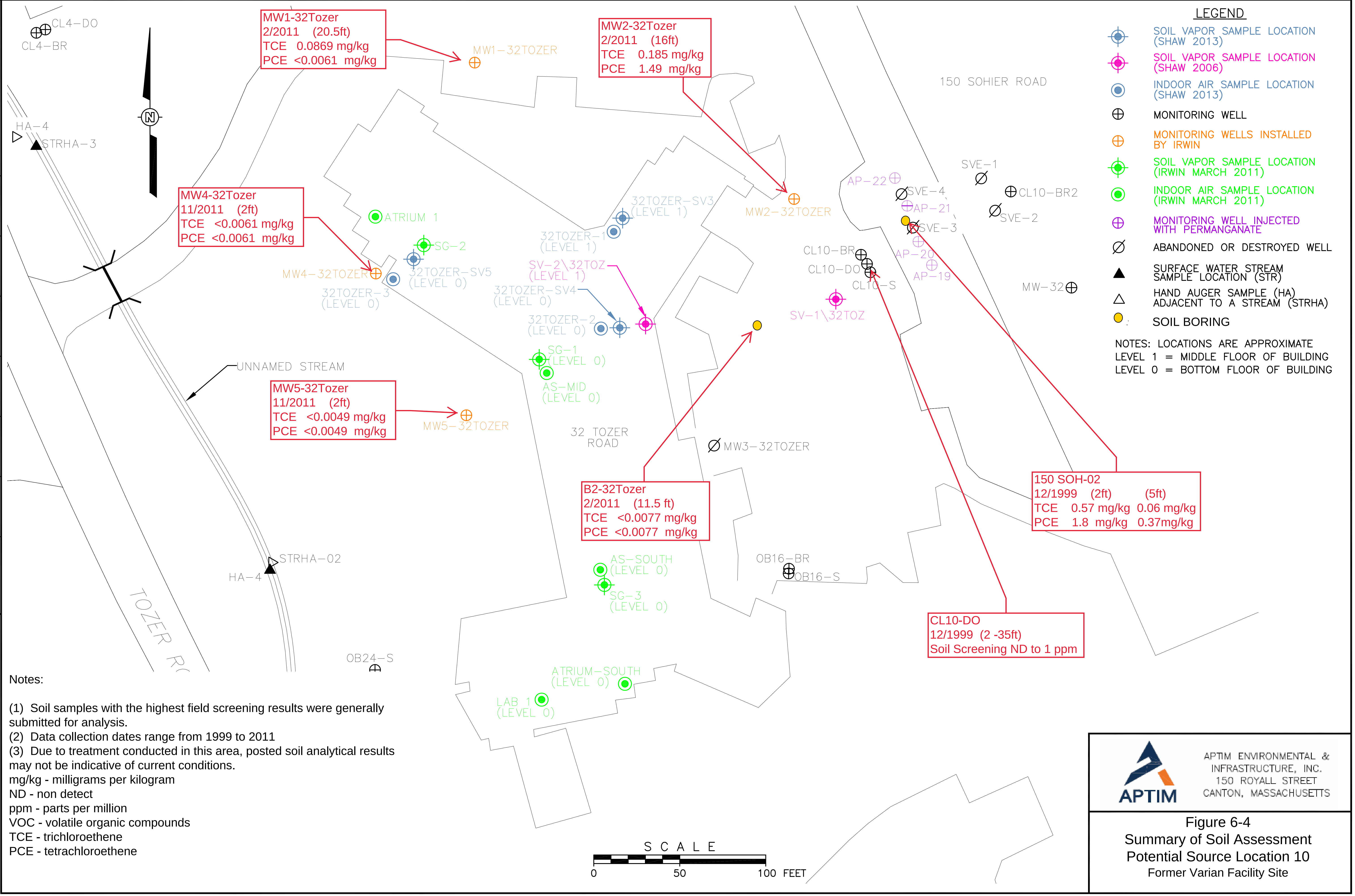
Notes:
(1) Areas of VOC impact estimated based on multiple sets of data including soil analytical, soil screening and soil vapor sampling results.
(2) Soil samples with the highest field screening results were generally submitted for analysis.
(3) Data collection dates range from 1995 to 2022
(4) Due to treatment conducted in this area, posted soil analytical results may not be indicative of current conditions.
mg/kg - milligrams per kilogram
ND - non detect
ppm - parts per million
VOC - volatile organic compounds
TCE - trichloroethene
PCE - tetrachloroethene

APTIM

APTIM ENVIRONMENTAL &
INFRASTRUCTURE, INC.
150 ROYALL STREET
CANTON, MASSACHUSETTS

FIGURE 6-3
Summary of Soil Assessment Results Building 5

FORMER VARIAN FACILITY
150 SOHIER ROAD
BEVERLY, MASSACHUSETTS



Notes:

(1) Soil samples with the highest field screening results were generally submitted for analysis.
(2) Data collection dates range from 1999 to 2011
(3) Due to treatment conducted in this area, posted soil analytical results may not be indicative of current conditions.
mg/kg - milligrams per kilogram
ND - non detect
ppm - parts per million
VOC - volatile organic compounds
TCE - trichloroethene
PCE - tetrachloroethene

APTIM

APTIM ENVIRONMENTAL &
INFRASTRUCTURE, INC.
150 ROYALL STREET
CANTON, MASSACHUSETTS

Figure 6-4
Summary of Soil Assessment
Potential Source Location 10
Former Varian Facility Site

DRAWING NUMBER	32TOZERROAD
APPROVED BY	-- --
CHECKED BY	RC 03/12/14
DRAWN BY	CD 03/12/14
OFFICE	CANTON, MA

XREF Files: IMAGE Files: CBI_Logo-Color.jpg
File: T:\MISC\Varian\Beverly, Ma\Phase 4\Rev2\32TOZERROAD.dwg
Plot Date/Time: Mar 12, 2014 - 9:13am
Plotted By: chris.desiata

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

● Sample Location

→ Groundwater Flow Direction

Trichloroethene Concentration

🟩 0.005 - 0.05 mg/L

🟩 0.05 - 0.5 mg/L

🟨 0.5 - 5 mg/L

🟨 5 - 50 mg/L

🟧 50 - 500 mg/L

🟥 >500 mg/L

Notes: Data used to generate this map include May 2021 groundwater sampling results and May/August 2022 sampling results from new wells installed in 2022.

Contours are dashed where inferred.

N

0 175 350 700
Feet

APTIM

VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

FIGURE 6-5

ESTIMATED TRICHLOROETHENE CONCENTRATIONS IN SHALLOW GROUNDWATER

FORMER VARIAN FACILITY SITE
BEVERLY, MA

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

● Sample Location

→ Groundwater Flow Direction

Trichloroethene Concentration

🟩 0.005 - 0.05 mg/L

🟩 0.05 - 0.5 mg/L

🟨 0.5 - 5 mg/L

🟨 5 - 50 mg/L

🟧 50 - 500 mg/L

🟥 >500 mg/L

Notes: Data used to generate this map include May 2021 groundwater sampling results and May/August 2022 sampling results from new wells installed in 2022.

Contours are dashed where inferred.

N

0 175 350 700
Feet

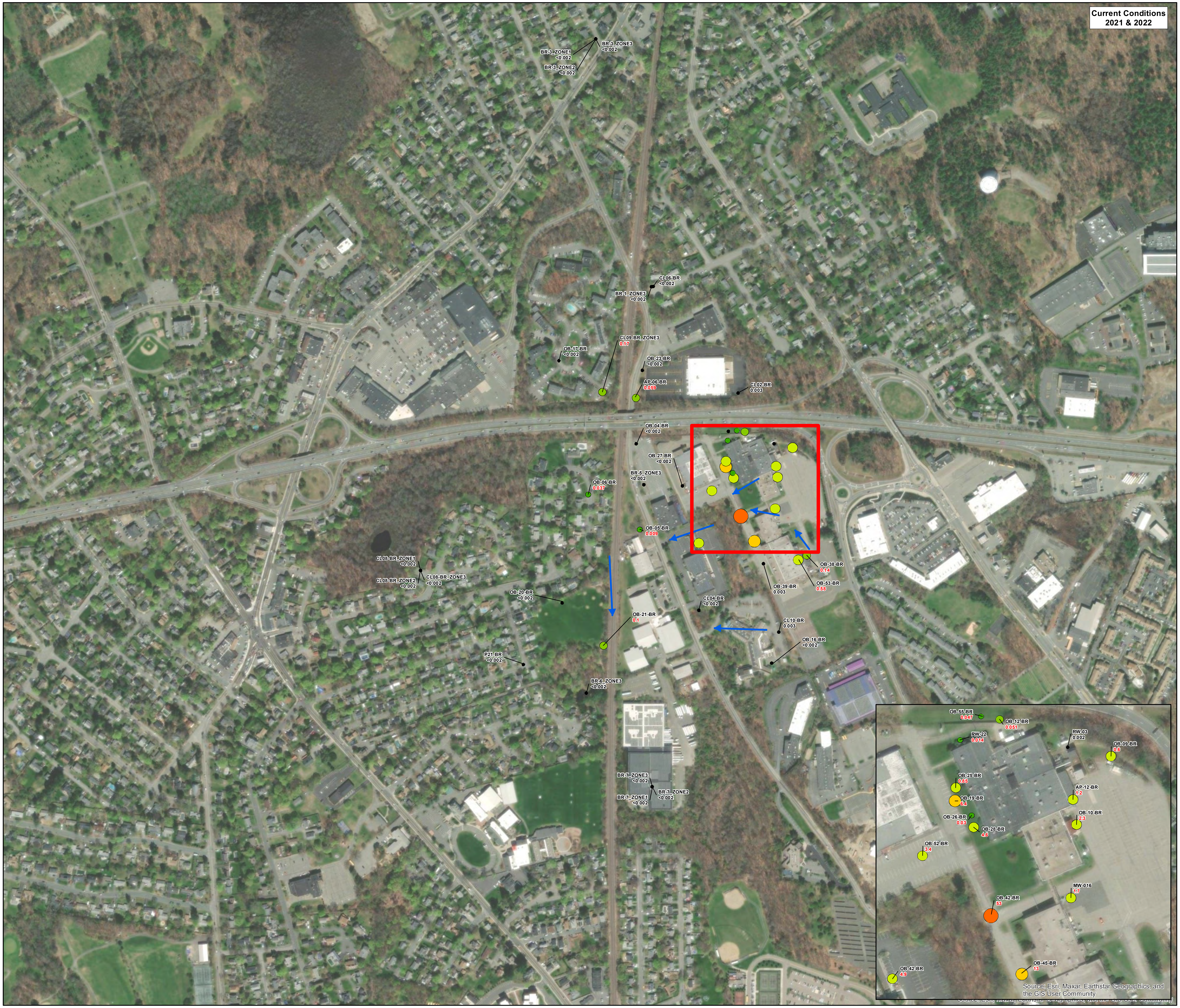
APTIM

VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

FIGURE 6-6

ESTIMATED TRICHLORETHENE CONCENTRATIONS IN DEEP OVERBURDEN GROUNDWATER

FORMER VARIAN FACILITY SITE
BEVERLY, MA



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

→ Groundwater Flow Direction

Trichloroethene Concentration

- • <0.005 mg/L
- ● 0.005 - 0.05 mg/L
- ● 0.05 - 0.5 mg/L
- ● 0.5 - 5 mg/L
- ● 5 - 50 mg/L
- ● >50 mg/L

Notes: Data used to generate this map include May 2021 groundwater sampling results and May/August 2022 sampling results from new wells installed in 2022.

Contours are dashed where inferred.

N

0 175 350 700
Feet

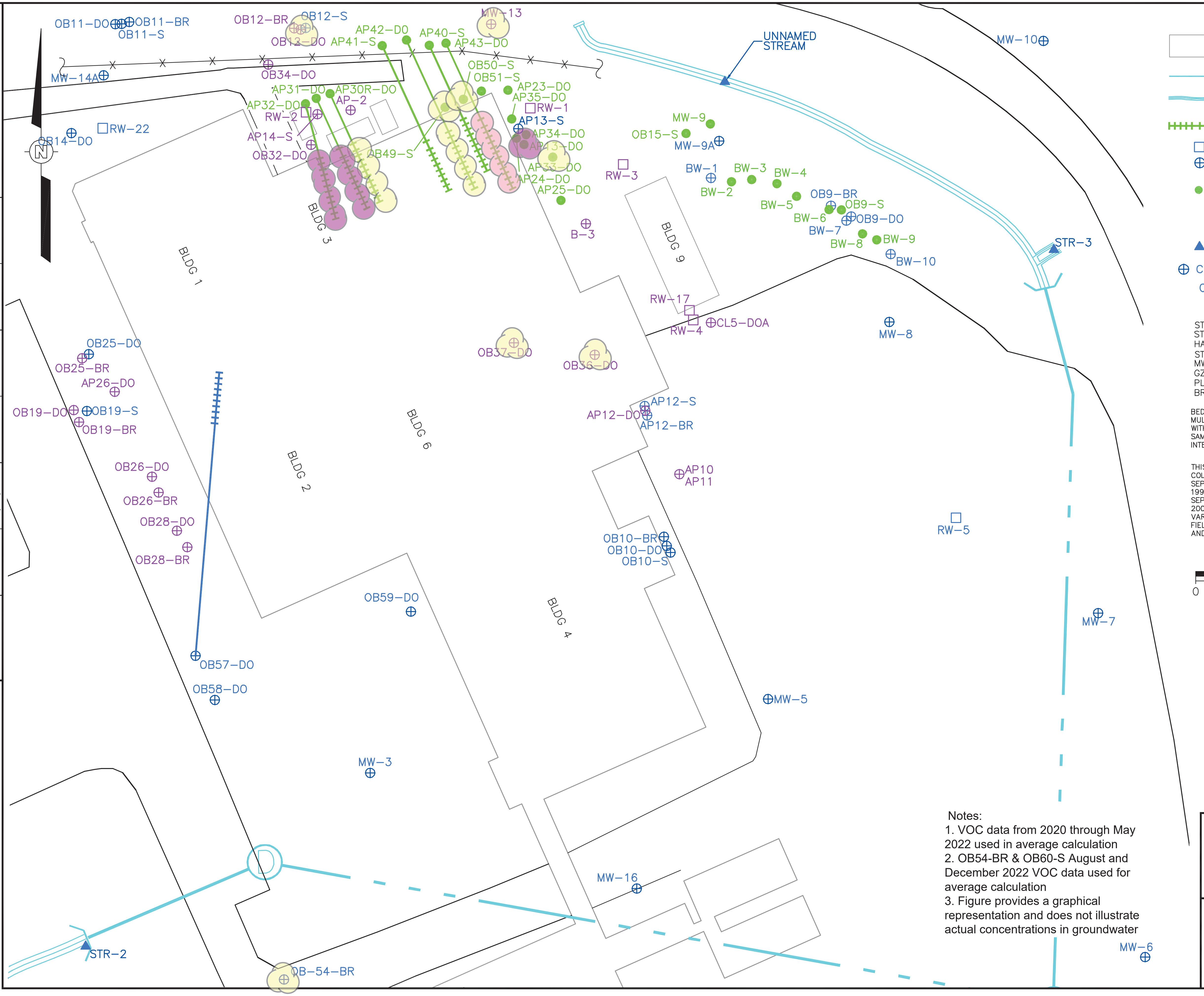
APTIM

VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

FIGURE 6-7

ESTIMATED TRICHLOROETHENE
CONCENTRATIONS IN
BEDROCK GROUNDWATER

FORMER VARIAN FACILITY SITE
BEVERLY, MA



Notes:
1. VOC data from 2020 through May 2022 used in average calculation
2. OB54-BR & OB60-S August and December 2022 VOC data used for average calculation
3. Figure provides a graphical representation and does not illustrate actual concentrations in groundwater

LEGEND

☐	APPROXIMATE BUILDING LOCATION
—	APPROXIMATE LOCATION OF STREAM IN CULVERT
═	APPROXIMATE STREAM LOCATION
┼┼┼┼┼—	ANGLED WELL AND SCREEN LOCATION
□	RECOVERY WELL (RW)
⊕	MONITORING WELL (MW)
●	BIOREMEDIATION INJECTION WELL SHOWN IN GREEN (PERMAGANATE INJECTION WELLS SHOWN IN PURPLE)
▲	SURFACE WATER STREAM (STR) SAMPLE LOCATION

⊕ CL4–BR – WELL IDENTIFICATION

CL–9	CLUSTER WELL NUMBER S=SHALLOW DO=DEEP OVERBURDEN BR=BEDROCK
STR–6	STREAM SAMPLE LOCATION NUMBER
STRHA–1	STREAM/SURFACE WATER SAMPLE
HA–1	HAND AUGER WELL LOCATION NUMBER
STRMH–1	STREAM/MANHOLE LOCATION NUMBER
MW–5	MONITORING WELL NUMBER
GZ–1	MONITORING WELL NUMBER
PLMW–1	MONITORING WELL NUMBER
BR–1	BEDROCK WELL NUMBER

BEDROCK WELLS BR–1 THROUGH BR–8 AND CL9–BR HAVE MULTILEVEL GROUNDWATER MONITORING SYSTEMS PRESENT WITHIN THE BEDROCK. ZONE 1 REFERS TO THE DEEPEST SAMPLING ZONE, ZONE 2 REFERS IS THE MIDDLE SAMPLING INTERVAL, AND ZONE 3 CLOSEST TO THE GROUND SURFACE.

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004; 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

SCALE

0 50 100 FEET

🟨	Average TCE or PCE concentration in groundwater indicates level >1% of solubility
🩷	Average TCE or PCE concentration in groundwater indicates level >5% of solubility
🟪	Average TCE or PCE concentration in groundwater indicates level >10% of solubility

APTIM

APTIM ENVIRONMENTAL &
INFRASTRUCTURE, INC.
150 ROYALL STREET
CANTON, MASSACHUSETTS
(617) 589–5111

Figure 6-8
Building 3 Wells with Average VOC Concentrations above 1%, 5%, and 10% of Solubility Limit
Former Varian Facility
150 Sohier Road, Beverly, MA

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
CANTON, MA	ELS	7/15/19	RC	--	--	--	631237906-B2

XREF Files: IMAGE Files:
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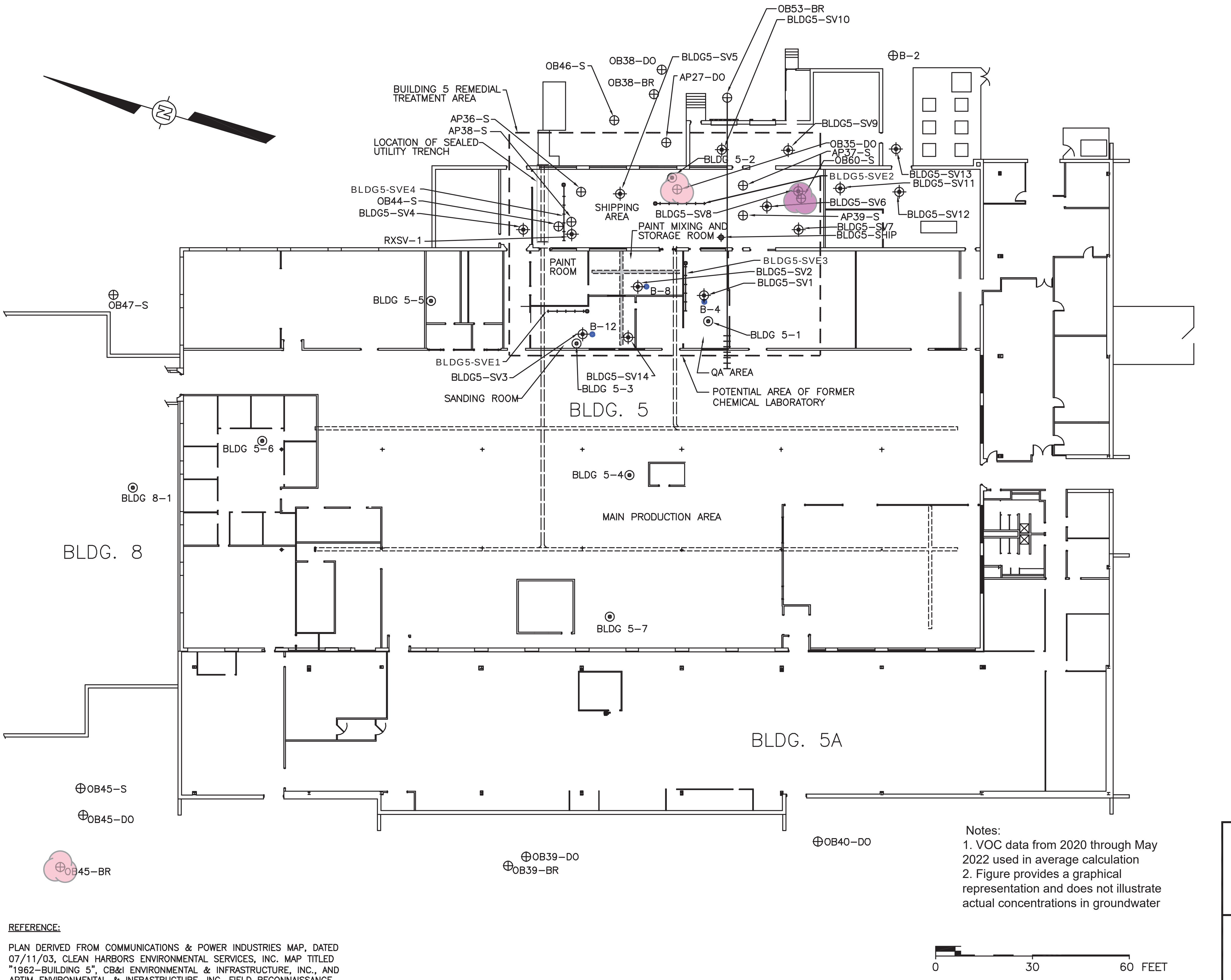
Plot Date/Time: Feb 07, 2023 – 10:51am
Plotted By: Greg.Jones



LEGEND

⌖	SUB-SLAB SOIL VAPOR SAMPLE LOCATION (2011-2014)
◉	INDOOR AIR SAMPLE LOCATION (2011-2014)
●	SUB-SLAB SOIL VAPOR SAMPLE LOCATION (1995)
⊕	MONITORING WELL
◆	SOIL BORING
▭	FORMER UTILITY TRENCH FILLED WITH CONCRETE
▭	UTILITY TRENCH
—+—+—●	SVE TRENCH WELL
⊢—⊕	ANGLED WELL AND SCREEN

INDOOR AIR SAMPLE ID RTN 3-0485	ROOM
BLDG 5-1	QA AREA
BLDG 5-2	SHIPPING AREA
BLDG 5-3	SANDING ROOM
BLDG 5-4	PRODUCTION AREA
BLDG 5-5	CATHODE SPRAY ROOM
BLDG 5-6	COMMON OFFICE AREA
BLDG 5-7	DEGREASER AREA
BLDG 8-1	HIGH POWER TESTING BUILDING 8 BASEMENT

●	Average TCE or PCE concentration in groundwater indicates level >1% of solubility
●	Average TCE or PCE concentration in groundwater indicates level >5% of solubility
●	Average TCE or PCE concentration in groundwater indicates level >10% of solubility

Notes:
1. VOC data from 2020 through May 2022 used in average calculation
2. Figure provides a graphical representation and does not illustrate actual concentrations in groundwater

REFERENCE:

PLAN DERIVED FROM COMMUNICATIONS & POWER INDUSTRIES MAP, DATED 07/11/03, CLEAN HARBORS ENVIRONMENTAL SERVICES, INC. MAP TITLED "1962-BUILDING 5", CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC. FIELD RECONNAISSANCE, JULY 2012, APRIL 2014 AND AUGUST 2018.

APTIM

APTIM ENVIRONMENTAL &
INFRASTRUCTURE, INC.
150 ROYALL STREET
CANTON, MASSACHUSETTS

Figure 6-9
Building 5 Wells with Average VOC
Concentrations above 1%, 5%, and 10% of
Solubility Limit
Former Varian Facility
150 Sohier Road, Beverly, MA

DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	OFFICE
146898-SITE PLAN	--	RC	CD/ES	CANTON, MA
	--	9/16/22	9/16/22	

XREF Files: IMAGE Files:
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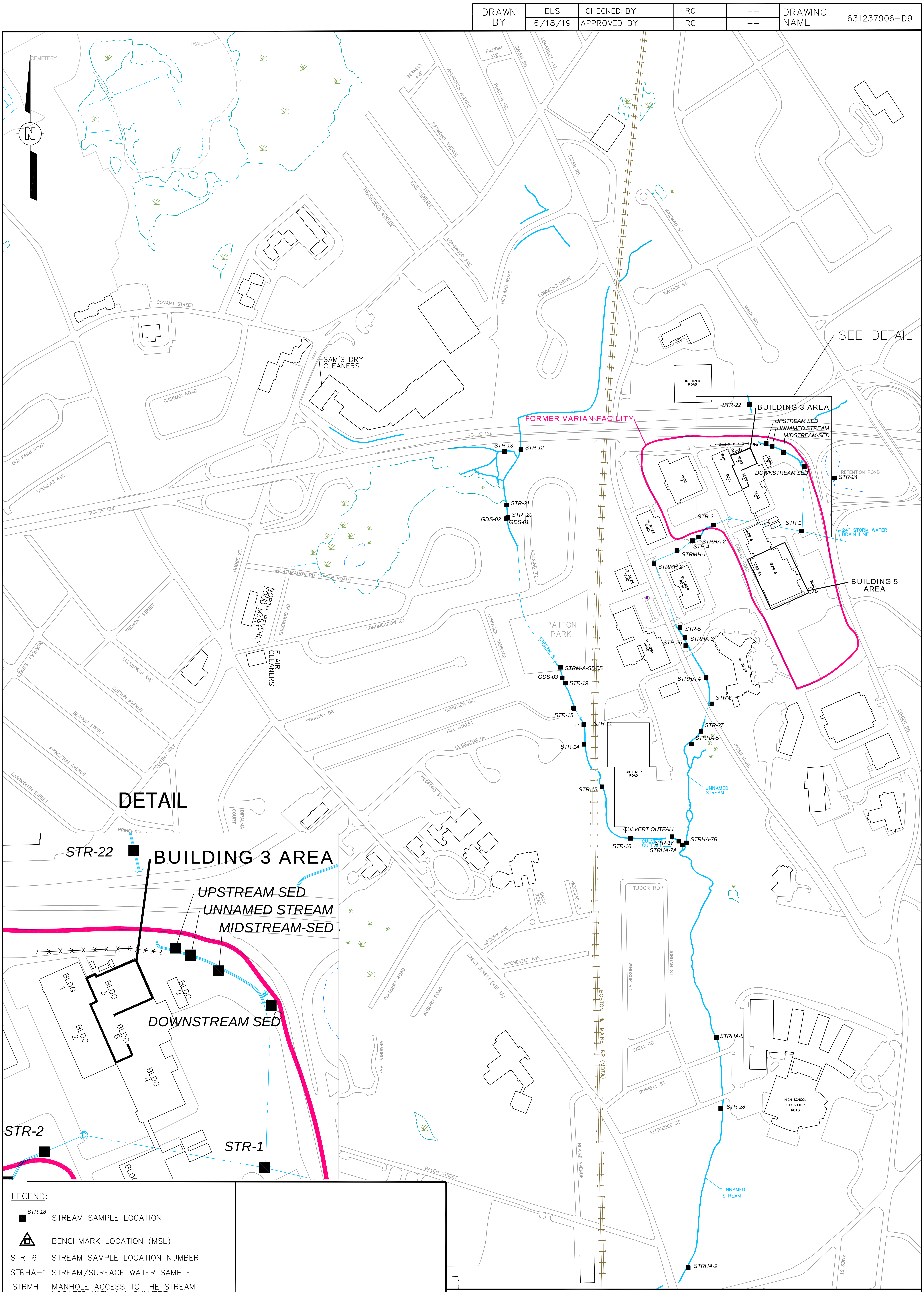
Plot Date/Time: Feb 09, 2023 - 1:51pm
Plotted By: Greg.Jones

DRAWN BY	ELS	CHECKED BY	RC	--	DRAWING NAME	631237906-D9
	6/18/19	APPROVED BY	RC	--		



LEGEND:

■ STR-18	STREAM SAMPLE LOCATION
△	BENCHMARK LOCATION (MSL)
STR-6	STREAM SAMPLE LOCATION NUMBER
STRHA-1	STREAM/SURFACE WATER SAMPLE
STRMH	MANHOLE ACCESS TO THE STREAM LOCATED WITHIN A CULVERT
☐	APPROXIMATE BUILDING LOCATION
Ⓓ	APPROXIMATE DRAIN MANHOLE LOCATION
— · —	APPROXIMATE LOCATION OF STREAM IN CULVERT
═	APPROXIMATE STREAM LOCATION
✱	WATER AND MARSH AREA

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004; 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

S C A L E
0 250 500 750 FEET

FIGURE 6-10
STREAM SAMPLE LOCATION MAP
FORMER VARIAN FACILITY SITE - BEVERLY, MA.

PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

SCALE: 1" = 250'	DRAFTED BY:
DATE:	PROJECT NO.:

PREPARED BY:
APTIM
APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

XREF Files: SITE_XREF33 WELLS OFF IMAGE Files: field.jpg
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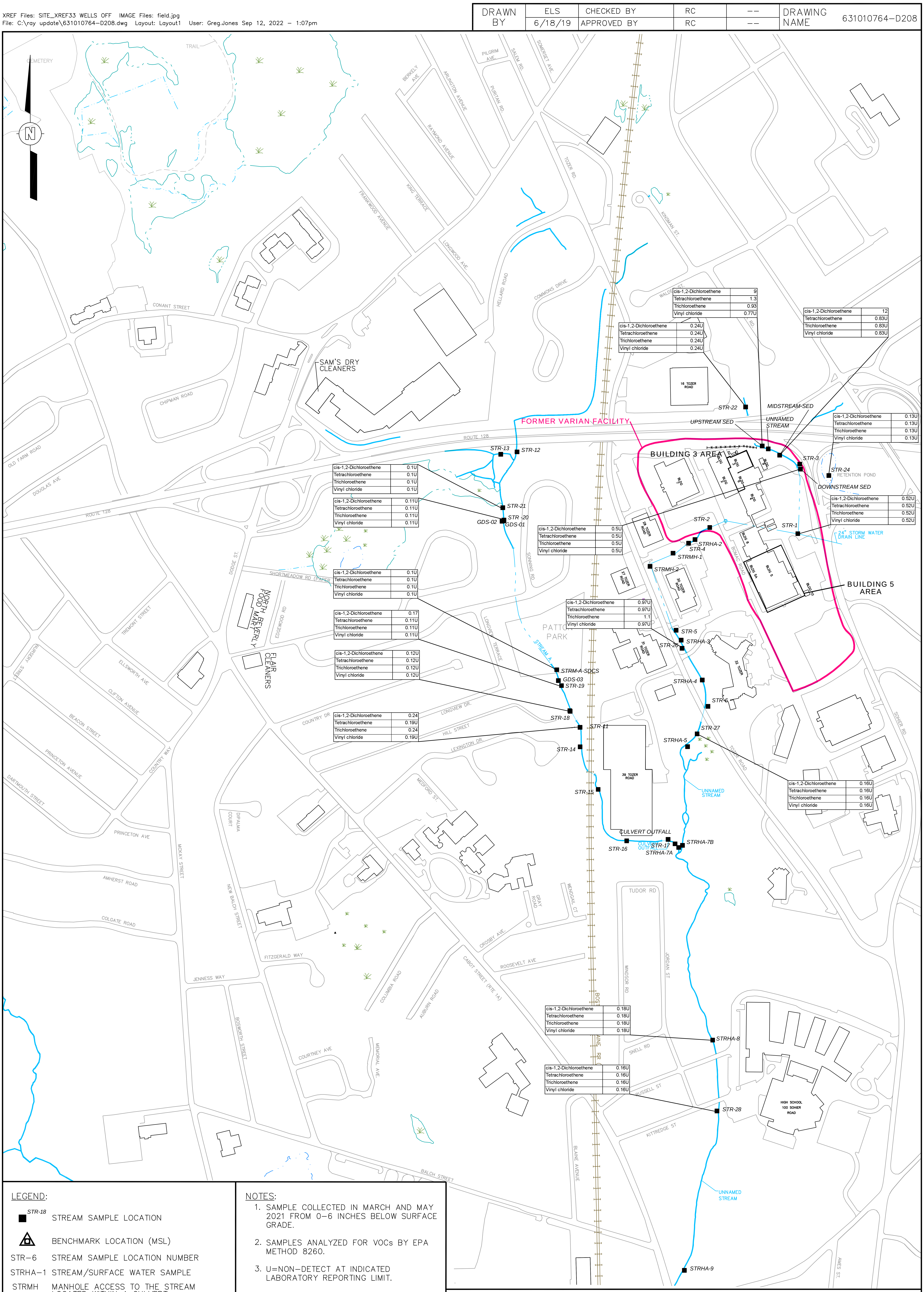
	6/18/19	APPROVED BY	RC	--		



LEGEND:

■ STR-18	STREAM SAMPLE LOCATION
△	BENCHMARK LOCATION (MSL)
STR-6	STREAM SAMPLE LOCATION NUMBER
STRHA-1	STREAM/SURFACE WATER SAMPLE
STRMH	MANHOLE ACCESS TO THE STREAM LOCATED WITHIN A CULVERT
☐	APPROXIMATE BUILDING LOCATION
Ⓓ	APPROXIMATE DRAIN MANHOLE LOCATION
— · —	APPROXIMATE LOCATION OF STREAM IN CULVERT
═	APPROXIMATE STREAM LOCATION
	WATER AND MARSH AREA
cis-1,2-Dichloroethene 0.16U Tetrachloroethene 0.16U Trichloroethene 0.16U Vinyl chloride 0.16U ■ STR-28	DATA AND SAMPLE LOCATION

NOTES:

1. SAMPLE COLLECTED IN MARCH AND MAY 2021 FROM 0-6 INCHES BELOW SURFACE GRADE.
2. SAMPLES ANALYZED FOR VOCs BY EPA METHOD 8260.
3. U=NON-DETECT AT INDICATED LABORATORY REPORTING LIMIT.
4. RESULTS IN MILLIGRAMS PER KILOGRAM
5. VOC=VOLATILE ORGANIC COMPOUNDS.

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004; 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

SCALE
0 250 500 750 FEET

FIGURE 6-11
STREAM SEDIMENT SAMPLE VOC RESULTS (2021)
FORMER VARIAN FACILITY SITE - BEVERLY, MA.

PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

SCALE: 1" = 250'	DRAFTED BY:
DATE: MARCH AND MAY 2021	PROJECT NO.:

PREPARED BY:
APTIM
APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

XREF Files: SITE_XREF33 WELLS OFF IMAGE Files: field.jpg
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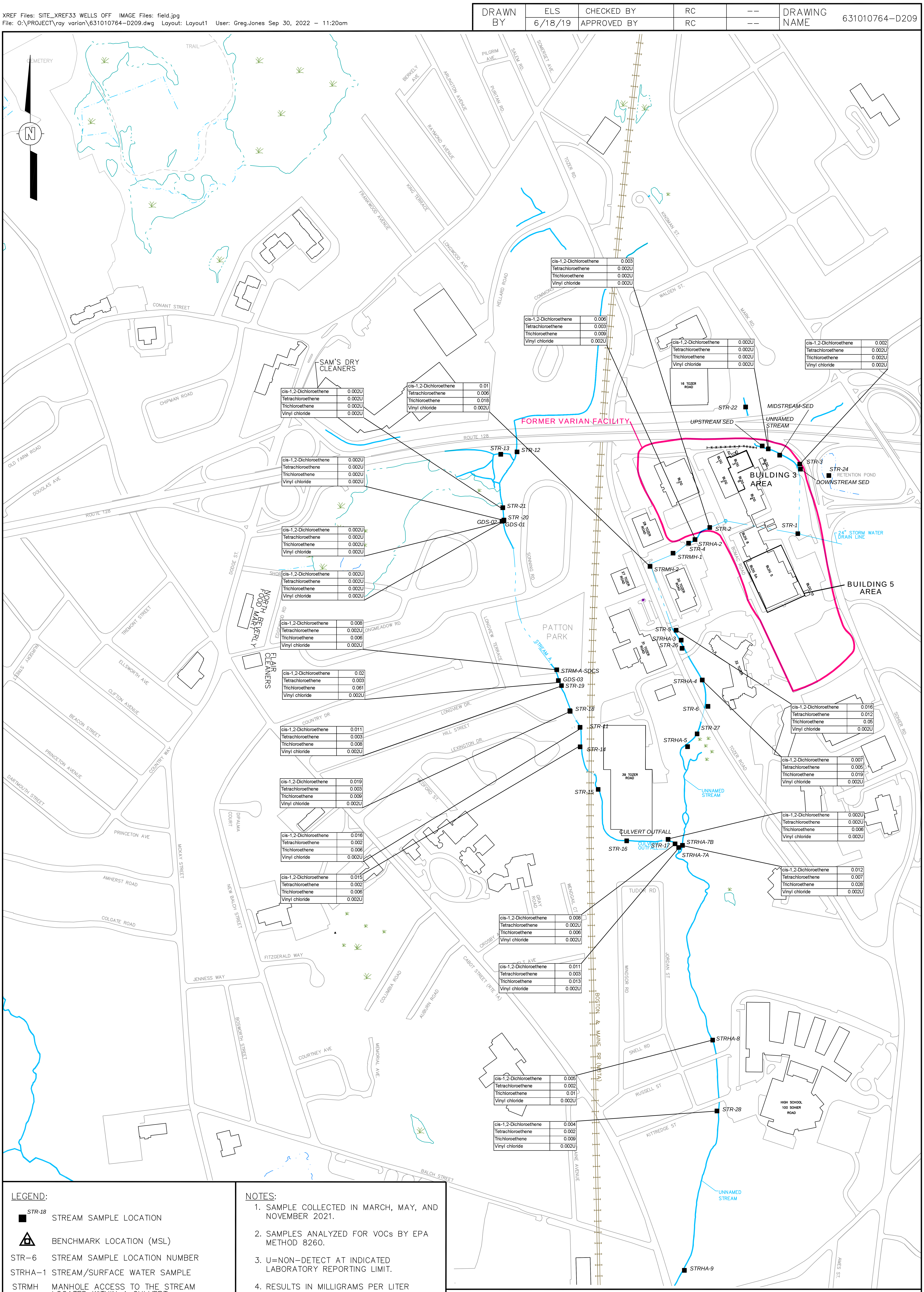
	6/18/19	APPROVED BY	RC	--		



LEGEND:

■ STR-18 STREAM SAMPLE LOCATION
BENCHMARK LOCATION (MSL)
STR–6 STREAM SAMPLE LOCATION NUMBER
STRHA–1 STREAM/SURFACE WATER SAMPLE
STRMH MANHOLE ACCESS TO THE STREAM LOCATED WITHIN A CULVERT
☐ APPROXIMATE BUILDING LOCATION
Ⓓ APPROXIMATE DRAIN MANHOLE LOCATION
APPROXIMATE LOCATION OF STREAM IN CULVERT
APPROXIMATE STREAM LOCATION
WATER AND MARSH AREA

cis-1,2-Dichloroethene	0.004
Tetrachloroethene	0.002
Trichloroethene	0.009
Vinyl chloride	0.002U

DATA AND SAMPLE LOCATION
STR-28

NOTES:

1. SAMPLE COLLECTED IN MARCH, MAY, AND NOVEMBER 2021.
2. SAMPLES ANALYZED FOR VOCs BY EPA METHOD 8260.
3. U=NON–DETECT AT INDICATED LABORATORY REPORTING LIMIT.
4. RESULTS IN MILLIGRAMS PER LITER
5. VOC=VOLATILE ORGANIC COMPOUNDS.
6. FOR LOCATIONS SAMPLED MULTIPLE TIMES ONLY THE LATEST SAMPLE RESULT IS POSTED.

THIS MAP HAS BEEN COMPILED FROM SURVEY DATA COLLECTED IN JULY 1994, MARCH 1995, OCTOBER 1995, SEPTEMBER 1996, MARCH 1997, DECEMBER 1997, SEPTEMBER 1998, JANUARY 2000, FEBRUARY 2001, JUNE 2002, SEPTEMBER 2002, JULY 2003, FEBRUARY 2004, OCTOBER 2004; 2005, JULY 2012, MAY 2014, AUGUST 2018 FROM VARIOUS EXISTING PLANS, AND OBSERVATIONS MADE IN THE FIELD BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC., AND APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

SCALE
0 250 500 750 FEET

FIGURE 6-12
STREAM SURFACE WATER SAMPLE VOC RESULTS (2021)
FORMER VARIAN FACILITY SITE - BEVERLY, MA.

PREPARED FOR: VARIAN MEDICAL SYSTEMS, INC.
PALO ALTO, CALIFORNIA

SCALE: 1" = 250'	DRAFTED BY:
DATE: MARCH, MAY & NOVEMBER 2021	PROJECT NO.:

PREPARED BY:
APTIM
APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.

Appendix A

MassDEP Comprehensive Response Action Transmittal Form (BWSC-108)

Massachusetts Department of Environmental Protection

Bureau of Waste Site Cleanup

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

BWSC 108

Release Tracking Number

3 - 485

A. SITE LOCATION:

1. Site Name: VARIAN-MICROWAVE DIV

2. Street Address: 150 SOHIER RD

3. City/Town: BEVERLY

4. ZIP Code: 019150000

☑ 5. Check here if the disposal site that is the source of the release is Tier Classified. Check the current Tier Classification Category:

☑ a. Tier I ☐ b. Tier ID ☐ c. Tier II

B. THIS FORM IS BEING USED TO: (check all that apply)

☐ 1. Submit a **Phase I Completion Statement,** pursuant to 310 CMR 40.0484.

☐ 2. Submit a **Revised Phase I Completion Statement,** pursuant to 310 CMR 40.0484.

☐ 3. Submit a **Phase II Scope of Work,** pursuant to 310 CMR 40.0834.

☐ 4. Submit an **interim Phase II Report.** This report does not satisfy the response action deadline requirements in 310 CMR 40.0500.

☑ 5. Submit a **final Phase II Report and Completion Statement,** pursuant to 310 CMR 40.0836.

☐ 6. Submit a **Revised Phase II Report and Completion Statement,** pursuant to 310 CMR 40.0836.

☐ 7. Submit a **Phase III Remedial Action Plan and Completion Statement,** pursuant to 310 CMR 40.0862.

☐ 8. Submit a **Revised Phase III Remedial Action Plan and Completion Statement,** pursuant to 310 CMR 40.0862.

☐ 9. Submit a **Phase IV Remedy Implementation Plan,** pursuant to 310 CMR 40.0874.

☐ 10. Submit a **Modified Phase IV Remedy Implementation Plan,** pursuant to 310 CMR 40.0874.

☐ 11. Submit an **As-Built Construction Report,** pursuant to 310 CMR 40.0875.

☐ 12. Submit a **Phase IV Status Report,** pursuant to 310 CMR 40.0877.

☐ 13. Submit a **Phase IV Completion Statement,** pursuant to 310 CMR 40.0878 and 40.0879.

Specify the outcome of Phase IV activities: (check one)

☐ a. Phase V Operation, Maintenance or Monitoring of the Comprehensive Remedial Action is necessary to achieve a Permanent or Temporary Solution.

☐ b. The requirements of a Permanent Solution have been met. A completed Permanent Solution Statement and Report (BWSC104) will be submitted to DEP.

☐ c. The requirements of a Temporary Solution have been met. A completed Temporary Solution Statement and Report (BWSC104) will be submitted to DEP.

B. THIS FORM IS BEING USED TO (cont.): (check all that apply)

☐ 14. Submit a **Revised Phase IV Completion Statement,** pursuant to 310 CMR 40.0878 and 40.0879.

☐ 15. Submit a **Phase V Status Report,** pursuant to 310 CMR 40.0892.

☐ 16. Submit a **Remedial Monitoring Report.** (This report can only be submitted through eDEP.)

a. Type of Report: (check one) ☐ i. Initial Report ☐ ii. Interim Report ☐ iii. Final Report

b. Frequency of Submittal: (check all that apply)

☐ i. A Remedial Monitoring Report(s) submitted monthly to address an Imminent Hazard.

☐ ii. A Remedial Monitoring Report(s) submitted monthly to address a Condition of Substantial Release Migration.

☐ iii. A Remedial Monitoring Report(s) submitted every six months, concurrent with a Status Report.

☐ iv. A Remedial Monitoring Report(s) submitted annually, concurrent with a Status Report.

c. Status of Site: (check one) ☐ i. Phase IV ☐ ii. Phase V ☐ iii. Remedy Operation Status ☐ iv. Temporary Solution

d. Number of Remedial Systems and/or Monitoring Programs: ____________________

A separate BWSC108A, CRA Remedial Monitoring Report, must be filled out for each Remedial System and/or Monitoring Program addressed by this transmittal form.

☐ 17. Submit a **Remedy Operation Status,** pursuant to 310 CMR 40.0893.

☐ 18. Submit a **Status Report to maintain a Remedy Operation Status,** pursuant to 310 CMR 40.0893(2).

☐ 19. Submit a **Transfer and/or a Modification of Persons Maintaining a Remedy Operation Status (ROS),** pursuant to 310 CMR 40.0893(5) (check one, or both, if applicable).

☐ a. Submit a Transfer of Persons Maintaining an ROS (the transferee should be the person listed in Section D, "Person Undertaking Response Actions").

☐ b. Submit a Modification of Persons Maintaining an ROS (the primary representative should be the person listed in Section D, "Person Undertaking Response Actions").

c. Number of Persons Maintaining an ROS not including the primary representative: ____________________

☐ 20. Submit a **Termination of a Remedy Operation Status,** pursuant to 310 CMR 40.0893(6).(check one)

☐ a. Submit a notice indicating ROS performance standards have not been met. A plan and timetable pursuant to 310 CMR 40.0893(6)(b) for resuming the ROS are attached.

☐ b. Submit a notice of Termination of ROS.

☐ 21. Submit a **Phase V Completion Statement,** pursuant to 310 CMR 40.0894.

Specify the outcome of Phase V activities: (check one)

☐ a. The requirements of a Permanent Solution have been met. A completed Permanent Solution Statement and Report (BWSC104) will be submitted to DEP.

☐ b. The requirements for a Temporary Solution have been met. A completed Temporary Solution Statement and Report (BWSC104) will be submitted to DEP.

☐ 22. Submit a **Revised Phase V Completion Statement,** pursuant to 310 CMR 40.0894.

☐ 23. Submit a **Temporary Solution Status Report,** pursuant to 310 CMR 40.0898.

☐ 24. Submit a **Plan for the Application of Remedial Additives** near a sensitive receptor, pursuant to 310 CMR 40.0046(3).

a. Status of Site: (check one)

☐ i. Phase IV ☐ ii. Phase V ☐ iii. Remedy Operation Status ☐ iv. Temporary Solution

C. LSP SIGNATURE AND STAMP:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and 309 CMR 4.03(2), and (iii) the provisions of 309 CMR 4.03(3), to the best of my knowledge, information and belief,

> *if Section B indicates that a* ***Phase I, Phase II, Phase III, Phase IV or Phase V Completion Statement*** *and/or a* ***Termination of a Remedy Operation Status*** *is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B indicates that a* ***Phase II Scope of Work*** *or a* ***Phase IV Remedy Implementation Plan*** *is being submitted,* the response action(s) that is (are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B indicates that an* ***As-Built Construction Report,*** *a* ***Remedy Operation Status,*** *a* ***Phase IV, Phase V or Temporary Solution Status Report,*** *a* ***Status Report to Maintain a Remedy Operation Status,*** *a* ***Transfer or Modification of Persons Maintaining a Remedy Operation Status*** *and/or a* ***Remedial Monitoring Report*** *is being submitted,* the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal.

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

1. LSP#: 4689

2. First Name: BRIAN J 3. Last Name: COTE

4. Telephone: 6175896175 5. Ext.: 6. Email:

7. Signature:

8. Date: (mm/dd/yyyy) 9. LSP Stamp:

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC 108

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number
3 - 485

D. PERSON UNDERTAKING RESPONSE ACTIONS:

1. Check all that apply: ☐ a. change in contact name ☑ b. change of address ☐ c. change in the person undertaking response actions

2. Name of Organization: VARIAN MEDICAL SYSTEMS INC

3. Contact First Name: MATTHEW 4. Last Name: GILLIS

5. Street: 525 9TH STREET 6. Title:

7. City/Town: WASHINGTON 8. State: DC 9. ZIP Code: 200040000

10. Telephone: 4104591710 11. Ext: 12. Email: matthew.gillis@varian.com

E. RELATIONSHIP TO SITE OF PERSON UNDERTAKING RESPONSE ACTIONS: ☐ Check here to change relationship

☑ 1. RP or PRP ☐ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter

☑ e. Other RP or PRP Specify: NON-SPECIFIED PRP

☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ 4. Any Other Person Undertaking Response Actions Specify Relationship:

F. REQUIRED ATTACHMENT AND SUBMITTALS:

☑ 1. Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

☑ 2. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the submittal of any Phase Reports to DEP.

☐ 3. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase III Remedial Action Plan.

☐ 4. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase IV Remedy Implementation Plan.

☐ 5. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of any field work involving the implementation of a Phase IV Remedial Action.

☐ 6. If submitting a Transfer of a Remedy Operation Status (as per 310 CMR 40.0893(5)), check here to certify that a statement detailing the compliance history for the person making this submittal (transferee) is attached.

☐ 7. If submitting a Modification of a Remedy Operation Status (as per 310 CMR 40.0893(5)), check here to certify that a statement detailing the compliance history for each new person making this submittal is attached.

☐ 8. Check here if any non-updatable information provided on this form is incorrect, e.g. Release Address/Location Aid. Send corrections to: BWSC.eDEP@state.ma.us.

☑ 9. Check here to certify that the LSP Opinion containing the material facts, data, and other information is attached.

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT
Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

BWSC 108

Release Tracking Number
3 - 485

G. CERTIFICATION OF PERSON UNDERTAKING RESPONSE ACTIONS:

1. I, ______________________, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

>*if Section B indicates that this is a* **Modification of a Remedy Operation Status (ROS),** I attest under the pains and penalties of perjury that I am fully authorized to act on behalf of all persons performing response actions under the ROS as stated in 310 CMR 40.0893(5)(d) to receive oral and written correspondence from MassDEP with respect to performance of response actions under the ROS, and to receive a statement of fee amount as per 4.03(3).

I understand that any material received by the Primary Representative from MassDEP shall be deemed received by all the persons performing response actions under the ROS, and I am aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate or incomplete information.

2. By: ______________________ (Signature)

3. Title: ______________________

4. For: VARIAN MEDICAL SYSTEMS INC (Name of person or entity recorded in Section D)

5. Date: ____________ (mm/dd/yyyy)

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section D.

7. Street: ______________________

8. City/Town: ____________ 9. State: ____________ 10. ZIP Code: ____________

11. Telephone: ____________ 12. Ext.: ____________ 13. Email: ____________

YOU ARE SUBJECT TO AN ANNUAL COMPLIANCE ASSURANCE FEE OF UP TO $10,000 PER BILLABLE YEAR FOR THIS DISPOSAL SITE. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Date Stamp (DEP USE ONLY:)

Attachment to BWSC 108
150 Sohier Road, Beverly, MA
RTN 3-0485

Approvals from the Massachusetts Department of Environmental Protection that this submittal is subject to include:

- Massachusetts Department of Environmental Protection Termination of Remedy Operation Status Notice of Noncompliance, dated February 18, 2022.

- Massachusetts Department of Environmental Protection approval of extension request, letter to Varian Medical Systems, Inc., dated July 6, 2022.

- Public Comment Draft Phase II Addendum Reporting Schedule, Aptim Environmental and Infrastructure, LLC letter to Massachusetts Department of Environmental Protection, dated September 12, 2022

Appendix B

Soil Boring/Well Logs (Post 2000)

APPENDIX B
SOIL BORING/WELL LOGS (POST 2000)
SHALLOW MONITORING WELLS

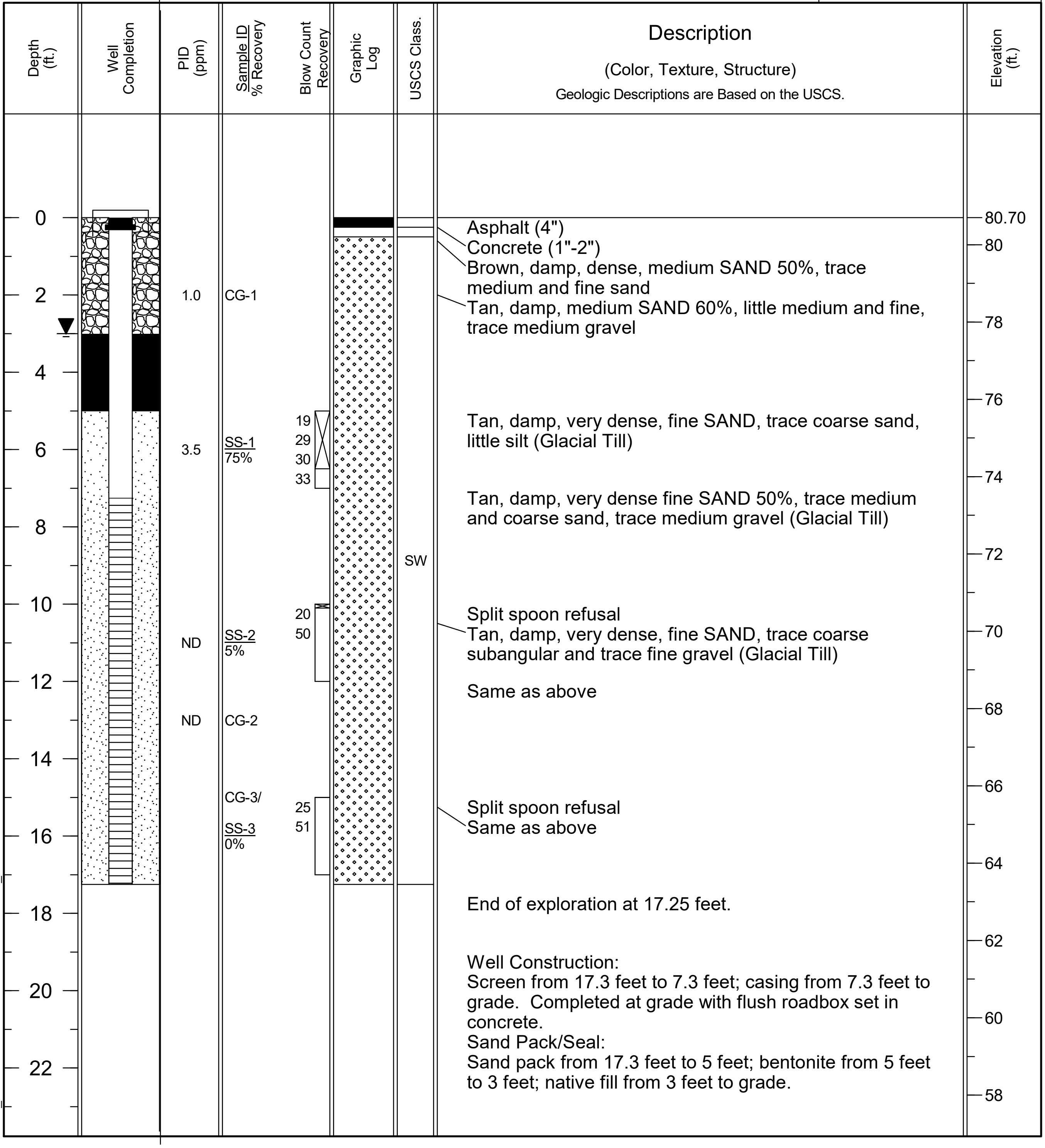
Drilling Log

Monitoring Well **AP-1**

Page: 1 of 1

Project Varian/Beverly
Owner Varian Medical Systems, Inc.
Location 150 Sohier Road, Beverly, Massachusetts
Proj. No. 806395
Surface Elev. 80.7 ft.
Total Hole Depth 17.3 ft.
North
East
Top of Casing 80.09 ft.
Water Level Initial ▽ 3.0 ft.
Static ▼ 3.0 ft.
Diameter 8.75 in.
Screen: Dia 2 in.
Length 10 ft.
Type/Size PVC/0.020 in.
Casing: Dia 2 in.
Length 7 ft.
Type PVC
Fill Material Native, Sand, Bentonite
Rig/Core Canterra
Drill Co. American Drilling Service
Method Hollow Stem Auger
Driller J. Keenan
Log By M. Winters
Date 1/18/00
Permit # NA
Checked By R. Cadorette
License No.

COMMENTS
ND = None detected



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0					Asphalt (4")	80.70
					Concrete (1"-2")	80
					Brown, damp, dense, medium SAND 50%, trace medium and fine sand	
2	1.0	CG-1			Tan, damp, medium SAND 60%, little medium and fine, trace medium gravel	78
4						76
6	3.5	SS-1 75%	19 29 30 33		Tan, damp, very dense, fine SAND, trace coarse sand, little silt (Glacial Till)	74
8					Tan, damp, very dense fine SAND 50%, trace medium and coarse sand, trace medium gravel (Glacial Till)	72
				SW		
10			20		Split spoon refusal	70
	ND	SS-2 5%	50		Tan, damp, very dense, fine SAND, trace coarse subangular and trace fine gravel (Glacial Till)	
12					Same as above	68
	ND	CG-2				
14						66
		CG-3/	25		Split spoon refusal	
16		SS-3 0%	51		Same as above	64
18					End of exploration at 17.25 feet.	62
20						60
22						58

Well Construction:
Screen from 17.3 feet to 7.3 feet; casing from 7.3 feet to grade. Completed at grade with flush roadbox set in concrete.
Sand Pack/Seal:
Sand pack from 17.3 feet to 5 feet; bentonite from 5 feet to 3 feet; native fill from 3 feet to grade.

Shaw
Shaw E & I, Inc.

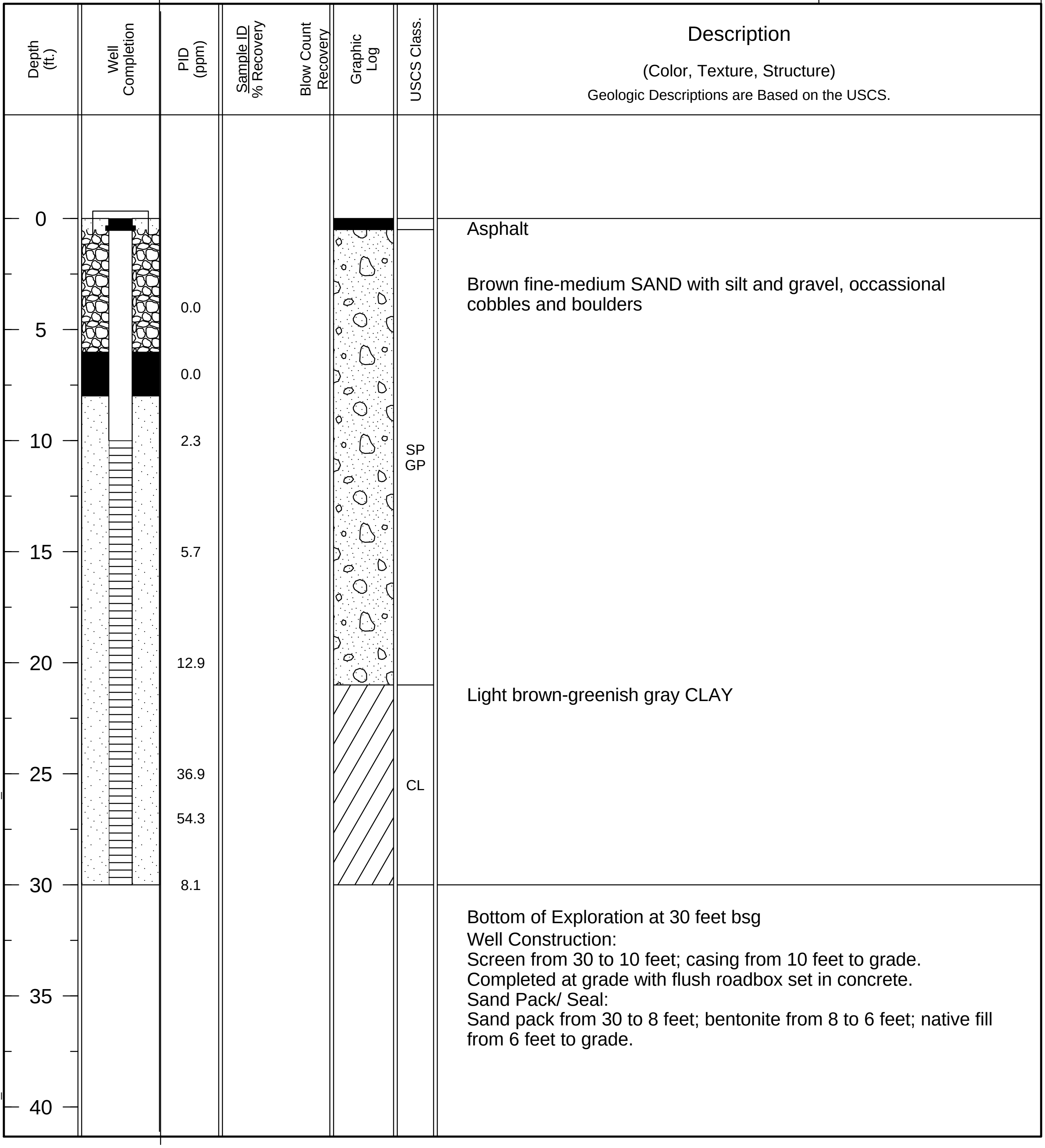
Drilling Log

Monitoring Well **AP-12-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *30.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *10 ft.* Type *PVC*
Fill Material *Sand, bentonite, native* Rig/Core *CME*
Drill Co. *Dragin Drilling Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *Dave Wattles* Date *1/7/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	PID (ppm)	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0			Asphalt
			Brown fine-medium SAND with silt and gravel, occassional cobbles and boulders
	0.0		
5			
	0.0		
10	2.3	SP GP	
15	5.7		
20	12.9		
			Light brown-greenish gray CLAY
25	36.9	CL	
	54.3		
30	8.1		

Bottom of Exploration at 30 feet bsg
Well Construction:
Screen from 30 to 10 feet; casing from 10 feet to grade.
Completed at grade with flush roadbox set in concrete.
Sand Pack/ Seal:
Sand pack from 30 to 8 feet; bentonite from 8 to 6 feet; native fill from 6 feet to grade.

Shaw E & I, Inc.

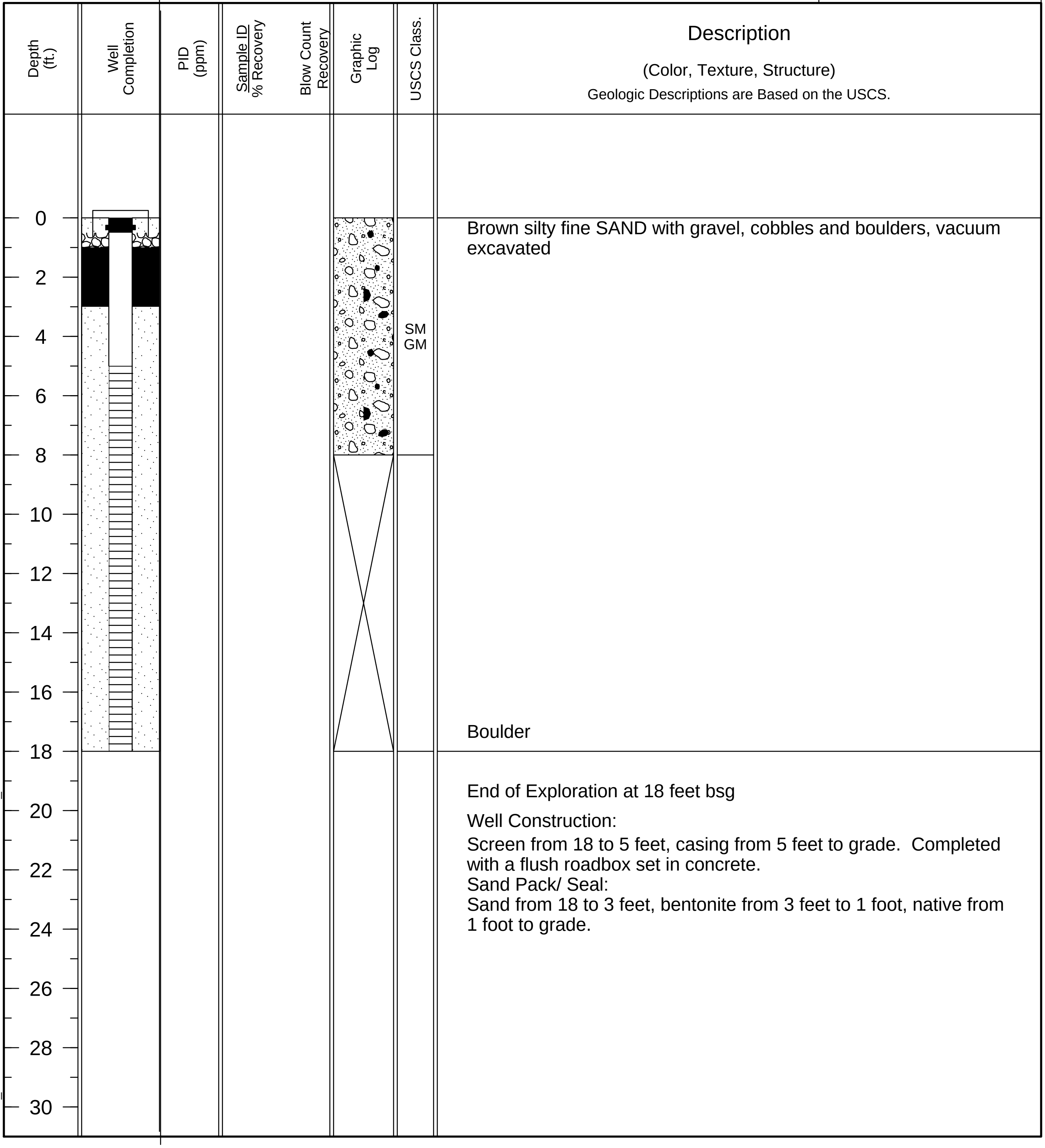
Drilling Log

Monitoring Well **AP-13-S**

Page: 1 of 1

Project Varian Beverly
Owner Varian Medical Systems, Inc.
Location 150 Sohier Road, Beverly, MA
Proj. No. 832837
Surface Elev. NA
Total Hole Depth 18.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter 4 in.
Screen: Dia 2 in.
Length 13 ft.
Type/Size PVC/.010 in.
Casing: Dia 2 in.
Length 5 ft.
Type PVC
Fill Material Sand, bentonite, native
Rig/Core Ingersol Rand
Drill Co. Paratt Wolff
Method Hollow Stem Auger
Driller Rick Navatka
Log By Dave Wattles
Date 4/9/02
Permit # NA
Checked By S. Metivier
License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Brown silty fine SAND with gravel, cobbles and boulders, vacuum excavated

Boulder

End of Exploration at 18 feet bsg

Well Construction:

Screen from 18 to 5 feet, casing from 5 feet to grade. Completed with a flush roadbox set in concrete.
Sand Pack/ Seal:
Sand from 18 to 3 feet, bentonite from 3 feet to 1 foot, native from 1 foot to grade.

Shaw E & I, Inc.

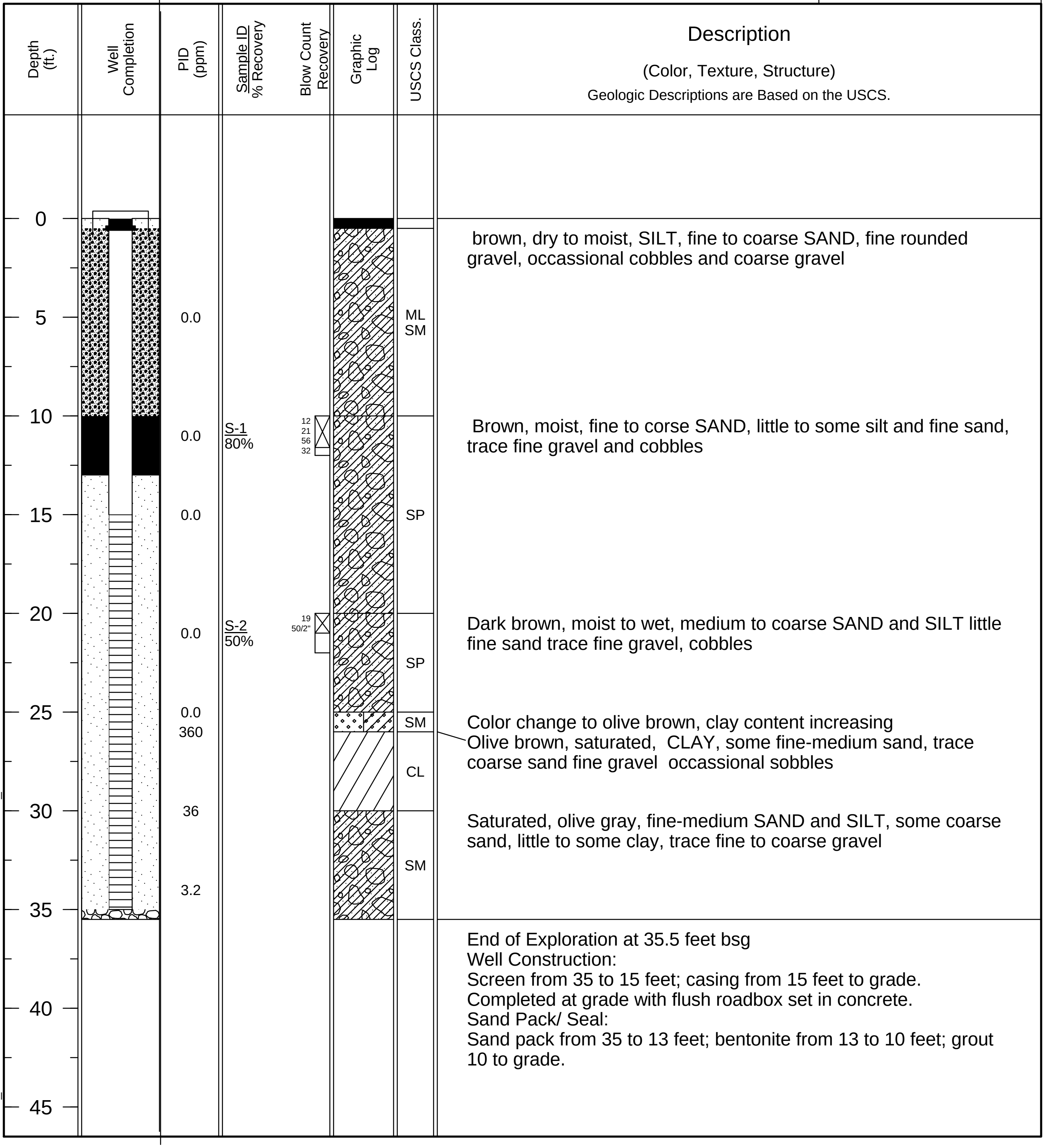
Drilling Log

Monitoring Well **AP-14-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *35.5 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *15 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *CME*
Drill Co. *Dragin Drilling Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *Mike Reilly* Date *12/28/01* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0				ML SM	brown, dry to moist, SILT, fine to coarse SAND, fine rounded gravel, occassional cobbles and coarse gravel
5	0.0				
10	0.0	S-1 80%	12 21 56 32	SP	Brown, moist, fine to corse SAND, little to some silt and fine sand, trace fine gravel and cobbles
15	0.0				
20	0.0	S-2 50%	19 50/2"	SP	Dark brown, moist to wet, medium to coarse SAND and SILT little fine sand trace fine gravel, cobbles
25	0.0 360			SM	Color change to olive brown, clay content increasing
				CL	Olive brown, saturated, CLAY, some fine-medium sand, trace coarse sand fine gravel occassional sobbles
30	36			SM	Saturated, olive gray, fine-medium SAND and SILT, some coarse sand, little to some clay, trace fine to coarse gravel
	3.2				
35					End of Exploration at 35.5 feet bsg Well Construction: Screen from 35 to 15 feet; casing from 15 feet to grade. Completed at grade with flush roadbox set in concrete. Sand Pack/ Seal: Sand pack from 35 to 13 feet; bentonite from 13 to 10 feet; grout 10 to grade.
40					
45					

Shaw E & I, Inc.

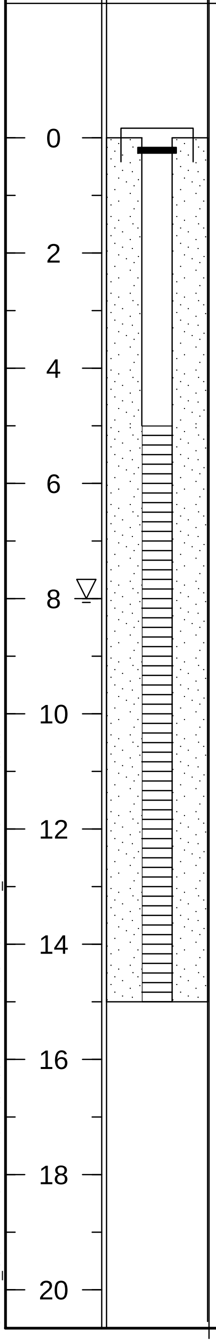
Drilling Log

Monitoring Well **AP-15S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *15.0 ft.* North East
Top of Casing *NA* Water Level Initial ∇ *8.0 ft.* Static *NA* Diameter *2 in.*
Screen: Dia *1 in.* Length *10 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *1 in.* Length *5 ft.* Type *PVC*
Fill Material *Sand* Rig/Core *Geoprobe/Core*
Drill Co. *AM Drilling* Method *Geoprobe*
Driller *A. Pindar* Log By *D. Walker* Date *8/26/02* Permit # *NA*
Checked By License No.

COMMENTS
No Soil Samples Collected



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							No Soil Samples Collected

Shaw E & I, Inc.

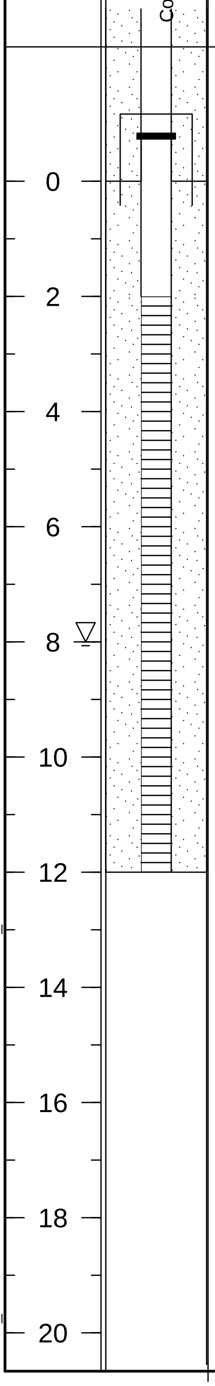
Drilling Log

Temporary Addition Well **AP-17S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *12.0 ft.* North East
Top of Casing *NA* Water Level Initial ∇ *8.0 ft.* Static *NA* Diameter *2 in.*
Screen: Dia *1 in.* Length *10 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *1 in.* Length *5 ft.* Type *PVC*
Fill Material *Sand* Rig/Core *Geoprobe/Core*
Drill Co. *AM Drilling* Method *Geoprobe*
Driller *A. Pindar* Log By *D. Walker* Date *8/26/02* Permit # *NA*
Checked By License No.

COMMENTS
No Soil Samples Collected Used as Temporary addition well for 8/26-27/02 sodium permanganate addition



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0–12							No Soil Samples Collected

Drilling Log

Monitoring Well **AP-36-S**

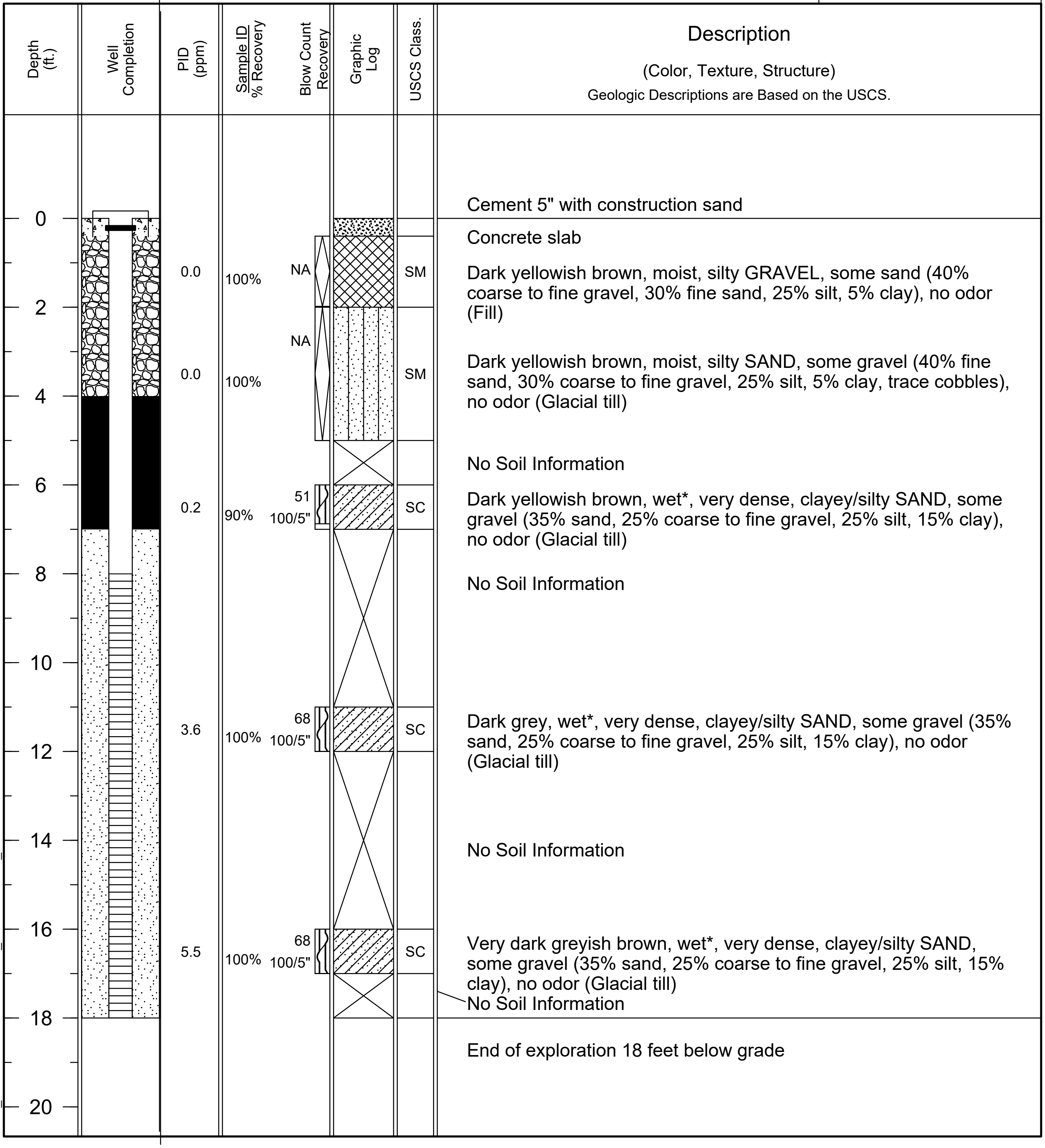
Page: 1 of 1

Project Varian Beverly
Owner Varian Medical Systems, Inc.
Location Beverly, Massachusetts
Proj. No. 631237905
Surface Elev. NA
Total Hole Depth 18.0 ft.
North
East
Top of Casing 81.25 ft.
Water Level Initial NA
Static NA
Diameter 2 in.
Screen: Dia 2 in.
Length 10 ft.
Type/Size 10-Slot/0.01 in.
Casing: Dia 2 in.
Length 8 ft.
Type Sch. 40 PVC
Fill Material 0.25 - 0.13 inch Stone
Rig/Core Acker/Soil Scout
Drill Co. Geologic
Method Drive and wash (4")
Driller John Boyd
Log By Chris Buerkle
Date 7/26/18
Permit # NA
Checked By Raymond Cadorette
License No.

COMMENTS
Hand cleared 0-5' on 7/25/2018

Collected soil VOC sample 16-16.9'

**Water from water table or drive and wash method.*



PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
				Cement 5" with construction sand
				Concrete slab
0.0	100%	NA	SM	Dark yellowish brown, moist, silty GRAVEL, some sand (40% coarse to fine gravel, 30% fine sand, 25% silt, 5% clay), no odor (Fill)
0.0	100%	NA	SM	Dark yellowish brown, moist, silty SAND, some gravel (40% fine sand, 30% coarse to fine gravel, 25% silt, 5% clay, trace cobbles), no odor (Glacial till)
				No Soil Information
0.2	90%	51 100/5"	SC	Dark yellowish brown, wet*, very dense, clayey/silty SAND, some gravel (35% sand, 25% coarse to fine gravel, 25% silt, 15% clay), no odor (Glacial till)
				No Soil Information
3.6	100%	68 100/5"	SC	Dark grey, wet*, very dense, clayey/silty SAND, some gravel (35% sand, 25% coarse to fine gravel, 25% silt, 15% clay), no odor (Glacial till)
				No Soil Information
5.5	100%	68 100/5"	SC	Very dark greyish brown, wet*, very dense, clayey/silty SAND, some gravel (35% sand, 25% coarse to fine gravel, 25% silt, 15% clay), no odor (Glacial till)
				No Soil Information
				End of exploration 18 feet below grade

APTIM

Drilling Log

Monitoring Well **AP-37-S**

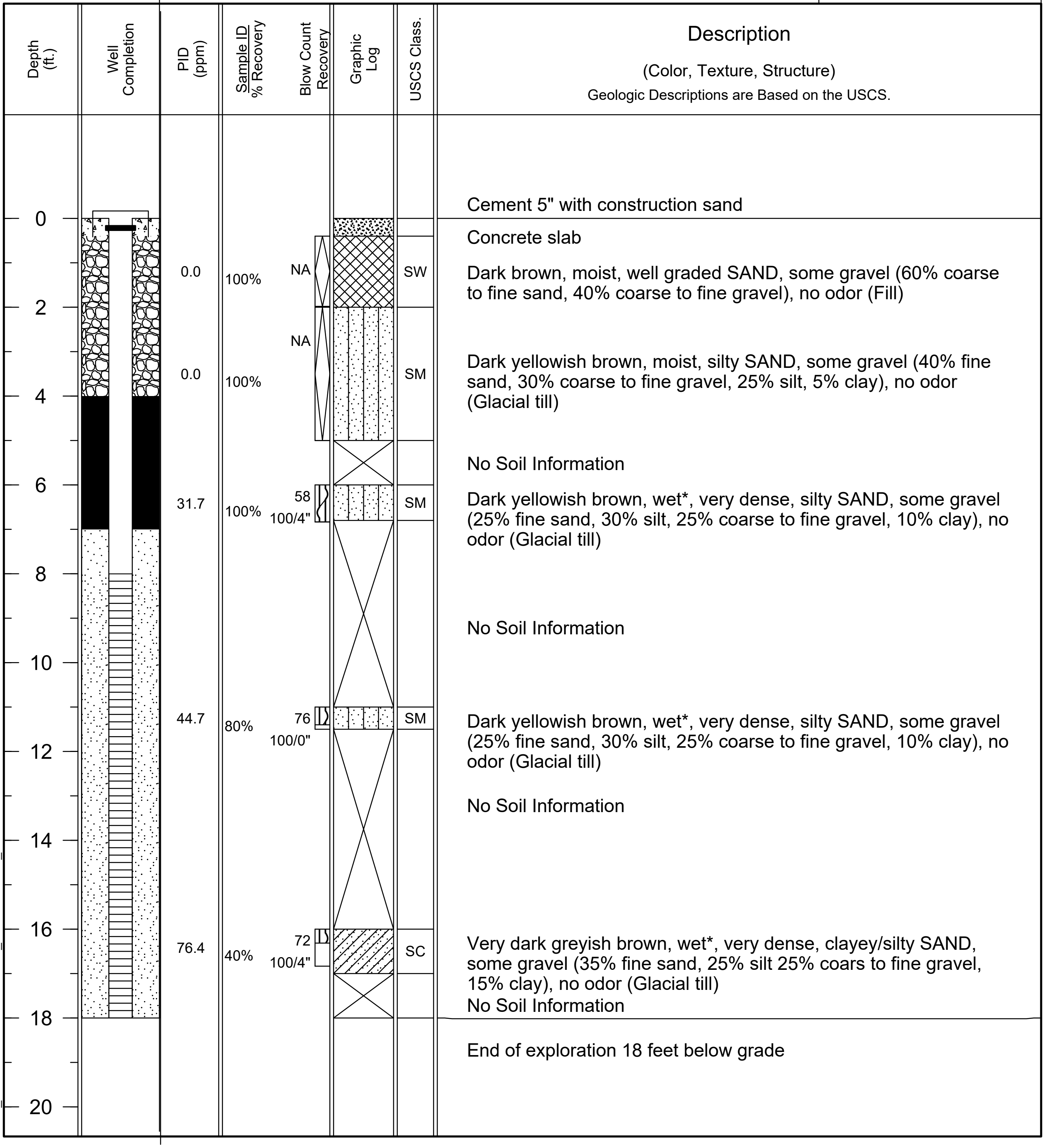
Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *Beverly, Massachusetts* Proj. No. *631237905*
Surface Elev. *NA* Total Hole Depth *18.0 ft.* North ______ East ______
Top of Casing *81.30 ft.* Water Level Initial *NA* Static *NA* Diameter *2 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *10-Slot/0.01 in.*
Casing: Dia *2 in.* Length *8 ft.* Type *Sch. 40 PVC*
Fill Material *0.25 - 0.13 inch Stone* Rig/Core *Acker/Soil Scout*
Drill Co. *Geologic* Method *Drive and wash (4")*
Driller *John Boyd* Log By *Chris Buerkle* Date *7/26/18* Permit # *NA*
Checked By *Raymond Cadorette* License No. ______

COMMENTS
Hand cleared 0-5' on 7/26/2018

Collected soil VOC sample 6-6.8'

**Water from water table or drive and wash method.*



PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
				Cement 5" with construction sand
				Concrete slab
0.0	100%	NA	SW	Dark brown, moist, well graded SAND, some gravel (60% coarse to fine sand, 40% coarse to fine gravel), no odor (Fill)
0.0	100%	NA	SM	Dark yellowish brown, moist, silty SAND, some gravel (40% fine sand, 30% coarse to fine gravel, 25% silt, 5% clay), no odor (Glacial till)
				No Soil Information
31.7	100%	58 100/4"	SM	Dark yellowish brown, wet*, very dense, silty SAND, some gravel (25% fine sand, 30% silt, 25% coarse to fine gravel, 10% clay), no odor (Glacial till)
				No Soil Information
44.7	80%	76 100/0"	SM	Dark yellowish brown, wet*, very dense, silty SAND, some gravel (25% fine sand, 30% silt, 25% coarse to fine gravel, 10% clay), no odor (Glacial till)
				No Soil Information
76.4	40%	72 100/4"	SC	Very dark greyish brown, wet*, very dense, clayey/silty SAND, some gravel (35% fine sand, 25% silt 25% coars to fine gravel, 15% clay), no odor (Glacial till)
				No Soil Information
				End of exploration 18 feet below grade

Drilling Log

Monitoring Well **AP-38-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *Beverly, Massachusetts* Proj. No. *631237905*

Surface Elev. *NA* Total Hole Depth *18.0 ft.* North East

Top of Casing *81.32 ft.* Water Level Initial *NA* Static *NA* Diameter *2 in.*

Screen: Dia *2 in.* Length *10 ft.* Type/Size *10-Slot/0.01 in.*

Casing: Dia *2 in.* Length *8 ft.* Type *Sch. 40 PVC*

Fill Material *0.25 - 0.13 inch Stone* Rig/Core *Acker/Soil Scout*

Drill Co. *Geologic* Method *Drive and wash (4")*

Driller *John Boyd* Log By *Chris Buerkle* Date *7/25/18* Permit # *NA*

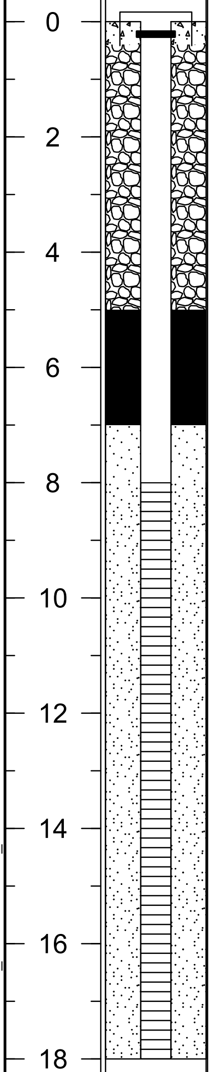
Checked By *Raymond Cadorette* License No.

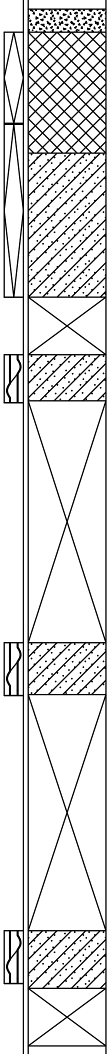
COMMENTS

Hand cleared 0-5' on 7/24/2018 and 7/25/2018

Collected soil VOC sample 6-6.8'

**Water from water table or drive and wash method.*





PID (ppm)	Sample ID / % Recovery	Blow Count / Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
				Cement 5" with construction sand
				Concrete slab
0.0	100%	NA	GC	Dark yellowish brown, moist, silty SAND, some gravel (40% fine sand, 30% coarse to fine gravel, 25% silt, 5% clay), no odor (Fill)
0.0	100%	NA	SC	Dark yellowish brown, moist, silty SAND, some gravel (40% fine sand, 30% coarse to fine gravel, 25% silt, 5% clay), no odor (Glacial till)
				No Soil Information
0.5	100%	64 100/4"	SC	Dark yellowish brown, wet*, very dense, clayey/silty SAND, some gravel (40% fine sand, 25% coarse to fine gravel, 20% silt, 15% clay), no odor (Glacial till)
				No Soil Information
36.1	100%	39 100/5"	SC	Dark greyish brown, wet*, very dense, clayey/silty SAND, some gravel (40% fine sand, 25% coarse to fine gravel, 20% silt, 15% clay), no odor (Glacial till)
				No Soil Information
36.2	100%	55 100/5"	SC	Dark greyish brown, wet*, very dense, clayey/silty SAND, some gravel (40% fine sand, 25% coarse to fine gravel, 20% silt, 15% clay), no odor (Glacial till)
				No Soil Information
				End of exploration 18 feet below grade

APTIM

Drilling Log

Monitoring Well **AP-39-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *Beverly, Massachusetts* Proj. No. *631237905*
Surface Elev. *NA* Total Hole Depth *18.0 ft.* North East
Top of Casing *81.16 ft.* Water Level Initial *NA* Static *NA* Diameter *2 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *10-Slot/0.01 in.*
Casing: Dia *2 in.* Length *8 ft.* Type *Sch. 40 PVC*
Fill Material *0.25 - 0.13 inch Stone* Rig/Core *Acker/Soil Scout*
Drill Co. *Geologic* Method *Drive and wash (4")*
Driller *John Boyd* Log By *Chris Buerkle* Date *7/23/18* Permit # *NA*
Checked By *Raymond Cadorette* License No.

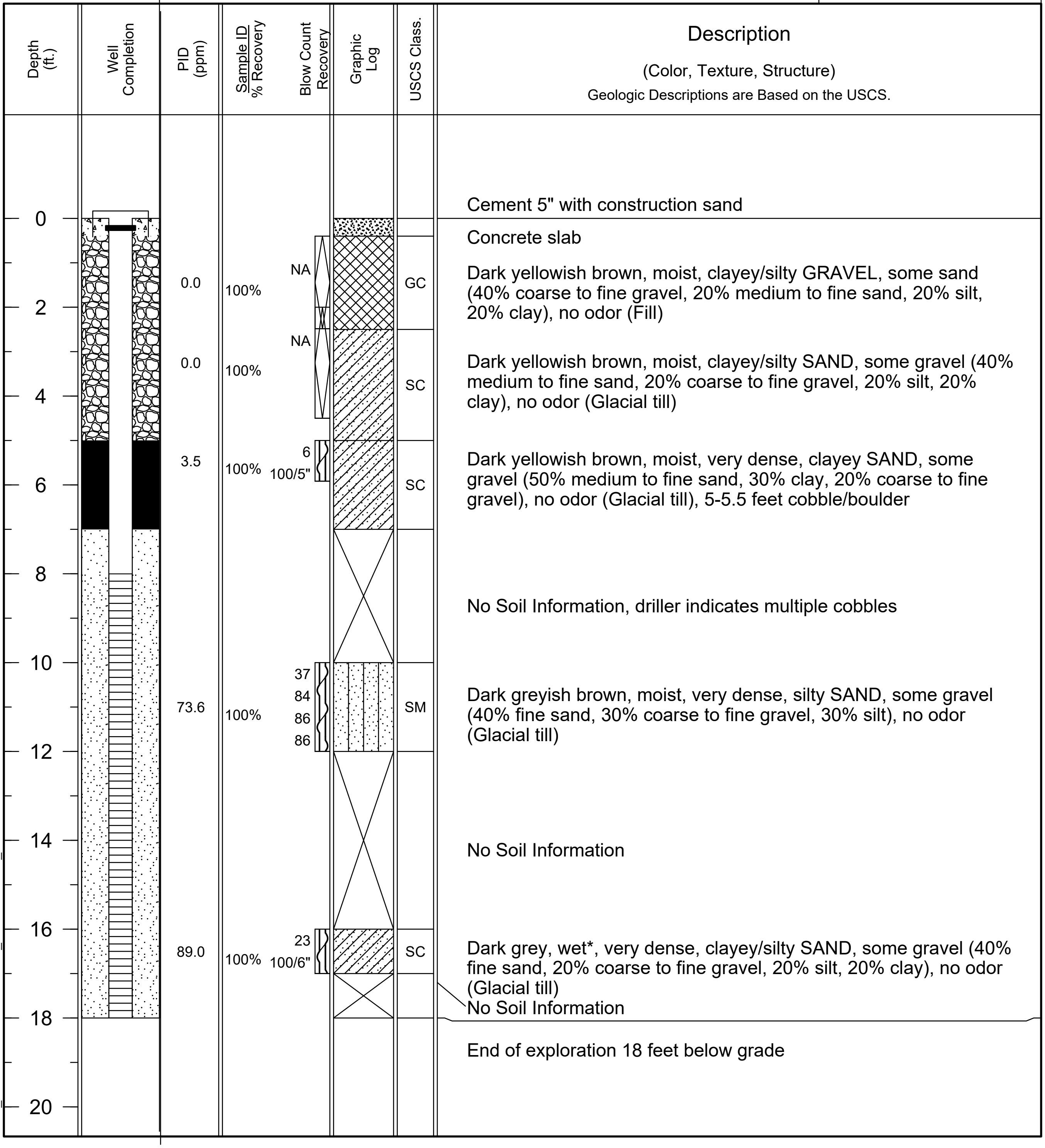
COMMENTS
Hand cleared 0-5' on 7/23/2018

Collected soil VOC sample 16-17'

**Water from water table or drive and wash method.*

HS Augers (8" ob/4.25" ID) from 0/10.5'

Drive and wash from 10.5' - 18', 4" hole.



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					Cement 5" with construction sand
0 - 0.5					Concrete slab
0.5 - 2.5	0.0	100%	NA	GC	Dark yellowish brown, moist, clayey/silty GRAVEL, some sand (40% coarse to fine gravel, 20% medium to fine sand, 20% silt, 20% clay), no odor (Fill)
2.5 - 5	0.0	100%	NA	SC	Dark yellowish brown, moist, clayey/silty SAND, some gravel (40% medium to fine sand, 20% coarse to fine gravel, 20% silt, 20% clay), no odor (Glacial till)
5 - 7	3.5	100%	6 100/5"	SC	Dark yellowish brown, moist, very dense, clayey SAND, some gravel (50% medium to fine sand, 30% clay, 20% coarse to fine gravel), no odor (Glacial till), 5-5.5 feet cobble/boulder
7 - 10					No Soil Information, driller indicates multiple cobbles
10 - 12	73.6	100%	37 84 86 86	SM	Dark greyish brown, moist, very dense, silty SAND, some gravel (40% fine sand, 30% coarse to fine gravel, 30% silt), no odor (Glacial till)
12 - 16					No Soil Information
16 - 17	89.0	100%	23 100/6"	SC	Dark grey, wet*, very dense, clayey/silty SAND, some gravel (40% fine sand, 20% coarse to fine gravel, 20% silt, 20% clay), no odor (Glacial till)
17 - 18					No Soil Information
18					End of exploration 18 feet below grade

Shaw™
Shaw E & I, Inc.

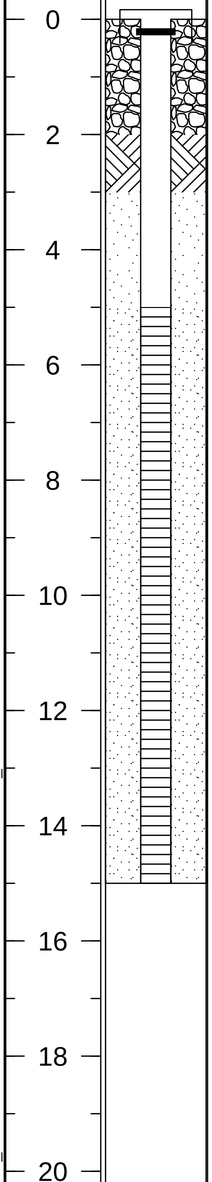
Drilling Log

Monitoring Well **BW-1**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *NA* Total Hole Depth *15.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *10 ft.* Type/Size *NA*
Casing: Dia *2 in.* Length *5 ft.* Type *PVC*
Fill Material *Sand, bentonite* Rig/Core
Drill Co. *Zebra Drilling* Method *Geoprobe*
Driller *W. McCallister* Log By *T. Villing* Date *7/9/03* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS
First attempt refusal at 7 feet below surface grade; moved over approximately 2 feet.

Depth (ft.) / Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Grass No samples colletected. End of exploration at 15 feet below surface grade.

Shaw E & I, Inc.

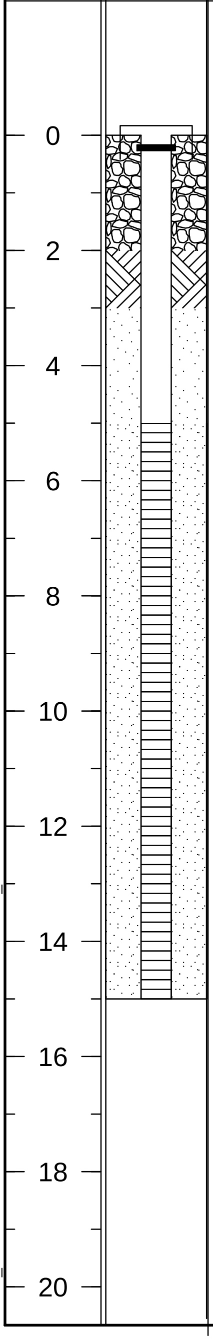
Drilling Log

Monitoring Well **BW-2**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *NA* Total Hole Depth *15.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *10 ft.* Type/Size *NA*
Casing: Dia *2 in.* Length *5 ft.* Type *PVC*
Fill Material *Sand, bentonite* Rig/Core
Drill Co. *Zebra Drilling* Method *Geoprobe*
Driller *W. McCallister* Log By *T. Villing* Date *7/9/03* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS
First attempt refusal at 7 feet below surface grade; moved over approximately 2 feet.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Grass
							No samples colletected.
							End of exploration at 15 feet below surface grade.

Shaw E & I, Inc.

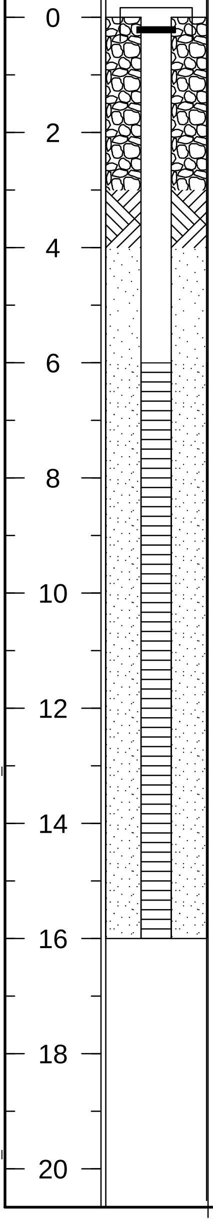
Drilling Log

Monitoring Well **BW-3**

Page: 1 of 1

Project *Varian Beverly*
Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts*
Proj. No. *844877*
Surface Elev. *NA*
Total Hole Depth *16.0 ft.*
North
East
Top of Casing *NA*
Water Level Initial *NA*
Static *NA*
Diameter
Screen: Dia *2 in.*
Length *10 ft.*
Type/Size *NA*
Casing: Dia *2 in.*
Length *6 ft.*
Type *PVC*
Fill Material *Sand, bentonite*
Rig/Core
Drill Co. *Zebra Drilling*
Method *Geoprobe*
Driller *W. McCallister*
Log By *T. Villing*
Date *7/9/03*
Permit # *NA*
Checked By *Raymond Cadorette*
License No.

COMMENTS



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							No samples colletected.
16							End of exploration at 16 feet below surface grade.

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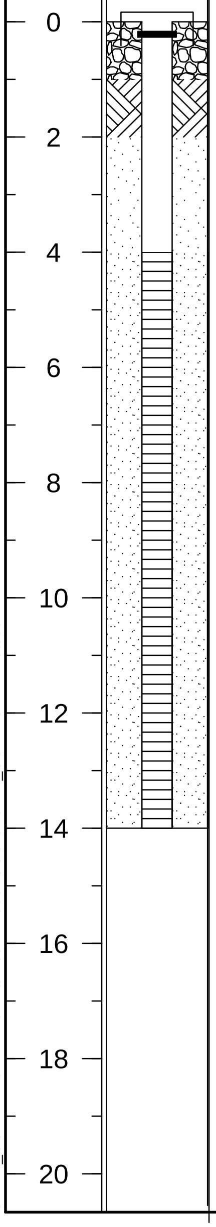
Drilling Log

Monitoring Well **BW-4**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *NA* Total Hole Depth *14.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *10 ft.* Type/Size *NA*
Casing: Dia *2 in.* Length *4 ft.* Type *PVC*
Fill Material *Sand, bentonite* Rig/Core
Drill Co. *Zebra Drilling* Method *Geoprobe*
Driller *W. McCallister* Log By *T. Villing* Date *7/9/03* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Grass
0							No samples colletected.
14							End of exploration at 14 feet below surface grade.

Shaw E & I, Inc.

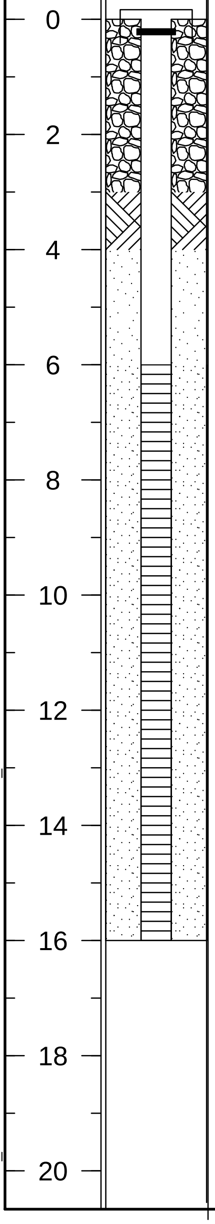
Drilling Log

Monitoring Well **BW-5**

Page: 1 of 1

Project *Varian Beverly*
Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts*
Proj. No. *844877*
Surface Elev. *NA*
Total Hole Depth *16.0 ft.*
North
East
Top of Casing *NA*
Water Level Initial *NA*
Static *NA*
Diameter
Screen: Dia *2 in.*
Length *10 ft.*
Type/Size *NA*
Casing: Dia *2 in.*
Length *6 ft.*
Type *PVC*
Fill Material *Sand, bentonite*
Rig/Core
Drill Co. *Zebra Drilling*
Method *Geoprobe*
Driller *W. McCallister*
Log By *T. Villing*
Date *7/9/03*
Permit # *NA*
Checked By *Raymond Cadorette*
License No.

COMMENTS



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							No samples colletected.
							End of exploration at 16 feet below surface grade.

SHAW_COMMERCIAL Rev: 6/12/02 2003LOGS.GPJ IT_CORP.GDT 11/3/09

Shaw E & I, Inc.

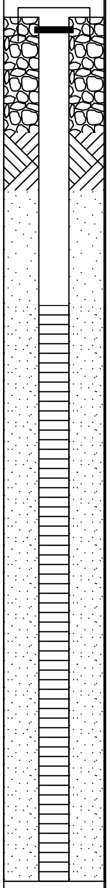
Drilling Log

Monitoring Well **BW-6**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *NA* Total Hole Depth *15.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *10 ft.* Type/Size *NA*
Casing: Dia *2 in.* Length *5 ft.* Type *PVC*
Fill Material *Sand, bentonite* Rig/Core
Drill Co. *Zebra Drilling* Method *Geoprobe*
Driller *W. McCallister* Log By *T. Villing* Date *7/9/03* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0 2 4 6 8 10 12 14							No samples colletected.
16 18 20							End of exploration at 15 feet below surface grade.

Shaw E & I, Inc.

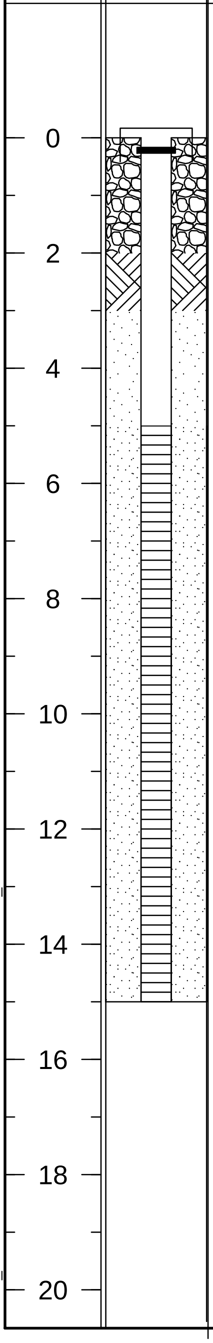
Drilling Log

Monitoring Well **BW-7**

Page: 1 of 1

Project *Varian Beverly*
Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts*
Proj. No. *844877*
Surface Elev. *NA*
Total Hole Depth *15.0 ft.*
North
East
Top of Casing *NA*
Water Level Initial *NA*
Static *NA*
Diameter
Screen: Dia *2 in.*
Length *10 ft.*
Type/Size *NA*
Casing: Dia *2 in.*
Length *5 ft.*
Type *PVC*
Fill Material *Sand, bentonite*
Rig/Core
Drill Co. *Zebra Drilling*
Method *Geoprobe*
Driller *W. McCallister*
Log By *T. Villing*
Date *7/9/03*
Permit # *NA*
Checked By *Raymond Cadorette*
License No.

COMMENTS



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							No samples colletected.
15							End of exploration at 15 feet below surface grade.

SHAW_COMMERCIAL Rev: 6/12/02 2003LOGS.GPJ IT_CORP.GDT 11/3/09

Shaw E & I, Inc.

Drilling Log

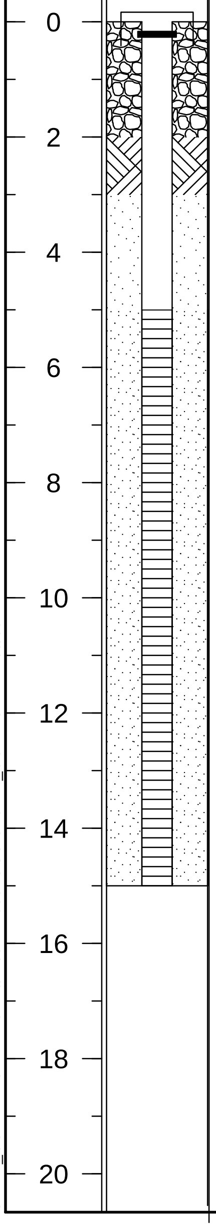
Monitoring Well **BW-8**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *NA* Total Hole Depth *15.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *10 ft.* Type/Size *NA*
Casing: Dia *2 in.* Length *5 ft.* Type *PVC*
Fill Material *Sand, bentonite* Rig/Core
Drill Co. *Zebra Drilling* Method *Geoprobe*
Driller *W. McCallister* Log By *T. Villing* Date *7/10/03* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0–15							No samples colletected.
15							End of exploration at 15 feet below surface grade.



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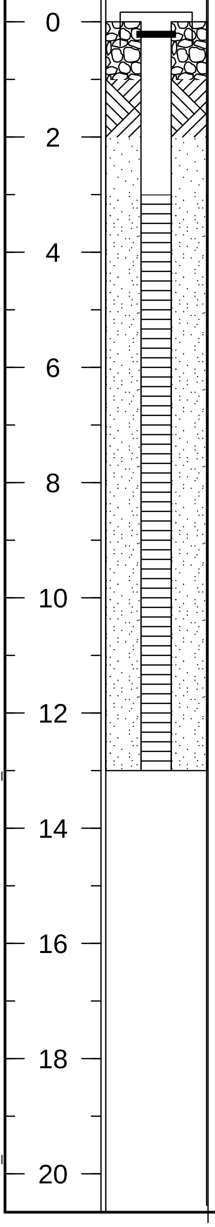
Drilling Log

Monitoring Well **BW-9**

Page: 1 of 1

Project Varian Beverly
Owner Varian Medical Systems, Inc.
Location 150 Sohier Road, Beverly, Massachusetts
Proj. No. 844877
Surface Elev. NA
Total Hole Depth 13.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter
Screen: Dia 2 in.
Length 10 ft.
Type/Size NA
Casing: Dia 2 in.
Length 3 ft.
Type PVC
Fill Material Sand, bentonite
Rig/Core
Drill Co. Zebra Drilling
Method Geoprobe
Driller W. McCallister
Log By T. Villing
Date 7/10/03
Permit # NA
Checked By Raymond Cadorette
License No.

COMMENTS



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							No samples colletected.
							End of exploration at 13 feet below surface grade (refusal).

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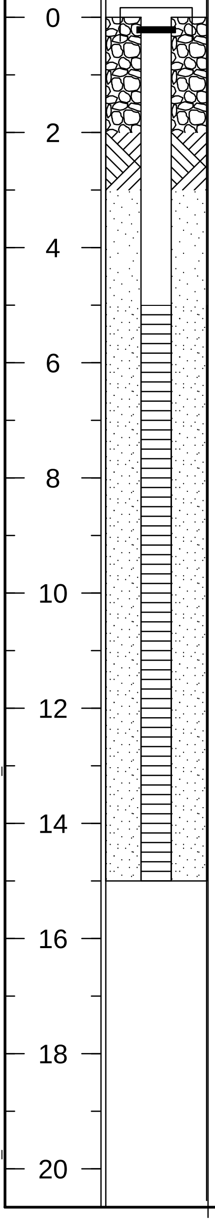
Drilling Log

Monitoring Well **BW-10**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *NA* Total Hole Depth *15.0 ft.* North ______ East ______
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ______
Screen: Dia *2 in.* Length *10 ft.* Type/Size *NA*
Casing: Dia *2 in.* Length *5 ft.* Type *PVC*
Fill Material *Sand, bentonite* Rig/Core ______
Drill Co. *Zebra Drilling* Method *Geoprobe*
Driller *W. McCallister* Log By *T. Villing* Date *7/10/03* Permit # *NA*
Checked By *Raymond Cadorette* License No. ______

COMMENTS



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							No samples colletected.
							End of exploration at 15 feet below surface grade.

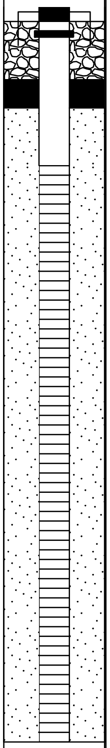
Drilling Log

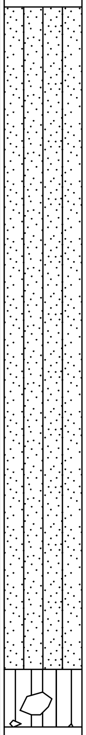
Monitoring Well **CL12-S1**

Page: 1 of 1

Project *Varian/Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *806395*
Surface Elev. *NA* Total Hole Depth *25.0 ft.* North East
Top of Casing *NA* Water Level Initial ∇ *10.0 ft.* Static *NA* Diameter *8.25 in.*
Screen: Dia *2.0 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2.0 in.* Length *4.5 ft.* Type *PVC*
Fill Material *Native, Sand, Bentonite* Rig/Core *CME 85*
Drill Co. *American Drilling Service* Method *Hollow Stem Auger*
Driller *K.Bylund/R.Dean* Log By *M. Reilly* Date *4/4/00* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS
ND = None detected





Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Surface: Sod
0							From Cuttings: Dark brown sandy SILT
5							Same as above, color slightly grayer, moist
		ND					
10 ∇							Grayish brown, wet, sandy SILT
						SM	
15							
20		ND					Same as above, moist, some gravel
		ND				GM GWS	Brownish gray to grayish brown, moist, GRAVEL and SAND, some silt
25							
							Bottom of exploration at 25 feet Well Construction: Screen from 25 feet to 5 feet; casing from 5 feet to grade. Completed at grade with flush roadbox set in concrete. Sand Pack / Seal: Sand pack from 25 feet to 2 feet; bentonite from 2 feet to 1 foot; native fill from 1 foot to grade.
30							
35							
40							

Drilling Log

Monitoring Well **CL12-S2**

Page: 1 of 1

Project *Varian/Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *806395*

Surface Elev. *NA* Total Hole Depth *30.0 ft.* North East

Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *8.25 in.*

Screen: Dia *2.0 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*

Casing: Dia *2.0 in.* Length *9.5 ft.* Type *PVC*

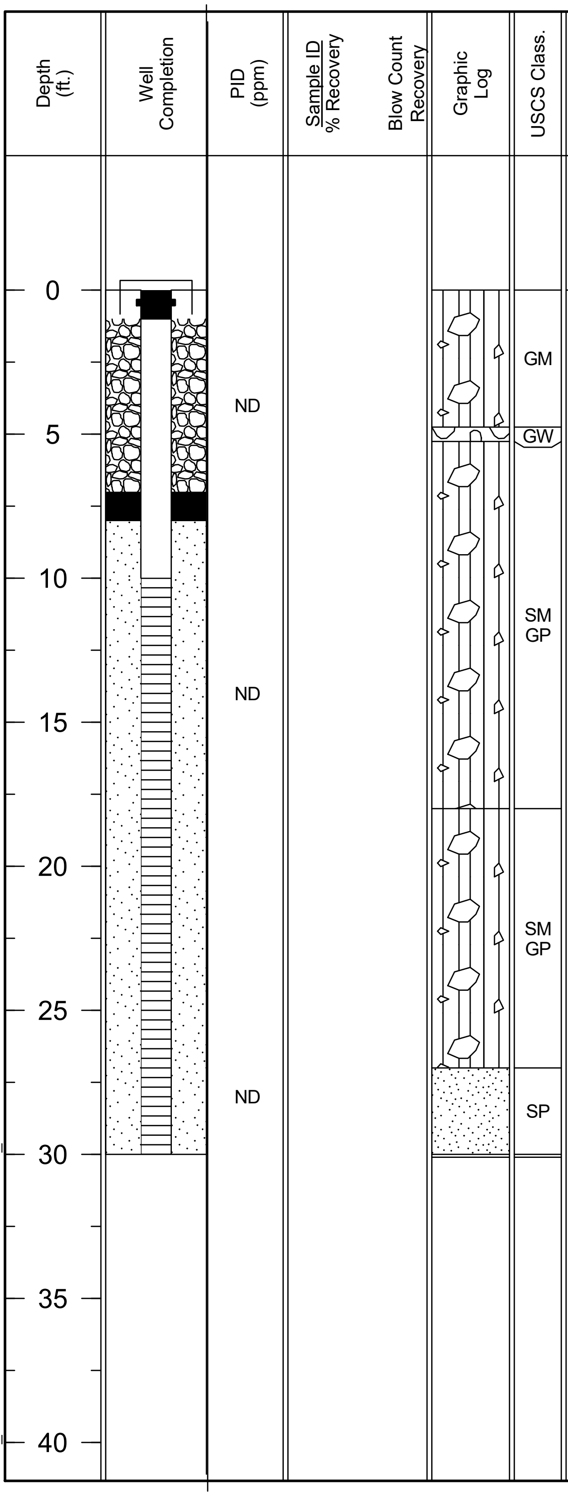
Fill Material *Native, Sand, Bentonite* Rig/Core *CME 85*

Drill Co. *American Drilling Service* Method *Hollow Stem Auger*

Driller *K.Bylund/R.Dean* Log By *M. Reilly* Date *4/4/00* Permit # *NA*

Checked By *R. Cadorette* License No.

COMMENTS
ND = None detected



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Surface: Sod

From cuttings: Topsoil, underlain by light brown, moist, silty, sandy GRAVEL

GRAVEL/rich layer at approximately 5 feet

Moderate brown, moist, SILT and SAND, high percentage of coarse to fine gravel

Moderate brown, moist, SILT and SAND, high percentage of coarse to fine gravel, occasional cobbles

Moderate brown, moist, SILT and SAND, high percentage of coarse to fine gravel, higher coarse gravel content

Sand layer

Bottom of exploration at 30 feet

Well Construction:

Screen from 30 feet to 10 feet; casing from 10 feet to grade.

Completed at grade with flush roadbox set in concrete.

Sand Pack / Seal:

Sand pack from 30 feet to 8 feet; bentonite from 8 feet to 7 feet; native fill from 7 feet to grade.

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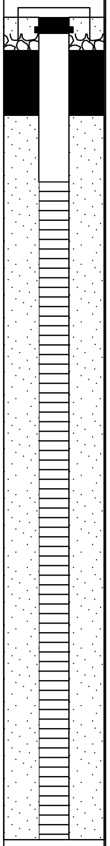
Drilling Log

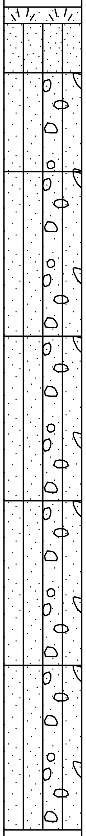
Monitoring Well **OB 4-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *25.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *5 ft.* Type *PVC*
Fill Material *Sand, bentonite, native* Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff* Method *Hollow Stem Auger*
Driller *Rick Navatka* Log By *Steve McGinn* Date *5/8/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Well Located at 28 Tozer Road Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.





Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Soil/loam, large cobble
						ML SM	Brown, fine-medium SILT/SAND with gravel
		0.0				SM GP	Black, moist, fine-medium SAND with gravel and some silt, strong odor, appears to be saturated with creosote or residue from MGP
		10.5					
5						SM GP	Same as above with increasing larger pebbles
		0.0					
10						SM GP	Same as above, strong odor, moist
		0.0					
15						SM GP	Same as above
20						SM GP	Same as above, strong odor, moist
		4.5					
25							End of Exploration at 25 feet bsg Well Construction: Screen from 25 to 5 feet, casing from 5 feet to grade. Completed with a flush roadbox set in concrete. Sand Pack/ Seal: Sand from 25 to 3 feet, bentonite from 3 feet to 1 foot, native from 1 foot to grade.
30							
35							

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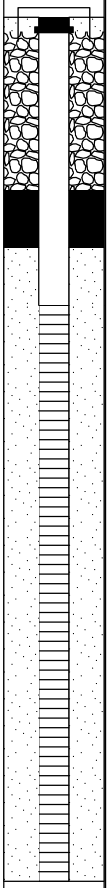
Drilling Log

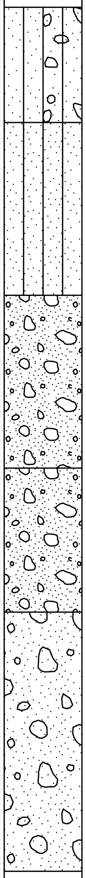
Monitoring Well **OB 5-S**

Page: 1 of 1

Project *Varian Beverly*
Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA*
Proj. No. *832837*
Surface Elev. *NA*
Total Hole Depth *30.0 ft.*
North
East
Top of Casing *NA*
Water Level Initial *NA*
Static *NA*
Diameter *4 in.*
Screen: Dia *2 in.*
Length *20 ft.*
Type/Size *PVC/.010 in.*
Casing: Dia *2 in.*
Length *10 ft.*
Type *PVC*
Fill Material *Sand, bentonite, native*
Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff*
Method *Hollow Stem Auger*
Driller *Rick Navatka*
Log By *Dave Wattles*
Date *3/12/02*
Permit # *NA*
Checked By *S. Metivier*
License No.

COMMENTS
Well located at 29 Tozer Road
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.





Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0	0.0			SM	Dark brown, silty fine SAND with gravel
5	0.0			SM	Light brown silty fine SAND
10	0.0			GP	Brown, 2-4 inch subangular GRAVEL
15	0.0			GP	Brown, 1-2 inch, subangular GRAVEL
20 25	0.0 0.0			SP GP	Brown, wet fine GRAVEL to coarse SAND
30 35 40					End of Exploration at 30 feet bsg Well Construction: Screen from 30 to 10 feet, casing from 10 feet to grade. Completed with a flush roadbox set in concrete. Sand Pack/ Seal: Sand pack from 30 to 8 feet, bentonite 8 to 6 feet, native from 6 feet to grade.

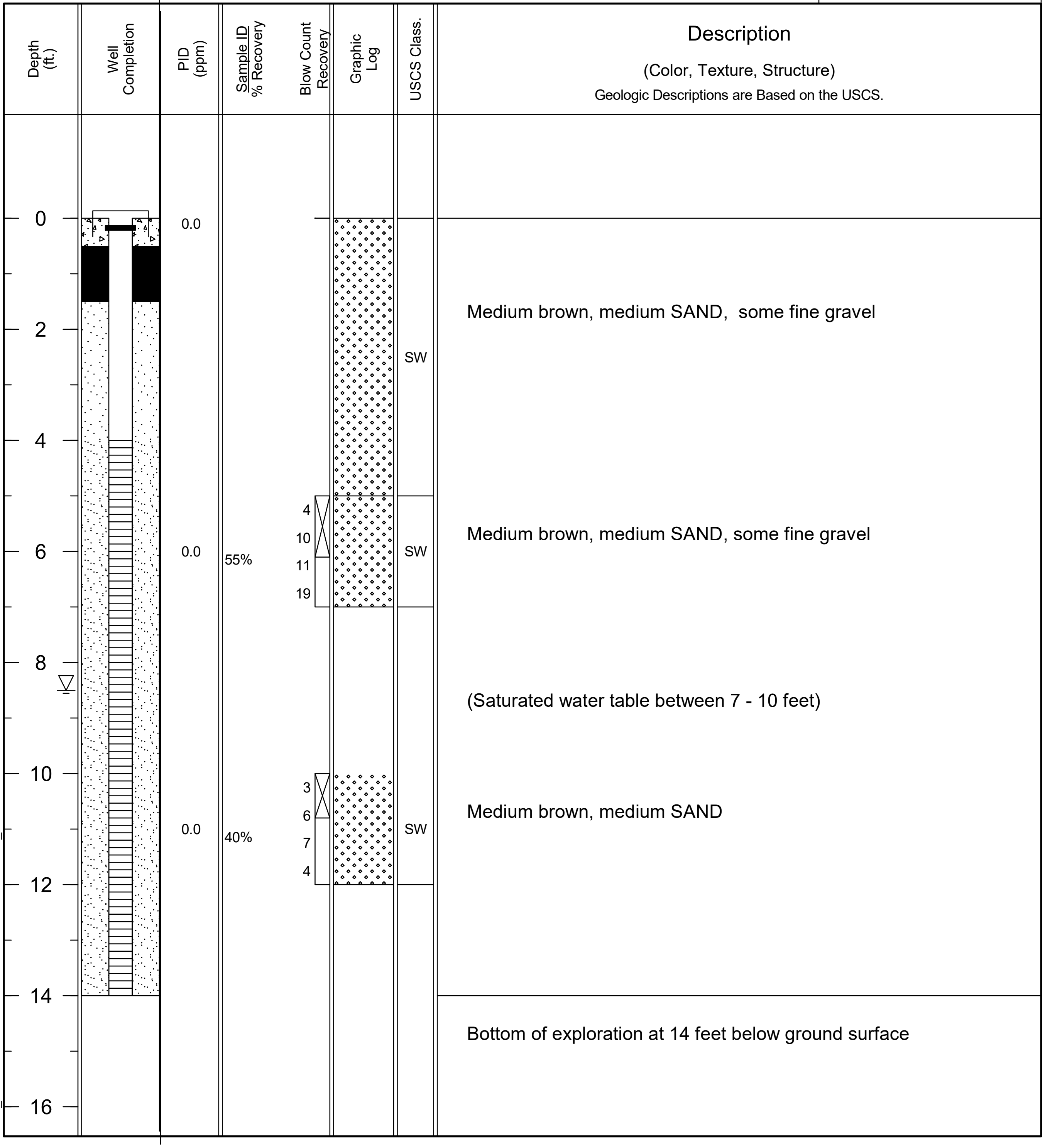
Drilling Log

Monitoring Well **OB-6-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *Sonning Road, Beverly, MA* Proj. No. *631010758*
Surface Elev. *NA* Total Hole Depth *14.0 ft.* North East
Top of Casing *NA* Water Level Initial ∇ *8.5 ft.* Static *NA* Diameter *6 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.030 Slot in.*
Casing: Dia *2 in.* Length *4 ft.* Type *PVC*
Fill Material *Sand, bentonite* Rig/Core *Hollow Stem Auger*
Drill Co. *TDS* Method *Hollow Stem Auger*
Driller *Darwin* Log By *Ryan Fichman* Date *4/19/21* Permit # *NA*
Checked By License No.

COMMENTS



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0	0.0			SW	Medium brown, medium SAND, some fine gravel
5			4	SW	Medium brown, medium SAND, some fine gravel
6	0.0	55%	10 11 19		
8 ∇					(Saturated water table between 7 - 10 feet)
10			3 6	SW	Medium brown, medium SAND
11	0.0	40%	7 4		
14					Bottom of exploration at 14 feet below ground surface

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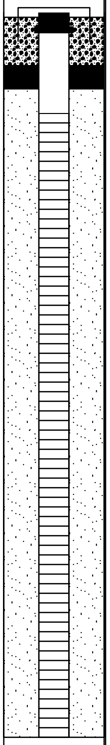
Drilling Log

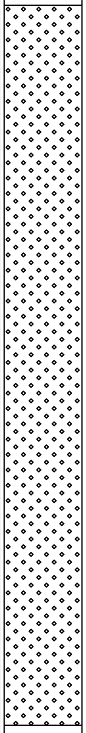
Monitoring Well **OB 8-S**

Page: 1 of 1

Project *Varian Beverly*
Owner *Varian Medical System, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts*
Proj. No. *832837*
Surface Elev. *NA*
Total Hole Depth *15.0 ft.*
North
East
Top of Casing *NA*
Water Level Initial ▽ *4.0 ft.*
Static *NA*
Diameter *4.25 in.*
Screen: Dia *2 in.*
Length *13 ft.*
Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.*
Length *2 ft.*
Type *PVC*
Fill Material *Sand, bentonite*
Rig/Core *Foremost*
Drill Co. *AM Drilling*
Method *Hollow Stem Auger*
Driller *J. Skaife*
Log By *Kara Tudman*
Date *8/6/02*
Permit # *NA*
Checked By
License No.

COMMENTS
BDL = Below Detection Limit





Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Pavement
0							Brown, dry, coarse to fine SAND, some fine gravel and silt
		BDL	CG-1				
2							
4 ▽							
6		BDL	CG-2				Same as above, wet
						SW	
8							
10		BDL	CG-3				Brown, wet, coarse to medium SAND, trace fine sand
12							
14							
							Bottom of exploration at 15 feet. Well Construction: Screen from 15 to 2 feet, casing from 2 feet to grade. Completed with flush roadbox set in concrete. Sand Pack / Seal: Sand pack from 15 to 1.5 feet, bentonite from 1.5 to 1 feet, grout 1 feet to grade.
16							
18							
20							
22							
24							

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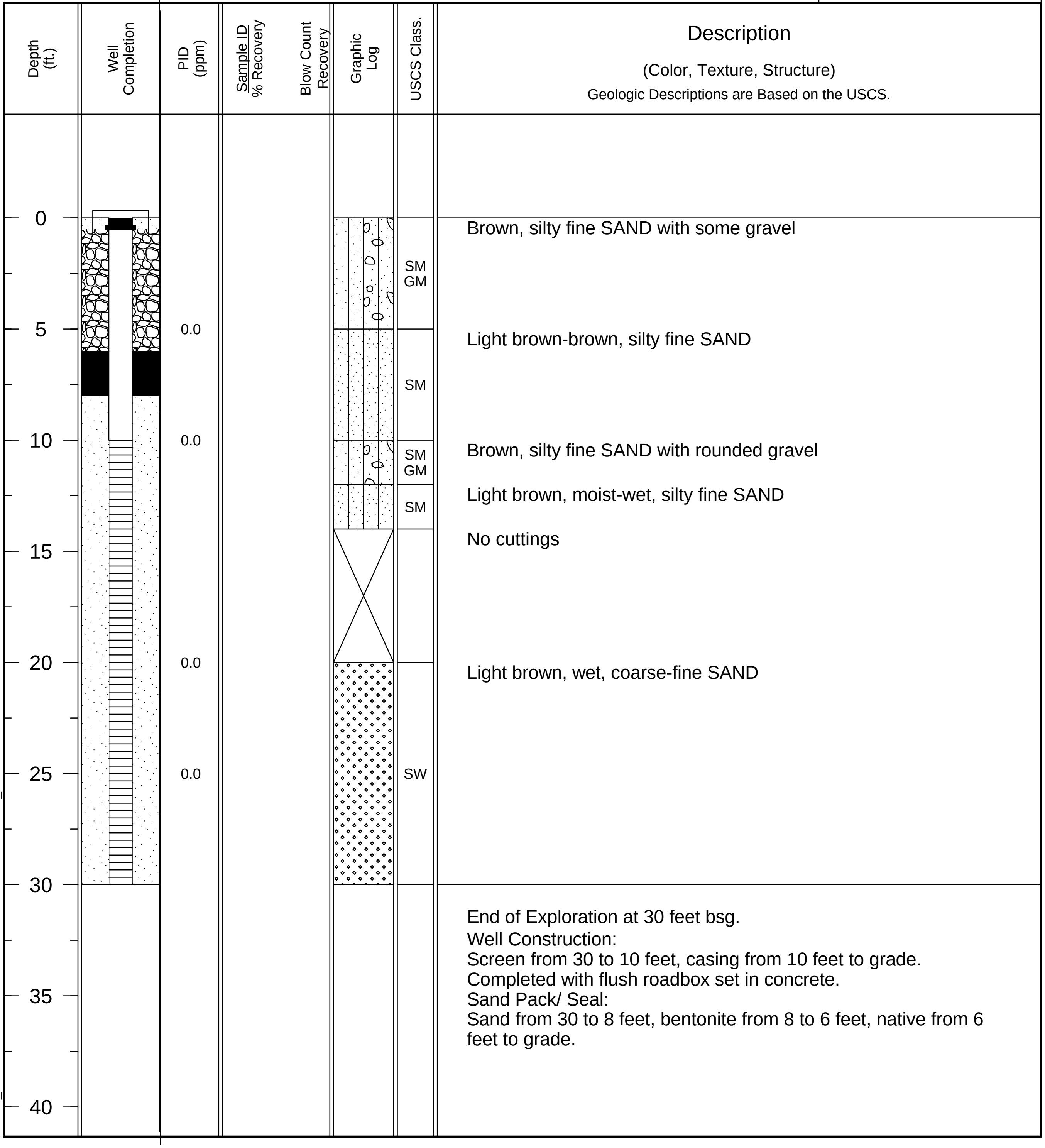
Drilling Log

Monitoring Well **OB 9-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *32.0 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *10 ft.* Type *PVC*
Fill Material *Sand, bentonite, native* Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff* Method *Hollow Stem Auger*
Driller *Rick Navatka* Log By *Dave Wattles* Date *4/4/02* Permit # *NA*
Checked By *S. Metivier* License No. ____

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0				SM GM	Brown, silty fine SAND with some gravel
5	0.0			SM	Light brown-brown, silty fine SAND
10	0.0			SM GM	Brown, silty fine SAND with rounded gravel
12				SM	Light brown, moist-wet, silty fine SAND
14					No cuttings
20	0.0				Light brown, wet, coarse-fine SAND
25	0.0			SW	
30					End of Exploration at 30 feet bsg. Well Construction: Screen from 30 to 10 feet, casing from 10 feet to grade. Completed with flush roadbox set in concrete. Sand Pack/ Seal: Sand from 30 to 8 feet, bentonite from 8 to 6 feet, native from 6 feet to grade.

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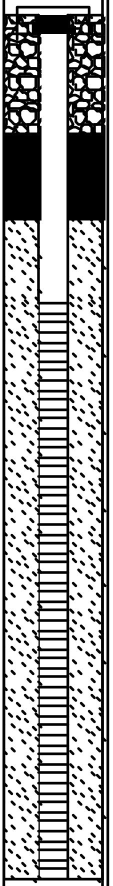
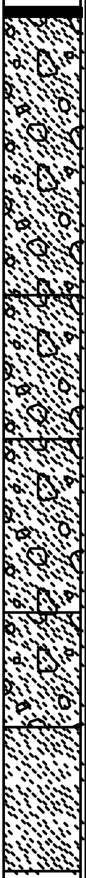
Drilling Log

Monitoring Well **OB10-S**
Page: 1 of 1

Project: Varian/Beverly
Owner: Varian Medical Systems, Inc.
Location: 150 Sohier Road, Beverly, Massachusetts
Proj. No.: 832837
Surface Elev.: NA
Total Hole Depth: 30.0 ft.
North:
East:
Top of Casing: NA
Water Level Initial: NA
Static: NA
Diameter: 8.5 in.
Screen: Dia: 2 in.
Length: 20 ft.
Type/Size: PVC/0.010 in.
Casing: Dia: 2 in.
Length: 10 ft.
Type: PVC
Fill Material: Native, Sand, Bentonite
Rig/Core: CME
Drill Co.: Dragin Drilling, Inc.
Method: Hollow Stem Auger
Driller: Todd Coleman
Log By: D. Wattles
Date: 1/2/02
Permit #: NA
Checked By: S. Metivier
License No.:

COMMENTS
ND = None detected





Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
					Asphalt
0					Asphalt (4")
	ND			SP	Brown, fine to medium SAND, little medium to fine gravel, trace cobbles, poorly graded
10	ND			SP	Brown, fine to medium SAND, little medium to fine gravel, trace cobbles, poorly graded
15	ND			SP	Brown, fine to medium SAND, little medium to fine gravel, trace cobbles, poorly graded
	ND			SP	Brown, fine to medium SAND, little medium to fine gravel, trace cobbles, poorly graded
25	ND			SP	Brown, fine to medium SAND, little medium to fine gravel, trace cobbles, poorly graded
30					End of Exploration at 30 ft bsg

Well Construction:
Screen from 30 feet to 10 feet, casing from 10 feet to grade. Completed at grade with a flush roadbox set in concrete.

Sand Pack/ Seal:
Sand from 30 to 7 feet, bentonite from 7 to 4 feet, native from 4 feet to grade.

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

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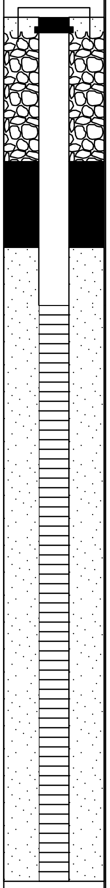
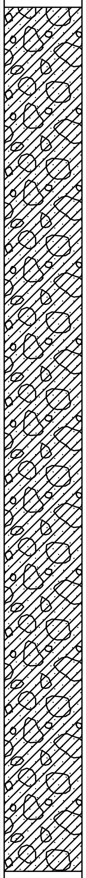
Drilling Log

Monitoring Well **OB 11-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *30.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *10 ft.* Type *PVC*
Fill Material *Sand, bentonite, native* Rig/Core *CME*
Drill Co. *Dragin Drilling Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *Dave Wattles* Date *1/15/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Brown fine SAND with silt, gravel and occassional cobbles
		0.0					
5							
		0.6					
10							
		1.3					
15						SM GP	
		0.0					
20							
25		0.7					
30							Bottom of Exploration at 30 feet bsg Well Construction: Screen from 30 to 10 feet; casing 10 feet to grade. Completed with a flush road box set in concrete. Sand Pack/ Seal: Sand pack from 30 to 8 feet; bentonite 8 to 5 feet; native fill from 5 feet to grade.
35							
40							

Shaw E & I, Inc.

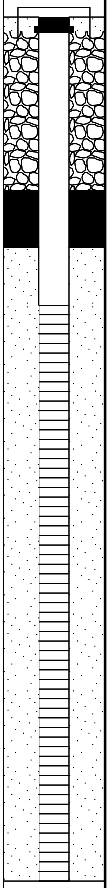
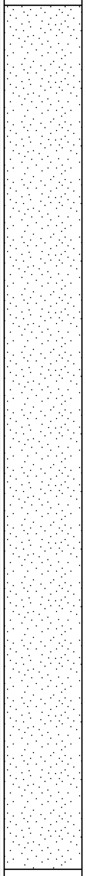
Drilling Log

Monitoring Well **OB 12-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *30.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *10 ft.* Type *PVC*
Fill Material *Sand, bentonite, native* Rig/Core *CME*
Drill Co. *Dragin Drilling Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *Dave Wattles* Date *1/18/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Brown, fine SAND with gravel and occassional cobbles
5		0.0					
10		0.0					
15		0.0				SP	
20		0.0					
25		0.0					
30							Bottom of Exploration at 30 feet bsg Well Construction: Screen from 30 to 10 feet; casing from 10 feet to grade. Completed with flush roadbox set in concrete. Sand Pack/ Seal: Sand pack from 30 to 8 feet; bentonite 8 to 6 feet; native fill from 6 feet to grade.
35							
40							

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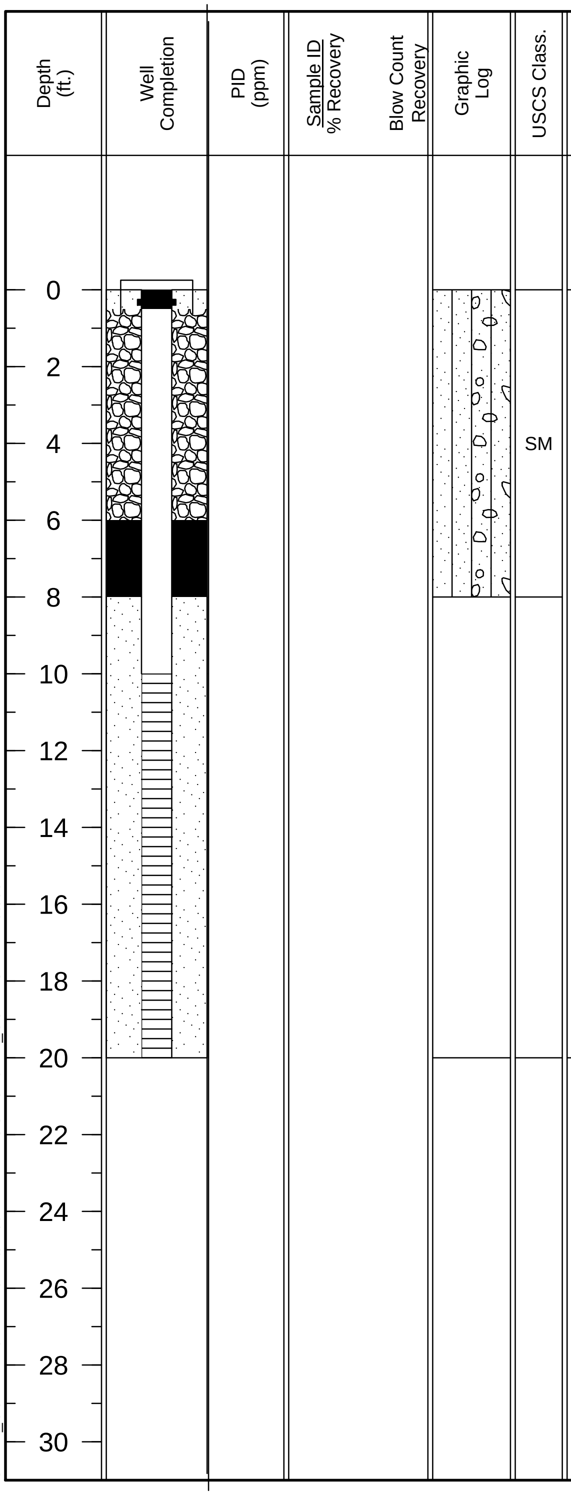
Drilling Log

Monitoring Well **OB 15-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *20.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *10 ft.* Type *PVC*
Fill Material *Sand, bentonite, native* Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff* Method *Hollow Stem Auger*
Driller *Rick Navatka* Log By *Dave Wattles* Date *4/3/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

(Vacuum Excavated) Brown, silty fine SAND with gravel and cobbles

No cuttings, cuttings filling vacuum excavation hole

End of Exploration at 20 feet bsg.

Well Construction:
Screen from 20 to 10 feet, casing from 10 feet to grade.
Completed with a flush roadbox set in concrete.
Sand Pack/ Seal:
Sand from 20 to 8 feet, bentonite from 8 to 6 feet, native from 6 feet to grade.

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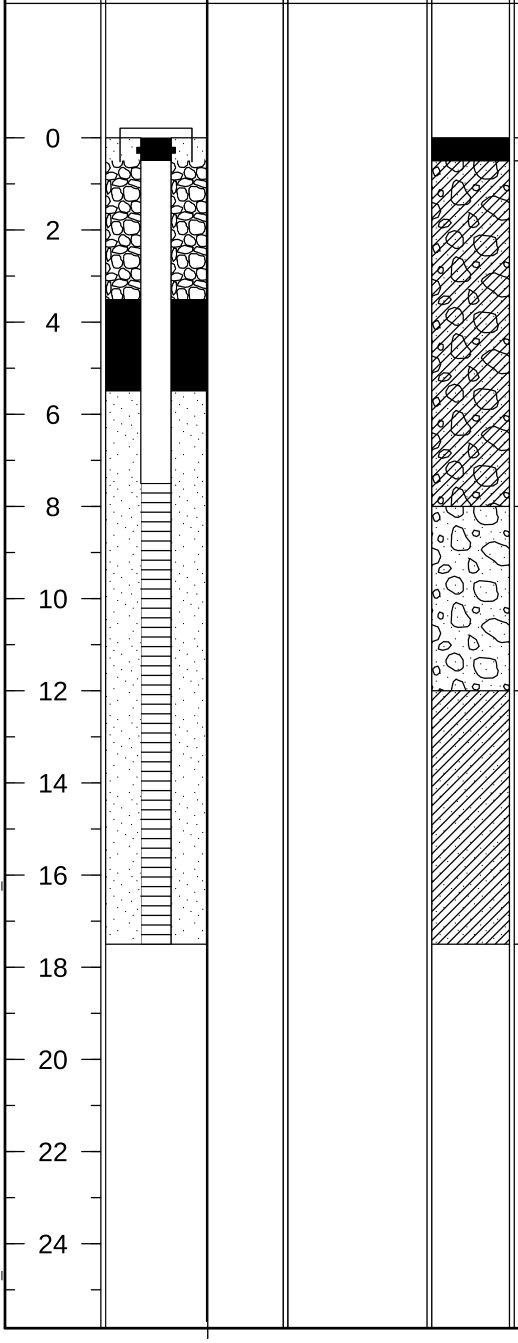
Drilling Log

Monitoring Well **OB 16-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *17.5 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *7.5 ft.* Type *PVC*
Fill Material *Sand, bentonite, native* Rig/Core *CME*
Drill Co. *Dragin Drilling Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *Dave Wattles* Date *1/24/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Well located at 32 Tozer Road
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						SW	Brown, fine-medium SAND with gravel and occassional cobbles
						GW	GRAVEL with brown, fine-medium Sand
						CL	Brown CLAY with fine sand and little gravel
							Bottom of Exploration at 17.5 feet bsg Well Construction: Screen from 17.5 to 7.5 feet; casing 7.5 feet to grade. Completed with flush roadbox set in concrete. Sand Pack/ Seal: Sand pack from 17.5 to 5.5 feet; bentonite 5.5 to 3.5 feet.

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Drilling Log

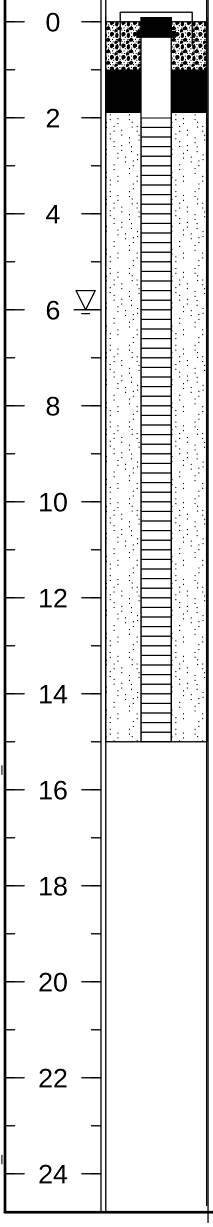
Monitoring Well **OB 18-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical System, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *15.0 ft.* North East
Top of Casing *NA* Water Level Initial ∇ *6.0 ft.* Static *NA* Diameter *4.25 in.*
Screen: Dia *2 in.* Length *12 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *3 ft.* Type *PVC*
Fill Material *Sand, bentonite* Rig/Core *Foremost/Split Spoon*
Drill Co. *AM Drilling* Method *Hollow Stem Auger*
Driller *J. Skaife* Log By *Kara Tudman* Date *8/5/02* Permit # *NA*
Checked By License No.

COMMENTS
No samples taken; see log for OB 18-DO.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Ground Surface
0–15							Obstruction - concrete
15							Bottom of exploration at 15 feet. Well Construction: Screen from 15 to 2 feet, casing from 2 feet to grade. Completed with flush roadbox set in concrete. Sand Pack / Seal: Sand pack from 15 to 2 feet, bentonite from 2 to 1 feet, grout 1 feet to grade.



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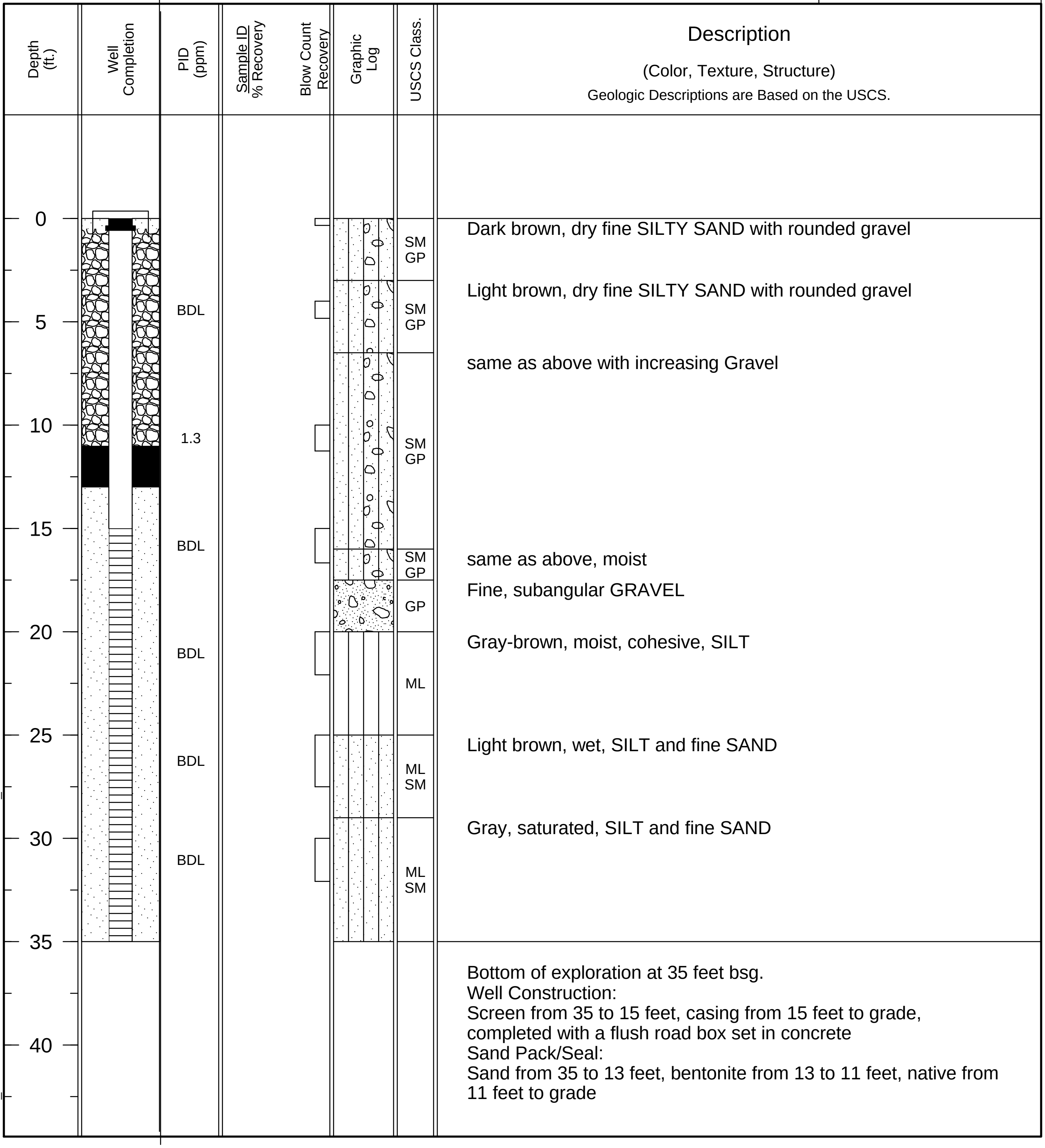
Drilling Log

Monitoring Well **OB 19-S**

Page: 1 of 1

Project Varian Beverly
Owner Varian Medical Systems, Inc.
Location 150 Sohier Road, Beverly, MA
Proj. No. 832837
Surface Elev. NA
Total Hole Depth 35.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter 4 in.
Screen: Dia 2 in.
Length 20 ft.
Type/Size PVC/.010 in.
Casing: Dia 2 in.
Length 15 ft.
Type PVC
Fill Material Sand, bentonite, native
Rig/Core Ingersol Rand
Drill Co. Paratt Wolff
Method Hollow Stem Auger
Driller Rick Navatka
Log By Dave Wattles
Date 4/17/02
Permit # NA
Checked By S. Metivier
License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

PID (ppm)	USCS Class.	Description
	SM GP	Dark brown, dry fine SILTY SAND with rounded gravel
BDL	SM GP	Light brown, dry fine SILTY SAND with rounded gravel
1.3 BDL	SM GP	same as above with increasing Gravel
	SM GP	same as above, moist
	GP	Fine, subangular GRAVEL
BDL	ML	Gray-brown, moist, cohesive, SILT
BDL	ML SM	Light brown, wet, SILT and fine SAND
BDL	ML SM	Gray, saturated, SILT and fine SAND

Bottom of exploration at 35 feet bsg.
Well Construction:
Screen from 35 to 15 feet, casing from 15 feet to grade, completed with a flush road box set in concrete
Sand Pack/Seal:
Sand from 35 to 13 feet, bentonite from 13 to 11 feet, native from 11 feet to grade

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Drilling Log

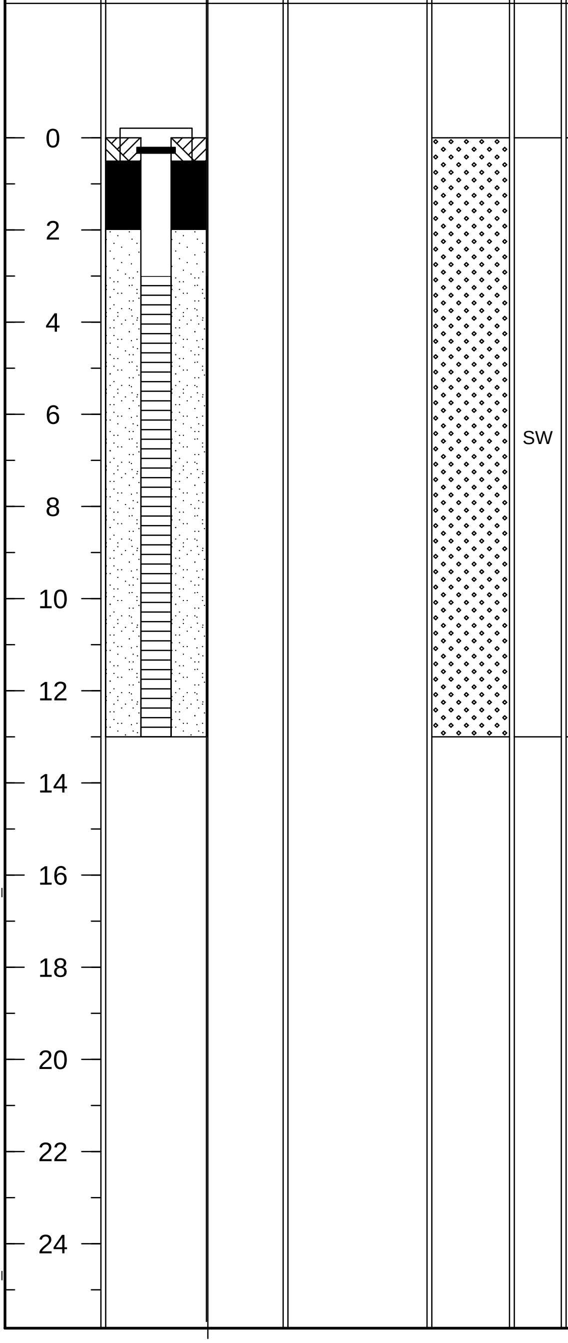
Monitoring Well **OB-20-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *SCDS Fields, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *13.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *3 ft.* Type *PVC*
Fill Material *Sand and bentonite* Rig/Core *Truck Mounted Mobil B57*
Drill Co. *New Hampshire Boring* Method *Drive and Wash*
Driller *Mark D'Ambrosen* Log By *K. Cote* Date *8/30/04* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS
No split spoon samples collected. Geological logging was completed using drill cuttings.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.



Grass

Brown, medium to fine SAND, some fine gravel.

End of exploration at 13 feet below surface grade.

Well Construction:
Screen 3 to 13 feet; casing 3 feet to grade; completed at grade with flush roadbox

Sandpack/Seal:
Sand 2 to 13 feet; bentonite 2 to 0.5 feet; cement 0.5 feet to grade

Shaw E & I, Inc.

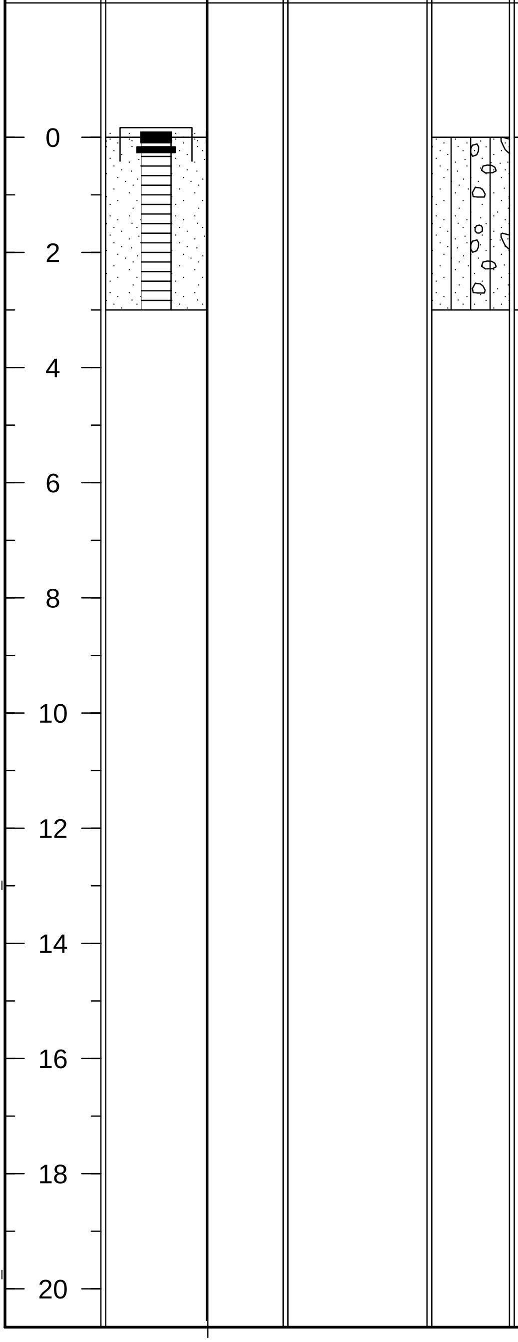
Drilling Log

Monitoring Well **OB 24-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *3.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *3 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *NA in.* Length *NA ft.* Type *NA*
Fill Material *Sand* Rig/Core *NA*
Drill Co. *Paratt Wolff* Method *Tripod with 140 Pound Hammer*
Driller *Rick Navatka* Log By *Lynn Maybury* Date *5/2/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Well located at 32 Tozer Road
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						SM GM	Medium-dense, light brown, medium-fine SAND, little silt and clay, trace gravel, extensive cobbles
3							End of Exploration with refusal at 3 feet bsg Well Construction: Screen from 3 feet to grade. Completed with a flush roadbox set in concrete. Sand Pack/ Seal Sand from 3 feet to grade.

Shaw E & I, Inc.

Drilling Log

Monitoring Well **OB-41-S**

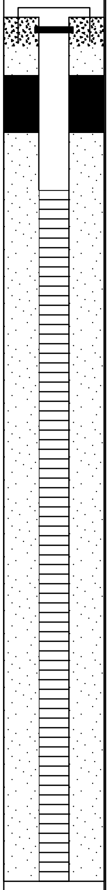
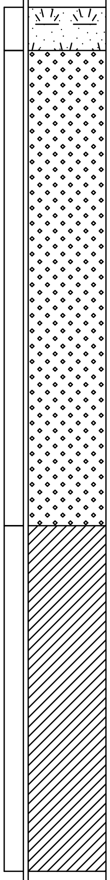
Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *39 Tozer Road, Beverly, Massachusetts* Proj. No. *139340*
Surface Elev. *NA* Total Hole Depth *15.0 ft.* North East
Top of Casing *NA* Water Level Initial ∇ *4.5 ft.* Static *NA* Diameter
Screen: Dia *2 in.* Length *12 ft.* Type/Size *PVC/Slot 0.010 in.*
Casing: Dia *2 in.* Length *3 ft.* Type *PVC*
Fill Material *Cement, Native, Silica Sand, Bentonite* Rig/Core *75 CME*
Drill Co. *GeoSearch* Method *Hollow Stem Auger*
Driller *S. Preston* Log By *S. Barry* Date *3/15/11* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS

ND = Not detected

Flushmounted 6" roadbox, 2' x 2' concrete pad

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Grass
0		ND					Topsoil
2							Brown with orange tint, moist, loose, coarse to medium SAND, trace small gravel and cobble
4 ∇		ND				SW	
6							
8							
10							Grey, brown, saturated, dense, CLAY, GRAVEL and COBBLE (till)
12		ND				CL	
14							
16							End of exploration at 15 feet below surface grade.
18							
20							

APTIM

Drilling Log

Monitoring Well **OB-42-S**

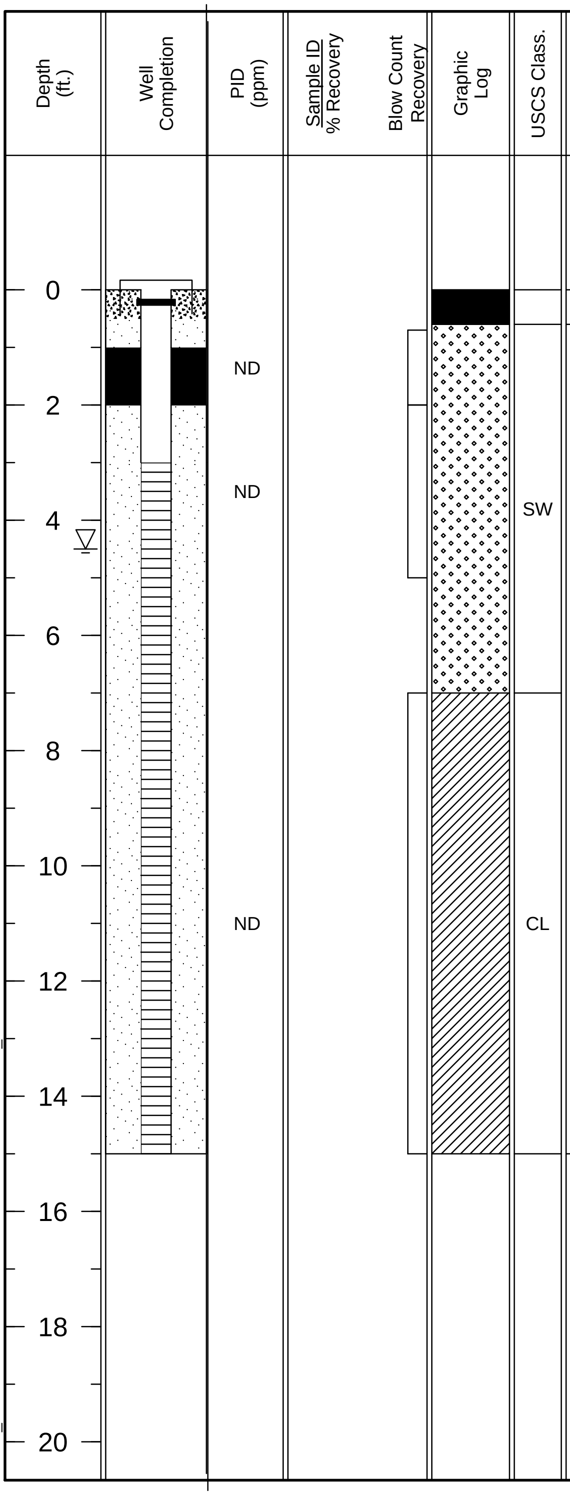
Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *30 Tozer Road, Beverly, Massachusetts* Proj. No. *139340*
Surface Elev. *NA* Total Hole Depth *15.0 ft.* North East
Top of Casing *NA* Water Level Initial ∇ *4.5 ft.* Static *NA* Diameter
Screen: Dia *2 in.* Length *12 ft.* Type/Size *PVC/Slot 0.010 in.*
Casing: Dia *2 in.* Length *3 ft.* Type *PVC*
Fill Material *Cement, Native, Silica Sand, Bentonite* Rig/Core *75 CME*
Drill Co. *GeoSearch* Method *Hollow Stem Auger*
Driller *S. Preston* Log By *S. Barry* Date *3/15/11* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS

ND = Not detected

Flushmounted 6" roadbox, 2' x 2' concrete pad



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Asphalt (8")

Brown with orange tint, moist, loose, coarse to medium SAND, trace small gravel and cobble

Brown, moist, loose, coarse to medium SAND, trace small gravel and cobble

Brown, saturated, dense, coarse to medium SAND, some gravel and cobble (till)

Grey brown, saturated, dense, CLAY, GRAVEL and COBBLE (till)

Cobble or boulder

End of exploration at 15 feet below surface grade.

Shaw E & I, Inc.

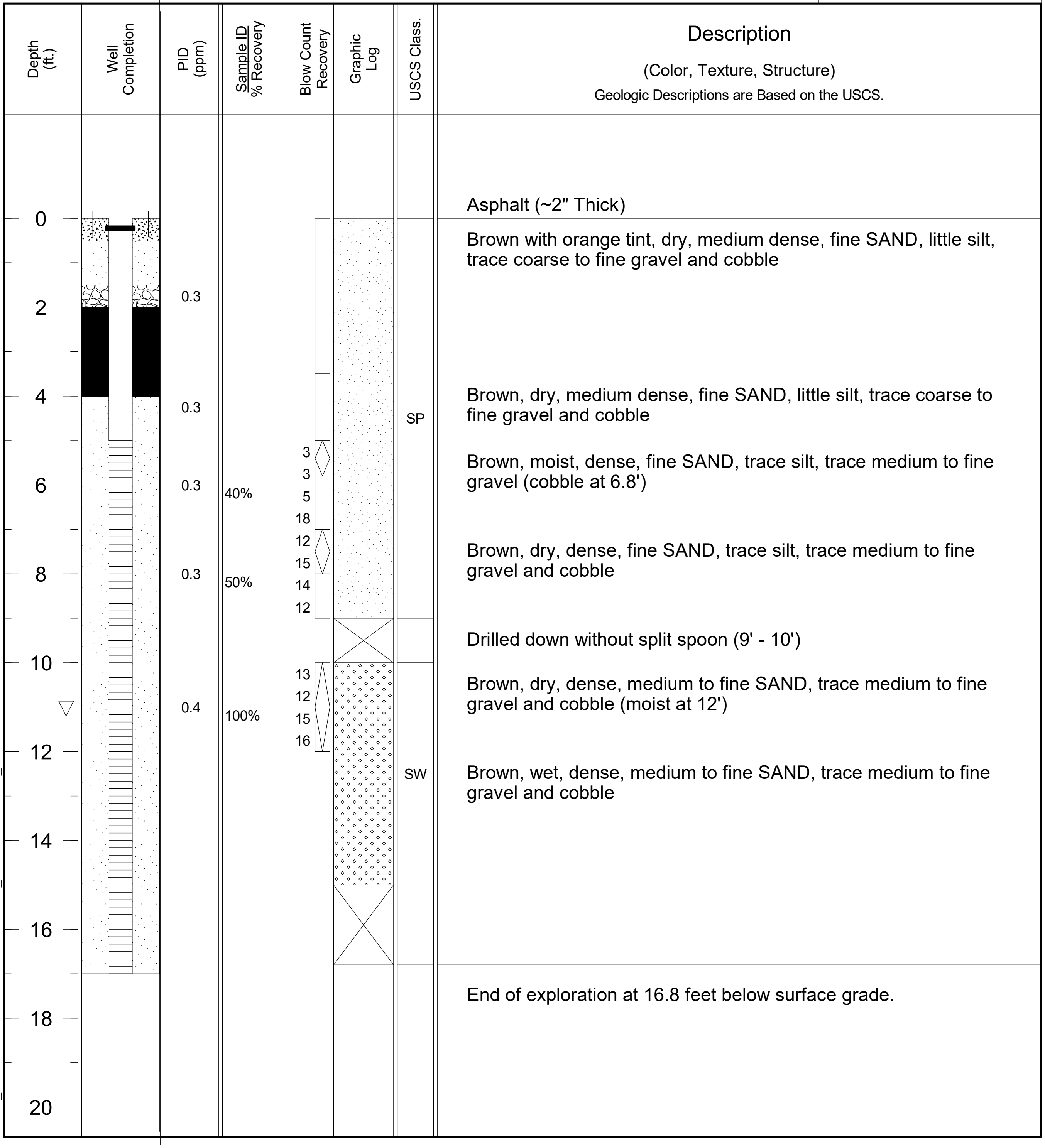
Drilling Log

Monitoring Well **OB43-S**

Page: 1 of 1

Project	*Varian Beverly*
Owner	*Varian Medical Systems, Inc.*
Location	*27 Tozer Road, Beverly, Massachusetts*
Proj. No.	*139340*
Surface Elev.	*NA*
Total Hole Depth	*16.8 ft.*
North	
East	
Top of Casing	*NA*
Water Level Initial	▽ *11.2 ft.*
Static	*NA*
Diameter	
Screen: Dia	*2 in.*
Length	*12 ft.*
Type/Size	*PVC/Slot 0.010 in.*
Casing: Dia	*2 in.*
Length	*5 ft.*
Type	*PVC*
Fill Material	*Cement, Native, Silica Sand, Bentonite*
Rig/Core	*CME 75*
Drill Co.	*Geosearch*
Method	*Hollow Stem Auger*
Driller	*Justin E.*
Log By	*Sheila Barry*
Date	*10/3/11*
Permit #	*NA*
Checked By	*Ray Cadorette*
License No.	

COMMENTS



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					Asphalt (~2" Thick)
0	0.3			SP	Brown with orange tint, dry, medium dense, fine SAND, little silt, trace coarse to fine gravel and cobble
4	0.3				Brown, dry, medium dense, fine SAND, little silt, trace coarse to fine gravel and cobble
5	0.3	40%	3 3 5 18		Brown, moist, dense, fine SAND, trace silt, trace medium to fine gravel (cobble at 6.8')
7	0.3	50%	12 15 14 12		Brown, dry, dense, fine SAND, trace silt, trace medium to fine gravel and cobble
9					Drilled down without split spoon (9' - 10')
10	0.4	100%	13 12 15 16	SW	Brown, dry, dense, medium to fine SAND, trace medium to fine gravel and cobble (moist at 12')
12					Brown, wet, dense, medium to fine SAND, trace medium to fine gravel and cobble
16.8					End of exploration at 16.8 feet below surface grade.

Drilling Log

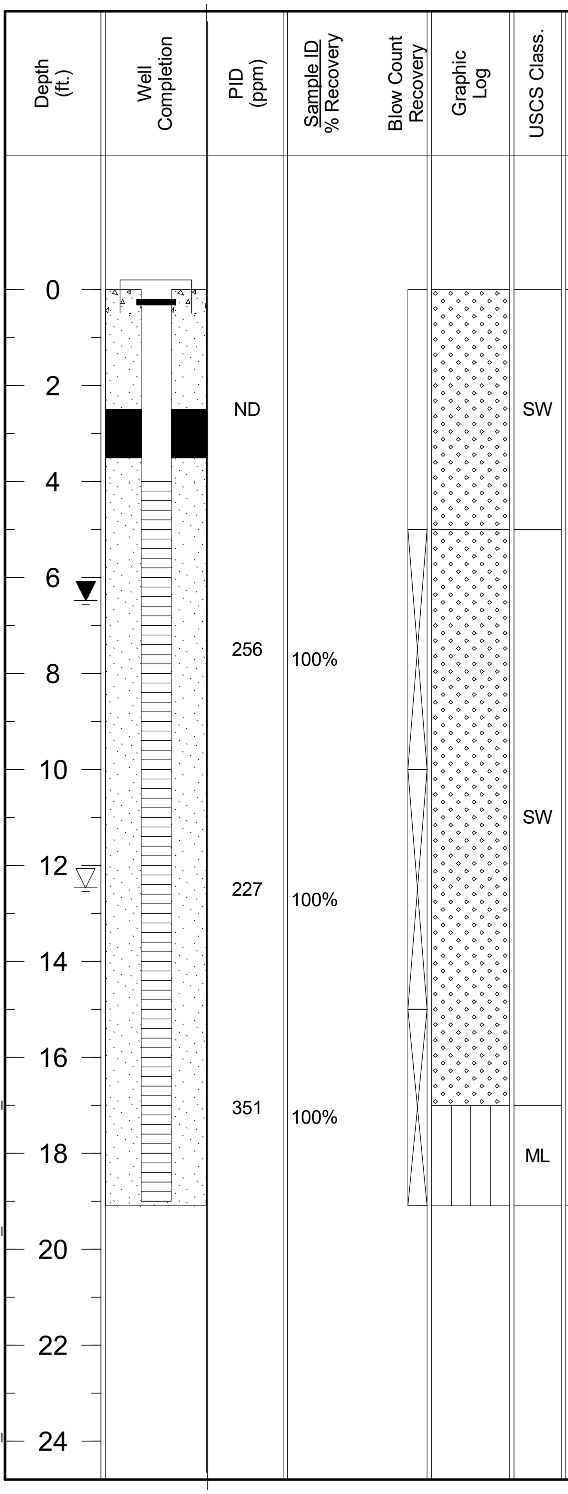
Monitoring Well **OB-44-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *Building 5, 150 Sohier Road, Beverly, Massachusetts* Proj. No. *150151*
Surface Elev. *NA* Total Hole Depth *19.1 ft.* North East
Top of Casing *NA* Water Level Initial ▽ *12.5 ft.* Static ▼ *6.5 ft.* Diameter *2 in.*
Screen: Dia *1 in.* Length *15 ft.* Type/Size *PVC/Slot 0.010 in.*
Casing: Dia *1 in.* Length *4 ft.* Type *PVC*
Fill Material *Native, Bentonite, Sand* Rig/Core *Geoprobe/6620 DT*
Drill Co. *Geosearch* Method *Direct Push*
Driller *B. Law* Log By *Dale Dailey* Date *12/30/13* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS

ND = Not detected



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Hand clear to 5'

Brown, dry, very dense SANDY FILL, some large gravel (5 cm); contains concrete, brick and other rock fragments to approximately 4' (Fill)

Light brown, dry, very dense, SANDY TILL, some gravel (2 - 5 cm); (some potential staining at 10')

Brown to light gray, dry, very dense, SAND and GRAVEL TILL, gravel (2 - 5 cm)

Brown, dry, very dense, SANDY TILL, some gravel (2 - 3 cm) to 17'

Gray, damp, dense CLAYEY TILL, trace gravel

End of exploration at 19.10 feet below surface grade.
Well set at 19 feet below surface grade.

Drilling Log

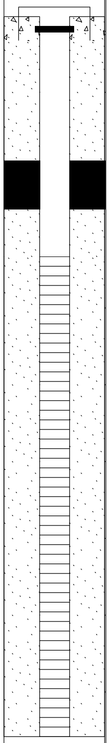
Monitoring Well **OB-45-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *Building 5, 150 Sohier Road, Beverly, Massachusetts* Proj. No. *150151*
Surface Elev. *76.8 ft.* Total Hole Depth *19.1 ft.* North ____ East ____
Top of Casing *76.57 ft.* Water Level Initial *NA* Static ▼ *11.4 ft.* Diameter *4 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/Slot 0.010 in.*
Casing: Dia *2 in.* Length *5 ft.* Type *PVC*
Fill Material *Native, Bentonite, Grout, Sand* Rig/Core *Hollow Stem Auger*
Drill Co. *TDS* Method *Hollow Stem Auger*
Driller *G. Caouette* Log By *Dale Dailey* Date *4/14/14* Permit # *NA*
Checked By *R. Cadorette* License No. ____

COMMENTS

ND = Not detected



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						FILL	Hand clear to 5' SAND and loose GRAVEL (Fill)
2							
4							
6		ND	40%	10 15 26 23		CL	Light brown, dry, very stiff CLAY, some poorly sorted, coarse gravel
8							
10		ND	25%	12 27		CL	Light brown, dry, very stiff CLAY, little fine gravel (Spoon refusal on potential boulder at 11.5'.)
▼							
12							
14							
16		ND	60%	15 22 32 35		CL	Light brown, damp, very stiff CLAY, some fine and coarse, poorly sorted gravel (1/4" to 1")
							End of exploration at 17 feet below surface grade
18							
20							
22							
24							

Drilling Log

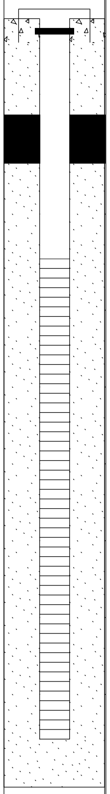
Monitoring Well **OB46-S**

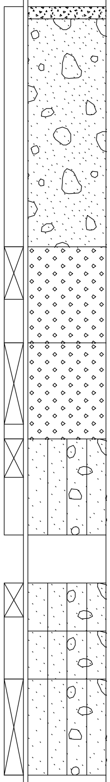
Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *Building 5, 150 Sohier Road, Beverly, Massachusetts* Proj. No. *152728*
Surface Elev. *NA* Total Hole Depth *16.0 ft.* North East
Top of Casing *NA* Water Level Initial ▽ *8.0 ft.* Static *NA* Diameter
Screen: Dia *2 in.* Length *10 ft.* Type/Size *Sch. 40 PVC/Slot 0.010 in.*
Casing: Dia *2 in.* Length *5 ft.* Type *Sch. 40 PVC*
Fill Material *Concrete, Sand, Bentonite* Rig/Core *Track Mounted/CME*
Drill Co. *Drillex* Method *Hollow Stem Auger*
Driller *James, Curtis, Alex* Log By *Ben Short* Date *3/13/15* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS

ND = Not detected above instrument limit (0.1 ppm)





Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count / Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					Concrete (3")
2	ND			SP GP	Cuttings, SAND and GRAVEL
4					
6	0.3	55%	14 21 28 34	SW	Light brown to yellowish brown, dense, fine to medium SAND, angular to subangular GRAVEL, some fines (Till)
8 ▽	ND	85%	19 23 26 31	SW	Same as above, wet at 8'
10	0.3	40%	14 16 60 for 3"	SM GP	Light grey, fine to medium SAND, SILT and GRAVEL (Till), boulder at 10' - 11'
12	ND	35%	16 14	SM GP	Light grey, GRAVEL (Till)
			61 37	SM GP	Light grey, SANDY SILT with GRAVEL
14	0.4	100%	19 24 23 25	SM GP	Dense, SILTY TILL
16					End of exploration at 16 feet below surface grade. Well set at 15 feet below surface grade.
18					
20					
22					
24					

Drilling Log

Monitoring Well **OB47-S**

Page: 1 of 1

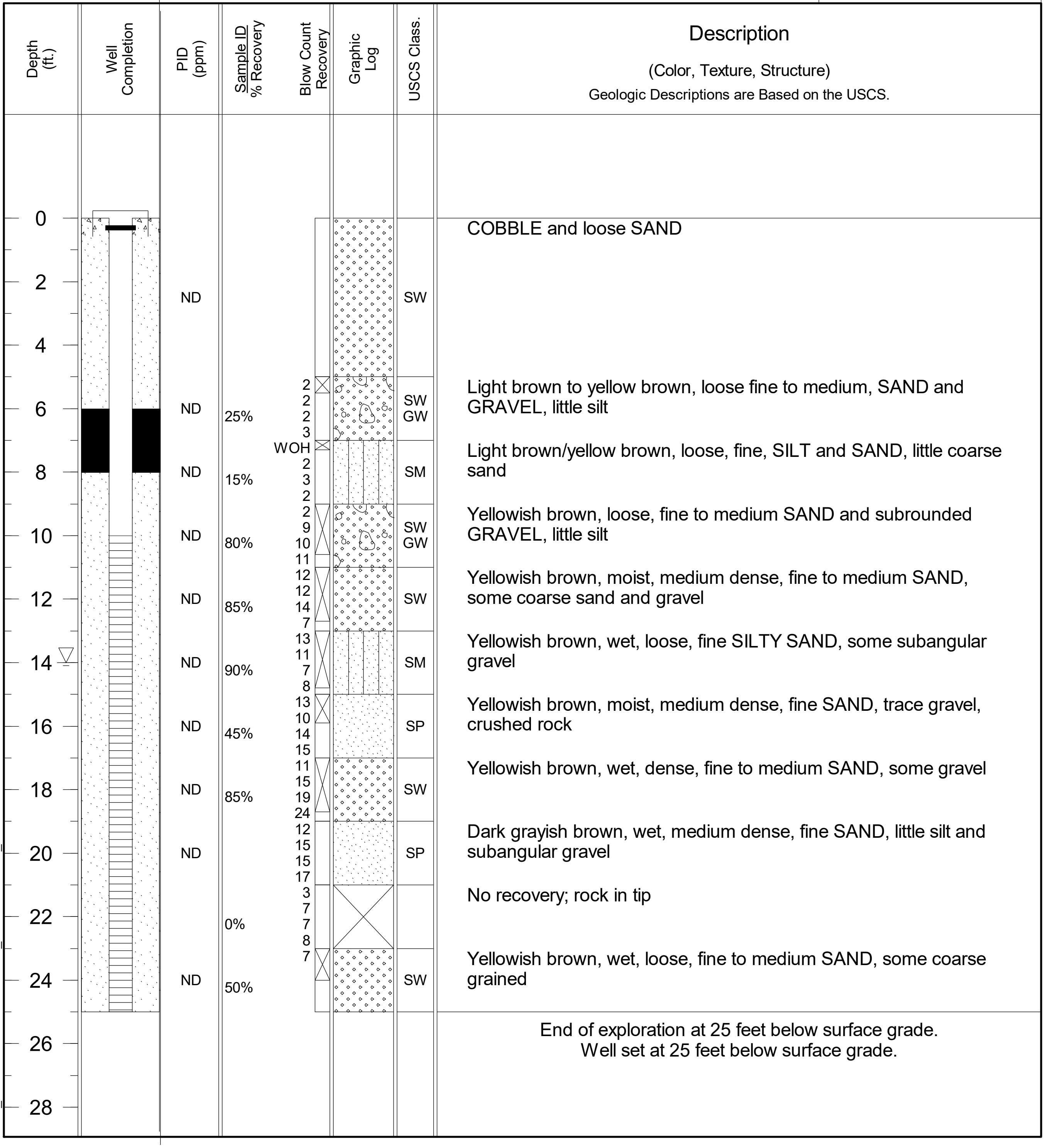
Project	*Varian Beverly*	Owner	*Varian Medical Systems, Inc.*
Location	*Building 5, 150 Sohier Road, Beverly, Massachusetts*	Proj. No.	*152728*

Surface Elev.	*NA*	Total Hole Depth	*25.0 ft.*	North		East	
Top of Casing	*NA*	Water Level Initial	▽ *14.0 ft.*	Static	*NA*	Diameter	
Screen: Dia	*2 in.*	Length	*15 ft.*	Type/Size	*Sch. 40 PVC/Slot 0.010 in.*		
Casing: Dia	*2 in.*	Length	*10 ft.*	Type	*Sch. 40 PVC*		
Fill Material	*Concrete, Sand, Bentonite*			Rig/Core	*Track Mounted/CME*		
Drill Co.	*Drillex*	Method	*Hollow Stem Auger*				
Driller	*James, Curtis, Alex*	Log By	*Ben Short*	Date	*3/14/15*	Permit #	*NA*
Checked By	*R. Cadorette*	License No.					

COMMENTS

ND = Not detected above instrument limit (0.1 ppm)

WOH = Weight of hammer



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0–5	ND			SW	COBBLE and loose SAND
5–7	ND	25%	2 2 2 3	SW GW	Light brown to yellow brown, loose fine to medium, SAND and GRAVEL, little silt
7–9	ND	15%	WOH 2 3 2	SM	Light brown/yellow brown, loose, fine, SILT and SAND, little coarse sand
9–11	ND	80%	2 9 10 11	SW GW	Yellowish brown, loose, fine to medium SAND and subrounded GRAVEL, little silt
11–13	ND	85%	12 12 14 7	SW	Yellowish brown, moist, medium dense, fine to medium SAND, some coarse sand and gravel
13–15	ND	90%	13 11 7 8	SM	Yellowish brown, wet, loose, fine SILTY SAND, some subangular gravel
15–17	ND	45%	13 10 14 15	SP	Yellowish brown, moist, medium dense, fine SAND, trace gravel, crushed rock
17–19	ND	85%	11 15 19 24	SW	Yellowish brown, wet, dense, fine to medium SAND, some gravel
19–21	ND		12 15 15 17	SP	Dark grayish brown, wet, medium dense, fine SAND, little silt and subangular gravel
21–23		0%	3 7 7 8		No recovery; rock in tip
23–25	ND	50%	7	SW	Yellowish brown, wet, loose, fine to medium SAND, some coarse grained

End of exploration at 25 feet below surface grade.
Well set at 25 feet below surface grade.

Drilling Log

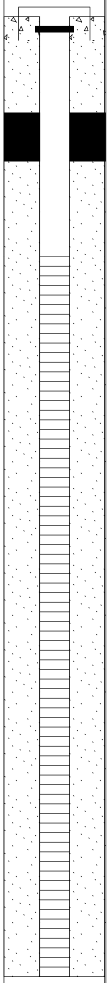
Monitoring Well **OB48-S**

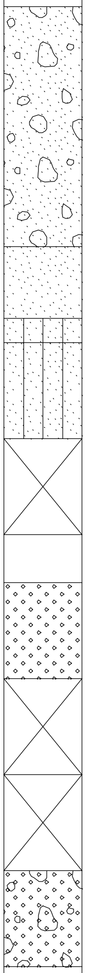
Page: 1 of 1

Project: *Varian Beverly*
Owner: *Varian Medical Systems, Inc.*
Location: *Building 5, 150 Sohier Road, Beverly, Massachusetts*
Proj. No.: *152728*
Surface Elev.: *NA*
Total Hole Depth: *20.0 ft.*
North:
East:
Top of Casing: *NA*
Water Level Initial: *NA*
Static: *NA*
Diameter:
Screen: Dia *2 in.*
Length *15 ft.*
Type/Size *Sch. 40 PVC/Slot 0.010 in.*
Casing: Dia *2 in.*
Length *5 ft.*
Type *Sch. 40 PVC*
Fill Material: *Concrete, Sand, Bentonite*
Rig/Core: *Track Mounted/CME*
Drill Co.: *Drillex*
Method: *Hollow Stem Auger*
Driller: *James, Curtis, Alex*
Log By: *Ben Short*
Date: *3/13/15*
Permit #: *NA*
Checked By: *R. Cadorette*
License No.:

COMMENTS

ND = Not detected above instrument limit (0.1 ppm)





Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					SAND and GRAVEL
2	ND			SP GP	
4					
5			3 2		Light brown, loose, medium SAND
6	ND	100%	2 1	SP	
6.5				SM	Dark grey, fine SAND and SILT
7			2 2		Dark grey, fine SAND and SILT, over black to very dark brown, fine SAND and SILT, rock in tip
8	ND	20%	3 3	SM	
9			2 2		No recovery
10		0%	2 2		
12			12 17		Yellowish brown, dry to slightly damp, medium dense, fine to medium SAND, some subangular gravel
13	ND		19 12	SW	
14			8 4		No recovery
15		0%	16 18		
16			12 17		No soil recovery, dry
17	ND	5%	19 16		
18			6 8		Light brown, slightly moist, dense, fine to medium SAND and angular to subangular GRAVEL, crushed rock at 19' - 20'
19	ND	50%	26 15	SW GW	
20					End of exploration at 20 feet below surface grade. Well set at 20 feet below surface grade.
22					
24					

Drilling Log

APTIM

Monitoring Well **OB49-S**

Page: 1 of 1

Project *Varian*

Owner *Varian Medical Systems Inc.*

Location *Beverly, MA*

Proj. No. *631237905*

Surface Elev. *NA*

Total Hole Depth *19.0 ft.*

North

East

Top of Casing *NA*

Water Level Initial ▽ *9.0 ft.*

Static ▼ *14.1 ft.*

Diameter *8 in.*

Screen: Dia *2 in.*

Length *10 ft.*

Type/Size *sch.40 PVC, slotted/0.01 in.*

Casing: Dia *2 in.*

Length *9 ft.*

Type *sch.40 PVC*

Fill Material *(monitoring well installed: see comments.)*

Rig/Core *ATV Rig (CMT-55LC)*

Drill Co. *Geosearch Inc.*

Method *Hollow Stem Augers 8"OD/4.25"ID*

Driller *Kenneth Bylund*

Log By *Chris Buerkle*

Date *12/17/19*

Permit # *NA*

Checked By *Chris Buerkle*

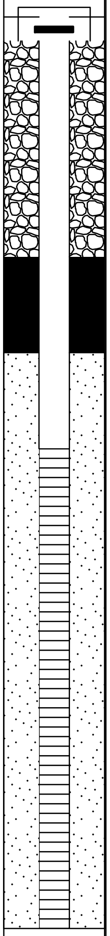
License No. *NH P.G. 827*

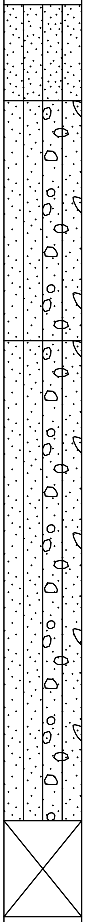
COMMENTS

0-5' Precleared on 12/16/19.

Soil VOC sample collected 15-17'.

Monitoring Well OB49-S: Flush mount. Native fill 0.5-5' bgs. Bentonite seal 5-7' bgs. Morie #2 silica sand 7-19' bgs. 2-inch PVC 10-slot screen 9-19' bgs. End cap.





Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0	0.0			SM	0-2': Silty SAND (SM), moist, dark brown 10YR 3/3, 60% fine sand, 40% silt, trace gravel, roots, no odor, (Probable Fill).
2	0.0 0.0			SM	2-5': Silty SAND with gravel (SM), moist, dark yellowish brown 10YR 4/4, 45% fine to medium sand, 30% fine to coarse gravel, 25% silt, no odor, (Probable Fill).
4					
6	0.0	30%	3 2 2 3		5-7' spoon: Same as 2-5', very loose, (Probable Fill).
8 ▽	0.0	55%	37 50/3"		7-9' spoon: Silty SAND with gravel (SM), moist, very dense, dark yellowish brown 10YR 4/4, 50% fine to medium sand, 30% fine to coarse gravel (angular to subangular), 20% silt, no odor, (Glacial Till).
10	0.1 0.1	75%	17 23 28 27		9-11' spoon: Same as 7-9', wet.
12	0.2	80%	30 30 29 30	SM	11-13' spoon: Same as 7-9', wet.
14 ▼	0.9	50%	13 15 17 21		13-15' spoon: Silty SAND with gravel (SM), wet, dense, 10YR 4/4, 50% fine to medium sand, 35% fine to coarse gravel (angular to subangular), 15% silt, no odor, (Glacial Till).
16	>9,999	60%	13 17 19 16		15-17' spoon: Same as 13-15', odor.
18	---	0%	17 18 21 22	---	17-19' spoon: No recovery.
20					19' Total Depth (reached target depth).
22					
24					

Drilling Log

Monitoring Well **OB50-S**

Page: 1 of 1

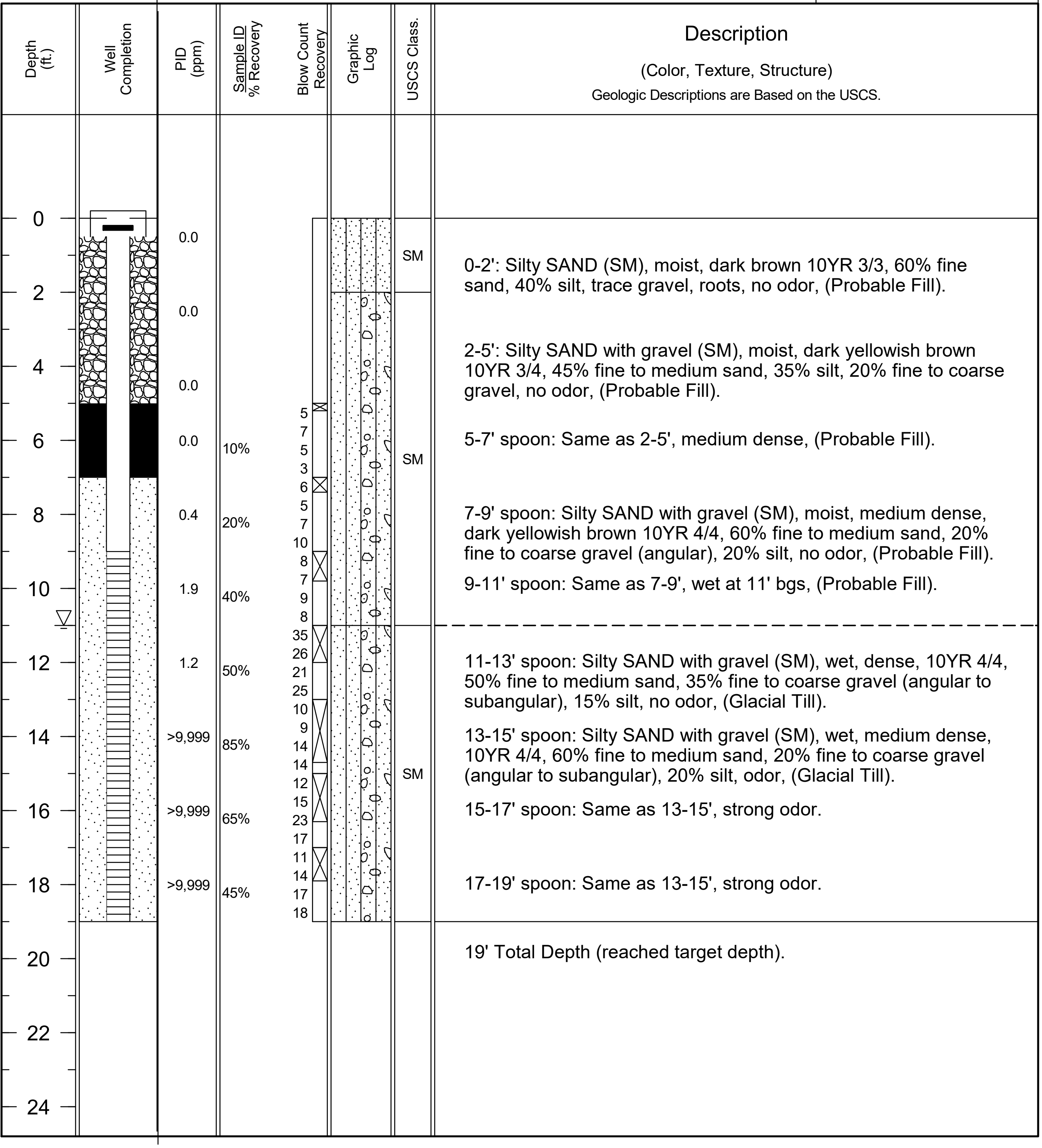
Project *Varian*
Owner *Varian Medical Systems Inc.*
Location *Beverly, MA*
Proj. No. *631237905*
Surface Elev. *NA*
Total Hole Depth *19.0 ft.*
North
East
Top of Casing *NA*
Water Level Initial ▽ *11.0 ft.*
Static *NA*
Diameter *8 in.*
Screen: Dia *2 in.*
Length *10 ft.*
Type/Size *sch.40 PVC, slotted/0.01 in.*
Casing: Dia *2 in.*
Length *9 ft.*
Type *sch.40 PVC*
Fill Material *(monitoring well installed: see comments.)*
Rig/Core *ATV Rig (CMT-55LC)*
Drill Co. *Geosearch Inc.*
Method *Hollow Stem Augers 8"OD/4.25"ID*
Driller *Kenneth Bylund*
Log By *Chris Buerkle*
Date *12/18/19*
Permit # *NA*
Checked By *Chris Buerkle*
License No. *NH P.G. 827*

COMMENTS

0-5' Precleared on 12/16/19.

Soil VOC sample collected 17-19'.

Monitoring Well OB50-S: Flush mount. Native fill 0.5-5' bgs. Bentonite seal 5-7' bgs. Morie #2 silica sand 7-19' bgs. 2-inch PVC 10-slot screen 9-19' bgs. End cap.



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0-2	0.0			SM	0-2': Silty SAND (SM), moist, dark brown 10YR 3/3, 60% fine sand, 40% silt, trace gravel, roots, no odor, (Probable Fill).
2-5	0.0 0.0			SM	2-5': Silty SAND with gravel (SM), moist, dark yellowish brown 10YR 3/4, 45% fine to medium sand, 35% silt, 20% fine to coarse gravel, no odor, (Probable Fill).
5-7	0.0	10%	5 7 5 3		5-7' spoon: Same as 2-5', medium dense, (Probable Fill).
7-9	0.4	20%	6 5 7 10		7-9' spoon: Silty SAND with gravel (SM), moist, medium dense, dark yellowish brown 10YR 4/4, 60% fine to medium sand, 20% fine to coarse gravel (angular), 20% silt, no odor, (Probable Fill).
9-11	1.9	40%	8 7 9 8		9-11' spoon: Same as 7-9', wet at 11' bgs, (Probable Fill).
11-13	1.2	50%	35 26 21 25	SM	11-13' spoon: Silty SAND with gravel (SM), wet, dense, 10YR 4/4, 50% fine to medium sand, 35% fine to coarse gravel (angular to subangular), 15% silt, no odor, (Glacial Till).
13-15	>9,999	85%	10 9 14 14		13-15' spoon: Silty SAND with gravel (SM), wet, medium dense, 10YR 4/4, 60% fine to medium sand, 20% fine to coarse gravel (angular to subangular), 20% silt, odor, (Glacial Till).
15-17	>9,999	65%	12 15 23 17		15-17' spoon: Same as 13-15', strong odor.
17-19	>9,999	45%	11 14 17 18		17-19' spoon: Same as 13-15', strong odor.
19					19' Total Depth (reached target depth).

Drilling Log

Monitoring Well **OB51-S**

Page: 1 of 1

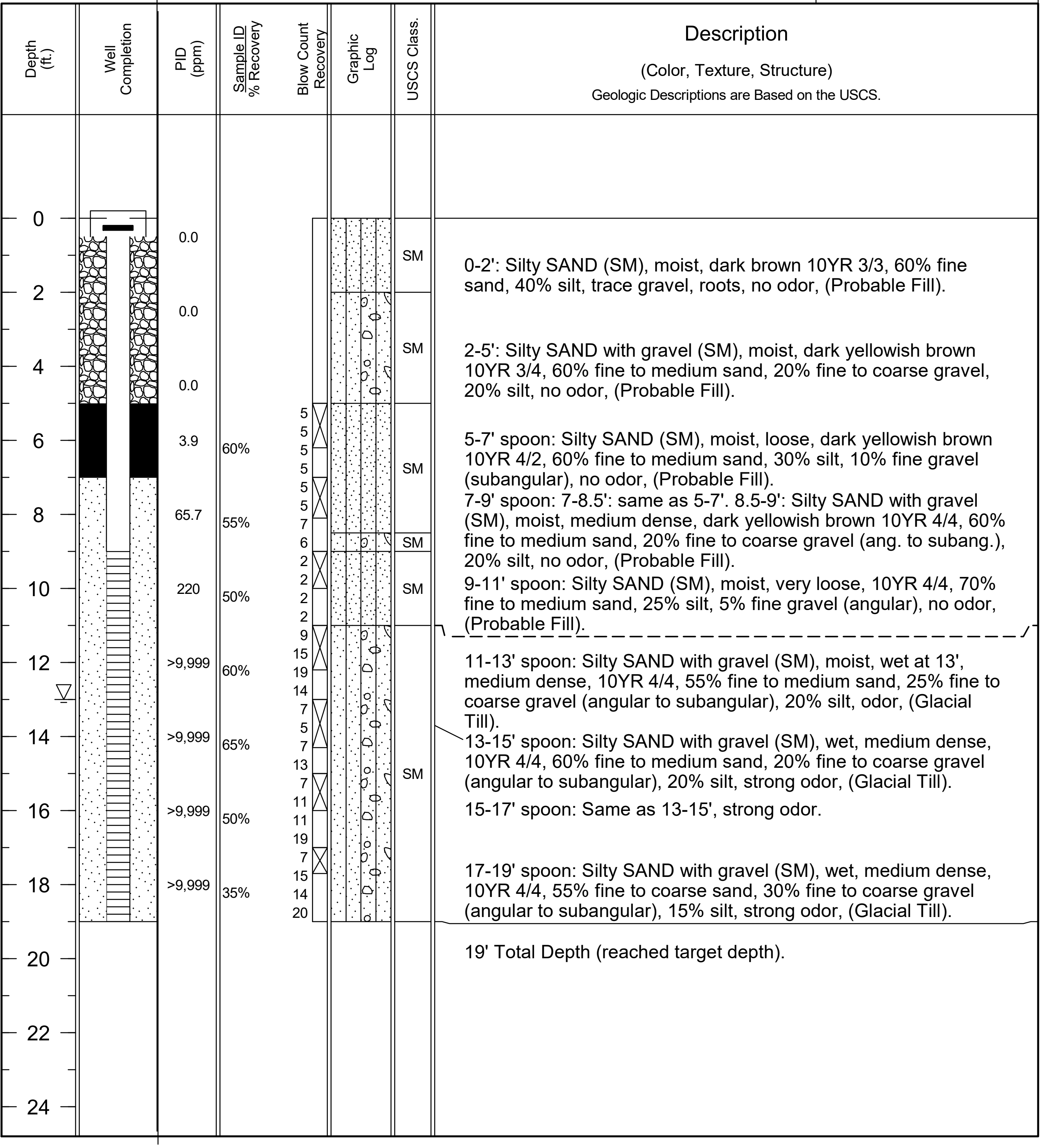
Project Varian
Owner Varian Medical Systems Inc.
Location Beverly, MA
Proj. No. 631237905
Surface Elev. NA
Total Hole Depth 19.0 ft.
North
East
Top of Casing NA
Water Level Initial ∇ 13.0 ft.
Static NA
Diameter 8 in.
Screen: Dia 2 in.
Length 10 ft.
Type/Size sch.40 PVC, slotted/0.01 in.
Casing: Dia 2 in.
Length 9 ft.
Type sch.40 PVC
Fill Material (monitoring well installed: see comments.)
Rig/Core ATV Rig (CMT-55LC)
Drill Co. Geosearch Inc.
Method Hollow Stem Augers 8"OD/4.25"ID
Driller Kenneth Bylund
Log By Chris Buerkle
Date 12/18/19
Permit # NA
Checked By Chris Buerkle
License No. NH P.G. 827

COMMENTS

0-5' Precleared on 12/16/19.

Soil VOC sample collected 9-11'.

Monitoring Well OB51-S: Flush mount. Native fill 0.5-5' bgs. Bentonite seal 5-7' bgs. Morie #2 silica sand 7-19' bgs. 2-inch PVC 10-slot screen 9-19' bgs. End cap.



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0-2	0.0			SM	0-2': Silty SAND (SM), moist, dark brown 10YR 3/3, 60% fine sand, 40% silt, trace gravel, roots, no odor, (Probable Fill).
2-5	0.0 0.0			SM	2-5': Silty SAND with gravel (SM), moist, dark yellowish brown 10YR 3/4, 60% fine to medium sand, 20% fine to coarse gravel, 20% silt, no odor, (Probable Fill).
5-7	3.9	60%	5 5 5 5	SM	5-7' spoon: Silty SAND (SM), moist, loose, dark yellowish brown 10YR 4/2, 60% fine to medium sand, 30% silt, 10% fine gravel (subangular), no odor, (Probable Fill).
7-9	65.7	55%	5 5 7 6	SM SM	7-9' spoon: 7-8.5': same as 5-7'. 8.5-9': Silty SAND with gravel (SM), moist, medium dense, dark yellowish brown 10YR 4/4, 60% fine to medium sand, 20% fine to coarse gravel (ang. to subang.), 20% silt, no odor, (Probable Fill).
9-11	220	50%	2 2 2 2	SM	9-11' spoon: Silty SAND (SM), moist, very loose, 10YR 4/4, 70% fine to medium sand, 25% silt, 5% fine gravel (angular), no odor, (Probable Fill).
11-13	>9,999	60%	9 15 19 14	SM	11-13' spoon: Silty SAND with gravel (SM), moist, wet at 13', medium dense, 10YR 4/4, 55% fine to medium sand, 25% fine to coarse gravel (angular to subangular), 20% silt, odor, (Glacial Till).
13-15	>9,999	65%	7 5 7 13	SM	13-15' spoon: Silty SAND with gravel (SM), wet, medium dense, 10YR 4/4, 60% fine to medium sand, 20% fine to coarse gravel (angular to subangular), 20% silt, strong odor, (Glacial Till).
15-17	>9,999	50%	7 11 11 19	SM	15-17' spoon: Same as 13-15', strong odor.
17-19	>9,999	35%	7 15 14 20	SM	17-19' spoon: Silty SAND with gravel (SM), wet, medium dense, 10YR 4/4, 55% fine to coarse sand, 30% fine to coarse gravel (angular to subangular), 15% silt, strong odor, (Glacial Till).
19					19' Total Depth (reached target depth).

Drilling Log

Monitoring Well **OB52-S**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *631010758*

Surface Elev. *NA* Total Hole Depth *15.5 ft.* North East

Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *2 in.*

Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.10 Slot in.*

Casing: Dia *4 in.* Length *5 ft.* Type *PVC*

Fill Material *Sand, bentonite* Rig/Core *Hollow Stem Auger*

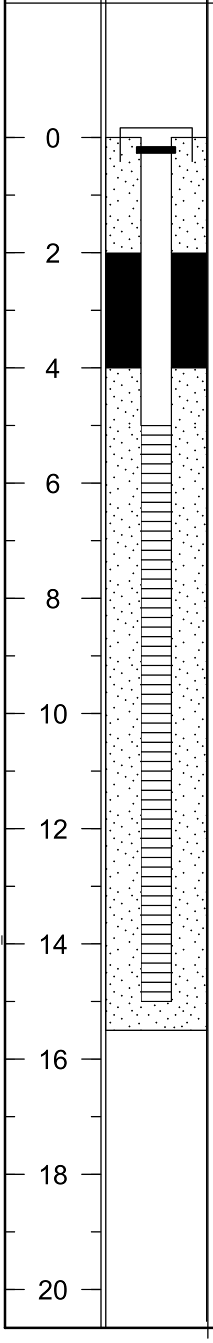
Drill Co. *Drillex* Method *Hollow Stem Auger/Air Rotary*

Driller *Chris Hogan* Log By *Jen Gailey* Date *5/17/21* Permit # *NA*

Checked By *Chris Buerkle* License No.

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.



Asphalt (0-0.3')

No soil logging (see boring log of OB52-BR for soil information).

15.5' total depth of exploration.

Drilling Log

Monitoring Well **OB-60-S**

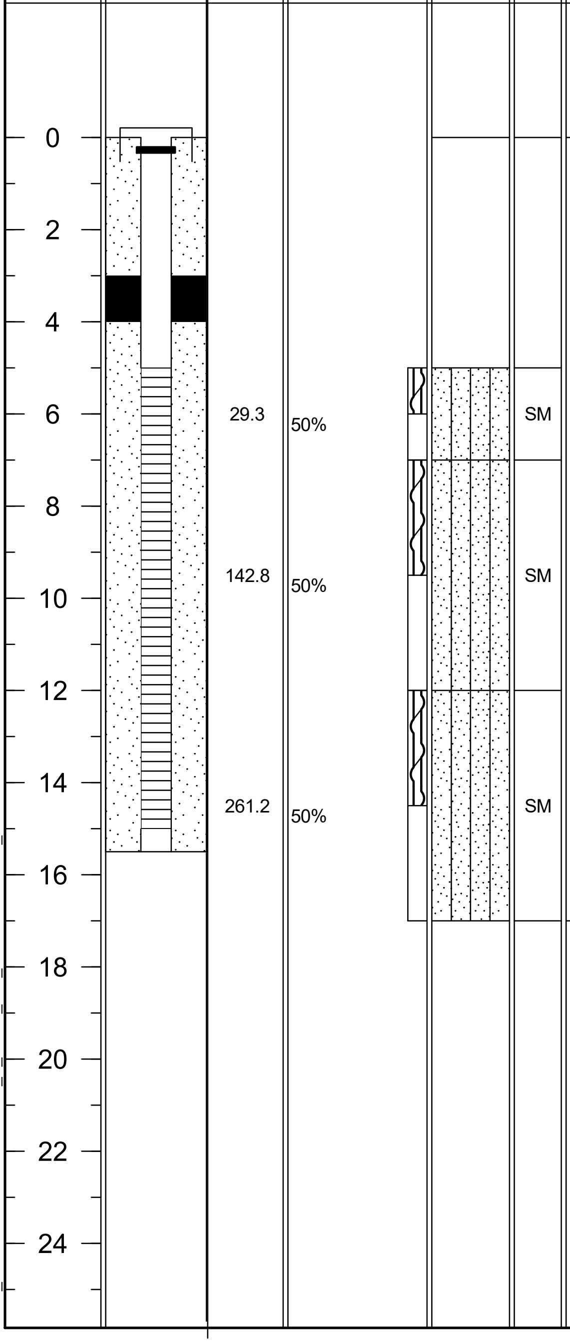
Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *631010764*
Surface Elev. *NA* Total Hole Depth *17.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *6 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/10 Slot in.*
Casing: Dia *2 in.* Length *5 ft.* Type *PVC*
Fill Material *Silica Holliston Sand 25* Rig/Core
Drill Co. *Geosearch* Method *Hollow Stem Auger 2"*
Driller *Ken Byland* Log By *CK* Date *8/13/22* Permit # *NA*
Checked By *RC* License No.

COMMENTS

0-5 feet was hand cleared on 8/6/2022

Samples submitted on 8/13/2022 for VOC analysis by method 8260D from depths of 7 feet and 16 feet below surface grade.



PID (ppm)	Sample ID % Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
			Concrete
29.3	50%	SM	Brown, dry, coarse SILT/SAND, some gravel and clay, very dense, spoon refusal at 3"
142.8	50%	SM	Olive gray, dry, SILT/SAND, very dense, spoon refusal at 3"
261.2	50%	SM	Olive gray, moist, SILT/SAND, very dense, spoon refusal at 3"
			End of exploration 17 feet below surface grade

Drilling Log

Monitoring Well **P-4R**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *Sonning Road, Beverly, MA* Proj. No. *631010758*

Surface Elev. *NA* Total Hole Depth *11.5 ft.* North East

Top of Casing *NA* Water Level Initial ∇ *3.0 ft.* Static *NA* Diameter *6 in.*

Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.030 Slot in.*

Casing: Dia *2 in.* Length *1.5 ft.* Type *PVC*

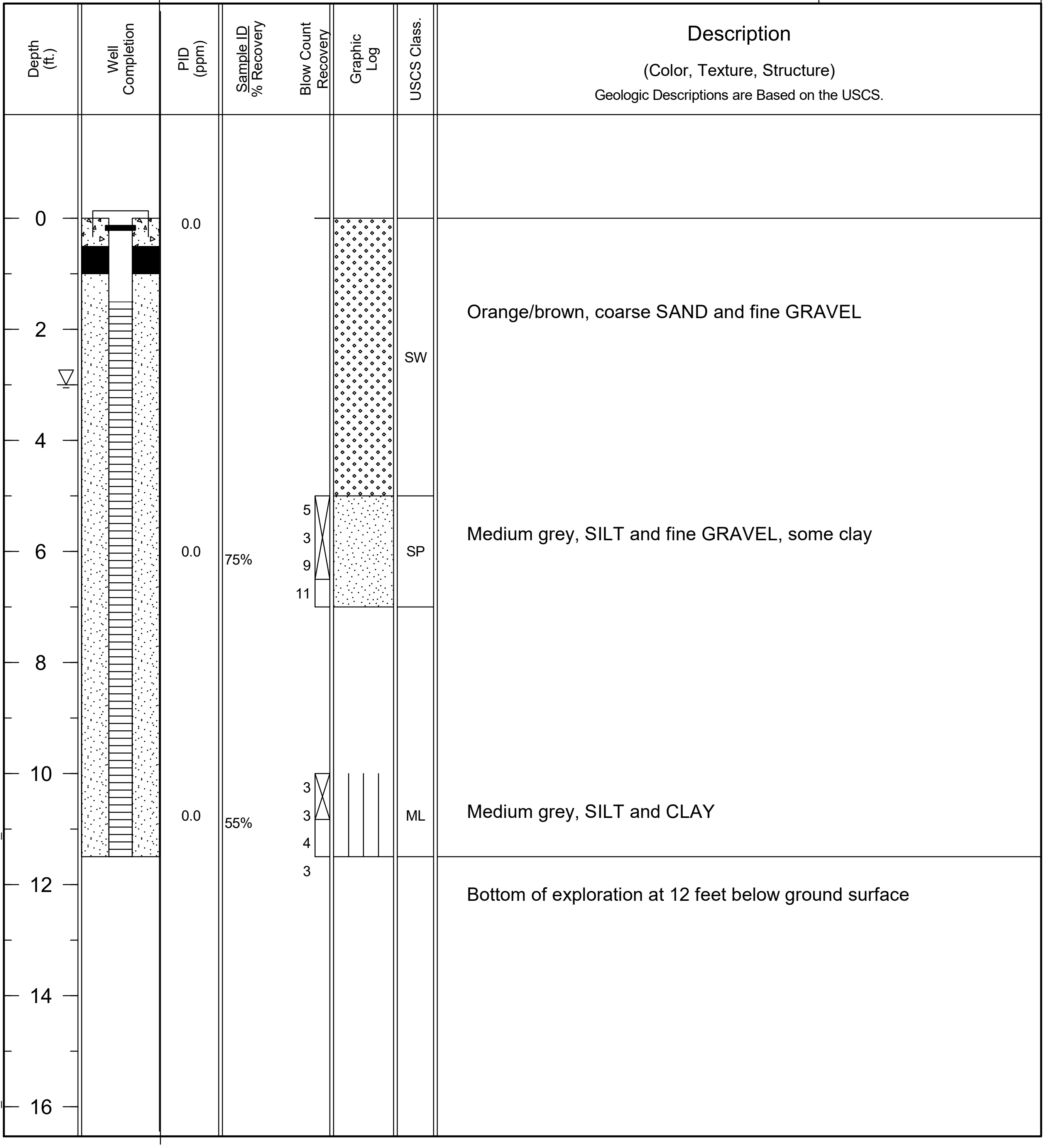
Fill Material *Sand, bentonite* Rig/Core *Hollow Stem Auger*

Drill Co. *TDS* Method *Hollow Stem Auger*

Driller *Darwin* Log By *Ryan Fichman* Date *4/20/21* Permit # *NA*

Checked By License No.

COMMENTS
P-4 Replacement well



PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0.0			SW	Orange/brown, coarse SAND and fine GRAVEL
0.0	75%	5 3 9 11	SP	Medium grey, SILT and fine GRAVEL, some clay
0.0	55%	3 3 4 3	ML	Medium grey, SILT and CLAY
				Bottom of exploration at 12 feet below ground surface

Drilling Log

Monitoring Well **P-5R**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *Sonning Road, Beverly, MA* Proj. No. *631010758*

Surface Elev. *NA* Total Hole Depth *15.0 ft.* North ____ East ____

Top of Casing *NA* Water Level Initial *▽ 7.8 ft.* Static *NA* Diameter *6 in.*

Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.030 Slot in.*

Casing: Dia *2 in.* Length *5 ft.* Type *PVC*

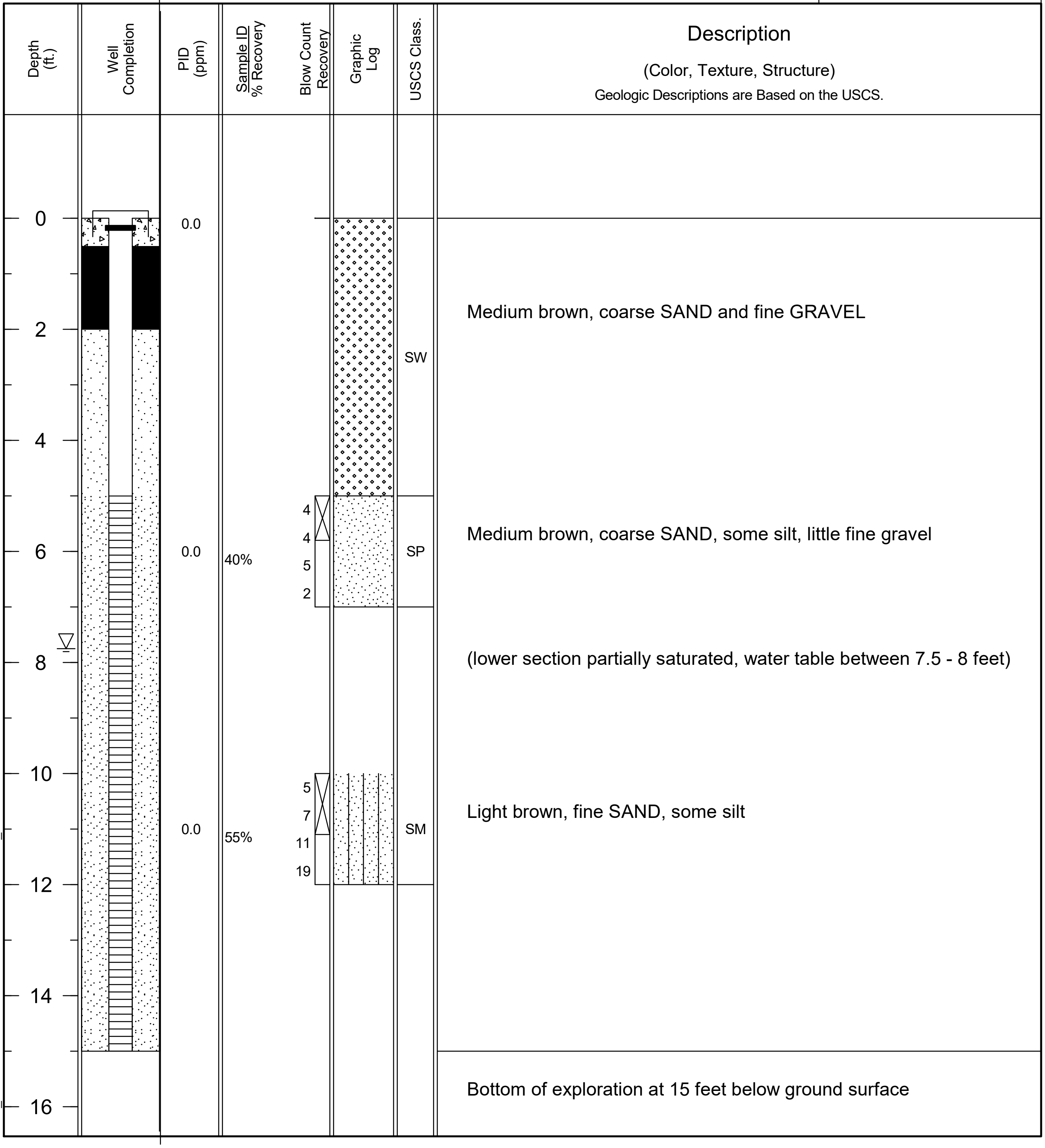
Fill Material *Sand, bentonite* Rig/Core *Hollow Stem Auger*

Drill Co. *TDS* Method *Hollow Stem Auger*

Driller *Darwin* Log By *Ryan Fichman* Date *4/20/21* Permit # *NA*

Checked By ____ License No. ____

COMMENTS
P-5 Replacement well



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0		0.0				SW	Medium brown, coarse SAND and fine GRAVEL
6		0.0	40%	4 4 5 2		SP	Medium brown, coarse SAND, some silt, little fine gravel
8							(lower section partially saturated, water table between 7.5 - 8 feet)
11		0.0	55%	5 7 11 19		SM	Light brown, fine SAND, some silt
15							Bottom of exploration at 15 feet below ground surface

Shaw™
Shaw E & I, Inc.

Drilling Log

Monitoring Well **P-9R**

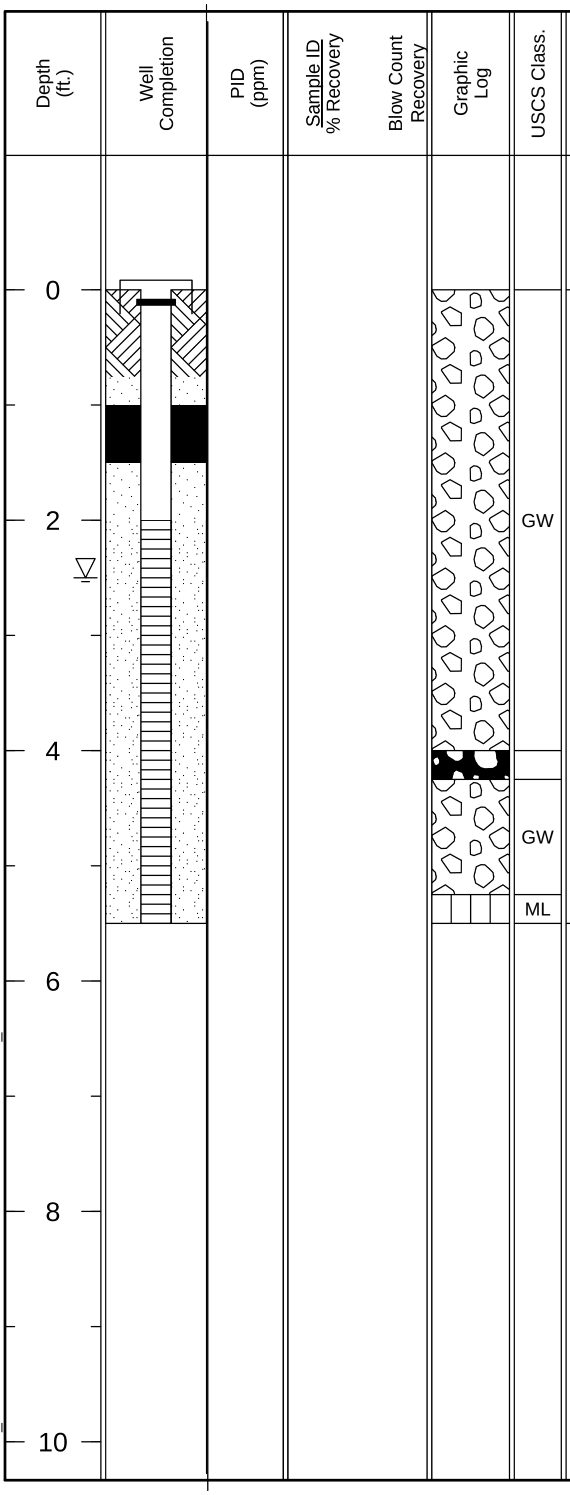
Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *28 Hill Street* Proj. No. *115974*
Surface Elev. *NA* Total Hole Depth *5.5 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial ∇ *2.5 ft.* Static *NA* Diameter ____
Screen: Dia *2 in.* Length *3.5 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *2 ft.* Type *PVC*
Fill Material *Sand and bentonite* Rig/Core *Geoprobe*
Drill Co. *Geosearch* Method *Geoprobe*
Driller *Steve* Log By *J. Parshall* Date *7/20/05* Permit # *NA*
Checked By *R. Cadorette* License No. ____

COMMENTS

Split spoon sampling collected (5 - 5.5 ft. bsg).

Geologic information collected from hand digging for (0 - 5 ft. bsg).



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Asphalt

Brown, medium SAND and cobble

Grey, medium SAND and gravel

Cobble

Grey, medium to fine SAND and gravel

Grey CLAY

Refusal at possible bedrock.
End of exploration at 5.5 feet below surface grade.

WELL CONSTRUCTION
5.5' - 2': 2" Sch. 40 PVC Screen
2' - Grade: 2" Sch. 40 PVC Casing
5.5' - 1.5': Sand
1.5' - 1': Bentonite
Completed with roadbox at grade.

Shaw E & I, Inc.

Drilling Log

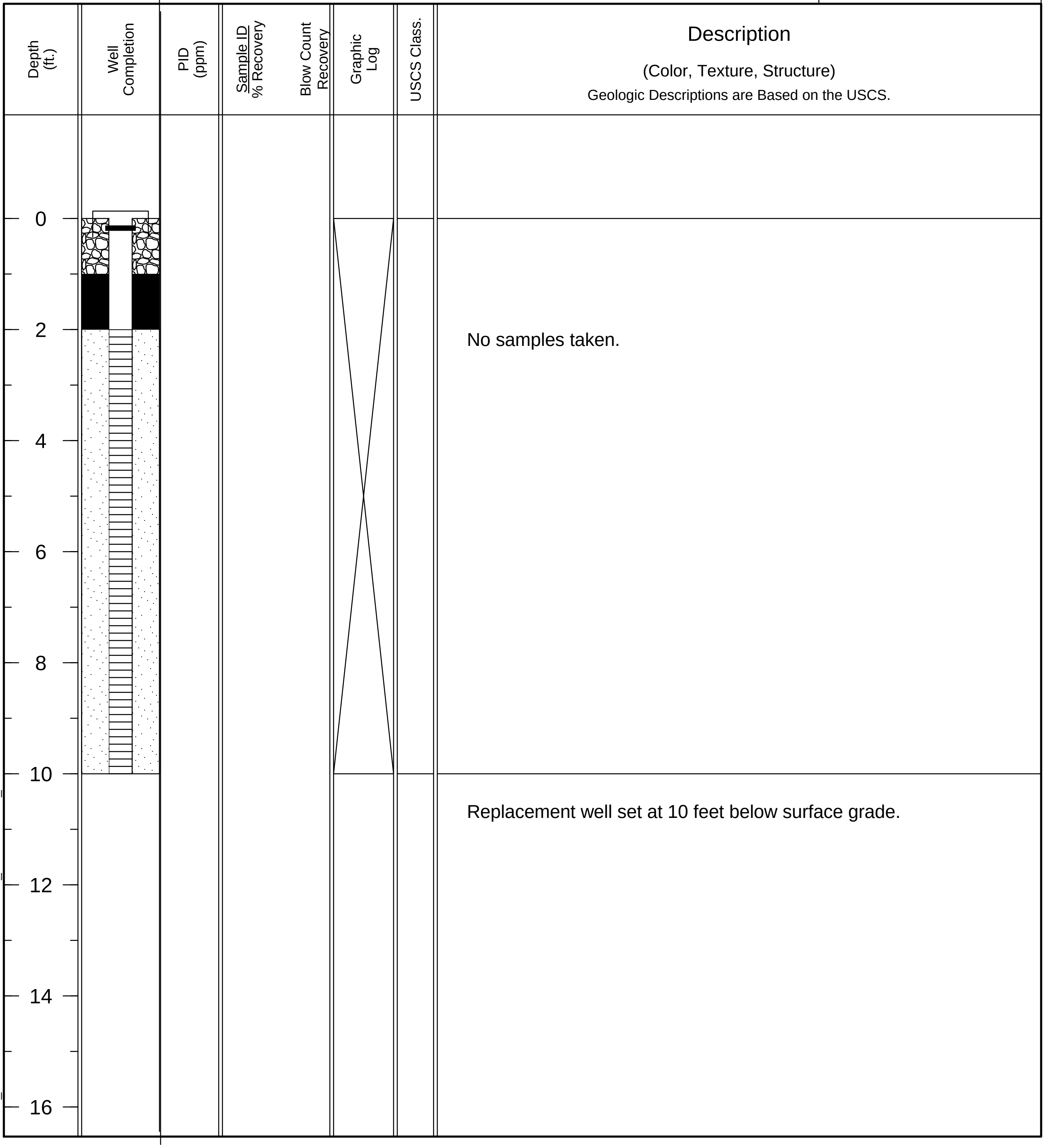
Monitoring Well **P-11R**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *6-8 Longview Terrace, Beverly, Massachusetts* Proj. No. *132653*
Surface Elev. *NA* Total Hole Depth *10.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *8 ft.* Type/Size *PVC/0.030 Slot in.*
Casing: Dia *2 in.* Length *2 ft.* Type *PVC*
Fill Material *Native* Rig/Core *Hollow Stem Auger*
Drill Co. *TDS* Method *Hollow Stem Auger*
Driller *Brett Balyk* Log By *Jen DiBari* Date *10/23/08* Permit # *NA*
Checked By License No.

COMMENTS

P-11 Replacement well



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

No samples taken.

Replacement well set at 10 feet below surface grade.

APTIM

Drilling Log

Monitoring Well **P-13R**

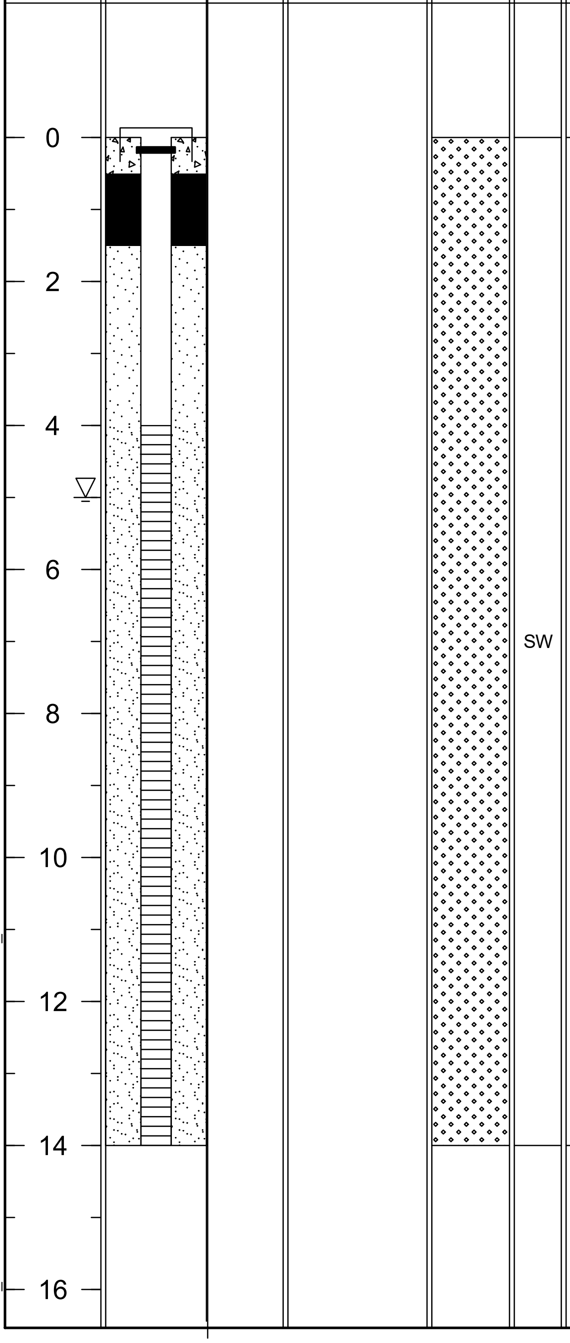
Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *Sonning Road, Beverly, MA* Proj. No. *631010758*
Surface Elev. *NA* Total Hole Depth *14.0 ft.* North East
Top of Casing *NA* Water Level Initial ▽ *5.0 ft.* Static *NA* Diameter *6 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.030 Slot in.*
Casing: Dia *2 in.* Length *4 ft.* Type *PVC*
Fill Material *Sand, bentonite* Rig/Core *Hollow Stem Auger*
Drill Co. *TDS* Method *Hollow Stem Auger*
Driller *Darwin* Log By *Ryan Fichman* Date *4/19/21* Permit # *NA*
Checked By License No.

COMMENTS

P-13 Replacement well

No split spoon samples taken due to insufficient overhead room to extend mast.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						SW	Orange-brown, medium SAND, some fine gravel
							Bottom of exploration at 14 feet below ground surface

Drilling Log

Monitoring Well **P-14R**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *Sonning Road, Beverly, MA* Proj. No. *631010758*

Surface Elev. *NA* Total Hole Depth *14.0 ft.* North East

Top of Casing *NA* Water Level Initial ▽ *6.0 ft.* Static *NA* Diameter *6 in.*

Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.030 Slot in.*

Casing: Dia *2 in.* Length *4 ft.* Type *PVC*

Fill Material *Sand, bentonite* Rig/Core *Hollow Stem Auger*

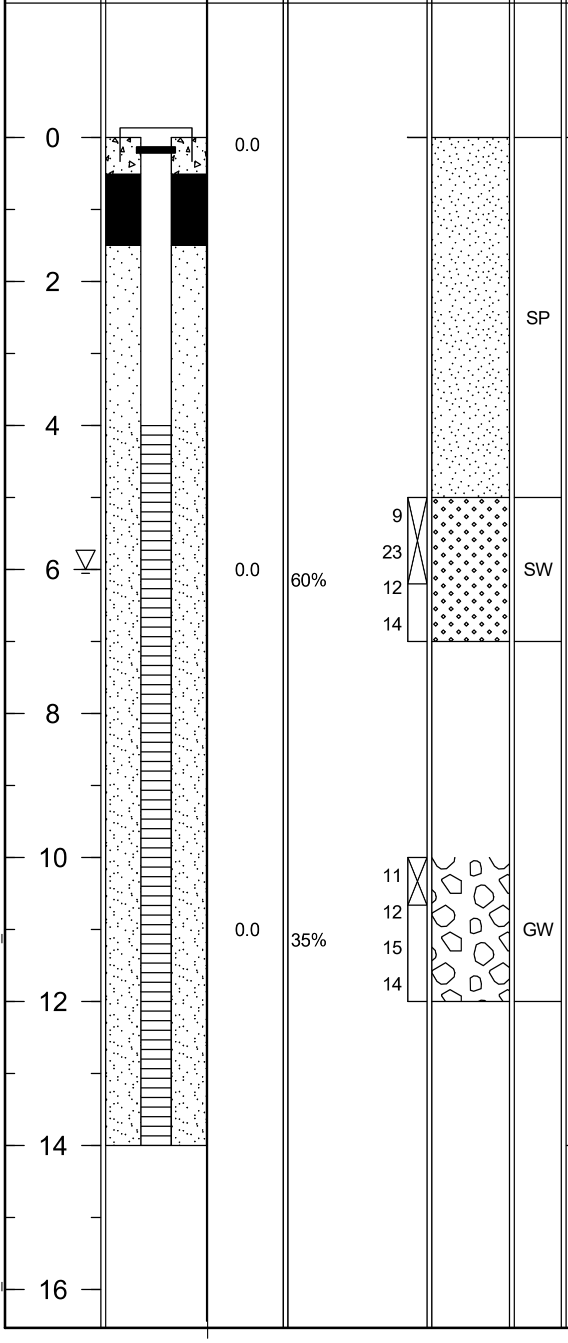
Drill Co. *TDS* Method *Hollow Stem Auger*

Driller *Darwin* Log By *Ryan Fichman* Date *4/19/21* Permit # *NA*

Checked By License No.

COMMENTS

P-14 Replacement well



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0–5	0.0			SP	Dark brown, fine SAND, some silt, little coarse gravel
5–7	0.0	60%	9 23 12 14	SW	Medium grey/brown, coarse SAND, some coarse gravel, orange brown coarse sand stringer
10–12	0.0	35%	11 12 15 14	GW	Grey/brown, fine GRAVEL and coarse SAND
14					Bottom of exploration at 14 feet below ground surface

Shaw E & I, Inc.

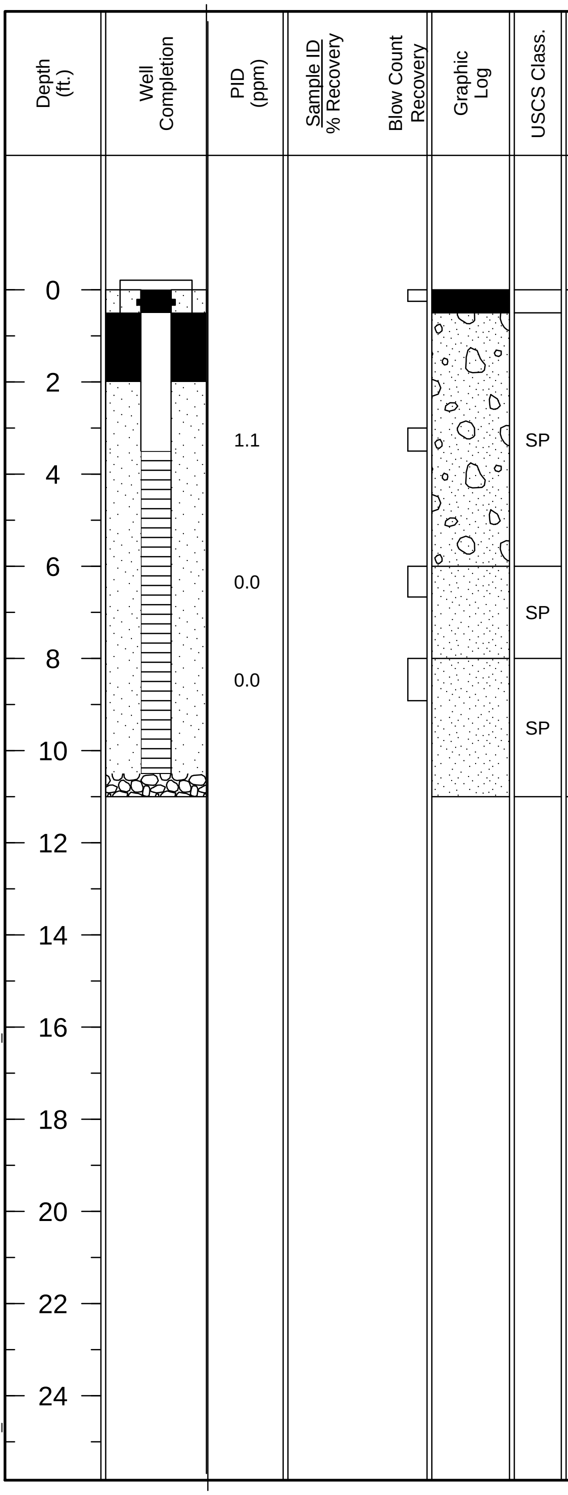
Drilling Log

Monitoring Well **P- 19A**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *11.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *7 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *3.5 ft.* Type *PVC*
Fill Material *Sand, bentonite, native* Rig/Core *CME*
Drill Co. *Dragin Drilling Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *Dave Wattles* Date *1/9/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Well located on Hill Street
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Dark brown, fine-medium SAND with gravel

Light brown fine SAND

Dark brown fine SAND

Bottom of Exploration at 11 feet bsg

Well Construction:

Screen from 10.5 to 3.5 feet; casing from 3.5 feet to grade.
Completed with flush roadbox set in concrete.
Sand Pack/ Seal

Sand pack from 10.5 to 2 feet; bentonite from 2 feet to grade.

Shaw E & I, Inc.

Drilling Log

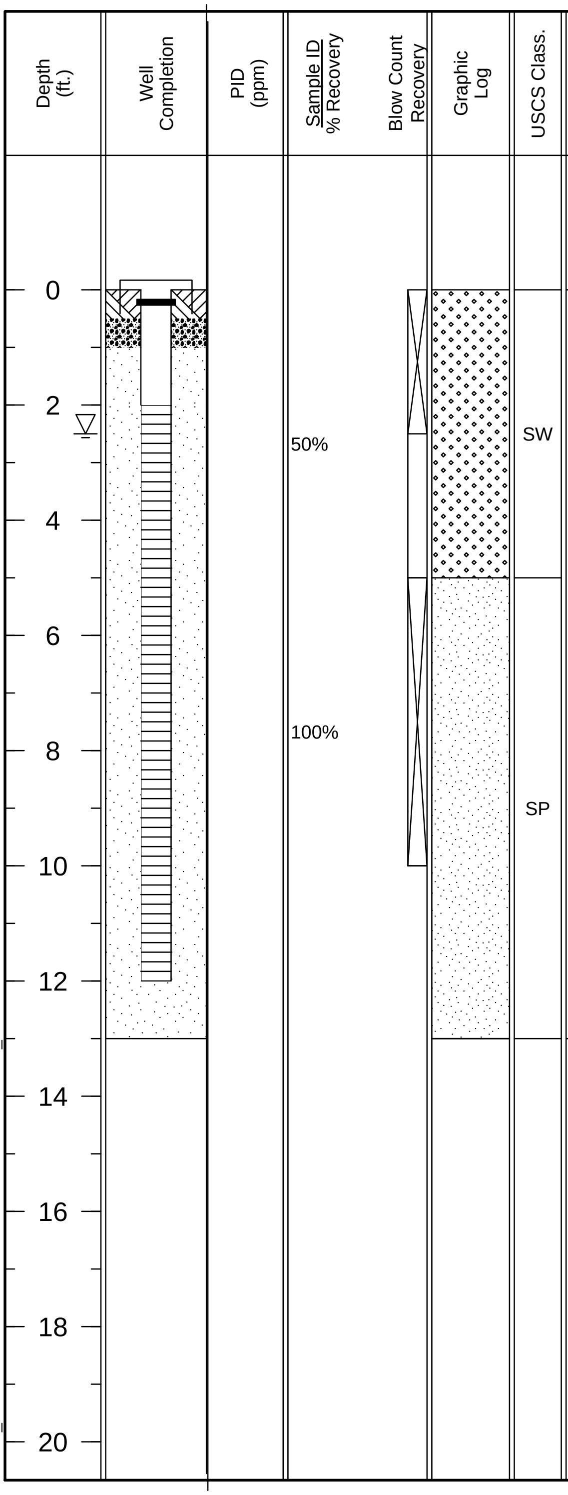
Monitoring Well **P-20R**

Page: 1 of 1

Project Varian Beverly
Owner Varian Medical Systems, Inc.
Location SCDS Fields, Beverly, Massachusetts
Proj. No. 115974
Surface Elev. NA
Total Hole Depth 12.0 ft.
North
East
Top of Casing NA
Water Level Initial ∇ 2.5 ft.
Static NA
Diameter
Screen: Dia 2 in.
Length 10 ft.
Type/Size PVC/0.010 in.
Casing: Dia 2 in.
Length 1.75 ft.
Type PVC
Fill Material Grout, #3 Sand
Rig/Core Geoprobe
Drill Co. Geosearch
Method Geoprobe
Driller Steve
Log By J. Parshall
Date 7/20/05
Permit # NA
Checked By R. Cadorette
License No.

COMMENTS

Split spoon sample collected at 0-10 feet below surface grade and sent to laboratory for analysis.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Grass

Orange brown, medium to fine SAND

Gray brown, fine SAND

End of exploration at 13 feet below surface grade.
Well set at 12 feet below surface grade.

WELL CONSTRUCTION
12' - 2': 2" PVC Screen
2' - 3": Sched. 40 PVC Casing
12' - 1': Sand
1' - 8": Bentonite
Completed with roadbox below surface grade.

Drilling Log

Monitoring Well **P-30**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *Sonning Road, Beverly, MA* Proj. No. *631010758*

Surface Elev. *NA* Total Hole Depth *14.0 ft.* North East

Top of Casing *NA* Water Level Initial ∇ *6.8 ft.* Static *NA* Diameter *6 in.*

Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.030 Slot in.*

Casing: Dia *2 in.* Length *4 ft.* Type *PVC*

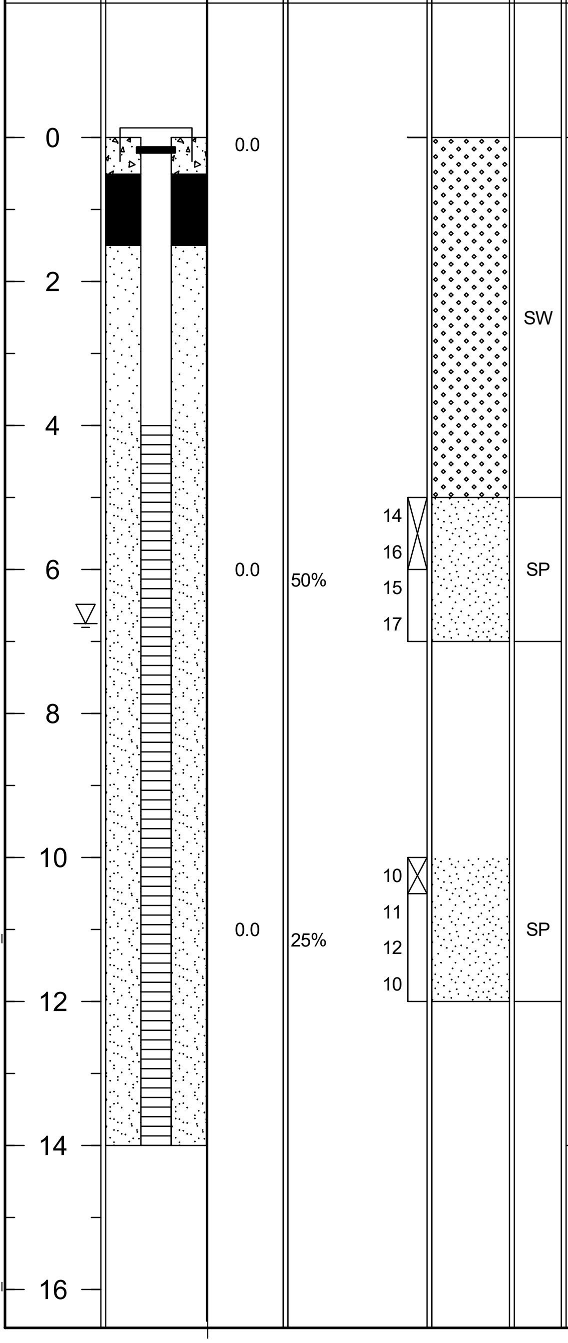
Fill Material *Sand, bentonite* Rig/Core *Hollow Stem Auger*

Drill Co. *TDS* Method *Hollow Stem Auger*

Driller *Darwin* Log By *Ryan Fichman* Date *4/19/21* Permit # *NA*

Checked By License No.

COMMENTS



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0	0.0			SW	Medium brown, fine SAND, litle coarse gravel
5	0.0	50%	14 16 15 17	SP	Medium brown, coarse to fine SAND, some coarse gravel
10	0.0	25%	10 11 12 10	SP	Medium SAND and some gravel, Orange-brown fine sand stringer, coarse sand and fine gravel below
14					Bottom of exploration at 14 feet below ground surface

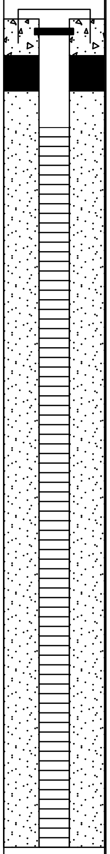
Drilling Log

Monitoring Well **P-31**

Page: 1 of 1

Project: Varian Beverly
Owner: Varian Medical Systems, Inc.
Location: Sonning Road, Beverly, MA
Proj. No.: 631010758
Surface Elev.: NA
Total Hole Depth: 11.5 ft.
North:
East:
Top of Casing: NA
Water Level Initial: ∇ 3.0 ft.
Static: NA
Diameter: 6 in.
Screen: Dia: 2 in.
Length: 10 ft.
Type/Size: PVC/0.030 Slot in.
Casing: Dia: 2 in.
Length: 1.5 ft.
Type: PVC
Fill Material: Sand, bentonite
Rig/Core: Hollow Stem Auger
Drill Co.: TDS
Method: Hollow Stem Auger
Driller: Darwin
Log By: Ryan Fichman
Date: 4/20/21
Permit #: NA
Checked By:
License No.:

COMMENTS



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0		0.0				SW	Orange/brown, fine SAND
5		0.0	5%	3 3 2 3		SP	Brown/grey, fine SAND, some silt and clay
7							
10		0.0	25%	4 4 6 5		ML	Light grey, SILT and CLAY
11.5							Bottom of exploration at 11.5 feet below ground surface

APPENDIX B
SOIL BORING/WELL LOGS (POST 2000)
DEEP OVERBURDEN MONITORING WELLS

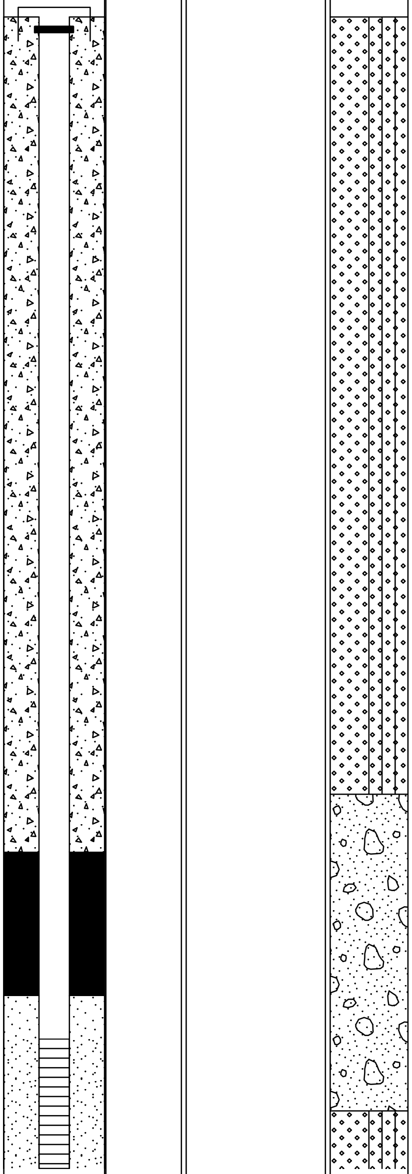
Drilling Log

Injection Well **AP-2**

Page: 1 of 2

Project *Varian/Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *806395*
Surface Elev. *NA* Total Hole Depth *55.5 ft.* North ______ East ______
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *6 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *Steel wire wrap/0.020 in.*
Casing: Dia *2 in.* Length *35.5 ft.* Type *Sch. 40 Steel*
Fill Material *Sand, bentonite, grout* Rig/Core *CME 450*
Drill Co. *GeoLogic, Inc.* Method *ODEX to 25 feet, then Drive & Wash to BOE*
Driller *M. Martinelli* Log By *P. Haskell* Date *7/12/00* Permit # *NA*
Checked By ______ License No. ______

COMMENTS



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Surface: Sod
0							Tan, coarse to fine SAND with some SILT and occasional boulders. (FILL)
5							
10							Brown to gray coarse SAND and fine GRAVEL with some fine SILT. Occassional boulder. (TILL)
15						SW SM	
20							Gray to brown, fine to coarse SAND and SILT, some gravel. (TILL)
25							
30						GW	Gray to brown coarse to medium SAND and fine to coarse GRAVEL.
35							
40						SW SM	Gray to brown, fine to coarse SAND and SILT, some gravel. (TILL)

Continued Next Page

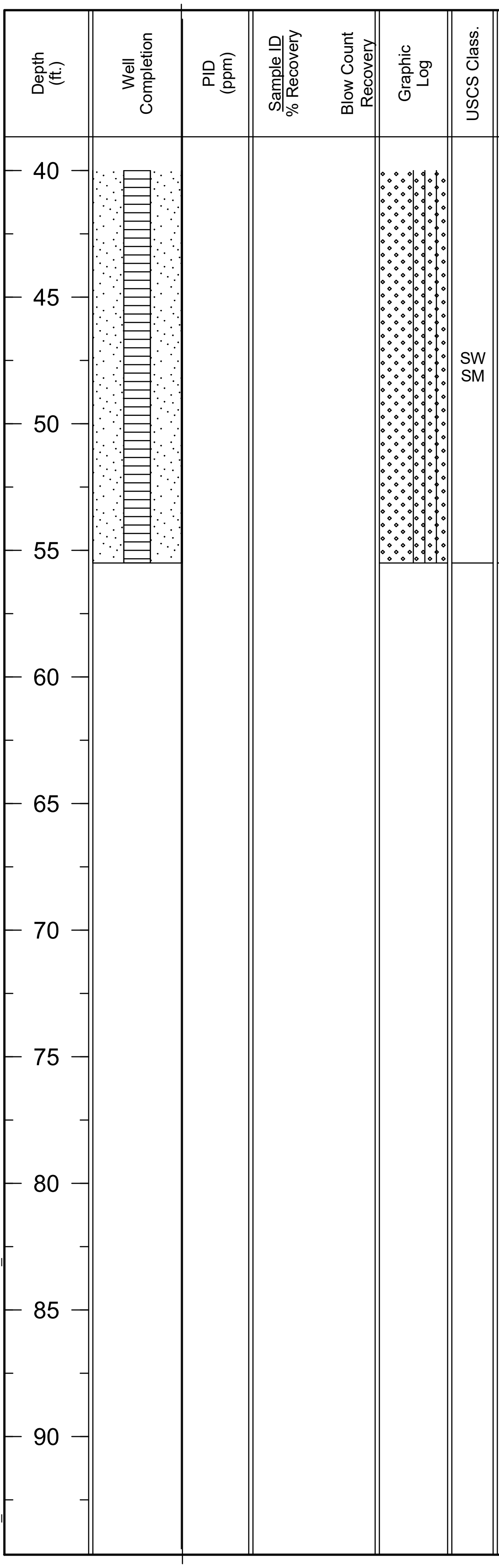
Drilling Log

Injection Well **AP-2**

Page: 2 of 2

Project *Varian/Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *806395*



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Continued

Auger refusal on weathered bedrock. Bottom of exploration at 55.5 feet.

Well Construction:
Steel wire-wrapped well screen from 55.5 to 35.5 feet. Steel casing from 35.5 feet to grade. Completed at grade with flush roadbox set in concrete.

Sand Pack/Seal:
Sand pack from 55.5 to 34 feet. Bentonite from 34 to 29 feet. Grout from 29 feet to approximately grade.

Shaw E & I, Inc.

Drilling Log

Monitoring Well **AP-3-DO**

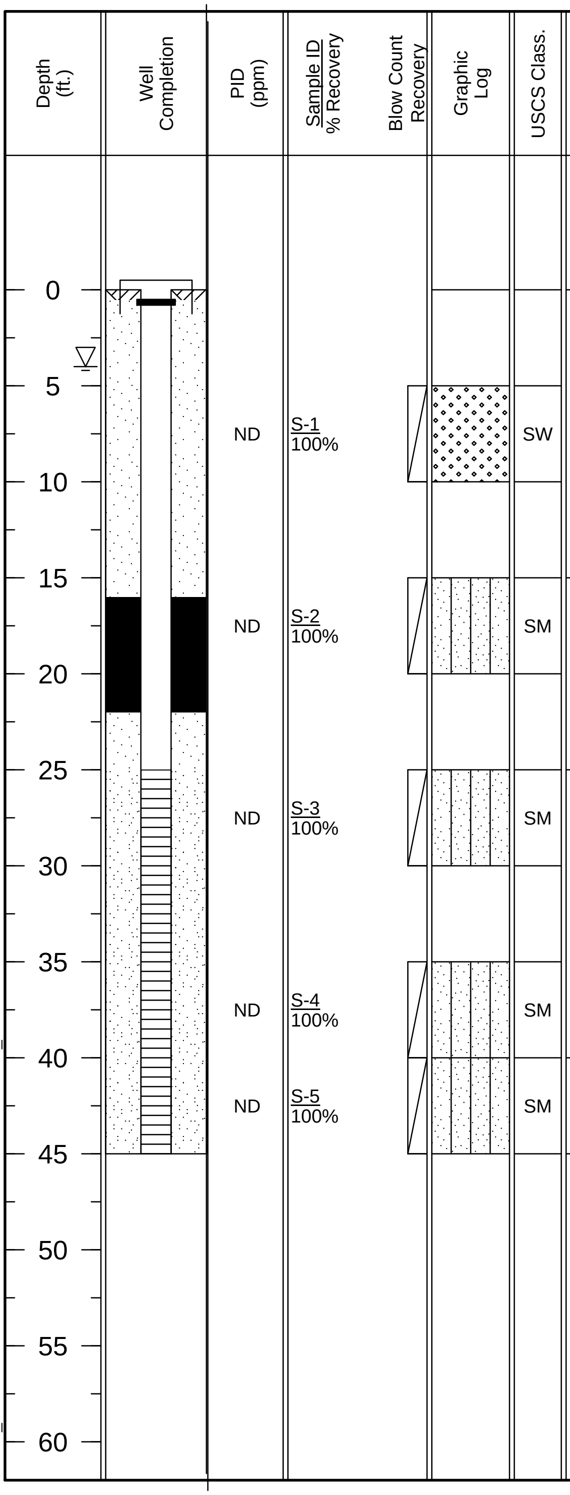
Page: 1 of 1

Project Varian Beverly
Owner Varian Medical Systems, Inc.
Location SCDS Fields, Beverly, Massachusetts
Proj. No. 108939
Surface Elev. NA
Total Hole Depth 45.0 ft.
North
East
Top of Casing NA
Water Level Initial ▽ 4.0 ft.
Static NA
Diameter
Screen: Dia 2 in.
Length 20 ft.
Type/Size PVC/0.010 in.
Casing: Dia 2 in.
Length 25 ft.
Type PVC
Fill Material Sand and bentonite
Rig/Core Truck mounted S9 Geoprobe
Drill Co. Geosearch, Inc.
Method Direct Push
Driller P. Rodney
Log By J. Perrry
Date 8/11/04
Permit # NA
Checked By R. Cadorette
License No.

COMMENTS
Soccer field

ppm = parts per million

ND = Non-detect, below PID limit of 1 ppm



PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
				Top Soil
ND	S-1 100%		SW	Light brown, well graded SAND and gravelly sand.
ND	S-2 100%		SM	Yellowish orange, SILTY SAND.
ND	S-3 100%		SM	Olive grey, SILTY SAND.
ND	S-4 100%		SM	Olive grey, SILTY SAND.
ND	S-5 100%		SM	Dark grey, SILTY SAND.

End of exploration at 45 feet below surface grade.

Well Construction:

Screen 25 to 45 feet; casing 25 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 22 to 45 feet; bentonite 16 to 22 feet; sand 16 to 0.5 feet; cement 0.5 feet to grade

Shaw E & I, Inc.

Drilling Log

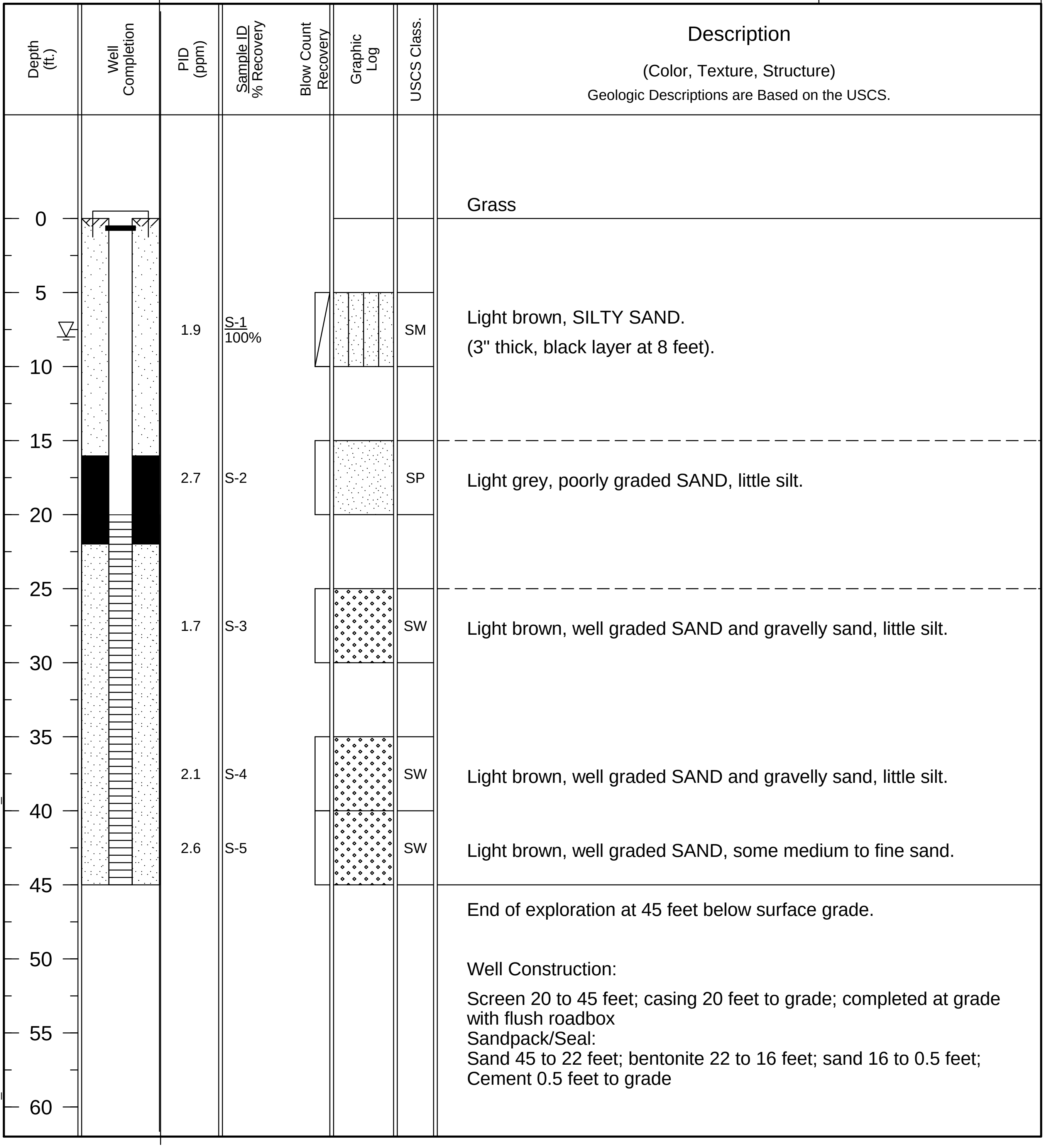
Monitoring Well **AP-4-DO**

Page: 1 of 1

Project Varian Beverly
Owner Varian Medical Systems, Inc.
Location SCDS Fields, Beverly, Massachusetts
Proj. No. 108939
Surface Elev. NA
Total Hole Depth 45.0 ft.
North
East
Top of Casing NA
Water Level Initial ∇ 8.0 ft.
Static NA
Diameter
Screen: Dia 2 in.
Length 20 ft.
Type/Size PVC/0.010 in.
Casing: Dia 2 in.
Length 25 ft.
Type PVC
Fill Material Sand and bentonite
Rig/Core Truck mounted S9 Geoprobe
Drill Co. Geosearch, Inc.
Method Direct Push
Driller P. Rodney
Log By J. Perry
Date 8/11/04
Permit # NA
Checked By R. Cadorette
License No.

COMMENTS

ppm= parts per million



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Grass
0							
5	∇	1.9	S-1 100%			SM	Light brown, SILTY SAND. (3" thick, black layer at 8 feet).
10							
15		2.7	S-2			SP	Light grey, poorly graded SAND, little silt.
20							
25		1.7	S-3			SW	Light brown, well graded SAND and gravelly sand, little silt.
30							
35		2.1	S-4			SW	Light brown, well graded SAND and gravelly sand, little silt.
40		2.6	S-5			SW	Light brown, well graded SAND, some medium to fine sand.
45							End of exploration at 45 feet below surface grade.
50							
55							
60							

Well Construction:

Screen 20 to 45 feet; casing 20 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 45 to 22 feet; bentonite 22 to 16 feet; sand 16 to 0.5 feet;
Cement 0.5 feet to grade

Shaw
Shaw E & I, Inc.

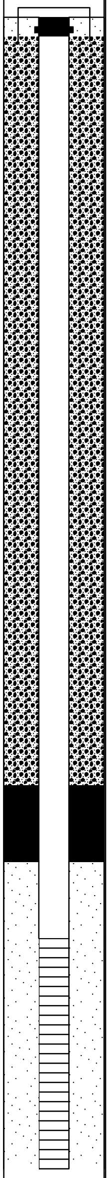
Drilling Log

Monitoring Well **AP-6-DO**

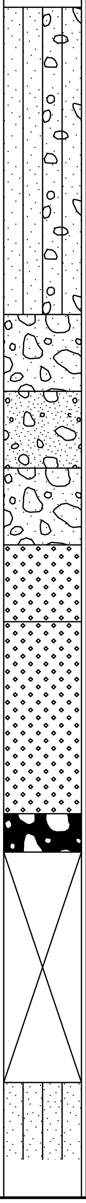
Project *Varian Beverly*
Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA*
Proj. No. *832837*
Surface Elev. *NA*
Total Hole Depth *48.5 ft.*
North
East
Top of Casing *NA*
Water Level Initial *NA*
Static *NA*
Diameter *4 in.*
Screen: Dia *2 in.*
Length *20 ft.*
Type/Size *PVC/.010 in.*
Casing: Dia *2 in.*
Length *24 ft.*
Type *PVC*
Fill Material *Sand, bentonite, native*
Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff*
Method *Hollow Stem Auger*
Driller *Rick Navatka*
Log By *Dave Wattles*
Date *3/13/02*
Permit # *NA*
Checked By *S. Metivier*
License No.

COMMENTS
Well located at 16 Tozer Road
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.

Well Completion



Graphic Log



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					Brown, silty fine SAND with rounded gravel
2	0.0				
4				SM GP	
	0.0				
6					
8				GM	1-2 inch GRAVEL with brown, silty fine sand
10				GP	2 inch subangular and rounded GRAVEL
	0.4				
12				GP	1 inch GRAVEL with coarse sand
14				SP	Brown, coarse-fine SAND, becoming moist at 13 feet
16	0.0				Fine GRAVEL fining to gray, silty fine sand
18				SM GP	
20					
	908				Boulder
22					No cuttings
24					
	10.9				
26					
28					Saturated, running silty fine SAND
				SM SP	
30					

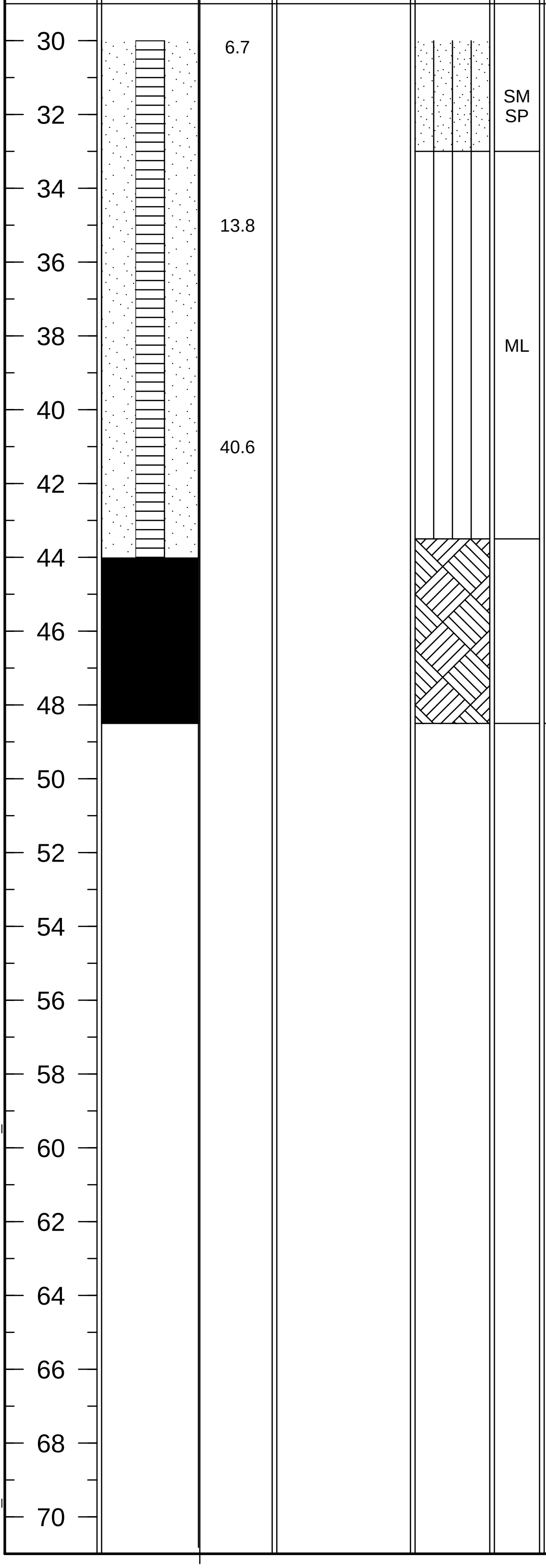
Continued Next Page

Drilling Log

Monitoring Well **AP-6-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*



Depth (ft.)	PID (ppm)	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
			Continued
30	6.7	SM SP	
33			SILT and CLAY mix with sand
35	13.8		
38		ML	
41	40.6		
43.5			Refusal on bedrock with auger; Advanced boring with air hammer to confirm the top of bedrock was at 43.5 ft bsg. Bedrock in granitic in composition.
48.5			End of Exploration at 48.5 feet Well Construction: Screen from 44 to 24 feet, casing from 24 feet to grade. Completed with a flush roadbox set in concrete. Sand Pack/ Seal: Sand from 44 to 22 feet, bentonite from 22 to 20 feet, grout from 20 feet to grade.

Shaw E & I, Inc.

Drilling Log

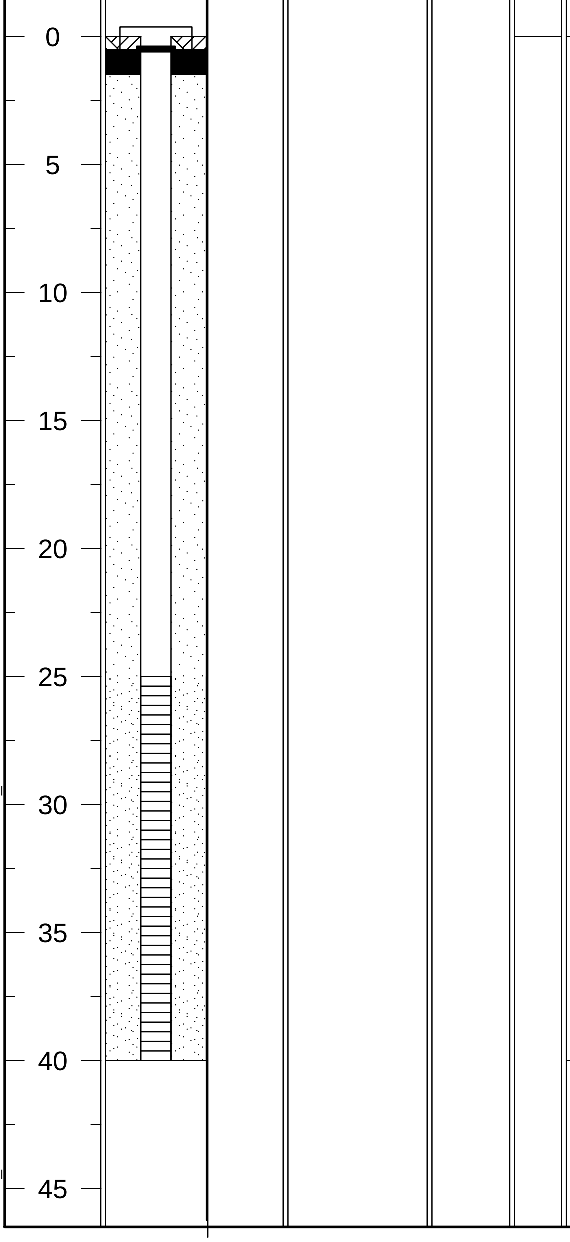
Monitoring Well **AP8-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *31 Tozer* Total Hole Depth *40.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *2 in.*
Screen: Dia *1 in.* Length *15 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *1 in.* Length *25 ft.* Type *NA*
Fill Material *Sand, Bentonite* Rig/Core *Geoprobe 6600/Core*
Drill Co. *Zebra Drilling* Method *Geoprobe*
Driller *Evan Moraitis* Log By *D. Walker* Date *8/7/03* Permit # *NA*
Checked By License No.

COMMENTS
Samples not collected.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							No samples collected
40							End of exploration at 40 feet below surface grade.



Shaw E & I, Inc.

Drilling Log

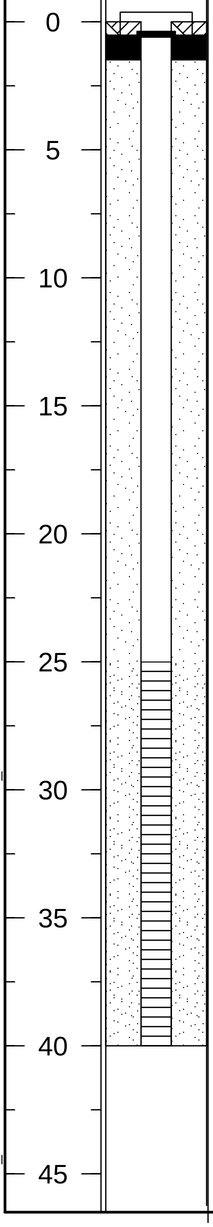
Monitoring Well **AP9-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *31 Tozer* Total Hole Depth *40.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *2 in.*
Screen: Dia *1 in.* Length *15 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *1 in.* Length *25 ft.* Type *NA*
Fill Material *Sand, Bentonite* Rig/Core *Geoprobe 6600/Core*
Drill Co. *Zebra Drilling* Method *Geoprobe*
Driller *Evan Moraitis* Log By *D. Walker* Date *8/7/03* Permit # *NA*
Checked By License No.

COMMENTS
Samples not collected.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							No samples collected
							Tight drilling at 28 feet below surface grade
							End of exploration at 40 feet below surface grade.



Shaw E & I, Inc.

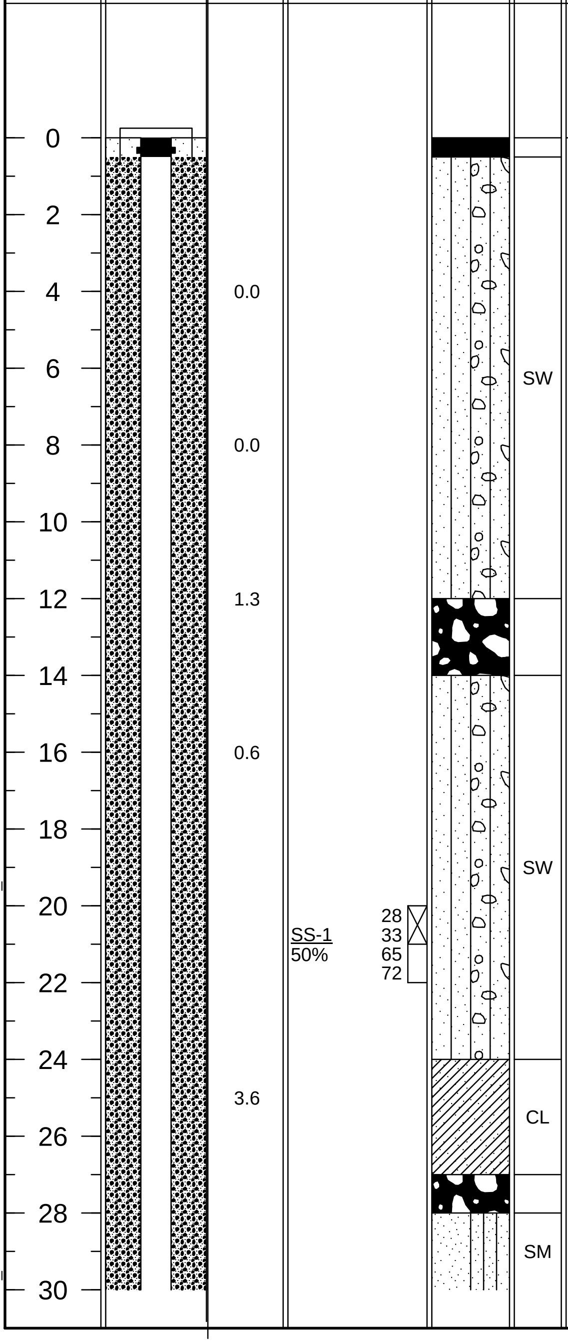
Drilling Log

Monitoring Well **AP-12-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *58.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *38 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *CME*
Drill Co. *Dragin Drilling Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *D. Wattles/S. Metivier* Date *1/7/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
0.5				SW	Brown fine-medium SAND with gravel and cobbles
4	0.0				
8	0.0				
12	1.3				Boulder
14				SW	Brown fine-medium SAND with gravel and cobbles
16	0.6				
20		SS-1 50%	28 33 65 72		
24				CL	Brown, wet, medium density CLAY, some fine sand and silt, poorly graded
25	3.6				
27					Large COBBLE
28				SM	Brown, wet, loose fine SAND and silt, poorly graded , too wet for soil vapor headspace sample

Continued Next Page

Shaw E & I, Inc.

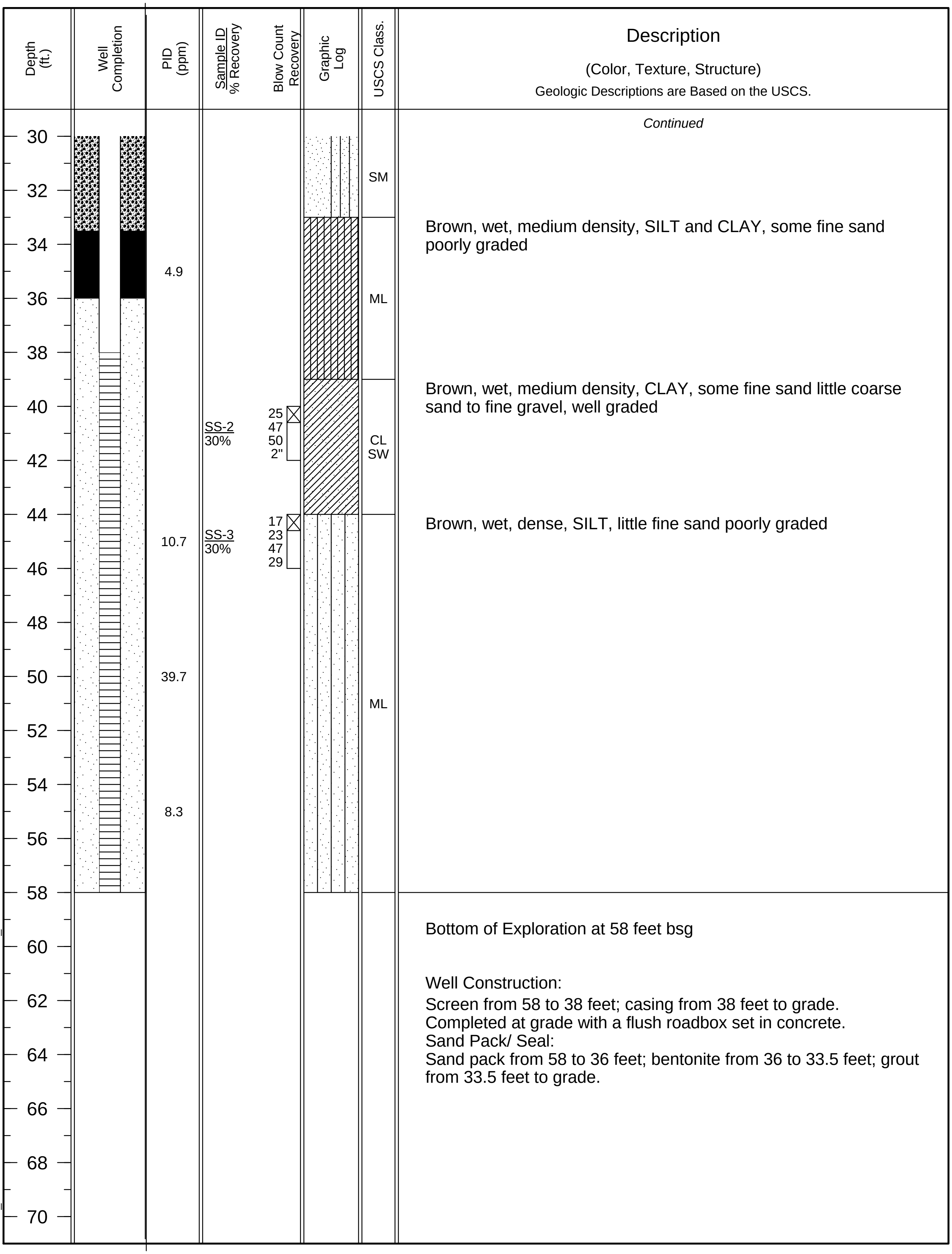
Drilling Log

Monitoring Well **AP-12-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
30						SM	*Continued*
33						ML	Brown, wet, medium density, SILT and CLAY, some fine sand poorly graded
35		4.9					
39						CL SW	Brown, wet, medium density, CLAY, some fine sand little coarse sand to fine gravel, well graded
40			SS-2 30%	25 47 50 2"			
44			SS-3 30%	17 23 47 29		ML	Brown, wet, dense, SILT, little fine sand poorly graded
45		10.7					
50		39.7					
55		8.3					
58							Bottom of Exploration at 58 feet bsg

Well Construction:

Screen from 58 to 38 feet; casing from 38 feet to grade.
Completed at grade with a flush roadbox set in concrete.
Sand Pack/ Seal:
Sand pack from 58 to 36 feet; bentonite from 36 to 33.5 feet; grout from 33.5 feet to grade.

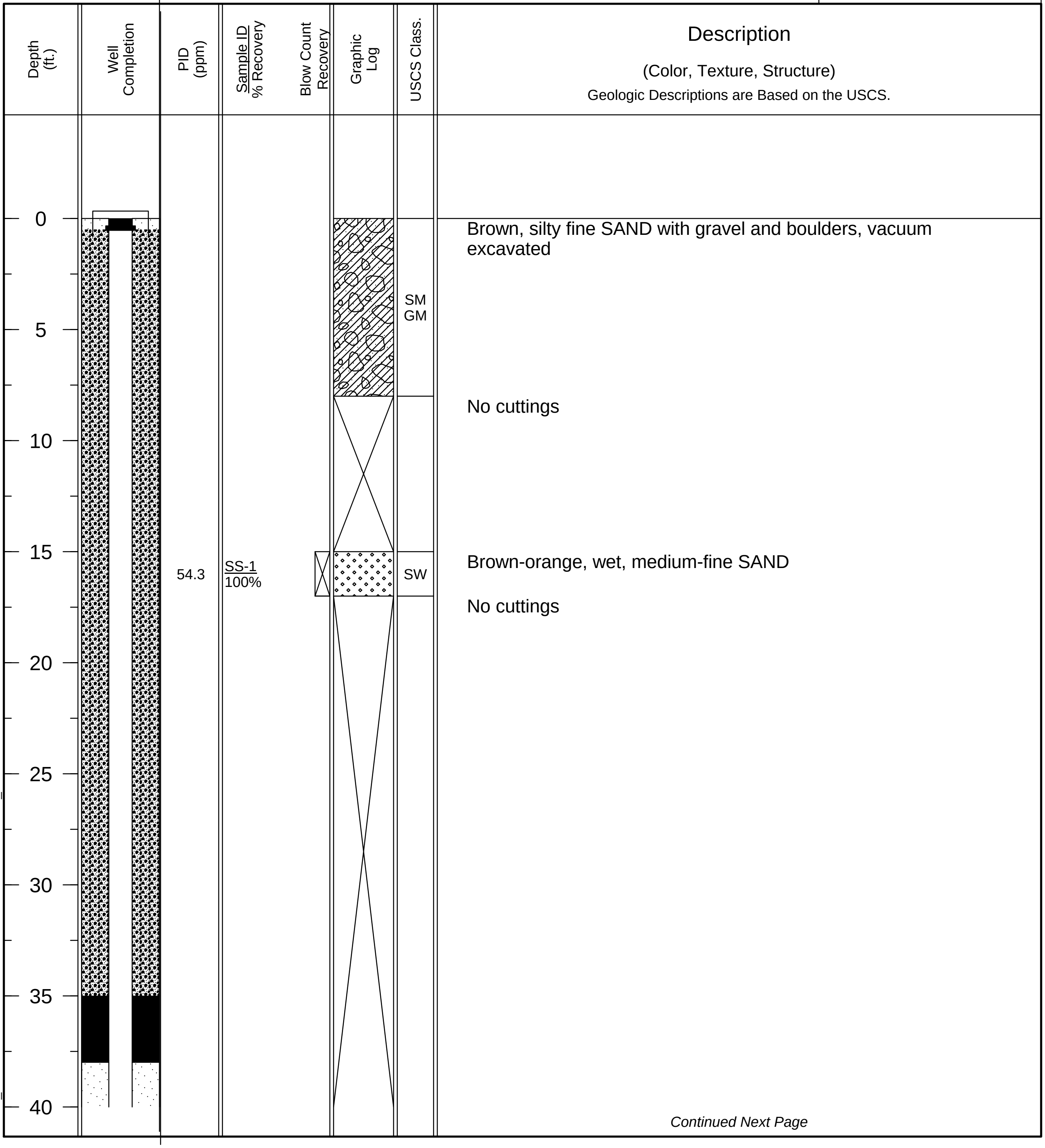
Shaw E & I, Inc.

Drilling Log

Monitoring Well **AP-13-DO**

Project *Varian Beverly*
Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA*
Proj. No. *832837*
Surface Elev. *NA*
Total Hole Depth *61.0 ft.*
North
East
Top of Casing *NA*
Water Level Initial *NA*
Static *NA*
Diameter *4 in.*
Screen: Dia *2 in.*
Length *20 ft.*
Type/Size *PVC/.010 in.*
Casing: Dia *2 in.*
Length *41 ft.*
Type *PVC*
Fill Material *Sand, bentonite, grout*
Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff*
Method *Hollow Stem Auger*
Driller *Rick Navatka*
Log By *Dave Wattles*
Date *4/8/02*
Permit # *NA*
Checked By *S. Metivier*
License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0				SM GM	Brown, silty fine SAND with gravel and boulders, vacuum excavated
					No cuttings
15	54.3	SS-1 100%		SW	Brown-orange, wet, medium-fine SAND
					No cuttings

Continued Next Page

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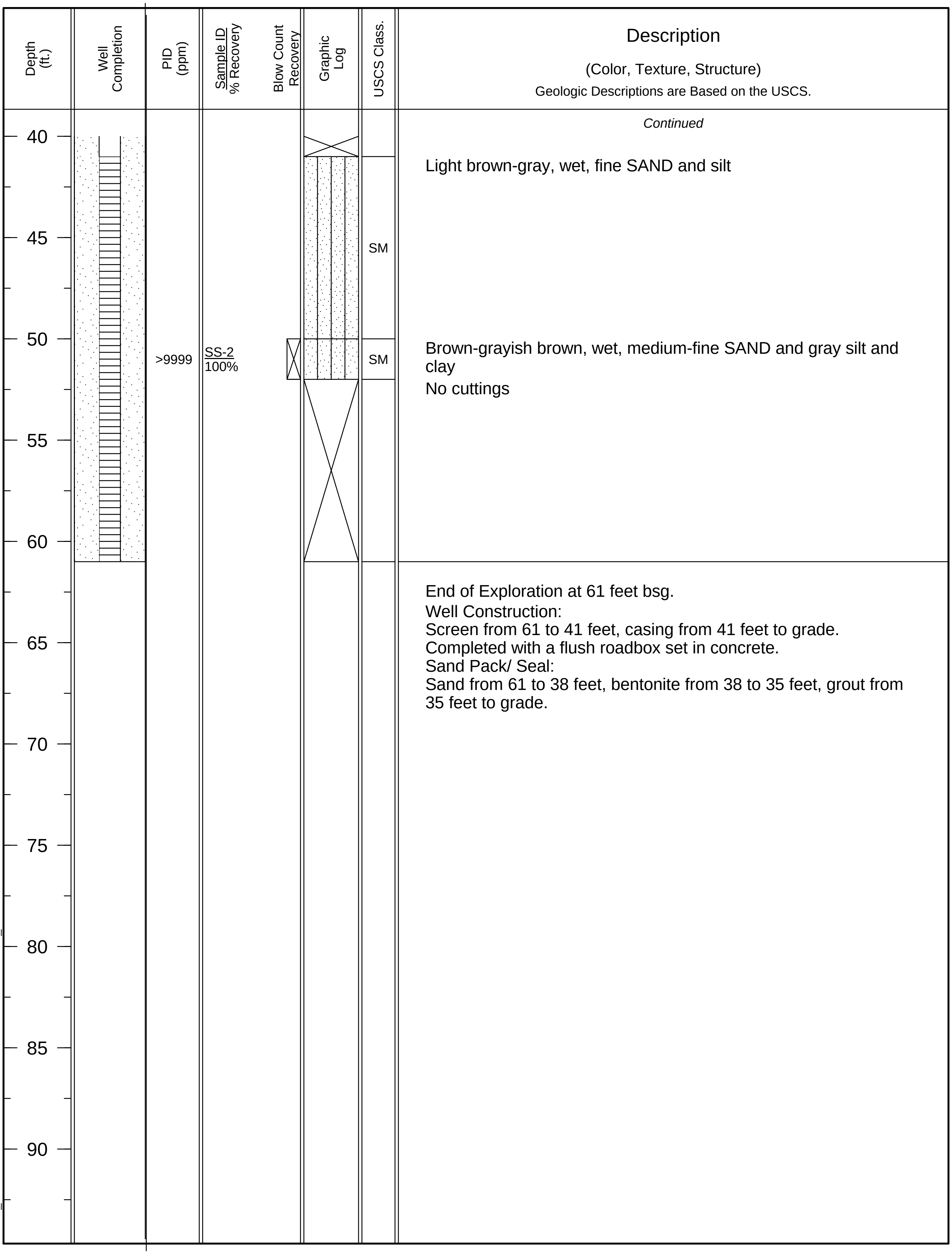
Drilling Log

Monitoring Well **AP-13-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
40							*Continued*
41–50						SM	Light brown-gray, wet, fine SAND and silt
50–52		>9999	SS-2 100%			SM	Brown-grayish brown, wet, medium-fine SAND and gray silt and clay No cuttings
61							End of Exploration at 61 feet bsg. Well Construction: Screen from 61 to 41 feet, casing from 41 feet to grade. Completed with a flush roadbox set in concrete. Sand Pack/ Seal: Sand from 61 to 38 feet, bentonite from 38 to 35 feet, grout from 35 feet to grade.

Shaw E & I, Inc.

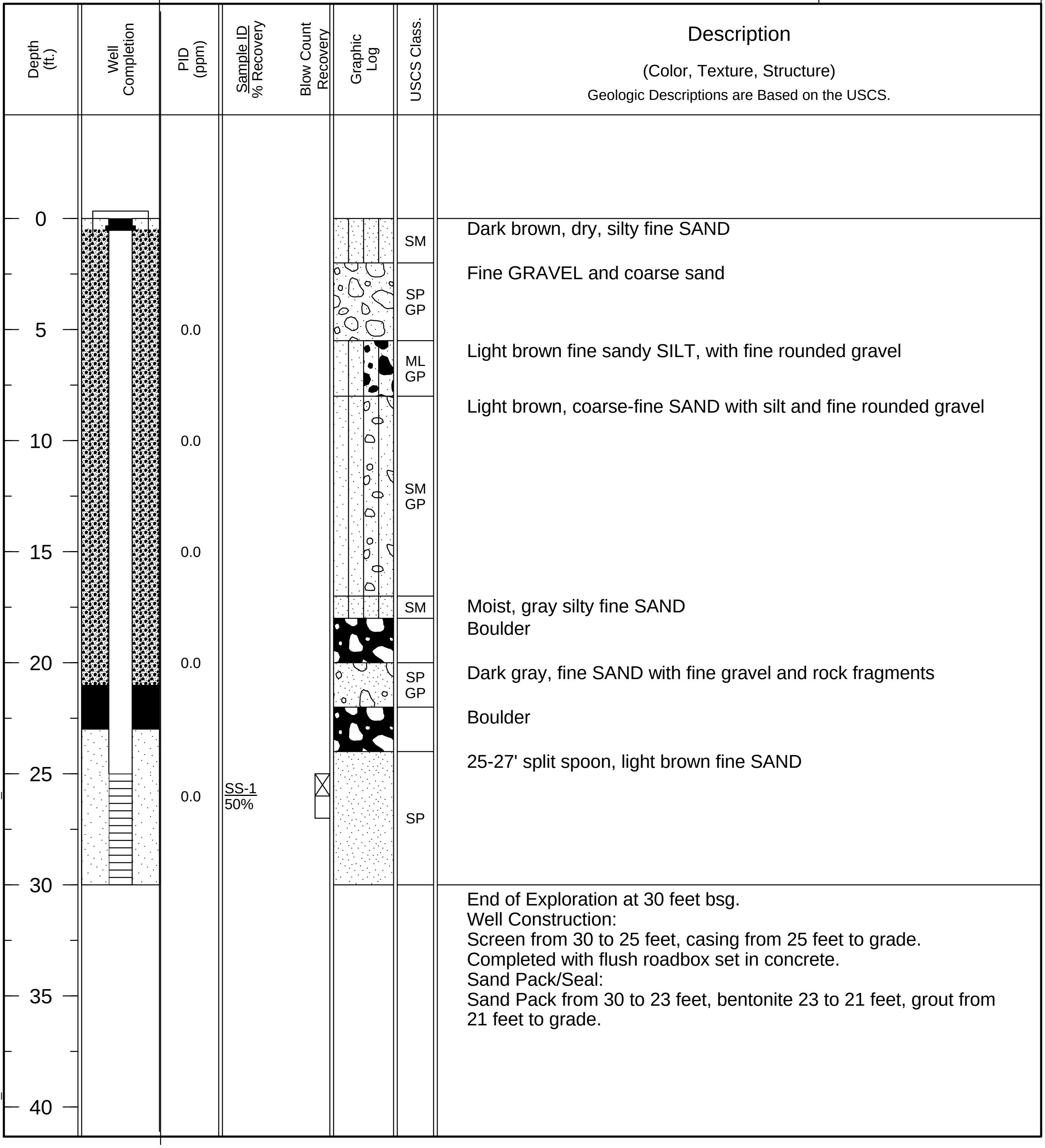
Drilling Log

Monitoring Well **AP-19**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *30.0 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *5 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *25 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff* Method *Hollow Stem Auger*
Driller *Rick Navatka* Log By *Dave Wattles* Date *5/13/02* Permit # *NA*
Checked By *S. Metivier* License No. ____

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						SM	Dark brown, dry, silty fine SAND
						SP GP	Fine GRAVEL and coarse sand
5		0.0				ML GP	Light brown fine sandy SILT, with fine rounded gravel
						SM GP	Light brown, coarse-fine SAND with silt and fine rounded gravel
10		0.0					
15		0.0					
						SM	Moist, gray silty fine SAND
							Boulder
20		0.0				SP GP	Dark gray, fine SAND with fine gravel and rock fragments
							Boulder
							25-27' split spoon, light brown fine SAND
25		0.0	SS-1 50%	☒		SP	
30							End of Exploration at 30 feet bsg. Well Construction: Screen from 30 to 25 feet, casing from 25 feet to grade. Completed with flush roadbox set in concrete. Sand Pack/Seal: Sand Pack from 30 to 23 feet, bentonite 23 to 21 feet, grout from 21 feet to grade.
35							
40							

Shaw E & I, Inc.

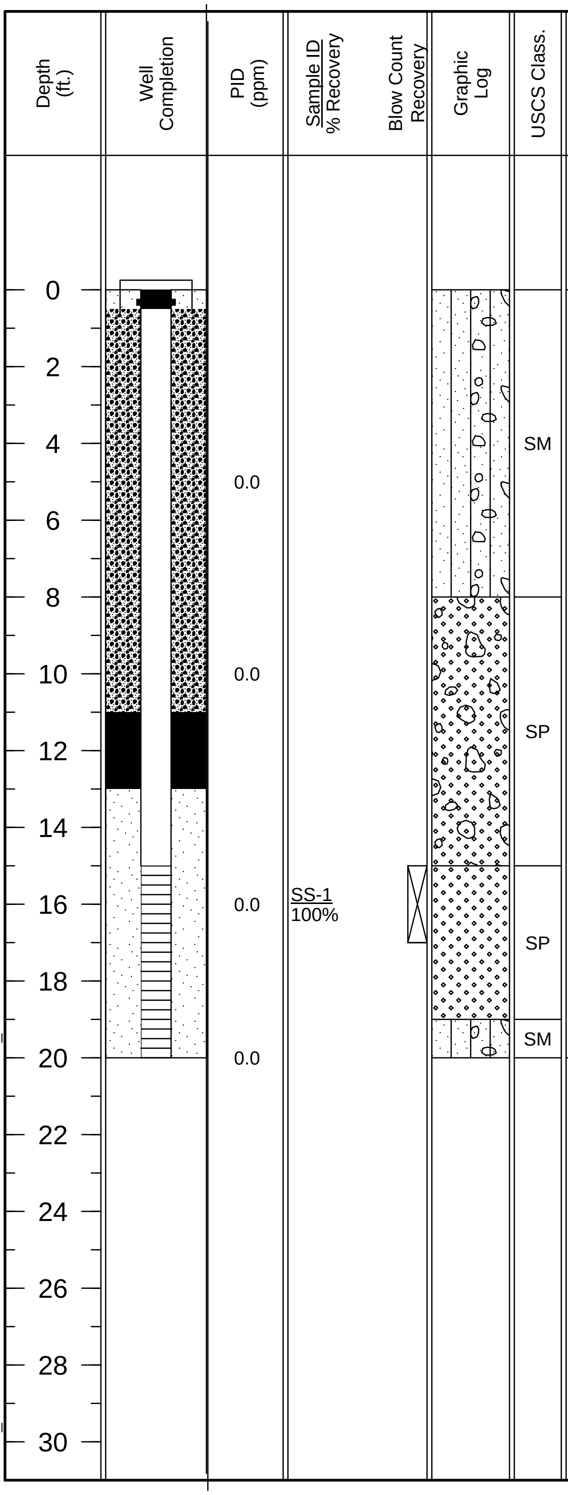
Drilling Log

Monitoring Well **AP-20**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *20.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *5 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *15 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff* Method *Hollow Stem Auger*
Driller *Rick Navatka* Log By *Dave Wattles* Date *5/14/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Light brown silty fine SAND with little rounded gravel

light brown, moist, medium-fine SAND with rounded gravel

Light brown fine SAND with coarse-medium sand and fine gravel inclusions and fine sandy silt with inclusions

gray, silty fine SAND with fine gravel and rock fragments

End of Exploration at 20 feet bsg.

Well Construction:
Screen from 20 to 15 feet, casing 15 feet to grade. Completed with flush roadbox set in conrete.
Sand Pack/Seal
Sand Pack from 20 to 13 feet, bentonite 13 to 11 feet, grout 11 feet to grade.

Shaw E & I, Inc.

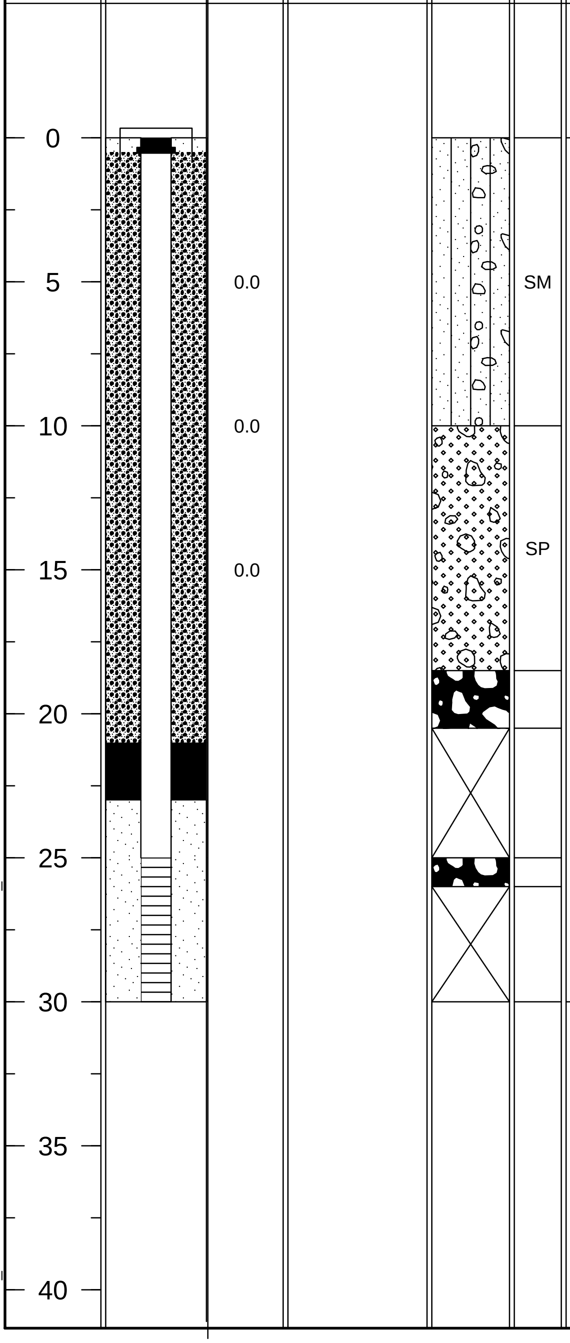
Drilling Log

Monitoring Well **AP-21**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *30.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *5 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *25 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff* Method *Hollow Stem Auger*
Driller *Rick Navatka* Log By *Dave Wattles* Date *5/14/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Light brown silty fine SAND with little coarse sand and fine rounded gravel
5		0.0				SM	
10		0.0					Light brown coarse-fine SAND with gravel
						SP	
15		0.0					
							Boulder
20							No cuttings
25							Boulder No cuttings
30							End of Exploration at 30 feet bsg. Well Construction: Screen from 30 to 25 feet, casing from 25 feet to grade. Completed with a flush roadbox set in concrete. Sand Pack/ Seal: Sand Pack 30 to 23 feet, bentonite 23 to 21 feet, grout 21 feet to grade.
35							
40							

Shaw E & I, Inc.

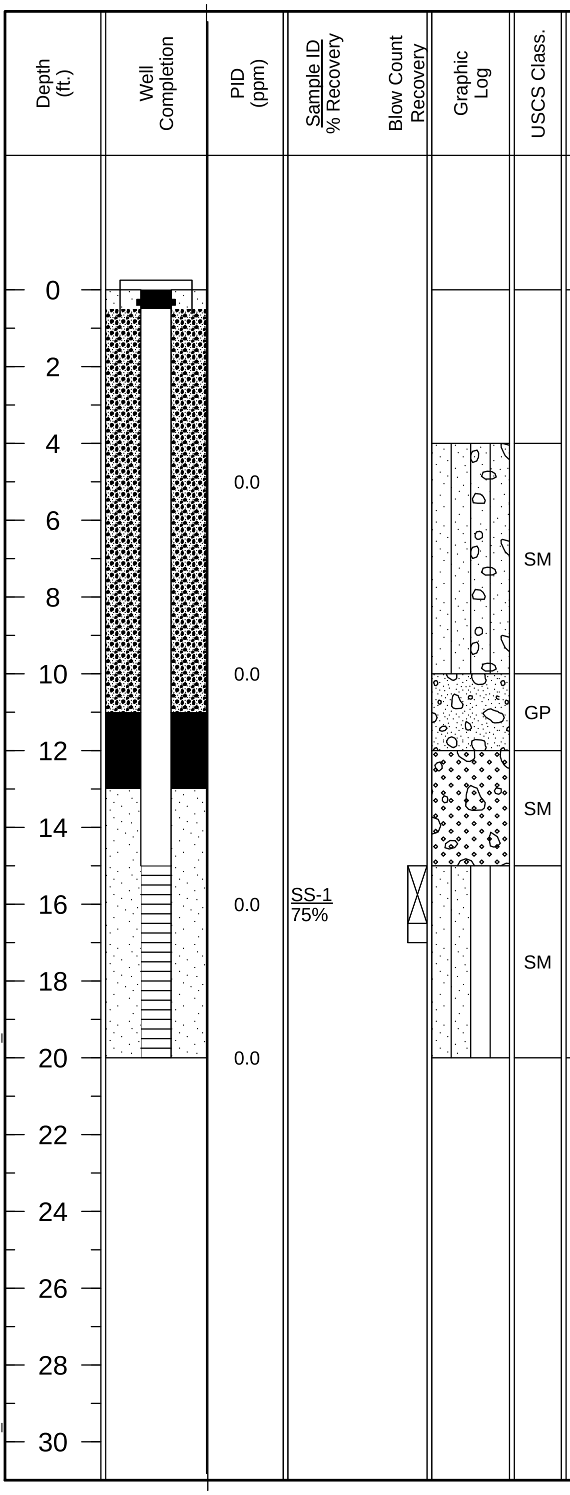
Drilling Log

Monitoring Well **AP-22**

Page: 1 of 1

Project Varian Beverly
Owner Varian Medical Systems, Inc.
Location 150 Sohier Road, Beverly, MA
Proj. No. 832837
Surface Elev. NA
Total Hole Depth 20.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter 4 in.
Screen: Dia 2 in.
Length 5 ft.
Type/Size PVC/.010 in.
Casing: Dia 2 in.
Length 15 ft.
Type PVC
Fill Material Sand, bentonite, grout
Rig/Core Ingersol Rand
Drill Co. Paratt Wolff
Method Hollow Stem Auger
Driller Rick Navatka
Log By Dave Wattles
Date 5/14/02
Permit # NA
Checked By S. Metivier
License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

No cuttings, cuttings in vacuum excavation hole

Light brown silty fine SAND with gravel

Fine rounded GRAVEL

Light brown, moist, silty, fine SAND with fine gravel and coarse sand

Silty fine SAND and sandy silt with inclusions of coarse-medium sand and fine gravel

End of Exploration at 20 feet

Well Construction:
Screen from 20 to 15 feet, casing from 15 feet to grade.
Completed with a flush road box set in concrete.
Sand Pack/ Seal:
Sand pack from 20 to 13 feet, bentonite from 13 to 11 feet, grout from 11 feet to grade.

Shaw E & I, Inc.

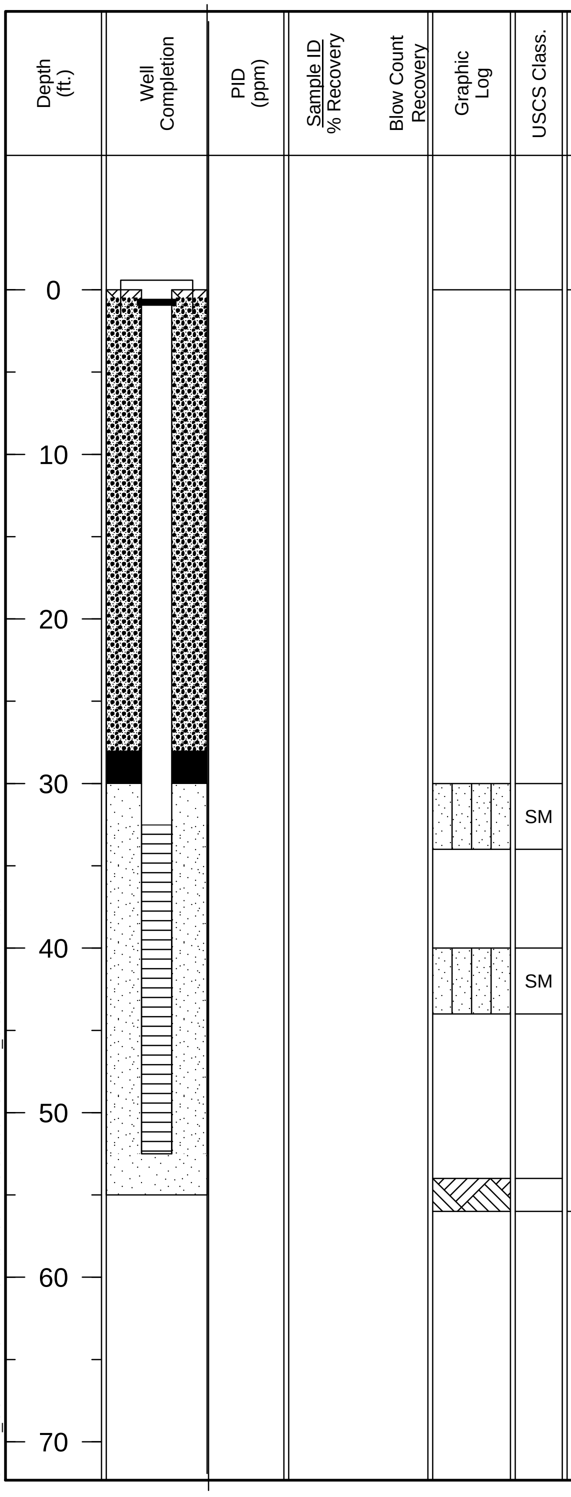
Drilling Log

Monitoring Well **AP-24-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *55.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *4 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *4 in.* Length *32.5 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Truck Mounted/Mobil B57*
Drill Co. *New Hampshire Boring* Method *Drive and Wash / Casing*
Driller *Mark D'Ambrosen* Log By *J. Perry* Date *8/2/04* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Fine SAND and SILT, cobbles

Coarse to fine SAND, with silt

Weathered Bedrock

End of exploration at 55 linear feet.

Well Construction:
Screen 32.5 to 52.5 feet; casing 32.5 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 30 to 52.5 feet; bentonite 28 to 30 feet; grout 28 to 0.5 feet; cement 0.5 feet to grade

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Drilling Log

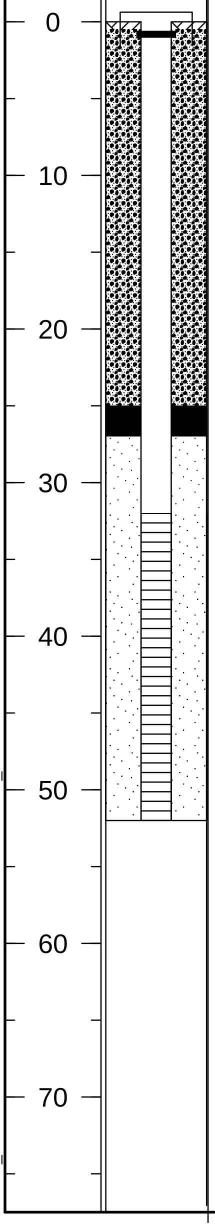
Monitoring Well **AP-25-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *52.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *32 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *CME750 ATV*
Drill Co. *New Hampshire Boring* Method *Drive and Wash / Casing*
Driller *J. Garside* Log By *R. Cadorette* Date *9/22/04* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS

Installed at 3 to 1 angle, west towards Building 3. Well head 17' from Building 3.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Samples not collected.
							End of exploration at 52 linear feet. Well Construction: Screen 52 to 32 feet; casing 32 feet to grade; completed at grade with flush roadbox Sandpack/Seal: Sand 28 to 52 feet; bentonite 26 to 28 feet; grout 26 to 0.5 feet; cement 0.5 feet to grade

Shaw E & I, Inc.

Drilling Log

Monitoring Well **AP-26-DO**

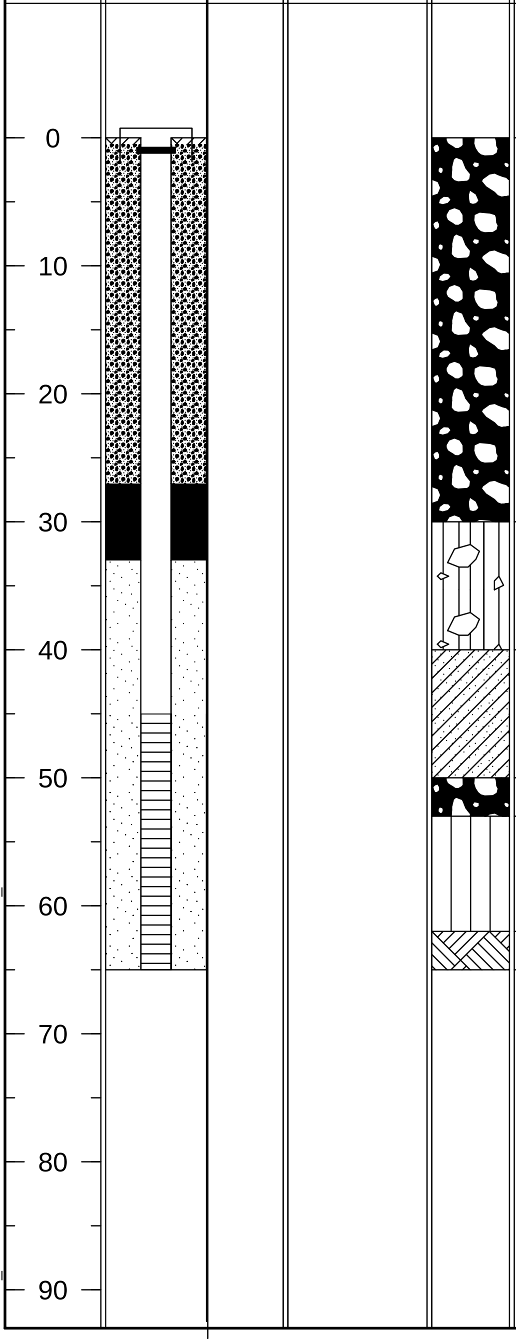
Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *65.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *6 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *6 in.* Length *45 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Truck Mounted Mobil B57*
Drill Co. *New Hampshire Boring* Method *Drive and Wash*
Driller *Mark D'Ambrosen* Log By *J. Perry* Date *7/19/04* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS
8" casing to 30'.

No split spoon samples collected. Geological logging was completed using drill cuttings.

Depth (ft.) | Well Completion | PID (ppm) | Sample ID % Recovery | Blow Count Recovery | Graphic Log | USCS Class.



USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
	Grass
	Light brown, BOULDERS AND COBBLES, medium sand.
GM	SILTY SAND and gravel.
SC	Grey, SILTY SAND with some clay.
	COBBLE layer.
ML	Grey, SILT AND CLAY with some fine sand.
	White-grey, quartz, BEDROCK.

End of exploration at 65 feet below surface grade.

Well Construction:
Screen 45 to 65 feet; casing 45 feet to grade; completed at grade with roadbox
Sandpack/Seal:
Sand 33 to 65 feet; bentonite 27 to 33 feet; grout 27 to 0.5 feet; cement 0.5 feet to grade

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Drilling Log

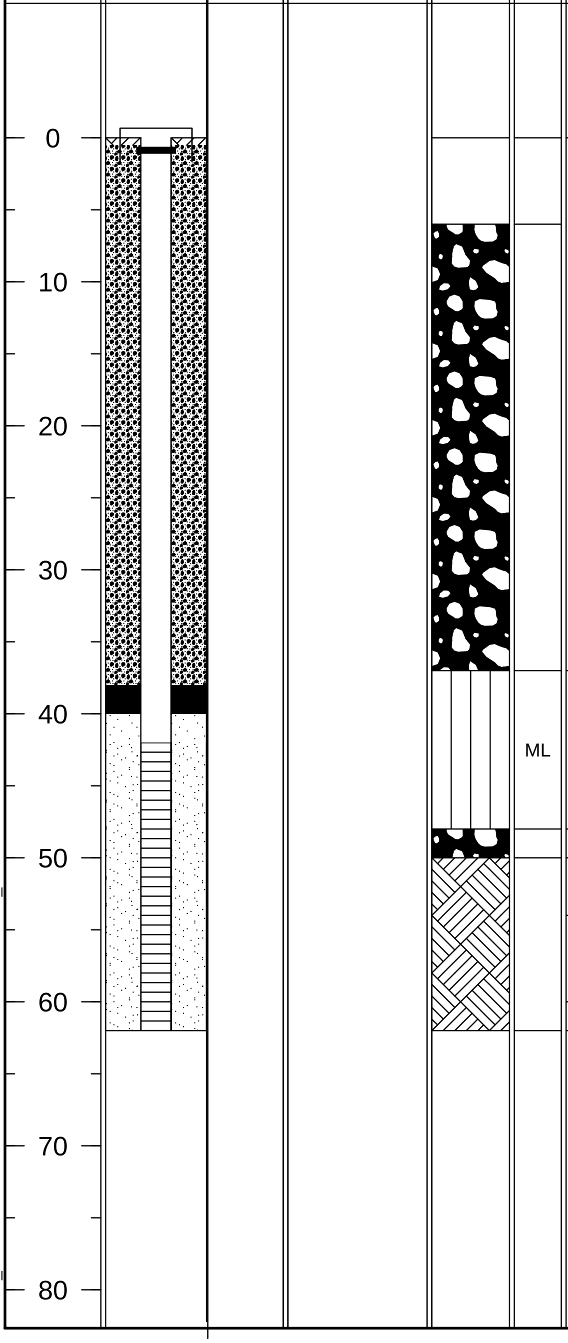
Monitoring Well **AP-27-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *62.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *4 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *4 in.* Length *42 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Truck Mounted Mobil B57*
Drill Co. *New Hampshire Boring* Method *Drive and Wash*
Driller *Mark D'Ambrosen* Log By *K. Cote* Date *7/16/04* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS
No split spoon samples collected. Geological logging was complicated using drill cuttings.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.



Pavement

BOULDERS AND COBBLES, medium gravel, some medium to fine sand.

Greyish SILT, some clay, trace fine gravel.

BOULDER.

Fractured BEDROCK, potassium feldspars, amphibole, layers of orange silt in fractures.

Same as above interbedded with tan, soft to hard cemented sand.

Greenish, SCHIST, quartz, dark colored feldspars.

End of exploration at 62 feet below surface grade.

Well Construction:
Screen 42 to 62 feet; casing 42 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 40 to 62 feet; bentonite 38 to 40 feet; grout 38 to 0.5 feet; cement 0.5 feet to grade

Shaw E & I, Inc.

Drilling Log

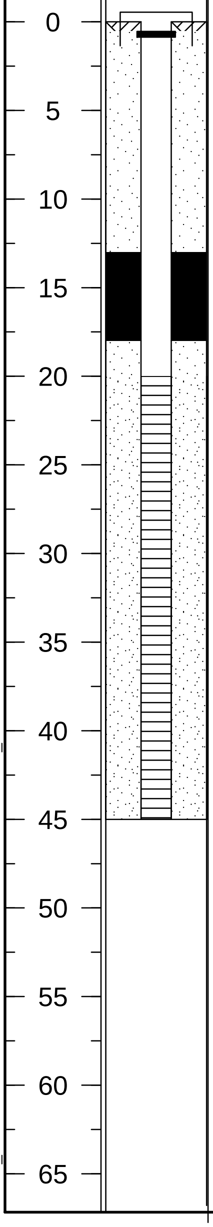
Monitoring Well **AP-28-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *31 Tozer Road, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *45.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *1.5 in.* Length *25 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *1.5 in.* Length *20 ft.* Type *PVC*
Fill Material *Sand and bentonite* Rig/Core *Truck Mounted S9 Geoprobe*
Drill Co. *Geosearch, Inc.* Method *Direct Push*
Driller *P. Rodney* Log By *J. Perry* Date *8/13/04* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							None noted
0–45							No samples collected.
45							End of exploration at 45 feet below surface grade. Well Construction:: Screen 20 to 45 feet; casing 20 feet to grade; completed at grade with flush road box Sandpack/Seal: Sand 18 to 45 feet; bentonite 13 to 18 feet; sand 13 to 0.5 feet; cement 0.5 feet to grade



SHAW_COMMERCIAL Rev: 6/12/02 31TOSER2004.GPJ IT_CORP.GDT 11/3/09

Shaw E & I, Inc.

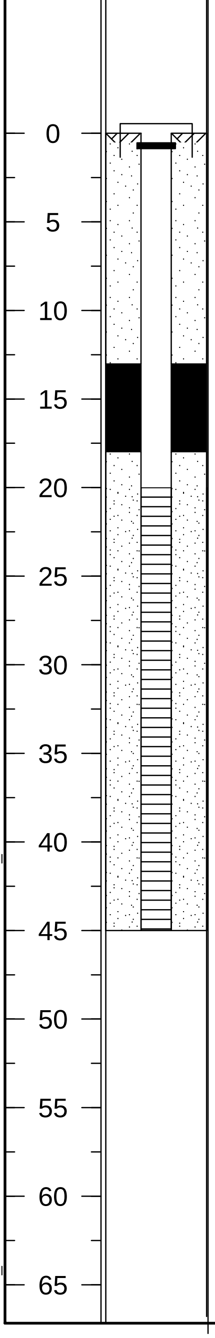
Drilling Log

Monitoring Well **AP-29-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *31 Tozer Road, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *45.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *1.5 in.* Length *25 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *1.5 in.* Length *20 ft.* Type *PVC*
Fill Material *Sand and bentonite* Rig/Core *Truck Mounted S9 Geoprobe*
Drill Co. *Geosearch, Inc.* Method *Direct Push*
Driller *P. Rodney* Log By *J. Perry* Date *9/13/04* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							None noted
							No samples collected.
							End of exploration at 45 feet below surface grade. Well Construction: Screen 20 to 45 feet; casing 20 feet to grade; completed at grade with flush roadbox Sandpack/Seal: Sand 18 to 45 feet; bentonite 13 to 18 feet; sand 13 to 0.5 feet; cement 0.5 feet to grade

Drilling Log

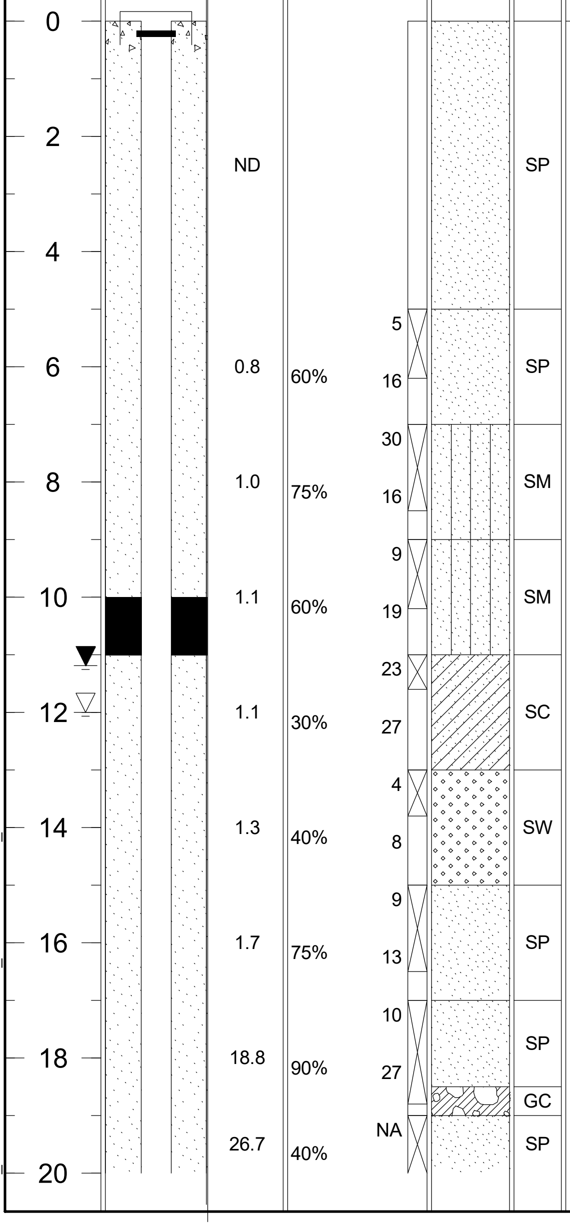
Monitoring Well **AP-33-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *Building 3, 150 Sohier Road, Beverly, Massachusetts* Proj. No. *150151*
Surface Elev. *NA* Total Hole Depth *40.0 ft.* North East
Top of Casing *NA* Water Level Initial ▽ *12.0 ft.* Static ▼ *11.2 ft.* Diameter *4.25 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/Slot 0.010 in.*
Casing: Dia *2 in.* Length *20 ft.* Type *PVC*
Fill Material *#2 Sand, Bentonite, Grout* Rig/Core *CME-75/140 Hammer*
Drill Co. *TDS* Method *Hollow Stem Auger*
Driller *Gary* Log By *Dale Dailey* Date *9/10/13* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS

ND = Not Detected



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					Hand cleared to 0' - 5'.
2	ND			SP	Brown, damp, loose, poorly sorted, fine SAND, trace gravel (Fill)
4					
			5		Same as above (Fill)
6	0.8	60%	16	SP	
			30		Brown, damp, medium dense, fine SAND, 2" lens of gray, dry, medium dense, gravel, some silt
8	1.0	75%	16	SM	
			9		Brown, moist, poorly sorted, medium dense, SILTY SAND
10	1.1	60%	19	SM	
			23		Grayish brown, moist, stiff, CLAYEY SAND, trace gravel (10%) to 12'
12	1.1	30%	27	SC	Brown, wet, stiff, CLAYEY SAND to 13'
			4		Brown, wet, well sorted, loose, SAND, some gravel (1 - 1.5 cm)
14	1.3	40%	8	SW	
			9		Brown, wet, very loose SAND, occasional 1" lenses of brown, loose clay
16	1.7	75%	13	SP	
			10	SP	Brown, wet, loose SAND, trace gravel (to 18.5')
18	18.8	90%	27		
				GC	Brown, wet, poorly sorted, stiff, GRAVELLY CLAY
	26.7	40%	NA	SP	Boulder at 19'
20					

Continued Next Page

Drilling Log

Monitoring Well **AP-33-DO**

Page: 2 of 2

Project *Varian Beverly*
Owner *Varian Medical Systems, Inc.*
Location *Building 3, 150 Sohier Road, Beverly, Massachusetts*
Proj. No. *150151*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Continued
20				4	░		Brown, saturated, poorly sorted, very loose SAND
		26.7	40%			SP	
22				12	░		Brown, wet, well sorted, loose, GRAVELLY SAND, (to 23')
		39.3	100%	14		SP	Brown, wet, GRAVELLY SAND, (black staining)
24				51	▨		Light gray, saturated, hard CLAY, trace poorly sorted sand lenses, some poorly sorted gravel (0.75 - 3 cm), (staining)
		66.9	60%	83		CH	
26				25	▨		Light gray, saturated, hard CLAY with gravelly clay lenses, (poorly sorted gravel 2 - 4 cm)
				46			
28							
		271	50%			CH	
30							
32				25	▥		Light gray, wet, very stiff, SILT, trace large cobbles
				46			
34							
		205	50%			MH	
36							
				24	▨		Light gray, saturated, stiff CLAY, trace poorly sorted gravel (1.5 - 3 cm), (odor)
38				23			
			10%			CL	
40							End of exploration at 40 feet below surface grade.
42							
44							
46							

Drilling Log

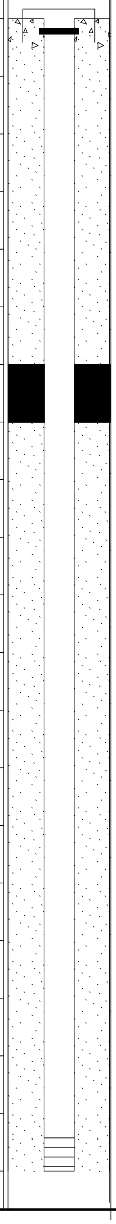
Monitoring Well **AP-34-DO**

Page: 1 of 2

Project: *Varian Beverly*
Owner: *Varian Medical Systems, Inc.*
Location: *Building 3, 150 Sohier Road, Beverly, Massachusetts*
Proj. No.: *150151*
Surface Elev.: *NA*
Total Hole Depth: *42.0 ft.*
North:
East:
Top of Casing: *NA*
Water Level Initial: ▽ *12.0 ft.*
Static: ▼ *11.4 ft.*
Diameter: *4.25 in.*
Screen: Dia: *2 in.*
Length: *20 ft.*
Type/Size: *PVC/Slot 0.010 in.*
Casing: Dia: *2 in.*
Length: *19.42 ft.*
Type: *PVC*
Fill Material: *#2 Sand, Bentonite, Grout*
Rig/Core: *CME-75/140 Hammer*
Drill Co.: *TDS*
Method: *Hollow Stem Auger*
Driller: *Gary*
Log By: *Dale Dailey*
Date: *9/11/13*
Permit #: *NA*
Checked By: *Raymond Cadorette*
License No.:

COMMENTS

ND = Not Detected



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0 2 4				SP	Hand cleared to 0' - 5'. Brown, dry, very loose, fine SAND, (Fill)
6	0.1	30%	1 1 2 4	SP	Brown, damp to dry, very loose, well sorted, fine SAND, trace well sorted gravel (approximately 2 cm) (Fill)
8	0.8	60%	3 4 10 11	SP	Brown, damp to moist, loose, well sorted, fine SAND, trace poorly sorted gravel (0.5 - 2 cm) (Fill)
10	1.1	85%	4 5 8 9	SP	Brown, wet, loose, well sorted, fine SAND, trace well sorted gravel (0.5 - 3 cm) (Fill)
12	1.1	90%	10 12 7 8	SP	Brown, wet, medium dense, fine, well sorted SAND, some poorly sorted gravel (0.5 - 3 cm), trace cobbles (Fill)
14	1.5	20%	6 4 4 5	SW	Brown, saturated, loose, fine and medium, poorly sorted SAND and GRAVEL (0.5 - 2 cm) (Fill)
16	2.0	45%	3 1 1 3	SP	Brown, saturated, very loose, well sorted, medium SAND, some poorly sorted gravel (0.5 - 2.5 cm) (Fill)
18	21.8	85%	5 6 6 8	SP	Brown, saturated, very loose, well sorted, medium SAND, some poorly sorted gravel (0.5 - 2.5 cm) (Fill)
20	41.4	50%	5 10	SP	Brown, wet, loose, well sorted, medium SAND, some well sorted gravel, trace poorly sorted cobbles (Fill)

Continued Next Page

Drilling Log

Monitoring Well **AP-34-DO**

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *Building 3, 150 Sohier Road, Beverly, Massachusetts* Proj. No. *150151*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
20		41.4	50%	7 9		SP	*Continued*
22		164	100%	19 20 18 19		SP	Same as above, (Fill) (staining and at 22')
24		44.9	70%	10 29 31 39		SP	Brown, saturated, well sorted, dense SAND (Fill)
				12 57		SP	Brown, wet, loose, well sorted, medium SAND (Fill) (to 26')
26		39.5	50%	53		SW	Grayish brown, wet, poorly sorted, very hard SAND and GRAVEL, rock at 26', (strong odor)
28		13.9	100%	28 50		SP	Brown, wet, well sorted, hard, medium SAND (to 28.5')
							Rock or boulder
30		42.4	25%	5 4 12 15		SM	Dark brown, moist, loose, medium dense, SILTY SAND, some poorly sorted, coarse gravel (2 - 5 cm), (staining)
32				9		GM	Brownish gray, wet, SANDY GRAVEL (to 32.5')
		275	95%	9 11		SP	Dark brown, wet, loose, SAND, (staining at 33')
				16		CL	Gray, moist, sticky, stiff CLAY (to 34')
34		1682	60%	6 5 6 13		CH	Gray, wet, stiff CLAY, some poorly sorted gravel (0.5 - 1.5 cm)
36		773	40%	16 18 31 17		CH	Gray, wet, very stiff, CLAY, trace poorly sorted gravel
38		1118	80%	7 7 10 14		CH	Gray, wet, stiff CLAY, trace poorly sorted gravel
40		1029	60%	10 8 10 12		CH	Same as above
42							End of exploration at 42 feet below surface grade. Well set at 39.42 feet below surface grade.
44							
46							

Drilling Log

Monitoring Well **AP-35-DO**

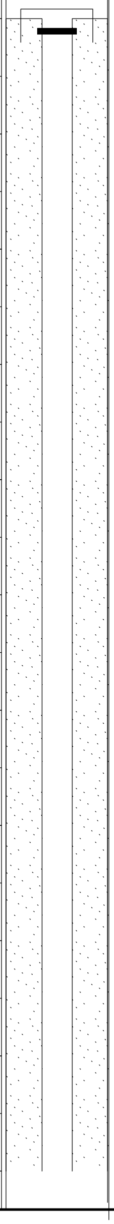
Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *Building 3, 150 Sohier Road, Beverly, Massachusetts* Proj. No. *150151*
Surface Elev. *NA* Total Hole Depth *40.0 ft.* North East
Top of Casing *NA* Water Level Initial ▽ *12.5 ft.* Static *NA* Diameter *4.25 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/Slot 0.010 in.*
Casing: Dia *2 in.* Length *20 ft.* Type *PVC*
Fill Material *#2 Sand, Bentonite, Grout* Rig/Core *CME-75/140 Hammer*
Drill Co. *TDS* Method *Hollow Stem Auger*
Driller *Gary* Log By *Dale Dailey* Date *9/12/13* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS

ND = Not Detected

Drilling started 9/11/2013 and finished 9/12/2013.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Hand cleared to 0' - 5'.
2							Light brown, wet, well sorted, medium SAND, (Fill)
4							
6							
8						SP	
10							
12 ▽							
14							
16		0.3	70%	1 2 3 3		SP	Same as above (Fill)
18		0.4	65%	2 4 6 6		SP	Same as above (Fill)
20						SP	Same as above (Fill)

Continued Next Page

Drilling Log

Monitoring Well **AP-35-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *Building 3, 150 Sohier Road, Beverly, Massachusetts* Proj. No. *150151*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
20							*Continued*
22						SP	
24		56.8	60%	10 17 18 17		SW	Brown, wet, poorly sorted, GRAVELLY SAND, (gravel 0.25 - 3 cm), trace clay
26		52.5		6 10 14 11		SW	Brown, saturated, poorly sorted, medium dense, SAND, some poorly sorted gravel (0.25 - 1.25 cm)
28							Rock or boulder at 26.5'
30						SW GW	Poorly sorted, SAND and GRAVEL, rock or boulder at 29'
32							
34		3596	70%	8 10 16 20		SW	Brown, wet, poorly sorted, medium dense SAND to 34.25', some gravel (0.5 - 2 cm)
						OL	Light brownish gray, stiff, CLAYEY SILT, some gravel
						SW	Brown, wet, dense, gravelly SAND to 35.75', (30% gravel, 0.25 - 1.0 cm)
36		3429	100%	19 18 16 10		OL	Light brownish gray, moist, stiff, SILTY CLAY, trace gravel and silt
38			0%	6 8 17 10			No recovery
40							End of exploration at 40 feet below surface grade.
42							
44							
46							

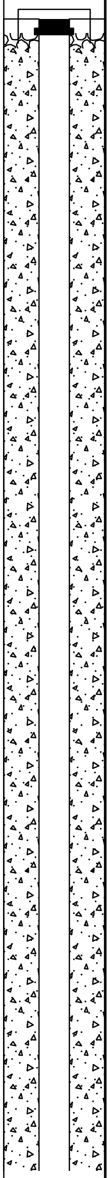
Drilling Log

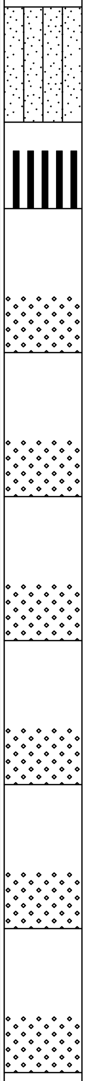
Monitoring Well **CL12-DO**

Page: 1 of 2

COMMENTS
ND = None detected

Project *Varian/Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *806395*
Surface Elev. *NA* Total Hole Depth *75.5 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial ▽ *10.0 ft.* Static *NA* Diameter *8.75 in.*
Screen: Dia *2.0 in.* Length *5.0 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2.0 in.* Length *68.5 ft.* Type *PVC*
Fill Material *Sand, Bentonite, Grout* Rig/Core *CME 85*
Drill Co. *American Drilling Service* Method *Hollow Stem Auger*
Driller *K.Bylund/R.Dean* Log By *M. Reilly* Date *4/4/00* Permit # *NA*
Checked By *R. Cadorette* License No. ____





Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Surface: Sod
0						ML	Medium to dark brown topsoil to approximately 1 foot depth, underlain by moderate, yellowish brown, sandy silt to silty sand, little fine gravel to 4 feet
5		ND	S-1 60%	2 4 3 3		ML	Olive gray, moist, sandy SILT and CLAY with traces of coarse sand/fine rounded gravel, medium stiff
10 ▽		ND	S-2 45%	12 12 9 15		SW	Moderate to reddish brown, wet,medium density, coarse to fine SAND with trace of silt and clay, trace of fine angular to rounded gravel
15		ND	S-3 50%	8 6 8 9		SW	Dark,to moderate and yellowish brown, wet, medium density, coarse to fine SAND, trace of clay and silt, trace of fine, subrounded to subangular gravel, medium density
20		ND	S-4 55%	10 10 10 10		SW	Light to moderate brown, wet, medium density,coarse to fine SAND, trace silt
25		ND	S-5 50%	6 14 12 12		SW	Same as above
30		ND	S-6 90%	4 6 15 22		SW	Moderate brown and yellowish brown, interlayered, wet,med dense, fine, SAND, medium sand with trace coarse sand, and coarse sand with some medium sand, trace fine rounded gravel, medium density
							Gravel rich layer observed at 33'
35		ND	S-7 100%	6 38		SW	Moderate brown, wet, fine and medium SAND, some coarse sand, dense (not representative, due to heaving of soil inside augers, therefore spoon only advanced 1 foot)
40							

Continued Next Page

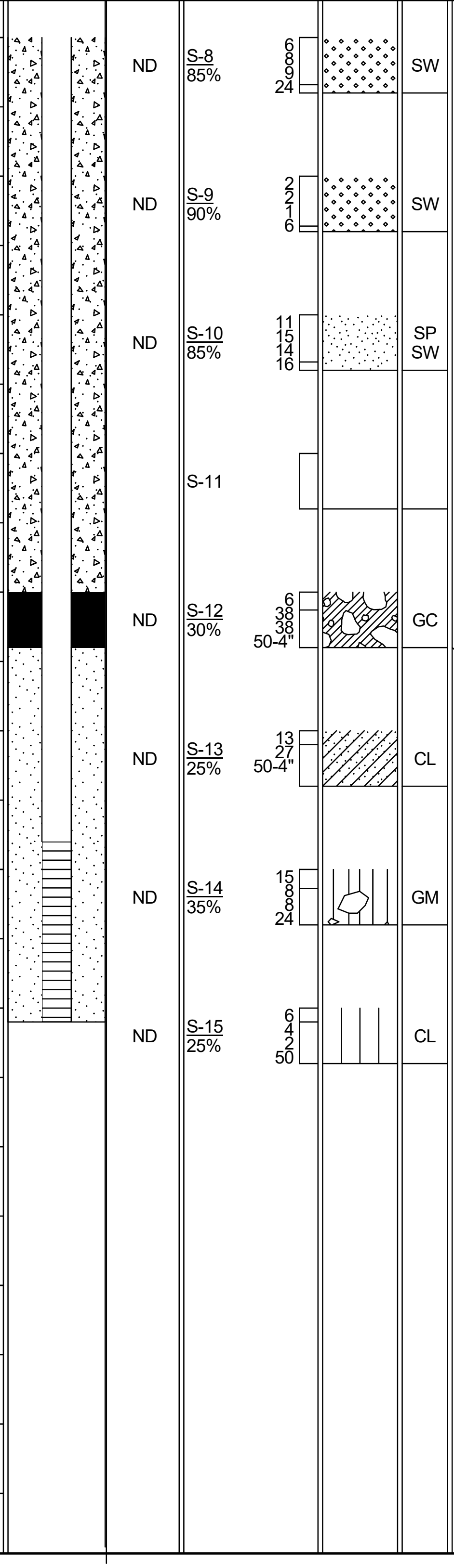
Drilling Log

Monitoring Well **CL12-DO**

Page: 2 of 2

Project *Varian/Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *806395*



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
					Continued
40	ND	S-8 85%	6 8 9 24	SW	Moderate to grayish brown, wet,med, dense, fine SAND, grading downward to coarse SAND, fine gravel in tip, medium densitiy
45	ND	S-9 90%	2 2 1 6	SW	Light to moderate brown, wet, medium, loose, to fine SAND, some coarse sand, trace fine, rounded gravel, very loose
50	ND	S-10 85%	11 15 14 16	SP SW	Light to moderate brown, wet, medium,dense SAND, trace fine, subangular, weathered gravel, layer of coarse SAND, layer of fine SAND, medium dense
55		S-11			Unable to collect sample due to >5' of "blow-in" in augers, proceed to 60'; "blow-in" recovered in sampler; light brown, wet, medium SAND, trace coarse sand
60	ND	S-12 30%	6 38 38 50-4"	GC	Greenish brown, wet,dense, medium SAND, underlain by light gray, bluish gray, and olive-brown, weathered rock (highly fractured), clay and coarse to fine sand (Very hard drilling 62 - 64 feet (cobbles or boulder))
65	ND	S-13 25%	13 27 50-4"	CL	Light gray to olive gray, wet, very dense,SILT, CLAY, and coarse to fine SAND, trace fine, rounded gravel
70	ND	S-14 35%	15 8 8 24	GM	Greenish gray, wet, CLAY, SILT, and medium to coarse SAND, trace to little subangular gravel to approximately 71.6', then yellow-brown to yellowish orange,medium density, silty coarse to medium SAND, some silt, little subrounded gravel
75	ND	S-15 25%	6 4 2 50	CL	Olive gray and greenish gray, moist, very dense,SILT, CLAY, and fine to medium SAND, trace fine, angular gravel, very dense, bottom 3 inches greenish gray and greenish black, weathered rock (possibly basalt or gabbro)
80					
85					
90					

Bottom of exploration at 75.5 feet on bedrock (auger refusal).
Well Construction:
Screen from 74 feet to 69 feet; casing from 69 feet to grade.
Completed at grade with flush roadbox set in concrete.
Sand Pack / Seal:
Sand Pack 75.5 feet to 62 feet; bentonite 62 feet to 60 feet; grout 60 feet to grade.

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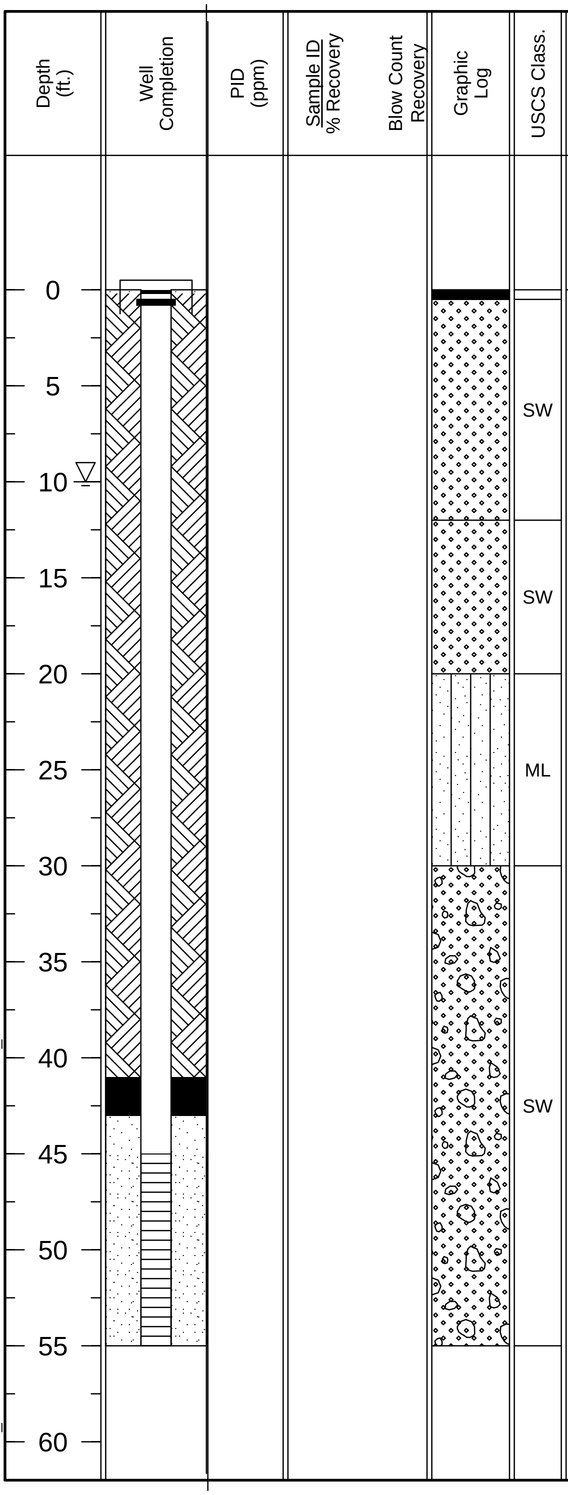
Drilling Log

Monitoring Well **CL13-DO**

Page: 1 of 1

Project *Varian/Beverly*
Owner *Varian Medical Systems Inc.*
Location *Hallard Road, Beverly, MA*
Proj. No. *820014*
Surface Elev. *NA*
Total Hole Depth *55.0 ft.*
North *575768.6587 ft.*
East *765013.9447 ft.*
Top of Casing *NA*
Water Level Initial ∇ *10.0 ft.*
Static *NA*
Diameter *10 in.*
Screen: Dia *2 in.*
Length *10 ft.*
Type/Size *10 slot PVC*
Casing: Dia *2 in.*
Length *46 ft.*
Type *PVC*
Fill Material *sand, bentonite, grout*
Rig/Core *Barber*
Drill Co. *Layne Christensen Company*
Method *Dual Rotary*
Driller
Log By *Tom LeCalvez*
Date *12/28/00*
Permit # *NA*
Checked By *Raymond Cadorette*
License No.

COMMENTS



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Graygreen, coarse-fine SAND, little medium-fine gravel, wet at 10'

Graygreen, coarse-fine SAND, little silt and clay, trace medium-fine gravel

Gray, saturated, SILT with trace sand

Gray, coarse-fine SAND, with little medium-fine gravel, and trace silt, refusal at 55'

Well Construction

Well screened with 10 slot 2 inch diameter PVC screening from 55 to 45 feet, 2 inch PVC casing from 45 feet to grade. Completed at grade with fluch roadbox set in concrete.

Sand pack/Seal:

Sand Pack: from 55 to 43 feet, Bentonite from 43 to 41 feet, grout to grade

Bottom of Exploration

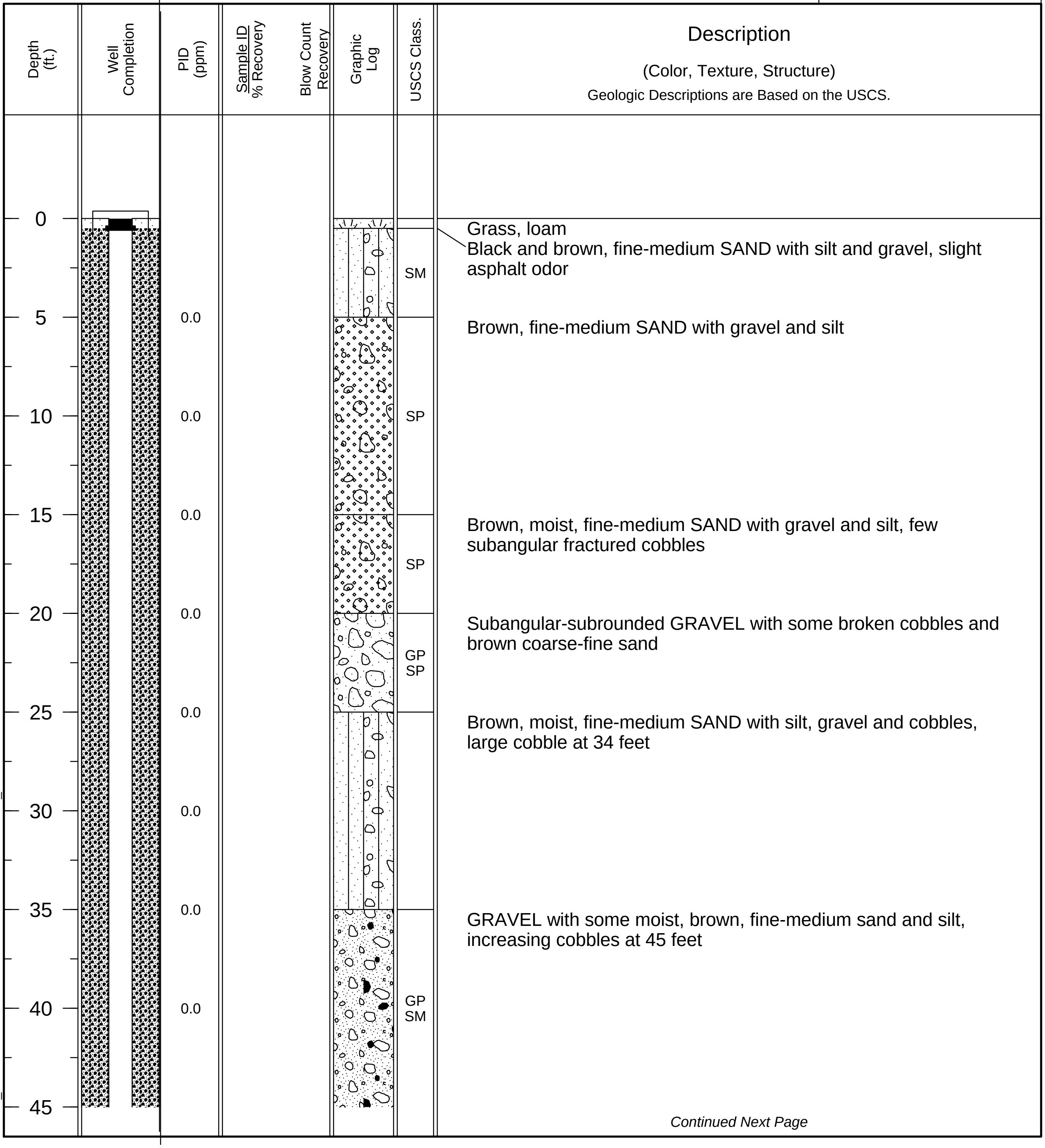
Shaw E & I, Inc.

Drilling Log

Monitoring Well **OB 4-DO**

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *70.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *50 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff* Method *Hollow Stem Auger*
Driller *Rick Navatka* Log By *Steve McGinn* Date *5/8/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Well located at 28 Tozer Road
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0				SM	Grass, loam Black and brown, fine-medium SAND with silt and gravel, slight asphalt odor
5	0.0			SP	Brown, fine-medium SAND with gravel and silt
10	0.0				
15	0.0			SP	Brown, moist, fine-medium SAND with gravel and silt, few subangular fractured cobbles
20	0.0			GP SP	Subangular-subrounded GRAVEL with some broken cobbles and brown coarse-fine sand
25	0.0				Brown, moist, fine-medium SAND with silt, gravel and cobbles, large cobble at 34 feet
30	0.0				
35	0.0			GP SM	GRAVEL with some moist, brown, fine-medium sand and silt, increasing cobbles at 45 feet
40	0.0				
45					

Continued Next Page

Shaw E & I, Inc.

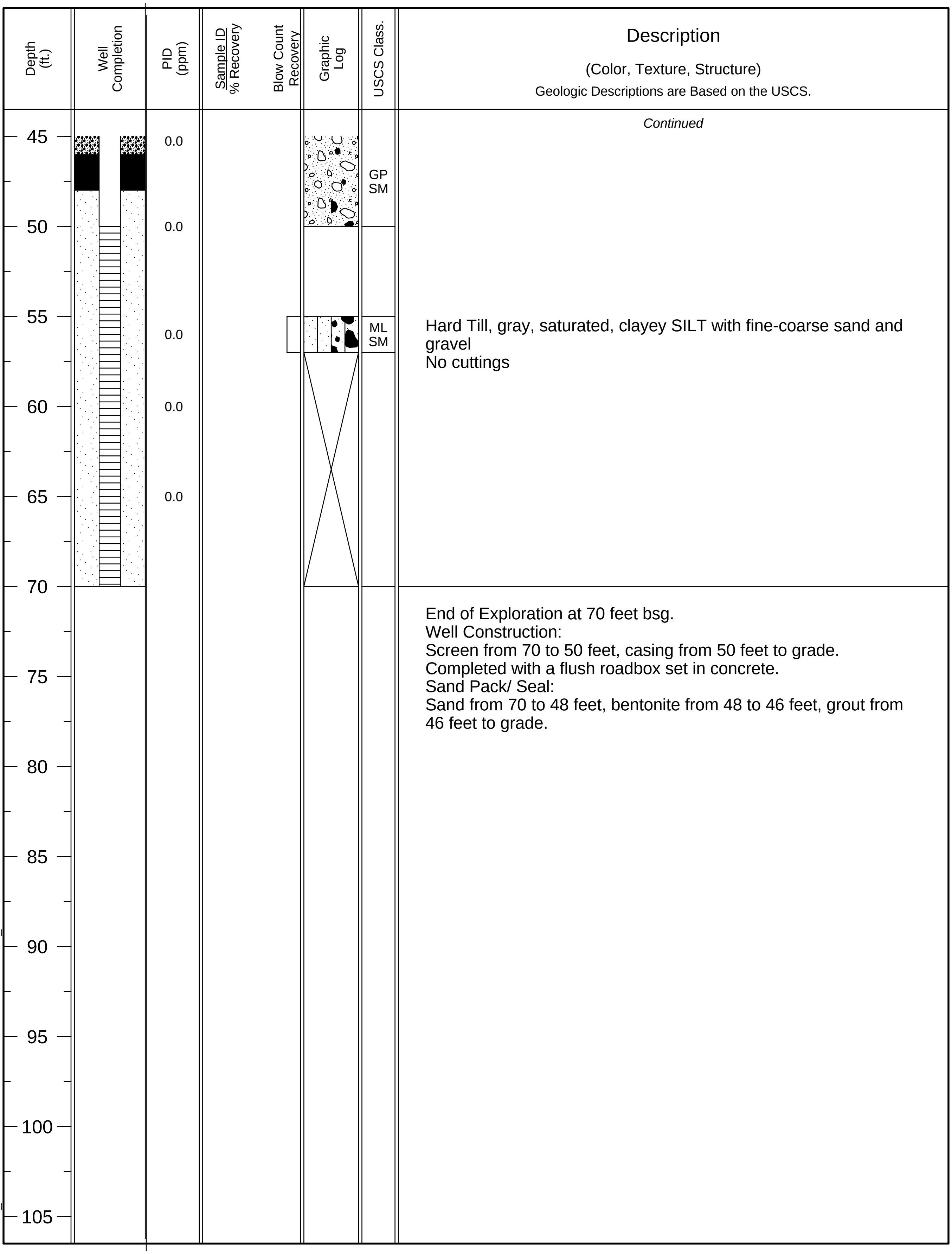
Drilling Log

Monitoring Well **OB 4-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Continued

Hard Till, gray, saturated, clayey SILT with fine-coarse sand and gravel
No cuttings

End of Exploration at 70 feet bsg.
Well Construction:
Screen from 70 to 50 feet, casing from 50 feet to grade.
Completed with a flush roadbox set in concrete.
Sand Pack/ Seal:
Sand from 70 to 48 feet, bentonite from 48 to 46 feet, grout from 46 feet to grade.

Shaw E & I, Inc.

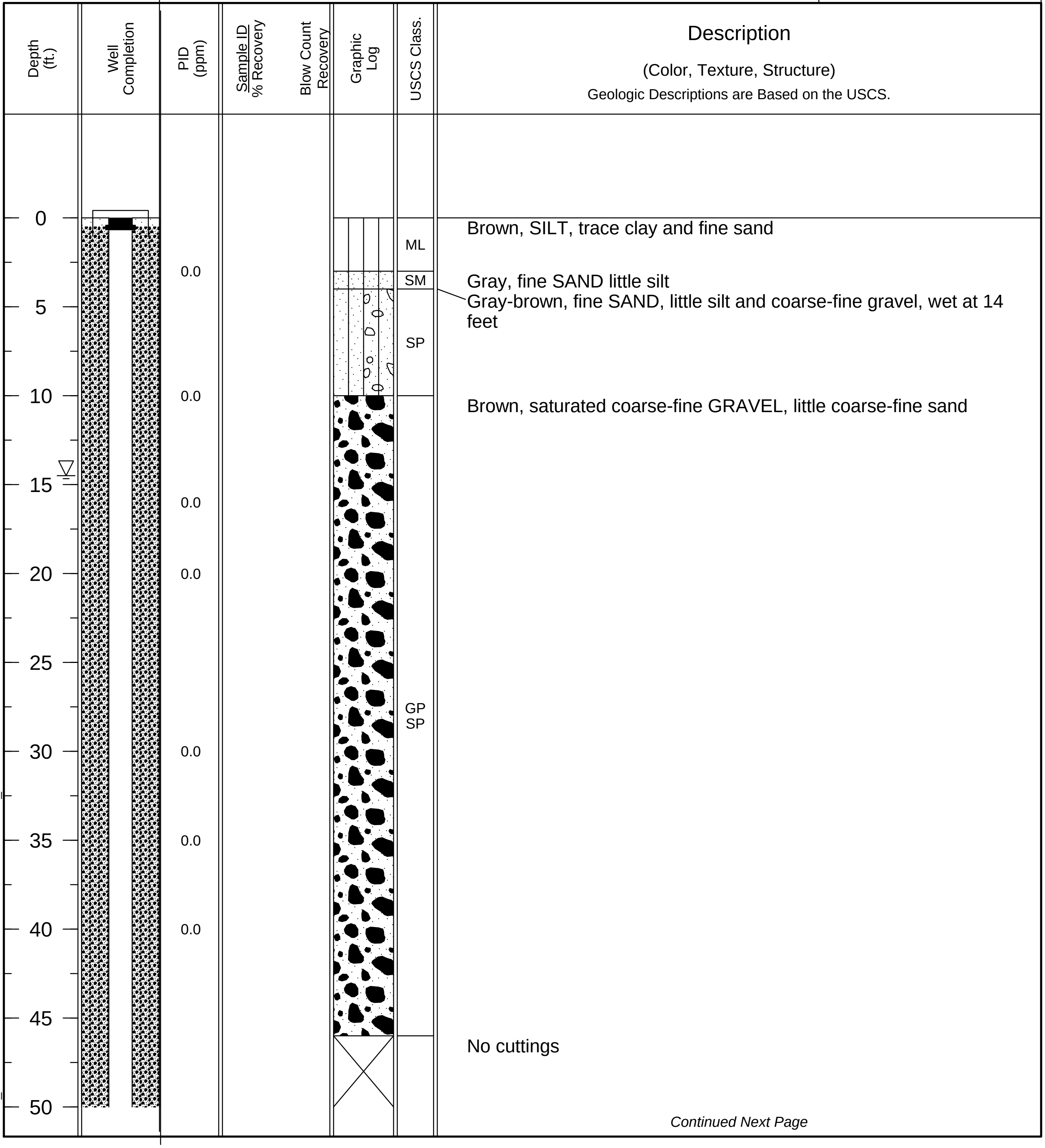
Drilling Log

Monitoring Well **OB 5-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *86.0 ft.* North East
Top of Casing *NA* Water Level Initial ∇ *14.5 ft.* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *66 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff* Method *Hollow Stem Auger*
Driller *Rick Navatka* Log By *Tom LeCalvez* Date *3/21/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Well located at 29 Tozer Road
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						ML	Brown, SILT, trace clay and fine sand
		0.0				SM	Gray, fine SAND little silt
5						SP	Gray-brown, fine SAND, little silt and coarse-fine gravel, wet at 14 feet
10		0.0				GP SP	Brown, saturated coarse-fine GRAVEL, little coarse-fine sand
∇							
15							
		0.0					
20		0.0					
25							
30		0.0					
35		0.0					
40		0.0					
45							
							No cuttings
50							

Continued Next Page

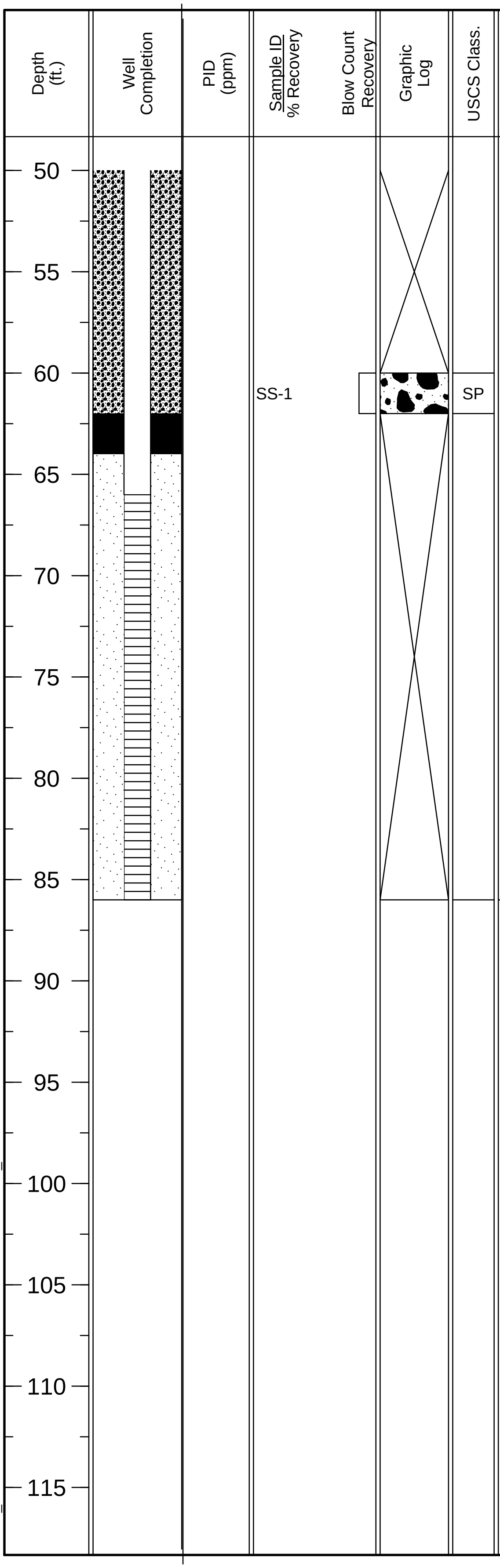
Shaw E & I, Inc.

Drilling Log

Monitoring Well **OB 5-DO**

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Continued

Split spoon, Brown coarse-fine SAND and coarse-fine gravel

No cuttings

Auger refusal at 86 feet bsg

End of Exploration at 86 feet bsg.
Well Construction:
Screen from 86 to 66 feet, casing from 66 feet to grade.
Completed with a flush roadbox set in concrete.
Sand Pack/Seal:
Sand from 86 to 64 feet, bentonite from 64 to 62 feet, grout from 62 feet to grade.

Shaw E & I, Inc.

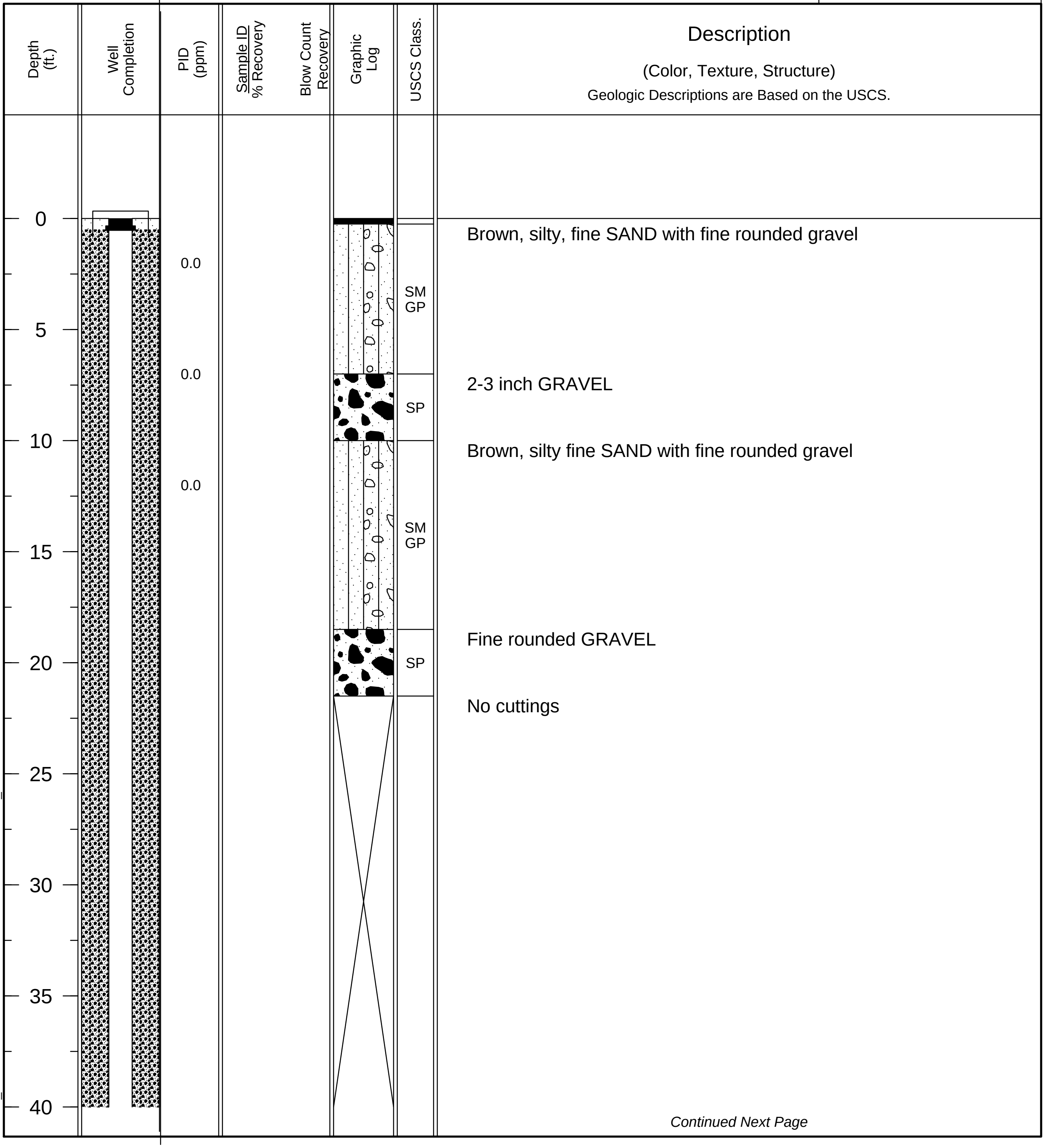
Drilling Log

Monitoring Well **OB 6-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *77.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *56 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *HSA*
Drill Co. *Paratt Wolff* Method *Hollow Stem Auger*
Driller *Rick Navatka* Log By *Dave Wattles* Date *4/11/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Well located on Sonning Road
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Brown, silty, fine SAND with fine rounded gravel
		0.0					
						SM GP	
5							
		0.0					2-3 inch GRAVEL
						SP	
10							Brown, silty fine SAND with fine rounded gravel
		0.0					
						SM GP	
15							
							Fine rounded GRAVEL
20						SP	
							No cuttings
25							
30							
35							
40							

Continued Next Page

Shaw E & I, Inc.

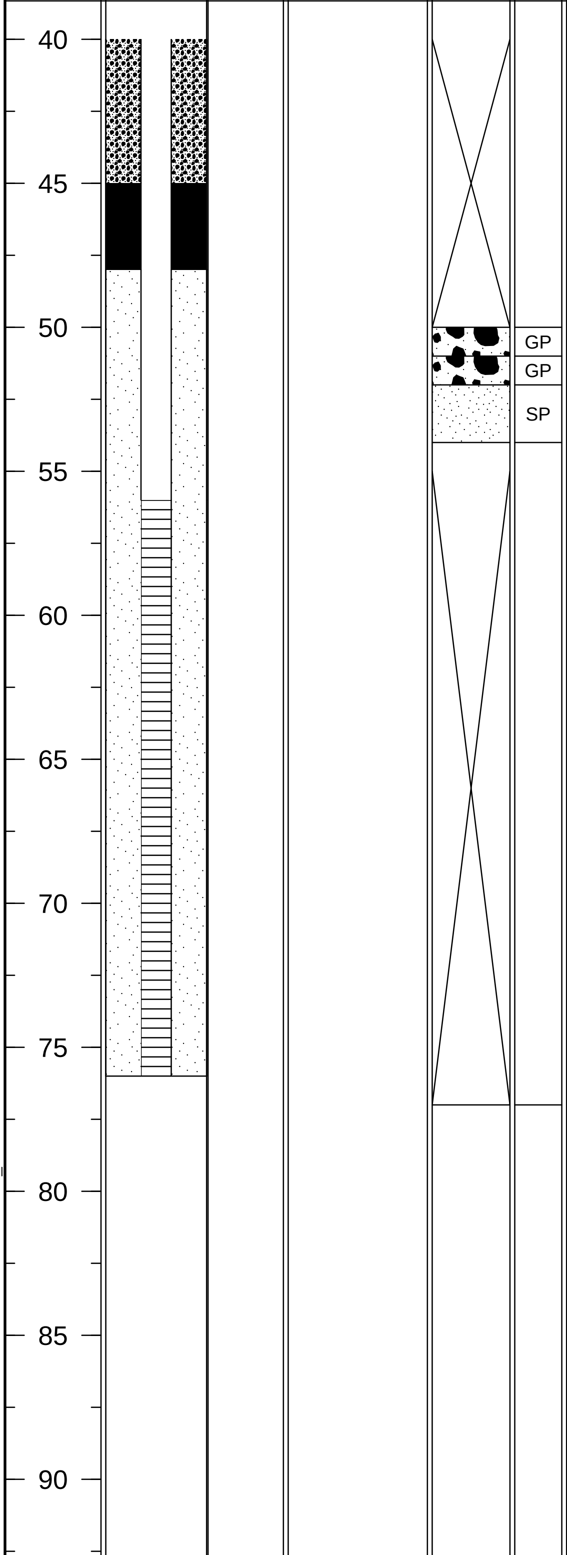
Drilling Log

Monitoring Well **OB 6-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Continued
50						GP	1 inch rounded GRAVEL
						GP	GRAVEL finining downward
						SP	Very coarse to coarse SAND
55							No cuttings
77							Bottom of Exploration at 77 feet bsg. Well Construction: Screen from 76 to 56 feet, casing from 56 feet to grade, completed with a flush road box set in concrete. Sand Pack/ Seal: Sand from 76 to 48 feet, bentonite from 48 to 45 feet, grout from 45 feet to grade.



SHAW_COMMERCIAL Rev: 6/12/02 WELLLOG2.GPJ IT_CORP.GDT 11/3/09

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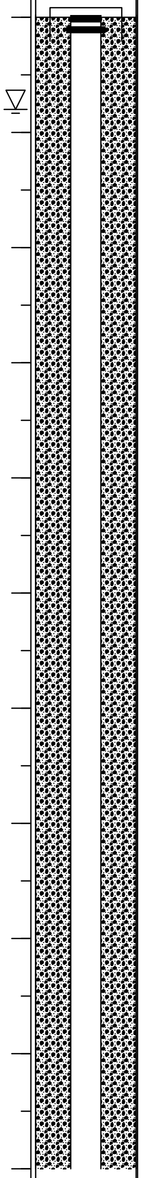
Drilling Log

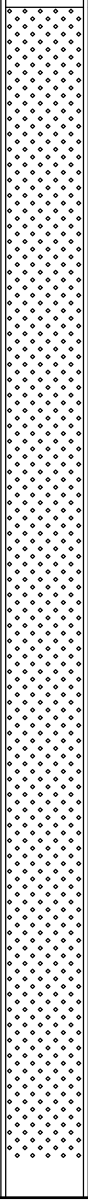
Monitoring Well **OB 8-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical System, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *80.0 ft.* North East
Top of Casing *NA* Water Level Initial *▽ 4.0 ft.* Static *NA* Diameter *4.25 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *70 ft.* Type *PVC*
Fill Material *Native, bentonite, grout* Rig/Core *Foremost*
Drill Co. *AM Drilling* Method *Hollow Stem Auger*
Driller *J. Skaife* Log By *Kara Tudman* Date *8/6/02* Permit # *NA*
Checked By License No.

COMMENTS
BDL = Below Detection Limit





Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Pavement
0		BDL	CG-1				Brown, dry, coarse to fine SAND, some fine gravel and silt
▽							
5							
10		BDL	CG-2				Brown, wet, coarse to medium SAND, trace fine sand
15							
20		BDL	CG-3				Same as above
25						SW	
30		BDL	CG-4				Brown, wet, coarse to medium SAND, trace fine sand and fine gravel
35							
40		BDL	CG-5				Brown, wet, coarse to medium SAND, little fine gravel, trace fine sand
45							
50							

Continued Next Page

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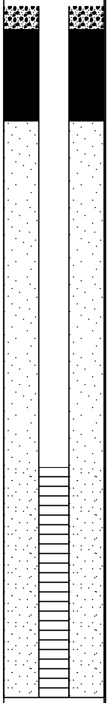
Drilling Log

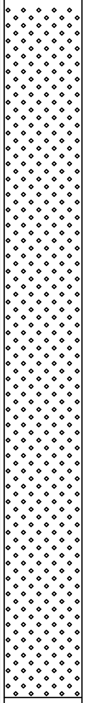
Monitoring Well **OB 8-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical System, Inc.*

Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *832837*





Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
					Continued
50	BDL	CG-6			Brown, wet, medium to fine SAND, some coarse sand and silt
55					
60	BDL	CG-7			Same as above
65				SW	
70	BDL	CG-8			Same as above
75					
					Same as above
80	BDL	CG-9			Bottom of exploration at 80 feet. Well Construction: Screen from 80 to 70 feet, casing from 70 feet to grade. Completed with flush roadbox set in concrete. Sand Pack / Seal: Sand pack from 80 to 55 feet, bentonite from 55 to 51 feet, grout 51 feet to grade.
85					
90					
95					
100					
105					
110					
115					

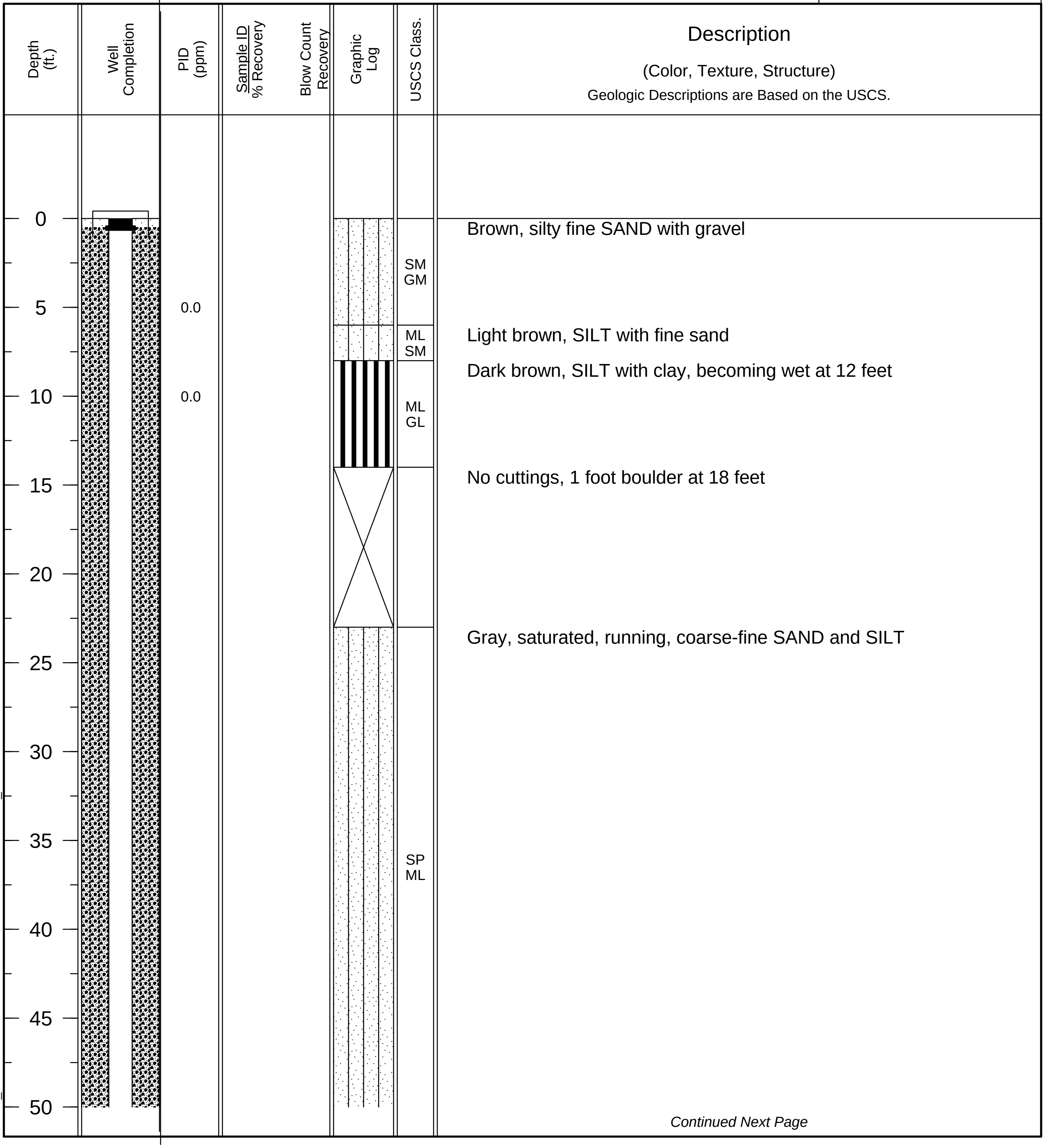
Shaw E & I, Inc.

Drilling Log

Monitoring Well **OB 9-DO**

Project Varian Beverly Owner Varian Medical Systems, Inc.
Location 150 Sohier Road, Beverly, MA Proj. No. 832837
Surface Elev. NA Total Hole Depth 97.0 ft. North East
Top of Casing NA Water Level Initial NA Static NA Diameter 4 in.
Screen: Dia 2 in. Length 20 ft. Type/Size PVC/.010 in.
Casing: Dia 2 in. Length 76 ft. Type PVC
Fill Material Sand, bentonite, grout Rig/Core Ingersol Rand
Drill Co. Paratt Wolff Method Hollow Stem Auger
Driller Rick Navatka Log By Dave Wattles Date 4/3/02 Permit # NA
Checked By S. Metivier License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						SM GM	Brown, silty fine SAND with gravel
5		0.0					
						ML SM	Light brown, SILT with fine sand
						ML GL	Dark brown, SILT with clay, becoming wet at 12 feet
10		0.0					
15							No cuttings, 1 foot boulder at 18 feet
20							
25						SP ML	Gray, saturated, running, coarse-fine SAND and SILT
30							
35							
40							
45							
50							

Continued Next Page

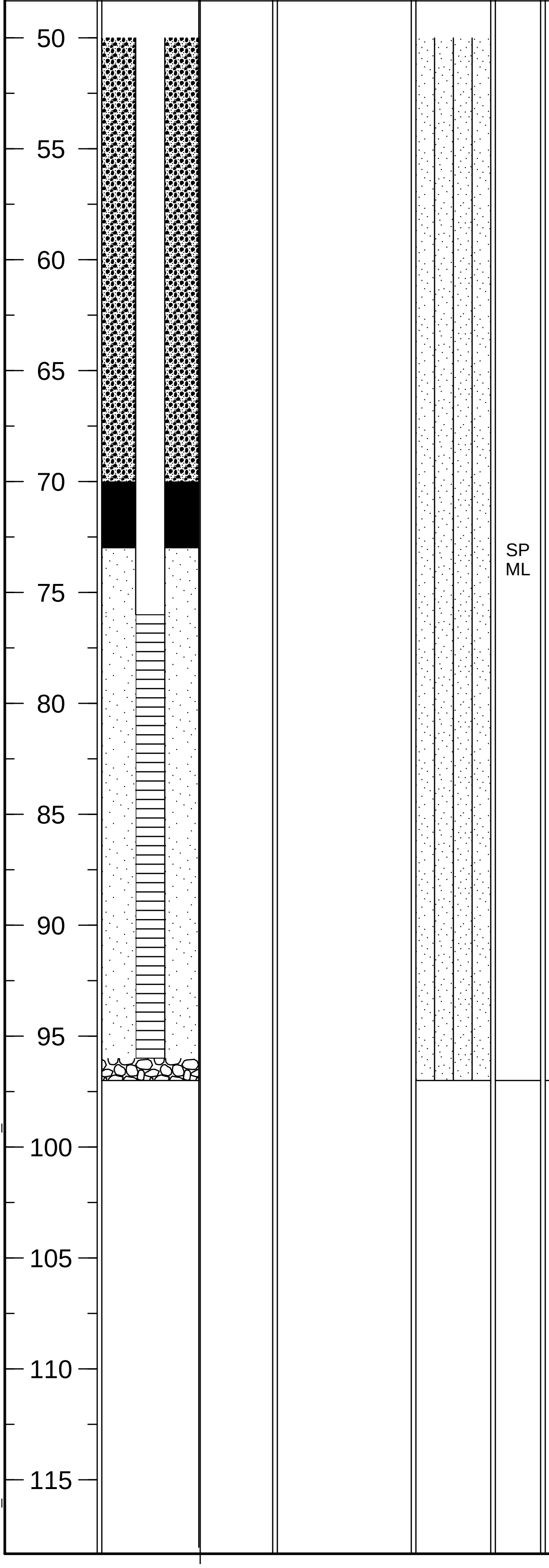
Drilling Log

Monitoring Well **OB 9-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Continued
73–97						SP ML	
97							End of Exploration at 97 feet bsg. Well Construction: Screen from 96 to 76 feet, casing from 76 feet to grade. Completed with a flush roadbox set in concrete. Sand Pack/ Seal: Sand from 96 to 73 feet, bentonite from 73 to 70 feet, grout from 70 feet to grade.



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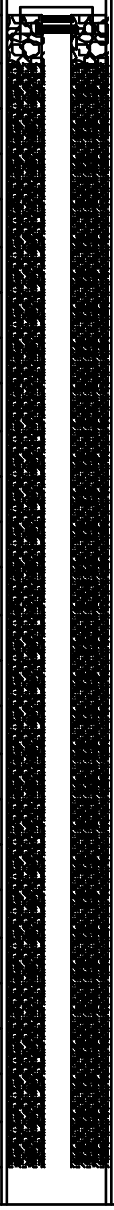
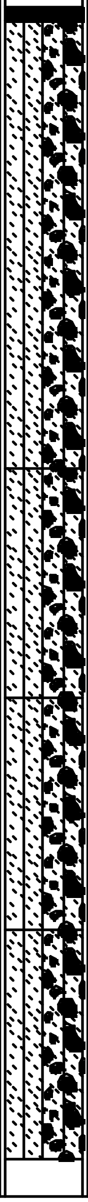
Drilling Log

Monitoring Well **OB10-DO**

Project *Varian/Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *49.5 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *8.5 in.*
Screen: Dia *2.0 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2.0 in.* Length *29.5 ft.* Type *PVC*
Fill Material *Sand, Bentonite, Grout* Rig/Core *CME*
Drill Co. *Dragin Drilling, Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *M. Reilly* Date *12/27/01* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
ND = None detected





Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Asphalt
0							Asphalt Brown, moist, fine to coarse SAND and SILT, little to some fine rounded gravel
2		ND					
4						SM SP	
6							
8							
10		ND					Olive brown, moist, fine to coarse SAND and SILT, little to some fine rounded gravel
12						SM SP	
14							
		ND					Olive brown, moist, fine to coarse SAND and SILT, little fine to medium rounded gravel
16							
18						SM SP	
20		ND					Olive brown, moist, fine to coarse SAND and SILT, trace fine to medium rounded gravel and cobbles
22						SM SP	
24							

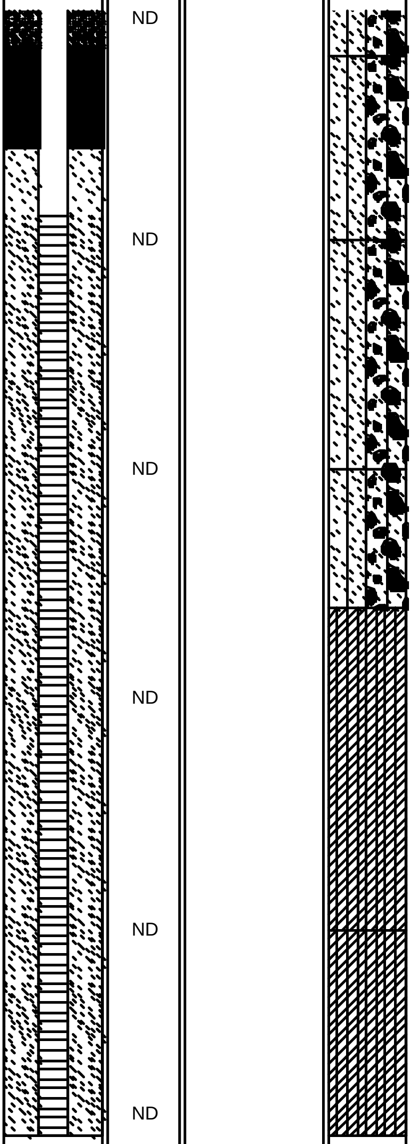
Continued Next Page

Drilling Log

Monitoring Well **OB10-DO**

Page: 2 of 2

Project Varian/Beverly
Owner Varian Medical Systems, Inc.
Location 150 Sohier Road, Beverly, Massachusetts
Proj. No. 832837



Continued

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
	ND			SM SP	Olive brown, moist, fine to coarse SAND and SILT, trace fine to medium rounded gravel and cobbles
26					Brown, moist, SILT and fine to medium SAND, trace cobbles and fine to medium gravel
28				SM SP	
30	ND				Brown, moist, SILT and fine to medium SAND, trace cobbles and fine to medium gravel
32				SM SP	
34					
	ND				Brown, moist, SILT and fine to medium SAND, trace cobbles and fine to medium gravel
36				SM SP	
38					Olive brown to olive gray, moist, CLAY, little silt, trace fine sand
40	ND				
42				CL ML	
44					
	ND				Olive gray, moist, CLAY, little silt, trace fine sand
46					
48				CL ML	
	ND				
50					Competent Bedrock at 49.5 feet bsg; End of Exploration
52					
54					
56					
58					

Well Construction:

Screen from 49.5 ffet to 29.5 feet, casing from 29.5 feet to grade. Completed with a flush roadbox set in concrete.

Sand Pack/ Seal:
Sand pack from 49.5 feet to 28 feet, bentonite from 28 feet to 26 feet, grout from 26 feet to grade.

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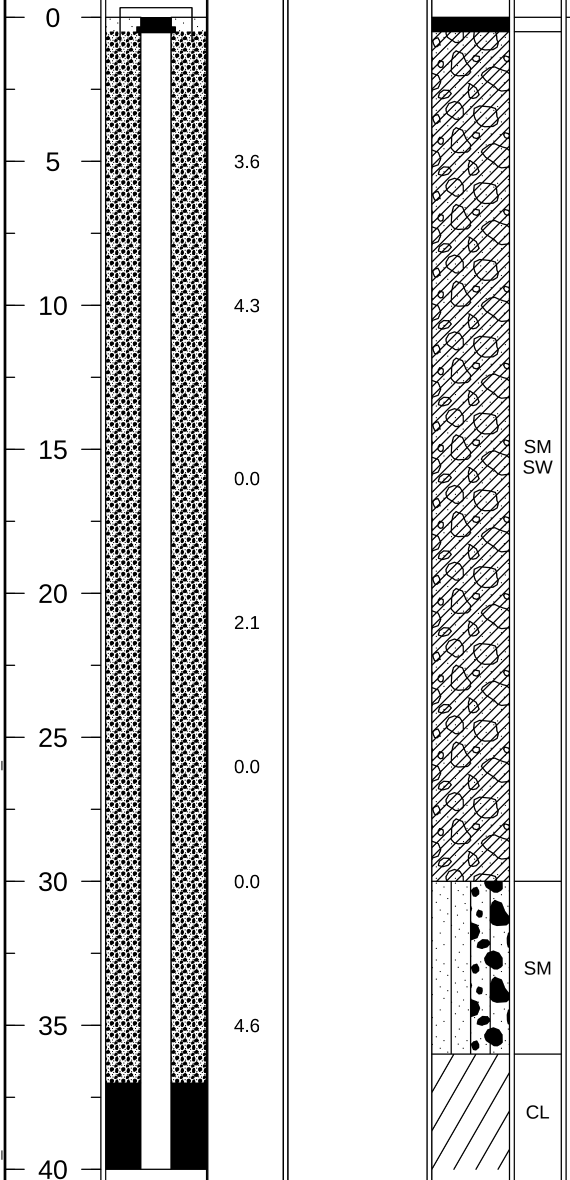
Drilling Log

Monitoring Well **OB 11-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *62.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *42 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *CME*
Drill Co. *Dragin Drilling Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *Dave Wattles* Date *1/15/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Brown, fine-medium SAND with silt, gravel and occassional cobbles
5		3.6					
10		4.3					
15						SM SW	
		0.0					
20		2.1					
25							
		0.0					
30		0.0					Brown, moist, fine-medium SAND with increasing silt and clay,
						SM	
35		4.6					
							Gray, moist CLAY
						CL	
40							

Continued Next Page

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Shaw E & I, Inc.

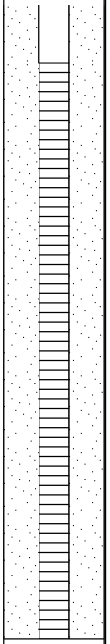
Drilling Log

Monitoring Well **OB 11-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
40		1.2			▨		*Continued*
45		0.0			▨		
50		0.0			▨	CL	
55		0.0			▨		
60					▨		
65							Bottom of Exploration at 62 feet bsg Well Construction: Screen from 62 to 42 feet; casing from 42 feet to grade. Completed with flush roadbox set in concrete. Sand Pack/ Seal: Sand pack from 62 to 40 feet; bentonite 40 to 37 feet; grout 37 feet to grade.
70							
75							
80							
85							
90							

Shaw E & I, Inc.

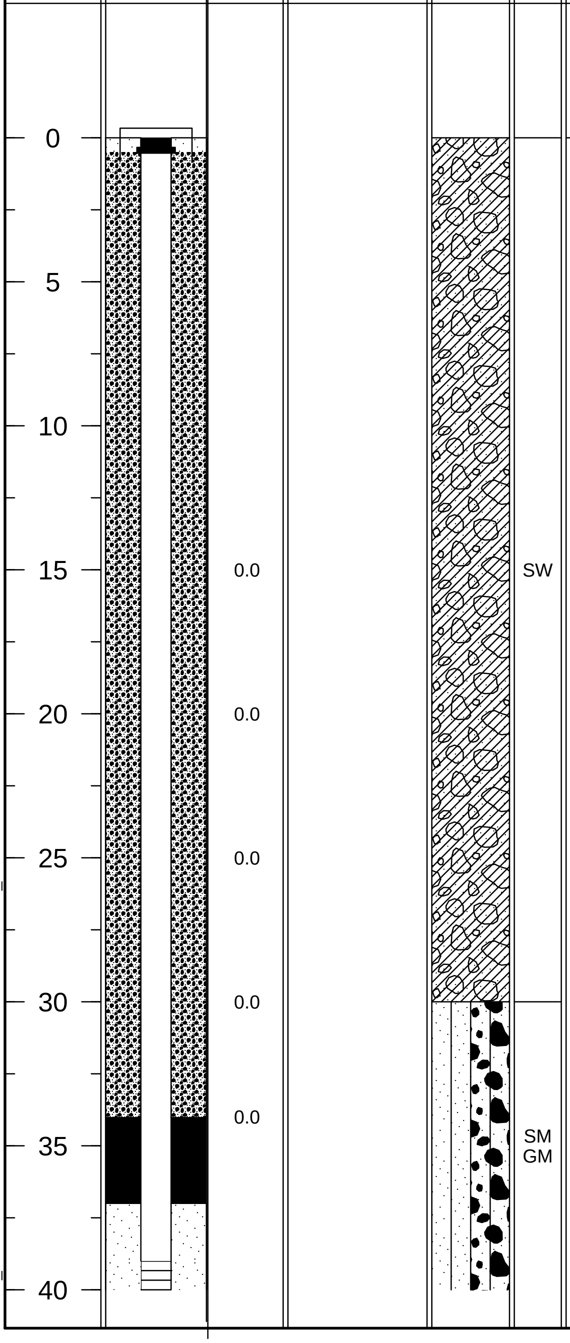
Drilling Log

Monitoring Well **OB 12-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *60.0 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *39 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *CME*
Drill Co. *Dragin Drilling Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *Dave Wattles* Date *1/18/02* Permit # *NA*
Checked By *S. Metivier* License No. ____

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Light brown fine SAND with gravel and occassional cobbles
15		0.0				SW	
20		0.0					
25		0.0					
30		0.0					Light brown fine SAND with gravel with increasing silt and clay
		0.0					
35						SM GM	

Continued Next Page

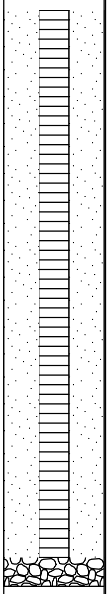
Shaw E & I, Inc.

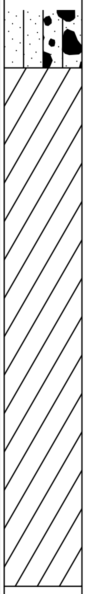
Drilling Log

Monitoring Well **OB 12-DO**

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*





Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Continued
40		0.0				SM GM	
						CL	Gray, wet CLAY
45		0.0					
50		0.0					
55							
60							Bottom of Exploration at 60 feet bsg. Well Construction: Screen from 60 to 40 feet; casing 40 feet to grade. Completed with flush roadbox set in concrete. Sand Pack/ Seal: Sand pack 60 to 37 feet; bentonite 37 to 34 feet; grout 34 feet to grade.
65							
70							
75							
80							
85							
90							

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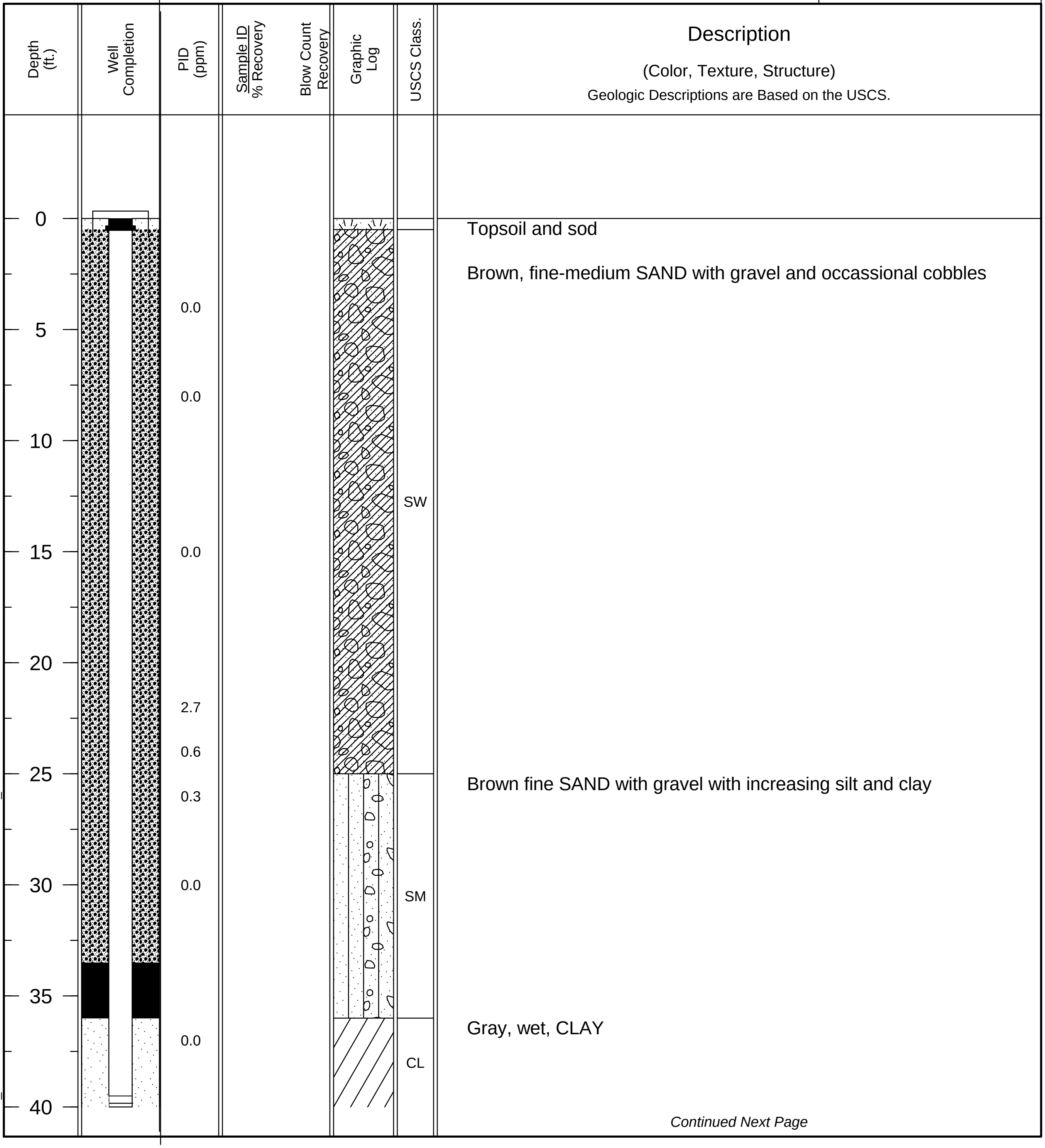
Drilling Log

Monitoring Well **OB 14-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *59.5 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *39.5 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *CME*
Drill Co. *Dragin Drilling Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *Dave Wattles* Date *1/3/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Description
(Color, Texture, Structure)
Geologic Descriptions are Based on the USCS.

Topsoil and sod

Brown, fine-medium SAND with gravel and occassional cobbles

Brown fine SAND with gravel with increasing silt and clay

Gray, wet, CLAY

Continued Next Page

Shaw E & I, Inc.

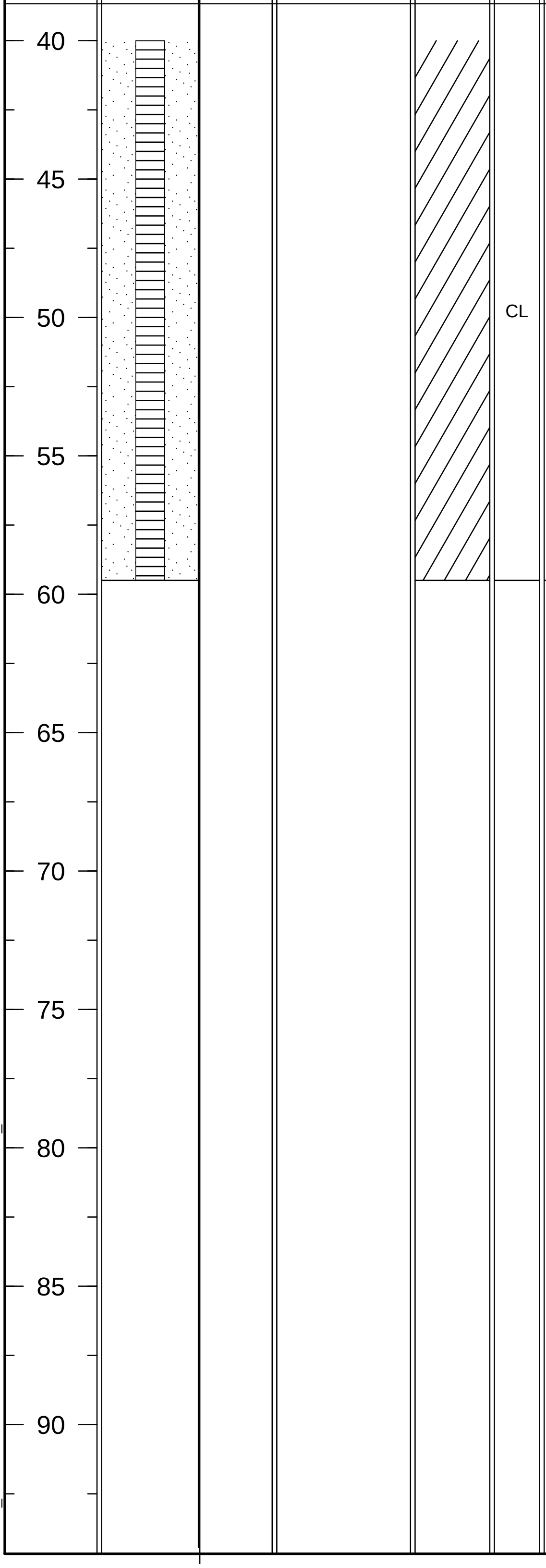
Drilling Log

Monitoring Well **OB 14-DO**

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Continued
50						CL	
60							Bottom of Exploration at 59.5 feet bsg Well Construction: Screen from 59.5 to 39.5 feet; casing from 39.5 feet to grade. Completed with flush roadbox set in concrete. Sand Pack/ Seal: Sand pack from 59.5 to 36.5 feet; bentonite 36.5 to 33.5 feet; grout 33.5 feet to grade.



Shaw E & I, Inc.

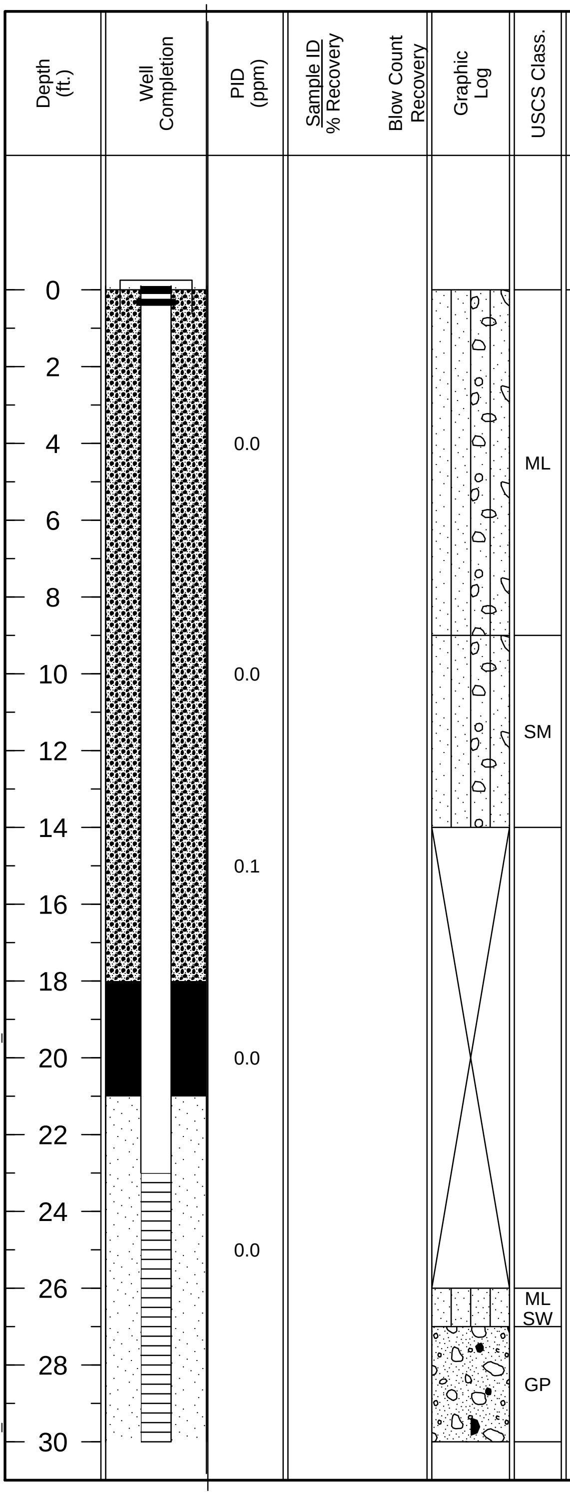
Drilling Log

Monitoring Well **OB 17-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *43.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *23 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Ingersol, Rand*
Drill Co. *Paratt Wolff* Method *Hollow Stem Auger*
Driller *Rick Navatka* Log By *M. Reilly/ D. Wattles* Date *3/14/02* Permit # *NA*
Checked By *S. Metivier* License No.

COMMENTS
Well located on Commons Drive
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Brown SILT, coarse-fine sand, coarse-fine rounded gravel

Brown, moist to wet, silty coarse-medium SAND and fine rounded gravel, boulder at 10 feet

No cuttings

Saturated, brown, SILT and fine SAND, some fine gravel

GRAVEL and COBBLES

Continued Next Page

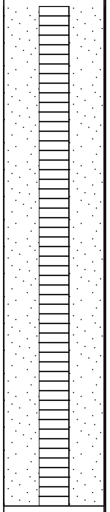
SHAW_COMMERCIAL Rev: 6/12/02 WELLLOG2.GPJ IT_CORP.GDT 11/3/09

Shaw
Shaw E & I, Inc.

Drilling Log

Monitoring Well **OB 17-DO**
Page: 2 of 2

Project Varian Beverly
Owner Varian Medical Systems, Inc.
Location 150 Sohier Road, Beverly, MA
Proj. No. 832837



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Continued
30		0.1					Brown, saturated SAND and SILT, some gravel and cobbles
32							
34							
		0.0					
36						ML SW	
38							
40		0.0					
42							
44							End of Exploration at 43 feet bsg.
46							Well Construction: Screen from 43 to 23 feet, casing from 23 feet to grade. Completed with a flush roadbox set in concrete. Sand Pack/ Seal: Sand from 43 to 21 feet, bentonite from 21 to 18 feet, grout from 18 feet to grade.
48							
50							
52							
54							
56							
58							
60							
62							
64							
66							
68							
70							

Shaw E & I, Inc.

Drilling Log

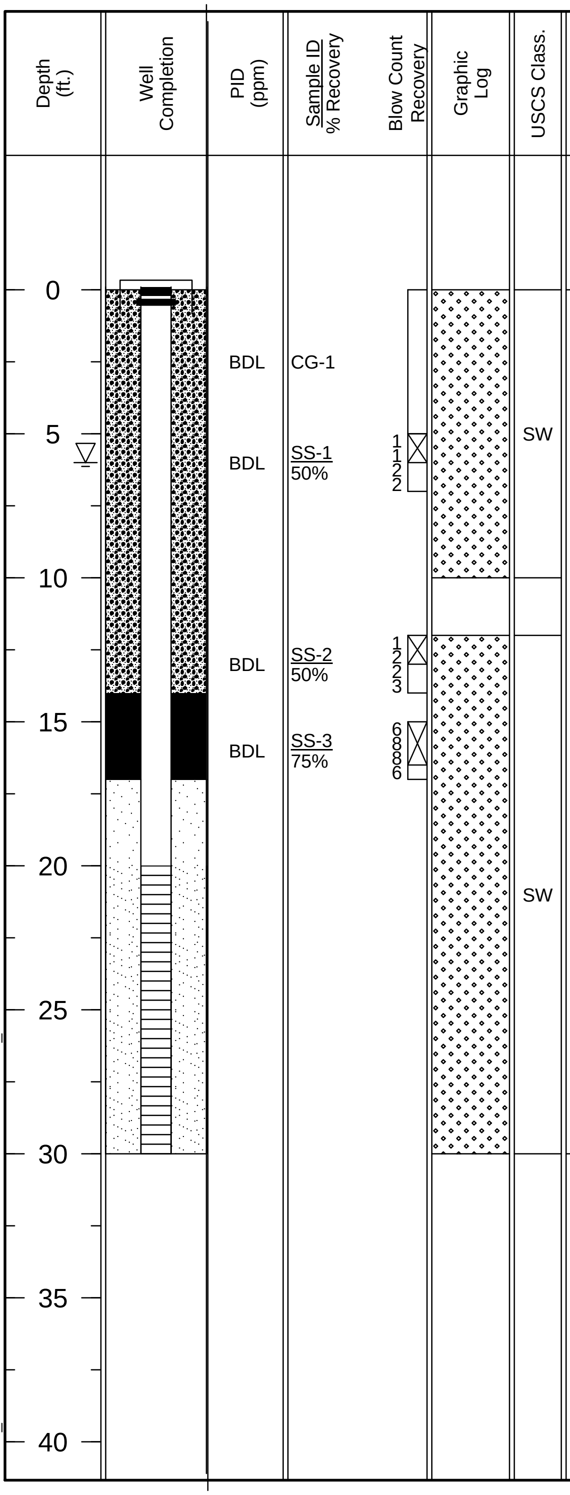
Monitoring Well **OB 18-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical System, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *30.0 ft.* North East
Top of Casing *NA* Water Level Initial ∇ *6.0 ft.* Static *NA* Diameter *4.25 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *20 ft.* Type *PVC*
Fill Material *Native, bentonite, grout* Rig/Core *Foremost/Split Spoon*
Drill Co. *AM Drilling* Method *Hollow Stem Auger*
Driller *J. Skaife* Log By *Kara Tudman* Date *8/5/02* Permit # *NA*
Checked By License No.

COMMENTS
BDL = Below Detection Limit

Could not sample past 15' - 17' interval due to running sands.



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					Ground Surface
					Brown, dry, medium to fine SAND, some coarse sand, trace fine gravel
	BDL	CG-1			
5	BDL	SS-1 50%	1 1 2 2	SW	Same as above Brown, wet, coarse to fine SAND, some fine gravel
10					Obstruction - concrete
	BDL	SS-2 50%	1 2 2 3		Brown, wet, coarse to medium SAND, some fine gravel, little fine sand and silt
15	BDL	SS-3 75%	6 8 8 6		Brown, wet, coarse to medium SAND, some fine sand, little silt and fine gravel
20				SW	
30					Bedrock

Bottom of exploration at 30 feet.
Well Construction:
Screen from 30 to 20 feet, casing from 20 feet to grade.
Completed with flush roadbox set in concrete.
Sand Pack / Seal:
Sand pack from 30 to 17 feet, bentonite from 17 to 14 feet, grout 14 feet to grade.

Shaw
Shaw E & I, Inc.

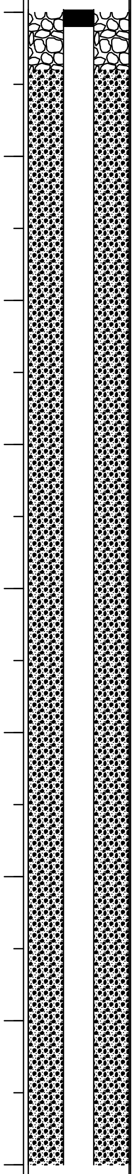
Drilling Log

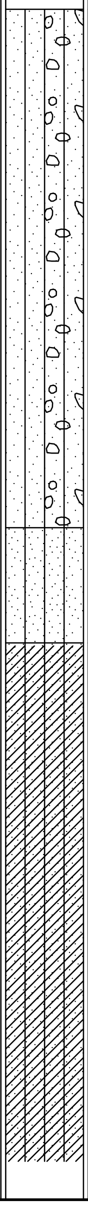
Monitoring Well **OB 19-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical System, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *65.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4.25 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/0.010 Slot in.*
Casing: Dia *2 in.* Length *45 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Ingersol Rand*
Drill Co. *Paratt Wolff* Method *HSA*
Driller *Rick Navatka* Log By *Dave Wattles* Date *3/5/02* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS





Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							
							Light brown, fine SAND with silty gravel, occasional cobbles
5		1.3					
						SM GP	
10		55.9					
		72.6					GRAVEL with brown, fine, silty sand
		66.3					Brown, fine SILTY SAND with gravel
		1.9					
15							
							Brown, moist, SILTY SAND
		1.2					
20						SM	Brown, wet, SILTY SAND
							Moist, SILTY SAND, with clay
		23.6					
							Wet, fine SAND, with silt and clay
25							
		9.1					
							saturated, fine SAND with silt and clay
30						SM CL	
35							
40							

Continued Next Page

Shaw
Shaw E & I, Inc.

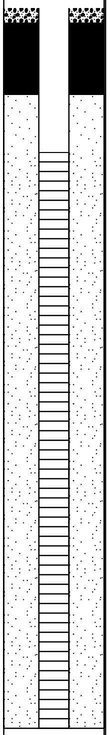
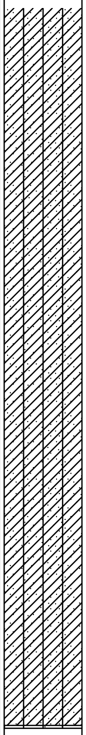
Drilling Log

Monitoring Well **OB 19-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical System, Inc.*

Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *832837*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Continued
40							
							same as above
45							
50							
						SM CL	same as above
55							
60							
65							
							Bottom of exploration at 65 feet bsg. Well construction: Screen from 65 to 45 feet, casing from 45 feet to grade Sand pack/seal: Sand from 65 to 43 feet, bentonite from 43 to 40.5 feet, grout from 40.5 to 2 feet
70							
75							
80							
85							
90							

Shaw E & I, Inc.

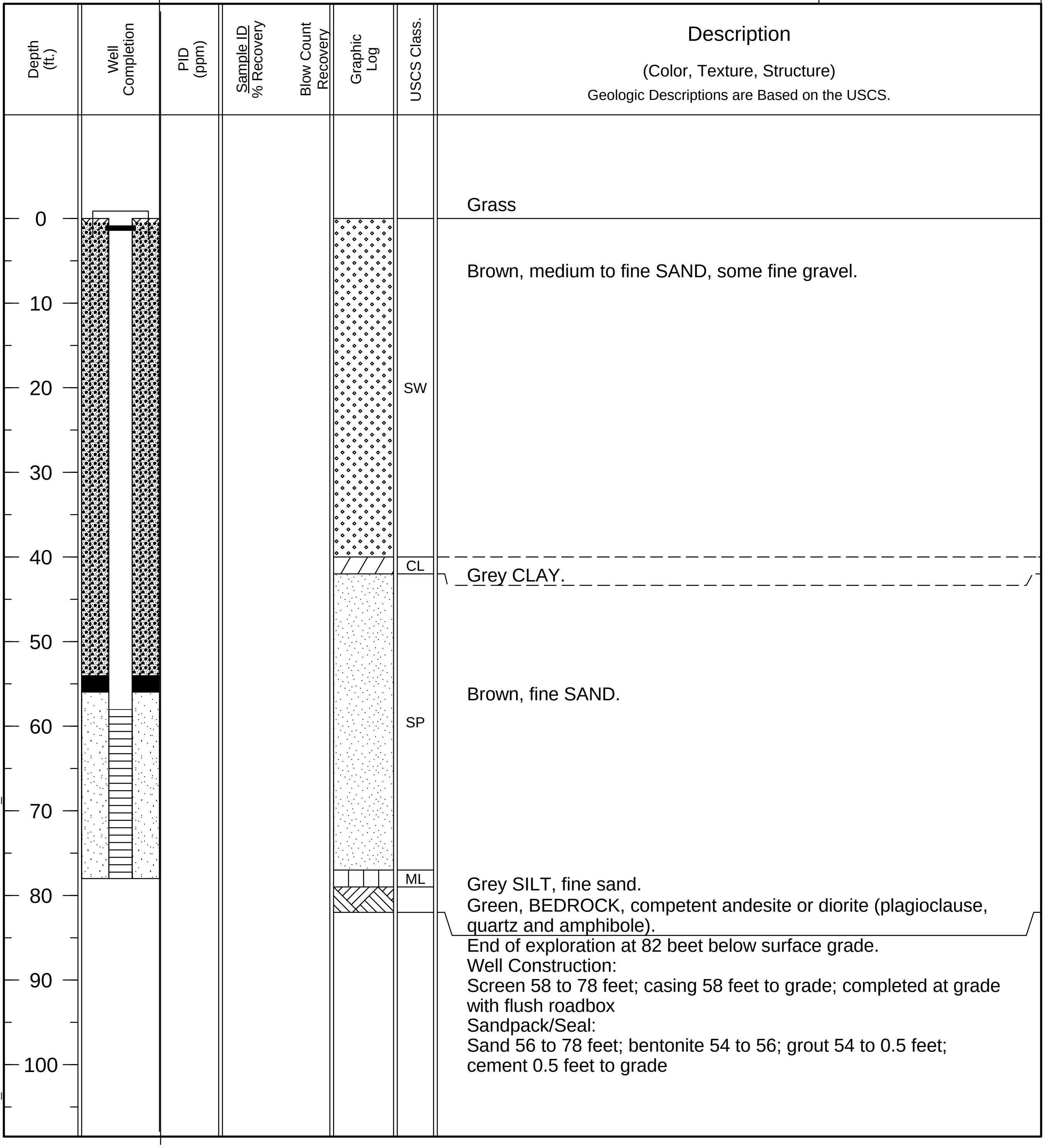
Drilling Log

Monitoring Well **OB-20-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *SCDS Fields, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *82.0 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ____
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *58 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Truck Mounted Mobil B57*
Drill Co. *New Hampshire Boring* Method *Drive and Wash*
Driller *Mark D'Ambrosen* Log By *P. Lindblom* Date *8/24/04* Permit # *NA*
Checked By *R. Cadorette* License No. ____

COMMENTS
No split spoon samples collected. Geological logging was completed using drill cuttings.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Grass

Brown, medium to fine SAND, some fine gravel.

Grey CLAY.

Brown, fine SAND.

Grey SILT, fine sand.

Green, BEDROCK, competent andesite or diorite (plagioclause, quartz and amphibole).

End of exploration at 82 beet below surface grade.
Well Construction:
Screen 58 to 78 feet; casing 58 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 56 to 78 feet; bentonite 54 to 56; grout 54 to 0.5 feet; cement 0.5 feet to grade

Shaw E & I, Inc.

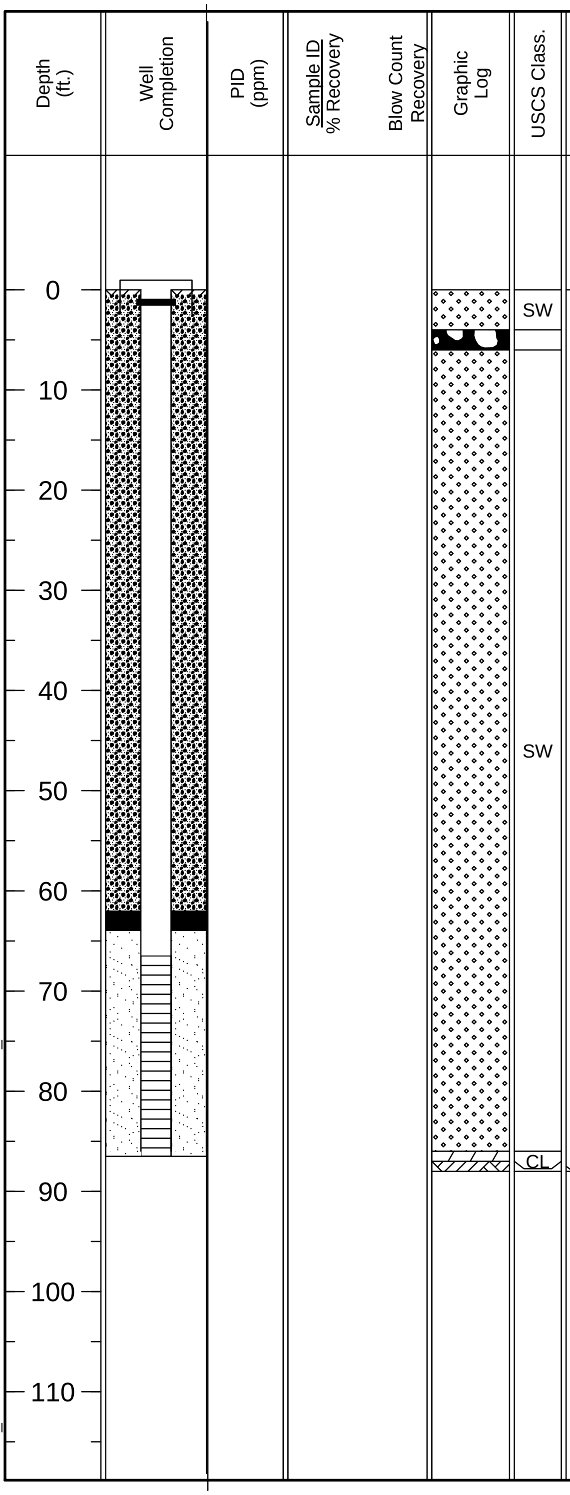
Drilling Log

Monitoring Well OB-21-DO

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *SCDS Fields, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *88.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *66.5 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Truck Mounted Mobil B57*
Drill Co. *New Hampshire Boring* Method *Drive and Wash*
Driller *Mark D'Ambros* Log By *K. Cote* Date *8/17/04* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS
No split spoon samples collected. Geological logging was completed using drill cuttings.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Grass

Brown, medium to fine SAND, some fine gravel.

BOULDER.

Brown, medium to fine SAND, some fine gravel.

Tan, medium to fine SAND, some fine gravel.

Grey CLAY.

Green BEDROCK, andesite or diorite competent (plagioclause and quartz).

End of exploration at 88 feet below surface grade
Well construction:
Screen 66.5 to 86.5 feet; casing 66.5 to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 64 to 86.5 feet; bentonite 62 to 64 feet; grout 62 to 0.5 feet; cement 0.5 feet to grade

Shaw E & I, Inc.

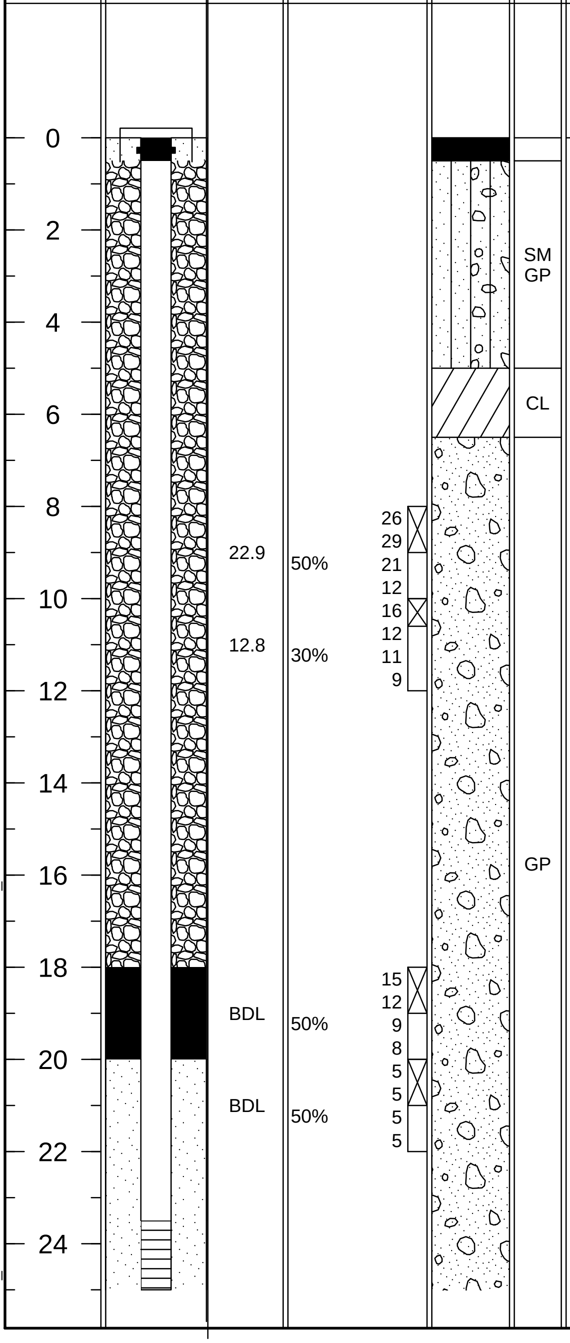
Drilling Log

Monitoring Well **OB 22-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*
Surface Elev. *NA* Total Hole Depth *45.0 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/.010 in.*
Casing: Dia *2 in.* Length *23.5 ft.* Type *PVC*
Fill Material *Sand, bentonite, native* Rig/Core *CME*
Drill Co. *Dragin Drilling Inc.* Method *Hollow Stem Auger*
Driller *Todd Collins* Log By *Dave Wattles* Date *1/28/02* Permit # *NA*
Checked By *S. Metivier* License No. ____

COMMENTS
Well located in the Shaw Shopping Plaza
Soil classifications were generated from grab samples collected from the auger flights unless otherwise stated.



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0.5				SM GP	Dark brown, fine SAND with silt and gravel
5				CL	Green-gray, moist CLAY
6.5				GP	Dark brown SAND with coarse gravel
8	22.9	50%	26 29 21 12		
10	12.8	30%	16 12 11 9		
18	BDL	50%	15 12 9 8		Brown, clean GRAVEL
20	BDL	50%	5 5 5 5		

Continued Next Page

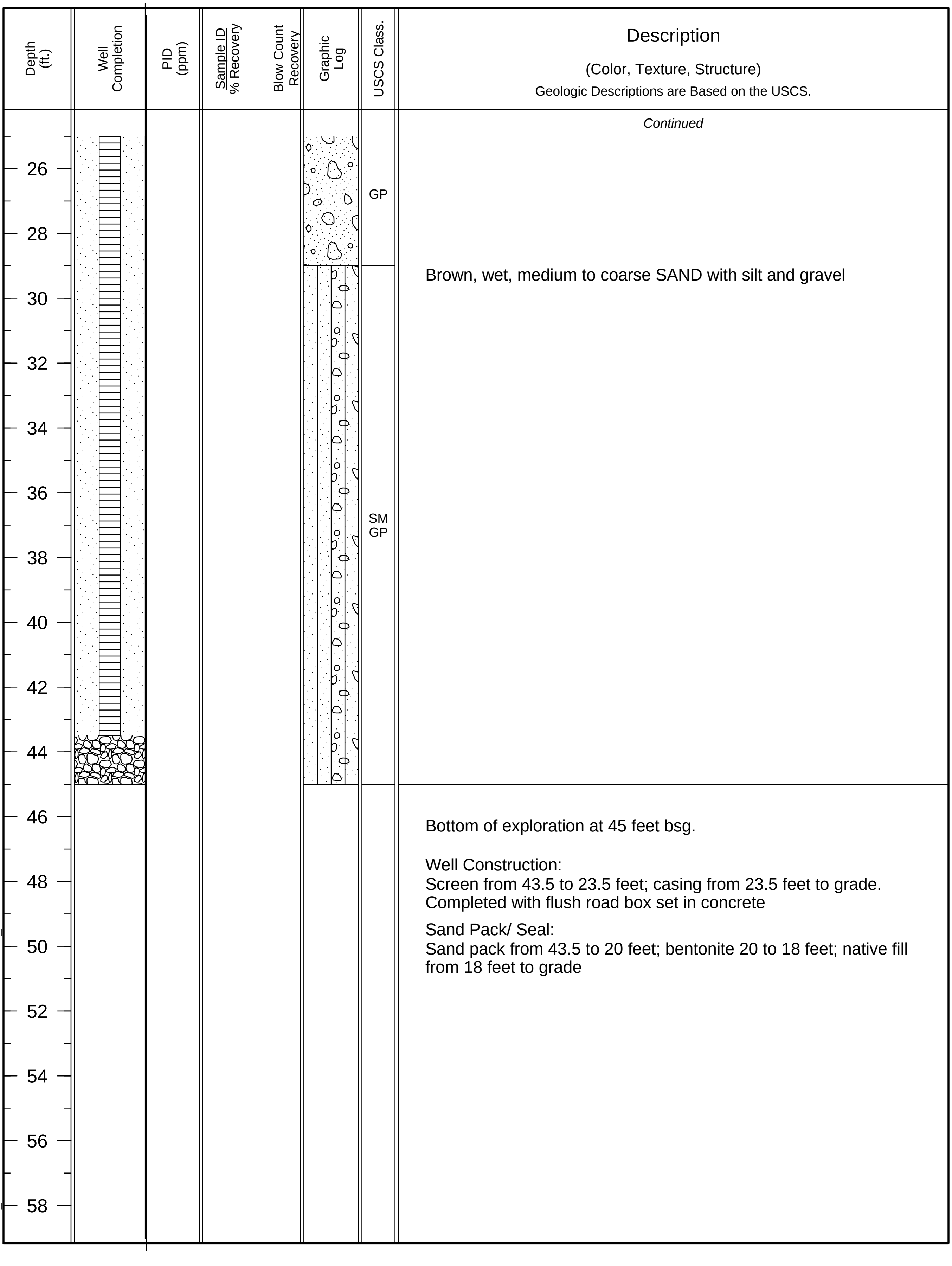
Shaw E & I, Inc.

Drilling Log

Monitoring Well **OB 22-DO**

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *832837*



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Continued

Brown, wet, medium to coarse SAND with silt and gravel

Bottom of exploration at 45 feet bsg.

Well Construction:
Screen from 43.5 to 23.5 feet; casing from 23.5 feet to grade.
Completed with flush road box set in concrete

Sand Pack/ Seal:
Sand pack from 43.5 to 20 feet; bentonite 20 to 18 feet; native fill from 18 feet to grade

Shaw
Shaw E & I, Inc.

Drilling Log

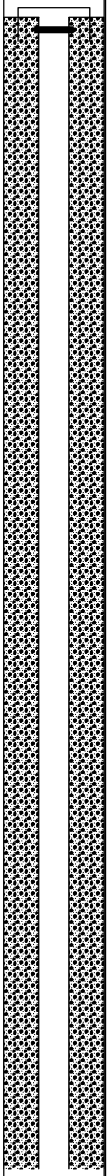
Monitoring Well **OB25-DO**

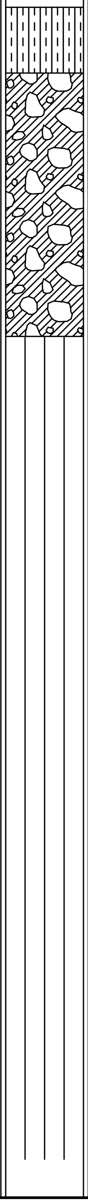
Page: 1 of 2

Project *Varian Beverly*
Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts*
Proj. No. *844877*
Surface Elev. *74.8 ft.*
Total Hole Depth *70.0 ft.*
North
East
Top of Casing *74.52 ft.*
Water Level Initial *NA*
Static *NA*
Diameter *10 in.*
Screen: Dia *4 in.*
Length *10 ft.*
Type/Size *PVC/0.010 in.*
Casing: Dia *4 in.*
Length *60 ft.*
Type *PVC*
Fill Material *Sand, Bentonite, Grout*
Rig/Core *Mobile*
Drill Co. *Parratt Wolff*
Method *Hollow Stem Auger/Air Rotary*
Driller *Ian Grassie*
Log By *J. Frazier*
Date *6/12/03*
Permit # *NA*
Checked By *Raymond Cadorette*
License No.

COMMENTS
ND = Not detected

Soil classification from grab samples collected from auger flights unless otherwise stated.





Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						OL	Medium brown, organic SILT, cobbles to 6" diameter
							Medium brown, slightly moist to dry, CLAY and SILT, with little gravel
5						GC	Same as above
10		ND					
							Brown, slightly moist, soft, CLAY and SILT, with some fine sand
							Very moist, soft, CLAY and SILT, with some fine sand and little gravel
15							
							Same as above, with rock/cobble (at 16 ft.)
20							Same as above
						ML	
		ND					Same as above with rock/cobble (at 24 ft.)
25							
							Light brown, moist, soft, CLAY and SILT, with some fine sand
							Same as above
30		ND					
							Brown/grey, wet, CLAY and SILT, with some fine sand
35							

Continued Next Page

Shaw E & I, Inc.

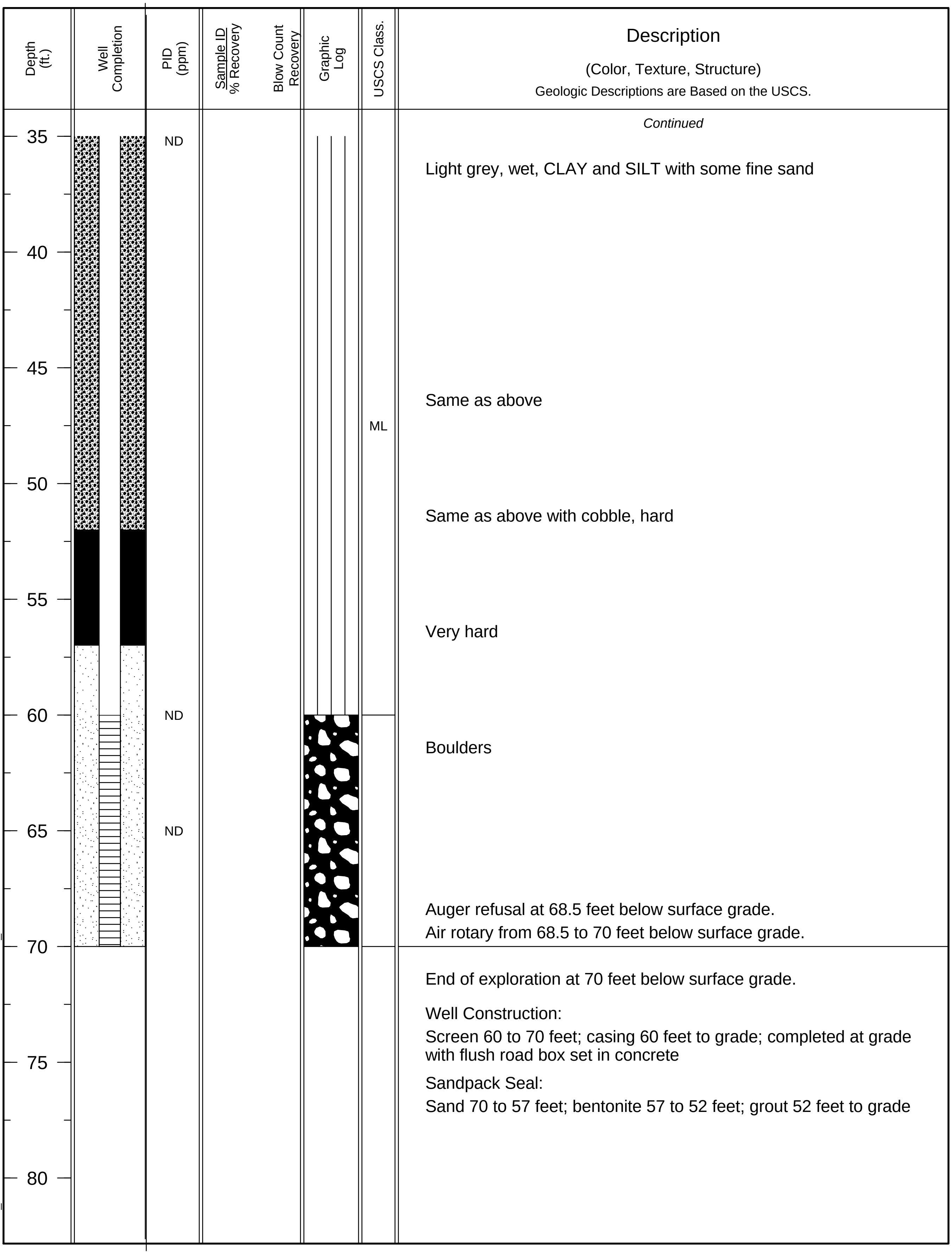
Drilling Log

Monitoring Well **OB25-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
					Continued
35	ND				Light grey, wet, CLAY and SILT with some fine sand
40					
45					Same as above
				ML	
50					Same as above with cobble, hard
55					Very hard
60	ND				Boulders
65	ND				
					Auger refusal at 68.5 feet below surface grade. Air rotary from 68.5 to 70 feet below surface grade.
70					End of exploration at 70 feet below surface grade. Well Construction: Screen 60 to 70 feet; casing 60 feet to grade; completed at grade with flush road box set in concrete Sandpack Seal: Sand 70 to 57 feet; bentonite 57 to 52 feet; grout 52 feet to grade
75					
80					

Shaw E & I, Inc.

Drilling Log

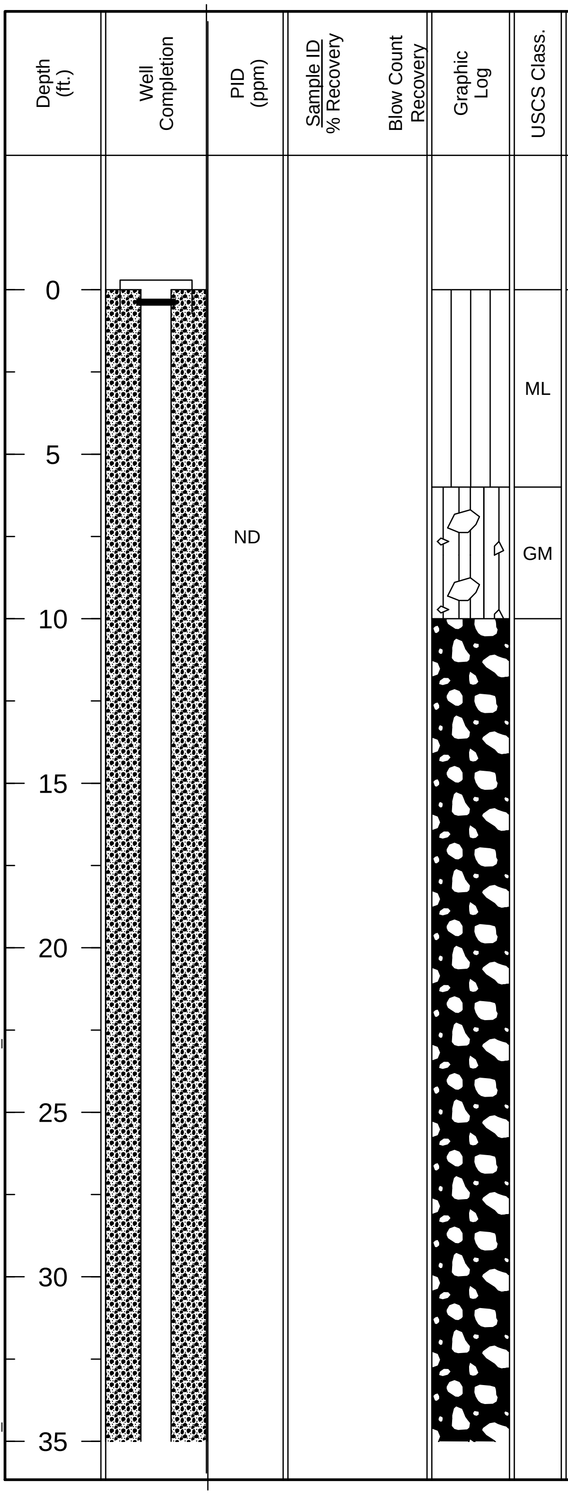
Monitoring Well **OB26-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *74.7 ft.* Total Hole Depth *66.0 ft.* North East
Top of Casing *74.48 ft.* Water Level Initial *NA* Static *NA* Diameter *10 in.*
Screen: Dia *4 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *4 in.* Length *46 ft.* Type *PVC*
Fill Material *Sand, Bentonite, Grout* Rig/Core *Mobile*
Drill Co. *Parratt Wolff* Method *Hollow Stem Auger/Mud Rotary*
Driller *Ian Grassie* Log By *J. Frazier* Date *6/26/03* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS
ND = Not detected

Soil classification from grab samples collected from auger flights unless otherwise stated.



PID (ppm)	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
		Medium brown, slightly moist, SILT with large cobbles
	ML	Medium brown, slightly moist, medium firm, SILT with large cobbles
ND	GM	Medium brown, slightly moist, SILT, with coarse gravel
		Began mud rotary drilling, limited soil returns
		Rock fragments in mud
		Cobbles within silty matrix
		Same as above
		Same as above
		Same as above
		Large cobbles at 26 ft.
		Same as above

Continued Next Page

Shaw E & I, Inc.

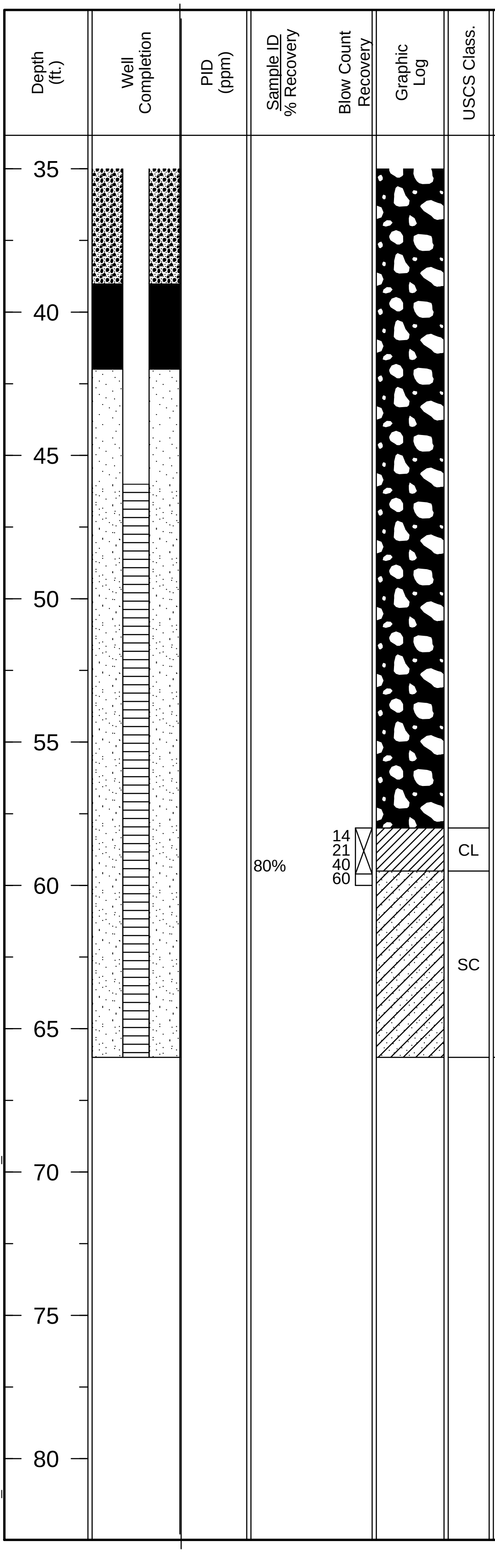
Drilling Log

Monitoring Well **OB26-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Continued

Increased rock fragments

Cobbles in clay matrix

Increased cobbles

Gravel and clay matrix

Same as above

Rock (cobbles/gravel) within silty clay matrix

Gray, stiff, CLAY with gravel

Wet, compacted, fine SAND with some clay

Same as above, rock fragments

Cobbles

Bedrock

End of exploration at 66 feet below surface grade.

Well Construction:

Screen 46 to 66 feet; casing 46 feet to grade; completed at grade with flush road box set in concrete

Sandpack Seal:

Sand 66 to 42 feet; bentonite 42 to 39 feet; grout 39 feet to grade

Shaw E & I, Inc.

Drilling Log

Monitoring Well **OB27-DO**

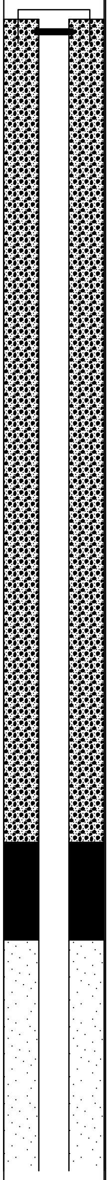
Page: 1 of 2

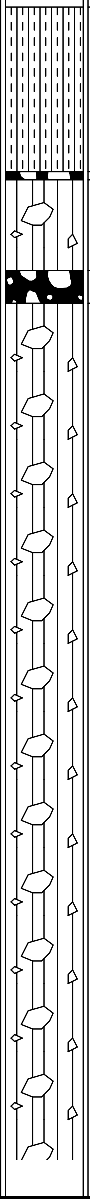
Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *72.2 ft.* Total Hole Depth *62.8 ft.* North East
Top of Casing *72.06 ft.* Water Level Initial *NA* Static *NA* Diameter *10 in.*
Screen: Dia *4 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *4 in.* Length *42 ft.* Type *PVC*
Fill Material *Sand, Bentonite, Grout* Rig/Core *Mobile*
Drill Co. *Parratt Wolff* Method *Hollow Stem Auger/Mud & Air Rotary*
Driller *Ian Grassie* Log By *J. Frazier* Date *6/19/03* Permit # *NA*
Checked By *Raymond Cadorette* License No.

COMMENTS
ND = Not detected

Soil classification from grab samples collected from auger flights unless otherwise stated.

Sand pack installed 63 to 28 ft. due to hole collapse.





Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					Medium brown, slightly moist, organic SILT, little sand
				OL	
5					Cobble layer
				GM	Medium brown, moist, GRAVEL and SILT
					Cobble layer
10	ND				Medium brown, slightly moist, SILT and GRAVEL, with cobbles
					Medium brown, moist, stiff, GRAVEL and SILT
15					Switch to Air Rotary
					Brown, dry, hard, COBBLES and SILT
20					Large boulders/cobbles up to 2 ft. thick
				GM	
					Same as above
25					Dry, stiff, SILT and GRAVEL
30					
35					

Continued Next Page

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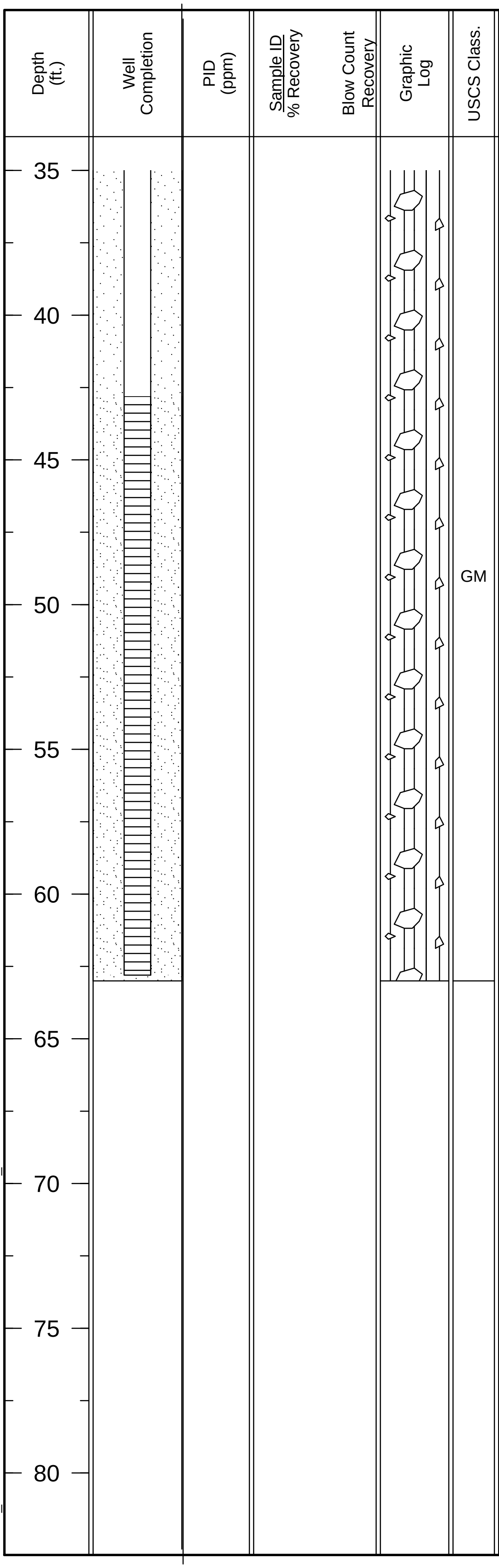
Drilling Log

Monitoring Well **OB27-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*



Description
(Color, Texture, Structure)
Geologic Descriptions are Based on the USCS.

Continued

Switch to Mud Rotary (at 38 ft.)
ROCK fragments in mud, some sand

Same as above

Dense formation with cobbles in silty matrix

Same as above

Larger ROCK fragments of quartzite, diorite

End of exploration at 63 feet below surface grade

Well Construction:

Screen 63 to 43 feet; casing 43 feet to grade; completed at grade with flush road box set in concrete

Sandpack Seal:

Sand 63 to 28 feet; bentonite 28 to 25 feet; grout 25 feet to approximate grade

Shaw E & I, Inc.

Drilling Log

Monitoring Well **OB28-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *NA* Total Hole Depth *10.0 ft.* North ______ East ______
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ______
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Grout* Rig/Core *Mobile/Track Mounted*
Drill Co. *Parratt Wolff* Method *Hollow Stem Auger/Rotary*
Driller *Ian Grassie* Log By *J. Frazier* Date *6/26/03* Permit # *NA*
Checked By *Raymond Cadorette* License No. ______

COMMENTS
ND = Not detected

Soil classification from grab samples collected from auger flights unless otherwise stated.

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0				▨	OH	Medium brown, slightly moist, soft, SILT with organic matter, some pebbles/gravel
5	ND		☐	▨	OH	Same as above
10						End of exploration at _______ feet below surface grade.
15						
20						
25						
30						
35						
40						

Shaw E & I, Inc.

Drilling Log

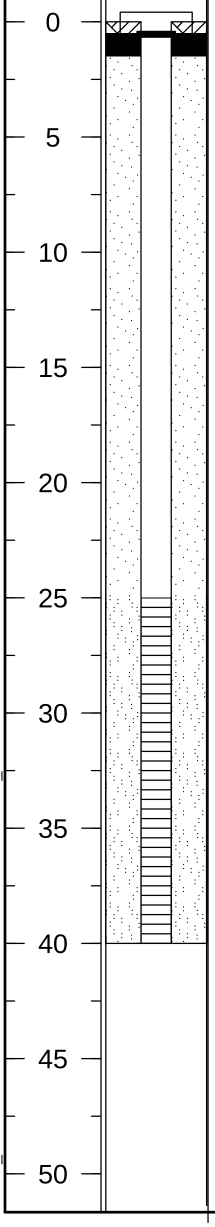
Monitoring Well **OB29-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844877*
Surface Elev. *31 Tozer* Total Hole Depth *40.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *2 in.*
Screen: Dia *1 in.* Length *15 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *1 in.* Length *25 ft.* Type *NA*
Fill Material *Sand, Bentonite* Rig/Core *Geoprobe 6600/Core*
Drill Co. *Zebra Drilling* Method *Geoprobe*
Driller *Evan Moraitis* Log By *D. Walker* Date *8/7/03* Permit # *NA*
Checked By License No.

COMMENTS
Samples not collected.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							No samples collected
							End of exploration at 40 feet below surface grade. Well Completion: Screen from 40 to 25 feet, casing from 2.5 feet to grade. Completed with flush roadbox set in concrete. Sand Pack/Seal: Sand 40 feet to 2 feet, bentonite from 2 feet to grade



Shaw
Shaw E & I, Inc.

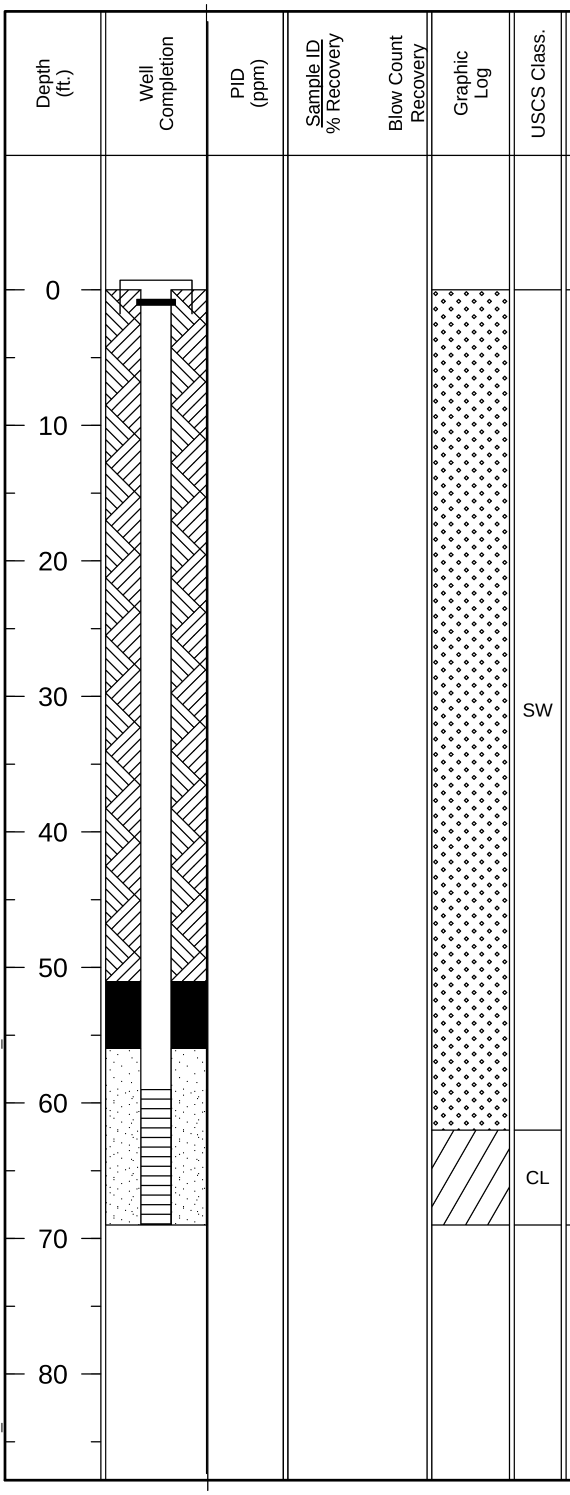
Drilling Log

Monitoring Well **OB30-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844221*
Surface Elev. *NA* Total Hole Depth *69.0 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *2 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *59 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Track Mounted*
Drill Co. *NH Boring* Method *Drive & Wash with Roller Bit*
Driller *Mark D'Ambrosia* Log By *Dave Walker* Date *12/9/03* Permit # *NA*
Checked By *Brian Smith* License No. ____

COMMENTS



Description
(Color, Texture, Structure)
Geologic Descriptions are Based on the USCS.

Brown, medium to fine SAND, little coarse gravel and cobbles

Tan, coarse to medium SAND

Medium SAND, some gray rock chips

Brown CLAY, little silt and gray/white rock cuttings

Bedrock

End of exploration at 69 feet below surface grade.

Well Construction:
Screen 59 to 69 feet; casing 59 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 57 to 69 feet; bentonite 52 to 57 feet; grout 52 feet to grade

Shaw E & I, Inc.

Drilling Log

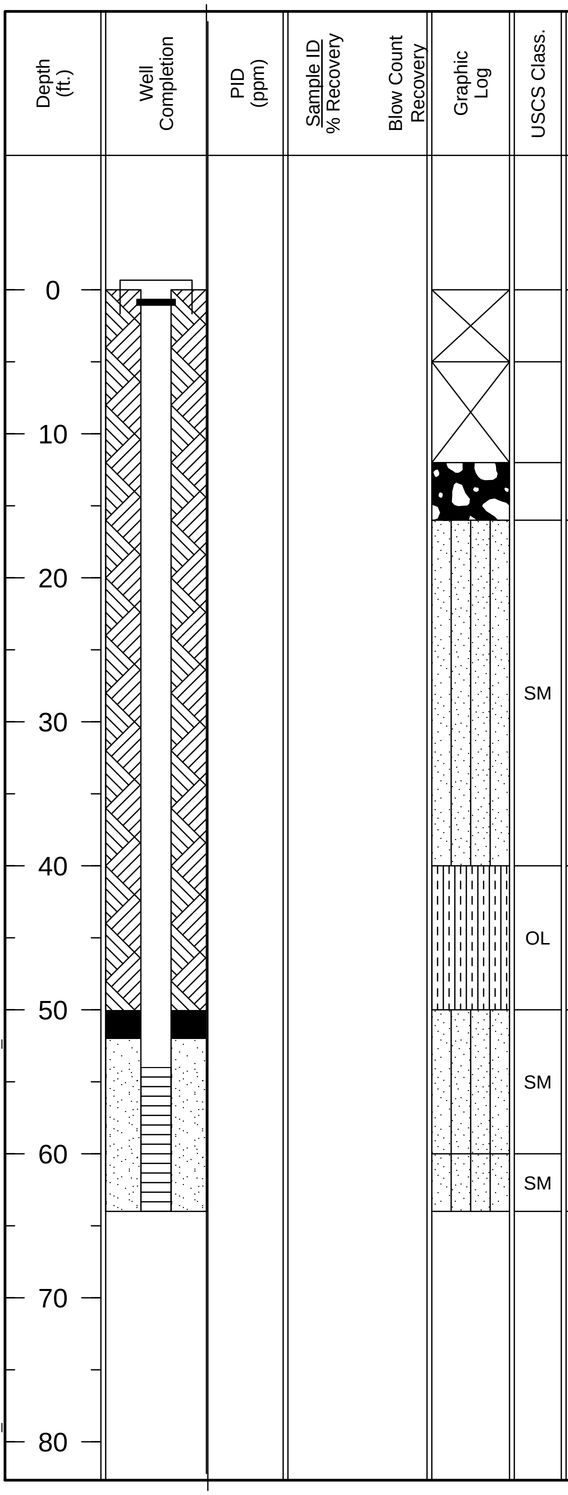
Monitoring Well **OB31-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844221*
Surface Elev. *NA* Total Hole Depth *64.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *2 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *54 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Track Mounted*
Drill Co. *NH Boring* Method *Drive & Wash with Roller Bit*
Driller *Mark D'Ambrosia* Log By *Dave Walker* Date *12/11/03* Permit # *NA*
Checked By *Brian Smith* License No.

COMMENTS
Building 5

Broken 4" casing in hole at 18' - 46'



USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
	Large boulder
SM	Coarse to medium SAND, some silt, little fine gravel
OL	Moist, SILT, some clay to fine sand
SM	Coarse to medium SAND, some fine sand and silt
SM	Coarse to fine SAND, some silt and clay, some rock fragments
	Bedrock

End of exploration at 64 feet below surface grade.

Well Construction:
Screen 54 to 64 feet; casing 54 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 52 to 64 feet; bentonite 50 to 52 feet; grout 50 feet to grade

Shaw E & I, Inc.

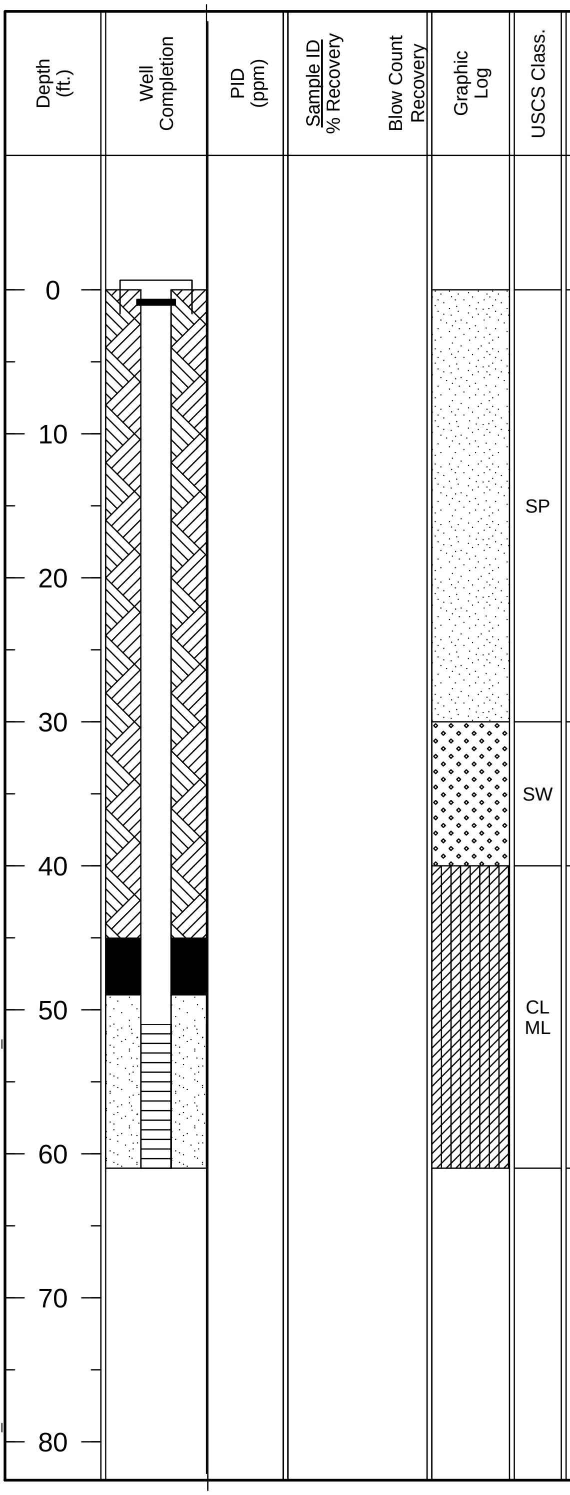
Drilling Log

Monitoring Well **OB32-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844221*
Surface Elev. *NA* Total Hole Depth *61.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *2 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *51 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Track Mounted*
Drill Co. *NH Boring* Method *Drive & Wash with Roller Bit*
Driller *Mark D'Ambrosia* Log By *Brian Smith* Date *12/17/03* Permit # *NA*
Checked By *Brian Smith* License No.

COMMENTS
Wash water turned from purple to brown at 35 feet below surface grade.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Brown, coarse SAND, with trace silt

Brown, coarse to medium SAND, with little silt and fine gravel

Gray, CLAY and SILT, with some fine sand

Gray, SILT and CLAY, with fine to coarse sand and some fine gravel
Bedrock
End of exploration at 61 feet below surface grade.

Well Construction:
Screen 51 to 61 feet; casing 61 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 49 to 61 feet; bentonite 45 to 49 feet; grout 45 feet to grade

Shaw E & I, Inc.

Drilling Log

Monitoring Well **OB33-DO**

Project *Varian Beverly* Owner *Varian Medical Systems*

Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844221*

Surface Elev. *NA* Total Hole Depth *56.0 ft.* North East

Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *2 in.*

Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.010 in.*

Casing: Dia *2 in.* Length *46 ft.* Type *PVC*

Fill Material *Sand, bentonite, grout* Rig/Core *Track Mounted*

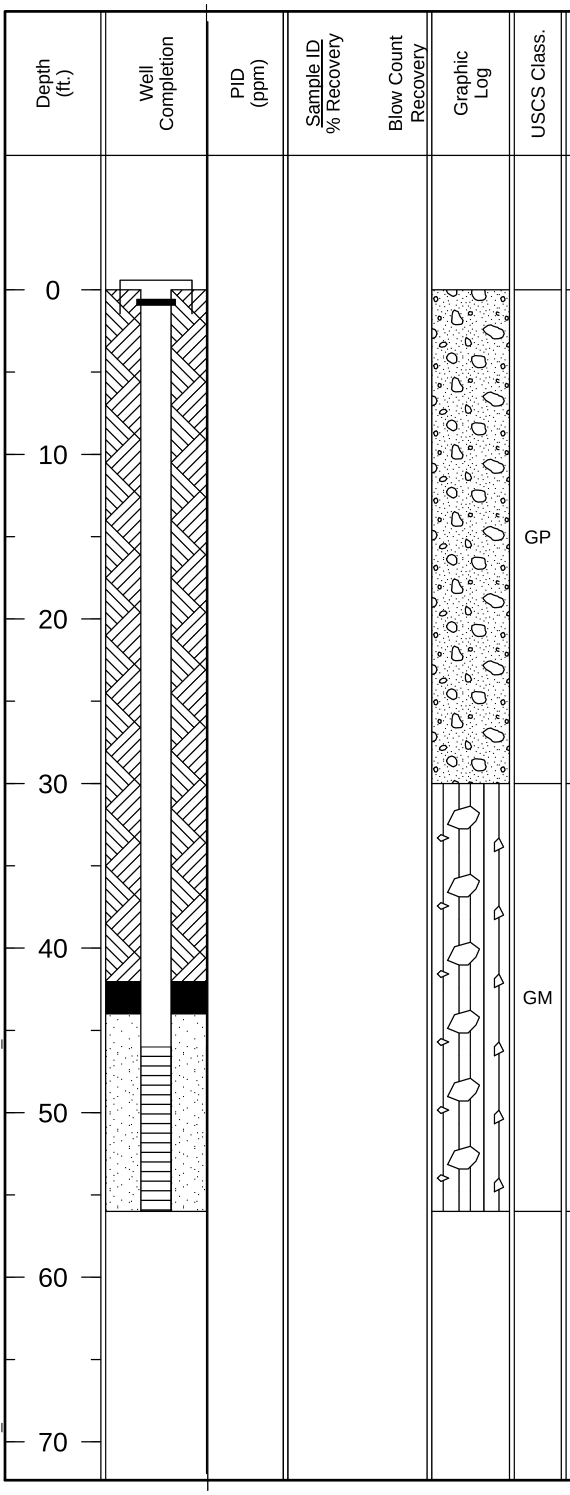
Drill Co. *NH Boring* Method *Drive & Wash with Roller Bit*

Driller *Mark D'Ambrosia* Log By *Brian Smith* Date *1/5/04* Permit # *NA*

Checked By *Brian Smith* License No.

COMMENTS

Broken 4" stell casing in ground at 17' - 52'.



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Brown, coarse SAND and GRAVEL with trace silt

Brown, medium to fine SAND, with some silt and gravel

Gray/brown, medium to fine SAND, with some silt and fine gravel

Bedrock

End of exploration at 56 feet below surface grade.

Well Construction:

Screen 46 to 56 feet; casing 46 feet to grade; completed at grade with flush roadbox

Sandpack/Seal:

Sand 44 to 56 feet; bentonite 42 to 44 feet; grout 44 feet to grade

Shaw E & I, Inc.

Drilling Log

Monitoring Well **OB34-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems*

Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844221*

Surface Elev. *NA* Total Hole Depth *64.0 ft.* North East

Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *2 in.*

Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.010 in.*

Casing: Dia *2 in.* Length *54 ft.* Type *PVC*

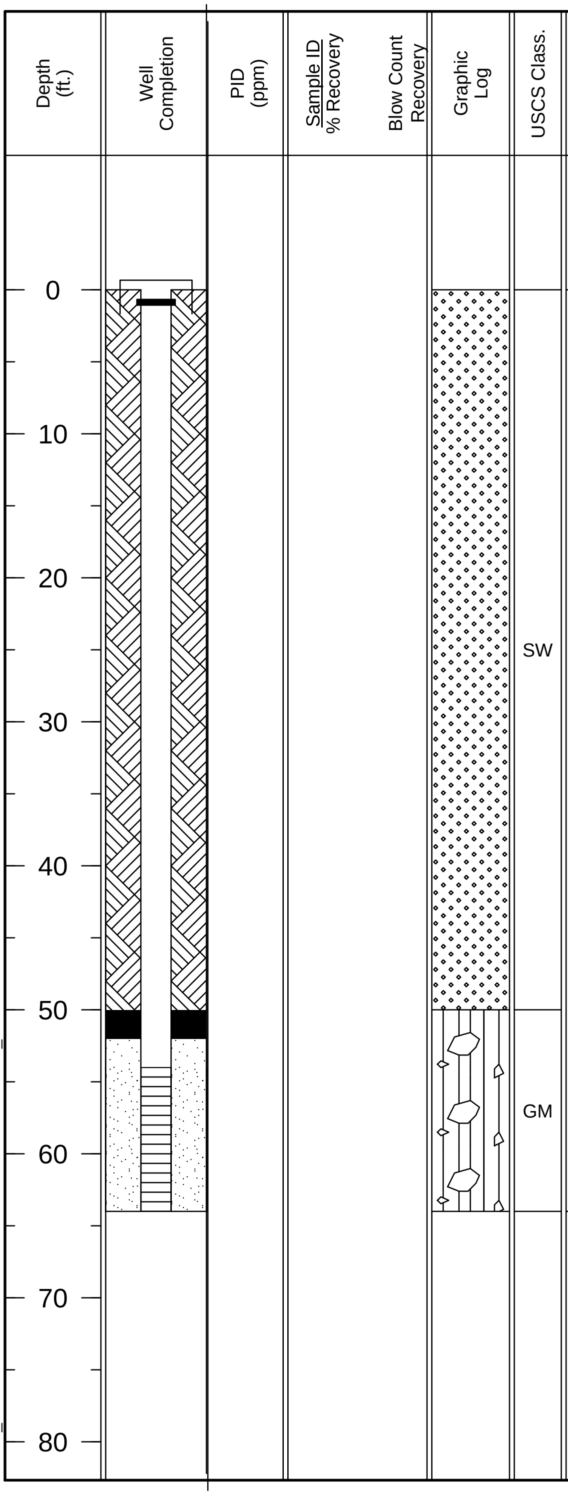
Fill Material *Sand, bentonite, grout* Rig/Core *Track Mounted*

Drill Co. *NH Boring* Method *Drive & Wash with Roller Bit*

Driller *Mark D'Ambrosia* Log By *Brian Smith* Date *1/7/04* Permit # *NA*

Checked By *Brian Smith* License No.

COMMENTS



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Brown, coarse SAND, with some gravel

Gray/brown, medium to fine SAND, with some silt and gravel

Bedrock

End of exploration at 64 feet below surface grade.

Well Construction:

Screen 54 to 64 feet; casing 54 feet to grade; completed at grade with flush roadbox

Sandpack/Seal:

Sand 52 to 64 feet; bentonite 50 to 52 feet; grout 50 feet to grade

Shaw E & I, Inc.

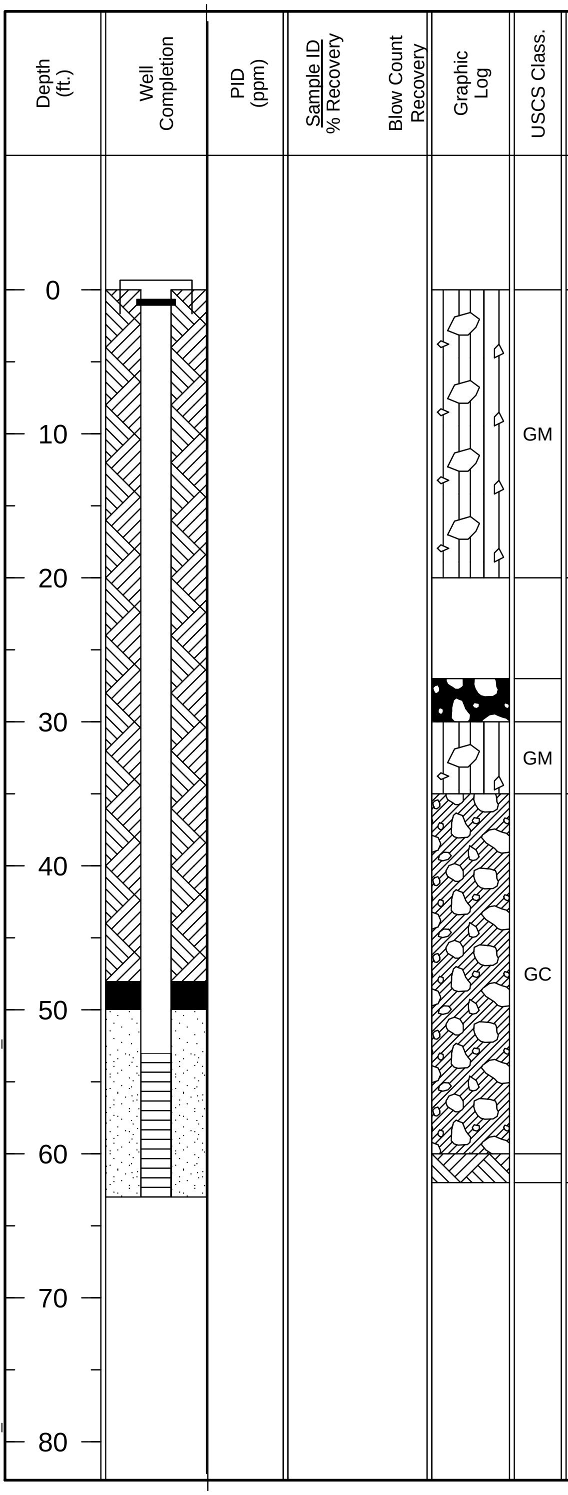
Drilling Log

Monitoring Well **OB35-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844221*
Surface Elev. *NA* Total Hole Depth *63.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *1 in.*
Screen: Dia *1 in.* Length *10 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *1 in.* Length *53 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Skid Mounted*
Drill Co. *NH Boring* Method *Drive & Wash with Roller Bit*
Driller *Steve, Adam* Log By *Tom LeCalvez* Date *12/29/03* Permit # *NA*
Checked By *Ray Cadorette* License No.

COMMENTS
Building 5



Description

(Color, Texture, Structure)
Geologic Descriptions are Based on the USCS.

Coarse to fine GRAVEL, coarse to fine sand and silt

Cobbles

Silty TILL with clay

BEDROCK

End of exploration at 63 feet below surface grade.

Well Construction:
Screen 53 to 63 feet; casing 53 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 50 to 63 feet; bentonite 48 to 50 feet; grout 48 feet to grade

Shaw E & I, Inc.

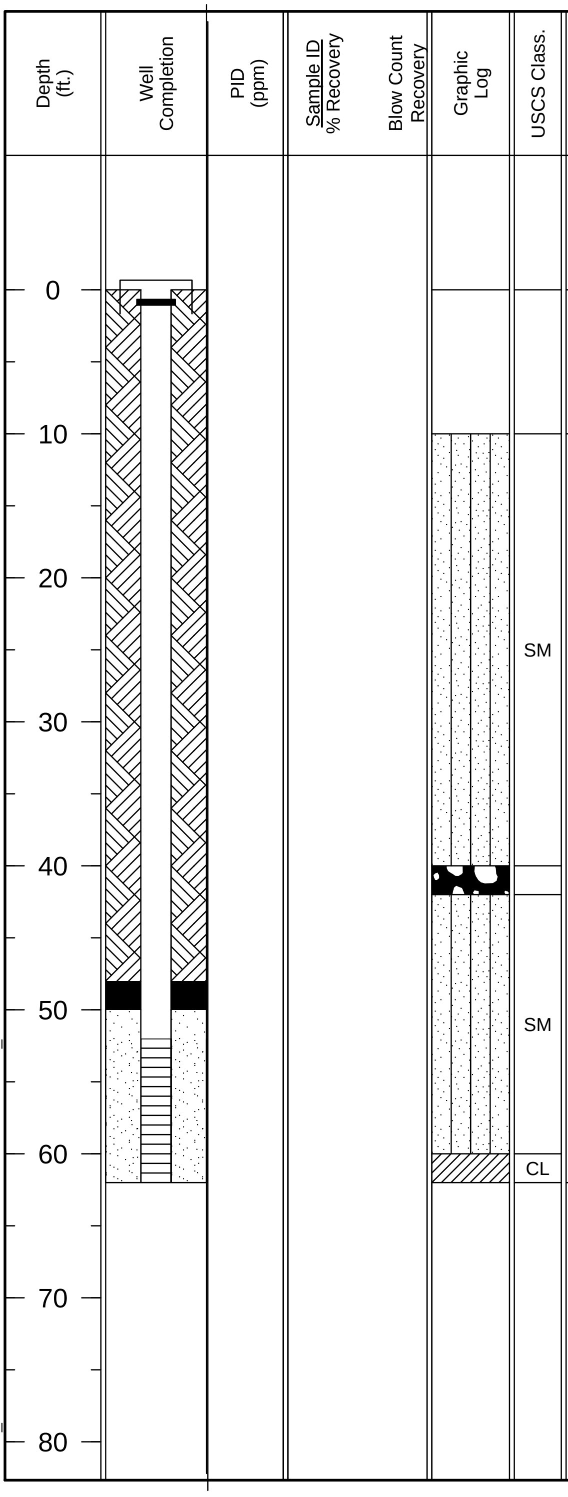
Drilling Log

Monitoring Well **OB36-DO**

Page: 1 of 1

Project Varian Beverly
Owner Varian Medical Systems
Location 150 Sohier Road, Beverly, Massachusetts
Proj. No. 844221
Surface Elev. NA
Total Hole Depth 62.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter 1 in.
Screen: Dia 1 in.
Length 10 ft.
Type/Size PVC/0.010 in.
Casing: Dia 1 in.
Length 52 ft.
Type PVC
Fill Material Sand, bentonite, grout
Rig/Core Track Mounted
Drill Co. NH Boring
Method Drive & Wash with Roller Bit
Driller Steve, Adam
Log By Tom LeCalvez
Date 12/26/03
Permit # NA
Checked By Ray Cadorette
License No.

COMMENTS
Building 6 Loading Dock



Description
(Color, Texture, Structure)
Geologic Descriptions are Based on the USCS.

Coarse to fine SAND and medium to fine gravel, some silt (till)

Boulder

Coarse to fine SAND, medium to fine gravel, some silt (till)

Silty CLAY and GRAVEL

Bedrock

End of exploration at 62 feet below surface grade.
Well Construction:
Screen 52 to 62 feet; casing 52 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 50 to 62 feet; bentonite 48 to 50 feet; grout 48 feet to grade

Shaw E & I, Inc.

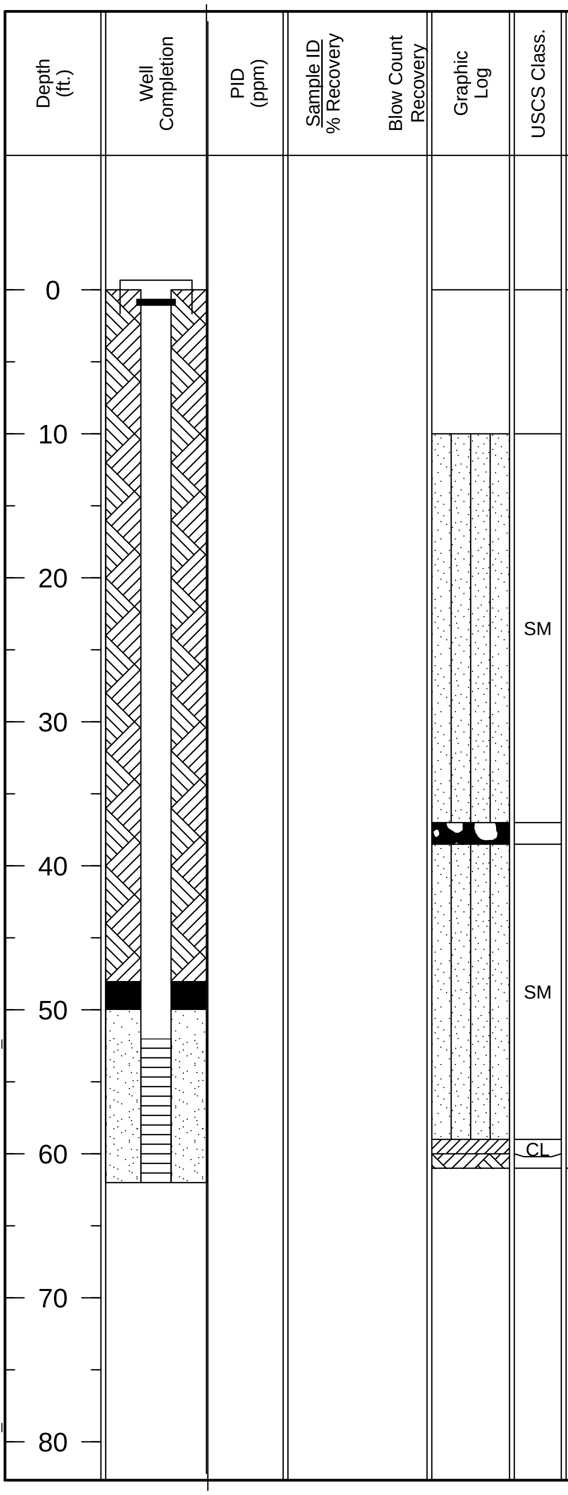
Drilling Log

Monitoring Well **OB37-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *844221*
Surface Elev. *NA* Total Hole Depth *61.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *1 in.*
Screen: Dia *1 in.* Length *10 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *1 in.* Length *51 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Skid Mounted*
Drill Co. *NH Boring* Method *Drive & Wash with Roller Bit*
Driller *Steve, Adam* Log By *Tom LeCalvez* Date *11/27/03* Permit # *NA*
Checked By *Ray Cadorette* License No.

COMMENTS
Hallway Location



Description
(Color, Texture, Structure)
Geologic Descriptions are Based on the USCS.

Coarse to fine SAND, medium to fine gravel, some silt (till)

Boulder

Coarse to fine SAND, medium to fine gravel, some silt

Silty CLAY and GRAVEL
Bedrock
End of exploration at 61 feet below surface grade.

Well Construction:
Screen 51 to 61 feet; casing 51 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 50 to 61 feet; bentonite 48 to 50 feet; grout 48 feet to grade

Shaw
Shaw E & I, Inc.

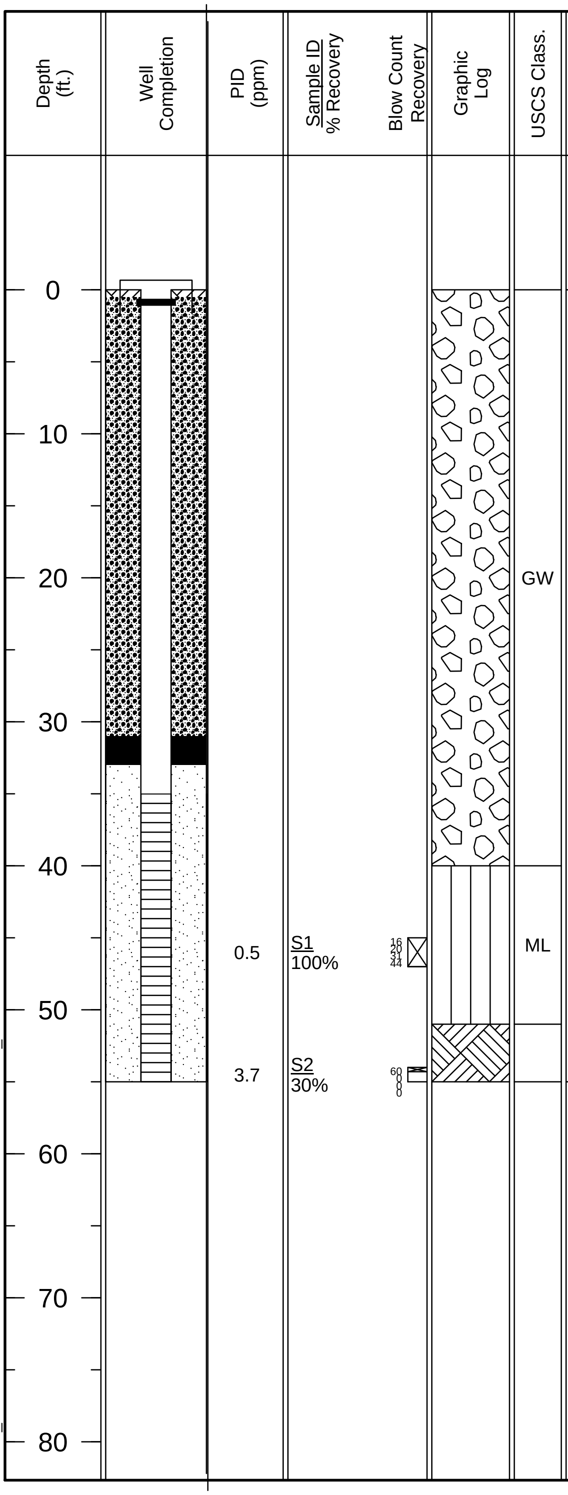
Drilling Log

Monitoring Well **OB-38-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *55.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *35 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Truck Mounted Mobil B57*
Drill Co. *New Hampshire Boring* Method *Drive and Wash*
Driller *Mark D'Ambrosen* Log By *K. Cote* Date *7/9/04* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS
Split spoon samples were only collected @ 45-47 and 54-55 ft. Remainder of geological logging was completed using drill cuttings.



Description

(Color, Texture, Structure)
Geologic Descriptions are Based on the USCS.

Pavement

Greyish, medium to fine GRAVEL, some medium sand.

Greyish, SILT and CLAY.

Tannish grey, wet, SILT and CLAY, trace fine to medium gravel.

Orange (iron stain), weathered BEDROCK, angular fragments of pink pottasium feldspar interbedded with silt.

End of exploration at 55 feet below surface grade.

Well Construction:
Screen 35 to 55 feet; casing 35 feet to grade; completed at grade with flush road box
Sandpack/Seal:
Sand 33 to 55 feet; bentonite 31 to 33 feet; grout 31 to 0.5 feet; cement 0.5 feet to grade

Shaw E & I, Inc.

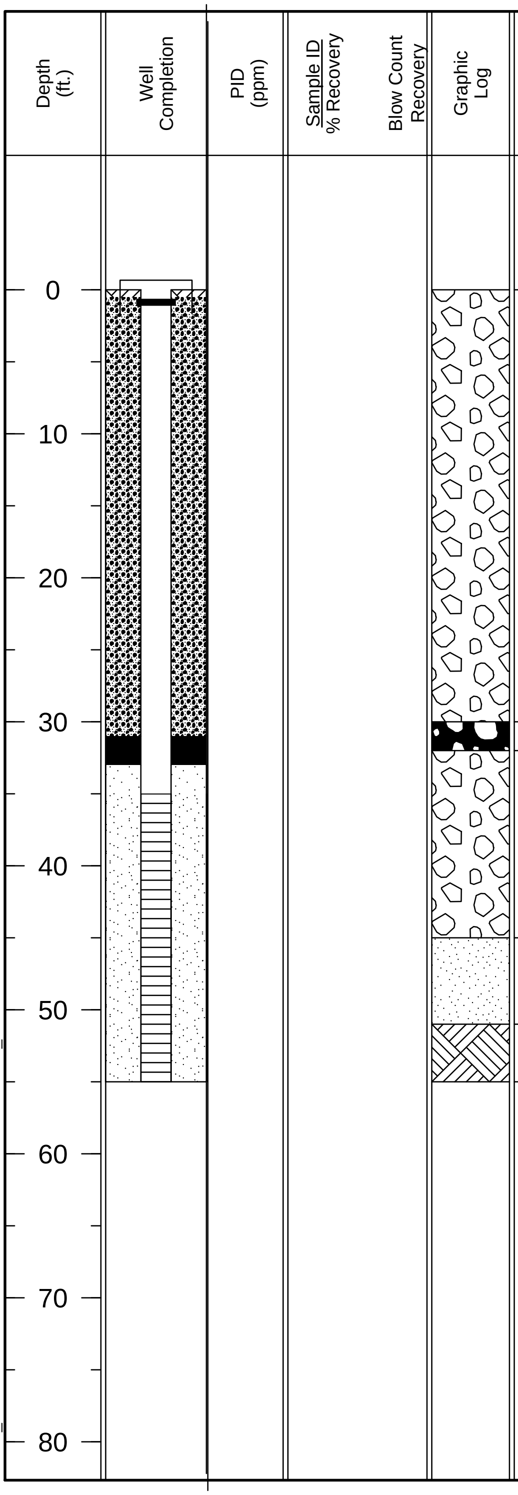
Drilling Log

Monitoring Well **OB-39-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *55.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *35 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core *Truck Mounted Mobil B57*
Drill Co. *New Hampshire Boring* Method *Drive and Wash*
Driller *Mark D'Ambrosen* Log By *K. Cote* Date *7/8/04* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS
No split spoon samples collected. Geological logging was completed using drill cuttings.



USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
	Grass
GW	Medium to fine GRAVEL, cobbles, medium sand (glacial till).
	BOULDER.
GW	Medium to fine GRAVEL, cobbles, medium sand (glacial till).
SP	SAND.
	Weathered light granite BEDROCK, potassium feldspar and quartz.

End of exploration at 55 feet below surface grade

Well Construction:
Screen 35 to 55 feet; casing 35 feet to grade; completed at grade with flush roadbox
Sandpack/Seal:
Sand 33 to 55 feet; bentonite 31 to 33 feet; grout 31 to 0.5 feet; cement 0.5 feet to grade

Shaw E & I, Inc.

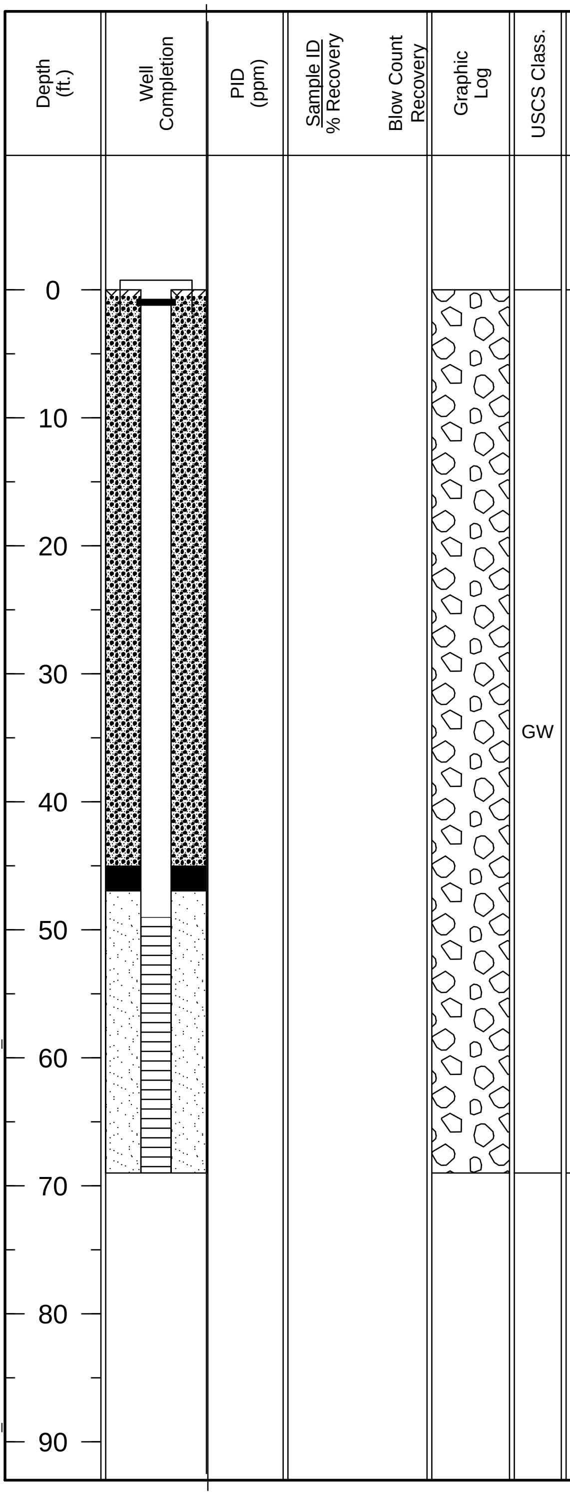
Drilling Log

Monitoring Well **OB-40-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *150 Sohier Road, Beverly, Massachusetts* Proj. No. *108939*
Surface Elev. *NA* Total Hole Depth *69.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *20 ft.* Type/Size *PVC/0.010 in.*
Casing: Dia *2 in.* Length *49 ft.* Type *PVC*
Fill Material *Sand, bentonite, grout* Rig/Core
Drill Co. *New Hampshire Boring* Method *Drive and Wash*
Driller *Mark D'Ambrosen* Log By *J. Perry* Date *7/6/04* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Grass

Brown, TILL with cobbles

Grey, TILL with cobbles

Cobble or possible weathered bedrock.

End of exploration at 69 feet below surface grade.

Well Construction:
Screen 49 to 69 feet; casing 49 feet to grade; completed at grade with flush roadbox.
Sandpack/Seal:
Sand 47 to 69 feet; bentonite 45 to 47 feet; grout 47 to 0.5 feet, cement 0.5 feet to grade

Shaw E & I, Inc.

Drilling Log

Monitoring Well **OB-45-DO**

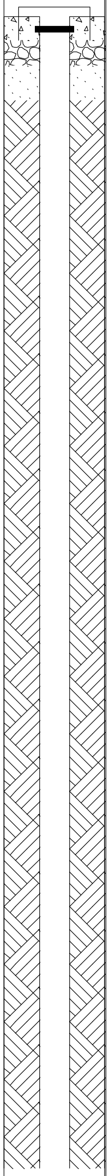
Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *Building 5, 150 Sohier Road, Beverly, Massachusetts* Proj. No. *150151*
Surface Elev. *76.7 ft.* Total Hole Depth *49.0 ft.* North East
Top of Casing *76.48 ft.* Water Level Initial *NA* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *15 ft.* Type/Size *PVC/Slot 0.010 in.*
Casing: Dia *2 in.* Length *34 ft.* Type *PVC*
Fill Material *Native, Bentonite, Grout, Sand* Rig/Core *Hollow Stem Auger*
Drill Co. *TDS* Method *Hollow Stem Auger*
Driller *G. Caovette* Log By *Dale Dailey* Date *4/15/14* Permit # *NA*
Checked By *R. Cadorette* License No.

COMMENTS

ND = Not detected

**PID response may have been due to moisture.*



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0				FILL	Hand clear to 5' SAND and loose GRAVEL (Fill)
5	ND	25%	23 32 35 28	CL	Light brown, dry, very stiff CLAY; some poorly sorted, coarse gravel
10	ND	45%	15 27 30 30		Gray, dry, boulder to 11.5'
11.5				CL	Light brown, dry, very stiff CLAY to 12'
15	ND	35%	18 30 28 30	CL	Light brown, damp, very stiff CLAY; some fine and coarse, poorly sorted gravel (1/4" to 3/4")
20	ND	45%	17 35 28 35	CL	Light brown, damp, stiff, SANDY CLAY; some well sorted fine gravel
24					

Continued Next Page

Shaw
Shaw E & I, Inc.

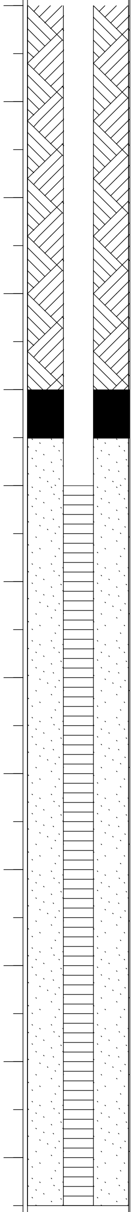
Drilling Log

Monitoring Well **OB-45-DO**

Page: 2 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *Building 5, 150 Sohier Road, Beverly, Massachusetts* Proj. No. *150151*



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
24					*Continued*
26	ND	60%	29 50	SW	Light brown, damp, very hard, SAND; some well sorted fine gravel (spoon refusal at 26.5' - 27')
28					
30	ND	40%	22 18 27 37	SW	Gray, dry, very hard, poorly sorted, coarse, SAND; some well sorted, coarse gravel
32					
34					
36	ND	25%	57 42 35 120	GC	Light gray, dry to slightly damp, coarse GRAVEL with some light brownish gray, interbedded clay lenses (approximately 0.5" - 1" in thickness)
38					
40	ND	35%	13 120	SW	Brown, dry, medium SAND, some well sorted, coarse GRAVEL (spoon refusal at 41')
42					
44					
46	5.3*	30%	17 25 50	SW	Brown, wet, poorly sorted, medium SAND; some poorly sorted, fine gravel
48					
50					End of exploration at 49 feet below surface grade
52					
54					
56					

Drilling Log

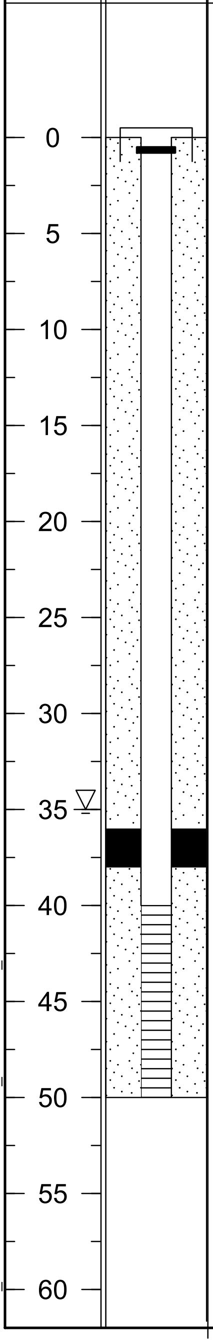
Monitoring Well **OB-52-DO**

Page: 1 of 1

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*
Location *Sonning Road, Beverly, MA* Proj. No. *631010758*
Surface Elev. *NA* Total Hole Depth *50.0 ft.* North ___ East ___
Top of Casing *NA* Water Level Initial ∇ *35.0 ft.* Static *NA* Diameter *4 in.*
Screen: Dia *2 in.* Length *10 ft.* Type/Size *PVC/0.10 Slot in.*
Casing: Dia *2 in.* Length *40 ft.* Type *PVC*
Fill Material *Sand, bentonite* Rig/Core *Hollow Stem Auger*
Drill Co. *Drillex* Method *Hollow Stem Auger/Air Rotary*
Driller *Chris Hogan* Log By *Jen Gailey* Date *5/17/21* Permit # *NA*
Checked By ___ License No. ___

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Asphalt (0-0.3')



Drilling Log

Monitoring Well **OB-58-DO**

Page: 1 of 2

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *631010764*

Surface Elev. *NA* Total Hole Depth *57.0 ft.* North East

Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter *2 in.*

Screen: Dia *2 in.* Length *10ft* Type/Size *PVC/10 Slot in.*

Casing: Dia *2 in.* Length *45ft* Type *PVC*

Fill Material Rig/Core

Drill Co. *Drillex* Method *Hollow Stem Auger 2"*

Driller Log By *KT* Date *7/28/22* Permit # *NA*

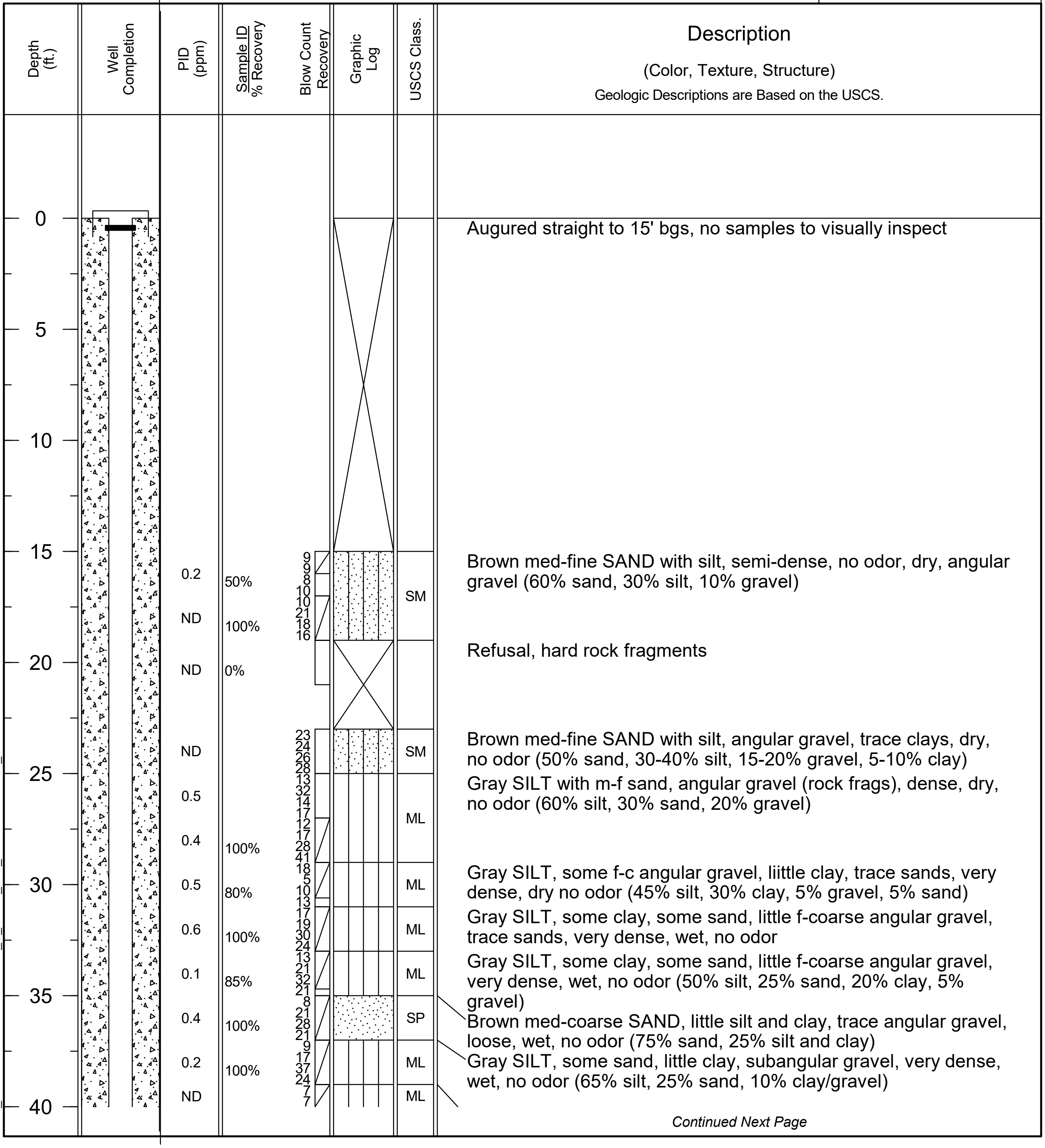
Checked By *JA* License No.

COMMENTS

Samples collected for 8260 (VOC) analysis at 35' and 55' below ground surface.

Target high resistivity zone 35'.

ND = non-detect



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					Augured straight to 15' bgs, no samples to visually inspect
15	0.2 ND	50% 100%	9 9 8 10 10 21 18 16	SM	Brown med-fine SAND with silt, semi-dense, no odor, dry, angular gravel (60% sand, 30% silt, 10% gravel)
20	ND	0%			Refusal, hard rock fragments
	ND		23 24 26 28	SM	Brown med-fine SAND with silt, angular gravel, trace clays, dry, no odor (50% sand, 30-40% silt, 15-20% gravel, 5-10% clay)
25	0.5 0.4	 100%	13 32 14 17 12 17 28 41	ML	Gray SILT with m-f sand, angular gravel (rock frags), dense, dry, no odor (60% silt, 30% sand, 20% gravel)
30	0.5	80%	18 5 10 13	ML	Gray SILT, some f-c angular gravel, liittle clay, trace sands, very dense, dry no odor (45% silt, 30% clay, 5% gravel, 5% sand)
	0.6	100%	17 19 30 24	ML	Gray SILT, some clay, some sand, little f-coarse angular gravel, trace sands, very dense, wet, no odor
	0.1	85%	13 21 32 21	ML	Gray SILT, some clay, some sand, little f-coarse angular gravel, very dense, wet, no odor (50% silt, 25% sand, 20% clay, 5% gravel)
35	0.4	100%	8 21 28 21	SP	Brown med-coarse SAND, little silt and clay, trace angular gravel, loose, wet, no odor (75% sand, 25% silt and clay)
	0.2	100%	9 17 37 24	ML	Gray SILT, some sand, little clay, subangular gravel, very dense, wet, no odor (65% silt, 25% sand, 10% clay/gravel)
40	ND		7 7	ML	

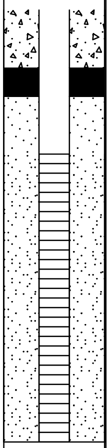
Continued Next Page

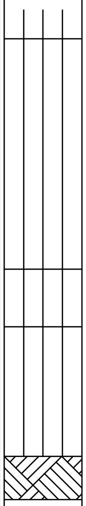
Drilling Log

Monitoring Well **OB-58-DO**

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *631010764*





Continued

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
40	ND	100%	9 11	ML	Gray SILT, trace clay, angular gravel, very dense, wet, no odor (85% silt)
	0.1	100%	12 13 14 16	ML	Gray SILT, some sand, little clay, angular gravel, very dense, wet, no odor (65% silt, 25% sand, 10% clay/gravel)
	0.1	100%	6 8 14 28		
45	0.2	100%	8 13 21 16		
	0.3	100%	8 9 15 12		
50	ND	10%	13 16 18 25	ML	Gray SILT with gravel, suspected fractured weathered bedrock, very dense, wet, no odor
	0.6	100%	19 23 27 31	ML	Gray SILT, little sand, trace gravel
	0	100%	20 38 31 38		
55	0.4		60 X X X		Bedrock

End of Exploration at 57 feet below surface grade

Depth scale: 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90

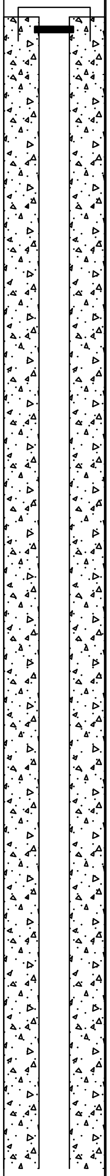
Drilling Log

Monitoring Well **OB-59-DO**

Project _Varian Beverly_ Owner _Varian Medical Systems, Inc._
Location _150 Sohier Road, Beverly, MA_ Proj. No. _631010764_
Surface Elev. _NA_ Total Hole Depth _55.0 ft._ North ____ East ____
Top of Casing _NA_ Water Level Initial _NA_ Static _NA_ Diameter _2 in._
Screen: Dia _2 in._ Length _10ft_ Type/Size _PVC/10 Slot in._
Casing: Dia _2 in._ Length _43ft_ Type _PVC_
Fill Material ____ Rig/Core ____
Drill Co. _Drillex_ Method _Hollow Stem Auger 2"_
Driller ____ Log By _KT_ Date _7/26/22_ Permit # _NA_
Checked By _JA_ License No. ____

COMMENTS
Samples collected for 8260 (VOC) analysis at 24' and 51' below ground surface.

Target high resistivity zone 24-25'.



Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
					Concrete
0					Augured straight to 15' bgs, no samples to visually inspect
5					
10					
15	1.7	100%	18 19 38 61	ML	Medium brown sandy SILT, semi-dense, dry, no odor (70% silt, 30% sand)
	NA	0%	60 2 X X		NA, refusal
20	NA	0%	60 1 X X		NA, refusal (cobbles in shoe)
	1.2	100%	25 46 61 60		
	NA	0%	33 64 58 46	ML	Gray gravelly SILT, dense, dry, no odor (60% silt, 30% coarse angular gravel, 10% fine sand)
25	0.6	100%	42 33 38 43		
	0.6	100%		ML	Gray SILT, some f-coarse angular gravel, little clay, trace sands, v. dense, dry no odor (45% silt, 30% gravel, 15% clay, 5% sand)
30	0.5	100%	12 18 38 60		
	NA	0%			NA, refusal
	0.3	100%	10 37 35 27	ML	Gray SILT, some f-coarse angular gravel, little clay, little sand, v. dense, wet, no odor (45-50% silt, 20% gravel, 15% clay, 15% sand)
35	0.2	100%	5 16 24 26		
	1.6	100%	15 26 20 21	ML	Gray SILT, some f-coarse sand, little clay, trace angular gravel, wet, no odor, sand layer at 38 ft.
40	0.8		12 15	ML	Gray SILT, little clay, trace fine sand, trace subangular grave,

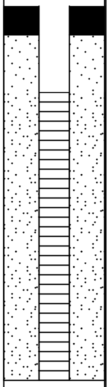
Continued Next Page

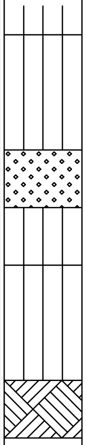
Drilling Log

Monitoring Well **OB-59-DO**

Project *Varian Beverly* Owner *Varian Medical Systems, Inc.*

Location *150 Sohier Road, Beverly, MA* Proj. No. *631010764*





Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Continued
40		0.8	100%	26 28		ML	very dense, wet, no odor (80% silt, 15% clay, 5% sand)
		0.4	100%	28 18 24 42		ML	Gray SILT, little clay, little angular gravel with sand, 41-41 ft soft, 42-43 v. dense, wet, no odor (50% silt, 20% clay, 15% gravel, 15% sand)
		0.7	100%	4 22 21 47			
45		1.1	100%	12 35 36 26		SW	Gray fine SAND, with silt, little clay, trace angular gravel, very dense, wet, no odor
		1.2	100%	28 36 42 61		ML	Gray SILT, some fine sand, little clay, angular gravel, very dense, wet, no odor (70% silt, 15% gravel, 10% sand, 5% clay)
50		1.2	100%	12 37 46 42		ML	Gray SILT, trace fine sand, little clay, trace angular gravel, very dense, wet, no odor (85% silt, 5% sand, 5% gravel, 5% clay)
		0.8	75%	54 60 3 X			
							Bedrock (top of bedrock at 53')
55							
							End of Exploration at 55 feet below surface grade
60							
65							
70							
75							
80							
85							
90							

Drilling Log

Monitoring Well **P-21-DO**

Project *Varian Beverly*

Owner *Varian Medical Systems, Inc.*

Location *34 Longview Drive, Beverly, MA*

Proj. No. *631010764*

Surface Elev. *NA*

Total Hole Depth *17.0 ft.*

North

East

Top of Casing *NA*

Water Level Initial *▽ 12.0 ft.*

Static *NA*

Diameter

Screen: Dia *2 in.*

Length *5 ft.*

Type/Size *PVC*

Casing: Dia *2 in.*

Length *17 ft.*

Type *PVC*

Fill Material *Sand, bentonite, grout*

Rig/Core *Hollow Stem Auger*

Drill Co. *Geosearch*

Method *Hollow Stem Auger*

Driller *Shawn Preston*

Log By *Sara Head*

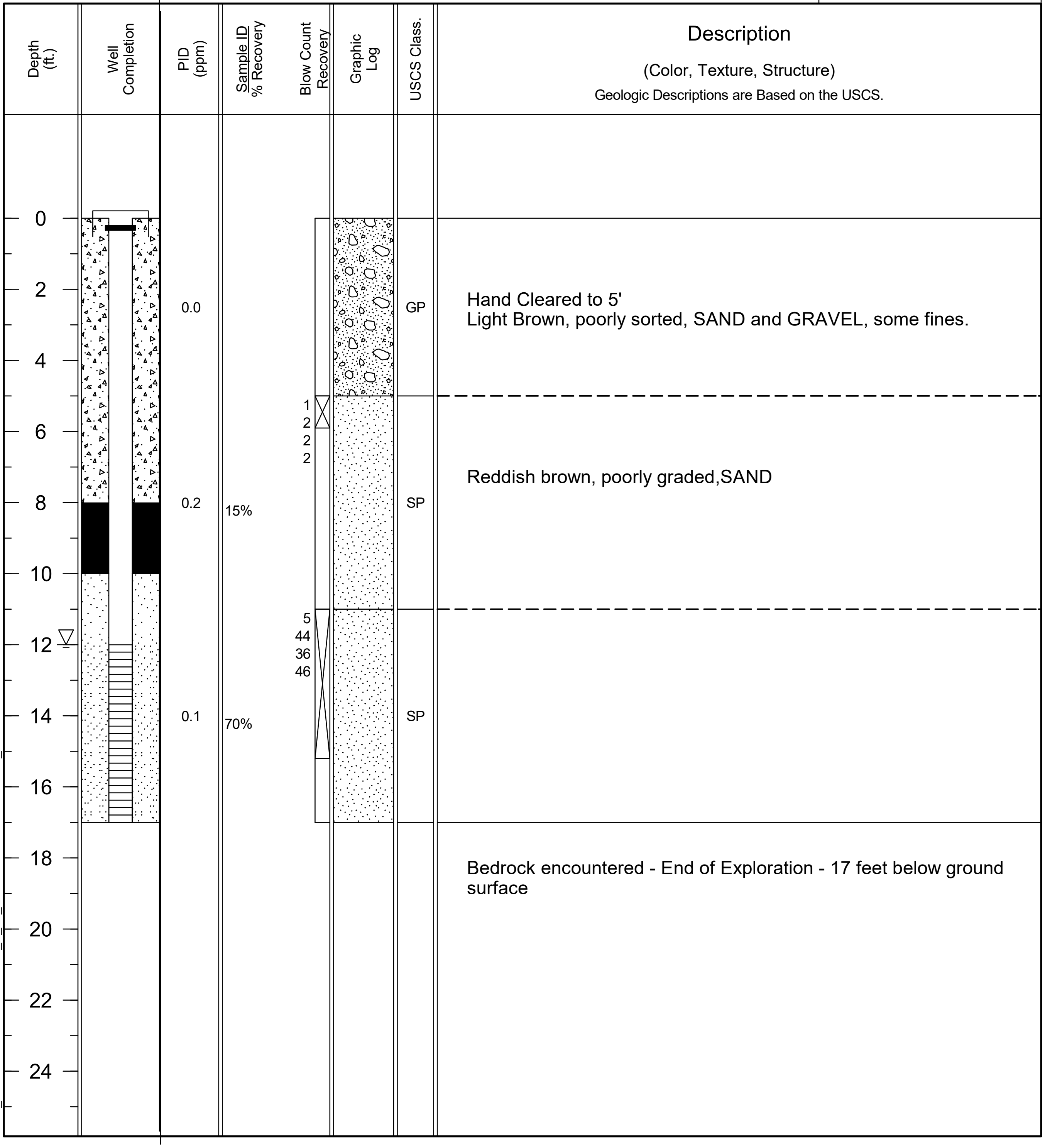
Date *3/1/22*

Permit # *NA*

Checked By *Jen Gailey*

License No.

COMMENTS



PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0.0			GP	Hand Cleared to 5' Light Brown, poorly sorted, SAND and GRAVEL, some fines.
0.2	15%	1 2 2 2	SP	Reddish brown, poorly graded,SAND
0.1	70%	5 44 36 46	SP	
				Bedrock encountered - End of Exploration - 17 feet below ground surface