CORRECTIVE MEASURES STUDY
FORMER ALCATEL FACILITY
2912 WAKE FOREST ROAD
RALEIGH, NORTH CAROLINA 27609
NCD 003-185-238

Prepared For:
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September 16, 2010

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Submitted to:
North Carolina Department of Environment and Natural Resources
Division of Waste Management,
Hazardous Waste Section

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EXECUTIVE SUMMARY

AMEC Earth and Environmental, Inc (AMEC) has completed a Corrective Measures Study (CMS) of the former Alcatel Sourcing Facility located at 2912 Wake Forest Road, Raleigh, North Carolina. The purpose of this CMS is to develop and evaluate corrective action alternatives and to recommend the corrective measure(s) to be implemented at the facility. The CMS includes a summary of current site conditions, establishment of clean up objectives, identification and evaluation of corrective measure alternatives, and details on the recommended corrective measure.

Alcatel began voluntarily assessing soil and groundwater impact on the property in 1989. Assessment results indicate an apparent release of tetrachloroethene (PCE) and 1,1,1-trichloroethane (TCA) which contained the stabilizer 1,4-dioxane, has occurred. Currently concentrations of TCA in the groundwater are below the North Carolina Administrative Code 15A Subtitle 2L Section .0202 (g) (2L Groundwater Standard) across the site; however, daughter products of this compound are present. Compounds currently present at concentrations in the groundwater above their respective 2L Standard include 1,4-dioxane, 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), PCE, trichloroethene (TCE), and vinyl chloride.

The PCE groundwater plume covers the largest area, extending from the subject property south to Six Forks Road in both the shallow and bedrock aquifer units. Other constituents of concern (COCs) targeted for corrective measure include 1,1-DCE and 1,4-dioxane. However, the distribution of the 1,1-DCE and the 1,4-dioxane are dissimilar from that of the PCE. Whereas the PCE plume extends to the south in both the shallow and bedrock aquifer, the 1,4-dioxane is found almost exclusively in the shallow aquifer and the plume trends toward the southwest, coinciding with current shallow groundwater flow directions. Similarly, the distribution of 1,1-DCE in the bedrock unit has a component trending to the southwest. Whereas higher concentrations of PCE can be encountered in the bedrock zone (MW-4d), higher concentrations of 1,1-DCE and 1,4-dioxane are encountered in the shallow saprolite aquifer.

Several groundwater remedial methods have been employed at the site over the years. Of most significance, a pump and treat groundwater remediation system began operating in 1997. The system consisted of injection wells, recovery wells, containment recovery wells, and a treatment facility. Although the historical operation of the pump and treat groundwater remediation system has been successful and reduced the concentration of COCs in the groundwater, the removal rate has steadily decreased over the past several years leading to asymptotic conditions.

There have also been two soil remedial efforts performed since the initial identification of COCs. The first removal action was conducted in 1990-1991, and the second in September 2009. A total of 437 tons of soil was excavated and disposed of offsite. The soil removal actions were successful in removing the majority of the impacted soil. The concentrations of COCs remaining in the soil are either below levels protective of groundwater, or can be addressed using institutional controls. Therefore, additional soil remedial action is not discussed in the CMS.

The 2L Standard for each COC in the groundwater has been established as the corrective action performance goals for groundwater at this site. These performance goals have been established to determine the extent of groundwater to be addressed under the proposed action. The successful treatment of large dilute plumes is technically challenging, and as such the

treatment of the groundwater at the subject site to meet 2L Standards cannot be guaranteed with the active remedial methods currently available. Therefore, Alcatel Lucent USA, Inc. is seeking to move the site toward a monitored natural attenuation (MNA) alternative, allowing the physical processes of advection, dispersion, and adsorption to address the remaining downgradient low concentrations of COCs.

To move to the MNA alternative, further reduction of contaminant mass in the shallow groundwater aquifer is warranted. With the previous removal of the impacted soils, the majority of the contaminant mass lies in the shallow aquifer material. Once source contaminant mass reduction has been achieved, MNA will be utilized for the dilute plume. Removing this remaining mass will have a positive impact to overall groundwater concentrations within the competent bedrock unit and in the shallow aquifer downgradient of the treatment area. Therefore, the focus of this CMS is to evaluate remedial alternatives which can be utilized for the source area and allow MNA to be utilized for the downgradient portion of the dilute plume.

Through the analysis of alternatives to treat the shallow aquifer in the source area, AMEC recommends that the shallow source material be treated using in-situ chemical oxidation (ISCO) via soil blending. Under the MNA alternative, groundwater monitoring would be conducted for several years to evaluate the overall effectiveness of the source reduction. A trigger for additional corrective measure may occur if the contaminant plume does not reach steady state conditions or increases in size.

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1.0 INTRODUCTION

This Corrective Measures Study (CMS) has been prepared for the former Alcatel USA Sourcing, Inc. (Alcatel) facility located at 2912 Wake Forest Road, Raleigh, Wake County, North Carolina (Figure 1). The purpose of the CMS is to develop and evaluate corrective action alternatives and to recommend the corrective measure(s) to be implemented at the facility. This CMS includes a summary of current site conditions, establishment of clean up objectives, identification and evaluation of corrective measure alternatives, and details on the recommended corrective measure.

1.1 Property History

The former Alcatel facility (Site) consists of approximately 24 acres with a 234,000 square foot building, storage and maintenance buildings, parking areas, and landscaped areas on the property (Figure 2). The Kellogg Corporation, a division of ITT, began operating at the facility in 1958, producing telecommunications equipment. Alcatel bought the facility in 1987 and performed electroplating operations as part of the manufacturing process until 1990.

Alcatel obtained a Resource Conservation and Recovery Act (RCRA) permit to store hazardous wastes at the site, including wastes with the following waste codes: F001 F002, F005, F006, F008, D001, D002, and D008. Under the RCRA permit, Alcatel was authorized for the following:

- Storage of the wastes described above in 55 gallon containers on two uncovered pads at the site;
- Drying of dewatered wastewater treatment sludge by evaporation while stored in a roll-off container located on the former sludge treatment container storage pad;
- Maintenance of in-ground holding tanks which received aqueous tin, lead, copper, chromium, nickel, mineral acid, caustics, and ammonium bifluoride wastes from the circuit board manufacturing processes; and,
- Treatment of wastes and rinse water at the on-site waste water treatment plant (WWTP).

The printed circuit board manufacturing operations at Alcatel ceased in 1990. At that time, all circuit board manufacturing equipment was decontaminated and sold. Structures associated with the manufacturing process, such as holding tanks and plating trenches, were decontaminated and decommissioned following the shut-down of manufacturing operations. The WWTP was also closed and decontaminated in 1991. The former WWTP equalization basin was converted into a chilled water storage tank unit, which was then used as part of the facility heating, ventilating, and air-conditioning (HVAC) system. The remaining WWTP equipment was dismantled. The area was decontaminated and a level concrete floor was poured over the existing floor. The area was converted for use as a maintenance area.

The site was sold in July 2003 to ITB Holdings, LLC and the site is currently not occupied, however, ALU maintains ownership of the environmental liability. The Alcatel facility continues to operate under the RCRA Hazardous Waste Permit (NCD 003-185-238), which was reissued on August 31, 2007.

1.2 Regulatory History

Alcatel began voluntarily assessing soil and groundwater impact on the property in 1989. Since that time several documents have been prepared that detail the environmental conditions and have been used in the preparation of this CMS. These documents include:

- *RCRA Facility Investigation for AOC#1 and AOC #2*, National Environmental Technologies, Inc., February 1996.
- *Interim Corrective Measures Plan for AOC #1 and AOC #2*, National Environmental Technologies, Inc., February 1996.
- *Phase II RCRA Facility Investigation*, Triangle Environmental, Inc., November 1998.
- *Corrective Measures Study*, TRC Environmental Corporation, January 2002.
- *Revised Corrective Measures Study*, TRC Environmental Corporation, May 2003.
- Interim Measures Progress Reports, Periods October 2001 through October 2009, TRC Environmental Corporation and AMEC Earth and Environmental, Inc.
- *Soil and Limited Groundwater Assessment Report and Soil Excavation Workplan*, AMEC Earth and Environmental, Inc., July 2009.
- Evaluation of Alcatel USA Sourcing, Inc. Status Under the RCRA Info Corrective Action Environmental Indicator Event Codes (CA725 and CA750), Techlaw, Inc. for USEPA, July 2009.
- *Soil Excavation Report*, AMEC Earth & Environmental, Inc., April 2010

During the 1996 RCRA Facility Investigation (RFI), two major Areas of Concern (AOC) were identified in addition to the groundwater impact. Figure 3 illustrates the location of AOC #1 and AOC #2.

AOC #1 was designated as the rear alleyway of the building and contained soils impacted with metals and volatile organic compounds (VOCs). The impacted soils were limited to four smaller areas labeled as Areas 1 through 4. Areas 1, 2, and 4 were impacted with metals. Areas 1 and 2 were located along the alleyway and contained soil impacted with lead and copper as a result of leaks from subsurface process piping. The impacted soil was excavated and transported off-site for disposal. Area 4 was located in the central portion of the alleyway and was the former location of a chemical processes shed. Soil and asphalt were sampled and concentrations of lead exceeded applicable goals. A total of 17.8 tons of soil was removed from the area and transported to a disposal facility in Michigan.

Area 3 was located on the western end of the alleyway. This area reportedly contained soils impacted with VOCs, including 1,1,1-trichloroethane (TCA), 1,1,2-trichloroethane (1,1,2-TCA), 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethane (1,2-DCA), 1,1-dichlroroethene (1,1-DCE), and tetrachloroethene (PCE). The RFI confirmed that a historic release occurred from a TCA aboveground storage tank (AST) in Area 3. Reportedly, approximately 92 tons of soil was removed from this area in 1990-1991.

AOC #2 is the former printed circuit board manufacturing area, located on the northern end of the facility. During the manufacturing operations, electroplating and chemical plating processes were performed in this AOC. Soil and groundwater impact was present as a result of an apparent release of TCA and PCE at the former printed circuit board manufacturing area.

The RFI revealed that the predominant constituents of concern (COC) at the site include 1,1-DCE, 1,1-DCA, 1,2-DCA, PCE, TCA, trichloroethene (TCE), vinyl chloride, and 1,4-dioxane. The groundwater plume of total VOCs extends approximately 1,000 feet downgradient from AOC #1, with an average width of approximately 300 feet. The VOCs are present in both the unconsolidated and the bedrock aquifers, and extends to a depth of approximately 80 feet below land surface (bls). Copper and lead were also identified as COCs in groundwater. However, no copper or lead groundwater plumes have ever been identified and concentrations of these metals are mostly below North Carolina 2L Groundwater Quality Standards (2L Standards).

An *Interim Corrective Measure* (ICM) *Plan* was prepared in 1996 that outlined a proposed interim remedial alternative. The plan included the installation of an interim groundwater remediation system which was designed to create a hydraulic barrier to reduce the size and stop the downgradient progression of the impacted groundwater. The system included a series of groundwater extraction wells and the produced groundwater would be treated and re-injected on-site. The groundwater remediation system began operating in September of 1996. ALU discontinued the use of the injection wells in July 2002 and instead discharged the treated groundwater to the adjacent stream under a National Pollutant Discharge Elimination System (NPDES) permit.

As a measure of the effectiveness of the groundwater pump and treat system operating at the Site, *Interim Measure Progress Reports* have been prepared on a semi-annual basis. These reports present the analytical results of groundwater samples collected from selected groundwater monitoring wells at the site, detail the direction of groundwater flow, and define the extent of the groundwater contaminant plume in the surficial and bedrock aquifer. Finally, historical data is tabulated to define trends in the reduction of contaminants in the groundwater. The latest report completed is the *October 2009 Interim Measure Progress Report.* Although samples were collected in April 2010, the *April 2010 Interim Measures Progress Report* was not submitted by publication time of this CMS Report.

In 2001, ALU began to evaluate other remedial techniques to address in the site. TRC Environmental Corporation (TRC) submitted a *Corrective Measures Study* in January 2002. The CMS summarized the elements of the treatment system, its performance, and supplemental corrective measures that were employed to enhance the performance of the existing pump and treat system. A revised CMS was submitted by TRC in May 2003, and recommended using Monitored Natural Attenuation (MNA) as a remedial option for the groundwater. In March 2004, the North Carolina Department of Environment and Natural Resources (NCDENR) approved a year-long MNA pilot test that included shutting down the recovery well system and monitoring the aquifer conditions as conditions return to steady state following seven years of groundwater extraction activities. The pilot test began in April 2004 and lasted for approximately 13 months. On May 26, 2005, ALU voluntarily began operating the groundwater remediation system again. However, groundwater was only extracted from the three northern-most recovery wells (RW-1

through RW-3). With the approval of NCDENR, Well RW-1 was shut down in May 2005, while well RW-2 was shut down in June 2008 due to pump mechanical failures. ALU has been utilizing well RW-3 to control the migration of the COCs.

2.0 ADDITIONAL SITE ASSESSMENT AND REMEDIAL ACTIVITIES

The facility is currently vacant and in severe disrepair. Regardless, soil and groundwater assessment and remediation has continued. In fact, the abandonment and dilapidation of the building has provided opportunities to access areas of the site that would not ordinarily be available. Larger equipment was mobilized to delineate and remediate areas with residual source material within the facility. These activities were performed in conjunction with the operation of the pump and treat system that has served as the interim remedial measure. A summary of the additional assessment and remedial activities recently completed are provided below.

2.1 Data Gaps

In 2007, ALU requested that AMEC determine if alternative remedial approaches could be utilized in place of the interim groundwater pump and treat system. AMEC evaluated various remedial techniques, most of which involved source reduction. In order to effectively implement these techniques, additional information was required to determine if a source of TCA and PCE was present which would continue to impact groundwater.

As noted above, soil assessment activities were conducted as part of the RFI which indicated that there had been releases in both the circuit board manufacturing area (AOC #2) and in Area 3 of AOC #1 as a result of a release from the TCA AST. The soil data collected indicated that only low levels of COCs remained in the unsaturated zone. The RFI and subsequent reports indicated that these source areas had been addressed.

However, AMEC noted a continued presence of 1,4-dioxane in the groundwater at the northern end of the parcel, near AOC #1. 1,4-Dioxane is an additive to the solvent TCA and is miscible in water with a very low retardation factor, so it is not readily absorbed to the soil matrix. Therefore, this compound is generally found near the leading edge of the plume. The continued detection of this compound in monitoring wells located at AOC #1 (Area 3) and AOC #2 indicated that COCs were likely present in the soil, providing an on-going source of COCs to the underlying groundwater. By delineating and addressing remaining source material in both the saturated and unsaturated zones, concentrations of COCs within the overall groundwater plume will ultimately decrease.

2.2 Soil Assessment and Remediation

2.2.1 Additional Soil Assessment/Source Identification

AMEC performed additional soil and limited groundwater assessment activities in AOC #1 and AOC #2 according to the July 2008 *Soil Sampling Workplan*. Assessment activities were designed to identify remaining potential sources to groundwater impact in AOC #2, and to

further define the limits of impacted soil at Area 3 of AOC #1. Limited groundwater assessment activities were also conducted to further characterize shallow groundwater beneath the floor slab of the main building. The results of the soil assessment were included in the AMEC July 17, 2009 report entitled *Assessment Report and Soil Excavation Workplan*.

As stated above, a release occurred from a TCA AST. In 1990-1991, approximately 92 tons of impacted soil was removed adjacent to the chiller room and along the alleyway. Additional soil could not be removed due to the presence of the chillers and the large fire line which runs through the center of the alleyway. Therefore, some impacted soil remained. With the presence of 1,4-dioxane in the groundwater, it was suspected that COCs could be present in this portion of the site. To provide access to this area, the chillers were moved and the chiller room structure was demolished.

The assessment data collected confirmed the presence of COCs in soil beneath the former chiller room and concrete pad present on the north side of the building adjacent to the concrete alleyway. In addition, impact was also identified in an interior room of the main building at the former location of the TCA distiller. Soil contained TCA, PCE, DCA, and DCE. The highest concentrations were observed at the chiller room. The majority of impact was present in the soil interval at five to nine feet bls. Minimal detectable impact was present in the surficial soils above five feet bls. AMEC recommended the excavation and off-site disposal of impacted soil in both areas.

In addition to the soil assessment activities, during this investigation phase AMEC also installed temporary groundwater monitoring wells to further define where the highest concentrations of COCs were present within the shallow aquifer unit. These results are summarized in Section 2.3.

2.2.2 Soil Remediation/Source Removal

In August and September 2009, approximately 345 tons of impacted soil was excavated addressing areas that could not originally be accessed (Figure 4). The removal action reduced the potential that the source material present within the vadose zone would further degrade underlying groundwater. Analytical results of post excavation soil samples collected from the side walls and bottom of the excavations indicate that minimal VOC impacted soil remains (Table 1). Further details on the excavation of impacted soil can be found in the AMEC April 13, 2010 report entitled *Soil Excavation Report*.

The soil removal action was successful in removing the majority of the impacted soil. Therefore, additional soil remedial action is not discussed in the CMS. The concentrations remaining are either below levels protective of groundwater, or can be addressed using institutional controls.

2.3 Additional Groundwater Assessment

2.3.1 Unconsolidated Aquifer/Source Area Groundwater Assessment

In October 2008 during the soil assessment activities described in Section 2.2.1 above, groundwater samples were collected from selected soil boring locations in AOC #1 and AOC #2

from the unconsolidated aquifer. The groundwater analytical results were used to identify areas beneath the floor slab of the building that may need to be addressed as part of the final groundwater remedial alternative.

Groundwater samples were collected from temporary wells installed in borings SB-5, SB-8, SB-11, SB-12, SB-19, and SB-21 (Figure 5) from within the building footprint. The analytical results of groundwater samples collected from each of the temporary wells indicated the presence of VOCs. Concentrations of total VOCs ranged from 22.3 micrograms per liter (µg/L) to 6,436 µg/L in the sample collected immediately south of the chiller room. The majority of this sample consisted of 1,4-dioxane which was present at a concentration of approximately 5,100 µg/L.

The greatest concentration of COCs in the unconsolidated aquifer exists beneath the former chiller room and extends south approximately 100 feet beneath the main building. The remaining VOC plume, which was previously defined, consists of much lower dilute concentrations of various VOCs and extends south and southwest beneath the main building and onto the adjoining property to the south.

The groundwater analytical results gained from the installation of temporary wells collected in October 2008 were combined with the October 2009 unconsolidated aquifer groundwater analytical results to produce the isoconcentration maps presented as Figures 6, 8, 10, and 12. The analytical results of groundwater samples collected from temporary wells provided expanded detail on the location and concentration of COCs in the shallow groundwater of the source area. These results are graphically depicted in the detail boxes presented in the above mentioned figures.

2.3.2 Assessment of Partially Weathered Rock Unit

As described above, elevated concentrations of VOCs were detected in the shallow unconsolidated saprolite aquifer unit. The saprolite material is underlain by partially weathered rock (PWR) material which can have higher transmissivities and provide a preferential pathway for the migration of COCs. Since higher concentrations of VOCs were detected in the shallow unconsolidated aquifer unit, AMEC believed that additional assessment of the PWR unit was warranted to determine if this aquifer zone also contained elevated concentrations of COCs, providing a continuing source of the VOCs to the underlying fractured bedrock material.

During previous assessment activities, only shallow wells could be installed through the floor slab within the building area. This was primarily due to the limited height clearance available. With the dilapidation of the building, AMEC could now remove the ceiling tiles and overhead structures. This provided four to five feet of additional vertical clearance and allowed AMEC to utilize a small sonic rig which could reach the PWR unit.

On November 16 through November 18 2009, AMEC supervised the installation of six groundwater monitoring wells screened within the PWR hydrogeologic unit. The wells were installed within the building using a mini sonic drill rig. Soil and rock cores were obtained using this drilling methodology and a description of the sample media was performed. To accurately

determine the composition of the PWR unit and the depth to competent bedrock, continuous cores of the unconsolidated overburden, PWR unit, and the competent bedrock were obtained during the installation of each boring. Once the competent rock unit was encountered, the borehole was completed with a Type II, groundwater monitoring well. Further details on the installation of PWR wells are included in Appendix A.

Analytical results of groundwater samples collected from the newly installed PWR wells indicate the presence of VOCs. Groundwater analytical results are summarized on Table 2 and the laboratory analytical reports are included in Appendix B. AMEC has prepared isoconcentration maps for the primary COCs and these are included as Figures 6 through 13.

The thickness of the PWR unit was found to range from approximately 6 to 16 feet. The concentrations of COCs observed within the PWR zone were found to be very similar to those observed within the overlying saprolite unit. Whereas at some sites the PWR can be more transmissive and form a preferential pathway for the migration of the COCs, at the former Alcatel site, the PWR is relatively thin and in some locations has hydraulic conductivities equally low as the saprolite material. The elevated concentrations of COCs identified within the shallow zone near the former chiller room are also likely reflected within the underlying PWR unit. Based on the data collected, AMEC believes that the PWR and saprolite act as one hydrogeologic unit as far as the vertical and lateral distribution of the COCs.

3.0 SITE CONCEPTUAL MODEL

3.1 Lithologic Units

Since the inception of assessment activities at this site in 1989, 31 monitoring, 22 recovery, and 9 injection wells have been installed at the site. Many of the wells have since been abandoned. A summary of construction details of both the existing and abandoned wells are presented in Table 3.

Stratigraphic information collected over the course of the various phases of investigation indicates that there are three lithologic units at the site. These units include the following:

- Unconsolidated Saprolite
- Partially Weathered Rock (PWR)
- Competent Bedrock consisting of and Intrusive Felsic Granite into a Biotite Gneiss or Schist.

Cross sections down the center of the plume (A-A') and perpendicular to general groundwater flow (B-B' and C'C') are provided as Figures 15, 16, and 17, respectively. A cross section index is included as Figure 14.

The saprolite consists of unconsolidated sands, silts and clays which extend from ground surface to 20 to 25 feet bls. The PWR serves as a gradational contact to the underlying competent rock and ranges from 6 to 16 feet thick. This unit grades from saprolite material with

some gravel size rock material, to less weathered chunks of either granite or gneiss with minimal clay. The underlying bedrock consists of an intrusive felsic granite into a biotite gneiss or schist. Massive, unfoliated rock types such as this tend to create thinner PWR units than other rock types such as slate or phyllite.

The competent rock underlying the PWR unit is likely fractured. Although a fracture trace analysis or a geophysical study have not been conducted, based the migration of COCs and injection results, fractures appear to trend approximately N 60° W and N 30° E. Actual fracture directions have not been measured. Drilling logs indicate that there is significant fracturing in the upper 10 to 20 feet of the unit and the fracturing decreases significantly below this point.

As part of the 1996 RFI, aquifer testing was performed on multiple wells to assess and characterize the hydrogeology. Slug test results confirmed that the silts and clays of the saprolite unit exhibited low hydraulic conductivities (3.99 ft/day). The PWR zone is by definition more weathered than the underlying competent rock unit. As such, it contains both clays and silts from the weathering process. In addition, remnant fractures are usually present which can increase the hydraulic conductivity of the unit. Therefore, the conductivities for the PWR unit would be expected to fall between those observed for the saprolite and competent rock.

Significant testing was conducted on the fractured bedrock unit. Some of the lithologic zones tested may have also included some of the PWR zone. Based on a step-drawdown test and a 72-hour constant rate pumping test, the average hydraulic conductivity was determined to be 19.40 ft/day. Since water is transmitted through fracture flow, these conductivities would be expected. This is based on the following individual conductivities.

Well Number	Screen Depth (feet)	Conductivity (ft/day)
RW-1	~15	19.89
RW-2	~37	17.97
MW-2sk	15	12.60
MW-2ik	37	40.59
MW-4d	52	15.02

3.2 Groundwater Flow

Groundwater elevations in the shallow wells measured in October 2009 indicate the overall direction of groundwater flow in both the water table and the bedrock aquifer is towards the southwest. Whereas the groundwater flow in the bedrock beneath the former Alcatel facility property is directed towards the west-southwest, flow on the properties to the southwest reveal a flow direction towards the south-southwest. The average groundwater gradient at the water table was approximately 0.01 ft/ft.

During the October 2009 sampling event, an upward vertical gradient of approximately +0.03 ft/ft was measured in most of the groundwater monitoring wells. A downward gradient (-0.04 ft/ft) was measured at the MW-3sk/3dk and MW-9sk/9dk well nests. The MW-3sk/3dk well nest

is located near the only groundwater extraction well still operating. Well nest MW-9sk/9dk is located at the toe of the groundwater plume, near Six Forks Road.

As would be expected, the operation of the pump and treat system has had a large impact on the overall groundwater flow directions in both the shallow saprolite material, and the fractured bedrock unit. AMEC prepared potentiometric maps showing groundwater flow in both these horizons for the following three time periods:

- December 26, 1999 – The pump and treat system was in full operation (Figures 18 and 19),
- October 19, 2004 – System had been operating under "pulsed pumping" for last several years (Figures 20 and 21), and,
- October 6, 2009 – The system has been operating with only one to three recovery wells in operation for the last 5 years (Figures 22 and 23).

The potentiometric maps demonstrate that the operation of the pump and treat system resulted in a groundwater gradient which flowed nearly north/south, along the line of groundwater extraction wells. Once the system was turned off and groundwater flow returned to natural conditions, the groundwater began to flow toward the southwest, toward the remnants of the stream (now culverted) which runs along Wake Forest Road.

3.3 Distribution of COCs

A summary of the most recent analytical results obtained in October 2009 is included as Table 4. The release at the site apparently consisted of PCE and TCA which contained the stabilizer 1,4-dioxane. Concentrations of TCA are now below the 2L Groundwater Standard across the site. However, daughter products of this compound are present. Compounds now present at concentrations above their respective 2L Standard include 1,4-dioxane, 1,1-DCE, 1,1-DCA, PCE TCE, and vinyl chloride. Benzene has been detected in one well (MW-12s adjacent to the property boundary) but this compound was not historically used at the site.

Isoconcentration maps have been prepared which detail site conditions as of the October 2009 groundwater sampling event. The isoconcentration maps show the distribution in the shallow saprolite unit and the bedrock aquifer unit for total VOCs (Figures 6 and 7), PCE (Figures 8 and 9), 1,1-DCE an anaerobic breakdown product of TCA (Figures 10 and 11), and 1,4-dioxane (Figures 12 and 13). AMEC has incorporated the shallow and PWR groundwater sampling results obtained in 2008 and 2009 (as described in Section 2 above). These maps provide a comprehensive view of the current distribution of the COCs.

The PCE plume covers the largest area, extending to Six Forks Road in both the shallow and bedrock aquifer units. The highest concentrations of PCE are found in bedrock well MW-4d, located on the southern side of the former Alcatel facility. The shallow groundwater plume follows the groundwater flow directions which were induced as a result of the groundwater pump and treat system. The distribution of PCE in the bedrock follows this same trend. This is likely

because the plume has followed the trace of the fractures which trend in this direction and operation of the deep groundwater extraction wells. With the shut down of the pump and treat system, there has been little change in the vertical and lateral distribution of the PCE in either the shallow or bedrock aquifers.

The distribution of the 1,1-DCE and the 1,4-dioxane are dissimilar from that of the PCE. Whereas higher concentrations of PCE can be encountered in the bedrock zone (MW-4d), higher concentrations of 1,1-DCE and 1,4-dioxane are encountered almost exclusively in the shallow saprolite aquifer. The 1,4-dioxane is in the shallow aquifer and the plume trends toward the southwest, coinciding with current shallow groundwater flow directions. The distribution of the 1,1-DCE in the bedrock unit trends toward the south, but also widens outward toward the west, in the same flow direction as the 1,4-dioxane. It is likely that with the operation of the full scale system, downward vertical gradients were greater resulting in more downward flow. With current groundwater flow conditions, the overall vertical gradient is upward, helping to lessen the overall downward movement of the COCs.

4.0 INTERIM REMEDIAL MEASURES

Several groundwater remedial methods have been employed at the site over the years. The following section provides a summary of these technologies.

4.1 Pump and Treat

The discovery of chlorinated solvents on site prompted the preparation of the *Interim Corrective Measures* (ICM) *Plan* that established the “Pump and Treat” system. After a three month trial of the treatment system, Alcatel began a groundwater remediation system in 1997. The system consisted of injection wells, recovery wells, containment recovery wells, and a treatment facility.

Utilizing “pump and treat” methodology, the site pumped contaminated water from the recovery wells and directed it to the treatment facility. The facility employed an in-line 25 μm particle filter prior to entering an air stripper and granular activated carbon (GAC) beds to eliminate volatiles. From 1997 to July 2002, approximately twenty percent of the treated effluent was allowed to flow by gravity into a series of eight injection wells. The remaining treated water was discharged during the first year of operation to the City of Raleigh POTW. Following the first year of operation and subsequent to the acquisition of a NPDES permit, the overflow water from the treatment system was discharged to a Crabtree Creek tributary. In addition containment recovery wells were utilized as recovery wells and as a preventative measure. The containment recovery wells engineered a depression that could retain contaminated groundwater from moving farther south.

In October 2001, three northern injection wells were turned off in an attempt to return the groundwater gradient to a more natural direction. The five remaining injection wells were shut down in July 2002. To further minimize drawdown (while maintaining efficacy), pulse pumping commenced in October 2002. While the recovery wells south of RW-5 were turned off

completely, the containment recovery wells (CRW wells) were turned on every other month. In April 2003, the CRW wells were shut down but the upgraded pumps in RW-3 and RW-5 allowed RW-1 through RW-5 to extract the same volume that all the recovery wells and containment recovery wells had previously performed.

In addition to the operation of the recovery wells, groundwater was purged using a submersible pump, collected in a holding tank and discharged to Alcatel's treatment system. Wells MW-2d, and MW-14d, each had impacted water directly removed approximately once a month from October 2001 to April 2003 using a small portable pump. From the October 2003 sampling event to April 2004, the scope was expanded to remove water from wells MW-2d, MW-14d, MW-4d, MW-3dk, and MW-13d. By April 2004, approximately 43,000 gallons of contaminated groundwater was pumped and treated in the Alcatel treatment system.

In May 2004, the system was turned off to execute the yearlong Monitored Natural Attenuation pilot test. In May 2005, only recovery wells RW-2 and RW-3 could be restarted to collect groundwater and send to the on-site treatment facility. In June 2008, RW-2 was shut down due to mechanical problems. Currently, only recovery well RW-3 remains in operation.

Total VOC concentration of influent to the treatment system has been decreasing since the system began operation. The average total VOC concentration during the last semi-annual period was 90 µg/L, with PCE comprising nearly 70% of the effluent. During the operation of the treatment system, approximately 207 pounds of VOCs have been removed by processing 148 million gallons of groundwater. Although the historical operation of the pump and treat groundwater remediation system has been successful and reduced the concentration of COCs in the groundwater, the removal rate has steadily decreased over the past several years leading to asymptotic conditions.

4.2 Aggressive Fluid Vapor Recovery (AFVR)

In April 2001, supplemental methods were utilized to remediate the site more assertively. Aggressive Fluid Vapor Recovery (AFVR) was applied semi-annually to shallow wells closest to AOC #1, namely MW-2s, MW-13s and MW-13d. By using a vacuum truck, up to 3,000 gallons of groundwater was removed, along with any soil gas vapors present in the vicinity. Between October 2000 and October 2002 marked reductions in total VOCs were recorded at these wells located near the central mass of the plume. MW-2s experienced an 83% decrease (193 to 33 µg/L), MW-13s had an 86% decrease (2,703 to 380 µg/L) and MW-13d underwent a 90% decrease (902 to 87 µg/L). Due to the depth limitations involved with AFVR, this method was used on selected shallow groundwater monitoring wells.

In addition to the AFVR, from July 5 to July 22, 2005, a Mobil Multi-phase Extraction (MMPE) unit was used to extract impacted vapor and groundwater from MW-13s under the building and MW-2d on the north side of the building. In all, approximately 65,000 gallons of water were removed and treated during the operation. Impacted groundwater removed was treated using the onsite treatment system.

4.3 Monitored Natural Attenuation

In May 2004, all active treatment methods were discontinued so that a MNA pilot study could begin. The objectives of the study were to monitor aquifer conditions such as water table elevation, dissolved oxygen, oxidation/reduction potential (ORP), and COC concentrations under more natural conditions. Over the course of the pilot study, no noticeable changes were detected in water table elevations, dissolved oxygen, or ORP. Aerobic conditions are generally present throughout most of the aquifer. Therefore, reductions would rely on the physical processes of advection, dispersion, and adsorption.

After a period of approximately one year, COC concentrations increased in wells closest to the plume. MW-2d had a pre-MNA PCE concentration of 250 µg/L and a post-MNA concentration of 480 µg/L. Similarly, MW-13d had a PCE increase from 4.4 µg/L to 18 µg/L. Meanwhile, wells MW-13s and MW-14d experienced decreases in 1,1-DCE and TCA, respectively. Wells down-gradient of the plume (RW-5 and RW-7) also experienced reductions in contaminant concentrations and the presence of degradation products (1,1-DCA, 1,2-DCA and 1,2-DCE).

Based on the results obtained from the MNA pilot test, ALU decided that some source reduction would be required to move the site to an MNA alternative as the final remedial alternative.

4.4 In-Situ Chemical Oxidation

In May 2007, an In-Situ Chemical Oxidation (ISCO) event was conducted by injecting sodium persulfate within the fractured bedrock and the PWR. Alcatel did not cease treatment system or recovery well operation during the ISCO treatment event. Five injection wells and one replacement monitoring well (MW-13sr) were installed to facilitate injection activities. The five injection wells comprised three shallow wells constructed of 2-inch PVC with a screen and riser. Additionally, two bedrock boreholes were drilled for use as injection points. The upper portion of the cased bedrock wells were constructed of PVC, and portion of the injection well in competent rock was left as open hole to have complete access to any fractures present. During the drilling of these bedrock injection wells, a large highly productive fracture was encountered between 20 to 25 feet bls. The two injection wells produced one vacuum truck full of groundwater during drilling activities.

Per the approved Underground Injection Control (UIC) permit, 500 gallons of sodium persulfate with a caustic catalyst was injected into each of the five injection wells. The sodium persulfate solution was mixed before injection. Hydrated lime was added to the solution to increase the pH to between 9 and 10. The solution was injected into the bedrock unit at approximately 5-10 gallons per minute with an injection pressure of 75-100 pounds per square inch (psi), using a double diaphragm pump. The wells completed within the PWR unit would take the injectant at a very limited rate. Limited pressure was added and several of the wells had to be left over night to allow the persulfate to move into the aquifer material.

Monitoring wells MW-2s, MW-2d, MW-4s, MW-4d, MW-13s, and MW-13d were sampled immediately prior to injection to develop a pre-injection baseline. Sampling was repeated on September 23, 2007, 45 days after the ISCO treatment event. There was a decrease in total VOC concentrations in wells MW-2d, MW-4d, and MW-13d, all completed within the fractured

bedrock (Figure 2). Wells MW-2d and MW-13d lie within approximately 20 to 25 feet of the injection wells. Well MW-4d is located on the southern side of the facility. Concentrations of total VOCs decreased from 736.2 µg/L to 161.7 µg/L in well MW-2d and from 1,051.17 µg/L to 692.49 µg/L in well MW-4d. A slight change was noted in well MW-13d, with a decrease from 76.7 µg/L to 20.4 µg/L.

Approximately 60 days after injection, concentrations of total VOCs decreased to 126.5 µg/L in well MW-2d and 606 µg/L in well MW-4d. During this same sampling interval, VOCs were detected in MW-13d at 13.1 µg/L. After approximately three months of monitoring, total VOCs had decreased from 736.2 µg/L to 45.9 µg/L in well MW-2d, and from 76.7 µg/L to 9.3 µg/L in well MW-13d. During this same time period, an overall decrease from 1,051.2 µg/L to 818.61 µg/L was noted in well MW-4d. Although total VOC concentrations decreased, there was no associated spike in metals or sulfate concentrations observed in these monitoring wells, or any of the injection monitoring network. No definitive change in total VOC concentrations were observed in the monitoring wells completed within the PWR or shallow aquifer. This may be due to a limited radius of influence associated with PWR injection wells.

In addition, during the October 2007 sampling event, no VOCs were detected in well MW-14d at concentrations at or exceeding laboratory PQLs. These are the lowest concentrations measured in these wells since samples were first collected over a decade ago. Similarly, the concentration of total VOCs in MW-2d continued to decrease until October 2008, when samples exhibited rebounding of concentrations. Based on the results observed in well MW-14d, it is likely that the highly productive fractures encountered in the injection wells are interconnected with those present in MW-14d, located cross gradient to the injection wells.

Although rebounding was subsequently observed in each of the bedrock wells, this was anticipated since the overlying source material had not been addressed. The overall results indicated that sodium persulfate can effectively treat the COCs present at the site, including the 1,4-dioxane. This remedial method is only effective if the injectant comes in direct contact with the COCs. In the saprolite unit and potentially in the PWR unit, the radius of influence will likely be limited. Success within the competent rock unit will be dependent upon intersecting the fractures which transmit the COCs downgradient from the source area.

5.0 ESTBALISHMENT OF MEDIA CLEAN UP OBJECTIVES

5.1 Soil Cleanup Objectives

The soil assessment activities performed have been successful in identifying the location(s) of chlorinated solvents. The excavation of impacted soil has removed the remaining source material and greatly minimized the further degradation of groundwater. However, analytical results of post excavation soil samples indicate the presence of limited impacted soil remaining in the subsurface. To gain full closure under RCRA for unrestricted land use, additional soil remedial action will be necessary to reduce the concentration of COCs in the soil to below the North Carolina Hazardous Waste Section Soil Screening Levels. However, with approval of the

land owner, land use restrictions can be used to address any soil impact remaining. Since the soils can be addressed using engineering controls, soil will be not addressed further when considering the various remedial alternatives applicable to this site.

5.2 Groundwater Clean Up Objectives

In support of the corrective action objectives, performance goals have been established to determine the extent of groundwater to be addressed under the proposed action. The performance goals for groundwater are the North Carolina Administrative Code 15A Subtitle 2L Section .0202 (g) (2L Groundwater Standard). The analytical results of samples collected as part of the October 2009 semi-annual sampling event are included in this CMS as a depiction of the current conditions in the unconsolidated and bedrock aquifer. Groundwater samples collected from temporary wells in October 2008 are included to provide evidence to the concentration of COCs near the source area within the unconsolidated aquifer. Finally, the analytical results of the groundwater samples collected from the PWR wells installed in November 2009 are included to depict the impact on the groundwater in this hydrogeologic unit. The results from these sampling events are depicted in the isoconcentration maps presented as Figures 6 through 13. These maps show the extent of COCs at concentrations exceeding their respective 2L Groundwater Standard.

The successful treatment of large dilute plumes is technically challenging. Treatment of the plume at the former Alcatel site to meet 2L Standards cannot be guaranteed with the active remedial methods currently available. ALU is currently seeking to move the site toward an MNA alternative, allowing the physical processes of advection, dispersion, and adsorption to address the remaining downgradient low concentrations of COCs. The previous MNA pilot test revealed that the plume is close to steady state conditions at this time. However, for the plume to begin shrinking in size, additional source material will need to be addressed.

For MNA to be a viable alternative, the method must be able to achieve remedial end goals. With source material remaining, these end goals cannot be achieved within a reasonable time frame. Therefore, the driver for this remedial action is to address the remaining source material and thereby make MNA a viable remedial alternative in which the plume achieves steady state conditions, and ultimately begins to shrink in size.

As described in Section 3.0, the highest concentrations of COCs are present adjacent to the former chiller room in the shallow aquifer including the saprolite and underlying PWR unit. With the previous removal of the impacted soils, the majority of the mass remaining lies in this shallow aquifer material. Removing this remaining mass will have a positive impact to overall groundwater concentrations within the competent bedrock unit and in the shallow aquifer downgradient of the treatment area. Source area treatment can be implemented and positively impact the dilute dissolved phase plume. Therefore, the focus of this CMS is to evaluate remedial alternatives which can be utilized for the source area and allow MNA to be utilized for the downgradient portion of the dilute plume.

The concentrations of VOCs present within the bedrock unit are much lower than within the upper source zone area. When evaluating the treatment area based on total mass to be removed, there is far less mass present in the fractured bedrock unit than within the upper

shallow aquifer zones. For the long term success of the MNA alternative, removal of mass material will promote the creation of a shrinking plume and decrease overall cleanup times and monitoring costs. Since significant mass removal likely cannot be achieved by addressing the bedrock material, remedial action will focus on addressing the shallow unit.

As stated above, once source reduction has been achieved MNA will be utilized for the dilute plume. Under the MNA alternative groundwater monitoring would be conducted for several years to evaluate the overall effectiveness of the source reduction.

6.0 IDENTIFICATION OF THE CORRECTIVE MEASURES ALTERNATIVES

AMEC evaluated the potential remedial alternatives in terms of the criteria described in the RCRA Corrective Action Plan (US EPA 1994) and the Advance Notice of Proposed Rulemaking (ANPR) (US EPA 1996). The evaluation criteria include threshold criteria and balancing criteria as subdivided below.

Threshold Criteria:

- Protection of Human Health
- Attain Media Cleanup Values (2L Standards)
- Control the Source of Release
- Comply with Applicable Standards for Management of Wastes

Balancing Criteria

- Long-term Reliability and Effectiveness
- Reduction in Toxicity, Mobility, and Volume of Wastes
- Short-Term Effectiveness
- Implementability
- Cost

The results of our evaluation are provided below and summarized on Table 5. There are various treatment options currently available to remediate sites impacted with PCE, TCA, and 1,4-dioxane. However, the options are limited by several factors.

- 1,4-Dioxane is miscible in water and recalcitrant and thereby not biodegradable like the other COCs present.
- The shallow aquifer consists of clays with low hydraulic conductivity. In addition, the PWR zone was found to have extremely low hydraulic conductivity in portions of the site. This aquifer characteristic will extremely limit the effectiveness of remedial alternatives such as air sparging, soil vapor extraction, direct injection of chemical oxidants, etc.
- Vagrants frequent the site and machinery is often stolen or destroyed. Therefore, it is unlikely that a remedial alternative involving dedicated equipment could be successfully maintained on-site for a prolonged period. This makes implementing alternatives such as soil vapor extraction, air sparging, recirculation wells, etc. extremely difficult.

As discussed above, ALU has historically utilized pump and treat technology as an interim measure. Although the historical operation of the pump and treat groundwater remediation system has been successful and reduced the concentration of COCs in the groundwater, the removal rate has steadily decreased over the past several years leading to asymptotic conditions. This technology has reached the limit of its effectiveness. In addition, as mentioned above, it will be difficult to maintain the system on an on-going basis without frequent repairs due to vandalism. Therefore, this technology will no longer be considered in this evaluation.

Potential alternatives include the following:

- In-Situ Chemical Oxidation (ISCO) via Direct Injection
- ISCO via Soil Blending
- Enhanced Bioremediation and Bioaugmentation
- Permeable Reactive Barrier
- Dig and Haul
- Monitored Natural Attenuation with Source Removal

6.1 In-Situ Chemical Oxidation Via Direct Injection

ISCO was previously used at the site and substantially decreased the concentrations of total VOCs. Although this method was successful in reducing total VOC concentrations in the bedrock, no definitive changes in total VOC concentrations were observed within the unconsolidated saprolite/upper PWR portion of the shallow aquifer.

When considering ISCO, various oxidizers can be used including Fenton's Reagent, sodium persulfate, or permanganate (potassium manganate - KMnO4). Due to the presence of 1,4-dioxane, a strong oxidizer is required, eliminating the potential of utilizing permanganate. Sodium persulfate was utilized at the site and successfully addressed each of the COCs present. Persulfate is a preferred oxidizer because it is easier to use and implement than Fenton's Reagent.

The key to a successful ISCO remediation is complete contact of the oxidizing compound with the VOCs. If the oxidant does not make contact with the VOCs, the VOCs are not destroyed. This means that the oxidant must be distributed equally through the impacted zone, including the tight clays of the saprolite material. Subsurface heterogeneities can cause uneven distribution of the oxidants, limiting its effectiveness. With this limitation, the technology is generally reserved for mass reduction, and not for attaining low 2L Standards across an entire plume.

The saprolite/PRW zone which contains the highest concentrations of VOCs is up to 20 feet thick. In order to address this thickness, two nested injection wells would be required at each location. Assuming a radius of influence of five feet for the saprolite material, over 50 injection well nests (over 100 wells) would be required. However, even this tight placement of injection points does not guarantee that adequate contact will be made. As mentioned above, slight heterogeneities in the soil can have a large impact on the distribution of the oxidant. Therefore, there is the potential that only 50% of the mass would be addressed within the saprolite material using direct injection techniques.

Based on previous testing, the hydraulic conductivity of the PWR zone is highly variable. In some portions of the site, fluid could be injected at rates over five gallons per minute. In other areas, the PWR is much tighter and very little fluid can be injected. Therefore, the success of the direct injection of the persulfate would be dependent upon the area and the characteristics of the PWR in that particular zone.

Direct injection of persulfate within the bedrock zone has been shown to be highly effective. However, success is predicated on the injection wells intersecting the fractures which are transmitting the VOCs. The two injection wells previously installed (INJ-1 and INJ-2) intersect highly productive fractures which contain VOCs. In addition, well MW-14D also intersects a large productive fracture. These wells could be utilized following treatment of the unconsolidated/PWR unit to address a limited portion of the bedrock material immediately adjacent to the source material. The installation of additional injection wells does not guarantee that productive fractures will be encountered and treated. Wells would be installed more on a trial and error basis.

6.2 In-Situ Chemical Oxidation via Soil Blending

Since effective use of oxidants requires direct contact with the target VOCs, ISCO is often limited by the ability to distribute the chemical amendments. By blending the material, the persulfate can be well distributed throughout the targeted zone. In-situ soil blending provides an alternative method to deliver oxidants to the subsurface where direct injection may not provide sufficient delivery. This method involves the use of an in-situ blender to effectively distribute chemical amendments, including persulfate, throughout the soil column. This includes both saturated and unsaturated soils. The material is not removed from the hole, so no waste material is generated. This alternative is less expensive than a standard dig and haul method when addressing saturated soils.

The blender is mounted on a large excavator with a modified diesel engine and hydraulic power system. The mixer is capable of mixing dry soil as well as sludge material to depths of up to 24 feet bls. Deeper depths can be achieved if the excavation is benched. The 28-inch mixing drum with “teeth” is rotated at speeds up to 100 revolutions per minute with torque of 20,300 ft-lbs. This allows the blender to penetrate all soil types including saprolite and highly weathered PWR material. For larger treatment zones, the treatment area is subdivided into smaller cells of lifts of up to 5 feet thick.

The limiting factor associated with this technology is the depth of the treatment zone and equipment access. By removing the upper 12 feet of unsaturated overburden, the excavation can be benched allowing the blender to reach the targeted depths of up to 32 feet bls. To provide adequate access for the operation, the portion of the building overlying the treatment area would have to be demolished and the debris removed. This would require prior approval of the land owner.

The saprolite and upper portion of the PWR zone would be treated using the soil blending method. The blender is not capable of addressing large rocks because they will break off the “teeth” on the mixing drum. So the treatment cannot address bedrock or PWR with a high concentration of large rocks. The top of competent rock was encountered at depths ranging

from 27 to 33 feet bls. But, due to the larger concentration of rock material immediately above the competent rock, the blender will likely only be able to treat within approximately five feet of the top of the rock unit. This makes target depths approximately 22 to 31 feet bls.

Although the less weathered PWR material cannot be treated directly using soil blending, a shadow zone area of treatment does occur immediately below the blended soils. Some of the persulfate and groundwater mixture within the treatment zone will percolate downward and into the underlying PWR unit, deepening the overall treatment area.

The act of blending the soils can make subsequent compaction of the material difficult. However, since the overburden would be removed and later used to backfill the excavation, appropriate soil compaction should be obtained following the remedial process.

With in-situ blending, the VOCs come in full contact with the oxidant. This results in more predictable outcome than with direct injection. The mass reduction associated with this delivery method, as compared to the direct injection will likely be significantly higher.

6.3 Enhanced Biodegradation and Bioaugmentation

The compounds PCE and TCA can naturally biodegrade through the process of reductive dechlorination under anaerobic aquifer conditions. As stated above, aerobic conditions are present throughout a large portion the aquifer environment both on-site and off-site. Materials such as emulsified vegetable oil, lactate, molasses, etc can be injected into the aquifer thereby reducing the dissolved oxygen concentrations and providing the necessary electron donors to promote the reductive dechlorination of the COCs. However, this process will only be successful if the proper bacteria are present. Based on the historical data and lack of daughter products beyond cis-1,2-dichloroethene, these bacteria are likely not present in sufficient volumes. Therefore, in order for the biodegradation process to be successful, the aquifer would need to be augmented with the microbe Dehalococcoides (DHC). The DHC is added once reductive conditions have been established within the aquifer.

This technology can treat dilute plumes and areas with more significant concentrations of COCs. Unlike ISCO methods, direct contact of the injectant with the VOCs at the time of injection is not required. An electron donor such as emulsified oil can be used which can last up to 18 months in the aquifer. Therefore, the material will naturally disperse through the aquifer material over time. The material can be emplaced along reactive barrier lines to address larger areas with faster moving groundwater, or through tightly spaced injection points to treat smaller areas consisting of tighter soils.

As noted above, the presence of TCA can hamper the degradation of the PCE. As a result, the PCE will stall at the formation of trichloroethene (TCE) and 1,2-DCE. To overcome this, the site would need to be augmented with a specific blend of DHC cultures which can address both PCE and TCA.

This remedial method has been shown to be highly effective under the proper conditions and would likely be effective in the downgradient plume consisting primarily of PCE and degradation products of TCA. However, this method will not address 1,4-dioxane since it is has been shown

to be recalcitrant. 1,4-Dioxane is a primary COC at the site and was found at concentrations exceeding 5,000 µg/L in the shallow groundwater at the source area. Although this remedial method could potentially be considered as needed for downgradient areas once the 1,4-dioxane has been addressed, it was not considered further as part of this evaluation to address the COCs present within the source area.

6.4 Permeable Reactive Barrier

In lieu of an MNA alternative in conjunction with source removal, AMEC looked at the potential of using a remedial alternative such as a permeable reactive barrier (PRB) to prevent the further downgradient movement of the COCs. PRBs are installed in the subsurface to intercept a contaminant plume. The barrier consists of reactive materials such as zero valent iron (ZVI) which transform the VOCs into environmentally acceptable forms. The barriers are designed to provide a preferential flow to promote the movement of the groundwater through the treatment medium. The barriers are considered a passive method and are used to protect potential receptors and not to remove source material. The barrier is generally installed along the toe of the plume to prevent further movement downgradient of the COCs.

The barrier is installed via a trench or as a slurry with ZVI which is emplaced using an auger drilling rig. At the toe of the plume at the former Alcatel site, the COCs are present within both the saprolite and the competent bedrock to depths exceeding 60 feet bls. Emplacement of a PRB to these depths and within the rock material is technically unfeasible. This alternative was thereby eliminated from further consideration.

6.5 Dig and Haul

The shallow saprolitic soils and PWR material can be addressed by excavating the material and transporting it to a local landfill for disposal. Since the excavation will involve the removal of saturated soils, both soil and water will be generated during the process and will need to be addressed. Based on the concentrations of the COCs present, it is possible that at least a portion of the soil may require disposal at a RCRA Subtitle C facility. The majority of the soil may be disposed of at a RCRA Subtitle D facility in accordance with the NCDENR “Contained Out” Policy. The ultimate disposition of the water generated cannot be determined at this time. However, water containing VOCs less than approximately 1,000 µg/L total VOCs could potentially be accepted by the City of Raleigh for treatment by their waste water treatment plant.

A limiting factor associated with this alternative is the depth of the treatment zone and equipment access. By removing the upper 12 feet of unsaturated overburden, the excavation can be benched allowing an excavator to easily reach the targeted depths of up to 25 feet bls. However, for adequate access, the portion of the building overlying the treatment area would have to be demolished and the debris removed. This would require prior approval of the land owner.

Whereas this alternative involves a similar technique as the soil blending method, the final cost of this alternative is difficult to quantify at this time, and will be dependent upon the concentrations of the VOCs present in the soil once excavated. In addition, ALU will maintain liability for the soils once transported to the disposal facility.

6.6 Monitored Natural Attenuation with Source Removal

Source removal of the vadose zone has been completed with the removal of 345 tons of impacted soil in 2009. Analytical results of post excavation soil samples collected from the side walls and bottom of the excavations indicate that minimal VOC impacted soil remains

Dependent upon site conditions, groundwater may be monitored and the COCs allowed to naturally degrade and attenuate over time. In order to consider this option, the following conditions must apply:

- The source of contamination must be controlled or remediated;
- The COCs must have the capacity to degrade or attenuate at the site;
- The time and direction of the contaminant travel must be able to be predicted; and,
- The continued migration of the COCs may not impact any foreseeable receptor at concentrations above 2L Standards.

AMEC evaluated if this option is viable for this site once the source material has been addressed. In addition, AMEC evaluated the volume of mass which need to be remediated to move to the MNA alternative.

To examine the feasibility of using MNA, three lines of evidence can be examined. These include:

- Primary lines of evidence - historic groundwater monitoring data;
- Secondary lines of evidence - geochemical characteristics of the groundwater; and,
- Optional lines of evidence - environmental fate modeling results.

The sections below provide a summary of our evaluation of each.

6.6.1 Primary Lines of Evidence

Groundwater monitoring activities have been nearly on-going at the site since approximately 1996, providing nearly 14 years of historical data. The data shows that the initial operation of the pump and treat system did result in the removal of mass material. However, over the last several years, with the pump and treat system operating at only minimal capacity (only one to three wells operating) concentrations have remained fairly steady or decreased in a large number of groundwater monitoring wells. Historical analytical data is included in Appendix C.

AMEC compiled the historical data and developed graphs showing the changes in VOC concentrations over time (Appendix C). These graphs are updated after each sampling event and included in each Interim Measures Progress Report. The Coefficient of Determination, or r2 method is applied to each well evaluated. Where the data is statistically significant, the data indicates decreasing concentration trends in a majority of the wells. An upward trend was observed in wells MW-4d and MW-9sk. Therefore, despite the minimal operation of the interim remediation system, the plume has nearly reached steady state conditions.

6.6.2 Secondary Lines of Evidence

Secondary lines of evidence consist of geochemical data used to evaluate if the conditions within the aquifer are suitable for the biodegradation of the COCs present. As stated above, the data previously collected indicates that biodegradation will play a negligible impact on the reduction of the total VOC concentrations at the site over time. Therefore, in order for MNA to be a viable option, physical processes will need to be sufficient.

In accordance with both EPA and ASTM guidance, the most reliable line of evidence to determine if MNA is appropriate for a site, is actual groundwater monitoring data (primary lines of evidence). The primary lines of evidence at this site indicate that the plume has reached nearly steady state conditions without the removal of the additional source material. With the removal of the impacted soil at the former chiller room, and additional remedial activities to address shallow groundwater impact in this area, it is anticipated that the plume will reach steady state conditions and likely begin shrinking in size.

6.6.3 Optional Lines of Evidence

To determine the concentrations of COCs which should be addressed in the source area to make MNA a viable alternative, AMEC utilized a one-dimensional screening groundwater contaminant transport model. A screening model can provide a simplified examination of the site and help determine if natural attenuation is a feasible remedial option. The one-dimensional model BIOCHLOR was selected. BIOCHLOR was developed by Groundwater Services, Inc. for the Air Force Center for Environmental Excellence. The model was developed to evaluate the feasibility of MNA. Information regarding the model, input parameters, aquifer characteristics, etc. is provided in Appendix D.

The site conceptual model confirms that the former Alcatel site is quite complex. COCs are present within three aquifer zones each with their own respective hydraulic conductivities. Flow within the competent rock material occurs along fractures and the movement of groundwater within the PWR unit is also at least partially influenced by remnant fracture traces. In addition, the groundwater gradient in each zone varies depending upon the portion of the site being evaluated. These gradients have varied significantly with the operation of the pump and treat system. These factors make calibrating any model to historical VOC data difficult.

To provide a more quantitative representation of the plume, a three-dimensional model would be required. However, as stated above, the most reliable lines of evidence are historical data and this data indicates that steady state conditions have nearly been reached without additional source treatment. Therefore, AMEC used a one-dimensional model to get a qualitative idea of the remedial end goals which may be appropriate for the source zone.

AMEC ran the BIOCHLOR model using end goals with total VOC values of 100 µg/L, 500 µg/L, and 1,000 µg/L. Model results are included in Appendix D. The model was calibrated to current site conditions with existing groundwater gradients observed on the property. Based on the historical data, the 1,4-dioxane plume shape and direction likely represents current site conditions, without the influence of the pump and treat system. Based on the screening level

evaluation, AMEC decided to address concentrations of VOCs within the source zone which exceed 1,000 µg/L total VOCs. The model showed that additional treatment area will have minimal impact on the overall stability of the plume.

7.0 RECOMMENDED CORRECTIVE MEASURES

The remedial action being proposed will be implemented to move the site toward a MNA alternative. As discussed in Section 6.0, with reductions in the concentrations of the COCs present in the former chiller room area, MNA will be a viable final remedial alternative. Based on the evaluation criteria and potential for success, AMEC recommends that the shallow source material be treated using ISCO via soil blending.

To treat the shallow aquifer at the chiller room area, the saprolite and shallow PWR material will be blended with sodium persulfate with a caustic catalyst. The zone to be targeted includes shallow groundwater with concentrations of total VOCs exceeding approximately 1,000 µg/L. This encompasses a volume of approximately 1,900 cubic yards of soil (Figure 24).

The building within the treatment area will have to be demolished and the material transported off-site. A structural engineer will be consulted to determine the appropriate area of the building which can be demolished while maintaining the integrity of the remaining structure. The precise limits of the treatment area will be dependent upon the removal of the structure and several load bearing features present in this zone. Once this determination has been made, the soil blending treatment area can be finalized.

Since soil blending will be utilized and the treatment area will be wider than it is deep, it will not be necessary to obtain an injection permit from the NCDENR, Division of Water Quality, Aquifer Protection Section, UIC Group.

Immediately prior to beginning the remedial activities, selected groundwater monitoring wells will be sampled to provide a snapshot of baseline VOC concentrations immediately prior to treatment. This baseline event will include wells INJ-3, INJ-4, INJ-5, MW-2s, MW-2d, MW-13s, MW-13sr, MW-13d, and MW-14d. After the sampling event, any groundwater monitoring and injection wells within the proposed treatment zone or those which could become damaged during demolition activities will be abandoned in accordance with North Carolina 2C Well Standards. At a minimum, this includes MW-13s, MW-13sr, and potentially wells MW-13d, INJ-3, INJ-4, and INJ-5.

The concrete cover will be removed and the overburden material will be screened using field monitoring equipment. Soils not exhibiting any VOCs using field equipment will be stockpiled outside the excavation. With the overburden removed, the excavation can be benched so the equipment can reach to the total depth of the proposed treatment zone. The soil will be blended as deep as practicable based on the size of rocks present in the PWR zone. This depth will vary by location. As needed, the soil will be blended in 5-foot lifts and following the blending of each lift, the entire soil column blended together. Since the treatment area is large, the blending will be conducted in smaller treatment cells.

To monitor the success of the remedial action, following the soil blending two to three shallow groundwater monitoring well nests will be installed within or immediately adjacent to the treatment zone to determine the concentrations of COCs following treatment. The well nests will consist of a shallow well screened across the saprolite material and a deeper well screened within the lower portion of the PWR. This deeper well will be used to monitor any "shadowing effect" and the ultimate concentrations of VOCs present below the treatment zone, above the competent bedrock unit.

Persulfate is reactive for up to 45 days in the subsurface. Whereas there can be significant rebounding with the direct injection of the oxidants, since the material is blended equally throughout the soil column this technology generally has less overall rebounding following the treatment.

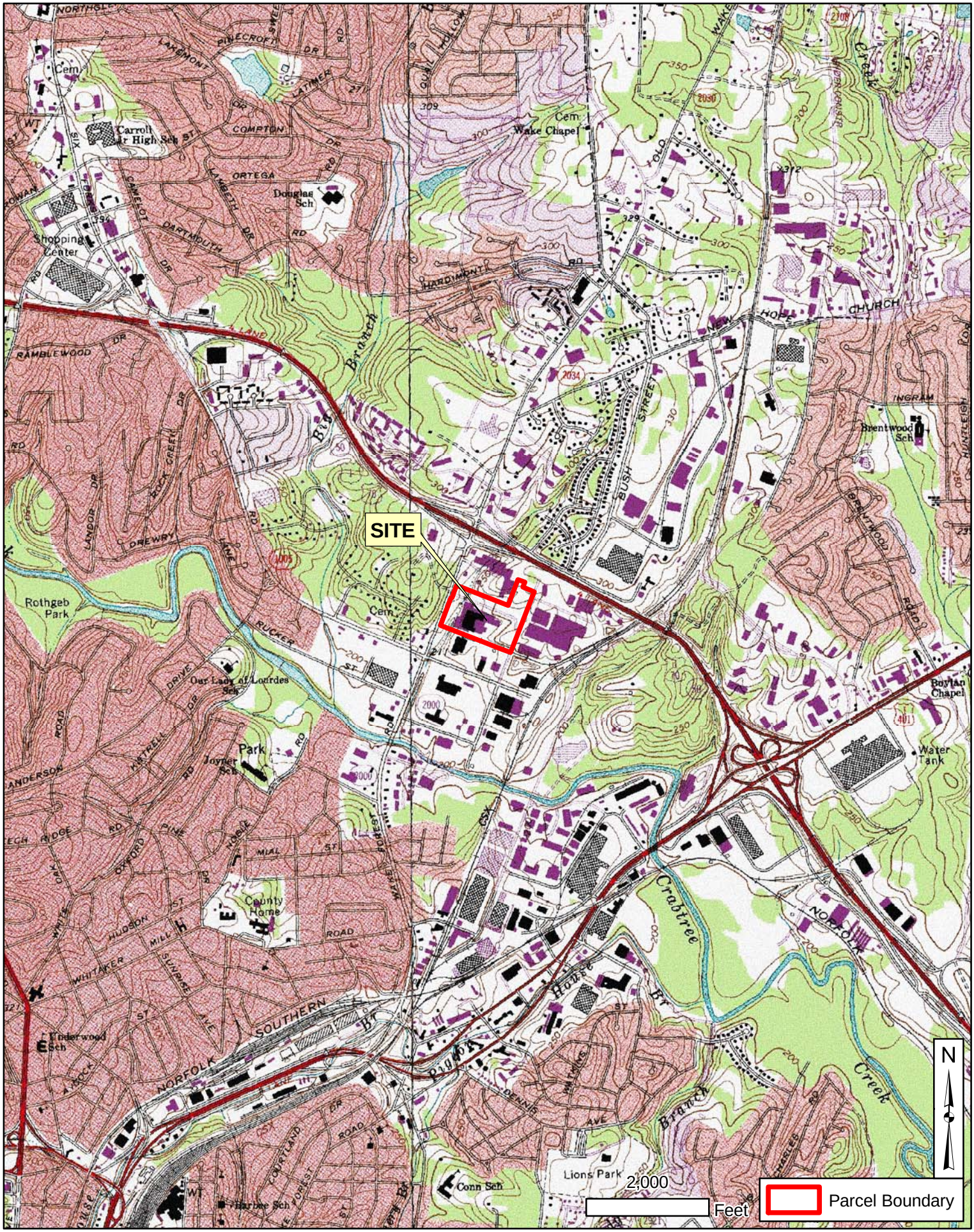
Following the completion of the source area treatment, MNA would be utilized to address the remaining portion of the plume. The existing pump and treat system will be shut down following approval of the proposed remedial method outlined above.

8.0 CORRECTIVE ACTION IMPLEMENTATION SCHEDULE

Following the completion of public notice requirements and approval of the CMS by the NCDENR, Division of Waste Management, ALU will complete the tasks outlined above. A tentative schedule is provided below.

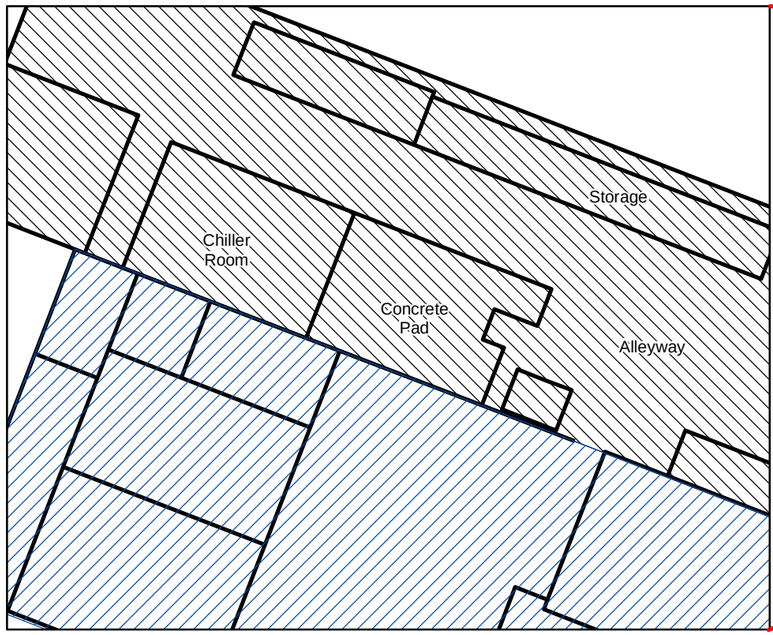
Preliminary Completion Date	Proposed Task
November 1, 2010	Final Approval of CMS (following Public Comment Period)
November 5, 2010	Pump and Treat System Permanently Shut Down
November 15, 2010	Building Demolition Design
December 1, 2010	Submittal of CMS Implementation Workplan
January 1, 2011	Approval of Workplan by NCDENR
January 8, 2011	Collection of Baseline Groundwater Data
January 9, 2011	Building Demolition and Debris Removal (one week)
January15, 2011	Soil Blending Begins (4 weeks)
February 15, 2011	Installation of Monitoring Wells at Treatment Area
2011	Groundwater Monitoring of Treatment Areas
2012	Begin MNA Alternative

FIGURES



AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	PROJ.: **559480000** SCALE: **1" = 2,000'** DATE: **05-27-2010**	TITLE: **SITE LOCATION MAP** DR: **JWB** CHK: **HMT**	Figure **1**

AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	PROJ.: 559480000 SCALE: 1" = 100' DATE: 05-27-2010	TITLE: **SITE LAYOUT MAP** DR: JWB CHK: HMT	Figure **2**

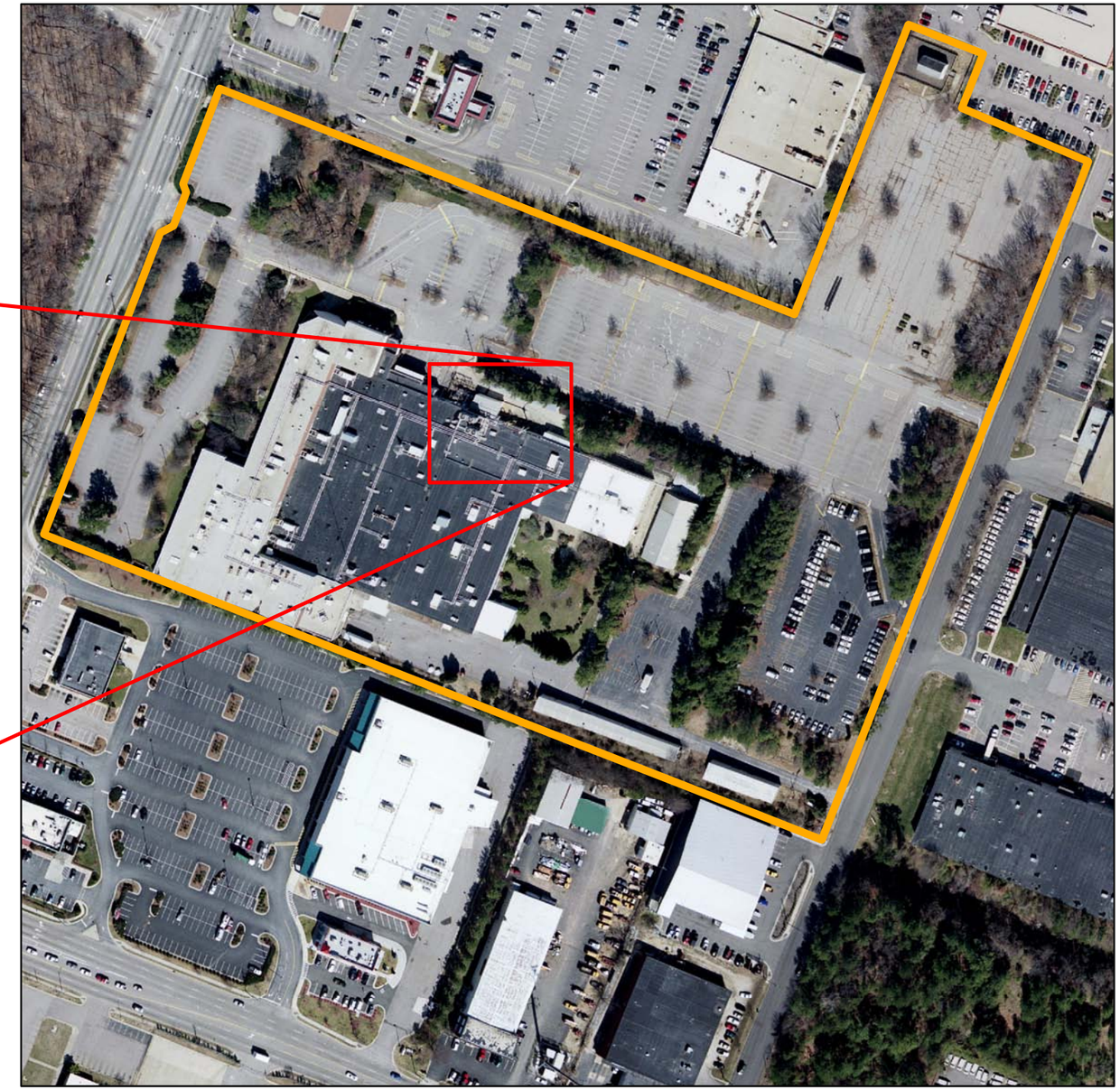


Area of Interest

Scale: 1" = 30'

AOC #1
AOC #2
Structure Line

N



Study Area

Parcel Boundary
Area of Interest

Scale: 1' = 200'

AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	**TITLE:** **AOC AREAS LOCATION MAP** **SITE:** **FORMER ALCATEL USA FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	**CLIENT:** **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** **DATE:** 05-27-2010 **SCALE:** Noted **PROJ.:** 559480000 **DR:** W. Blaylock **CHK:** H. Thurston **LOCATION:** P:\ProjectFiles\559480000-Alcatel Remediation\GIS\Corrective_Measures_Report\Figure2_aoc.mxd	**Figure** 3

AMEC Earth & Environmental
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Morrisville, NC 27560
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CLIENT: **ALCATEL LUCENT USA, INC**
RALEIGH, NORTH CAROLINA

SITE: **FORMER ALCATEL USA SOURCING FACILITY**
2912 WAKE FOREST ROAD
RALEIGH, NORTH CAROLINA 27609

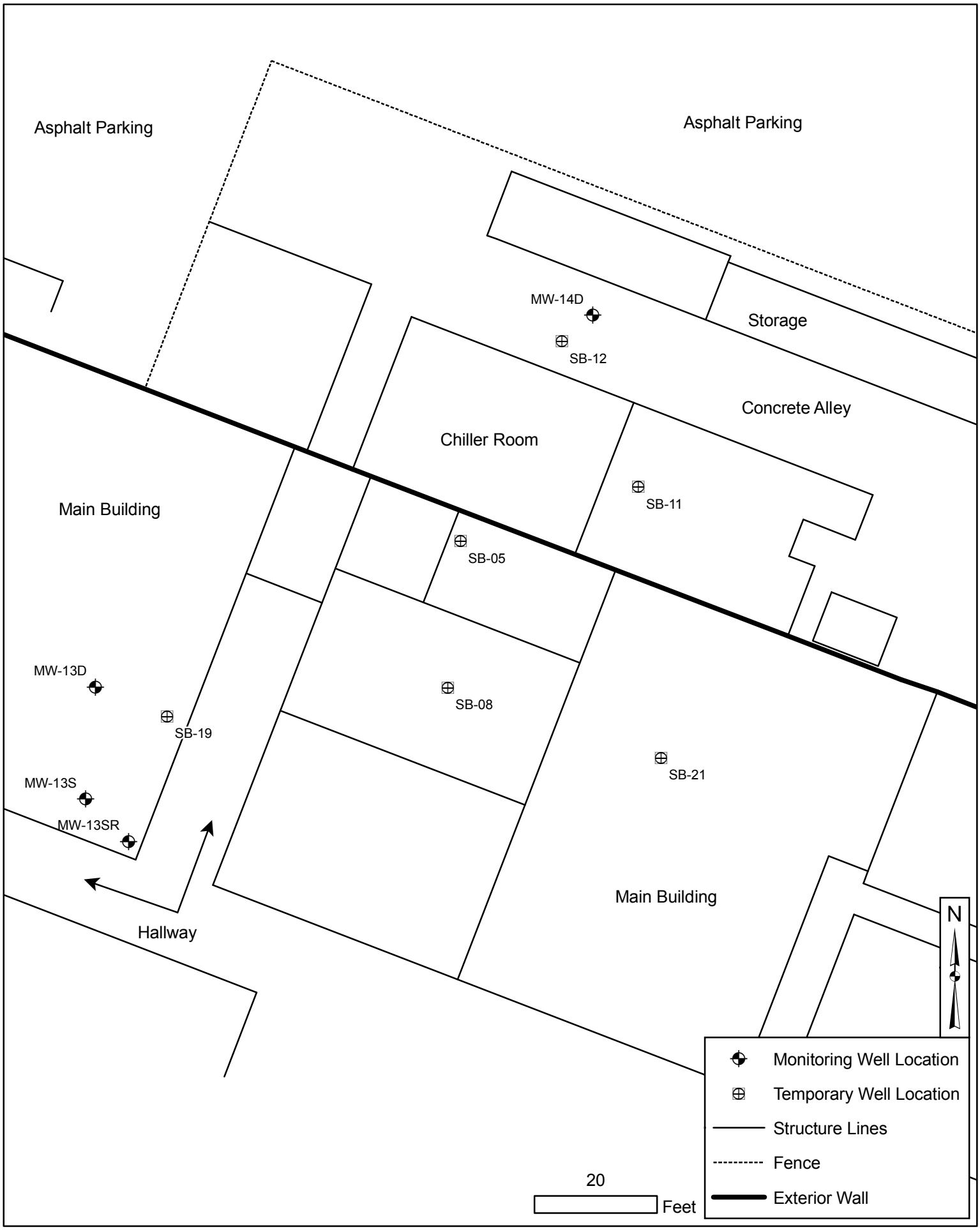
amec

PROJECT: 559480000
SCALE: 1" = 20'
DATE: 05-27-2010

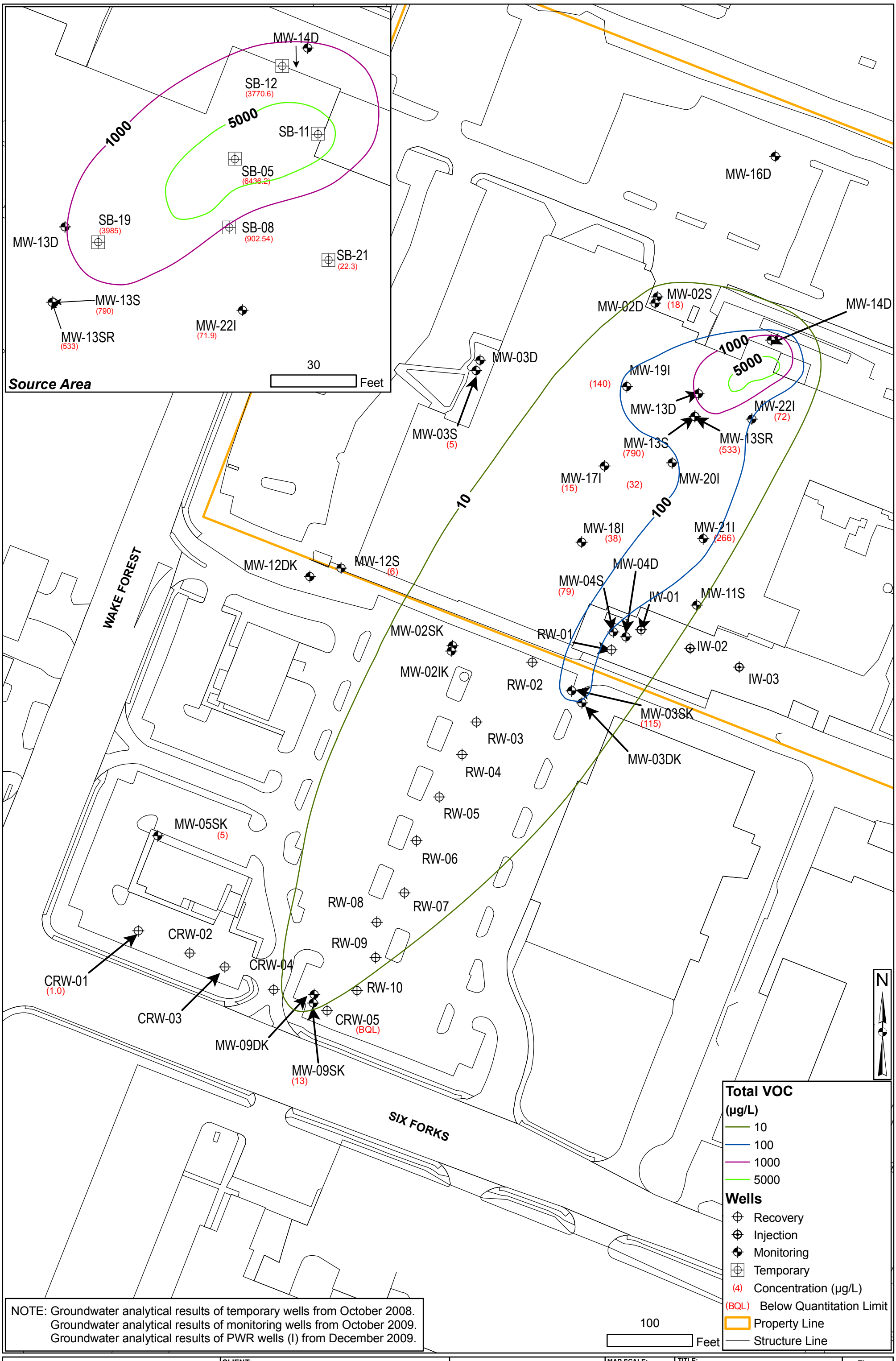
TITLE: **SOIL EXCAVATION AND SAMPLE LOCATION MAP**

DR: JWB
CHK: HMT

Figure
4

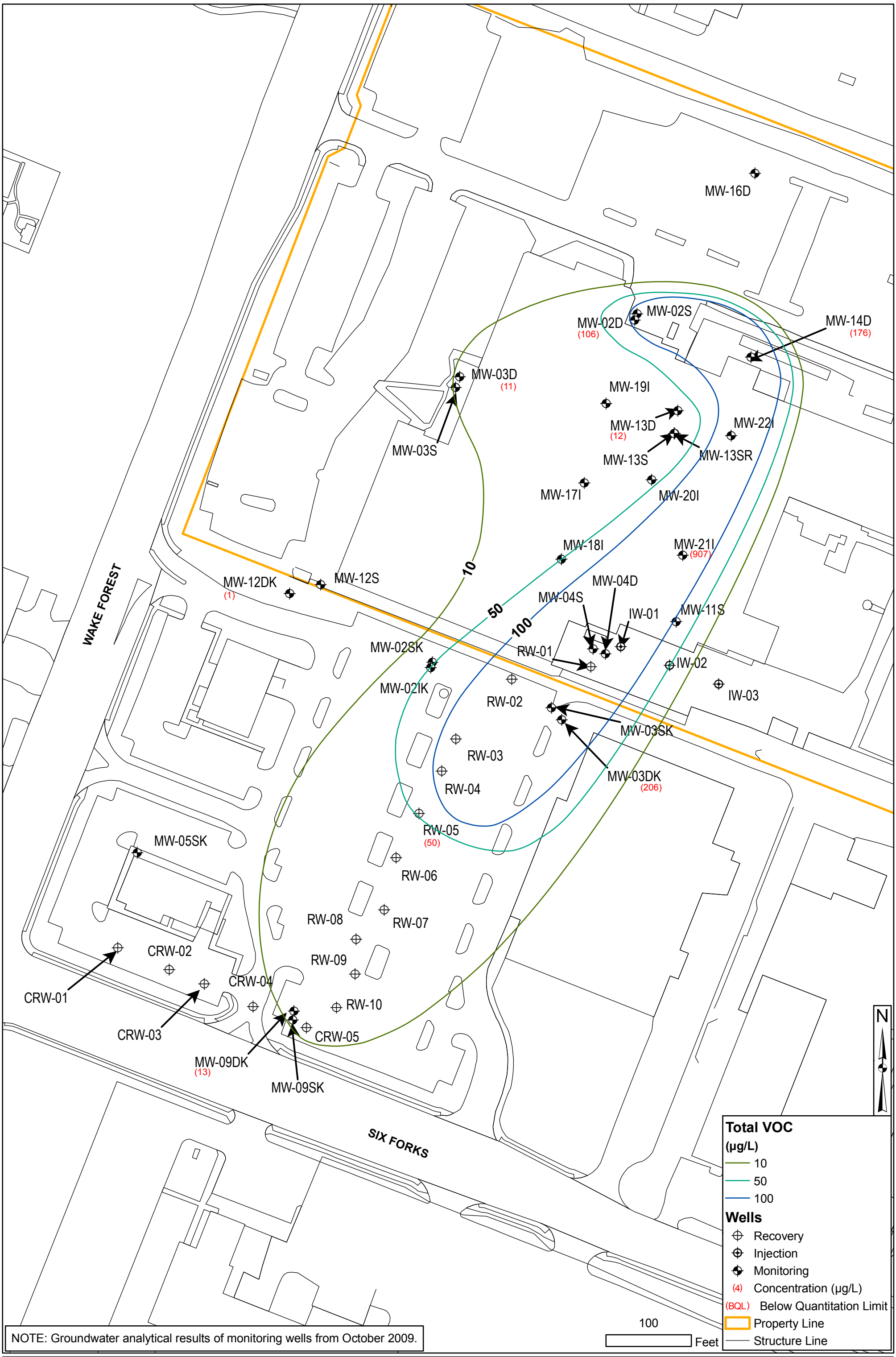


AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	PROJ.: **559480000** SCALE: **1" = 20'** DATE: **05-27-2010**	TITLE: **TEMPORARY WELL LOCATION MAP** DR: **JWB** CHK: **HMT**	Figure **5**



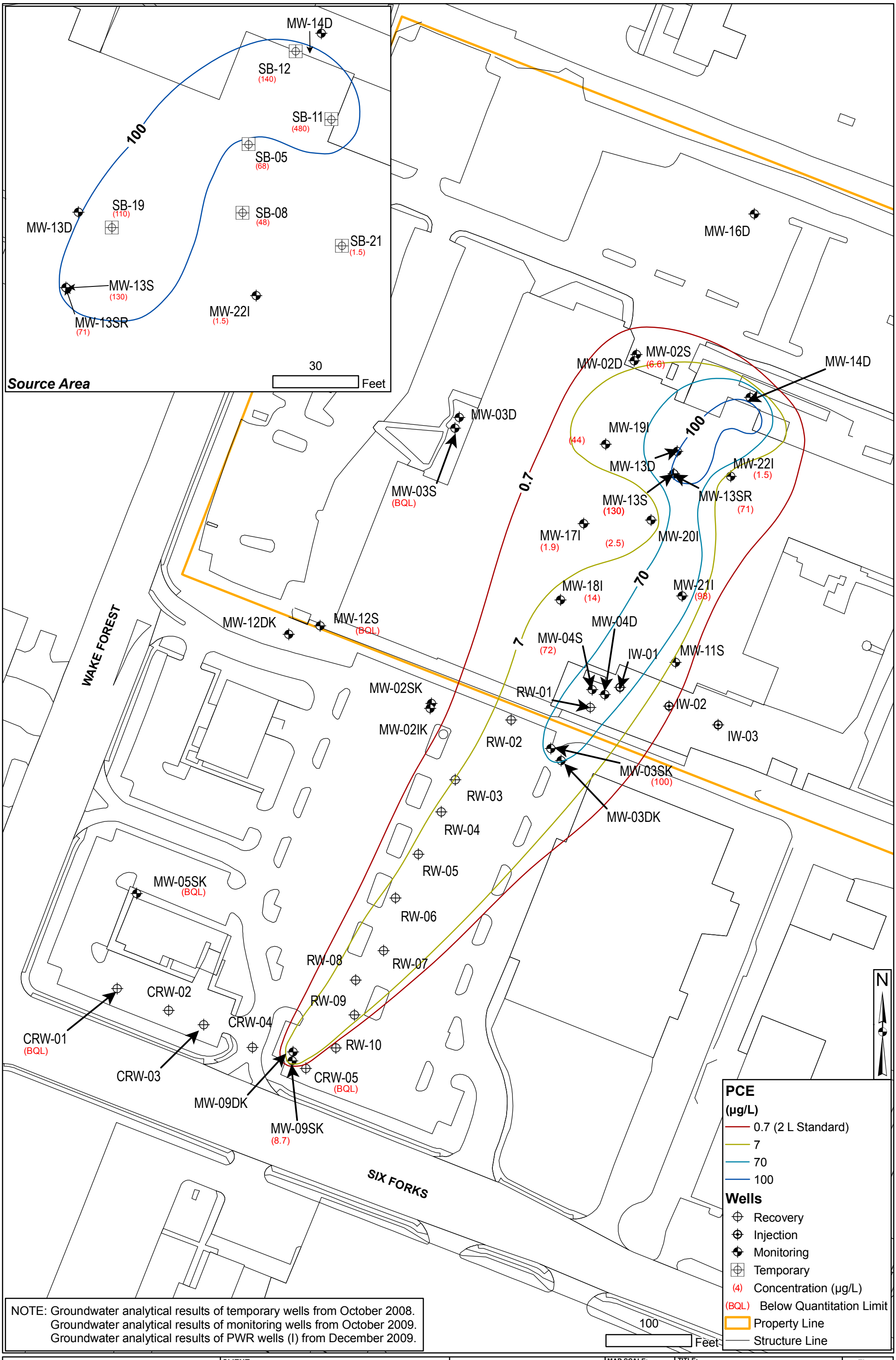
NOTE: Groundwater analytical results of temporary wells from October 2008.
Groundwater analytical results of monitoring wells from October 2009.
Groundwater analytical results of PWR wells (I) from December 2009.

AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	MAP SCALE: **1" = 100'** SRCE AREA SCALE: **1" = 30'** DATE: **09-01-2010**	TITLE: **TOTAL VOC CONCENTRATION UNCONSOLIDATED AQUIFER (OCTOBER 2009)** DR: **JWB** CHK: **HMT**	Figure **6** Project **559480000**



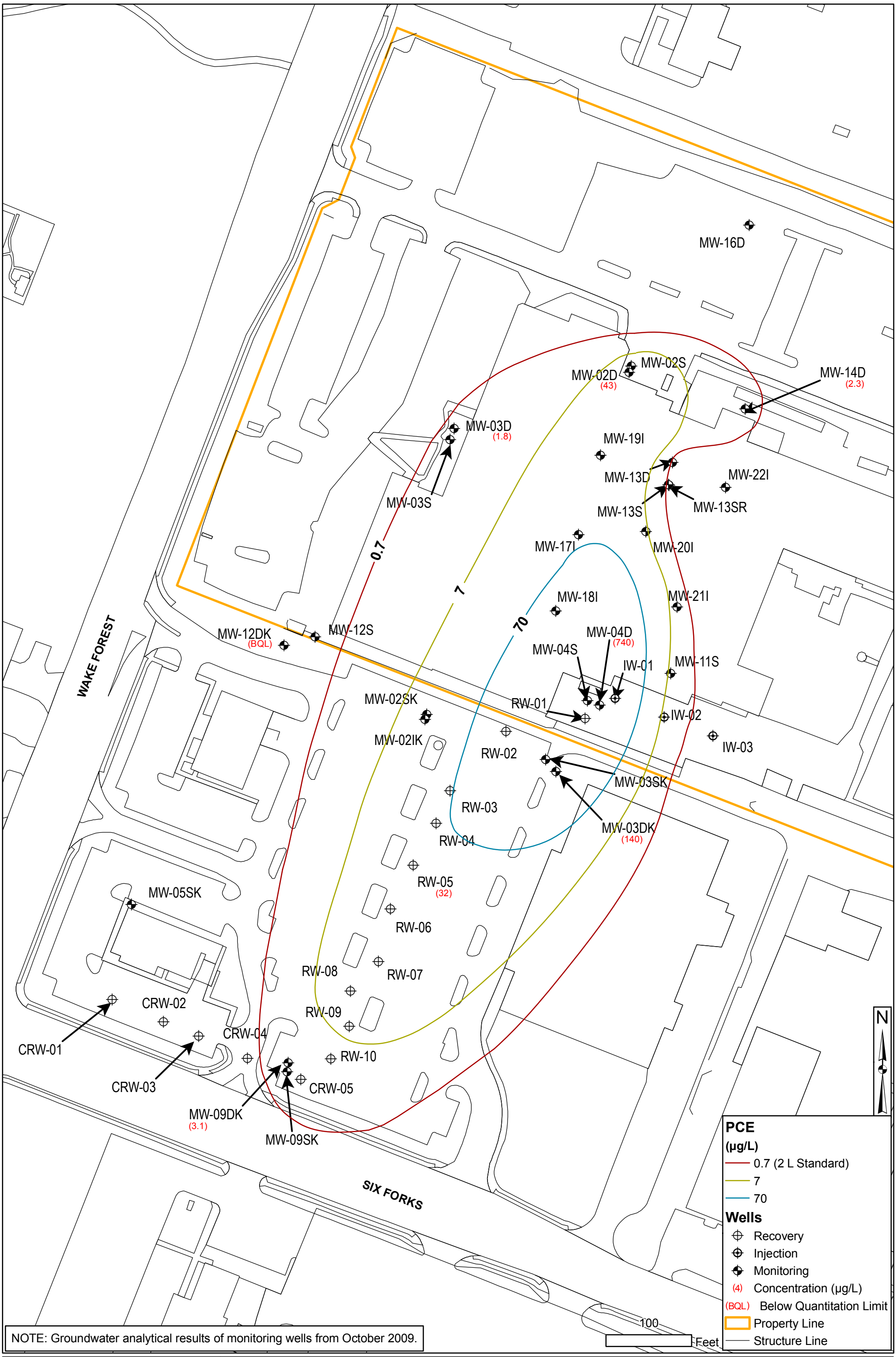
NOTE: Groundwater analytical results of monitoring wells from October 2009.

AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	PROJ.: 559480000 SCALE: 1" = 100' DATE: 09-01-2010	TITLE: **TOTAL VOC CONCENTRATION BEDROCK AQUIFER (OCTOBER 2009)** DR: JWB CHK: HMT	Figure **7**



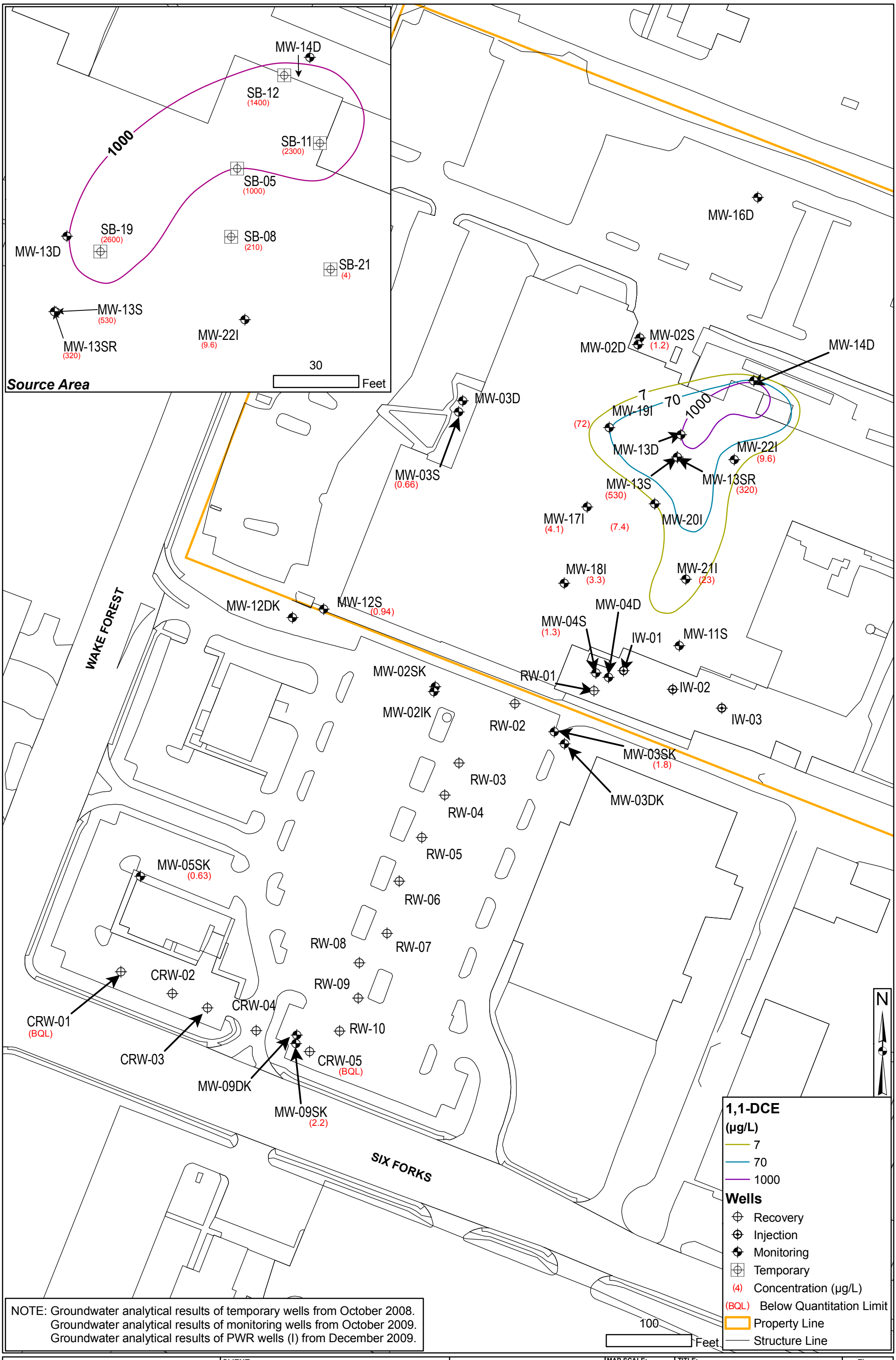
NOTE: Groundwater analytical results of temporary wells from October 2008.
Groundwater analytical results of monitoring wells from October 2009.
Groundwater analytical results of PWR wells (I) from December 2009.

AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	MAP SCALE: **1" = 100'** SRCE AREA SCALE: **1" = 30'** DATE: **08-01-2010**	TITLE: **PCE CONCENTRATION UNCONSOLIDATED AQUIFER (OCTOBER 2009)** DR: **JWB** CHK: **HMT**	Figure **8** Project **559480000**



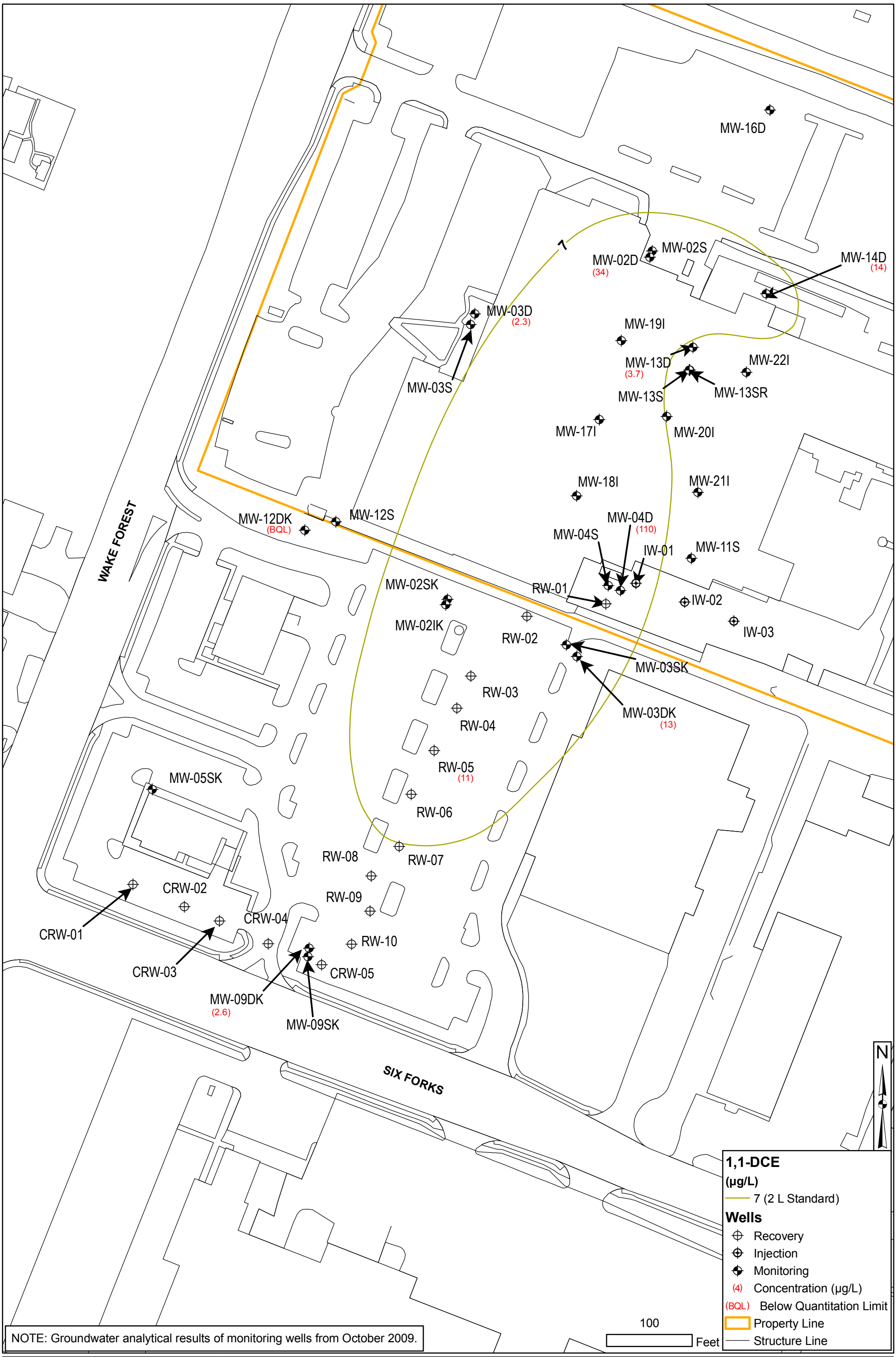
NOTE: Groundwater analytical results of monitoring wells from October 2009.

AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	PROJ.: 559480000 SCALE: 1" = 100' DATE: 09-01-2010	TITLE: **PCE CONCENTRATION BEDROCK AQUIFER (OCTOBER 2009)** DR: JWB CHK: HMT	Figure **9**



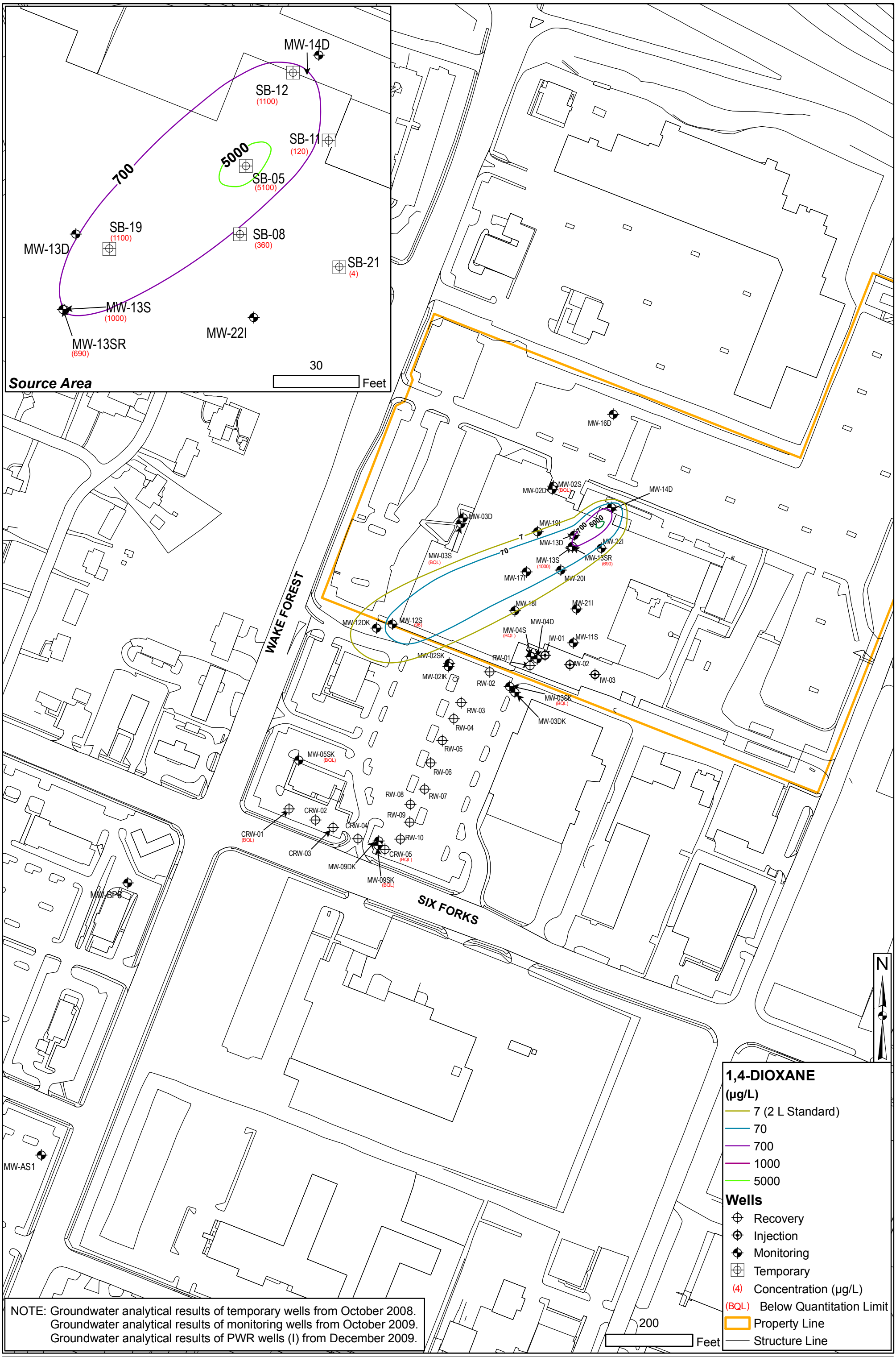
NOTE: Groundwater analytical results of temporary wells from October 2008.
Groundwater analytical results of monitoring wells from October 2009.
Groundwater analytical results of PWR wells (I) from December 2009.

AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	MAP SCALE: 1" = 100' SRCE AREA SCALE: 1" = 30' DATE: 09-01-2010	TITLE: **1,1-DCE CONCENTRATION UNCONSOLIDATED AQUIFER (OCTOBER 2009)** DR: JWB CHK: HMT	Figure **10** Project 559480000



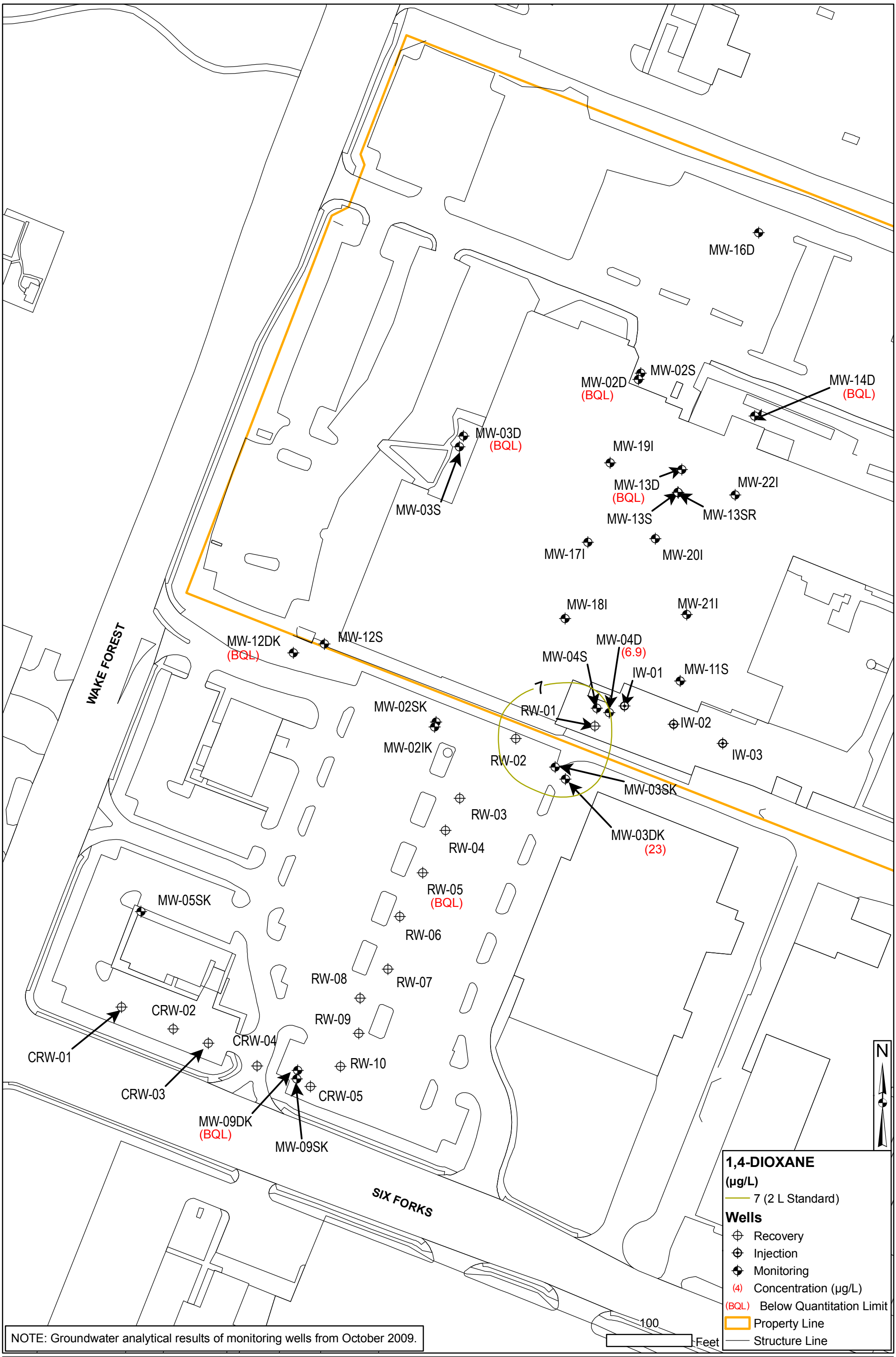
NOTE: Groundwater analytical results of monitoring wells from October 2009.

AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	PROJ.: 559480000 SCALE: 1" = 100' DATE: 09-01-2010	TITLE: **1,1-DCE CONCENTRATION BEDROCK AQUIFER (OCTOBER 2009)** DR: JWB CHK: HMT	Figure **11**



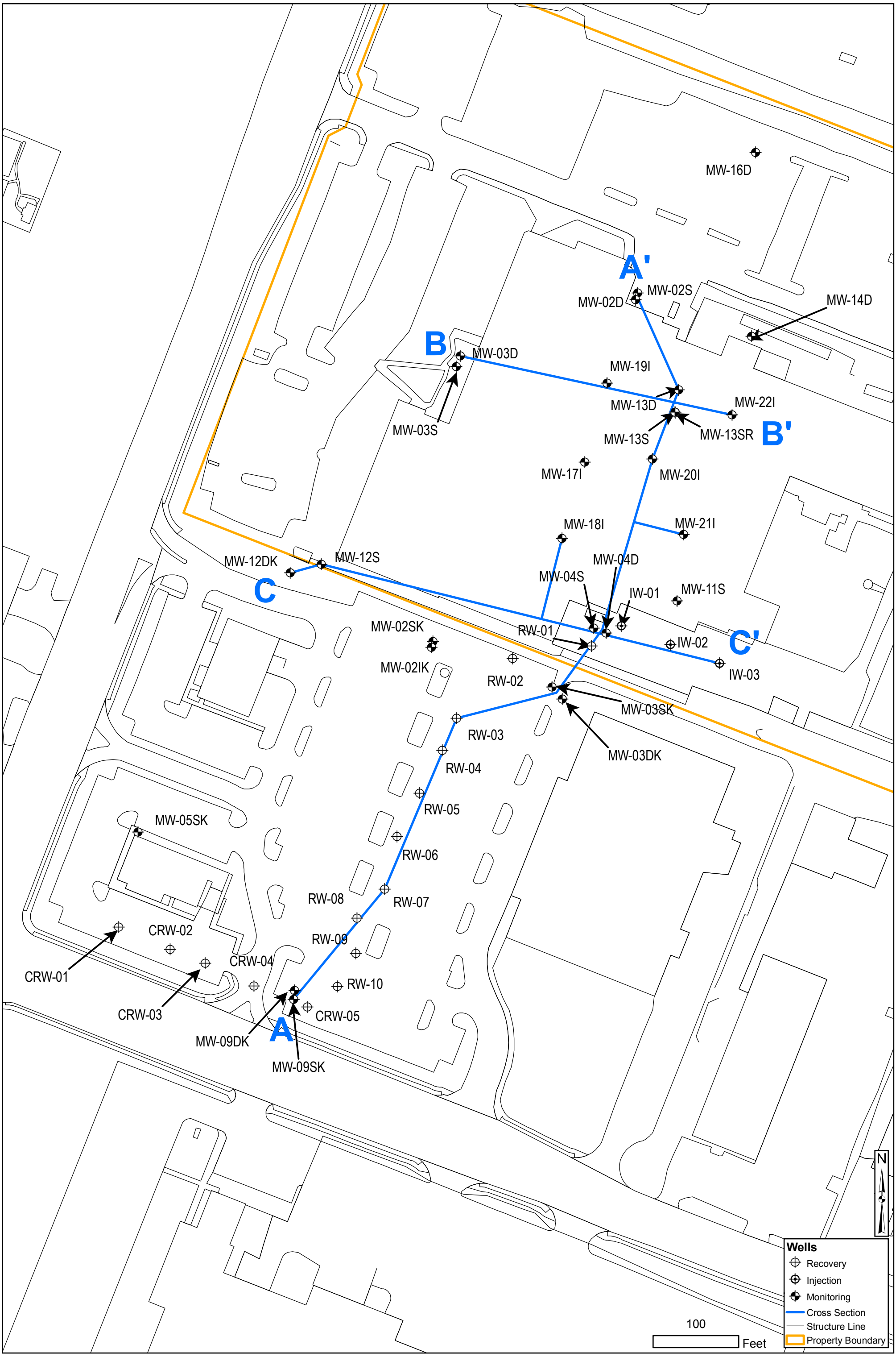
NOTE: Groundwater analytical results of temporary wells from October 2008.
Groundwater analytical results of monitoring wells from October 2009.
Groundwater analytical results of PWR wells (I) from December 2009.

AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	MAP SCALE: **1" = 100'** SRCE AREA SCALE: **1" = 30'** DATE: **09-01-2010**	TITLE: **1,4-DIOXANE CONCENTRATION UNCONSOLIDATED AQUIFER (OCTOBER 2009)** DR: **JWB** CHK: **HMT**	Figure **12** Project **559480000**

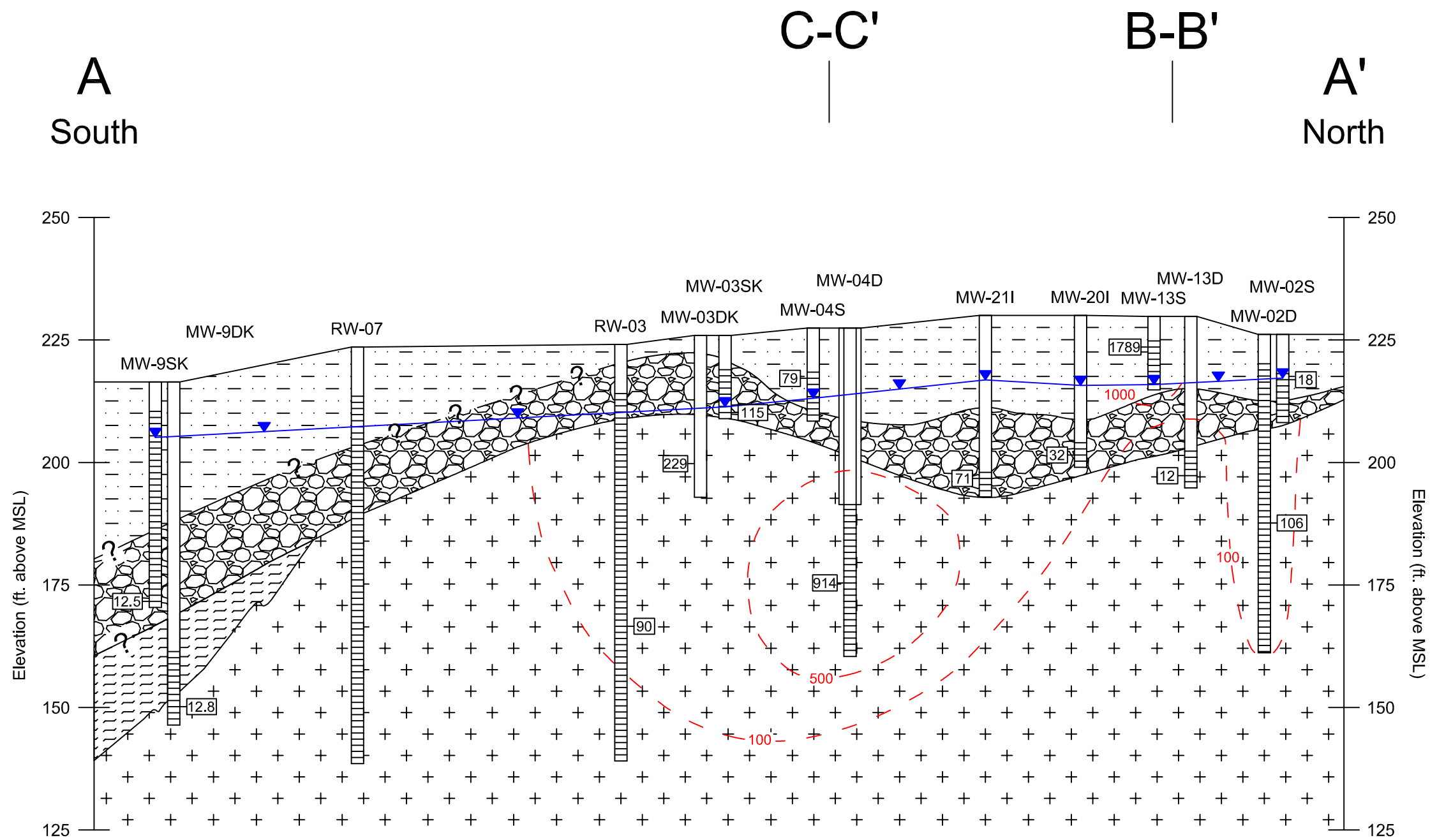


NOTE: Groundwater analytical results of monitoring wells from October 2009.

AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	PROJ.: 559480000 SCALE: 1" = 100' DATE: 09-01-2010	TITLE: **1,4-DIOXANE CONCENTRATION BEDROCK AQUIFER (OCTOBER 2009)** DR: JWB CHK: HMT	Figure **13**



AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	PROJECT: 559480000 SCALE: 1" = 100' DATE: 09-01-2010	TITLE: **CROSS SECTION INDEX MAP** DR: JWB CHK: HMT	Figure **14**



SCALE

25 ft.

Vertical Exaggeration 4X

0

100 ft.

LEGEND

MW-04D	Well Name		Well Screen Interval		Partially Weathered Rock
229	Total VOCs in µg/L - October 2009		Water Level		Gneiss
500	Isoconcentration Line (µg/L)		Saprolite		Granite

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2200 Gateway Centre Blvd., Suite 205
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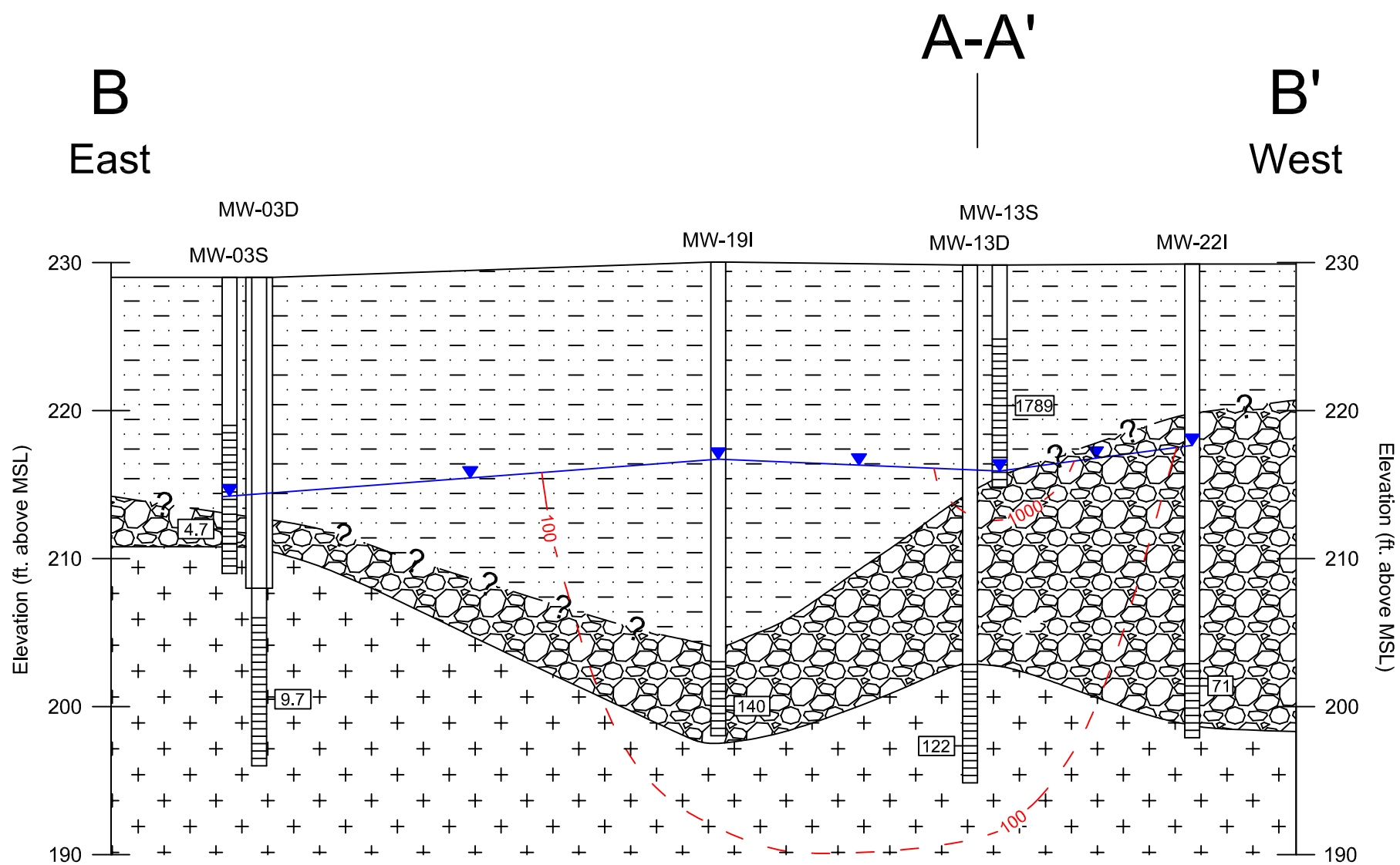
CLIENT: ALCATEL LUCENT USA, INC.

TITLE: LITHOLOGIC CROSS SECTION A-A'
FORMER ALCATEL USA SOURCING FACILITY
RALEIGH, NORTH CAROLINA

DR: JWB	REV: HT	PROJ. NO.: 559480000
CHK: HT	DATE: September 1, 2010	DWG NO. NA
SCALE: 1" = 50'		FIGURE. NO.: 15

P:\ProjectFiles\559480000-Alcatel Remediation\GIS\CAD_XS\cross_section1.dwg Sep. 01, 2010 wes.blaylock



SCALE

10 ft.

Vertical Exaggeration 5X

0

50 ft.

LEGEND

MW-04D	Well Name		Well Screen Interval		Partially Weathered Rock
229	Total VOCs in µg/L - October 2009		Water Level		Gneiss
----500	Isoconcentration Line (µg/L)		Saprolite		Granite

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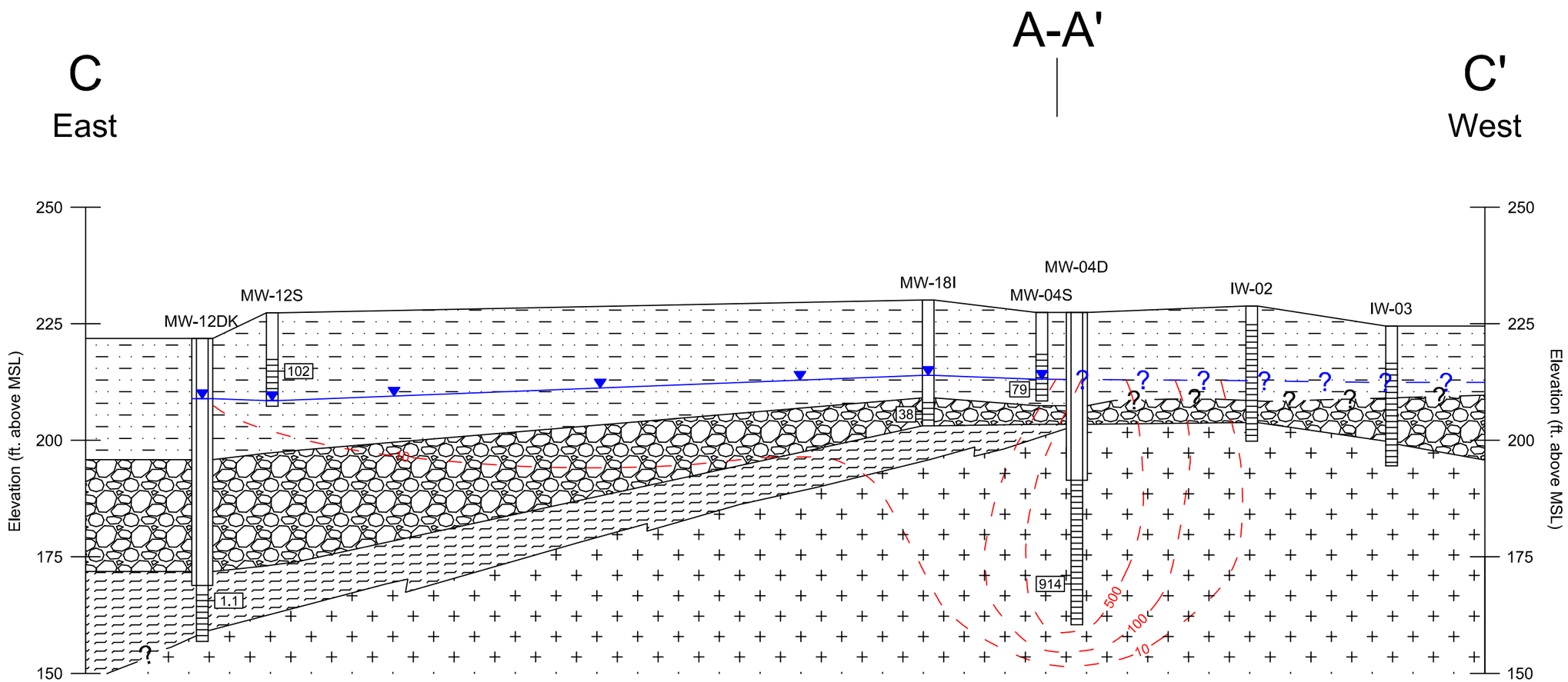
CLIENT: ALCATEL LUCENT USA, INC.

TITLE: LITHOLOGIC CROSS SECTION B-B'
FORMER ALCATEL USA SOURCING FACILITY
RALEIGH, NORTH CAROLINA

DR: JWB	REV: HT	PROJ. NO.: 559480000
CHK: HT	DATE: September 1, 2010	DWG NO. NA
SCALE: 1" = 50'		FIGURE. NO.: 16

P:\Project Files\559480000-Alcatel Remediation\GIS\CAD_XS\cross_section1.dwg Sep. 01, 2010 wes.blaylock



SCALE

25 ft.

Vertical Exaggeration 2X

0 — 50 ft.

LEGEND

MW-04D	Well Name		Well Screen Interval		Partially Weathered Rock
229	Total VOCs in µg/L - October 2009		Water Level		Gneiss
----500	Isoconcentration Line (µg/L)		Saprolite		Granite

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CLIENT: ALCATEL LUCENT USA, INC.

TITLE: LITHOLOGIC CROSS SECTION C-C'
FORMER ALCATEL USA SOURCING FACILITY
RALEIGH, NORTH CAROLINA

DR: JWB	REV: HT	PROJ. NO.: 559480000
CHK: HT	DATE: September 1, 2010	DWG NO. NA
SCALE: 1" = 50'		FIGURE. NO.: 17

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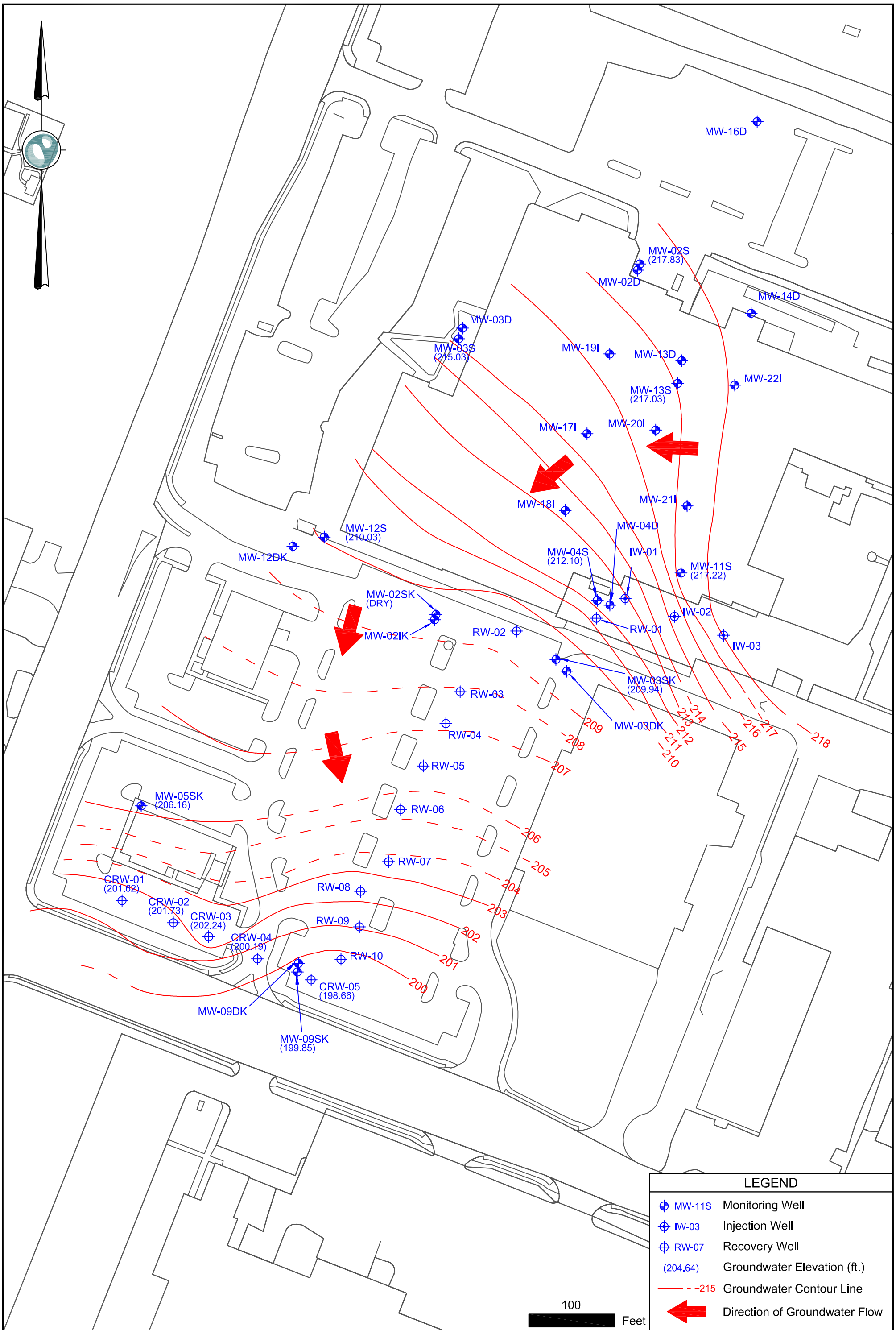

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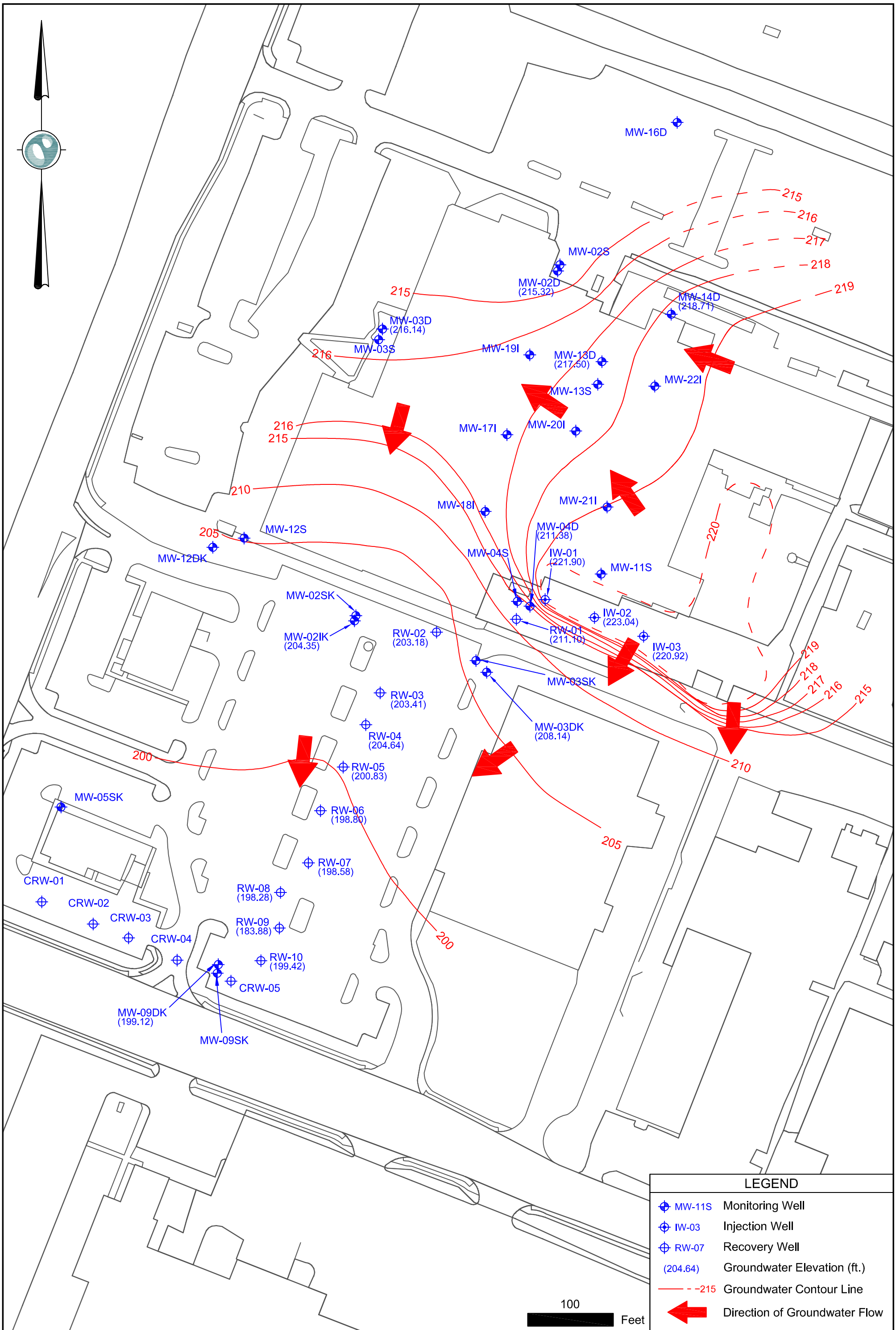
CLIENT: **ALCATEL LUCENT USA, INC.**
RALEIGH, NORTH CAROLINA

SITE: **FORMER ALCATEL USA SOURCING FACILITY**
2912 WAKE FOREST ROAD
RALEIGH, NORTH CAROLINA, 27609

amec

PROJECT: 559480000	TITLE: **GROUNDWATER CONTOURS MAP** SHALLOW AQUIFER - 10/26/1999 SYSTEM IN FULL OPERATION	FIGURE
SCALE: 1" = 100'		18
DATE: 05-26-2010	DRAWN BY: W. BLAYLOCK / REVIEWED BY: H. THURSTON	



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Morrisville, NC 27560
(919) 447-2750

CLIENT: **ALCATEL LUCENT USA, INC.**
RALEIGH, NORTH CAROLINA

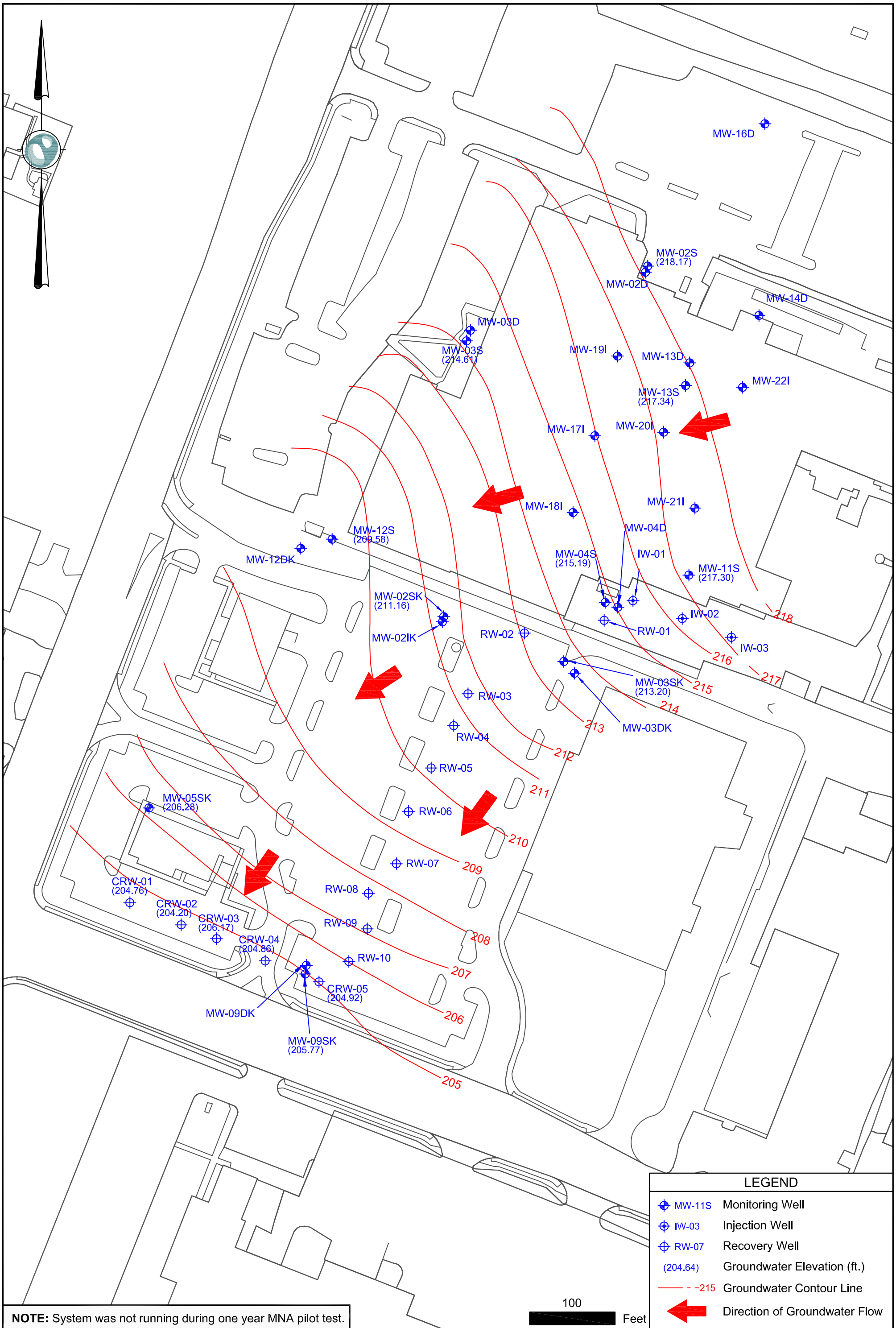
SITE: **FORMER ALCATEL USA SOURCING FACILITY**
2912 WAKE FOREST ROAD
RALEIGH, NORTH CAROLINA, 27609

PROJECT: 559480000
SCALE: 1" = 100'
DATE: 05-26-2010

TITLE: **GROUNDWATER CONTOURS MAP**
DEEP AQUIFER - 10/26/1999
SYSTEM IN FULL OPERATION

DRAWN BY: W. BLAYLOCK
REVIEWED BY: H. THURSTON

FIGURE
19



NOTE: System was not running during one year MNA pilot test.

AMEC Earth & Environmental
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CLIENT: **ALCATEL LUCENT USA, INC.**
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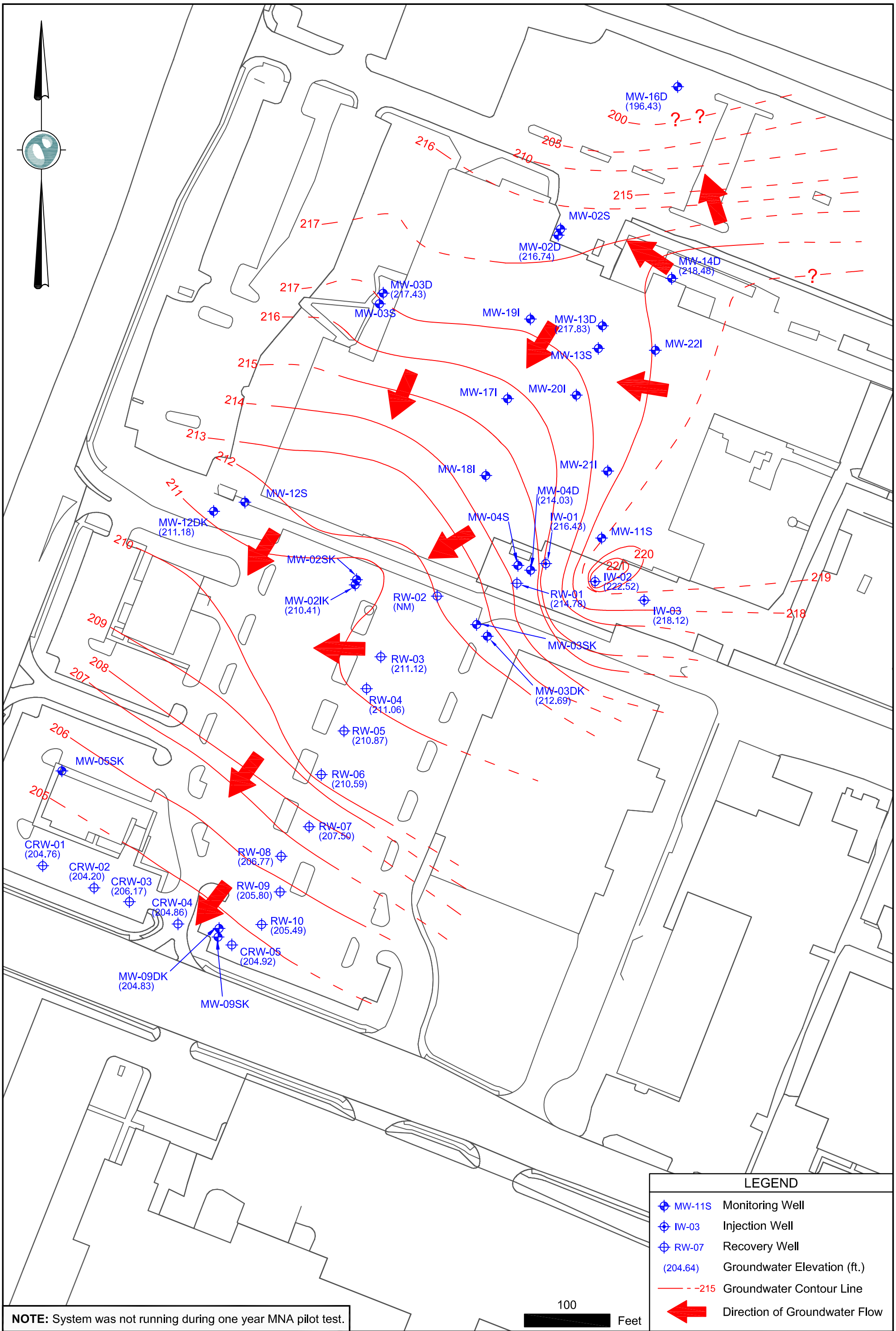
SITE: **FORMER ALCATEL USA SOURCING FACILITY**
2912 WAKE FOREST ROAD
RALEIGH, NORTH CAROLINA, 27609

PROJECT: 559480000
SCALE: 1" = 100'
DATE: 05-26-2010

TITLE: **GROUNDWATER CONTOURS MAP**
SHALLOW AQUIFER - 10/19/2004
SYSTEM NOT RUNNING

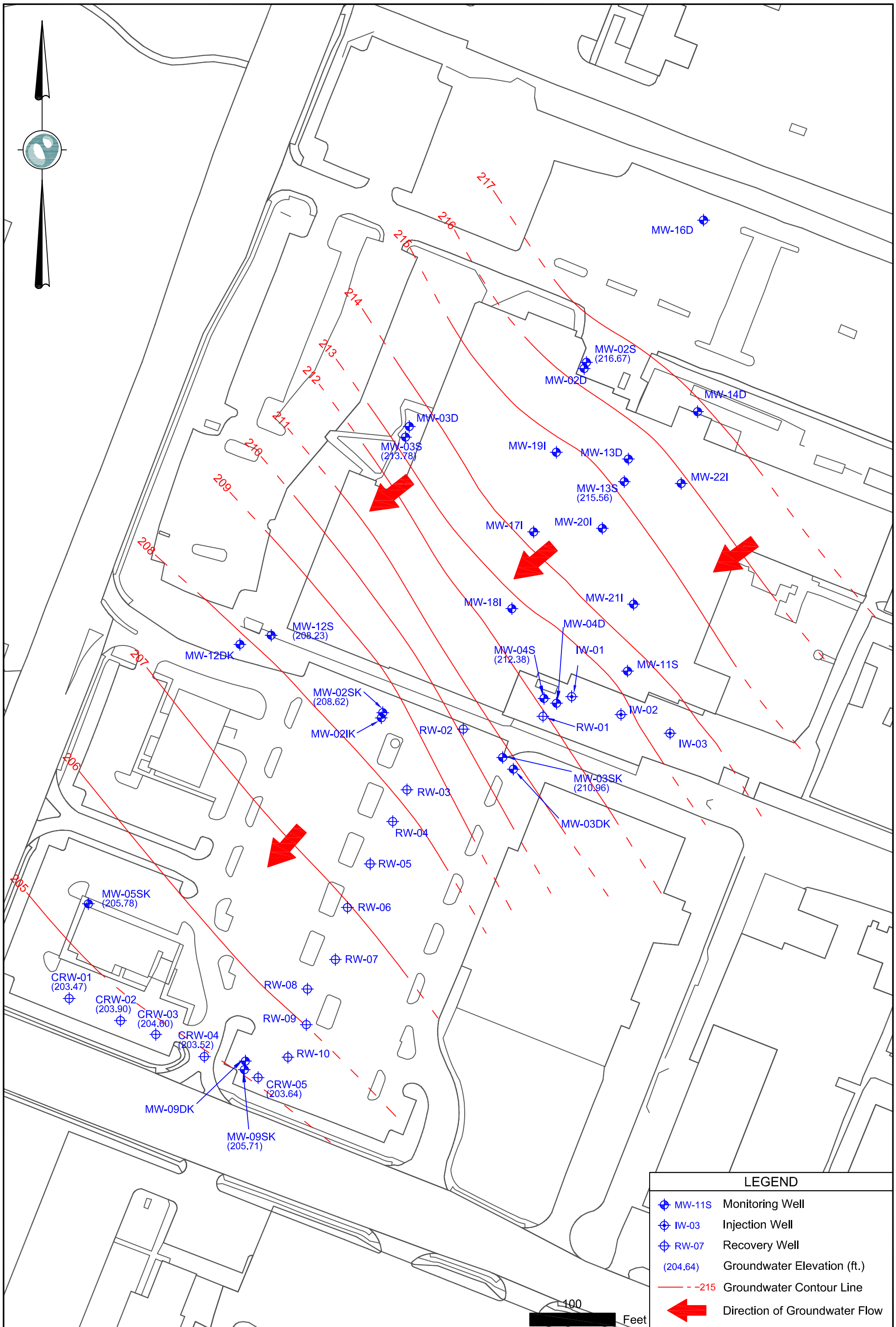
DRAWN BY: W. BLAYLOCK
REVIEWED BY: H. THURSTON

FIGURE
20



NOTE: System was not running during one year MNA pilot test.

AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC.** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA, 27609	amec	PROJECT: 559480000 SCALE: 1" = 100' DATE: 05-26-2010	TITLE: **GROUNDWATER CONTOURS MAP** DEEP AQUIFER - 10/19/2004 SYSTEM NOT RUNNING DRAWN BY: W. BLAYLOCK REVIEWED BY: H. THURSTON	FIGURE 21



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RALEIGH, NORTH CAROLINA

SITE: **FORMER ALCATEL USA SOURCING FACILITY**
2912 WAKE FOREST ROAD
RALEIGH, NORTH CAROLINA, 27609

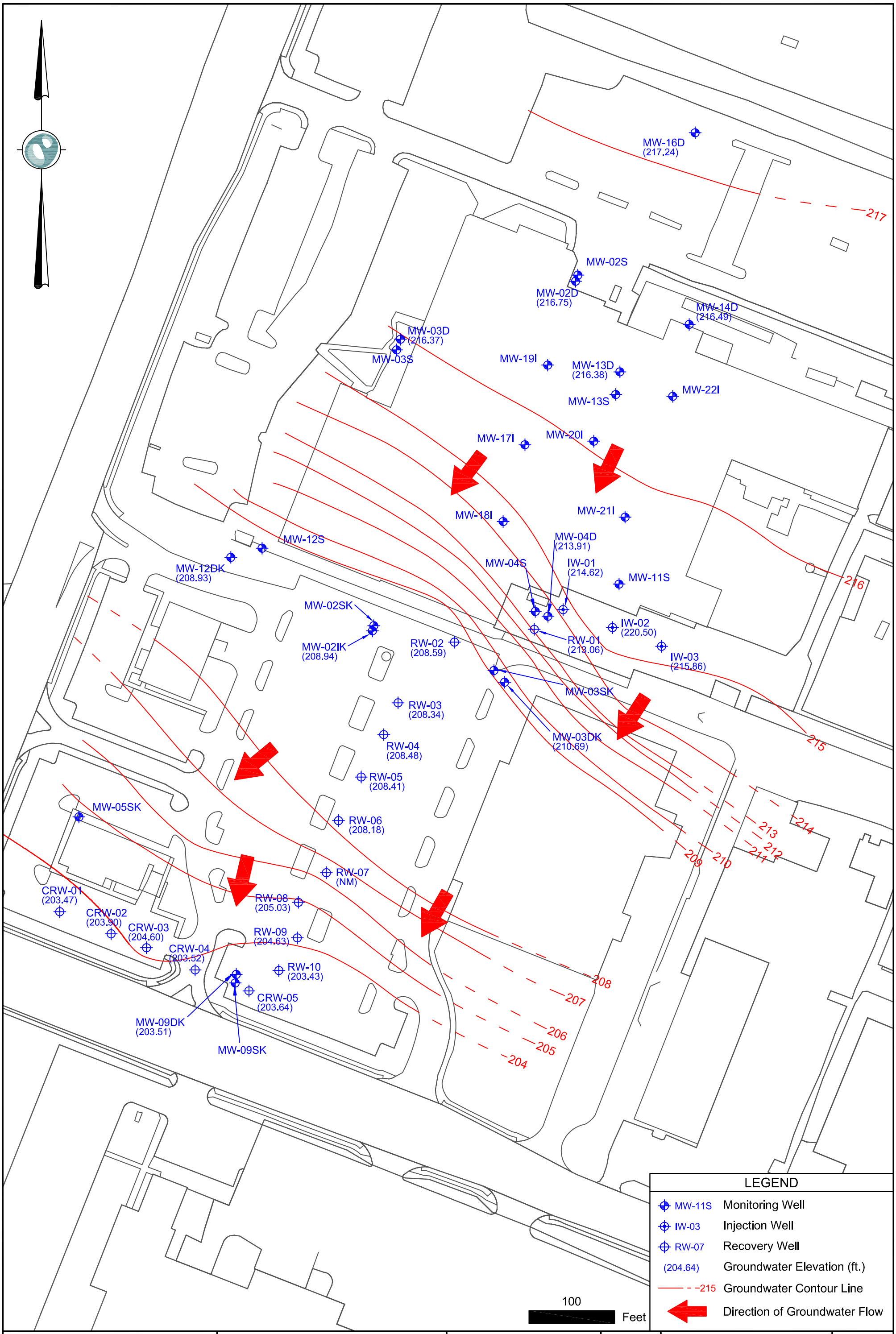
amec

PROJECT: 559480000
SCALE: 1" = 100'
DATE: 05-26-2010

TITLE: **GROUNDWATER CONTOURS MAP**
SHALLOW AQUIFER - 10/06/2009
CURRENT CONDITIONS

DRAWN BY: W. BLAYLOCK
REVIEWED BY: H. THURSTON

FIGURE
22



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RALEIGH, NORTH CAROLINA

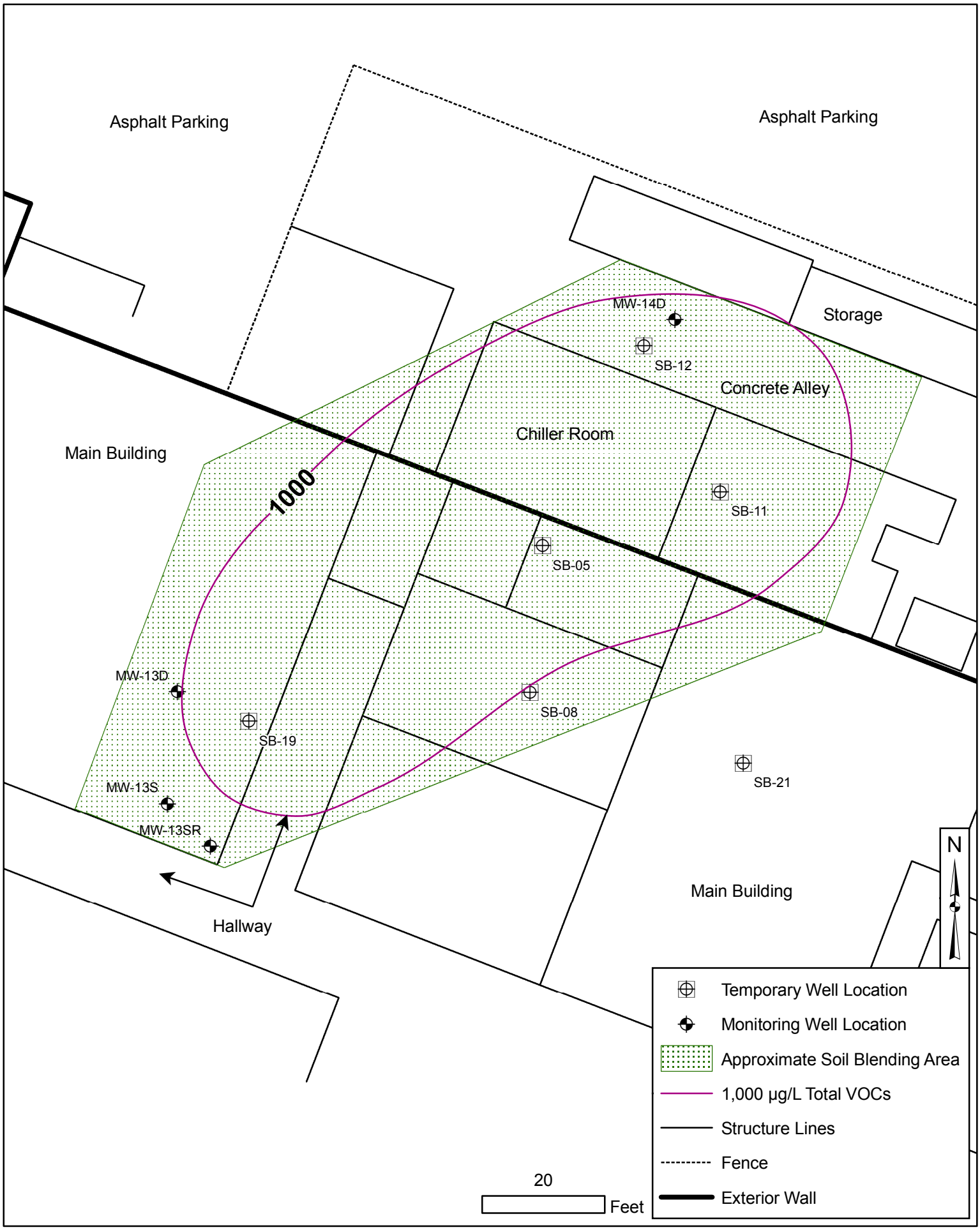
SITE: **FORMER ALCATEL USA SOURCING FACILITY**
2912 WAKE FOREST ROAD
RALEIGH, NORTH CAROLINA, 27609

PROJECT: 559480000
SCALE: 1" = 100'
DATE: 05-26-2010

TITLE: **GROUNDWATER CONTOURS MAP**
DEEP AQUIFER - 10/06/2009
CURRENT CONDITIONS

DRAWN BY: W. BLAYLOCK
REVIEWED BY: H. THURSTON

FIGURE
23



AMEC Earth & Environmental 2200 Gateway Centre Blvd., Suite 205 Morrisville, NC 27560 (919) 447-2750	CLIENT: **ALCATEL LUCENT USA, INC** **RALEIGH, NORTH CAROLINA** SITE: **FORMER ALCATEL USA SOURCING FACILITY** 2912 WAKE FOREST ROAD RALEIGH, NORTH CAROLINA 27609	amec	PROJ.: **559480000** SCALE: **1" = 20'** DATE: **05-27-2010**	TITLE: **PROPOSED TREATMENT AREA MAP** DR: **JWB** CHK: **HMT**	Figure **24**

TABLES

Table 1
Post Excavation Soil Sampling Results
Volatile Organic Compounds
Alcatel-Lucent USA
Raleigh, North Carolina
September-November 2009

Sample ID Number	Sample Depth (ft bls)	Sample Date	VOC 8260 (ug/kg)								
			1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	1,1-Dichloro-ethane	1,1-Dichloro-ethene	Acetone	cis-1,2-Dichloroethene	Tetrachloro-ethene	Trichloro-ethene	Trichlorofluoro-methane
HWS SSL			***1,670***	***17***	***382***	***44.5***	***2,810***	***350***	***7.42***	***18.3***	***31,500***
Region 9 PRGs			***1.2×10^6***	***1,600***	***5.1×10^5***	***1.2×10^5***	***1.4×10^7***	***NS***	***480***	***53***	***3.9×10^5***
EXCAVATION #1											
EXC 1 SW1	9	9/4/2009	<6.8	<6.8	35	**56**	<27	<6.8	**25**	<6.8	360 E
EXC 1 SW2	7	9/9/2009	<5.4	<5.4	12	29	<22	40	**40**	<5.4	<5.4
EXC 1 SW3	10	11/16/2009	2.8 J	<5.3	5.2 J	4.1 J	<21	<5.3	2.5 J	<5.3	<5.3
EXC 1 SW4	10	11/16/2009	12	<7.5	8.8	4.8 J	24 J	4.3 J	**11 J**	<7.5	5.5 J
EXC 1 B1	12	9/4/2009	<6.5	5.4 J	240	**190**	52	<6.5	**170**	<6.5	320
EXC 1 B2	12	9/8/2009	<5.7	<5.7	<5.7	4.3 J	<23	<5.7	**7.9 J**	<5.7	11
EXC 1 B3	12	9/9/2009	<5.4	<5.4	12	27	<22	86	4.0 J	<5.4	<5.4
EXCAVATION #2											
EXC 2 SW-1	6.5	9/1/2009	<8.8	<8.8	20	**51**	39	<8.8	**17 J**	<8.8	<8.8
EXC 2 SW-2	7.5	9/2/2009	<6.6	<6.6	<6.6	16	<27	<6.6	<13	<6.6	<6.6
EXC 2 SW-3	6.5	9/3/2009	<5.7	<5.7	10	26	<23	<5.7	**20**	<5.7	<5.7
EXC 2 SW-4	6	9/3/2009	<6.1	<6.1	13	**46**	<24	<6.1	**36**	<6.1	<6.1
EXC 2 B1	9	9/1/2009	<6.8	<6.8	29	**88**	<27	<6.8	**25**	<6.8	<6.8
EXC 2 B2	10	9/2/2009	<6.3	<6.3	21	**81**	28	<6.3	**18**	<6.3	<6.3
EXC 2 B3	9.5	9/3/2009	<5.6	<5.6	5.2 J	12	<23	<5.6	4.4 J	<5.6	<5.6
EXC 2 B4	9	9/3/2009	<6.9	<6.9	18	**52**	35	<6.9	**29**	<6.9	<6.9

NOTES:
(ug/kg) = micrograms per kilogram
(ft bls) = feet below land surface
VOC = volatile organic compounds
NS = no standard
Bold values exceed the HWS SSL

E = estimate concentration, calibration range exceeded
J = analyte was positively identified but value is below reporting limit
HWS SSL = North Carolina Hazardous Waste Section Soil Screening Levels
Region 9 PRGs = US EPA Region 9 Preliminary Remediation Goals

Table 2
Groundwater Analytical Results - PWR Wells
Alcatel-Lucent USA
Raleigh, North Carolina
December 2009

Sample ID Number	Sample Date	Volatile Organic Compounds (µg/L)										
		1,1,1-Trichloro-ethane	1,1-Dichloro-ethane	1,1-Dichloro-ethene	Acetone	Benzene	Bromodi-chloro-methane	Chloro-form	Tetra-chloro-ethene	Toluene	Trichloro-ethene	Total VOCs
2L Standard		*200*	*6*	*7*	*6,000*	*1*	*0.6*	*70*	*0.7*	*600*	*3*	*N/A*
MW-17i	12/3/2009	5.8	1.4	4.1	<10	0.54 J	<1.0	0.85 J	**1.9**	0.76 J	<2.0	15.35
MW-18i	12/3/2009	1	0.7 J	3.3	<10	<1.0	**2**	15	**14**	2	<2.0	38
MW-19i	12/3/2009	2.5	**17**	**72**	<10	0.51 J	<1.0	1.2	**44**	<1.0	2.6	139.81
MW-20i	12/3/2009	20	2.4	**7.4**	<10	<1.0	<1.0	<1.0	**2.5**	<1.0	<2.0	32.3
MW-21i	12/3/2009	120	<1.0	**23**	21	<1.0	**0.69 J**	2.9	**98**	<1.0	<2.0	265.59
MW-22i	12/3/2009	54	<1.0	**9.6**	<10	<1.0	**0.96 J**	5.8	**1.5**	<1.0	<2.0	71.86

NOTES:
(µg/L) = Micrograms per liter
2L Standard = North Carolina Groundwater Quality Standards (NCGWQS)
Concentrations which exceed the NCGWQS are highlighted in **BOLD**
N/A = not applicable

Table 3
Well Construction Details
Alcatel-Lucent USA
Raleigh, North Carolina

Well	Top of Casing Elevation (feet)	Ground Surface Elevation (feet)	Total Well Depth (feet)	Depth to Top of Screen (feet)	Screen Length (feet)	Screened Interval		Well Information		
						Top	Bottom	Well Type	Well Casing Diam.	Surf. Casing Diam.
MW-1s	228.40	229.25	19.00	9.00	10.00	9.00	19.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-2d	225.81	226.14	65.00	55.00	10.00	55.00	65.00	Monitoring	2-inch Sch. 40 PVC	6-inch Sch. 40 PVC
MW-2s	225.59	225.99	18.00	8.00	10.00	8.00	18.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-3d	228.48	228.64	70.00	55.00	15.00	55.00	70.00	Monitoring	2-inch Sch. 40 PVC	6-inch Sch. 40 PVC
MW-3s	228.55	228.74	20.50	10.50	10.00	10.50	20.50	Monitoring	2-inch Sch. 40 PVC	N/A
MW-4d	227.20	227.42	67.00	37.00	30.00	37.00	67.00	Monitoring	2-inch Sch. 40 PVC	6-inch Sch. 40 PVC
MW-4dd	226.53	Unknown	142.00	132.00	10.00	132.00	142.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-4s	226.71	Unknown	15.00	10.00	5.00	10.00	15.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-5s	228.40	229.25	20.00	10.00	10.00	10.00	20.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-6s	229.16	229.58	20.30	10.30	10.00	10.30	20.30	Monitoring	2-inch Sch. 40 PVC	N/A
MW-7d	229.35	229.53	70.00	50.00	20.00	50.00	70.00	Monitoring	2-inch Sch. 40 PVC	6-inch Sch. 40 PVC
MW-7s	229.27	229.56	19.00	9.00	10.00	9.00	19.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-8s	229.34	229.46	20.00	10.00	10.00	10.00	20.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-9s	243.17	243.42	18.00	8.00	10.00	8.00	18.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-10s	252.71	253.09	24.00	14.00	10.00	14.00	24.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-11s	229.63	229.81	14.00	4.00	10.00	4.00	14.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-12s	227.05	227.32	20.00	10.00	10.00	10.00	20.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-13d	229.42	Unknown	35.00	Unknown	Unknown	Unknown	Unknown	Monitoring	2-inch Sch. 40 PVC	N/A
MW-13s	229.48	229.80	15.00	5.00	10.00	5.00	15.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-14d	227.40	Unknown	56.00	36.00	20.00	36.00	56.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-15d	210.82	Unknown	77.00	62.00	15.00	62.00	77.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-15s	210.47	Unknown	22.80	5.00	18.00	5.00	23.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-1sk	Unknown	Unknown	20.00	10.00	10.00	10.00	20.00	Monitoring	2-inch Sch. 40 PVC	N/A
Mw-1ik	Unknown	Unknown	42.50	37.50	5.00	37.50	42.50	Monitoring	2-inch Sch. 40 PVC	6-inch Sch. 40 PVC
MW-2ik	223.36	226.20	40.90	32.00	10.00	32.00	42.00	Monitoring	2-inch Sch. 40 PVC	6-inch Sch. 40 PVC
MW-2sk	223.47	226.39	20.00	10.00	10.00	10.00	20.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-3dk	225.90	Unknown	33.23	Unknown	Unknown	Unknown	Unknown	Monitoring	2-inch Sch. 40 PVC	N/A

Table 3
Well Construction Details
Alcatel-Lucent USA
Raleigh, North Carolina

Well	Top of Casing Elevation (feet)	Ground Surface Elevation (feet)	Total Well Depth (feet)	Depth to Top of Screen (feet)	Screen Length (feet)	Screened Interval		Well Information		
						Top	Bottom	Well Type	Well Casing Diam.	Surf. Casing Diam.
MW-3sk	225.51	225.92	17.00	7.00	10.00	7.00	17.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-4sk	Unknown	227.10	19.00	9.00	10.00	9.00	19.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-5sk	215.28	220.95	24.00	14.00	10.00	14.00	24.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-6sk	Unknown	226.93	23.00	13.00	10.00	13.00	23.00	Monitoring	2-inch Sch. 40 PVC	N/A
Mw-6ik	Unknown	226.94	58.00	53.00	5.00	53.00	58.00	Monitoring	2-inch Sch. 40 PVC	6-inch Sch. 40 PVC
Mw-7sk	Unknown	226.99	23.00	13.00	10.00	13.00	23.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-7ik	Unknown	227.01	73.00	58.00	15.00	58.00	73.00	Monitoring	2-inch Sch. 40 PVC	6-inch Sch. 40 PVC
Mw-8sk	Unknown	225.37	20.00	10.00	10.00	10.00	20.00	Monitoring	2-inch Sch. 40 PVC	N/A
Mw-8ik	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Monitoring	2-inch Sch. 40 PVC	N/A
MW-8dk	225.31	225.75	80.00	50.00	30.00	50.00	80.00	Monitoring	2-inch Sch. 40 PVC	6-inch Sch. 40 PVC
MW-9dk	216.95	216.42	70.00	55.00	15.00	55.00	70.00	Monitoring	2-inch Sch. 40 PVC	6-inch Sch. 40 PVC
MW-9sk	217.04	216.34	46.00	6.00	40.00	6.00	46.00	Monitoring	2-inch Sch. 40 PVC	N/A
MW-12dk	221.85	221.84	65.00	Unknown	Unknown	Unknown	Unknown	Monitoring	2-inch Sch. 40 PVC	6-inch Sch. 40 PVC
RW-1	223.80	227.12	24.00	9.00	9.00	9.00	18.00	Recovery	6-inch Sch. 40 PVC	N/A
RW-2	220.61	225.27	40.00	15.00	25.00	15.00	40.00	Recovery	6-inch Sch. 40 PVC	N/A
RW-2R	Unknown	Unknown	85.00	10.00	75.00	10.00	85.00	Recovery	6-inch Sch. 40 PVC	N/A
RW-3	221.50	Unknown	85.00	10.00	75.00	10.00	85.00	Recovery	6-inch Sch. 40 PVC	N/A
RW-4	221.18	Unknown	85.00	10.00	65.00	10.00	75.00	Recovery	6-inch Sch. 40 PVC	N/A
RW-5	220.83	Unknown	88.00	7.00	65.00	7.00	72.00	Recovery	6-inch Sch. 40 PVC	N/A
RW-6	220.98	Unknown	74.00	13.00	40.00	13.00	53.00	Recovery	6-inch Sch. 40 PVC	N/A
RW-7	220.29	Unknown	85.00	10.00	75.00	10.00	85.00	Recovery	6-inch Sch. 40 PVC	N/A
RW-8	219.18	Unknown	48.00	10.00	38.00	10.00	48.00	Recovery	6-inch Sch. 40 PVC	N/A
RW-9	217.97	Unknown	48.00	13.00	35.00	13.00	48.00	Recovery	6-inch Sch. 40 PVC	N/A
RW-10	215.35	Unknown	52.00	10.00	42.00	10.00	52.00	Recovery	6-inch Sch. 40 PVC	N/A
CRW-1	211.74	Unknown	35.00	6.00	29.00	6.00	35.00	Recovery	6-inch Sch. 40 PVC	N/A
CRW-2	212.10	Unknown	32.00	7.00	25.00	7.00	32.00	Recovery	6-inch Sch. 40 PVC	N/A
CRW-3	212.44	Unknown	33.00	8.00	25.00	8.00	33.00	Recovery	6-inch Sch. 40 PVC	N/A
CRW-4	211.64	Unknown	35.00	10.00	25.00	10.00	35.00	Recovery	6-inch Sch. 40 PVC	N/A

Table 3
Well Construction Details
Alcatel-Lucent USA
Raleigh, North Carolina

Well	Top of Casing Elevation (feet)	Ground Surface Elevation (feet)	Total Well Depth (feet)	Depth to Top of Screen (feet)	Screen Length (feet)	Screened Interval		Well Information		
						Top	Bottom	Well Type	Well Casing Diam.	Surf. Casing Diam.
CRW-5	213.87	Unknown	44.00	9.00	35.00	9.00	44.00	Recovery	6-inch Sch. 40 PVC	N/A
CRW-6	214.77	Unknown	45.00	35.00	10.00	35.00	45.00	Recovery	6-inch Sch. 40 PVC	N/A
CRW-7	215.90	Unknown	85.00	10.00	75.00	10.00	85.00	Recovery	6-inch Sch. 40 PVC	N/A
CRW-8	216.61	Unknown	80.00	10.00	70.00	10.00	80.00	Recovery	6-inch Sch. 40 PVC	N/A
CRW-9	216.78	Unknown	75.00	7.00	68.00	7.00	75.00	Recovery	6-inch Sch. 40 PVC	N/A
CRW-10	216.97	Unknown	83.00	10.00	73.00	10.00	83.00	Recovery	6-inch Sch. 40 PVC	N/A
CRW-11	217.12	Unknown	80.00	10.00	70.00	10.00	80.00	Recovery	6-inch Sch. 40 PVC	N/A
CRW-12	217.46	Unknown	80.00	10.00	70.00	10.00	80.00	Recovery	6-inch Sch. 40 PVC	N/A
IW-1	223.87	Unknown	31.00	5.50	25.00	5.50	30.50	Injection	Unknown	Groundwater Injection
IW-2	228.80	Unknown	29.00	4.00	25.00	4.00	29.00	Injection	Unknown	Groundwater Injection
IW-3	224.50	Unknown	30.00	8.00	22.00	8.00	30.00	Injection	Unknown	Groundwater Injection
IW-4	225.28	Unknown	30.00	10.00	20.00	10.00	30.00	Injection	Unknown	Groundwater Injection
IW-5	228.68	Unknown	27.00	7.00	20.00	7.00	27.00	Injection	Unknown	Groundwater Injection
IW-6	225.66	Unknown	28.00	8.00	20.00	8.00	28.00	Injection	Unknown	Groundwater Injection
IW-7	225.11	Unknown	25.00	5.00	20.00	5.00	25.00	Injection	Unknown	Groundwater Injection
IW-8	225.86	Unknown	29.00	4.00	25.00	4.00	29.00	Injection	Unknown	Groundwater Injection
INJ-1b	NM	NM	61.00	Unknown	None	Open Hole 18 to 61		Injection	Unknown	Groundwater Injection
INJ-2b	NM	NM	61.00	Unknown	None	Open Hole 18.1 to 61		Injection	Unknown	Groundwater Injection
INJ-3s	NM	NM	22.00	Unknown	5.00	17.00	22.00	Injection	Unknown	Groundwater Injection
INJ-4s	NM	NM	21.00	Unknown	5.00	16.00	21.00	Injection	Unknown	Groundwater Injection
INJ-5s	NM	NM	25.00	Unknown	5.00	20.00	25.00	Injection	Unknown	Groundwater Injection
MW-17i	229.72	Unknown	31.00	Unknown	Unknown	26.00	31.00	PWR	2-inch Sch. 40 PVC	N/A
MW-18i	229.74	Unknown	27.00	Unknown	Unknown	22.00	27.00	PWR	2-inch Sch. 40 PVC	N/A
MW-19i	229.78	Unknown	32.00	Unknown	Unknown	27.00	32.00	PWR	2-inch Sch. 40 PVC	N/A
MW-20i	229.74	Unknown	31.00	Unknown	Unknown	26.00	31.00	PWR	2-inch Sch. 40 PVC	N/A
MW-21i	229.70	Unknown	37.00	Unknown	Unknown	32.00	37.00	PWR	2-inch Sch. 40 PVC	N/A
MW-22i	229.88	Unknown	32.00	Unknown	Unknown	27.00	32.00	PWR	2-inch Sch. 40 PVC	N/A

Notes:
NM = Not Measured
N/A = Not Applicable
Green shading indicates well has been abandoned.

Table 4
Summary of October 2009 Groundwater Analytical Results
Volatile Organic Compounds and Metals
Alcatel-Lucent USA
Raleigh, North Carolina

Sample ID Number	Sample Date	Volatile Organic Compounds (µg/L)													Metals (µg/L)	
		1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	1,1-Dichloro-ethane	1,1-Dichloro-ethene	1,2-Dichloro-ethane	Chloro-form	cis-1,2-Dichloro-ethene	Tetra-chloro-ethene	Trichloro-ethene	Trichloro-fluoro-methane	Vinyl Chloride	1,4-Dioxane	Total VOCs	Copper	Lead
2L Standard		*200*	*210,000*	*20*	*7*	*0.38*	*70*	*70*	*0.7*	*2.8*	*2,100*	*0.015*	*7*	*N/A*	*1,000*	*15*
MW-2D*	10/8/2009	26	<0.50	1.6	**34**	<0.50	<0.50	1.3	**43**	<0.50	<0.50	<0.50	<1.0	105.9*	30	4.8 J
MW-2S	10/8/2009	8.0	<0.50	1.5	1.2	<0.50	<0.50	<0.50	**6.6**	<0.50	0.85	<0.50	<1.0	18.15	1.7 J	1.9 J
MW-3S	10/8/2009	<0.50	<0.50	0.70	0.66	<0.50	<0.50	<0.50	<0.50	**3.3**	<0.50	<0.50	<1.0	4.66	2.7 J	<5.0
MW-3D	10/8/2009	4.5	<0.50	1.1	2.3	<0.50	0.78	<0.50	**1.8**	<0.50	<0.50	<0.50	<1.0	9.70	<10	<5.0
MW-3SK	10/7/2009	13	<0.50	<0.50	1.8	<0.50	<0.50	<0.50	**100**	<0.50	<0.50	<0.50	<1.0	114.8	6.6 J	5.9 J
MW-3DK	10/7/2009	47	<0.50	5.1	**13**	<0.50	0.57	<0.50	**140**	<0.50	<0.50	<0.50	**23**	228.67	1.5 J	<5.0
MW-4S	10/7/2009	5.9	<0.50	<0.50	1.3	<0.50	<0.50	<0.50	**72**	<0.50	<0.50	<0.50	<1.0	79.2	23	7.1
MW-4D	10/7/2009	57	<5.0	<5.0	**110**	<5.0	<5.0	<5.0	**740**	<5.0	<5.0	<5.0	**6.9**	914	<10	<5.0
MW-5SK	10/7/2009	<0.50	<0.50	<0.50	0.63	<0.50	<0.50	3.3	<0.50	<0.50	<0.50	**0.57**	<1.0	4.5	1.8 J	1.2 J
MW-9SK	10/6/2009	0.76	<0.50	<0.50	2.2	<0.50	<0.50	<0.50	**8.7**	0.87	<0.50	<0.50	<1.0	12.5	<10	<5.0
MW-9DK	10/6/2009	0.60	<0.50	<0.50	2.6	<0.50	0.92	<0.50	**3.1**	**5.6**	<0.50	<0.50	<1.0	12.8	<10	<5.0
MW-12S	10/8/2009	<0.50	<0.50	3.2	0.94	<0.50	<0.50	0.97	<0.50	1.1	<0.50	<0.50	**96**	102.2	2.6 J	1.6 J
MW-12DK	10/7/2009	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	1.1	<10	<5.0
MW-13S	10/8/2009	14	4.2	**86**	**530**	**8.5**	12	<2.0	**130**	**4.9**	<2.0	<2.0	**1000**	1789.6	3.2 J	<5.0
MW-13SR	10/8/2009	49	1.5	**82**	**320**	**3.4**	1.8	<0.50	**71**	**3.9**	<0.50	<0.50	**690**	1222.6	1.5 J	<5.0
MW-13D	10/8/2009	5.7	<0.50	1.4	3.7	<0.50	<0.50	<0.50	**1.4**	<0.50	<0.50	<0.50	<1.0	12.20	350	<5.0
MW-14D	10/7/2009	160	<0.50	<0.50	**14**	<0.50	<0.50	<0.50	**2.3**	<0.50	<0.50	<0.50	<1.0	176.3	140	1.9 J
DUP-01	10/7/2009	64	<5.0	<5.0	**110**	<5.0	<5.0	<5.0	**730**	<5.0	<5.0	<5.0	**13**	917	<10	<5.0
DUP-02	10/8/2009	7.4	<0.50	1.3	1.1	<0.50	<0.50	<0.50	**5.7**	<0.50	0.81	<0.50	<1.0	16	1.4 J	1.7 J
CRW-1	10/7/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	<1.0	1.1	<10	<5.0
CRW-5	10/7/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	1.8 J	<5.0
RW-5	10/7/2009	0.60	<0.50	1.0	**11**	<0.50	1.9	<0.50	**32**	**3.1**	<0.50	<0.50	<1.0	49.6	1.1 J	1.3 J
EQ-1	10/8/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	2.2 J	1.2 J

NOTES:
(µg/L) = Micrograms per liter
2L Standard = North Carolina Groundwater Quality Standards (NCGWQS)
Concentrations which exceed the NCGWQS are highlighted in **BOLD**
*Sample MW-2D also contained 1.0 µg/L of benzene

Table 5
Evaluation of Remedial Alternatives
Alcatel-Lucent USA
Raleigh, North Carolina

GROUNDWATER REMEDIAL ALTERNATIVE	ATTAINMENT OF REMEDIAL END GOALS	COMPLIANCE WITH REGULATIONS	LONG TERM PERMANENCE	SHORT-TERM EFFECTIVENESS	IMPLEMENTABILITY	COST	CLEANUP TIME
ISCO via Direct Injection	Medium. Contact with VOCs required. Tight soils within the shallow unit make attaining goals difficult. With bedrock, identifing the VOC bearing fractures is limiting factor.	Will require UIC Permit from DWQ	High. After initial rebounding, concentrations remaining will be sustained.	Moderate. Some rebounding following injection is likely.	Moderate. Potential difficulty installing bedrock wells within building area due to limited height clearance.	Saprolite/PWR - $360K Bedrock - $115K	Persulfate reactive for approximately 45 days. Further injections could be required over course of a year.
ISCO via Soil Blending	Source can be addressed in the shallow saprolite and upper PWR. The blending provides complete contact with oxidant. Treatment in lower PWR zone by percolation only.	Yes	High. After initial rebounding, concentrations remaining will be sustained since COCs have been destroyed.	High. Due to complete distribution of oxidant, little rebounding expected.	Will require demoliton of a portion of the building to allow equipment access. Equipment can reach required depths.	$200K	Persulfate reactive for approximately 45 days. Further injections could be required over course of a year.
Enhanced Biodegradation and Bioaugmentation	Does not address 1,4-Dioxane. For other COCs, natural biodegradation processes are increased with the injection of electron donor and DHC microbes. Low concentrations of COCs can be achieved. Limiting factor is distribution of donor material.	Will require UIC Permit from DWQ	Once COCs are broken down to CO2 and water, the reaction is not reversible. Dioxane not addressed.	Remedial success dependent upon complete distribution of electron donor and DHC microbes. The low levels of DO in the groundwater must be maintained until remedial goals achieved.	Distribution of electron donor and DHC will be difficult in tight saprolite material. This will require large number of injection points or establishment of reactive zones.	$145K	Slower process than ISCO requiring up to 2 to 3 years to attain goals in source area.
Permeable Reactive Barrier	Protection of downgradient receptors only. Does not address source material or address COCs within plume area.	Yes	The effective life of the PRB depenent upon the type utilized but can be as long as 30 years.	High likelyhood of success if can be emplaced. But depth required beyond ability of the equipment.	Low. Altnerative will not address fractured bedrock impact and depth of impact is beyond limits of emplacement methods.	Not Determined	Installation within several months. Indefinate overall cleanup time since alternative does not address source or interior of plume area.
Dig and Haul	Source can be addressed in the shallow saprolite and upper PWR zone. The soil and generated water transported off-site for disposal	Material must be sent to permitted facility and if concentrations are suitable, handled in accordance with "contained out" policy	High. COCs removed from the site but ALU maintains liability for the material from cradle to grave.	High. COCs removed from the site.	Will require demoliton of a portion of the building to allow equipment access. Equipment can reach required depths.	$470K	Source can be addressed within a period of several months.
Monitored Natural Attenuation with Source Removal	Historical groundwater data indicates the nearly steady state levels have been achieved. With additional source removal, the plume will be at steady state and likely begin to shrink in size.	Yes	Once physical processes address the COCs, the process is generally not reversible. Little to no rebounding expected.	Remedial method allows for steady progression toward goals.	Remedial method allows for steady progression toward goals.	$15K/year after source reduction	Overall cleanup time following removal of source material dependent upon success of source area reduction activities. However, dilute plume will be present for 10+ years.

APPENDIX A

BORING LOGS AND WELL COMPLETION DIAGRAMS – PWR INVESTIGATION

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Appendix A
Investigation Methods
Partially Weathered Rock Unit

On November 16 through November 18 2009, AMEC supervised the installation of six groundwater monitoring wells screened within the partially weathered rock (PWR) hydrogeologic unit. The wells were installed within the building using a mini sonic drill rig. Soil and rock cores were obtained using this drilling methodology and a description of the sample media was performed. To accurately determine the composition of the PWR unit and the depth to competent bedrock, continuous cores of the unconsolidated overburden, PWR unit, and the competent bedrock were obtained during the installation of each boring. Once the competent rock unit was encountered, the borehole was completed with a Type II, groundwater monitoring well.

Monitoring wells MW-17i, MW-18i, MW-19i, MW-20i, MW-21i, and MW-22i were installed within the lower portion of the PWR unit, immediately above the competent rock (Figure 2). The construction of these wells includes a 5-foot section of 0.01-inch slotted, 2.0-inch diameter, PVC well screen, completed to the surface with PVC casing and finished with a lockable, flush mounted, manhole cover. The following table is a summary of the well construction details. Boring logs and well construction details are included in Appendix A.

PWR Well Construction Details						
Well ID	**Casing Interval (ft bls)**	**Total Depth (ft bls)**	**Screen Interval (ft bls)**	**Base of Saprolite (ft bls)**	**Thickness of PWR (ft)**	**Top of Competent Rock (ft bls)**
MW-17i	0-26	31	26-31	20	11	31
MW-18i	0-22	27	22-27	21	14	35
MW-19i	0-27	32	27-32	26	7	33
MW-20i	0-26	31	26-31	25	6	31
MW-21i	0-32	37	32-37	21	16	37
MW-22i	0-27	32	27-32	Not logged	Not logged	33

Well Development

Upon completion, each newly installed well was developed with a decontaminated submersible pump using dedicated, disposable tubing. Development was performed by removing groundwater from each well in order to remove fines and hydraulically connect the well to the surrounding aquifer. Observations of purge water were made throughout the development process to evaluate the turbidity of the water to gauge the necessity for continued development. Development was halted once water removed from the well appeared free of sediment. Water produced during development was placed in drums, labeled and staged on the property awaiting analytical results of groundwater samples to determine disposal requirements.

Groundwater Sampling

AMEC personnel mobilized to the site on December 3, 2009, to collect groundwater samples from newly installed wells. Prior to sampling, the depth-to-groundwater was measured from the top of casing in each well. Groundwater samples were collected using low-flow sampling techniques to allow measurement of stabilized water quality parameters including conductivity, dissolved oxygen, pH, oxidation reduction potential, temperature and turbidity. These measurements are necessary to insure collection of representative samples. Low-flow purging and sampling procedures were conducted in accordance with the Groundwater Sampling Operating Procedure included in the EPA Region 4 Field Branches Quality System and Technical Procedures (SESDPROC-301-R1). Water quality parameters were measured using a Hanna HI 9828 water quality meter and flow-through cell assembly.

Groundwater samples were placed in pre-labeled, laboratory-supplied containers, placed on ice, and transported under chain-of-custody for analysis by the laboratory. The groundwater samples were submitted to Prism Laboratories, Inc. of Charlotte, North Carolina and analyzed for the presence of VOCs according to EPA Method 8260B.

Investigation Derived Waste Material

Soil/rock cuttings, as well as water produced during drilling, were placed in drums, labeled, and staged on the property awaiting disposal. Upon receipt of the final laboratory analytical data collected from the waste material, the soil and water was disposed of in accordance with local, state, and federal requirements.

AMEC Earth & Environmental, Inc.

BORING LOG

Boring/Well No.: MW-17I	**Site Name: Alcatel - Lucent Wake Forest Road**
Date: 11/16/09	**Location: Raleigh, NC**
Job No.: 559480000.4000.0006	**Sample Method:**
AMEC Rep: David Treadway	**Drilling Equipment: Mini-Sonic**

Remarks: PWR Well Installation beneath building

Depth (ft BLS)	FID Reading (ppm)	Blow Counts	Soil/Lithologic Description
0 - 0.3	0-2' = 2.4		Concrete
0.3 - 5	2'-4' = 1.7		Yellow brown sandy CLAY - Saprolite
5 - 10	4'-6' = 5.2		Yellow brown silty CLAY - Saprolite
10 - 15	6'-8' = 6.1		Yellow brown sandy CLAY - Saprolite
15 - 20	8'-10' = 4.2		Red brown SILT- Saprolite
20	10'-12' = 10.5		Gray to tan partially weathered rock
31	12'-14' = 7.0		Terminated at top of bedrock
	14'-16' = 14.2		
	16'-18' = 16.5		
	18'-20' = 5.0		
	20'-22' = 5.2		
	22'-24' = 301		
	24'-26' = 7.4		
	26'-28' = 8.1		

WELL CONSTRUCTION DETAILS (If Applicable)

Well Type/Diameter:Flush mount PVC / 2"	Outer Casing Interval:
Total Depth: 31' bgs	Outer Casing Diameter:
Screen Interval: 26-31' bgs	Bentonite Interval: 22-24' bgs
Sand Interval: 24-31' bgs	Slot Size: 0.01"
Grout Interval: 0.5-22' bgs	Static Water Level: 15.83' BTOC

AMEC Earth & Environmental, Inc.

BORING LOG

Boring/Well No.: MW-18I	**Site Name: Alcatel - Lucent Wake Forest Road**
Date: 11/17/09	**Location: Raleigh, NC**
Job No.: 559480000.4000.0006	**Sample Method:**
AMEC Rep: David Treadway	**Drilling Equipment: Mini-Sonic**

Remarks: PWR Well Installation beneath building

Depth (ft BLS)	FID Reading (ppm)	Blow Counts	Soil/Lithologic Description
0 - 0.3	0-2' =		Concrete
0.3 - 4	2'-4' =		Brown red silty CLAY, micaceous
4 - 21	4'-6' =		Tan and yellow brown silty SAND - Saprolite
21 - 24	6'-8' =		Tan, dry partially weathered rock
24 - 27	8'-10' =		Mixed tan, gray, and red brown partially weathered rock
	10'-12' = <0.1		0.5' thick clay lense at 24' and 26'
27 - 35	12'-14' = <0.1		Bedrock -Biotite Gneiss
	14'-16' = <0.1		
	16'-18' = 1.1		
	18'-20' = <0.1		
	20'-22' = 3.0		
	22'-24' = 0.1		
	24'-25' = <0.1		

WELL CONSTRUCTION DETAILS (If Applicable)

Well Type/Diameter:Flush Mount PVC / 2"	Outer Casing Interval:
Total Depth: 27' bgs	Outer Casing Diameter:
Screen Interval: 22-27' bgs	Bentonite Interval: 18-20' bgs
Sand Interval: 20-27' bgs	Slot Size: 0.01 "
Grout Interval: 0.5-18' bgs	Static Water Level: 16.36' BTOC

AMEC Earth & Environmental, Inc.

BORING LOG

Boring/Well No.: MW-19I	**Site Name: Alcatel - Lucent Wake Forest Road**
Date: 11/17/09	**Location: Raleigh, NC**
Job No.: 559480000.4000.0006	**Sample Method:**
AMEC Rep: David Treadway	**Drilling Equipment: Mini-Sonic**

Remarks: PWR Well Installation beneath building

Depth (ft BLS)	FID Reading (ppm)	Blow Counts	Soil/Lithologic Description
0 - 0.3	0-2' = 2.5		Concrete
0.3 - 10	2'-4' = 4.7		Red brown silty CLAY, micaceous, very stiff
10 - 19	4'-6' = 3.2		Yellow brown sandy CLAY, stiff - Saprolite
19 - 26	6'-8' = 2.8		Dark brown sandy SILT with wood debris
26 - 33	8'-10' = 1.4		Mixed gray, yellow brown, and and red brown partially weathered rock
	10'-12' = 2.9		
33	12'-14' = 7.1		Terminate at top of bedrock
	14'-16' = 5.7		
	16'-18' = 5.4		
	18'-20' = 86		
	20'-22' = 189		
	22'-24' = 482		
	24'-26' = 225		
	26'-28' = 7.6		
	28'-30' = 10		
	30'-32' = 43		
	32'-33' = 28		

WELL CONSTRUCTION DETAILS (If Applicable)

Well Type/Diameter:Flush Mount PVC / 2"	Outer Casing Interval:
Total Depth: 32' bgs	Outer Casing Diameter:
Screen Interval: 27-32' bgs	Bentonite Interval: 23-25' bgs
Sand Interval: 25-33' bgs	Slot Size: 0.01"
Grout Interval: 0.5-23' bgs	Static Water Level: 13.96' BTOC

AMEC Earth & Environmental, Inc.

BORING LOG

Boring/Well No.: MW-20I	**Site Name: Alcatel - Lucent Wake Forest Road**
Date: 11/17/09	**Location: Raleigh, NC**
Job No.: 559480000.4000.0006	**Sample Method:**
AMEC Rep: David Treadway	**Drilling Equipment: Mini-Sonic**

Remarks: PWR Well Installation beneath building

Depth (ft BLS)	FID Reading (ppm)	Blow Counts	Soil/Lithologic Description
0 - 0.3	0-2' = <0.1		Concrete
0.3 - 4	2'-4' = 1.5		Yellow red silty CLAY
4 - 25	4'-6' = 3.1		Yellow brown to light brown calyey SILT, micaceous - Saprolite
25 - 31	6'-8' = 3.1		Mix tan, brown and gray partially weathered rock
31 - 34	8'-10' = 1.8		Bedrock - Granite
	10'-12' = 1.7		
	12'-14' = <0.1		
	14'-16' = 14		
	16'-18' = 23		
	18'-20' = 21		
	20'-22' = 44		
	22'-24' = 27		
	24'-26' = 24		
	26'-28' = 3.9		
	28'-30' = 8.8		

WELL CONSTRUCTION DETAILS (If Applicable)

Well Type/Diameter:Flush Mount PVC / 2"	Outer Casing Interval:
Total Depth: 31' bgs	Outer Casing Diameter:
Screen Interval: 26-31' bgs	Bentonite Interval: 22-24' bgs
Sand Interval: 24-31' bgs	Slot Size: 0.01"
Grout Interval: 0.5-22' bgs	Static Water Level: 14.53' BTOC

AMEC Earth & Environmental, Inc.

BORING LOG

Boring/Well No.: MW-21I	**Site Name: Alcatel - Lucent Wake Forest Road**
Date: 11/18/09	**Location: Raleigh, NC**
Job No.: 559480000.4000.0006	**Sample Method:**
AMEC Rep: David Treadway	**Drilling Equipment: Mini-Sonic**

Remarks: PWR Well Installation beneath building

Depth (ft BLS)	FID Reading (ppm)	Blow Counts	Soil/Lithologic Description
0 - 0.3	0-2' = 6.1		Concrete
0.3 - 37	2'-4' = 9.5		White and brown partially weatehred rock, micaceous
	4'-6' = 9.6		tan and white below 8'
37 - 40	6'-8' = 7.9		Bedrock - Granite, fracture at 39-39.5' bgs
	8'-10' = 6.4		
	10'-12' = 6.8		
	12'-14' = 7.0		
	14'-16' = 9.4		
	16'-18' = 5.4		
	18'-20' = 7.5		
	20'-22' = 40		
	22'-24' = 38		
	24'-26' = 31		
	26'-28' = 26		
	28'-30' = 51		
	30'-32' = 39		
	32'-34' = 5.8		
	34'-36' = 68		
	36'-38' = 34		
	38'-40' = 56		

WELL CONSTRUCTION DETAILS (If Applicable)

Well Type/Diameter:Flush Mount PVC / 2"	Outer Casing Interval:
Total Depth: 37' bgs	Outer Casing Diameter:
Screen Interval: 32-37' bgs	Bentonite Interval: 37-40' bgs
Sand Interval: 30-37' bgs	Slot Size: 0.01"
Grout Interval: 0.5-28' bgs	Static Water Level: 13.37' BTOC

AMEC Earth & Environmental, Inc.

BORING LOG

Boring/Well No.: MW-22I	**Site Name: Alcatel - Lucent Wake Forest Road**
Date: 11/18/09	**Location: Raleigh, NC**
Job No.: 559480000.4000.0006	**Sample Method:**
AMEC Rep: David Treadway	**Drilling Equipment: Mini-Sonic**

Remarks: PWR Well Installation beneath building

Depth (ft BLS)	FID Reading (ppm)	Blow Counts	Soil/Lithologic Description
0 - 0.3			Concrete
0.3 - 31			Saprolite or partially weathered rock
31 - 33			Bedrock - Granite
			Note: soil cutting/samples were not retrieved or logged due to time constraints.

WELL CONSTRUCTION DETAILS (If Applicable)	
Well Type/Diameter:Flush Mount PVC / 2"	Outer Casing Interval:
Total Depth: 32' bgs	Outer Casing Diameter:
Screen Interval: 27-32" bgs	Bentonite Interval: 23-25' bgs
Sand Interval: 25-33' bgs	Slot Size: 0.01"
Grout Interval: 0.5-23' bgs	Static Water Level: 12.26' BTOC

PROJECT NAME: Alcatel-Lucent - Wake Forest Rd

LOCATION: Raleigh, North Carolina

CLIENT: Alcatel-Lucent

SUBCONTRACTOR: _____

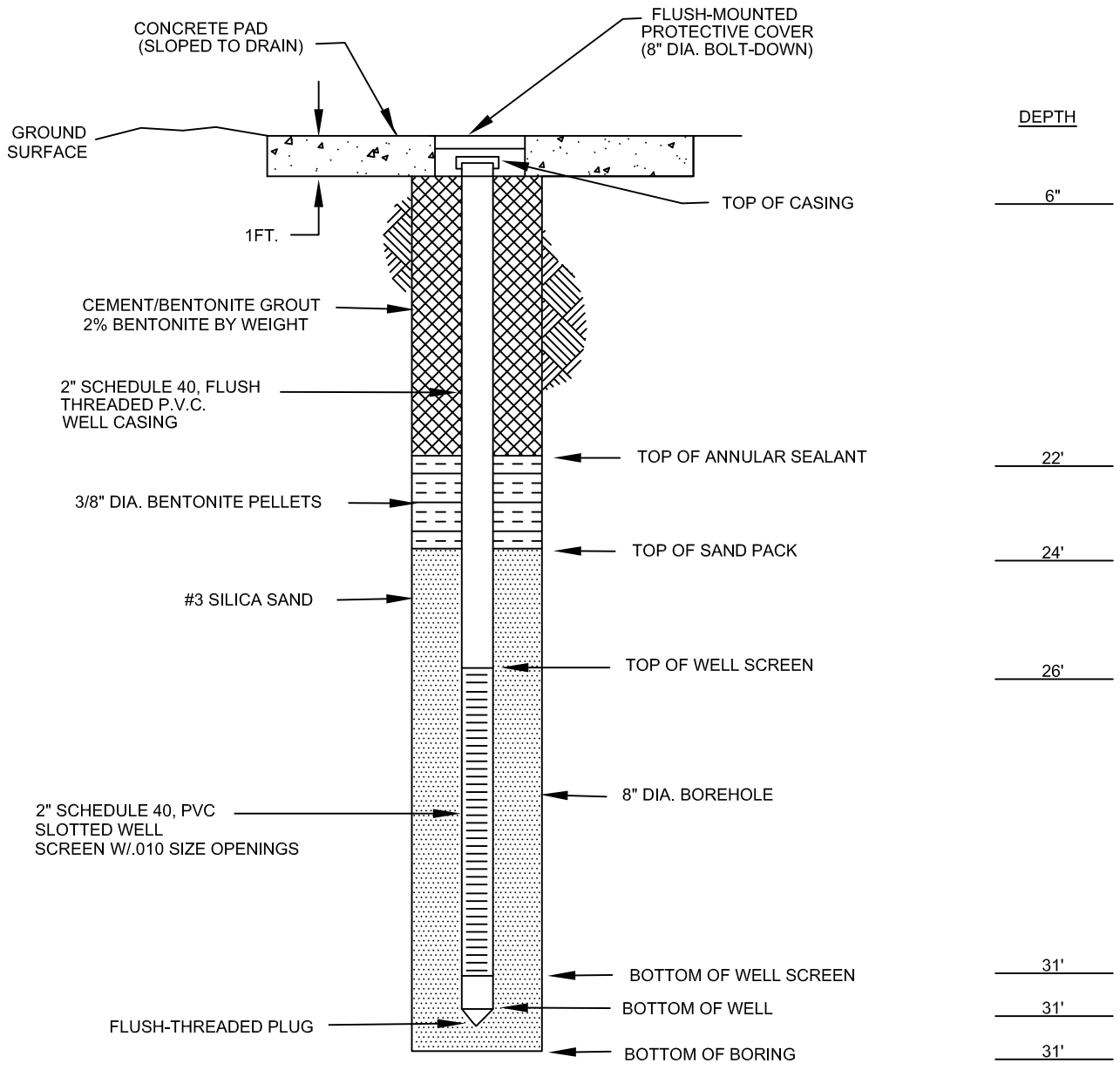
DRILLER: _____

WELL NUMBER: MW-17I

INSTALLATION DATE: _____

FIELD REP: David Treadway

PROJECT NO.: 559480000



PREPARED BY:

amec

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TYPE II MONITORING WELL CONSTRUCTION SCHEMATIC

PROJECT NAME: Alcatel-Lucent - Wake Forest Rd

LOCATION: Raleigh, North Carolina

CLIENT: Alcatel-Lucent

SUBCONTRACTOR: _____

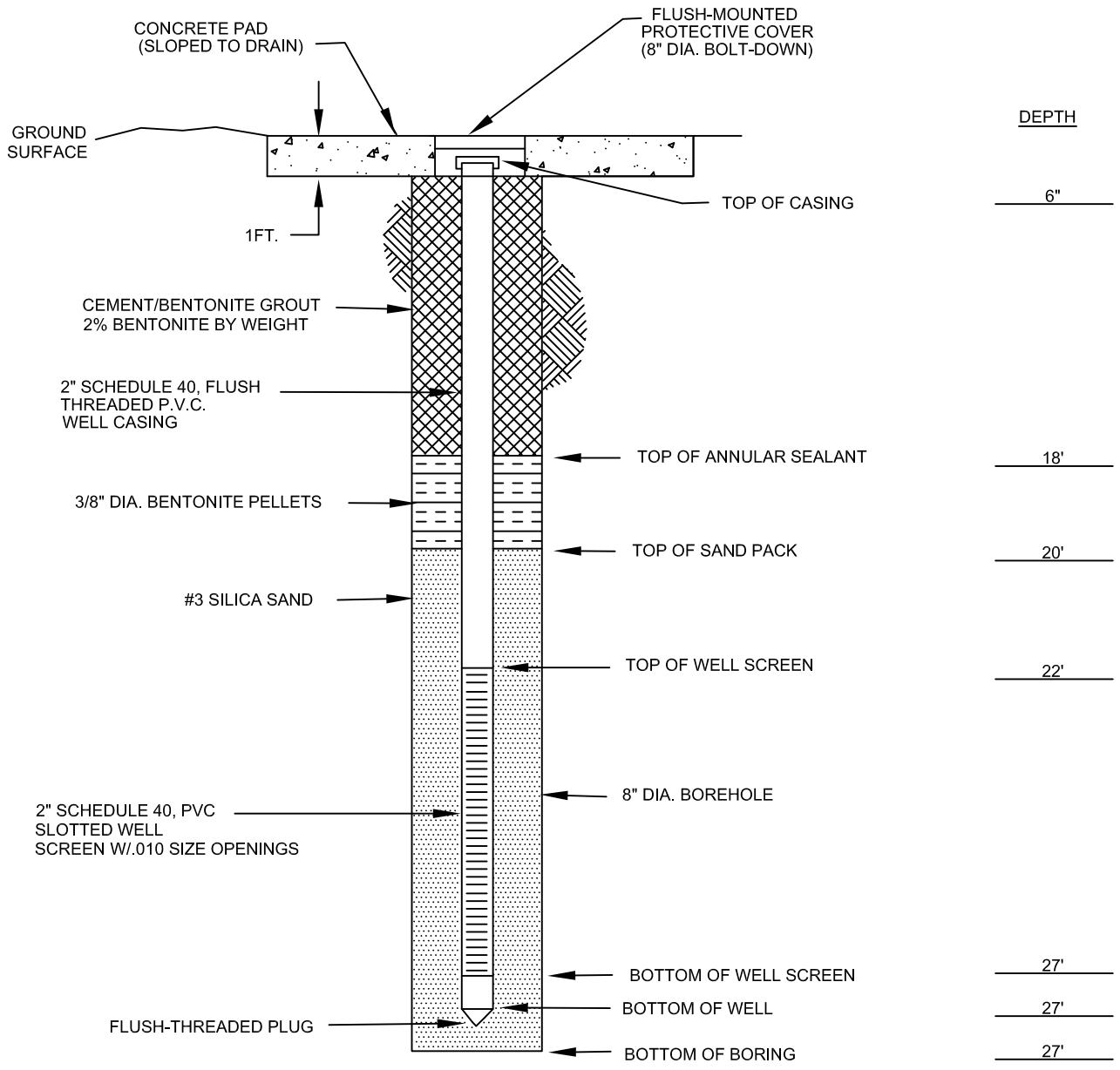
DRILLER: _____

WELL NUMBER: MW-18I

INSTALLATION DATE: _____

FIELD REP: David Treadway

PROJECT NO.: 559480000



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TYPE II MONITORING WELL CONSTRUCTION SCHEMATIC

PROJECT NAME: Alcatel-Lucent - Wake Forest Rd

LOCATION: Raleigh, North Carolina

CLIENT: Alcatel-Lucent

SUBCONTRACTOR: _____

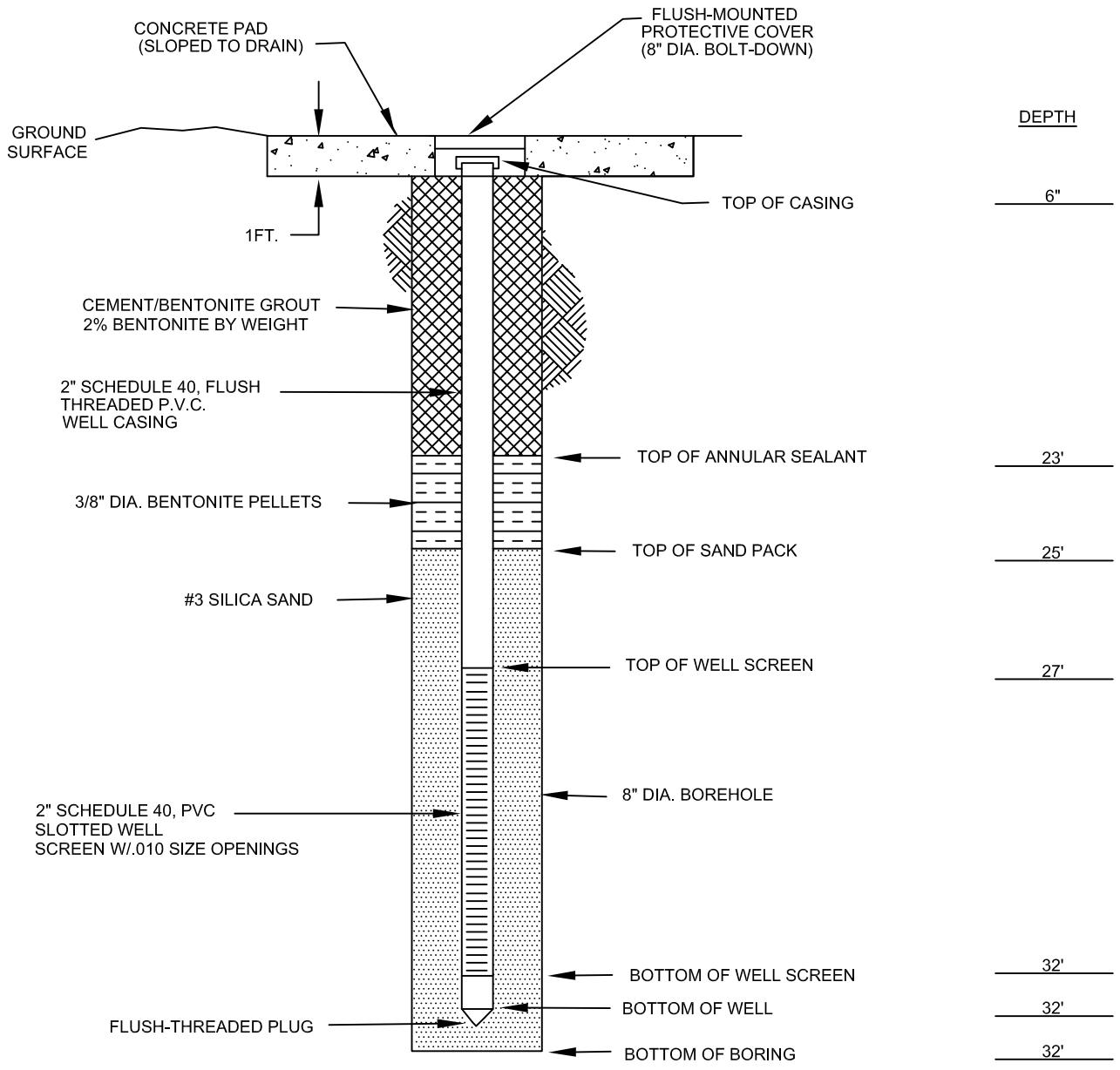
DRILLER: _____

WELL NUMBER: MW-19I

INSTALLATION DATE: _____

FIELD REP: David Treadway

PROJECT NO.: 559480000



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TYPE II MONITORING WELL CONSTRUCTION SCHEMATIC

PROJECT NAME: Alcatel-Lucent - Wake Forest Rd

LOCATION: Raleigh, North Carolina

CLIENT: Alcatel-Lucent

SUBCONTRACTOR: _____

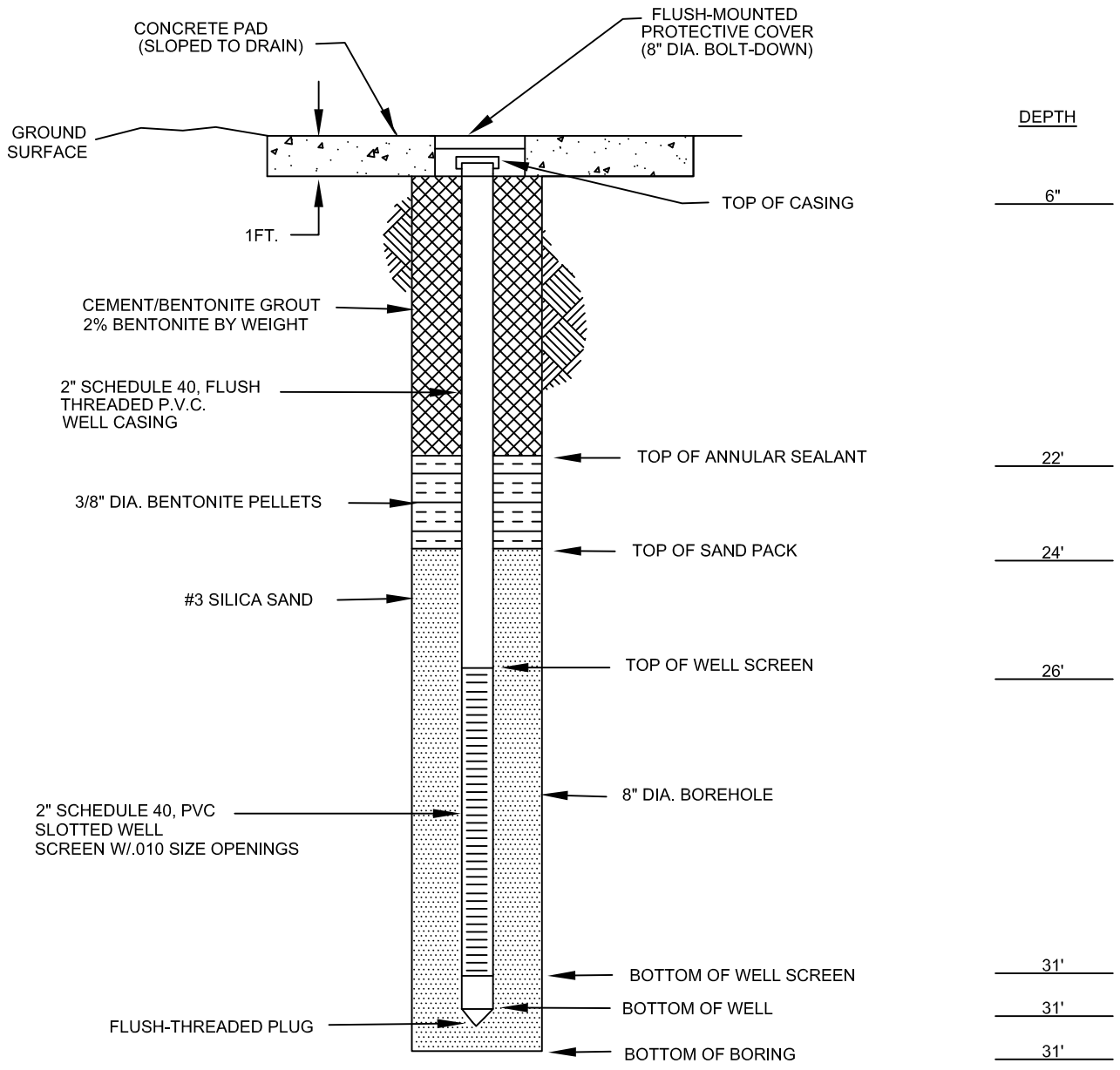
DRILLER: _____

WELL NUMBER: MW-20I

INSTALLATION DATE: _____

FIELD REP: David Treadway

PROJECT NO.: 559480000



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TYPE II MONITORING WELL CONSTRUCTION SCHEMATIC

PROJECT NAME: Alcatel-Lucent - Wake Forest Rd

LOCATION: Raleigh, North Carolina

CLIENT: Alcatel-Lucent

SUBCONTRACTOR: _____

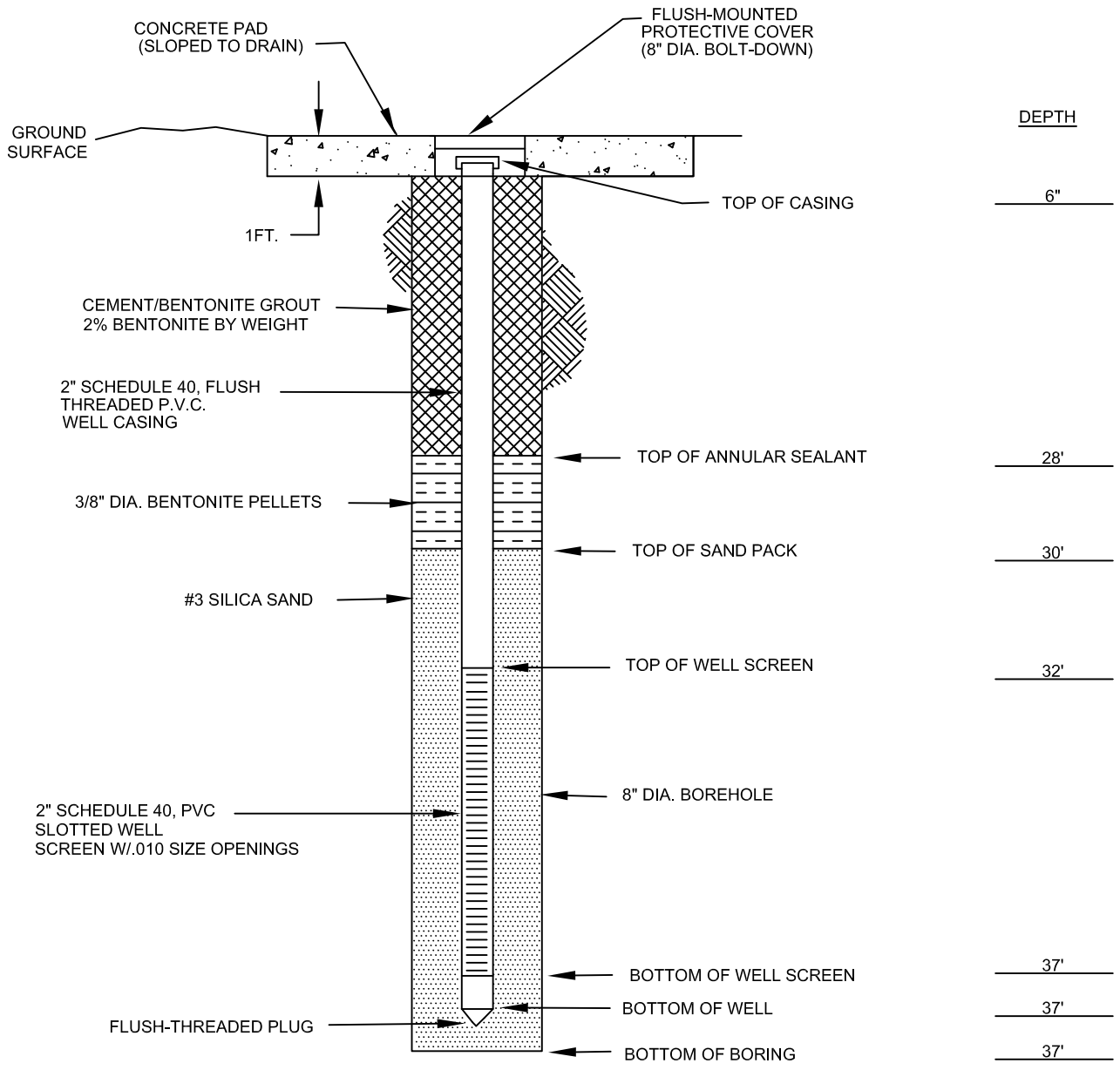
DRILLER: _____

WELL NUMBER: MW-21I

INSTALLATION DATE: _____

FIELD REP: David Treadway

PROJECT NO.: 559480000



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TYPE II MONITORING WELL CONSTRUCTION SCHEMATIC

PROJECT NAME: Alcatel-Lucent - Wake Forest Rd

LOCATION: Raleigh, North Carolina

CLIENT: Alcatel-Lucent

SUBCONTRACTOR: _____

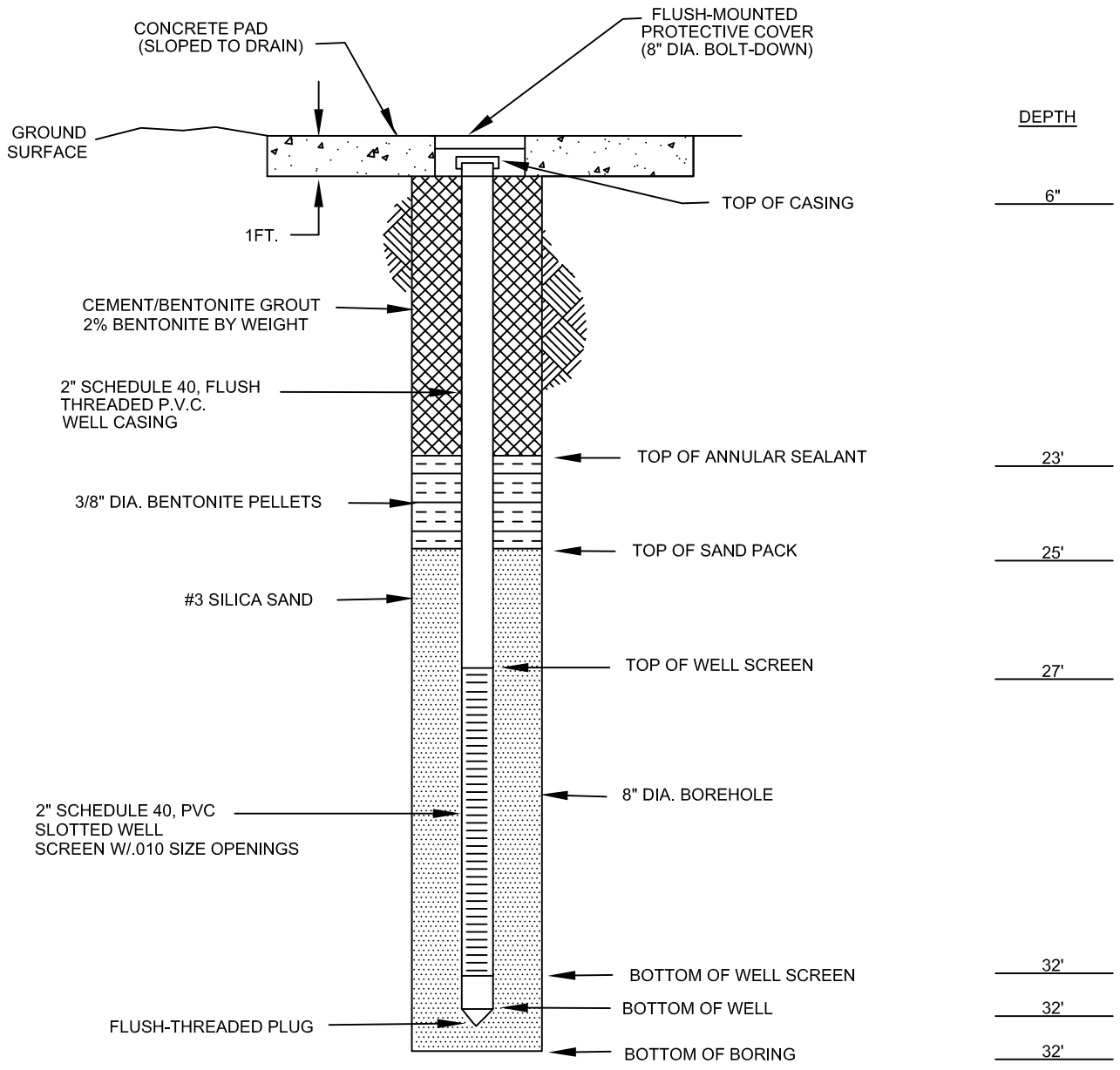
DRILLER: _____

WELL NUMBER: MW-22I

INSTALLATION DATE: _____

FIELD REP: David Treadway

PROJECT NO.: 559480000



PREPARED BY:

amec

2200 Gateway Centre Blvd.
Suite 205
Morrisville, NC 27560
(919) 447-2750

TYPE II MONITORING WELL CONSTRUCTION SCHEMATIC

APPENDIX B

LABORATORY ANALYTICAL DATA

AMEC Earth & Environmental, Inc.
2200 Gateway Centre Boulevard, Suite 205
Morrisville, NC 27560
www.amec.com
Tel – (919) 447-2750
Fax – (919) 447-2751

Case Narrative

PRISM LABORATORIES, INC.

Date:	12/17/09	**Client Project ID:**	Alcatel-Raleigh-GW
Company:	AMEC Earth & Environmental, Inc.	**Prism COC Group No:**	G1209167
Contact:	Harold Thurston	**Collection Date(s):**	12/03/09
Address:	Suite 205 2200 Gateway Centre Blvd Morrisville, NC 27560	**Lab Submittal Date(s):**	12/04/09
		Client Project Name Or No:	Wakeforest Road

This data package contains the analytical results for the project identified above and includes a Case Narrative, Laboratory Report and Quality Control Data totaling 28 pages. A chain-of-custody is also attached for the samples submitted to Prism for this project.

Data qualifiers are flagged individually on each sample. A key reference for the data qualifiers appears at the end of this case narrative. Quality control statements and/or sample specific remarks are included in the sample comments section of the laboratory report for each sample affected.

Semi Volatile Analysis

N/A

Volatile Analysis

No Anomalies Reported

Metals Analysis

N/A

Wet Lab and Micro Analysis

N/A

Please call if you have any questions relating to this analytical report.

Data Reviewed by:	Robbi A. Jones	**Project Manager:**	Robbi A. Jones
Signature:	Robbi A. Jones	**Signature:**	Robbi A. Jones
Review Date:	12/17/09	**Approval Date:**	12/17/09

Data Qualifiers Key Reference:

B: Compound also detected in the method blank.
#: Result outside of the QC limits.
DO: Compound diluted out.
E: Estimated concentration, calibration range exceeded.
J: The analyte was positively identified but the value is estimated below the reporting limit.
H: Estimated concentration with a high bias.
L: Estimated concentration with a low bias.
M: A matrix effect is present.

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PRISM LABORATORIES, INC.
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NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-21I
Prism Sample ID: 265280
COC Group: G1209167
Time Collected: 12/03/09 10:17
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
1,1,1,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.15	1	8260B	12/11/09 17:10	lwitry	Q46538
1,1,1-Trichloroethane	**120**	µg/L	10	0.63	10	8260B	12/14/09 11:20	lwitry	Q46538
1,1,2,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.071	1	8260B	12/11/09 17:10	lwitry	Q46538
1,1,2-Trichloroethane	**BRL**	µg/L	1.0	0.17	1	8260B	12/11/09 17:10	lwitry	Q46538
1,1-Dichloroethane	**BRL**	µg/L	1.0	0.096	1	8260B	12/11/09 17:10	lwitry	Q46538
1,1-Dichloroethene	**23**	µg/L	1.0	0.078	1	8260B	12/11/09 17:10	lwitry	Q46538
1,1-Dichloropropene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 17:10	lwitry	Q46538
1,2,3-Trichlorobenzene	**BRL**	µg/L	2.0	0.20	1	8260B	12/11/09 17:10	lwitry	Q46538
1,2,3-Trichloropropane	**BRL**	µg/L	1.0	0.081	1	8260B	12/11/09 17:10	lwitry	Q46538
1,2,4-Trichlorobenzene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 17:10	lwitry	Q46538
1,2,4-Trimethylbenzene	**BRL**	µg/L	1.0	0.048	1	8260B	12/11/09 17:10	lwitry	Q46538
1,2-Dibromo-3-chloropropane	**BRL**	µg/L	2.0	0.59	1	8260B	12/11/09 17:10	lwitry	Q46538
1,2-Dibromoethane (EDB)	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 17:10	lwitry	Q46538
1,2-Dichlorobenzene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 17:10	lwitry	Q46538
1,2-Dichloroethane	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 17:10	lwitry	Q46538
1,2-Dichloropropane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 17:10	lwitry	Q46538
1,3,5-Trimethylbenzene	**BRL**	µg/L	1.0	0.057	1	8260B	12/11/09 17:10	lwitry	Q46538
1,3-Dichlorobenzene	**BRL**	µg/L	1.0	0.074	1	8260B	12/11/09 17:10	lwitry	Q46538
1,3-Dichloropropane	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 17:10	lwitry	Q46538
1,4-Dichlorobenzene	**BRL**	µg/L	1.0	0.068	1	8260B	12/11/09 17:10	lwitry	Q46538
2,2-Dichloropropane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 17:10	lwitry	Q46538
2-Chloroethyl vinyl ether	**BRL**	µg/L	2.0	0.22	1	8260B	12/11/09 17:10	lwitry	Q46538
2-Chlorotoluene	**BRL**	µg/L	1.0	0.038	1	8260B	12/11/09 17:10	lwitry	Q46538
2-Hexanone	**BRL**	µg/L	5.0	0.19	1	8260B	12/11/09 17:10	lwitry	Q46538
4-Chlorotoluene	**BRL**	µg/L	1.0	0.053	1	8260B	12/11/09 17:10	lwitry	Q46538
4-Methyl-2-pentanone (MIBK)	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 17:10	lwitry	Q46538
Acetone	**21**	µg/L	10	0.62	1	8260B	12/11/09 17:10	lwitry	Q46538

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Full Service Analytical & Environmental Solutions

NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-21I
Prism Sample ID: 265280
COC Group: G1209167
Time Collected: 12/03/09 10:17
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Acrolein	**BRL**	µg/L	100	1.1	1	8260B	12/11/09 17:10	lwitry	Q46538
Acrylonitrile	**BRL**	µg/L	100	0.86	1	8260B	12/11/09 17:10	lwitry	Q46538
Benzene	**BRL**	µg/L	1.0	0.072	1	8260B	12/11/09 17:10	lwitry	Q46538
Bromobenzene	**BRL**	µg/L	1.0	0.064	1	8260B	12/11/09 17:10	lwitry	Q46538
Bromochloromethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 17:10	lwitry	Q46538
Bromodichloromethane	**0.69 J**	µg/L	1.0	0.063	1	8260B	12/11/09 17:10	lwitry	Q46538
Bromoform	**BRL**	µg/L	1.0	0.27	1	8260B	12/11/09 17:10	lwitry	Q46538
Bromomethane	**BRL**	µg/L	3.0	0.47	1	8260B	12/11/09 17:10	lwitry	Q46538
Carbon disulfide	**BRL**	µg/L	5.0	1.4	1	8260B	12/11/09 17:10	lwitry	Q46538
Carbon tetrachloride	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 17:10	lwitry	Q46538
Chlorobenzene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 17:10	lwitry	Q46538
Chlorodibromomethane	**BRL**	µg/L	1.0	0.30	1	8260B	12/11/09 17:10	lwitry	Q46538
Chloroethane	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 17:10	lwitry	Q46538
Chloroform	**2.9**	µg/L	1.0	0.089	1	8260B	12/11/09 17:10	lwitry	Q46538
Chloromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 17:10	lwitry	Q46538
cis-1,2-Dichloroethene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 17:10	lwitry	Q46538
cis-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 17:10	lwitry	Q46538
Dibromomethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 17:10	lwitry	Q46538
Dichlorodifluoromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 17:10	lwitry	Q46538
Ethylbenzene	**BRL**	µg/L	1.0	0.067	1	8260B	12/11/09 17:10	lwitry	Q46538
Hexachlorobutadiene	**BRL**	µg/L	2.0	0.36	1	8260B	12/11/09 17:10	lwitry	Q46538
Isopropyl ether (IPE)	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 17:10	lwitry	Q46538
Isopropylbenzene	**BRL**	µg/L	1.0	0.072	1	8260B	12/11/09 17:10	lwitry	Q46538
m,p-Xylenes	**BRL**	µg/L	2.0	0.081	1	8260B	12/11/09 17:10	lwitry	Q46538
Methyl ethyl ketone (MEK)	**BRL**	µg/L	5.0	0.90	1	8260B	12/11/09 17:10	lwitry	Q46538
Methyl t-butyl ether (MTBE)	**BRL**	µg/L	1.0	0.070	1	8260B	12/11/09 17:10	lwitry	Q46538
Methylene chloride	**BRL**	µg/L	2.0	0.45	1	8260B	12/11/09 17:10	lwitry	Q46538

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NC Drinking Water Cert. No. 37735

Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-21I
Prism Sample ID: 265280
COC Group: G1209167
Time Collected: 12/03/09 10:17
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
n-Butylbenzene	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 17:10	lwitry	Q46538
n-Propylbenzene	**BRL**	µg/L	1.0	0.060	1	8260B	12/11/09 17:10	lwitry	Q46538
Naphthalene	**BRL**	µg/L	1.0	0.098	1	8260B	12/11/09 17:10	lwitry	Q46538
o-Xylene	**BRL**	µg/L	1.0	0.046	1	8260B	12/11/09 17:10	lwitry	Q46538
p-Isopropyltoluene	**BRL**	µg/L	1.0	0.065	1	8260B	12/11/09 17:10	lwitry	Q46538
sec-Butylbenzene	**BRL**	µg/L	1.0	0.087	1	8260B	12/11/09 17:10	lwitry	Q46538
Styrene	**BRL**	µg/L	1.0	0.047	1	8260B	12/11/09 17:10	lwitry	Q46538
tert-Butylbenzene	**BRL**	µg/L	1.0	0.080	1	8260B	12/11/09 17:10	lwitry	Q46538
Tetrachloroethene	**98**	µg/L	1.0	0.069	1	8260B	12/11/09 17:10	lwitry	Q46538
Toluene	**BRL**	µg/L	1.0	0.042	1	8260B	12/11/09 17:10	lwitry	Q46538
trans-1,2-Dichloroethene	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 17:10	lwitry	Q46538
trans-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 17:10	lwitry	Q46538
Trichloroethene	**BRL**	µg/L	2.0	0.054	1	8260B	12/11/09 17:10	lwitry	Q46538
Trichlorofluoromethane	**BRL**	µg/L	2.0	0.088	1	8260B	12/11/09 17:10	lwitry	Q46538
Vinyl acetate	**BRL**	µg/L	20	0.10	1	8260B	12/11/09 17:10	lwitry	Q46538
Vinyl chloride	**BRL**	µg/L	2.0	0.15	1	8260B	12/11/09 17:10	lwitry	Q46538

Surrogate	% Recovery	Control Limits
Toluene-d8	96	77 - 123
Dibromofluoromethane	93	75 - 129
Bromofluorobenzene	96	80 - 124

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Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-21I
Prism Sample ID: 265280
COC Group: G1209167
Time Collected: 12/03/09 10:17
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a wet-weight basis

Angela D. Overcash, V.P. Laboratory Services

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12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-20I
Prism Sample ID: 265281
COC Group: G1209167
Time Collected: 12/03/09 12:15
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
1,1,1,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.15	1	8260B	12/11/09 17:37	lwitry	Q46538
1,1,1-Trichloroethane	**20**	µg/L	1.0	0.063	1	8260B	12/11/09 17:37	lwitry	Q46538
1,1,2,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.071	1	8260B	12/11/09 17:37	lwitry	Q46538
1,1,2-Trichloroethane	**BRL**	µg/L	1.0	0.17	1	8260B	12/11/09 17:37	lwitry	Q46538
1,1-Dichloroethane	**2.4**	µg/L	1.0	0.096	1	8260B	12/11/09 17:37	lwitry	Q46538
1,1-Dichloroethene	**7.4**	µg/L	1.0	0.078	1	8260B	12/11/09 17:37	lwitry	Q46538
1,1-Dichloropropene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 17:37	lwitry	Q46538
1,2,3-Trichlorobenzene	**BRL**	µg/L	2.0	0.20	1	8260B	12/11/09 17:37	lwitry	Q46538
1,2,3-Trichloropropane	**BRL**	µg/L	1.0	0.081	1	8260B	12/11/09 17:37	lwitry	Q46538
1,2,4-Trichlorobenzene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 17:37	lwitry	Q46538
1,2,4-Trimethylbenzene	**BRL**	µg/L	1.0	0.048	1	8260B	12/11/09 17:37	lwitry	Q46538
1,2-Dibromo-3-chloropropane	**BRL**	µg/L	2.0	0.59	1	8260B	12/11/09 17:37	lwitry	Q46538
1,2-Dibromoethane (EDB)	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 17:37	lwitry	Q46538
1,2-Dichlorobenzene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 17:37	lwitry	Q46538
1,2-Dichloroethane	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 17:37	lwitry	Q46538
1,2-Dichloropropane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 17:37	lwitry	Q46538
1,3,5-Trimethylbenzene	**BRL**	µg/L	1.0	0.057	1	8260B	12/11/09 17:37	lwitry	Q46538
1,3-Dichlorobenzene	**BRL**	µg/L	1.0	0.074	1	8260B	12/11/09 17:37	lwitry	Q46538
1,3-Dichloropropane	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 17:37	lwitry	Q46538
1,4-Dichlorobenzene	**BRL**	µg/L	1.0	0.068	1	8260B	12/11/09 17:37	lwitry	Q46538
2,2-Dichloropropane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 17:37	lwitry	Q46538
2-Chloroethyl vinyl ether	**BRL**	µg/L	2.0	0.22	1	8260B	12/11/09 17:37	lwitry	Q46538
2-Chlorotoluene	**BRL**	µg/L	1.0	0.038	1	8260B	12/11/09 17:37	lwitry	Q46538
2-Hexanone	**BRL**	µg/L	5.0	0.19	1	8260B	12/11/09 17:37	lwitry	Q46538
4-Chlorotoluene	**BRL**	µg/L	1.0	0.053	1	8260B	12/11/09 17:37	lwitry	Q46538
4-Methyl-2-pentanone (MIBK)	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 17:37	lwitry	Q46538
Acetone	**BRL**	µg/L	10	0.62	1	8260B	12/11/09 17:37	lwitry	Q46538

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12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
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Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-20I
Prism Sample ID: 265281
COC Group: G1209167
Time Collected: 12/03/09 12:15
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Acrolein	**BRL**	µg/L	100	1.1	1	8260B	12/11/09 17:37	lwitry	Q46538
Acrylonitrile	**BRL**	µg/L	100	0.86	1	8260B	12/11/09 17:37	lwitry	Q46538
Benzene	**BRL**	µg/L	1.0	0.072	1	8260B	12/11/09 17:37	lwitry	Q46538
Bromobenzene	**BRL**	µg/L	1.0	0.064	1	8260B	12/11/09 17:37	lwitry	Q46538
Bromochloromethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 17:37	lwitry	Q46538
Bromodichloromethane	**BRL**	µg/L	1.0	0.063	1	8260B	12/11/09 17:37	lwitry	Q46538
Bromoform	**BRL**	µg/L	1.0	0.27	1	8260B	12/11/09 17:37	lwitry	Q46538
Bromomethane	**BRL**	µg/L	3.0	0.47	1	8260B	12/11/09 17:37	lwitry	Q46538
Carbon disulfide	**BRL**	µg/L	5.0	1.4	1	8260B	12/11/09 17:37	lwitry	Q46538
Carbon tetrachloride	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 17:37	lwitry	Q46538
Chlorobenzene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 17:37	lwitry	Q46538
Chlorodibromomethane	**BRL**	µg/L	1.0	0.30	1	8260B	12/11/09 17:37	lwitry	Q46538
Chloroethane	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 17:37	lwitry	Q46538
Chloroform	**BRL**	µg/L	1.0	0.089	1	8260B	12/11/09 17:37	lwitry	Q46538
Chloromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 17:37	lwitry	Q46538
cis-1,2-Dichloroethene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 17:37	lwitry	Q46538
cis-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 17:37	lwitry	Q46538
Dibromomethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 17:37	lwitry	Q46538
Dichlorodifluoromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 17:37	lwitry	Q46538
Ethylbenzene	**BRL**	µg/L	1.0	0.067	1	8260B	12/11/09 17:37	lwitry	Q46538
Hexachlorobutadiene	**BRL**	µg/L	2.0	0.36	1	8260B	12/11/09 17:37	lwitry	Q46538
Isopropyl ether (IPE)	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 17:37	lwitry	Q46538
Isopropylbenzene	**BRL**	µg/L	1.0	0.072	1	8260B	12/11/09 17:37	lwitry	Q46538
m,p-Xylenes	**BRL**	µg/L	2.0	0.081	1	8260B	12/11/09 17:37	lwitry	Q46538
Methyl ethyl ketone (MEK)	**BRL**	µg/L	5.0	0.90	1	8260B	12/11/09 17:37	lwitry	Q46538
Methyl t-butyl ether (MTBE)	**BRL**	µg/L	1.0	0.070	1	8260B	12/11/09 17:37	lwitry	Q46538
Methylene chloride	**BRL**	µg/L	2.0	0.45	1	8260B	12/11/09 17:37	lwitry	Q46538

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PRISM LABORATORIES, INC.
Full Service Analytical & Environmental Solutions

NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-20I
Prism Sample ID: 265281
COC Group: G1209167
Time Collected: 12/03/09 12:15
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
n-Butylbenzene	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 17:37	lwitry	Q46538
n-Propylbenzene	**BRL**	µg/L	1.0	0.060	1	8260B	12/11/09 17:37	lwitry	Q46538
Naphthalene	**BRL**	µg/L	1.0	0.098	1	8260B	12/11/09 17:37	lwitry	Q46538
o-Xylene	**BRL**	µg/L	1.0	0.046	1	8260B	12/11/09 17:37	lwitry	Q46538
p-Isopropyltoluene	**BRL**	µg/L	1.0	0.065	1	8260B	12/11/09 17:37	lwitry	Q46538
sec-Butylbenzene	**BRL**	µg/L	1.0	0.087	1	8260B	12/11/09 17:37	lwitry	Q46538
Styrene	**BRL**	µg/L	1.0	0.047	1	8260B	12/11/09 17:37	lwitry	Q46538
tert-Butylbenzene	**BRL**	µg/L	1.0	0.080	1	8260B	12/11/09 17:37	lwitry	Q46538
Tetrachloroethene	**2.5**	µg/L	1.0	0.069	1	8260B	12/11/09 17:37	lwitry	Q46538
Toluene	**BRL**	µg/L	1.0	0.042	1	8260B	12/11/09 17:37	lwitry	Q46538
trans-1,2-Dichloroethene	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 17:37	lwitry	Q46538
trans-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 17:37	lwitry	Q46538
Trichloroethene	**BRL**	µg/L	2.0	0.054	1	8260B	12/11/09 17:37	lwitry	Q46538
Trichlorofluoromethane	**BRL**	µg/L	2.0	0.088	1	8260B	12/11/09 17:37	lwitry	Q46538
Vinyl acetate	**BRL**	µg/L	20	0.10	1	8260B	12/11/09 17:37	lwitry	Q46538
Vinyl chloride	**BRL**	µg/L	2.0	0.15	1	8260B	12/11/09 17:37	lwitry	Q46538

Surrogate	% Recovery	Control Limits
Toluene-d8	94	77 - 123
Dibromofluoromethane	95	75 - 129
Bromofluorobenzene	95	80 - 124

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12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-20I
Prism Sample ID: 265281
COC Group: G1209167
Time Collected: 12/03/09 12:15
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a wet-weight basis

Angela D. Overcash, V.P. Laboratory Services

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Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-18I
Prism Sample ID: 265282
COC Group: G1209167
Time Collected: 12/03/09 13:11
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
1,1,1,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.15	1	8260B	12/11/09 23:21	lwitry	Q46538
1,1,1-Trichloroethane	**1.0**	µg/L	1.0	0.063	1	8260B	12/11/09 23:21	lwitry	Q46538
1,1,2,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.071	1	8260B	12/11/09 23:21	lwitry	Q46538
1,1,2-Trichloroethane	**BRL**	µg/L	1.0	0.17	1	8260B	12/11/09 23:21	lwitry	Q46538
1,1-Dichloroethane	**0.70 J**	µg/L	1.0	0.096	1	8260B	12/11/09 23:21	lwitry	Q46538
1,1-Dichloroethene	**3.3**	µg/L	1.0	0.078	1	8260B	12/11/09 23:21	lwitry	Q46538
1,1-Dichloropropene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 23:21	lwitry	Q46538
1,2,3-Trichlorobenzene	**BRL**	µg/L	2.0	0.20	1	8260B	12/11/09 23:21	lwitry	Q46538
1,2,3-Trichloropropane	**BRL**	µg/L	1.0	0.081	1	8260B	12/11/09 23:21	lwitry	Q46538
1,2,4-Trichlorobenzene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 23:21	lwitry	Q46538
1,2,4-Trimethylbenzene	**BRL**	µg/L	1.0	0.048	1	8260B	12/11/09 23:21	lwitry	Q46538
1,2-Dibromo-3-chloropropane	**BRL**	µg/L	2.0	0.59	1	8260B	12/11/09 23:21	lwitry	Q46538
1,2-Dibromoethane (EDB)	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 23:21	lwitry	Q46538
1,2-Dichlorobenzene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 23:21	lwitry	Q46538
1,2-Dichloroethane	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 23:21	lwitry	Q46538
1,2-Dichloropropane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 23:21	lwitry	Q46538
1,3,5-Trimethylbenzene	**BRL**	µg/L	1.0	0.057	1	8260B	12/11/09 23:21	lwitry	Q46538
1,3-Dichlorobenzene	**BRL**	µg/L	1.0	0.074	1	8260B	12/11/09 23:21	lwitry	Q46538
1,3-Dichloropropane	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 23:21	lwitry	Q46538
1,4-Dichlorobenzene	**BRL**	µg/L	1.0	0.068	1	8260B	12/11/09 23:21	lwitry	Q46538
2,2-Dichloropropane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 23:21	lwitry	Q46538
2-Chloroethyl vinyl ether	**BRL**	µg/L	2.0	0.22	1	8260B	12/11/09 23:21	lwitry	Q46538
2-Chlorotoluene	**BRL**	µg/L	1.0	0.038	1	8260B	12/11/09 23:21	lwitry	Q46538
2-Hexanone	**BRL**	µg/L	5.0	0.19	1	8260B	12/11/09 23:21	lwitry	Q46538
4-Chlorotoluene	**BRL**	µg/L	1.0	0.053	1	8260B	12/11/09 23:21	lwitry	Q46538
4-Methyl-2-pentanone (MIBK)	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 23:21	lwitry	Q46538
Acetone	**BRL**	µg/L	10	0.62	1	8260B	12/11/09 23:21	lwitry	Q46538

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SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-18I
Prism Sample ID: 265282
COC Group: G1209167
Time Collected: 12/03/09 13:11
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Acrolein	**BRL**	µg/L	100	1.1	1	8260B	12/11/09 23:21	lwitry	Q46538
Acrylonitrile	**BRL**	µg/L	100	0.86	1	8260B	12/11/09 23:21	lwitry	Q46538
Benzene	**BRL**	µg/L	1.0	0.072	1	8260B	12/11/09 23:21	lwitry	Q46538
Bromobenzene	**BRL**	µg/L	1.0	0.064	1	8260B	12/11/09 23:21	lwitry	Q46538
Bromochloromethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 23:21	lwitry	Q46538
Bromodichloromethane	**2.0**	µg/L	1.0	0.063	1	8260B	12/11/09 23:21	lwitry	Q46538
Bromoform	**BRL**	µg/L	1.0	0.27	1	8260B	12/11/09 23:21	lwitry	Q46538
Bromomethane	**BRL**	µg/L	3.0	0.47	1	8260B	12/11/09 23:21	lwitry	Q46538
Carbon disulfide	**BRL**	µg/L	5.0	1.4	1	8260B	12/11/09 23:21	lwitry	Q46538
Carbon tetrachloride	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 23:21	lwitry	Q46538
Chlorobenzene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 23:21	lwitry	Q46538
Chlorodibromomethane	**BRL**	µg/L	1.0	0.30	1	8260B	12/11/09 23:21	lwitry	Q46538
Chloroethane	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 23:21	lwitry	Q46538
Chloroform	**15**	µg/L	1.0	0.089	1	8260B	12/11/09 23:21	lwitry	Q46538
Chloromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 23:21	lwitry	Q46538
cis-1,2-Dichloroethene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 23:21	lwitry	Q46538
cis-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 23:21	lwitry	Q46538
Dibromomethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 23:21	lwitry	Q46538
Dichlorodifluoromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 23:21	lwitry	Q46538
Ethylbenzene	**BRL**	µg/L	1.0	0.067	1	8260B	12/11/09 23:21	lwitry	Q46538
Hexachlorobutadiene	**BRL**	µg/L	2.0	0.36	1	8260B	12/11/09 23:21	lwitry	Q46538
Isopropyl ether (IPE)	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 23:21	lwitry	Q46538
Isopropylbenzene	**BRL**	µg/L	1.0	0.072	1	8260B	12/11/09 23:21	lwitry	Q46538
m,p-Xylenes	**BRL**	µg/L	2.0	0.081	1	8260B	12/11/09 23:21	lwitry	Q46538
Methyl ethyl ketone (MEK)	**BRL**	µg/L	5.0	0.90	1	8260B	12/11/09 23:21	lwitry	Q46538
Methyl t-butyl ether (MTBE)	**BRL**	µg/L	1.0	0.070	1	8260B	12/11/09 23:21	lwitry	Q46538
Methylene chloride	**BRL**	µg/L	2.0	0.45	1	8260B	12/11/09 23:21	lwitry	Q46538

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NC Drinking Water Cert. No. 37735

Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-18I
Prism Sample ID: 265282
COC Group: G1209167
Time Collected: 12/03/09 13:11
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
n-Butylbenzene	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 23:21	lwitry	Q46538
n-Propylbenzene	**BRL**	µg/L	1.0	0.060	1	8260B	12/11/09 23:21	lwitry	Q46538
Naphthalene	**BRL**	µg/L	1.0	0.098	1	8260B	12/11/09 23:21	lwitry	Q46538
o-Xylene	**BRL**	µg/L	1.0	0.046	1	8260B	12/11/09 23:21	lwitry	Q46538
p-Isopropyltoluene	**BRL**	µg/L	1.0	0.065	1	8260B	12/11/09 23:21	lwitry	Q46538
sec-Butylbenzene	**BRL**	µg/L	1.0	0.087	1	8260B	12/11/09 23:21	lwitry	Q46538
Styrene	**BRL**	µg/L	1.0	0.047	1	8260B	12/11/09 23:21	lwitry	Q46538
tert-Butylbenzene	**BRL**	µg/L	1.0	0.080	1	8260B	12/11/09 23:21	lwitry	Q46538
Tetrachloroethene	**14**	µg/L	1.0	0.069	1	8260B	12/11/09 23:21	lwitry	Q46538
Toluene	**2.0**	µg/L	1.0	0.042	1	8260B	12/11/09 23:21	lwitry	Q46538
trans-1,2-Dichloroethene	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 23:21	lwitry	Q46538
trans-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 23:21	lwitry	Q46538
Trichloroethene	**BRL**	µg/L	2.0	0.054	1	8260B	12/11/09 23:21	lwitry	Q46538
Trichlorofluoromethane	**BRL**	µg/L	2.0	0.088	1	8260B	12/11/09 23:21	lwitry	Q46538
Vinyl acetate	**BRL**	µg/L	20	0.10	1	8260B	12/11/09 23:21	lwitry	Q46538
Vinyl chloride	**BRL**	µg/L	2.0	0.15	1	8260B	12/11/09 23:21	lwitry	Q46538

Surrogate	% Recovery	Control Limits
Toluene-d8	93	77 - 123
Dibromofluoromethane	96	75 - 129
Bromofluorobenzene	93	80 - 124

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Attn: Harold Thurston
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Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-18I
Prism Sample ID: 265282
COC Group: G1209167
Time Collected: 12/03/09 13:11
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a wet-weight basis

Angela D. Overcash, V.P. Laboratory Services

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12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-17I
Prism Sample ID: 265283
COC Group: G1209167
Time Collected: 12/03/09 14:31
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
1,1,1,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.15	1	8260B	12/11/09 18:03	lwitry	Q46538
1,1,1-Trichloroethane	**5.8**	µg/L	1.0	0.063	1	8260B	12/11/09 18:03	lwitry	Q46538
1,1,2,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.071	1	8260B	12/11/09 18:03	lwitry	Q46538
1,1,2-Trichloroethane	**BRL**	µg/L	1.0	0.17	1	8260B	12/11/09 18:03	lwitry	Q46538
1,1-Dichloroethane	**1.4**	µg/L	1.0	0.096	1	8260B	12/11/09 18:03	lwitry	Q46538
1,1-Dichloroethene	**4.1**	µg/L	1.0	0.078	1	8260B	12/11/09 18:03	lwitry	Q46538
1,1-Dichloropropene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 18:03	lwitry	Q46538
1,2,3-Trichlorobenzene	**BRL**	µg/L	2.0	0.20	1	8260B	12/11/09 18:03	lwitry	Q46538
1,2,3-Trichloropropane	**BRL**	µg/L	1.0	0.081	1	8260B	12/11/09 18:03	lwitry	Q46538
1,2,4-Trichlorobenzene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 18:03	lwitry	Q46538
1,2,4-Trimethylbenzene	**BRL**	µg/L	1.0	0.048	1	8260B	12/11/09 18:03	lwitry	Q46538
1,2-Dibromo-3-chloropropane	**BRL**	µg/L	2.0	0.59	1	8260B	12/11/09 18:03	lwitry	Q46538
1,2-Dibromoethane (EDB)	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 18:03	lwitry	Q46538
1,2-Dichlorobenzene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 18:03	lwitry	Q46538
1,2-Dichloroethane	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 18:03	lwitry	Q46538
1,2-Dichloropropane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 18:03	lwitry	Q46538
1,3,5-Trimethylbenzene	**BRL**	µg/L	1.0	0.057	1	8260B	12/11/09 18:03	lwitry	Q46538
1,3-Dichlorobenzene	**BRL**	µg/L	1.0	0.074	1	8260B	12/11/09 18:03	lwitry	Q46538
1,3-Dichloropropane	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 18:03	lwitry	Q46538
1,4-Dichlorobenzene	**BRL**	µg/L	1.0	0.068	1	8260B	12/11/09 18:03	lwitry	Q46538
2,2-Dichloropropane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 18:03	lwitry	Q46538
2-Chloroethyl vinyl ether	**BRL**	µg/L	2.0	0.22	1	8260B	12/11/09 18:03	lwitry	Q46538
2-Chlorotoluene	**BRL**	µg/L	1.0	0.038	1	8260B	12/11/09 18:03	lwitry	Q46538
2-Hexanone	**BRL**	µg/L	5.0	0.19	1	8260B	12/11/09 18:03	lwitry	Q46538
4-Chlorotoluene	**BRL**	µg/L	1.0	0.053	1	8260B	12/11/09 18:03	lwitry	Q46538
4-Methyl-2-pentanone (MIBK)	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 18:03	lwitry	Q46538
Acetone	**BRL**	µg/L	10	0.62	1	8260B	12/11/09 18:03	lwitry	Q46538

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PRISM LABORATORIES, INC.
Full Service Analytical & Environmental Solutions

NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-17I
Prism Sample ID: 265283
COC Group: G1209167
Time Collected: 12/03/09 14:31
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Acrolein	**BRL**	µg/L	100	1.1	1	8260B	12/11/09 18:03	lwitry	Q46538
Acrylonitrile	**BRL**	µg/L	100	0.86	1	8260B	12/11/09 18:03	lwitry	Q46538
Benzene	**0.54 J**	µg/L	1.0	0.072	1	8260B	12/11/09 18:03	lwitry	Q46538
Bromobenzene	**BRL**	µg/L	1.0	0.064	1	8260B	12/11/09 18:03	lwitry	Q46538
Bromochloromethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 18:03	lwitry	Q46538
Bromodichloromethane	**BRL**	µg/L	1.0	0.063	1	8260B	12/11/09 18:03	lwitry	Q46538
Bromoform	**BRL**	µg/L	1.0	0.27	1	8260B	12/11/09 18:03	lwitry	Q46538
Bromomethane	**BRL**	µg/L	3.0	0.47	1	8260B	12/11/09 18:03	lwitry	Q46538
Carbon disulfide	**BRL**	µg/L	5.0	1.4	1	8260B	12/11/09 18:03	lwitry	Q46538
Carbon tetrachloride	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 18:03	lwitry	Q46538
Chlorobenzene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 18:03	lwitry	Q46538
Chlorodibromomethane	**BRL**	µg/L	1.0	0.30	1	8260B	12/11/09 18:03	lwitry	Q46538
Chloroethane	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 18:03	lwitry	Q46538
Chloroform	**0.85 J**	µg/L	1.0	0.089	1	8260B	12/11/09 18:03	lwitry	Q46538
Chloromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 18:03	lwitry	Q46538
cis-1,2-Dichloroethene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 18:03	lwitry	Q46538
cis-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 18:03	lwitry	Q46538
Dibromomethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 18:03	lwitry	Q46538
Dichlorodifluoromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 18:03	lwitry	Q46538
Ethylbenzene	**BRL**	µg/L	1.0	0.067	1	8260B	12/11/09 18:03	lwitry	Q46538
Hexachlorobutadiene	**BRL**	µg/L	2.0	0.36	1	8260B	12/11/09 18:03	lwitry	Q46538
Isopropyl ether (IPE)	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 18:03	lwitry	Q46538
Isopropylbenzene	**BRL**	µg/L	1.0	0.072	1	8260B	12/11/09 18:03	lwitry	Q46538
m,p-Xylenes	**BRL**	µg/L	2.0	0.081	1	8260B	12/11/09 18:03	lwitry	Q46538
Methyl ethyl ketone (MEK)	**BRL**	µg/L	5.0	0.90	1	8260B	12/11/09 18:03	lwitry	Q46538
Methyl t-butyl ether (MTBE)	**BRL**	µg/L	1.0	0.070	1	8260B	12/11/09 18:03	lwitry	Q46538
Methylene chloride	**BRL**	µg/L	2.0	0.45	1	8260B	12/11/09 18:03	lwitry	Q46538

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Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-17I
Prism Sample ID: 265283
COC Group: G1209167
Time Collected: 12/03/09 14:31
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
n-Butylbenzene	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 18:03	lwitry	Q46538
n-Propylbenzene	**BRL**	µg/L	1.0	0.060	1	8260B	12/11/09 18:03	lwitry	Q46538
Naphthalene	**BRL**	µg/L	1.0	0.098	1	8260B	12/11/09 18:03	lwitry	Q46538
o-Xylene	**BRL**	µg/L	1.0	0.046	1	8260B	12/11/09 18:03	lwitry	Q46538
p-Isopropyltoluene	**BRL**	µg/L	1.0	0.065	1	8260B	12/11/09 18:03	lwitry	Q46538
sec-Butylbenzene	**BRL**	µg/L	1.0	0.087	1	8260B	12/11/09 18:03	lwitry	Q46538
Styrene	**BRL**	µg/L	1.0	0.047	1	8260B	12/11/09 18:03	lwitry	Q46538
tert-Butylbenzene	**BRL**	µg/L	1.0	0.080	1	8260B	12/11/09 18:03	lwitry	Q46538
Tetrachloroethene	**1.9**	µg/L	1.0	0.069	1	8260B	12/11/09 18:03	lwitry	Q46538
Toluene	**0.76 J**	µg/L	1.0	0.042	1	8260B	12/11/09 18:03	lwitry	Q46538
trans-1,2-Dichloroethene	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 18:03	lwitry	Q46538
trans-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 18:03	lwitry	Q46538
Trichloroethene	**BRL**	µg/L	2.0	0.054	1	8260B	12/11/09 18:03	lwitry	Q46538
Trichlorofluoromethane	**BRL**	µg/L	2.0	0.088	1	8260B	12/11/09 18:03	lwitry	Q46538
Vinyl acetate	**BRL**	µg/L	20	0.10	1	8260B	12/11/09 18:03	lwitry	Q46538
Vinyl chloride	**BRL**	µg/L	2.0	0.15	1	8260B	12/11/09 18:03	lwitry	Q46538

Surrogate	% Recovery	Control Limits
Toluene-d8	93	77 - 123
Dibromofluoromethane	102	75 - 129
Bromofluorobenzene	94	80 - 124

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Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-17I
Prism Sample ID: 265283
COC Group: G1209167
Time Collected: 12/03/09 14:31
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a wet-weight basis

Angela D. Overcash, V.P. Laboratory Services

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Attn: Harold Thurston
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Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-19I
Prism Sample ID: 265284
COC Group: G1209167
Time Collected: 12/03/09 15:35
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
1,1,1,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.15	1	8260B	12/11/09 18:30	lwitry	Q46538
1,1,1-Trichloroethane	**2.5**	µg/L	1.0	0.063	1	8260B	12/11/09 18:30	lwitry	Q46538
1,1,2,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.071	1	8260B	12/11/09 18:30	lwitry	Q46538
1,1,2-Trichloroethane	**BRL**	µg/L	1.0	0.17	1	8260B	12/11/09 18:30	lwitry	Q46538
1,1-Dichloroethane	**17**	µg/L	1.0	0.096	1	8260B	12/11/09 18:30	lwitry	Q46538
1,1-Dichloroethene	**72**	µg/L	1.0	0.078	1	8260B	12/11/09 18:30	lwitry	Q46538
1,1-Dichloropropene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 18:30	lwitry	Q46538
1,2,3-Trichlorobenzene	**BRL**	µg/L	2.0	0.20	1	8260B	12/11/09 18:30	lwitry	Q46538
1,2,3-Trichloropropane	**BRL**	µg/L	1.0	0.081	1	8260B	12/11/09 18:30	lwitry	Q46538
1,2,4-Trichlorobenzene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 18:30	lwitry	Q46538
1,2,4-Trimethylbenzene	**BRL**	µg/L	1.0	0.048	1	8260B	12/11/09 18:30	lwitry	Q46538
1,2-Dibromo-3-chloropropane	**BRL**	µg/L	2.0	0.59	1	8260B	12/11/09 18:30	lwitry	Q46538
1,2-Dibromoethane (EDB)	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 18:30	lwitry	Q46538
1,2-Dichlorobenzene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 18:30	lwitry	Q46538
1,2-Dichloroethane	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 18:30	lwitry	Q46538
1,2-Dichloropropane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 18:30	lwitry	Q46538
1,3,5-Trimethylbenzene	**BRL**	µg/L	1.0	0.057	1	8260B	12/11/09 18:30	lwitry	Q46538
1,3-Dichlorobenzene	**BRL**	µg/L	1.0	0.074	1	8260B	12/11/09 18:30	lwitry	Q46538
1,3-Dichloropropane	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 18:30	lwitry	Q46538
1,4-Dichlorobenzene	**BRL**	µg/L	1.0	0.068	1	8260B	12/11/09 18:30	lwitry	Q46538
2,2-Dichloropropane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 18:30	lwitry	Q46538
2-Chloroethyl vinyl ether	**BRL**	µg/L	2.0	0.22	1	8260B	12/11/09 18:30	lwitry	Q46538
2-Chlorotoluene	**BRL**	µg/L	1.0	0.038	1	8260B	12/11/09 18:30	lwitry	Q46538
2-Hexanone	**BRL**	µg/L	5.0	0.19	1	8260B	12/11/09 18:30	lwitry	Q46538
4-Chlorotoluene	**BRL**	µg/L	1.0	0.053	1	8260B	12/11/09 18:30	lwitry	Q46538
4-Methyl-2-pentanone (MIBK)	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 18:30	lwitry	Q46538
Acetone	**BRL**	µg/L	10	0.62	1	8260B	12/11/09 18:30	lwitry	Q46538

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Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-19I
Prism Sample ID: 265284
COC Group: G1209167
Time Collected: 12/03/09 15:35
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Acrolein	**BRL**	µg/L	100	1.1	1	8260B	12/11/09 18:30	lwitry	Q46538
Acrylonitrile	**BRL**	µg/L	100	0.86	1	8260B	12/11/09 18:30	lwitry	Q46538
Benzene	**0.51 J**	µg/L	1.0	0.072	1	8260B	12/11/09 18:30	lwitry	Q46538
Bromobenzene	**BRL**	µg/L	1.0	0.064	1	8260B	12/11/09 18:30	lwitry	Q46538
Bromochloromethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 18:30	lwitry	Q46538
Bromodichloromethane	**BRL**	µg/L	1.0	0.063	1	8260B	12/11/09 18:30	lwitry	Q46538
Bromoform	**BRL**	µg/L	1.0	0.27	1	8260B	12/11/09 18:30	lwitry	Q46538
Bromomethane	**BRL**	µg/L	3.0	0.47	1	8260B	12/11/09 18:30	lwitry	Q46538
Carbon disulfide	**BRL**	µg/L	5.0	1.4	1	8260B	12/11/09 18:30	lwitry	Q46538
Carbon tetrachloride	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 18:30	lwitry	Q46538
Chlorobenzene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 18:30	lwitry	Q46538
Chlorodibromomethane	**BRL**	µg/L	1.0	0.30	1	8260B	12/11/09 18:30	lwitry	Q46538
Chloroethane	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 18:30	lwitry	Q46538
Chloroform	**1.2**	µg/L	1.0	0.089	1	8260B	12/11/09 18:30	lwitry	Q46538
Chloromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 18:30	lwitry	Q46538
cis-1,2-Dichloroethene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 18:30	lwitry	Q46538
cis-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 18:30	lwitry	Q46538
Dibromomethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 18:30	lwitry	Q46538
Dichlorodifluoromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 18:30	lwitry	Q46538
Ethylbenzene	**BRL**	µg/L	1.0	0.067	1	8260B	12/11/09 18:30	lwitry	Q46538
Hexachlorobutadiene	**BRL**	µg/L	2.0	0.36	1	8260B	12/11/09 18:30	lwitry	Q46538
Isopropyl ether (IPE)	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 18:30	lwitry	Q46538
Isopropylbenzene	**BRL**	µg/L	1.0	0.072	1	8260B	12/11/09 18:30	lwitry	Q46538
m,p-Xylenes	**BRL**	µg/L	2.0	0.081	1	8260B	12/11/09 18:30	lwitry	Q46538
Methyl ethyl ketone (MEK)	**BRL**	µg/L	5.0	0.90	1	8260B	12/11/09 18:30	lwitry	Q46538
Methyl t-butyl ether (MTBE)	**BRL**	µg/L	1.0	0.070	1	8260B	12/11/09 18:30	lwitry	Q46538
Methylene chloride	**BRL**	µg/L	2.0	0.45	1	8260B	12/11/09 18:30	lwitry	Q46538

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Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-19I
Prism Sample ID: 265284
COC Group: G1209167
Time Collected: 12/03/09 15:35
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
n-Butylbenzene	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 18:30	lwitry	Q46538
n-Propylbenzene	**BRL**	µg/L	1.0	0.060	1	8260B	12/11/09 18:30	lwitry	Q46538
Naphthalene	**BRL**	µg/L	1.0	0.098	1	8260B	12/11/09 18:30	lwitry	Q46538
o-Xylene	**BRL**	µg/L	1.0	0.046	1	8260B	12/11/09 18:30	lwitry	Q46538
p-Isopropyltoluene	**BRL**	µg/L	1.0	0.065	1	8260B	12/11/09 18:30	lwitry	Q46538
sec-Butylbenzene	**BRL**	µg/L	1.0	0.087	1	8260B	12/11/09 18:30	lwitry	Q46538
Styrene	**BRL**	µg/L	1.0	0.047	1	8260B	12/11/09 18:30	lwitry	Q46538
tert-Butylbenzene	**BRL**	µg/L	1.0	0.080	1	8260B	12/11/09 18:30	lwitry	Q46538
Tetrachloroethene	**44**	µg/L	1.0	0.069	1	8260B	12/11/09 18:30	lwitry	Q46538
Toluene	**BRL**	µg/L	1.0	0.042	1	8260B	12/11/09 18:30	lwitry	Q46538
trans-1,2-Dichloroethene	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 18:30	lwitry	Q46538
trans-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 18:30	lwitry	Q46538
Trichloroethene	**2.6**	µg/L	2.0	0.054	1	8260B	12/11/09 18:30	lwitry	Q46538
Trichlorofluoromethane	**BRL**	µg/L	2.0	0.088	1	8260B	12/11/09 18:30	lwitry	Q46538
Vinyl acetate	**BRL**	µg/L	20	0.10	1	8260B	12/11/09 18:30	lwitry	Q46538
Vinyl chloride	**BRL**	µg/L	2.0	0.15	1	8260B	12/11/09 18:30	lwitry	Q46538

Surrogate	% Recovery	Control Limits
Toluene-d8	96	77 - 123
Dibromofluoromethane	102	75 - 129
Bromofluorobenzene	94	80 - 124

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PRISM LABORATORIES, INC.
Full Service Analytical & Environmental Solutions

NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-19I
Prism Sample ID: 265284
COC Group: G1209167
Time Collected: 12/03/09 15:35
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a wet-weight basis

Angela D. Overcash, V.P. Laboratory Services

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Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-22I
Prism Sample ID: 265285
COC Group: G1209167
Time Collected: 12/03/09 16:34
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
1,1,1,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.15	1	8260B	12/11/09 18:56	lwitry	Q46538
1,1,1-Trichloroethane	**54**	µg/L	1.0	0.063	1	8260B	12/11/09 18:56	lwitry	Q46538
1,1,2,2-Tetrachloroethane	**BRL**	µg/L	1.0	0.071	1	8260B	12/11/09 18:56	lwitry	Q46538
1,1,2-Trichloroethane	**BRL**	µg/L	1.0	0.17	1	8260B	12/11/09 18:56	lwitry	Q46538
1,1-Dichloroethane	**BRL**	µg/L	1.0	0.096	1	8260B	12/11/09 18:56	lwitry	Q46538
1,1-Dichloroethene	**9.6**	µg/L	1.0	0.078	1	8260B	12/11/09 18:56	lwitry	Q46538
1,1-Dichloropropene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 18:56	lwitry	Q46538
1,2,3-Trichlorobenzene	**BRL**	µg/L	2.0	0.20	1	8260B	12/11/09 18:56	lwitry	Q46538
1,2,3-Trichloropropane	**BRL**	µg/L	1.0	0.081	1	8260B	12/11/09 18:56	lwitry	Q46538
1,2,4-Trichlorobenzene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 18:56	lwitry	Q46538
1,2,4-Trimethylbenzene	**BRL**	µg/L	1.0	0.048	1	8260B	12/11/09 18:56	lwitry	Q46538
1,2-Dibromo-3-chloropropane	**BRL**	µg/L	2.0	0.59	1	8260B	12/11/09 18:56	lwitry	Q46538
1,2-Dibromoethane (EDB)	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 18:56	lwitry	Q46538
1,2-Dichlorobenzene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 18:56	lwitry	Q46538
1,2-Dichloroethane	**BRL**	µg/L	1.0	0.14	1	8260B	12/11/09 18:56	lwitry	Q46538
1,2-Dichloropropane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 18:56	lwitry	Q46538
1,3,5-Trimethylbenzene	**BRL**	µg/L	1.0	0.057	1	8260B	12/11/09 18:56	lwitry	Q46538
1,3-Dichlorobenzene	**BRL**	µg/L	1.0	0.074	1	8260B	12/11/09 18:56	lwitry	Q46538
1,3-Dichloropropane	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 18:56	lwitry	Q46538
1,4-Dichlorobenzene	**BRL**	µg/L	1.0	0.068	1	8260B	12/11/09 18:56	lwitry	Q46538
2,2-Dichloropropane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 18:56	lwitry	Q46538
2-Chloroethyl vinyl ether	**BRL**	µg/L	2.0	0.22	1	8260B	12/11/09 18:56	lwitry	Q46538
2-Chlorotoluene	**BRL**	µg/L	1.0	0.038	1	8260B	12/11/09 18:56	lwitry	Q46538
2-Hexanone	**BRL**	µg/L	5.0	0.19	1	8260B	12/11/09 18:56	lwitry	Q46538
4-Chlorotoluene	**BRL**	µg/L	1.0	0.053	1	8260B	12/11/09 18:56	lwitry	Q46538
4-Methyl-2-pentanone (MIBK)	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 18:56	lwitry	Q46538
Acetone	**BRL**	µg/L	10	0.62	1	8260B	12/11/09 18:56	lwitry	Q46538

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NC Certification No. 402
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Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-22I
Prism Sample ID: 265285
COC Group: G1209167
Time Collected: 12/03/09 16:34
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Acrolein	**BRL**	µg/L	100	1.1	1	8260B	12/11/09 18:56	lwitry	Q46538
Acrylonitrile	**BRL**	µg/L	100	0.86	1	8260B	12/11/09 18:56	lwitry	Q46538
Benzene	**BRL**	µg/L	1.0	0.072	1	8260B	12/11/09 18:56	lwitry	Q46538
Bromobenzene	**BRL**	µg/L	1.0	0.064	1	8260B	12/11/09 18:56	lwitry	Q46538
Bromochloromethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 18:56	lwitry	Q46538
Bromodichloromethane	**0.96 J**	µg/L	1.0	0.063	1	8260B	12/11/09 18:56	lwitry	Q46538
Bromoform	**BRL**	µg/L	1.0	0.27	1	8260B	12/11/09 18:56	lwitry	Q46538
Bromomethane	**BRL**	µg/L	3.0	0.47	1	8260B	12/11/09 18:56	lwitry	Q46538
Carbon disulfide	**BRL**	µg/L	5.0	1.4	1	8260B	12/11/09 18:56	lwitry	Q46538
Carbon tetrachloride	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 18:56	lwitry	Q46538
Chlorobenzene	**BRL**	µg/L	1.0	0.061	1	8260B	12/11/09 18:56	lwitry	Q46538
Chlorodibromomethane	**BRL**	µg/L	1.0	0.30	1	8260B	12/11/09 18:56	lwitry	Q46538
Chloroethane	**BRL**	µg/L	5.0	0.13	1	8260B	12/11/09 18:56	lwitry	Q46538
Chloroform	**5.8**	µg/L	1.0	0.089	1	8260B	12/11/09 18:56	lwitry	Q46538
Chloromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 18:56	lwitry	Q46538
cis-1,2-Dichloroethene	**BRL**	µg/L	1.0	0.076	1	8260B	12/11/09 18:56	lwitry	Q46538
cis-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.10	1	8260B	12/11/09 18:56	lwitry	Q46538
Dibromomethane	**BRL**	µg/L	1.0	0.13	1	8260B	12/11/09 18:56	lwitry	Q46538
Dichlorodifluoromethane	**BRL**	µg/L	2.0	0.11	1	8260B	12/11/09 18:56	lwitry	Q46538
Ethylbenzene	**BRL**	µg/L	1.0	0.067	1	8260B	12/11/09 18:56	lwitry	Q46538
Hexachlorobutadiene	**BRL**	µg/L	2.0	0.36	1	8260B	12/11/09 18:56	lwitry	Q46538
Isopropyl ether (IPE)	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 18:56	lwitry	Q46538
Isopropylbenzene	**BRL**	µg/L	1.0	0.072	1	8260B	12/11/09 18:56	lwitry	Q46538
m,p-Xylenes	**BRL**	µg/L	2.0	0.081	1	8260B	12/11/09 18:56	lwitry	Q46538
Methyl ethyl ketone (MEK)	**BRL**	µg/L	5.0	0.90	1	8260B	12/11/09 18:56	lwitry	Q46538
Methyl t-butyl ether (MTBE)	**BRL**	µg/L	1.0	0.070	1	8260B	12/11/09 18:56	lwitry	Q46538
Methylene chloride	**BRL**	µg/L	2.0	0.45	1	8260B	12/11/09 18:56	lwitry	Q46538

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SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Laboratory Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-22I
Prism Sample ID: 265285
COC Group: G1209167
Time Collected: 12/03/09 16:34
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
n-Butylbenzene	**BRL**	µg/L	1.0	0.11	1	8260B	12/11/09 18:56	lwitry	Q46538
n-Propylbenzene	**BRL**	µg/L	1.0	0.060	1	8260B	12/11/09 18:56	lwitry	Q46538
Naphthalene	**BRL**	µg/L	1.0	0.098	1	8260B	12/11/09 18:56	lwitry	Q46538
o-Xylene	**BRL**	µg/L	1.0	0.046	1	8260B	12/11/09 18:56	lwitry	Q46538
p-Isopropyltoluene	**BRL**	µg/L	1.0	0.065	1	8260B	12/11/09 18:56	lwitry	Q46538
sec-Butylbenzene	**BRL**	µg/L	1.0	0.087	1	8260B	12/11/09 18:56	lwitry	Q46538
Styrene	**BRL**	µg/L	1.0	0.047	1	8260B	12/11/09 18:56	lwitry	Q46538
tert-Butylbenzene	**BRL**	µg/L	1.0	0.080	1	8260B	12/11/09 18:56	lwitry	Q46538
Tetrachloroethene	**1.5**	µg/L	1.0	0.069	1	8260B	12/11/09 18:56	lwitry	Q46538
Toluene	**BRL**	µg/L	1.0	0.042	1	8260B	12/11/09 18:56	lwitry	Q46538
trans-1,2-Dichloroethene	**BRL**	µg/L	2.0	0.12	1	8260B	12/11/09 18:56	lwitry	Q46538
trans-1,3-Dichloropropene	**BRL**	µg/L	1.0	0.043	1	8260B	12/11/09 18:56	lwitry	Q46538
Trichloroethene	**BRL**	µg/L	2.0	0.054	1	8260B	12/11/09 18:56	lwitry	Q46538
Trichlorofluoromethane	**BRL**	µg/L	2.0	0.088	1	8260B	12/11/09 18:56	lwitry	Q46538
Vinyl acetate	**BRL**	µg/L	20	0.10	1	8260B	12/11/09 18:56	lwitry	Q46538
Vinyl chloride	**BRL**	µg/L	2.0	0.15	1	8260B	12/11/09 18:56	lwitry	Q46538

Surrogate	% Recovery	Control Limits
Toluene-d8	91	77 - 123
Dibromofluoromethane	90	75 - 129
Bromofluorobenzene	92	80 - 124

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Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW
Sample Matrix: Water

Client Sample ID: MW-22I
Prism Sample ID: 265285
COC Group: G1209167
Time Collected: 12/03/09 16:34
Time Submitted: 12/04/09 15:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a wet-weight basis

Angela D. Overcash, V.P. Laboratory Services

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Level II QC Report

12/17/09

AMEC Earth & Environmental, Inc.
Attn: Harold Thurston
Suite 205
2200 Gateway Centre Blvd
Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW

COC Group Number: G1209167
Date/Time Submitted: 12/4/09 15:00

Volatile Organic Compounds by GC/MS, method 8260B

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
1,1,1,2-Tetrachloroethane	ND	1	<0.5	µg/L	Q46538
1,1,1-Trichloroethane	ND	1	<0.5	µg/L	Q46538
1,1,2,2-Tetrachloroethane	ND	1	<0.5	µg/L	Q46538
1,1,2-Trichloroethane	ND	1	<0.5	µg/L	Q46538
1,1-Dichloroethane	ND	1	<0.5	µg/L	Q46538
1,1-Dichloroethene	ND	1	<0.5	µg/L	Q46538
1,1-Dichloropropene	ND	1	<0.5	µg/L	Q46538
1,2,3-Trichlorobenzene	ND	2	<1	µg/L	Q46538
1,2,3-Trichloropropane	ND	1	<0.5	µg/L	Q46538
1,2,4-Trichlorobenzene	ND	1	<0.5	µg/L	Q46538
1,2,4-Trimethylbenzene	ND	1	<0.5	µg/L	Q46538
1,2-Dibromo-3-chloropropane	ND	2	<1	µg/L	Q46538
1,2-Dibromoethane (EDB)	ND	1	<0.5	µg/L	Q46538
1,2-Dichlorobenzene	ND	1	<0.5	µg/L	Q46538
1,2-Dichloroethane	ND	1	<0.5	µg/L	Q46538
1,2-Dichloropropane	ND	1	<0.5	µg/L	Q46538
1,3,5-Trimethylbenzene	ND	1	<0.5	µg/L	Q46538
1,3-Dichlorobenzene	ND	1	<0.5	µg/L	Q46538
1,3-Dichloropropane	ND	1	<0.5	µg/L	Q46538
1,4-Dichlorobenzene	ND	1	<0.5	µg/L	Q46538
2,2-Dichloropropane	ND	2	<1	µg/L	Q46538
2-Chloroethyl vinyl ether	ND	2	<1	µg/L	Q46538
2-Chlorotoluene	ND	1	<0.5	µg/L	Q46538
2-Hexanone	ND	5	<2.5	µg/L	Q46538
4-Chlorotoluene	ND	1	<0.5	µg/L	Q46538
4-Methyl-2-pentanone (MIBK)	ND	5	<2.5	µg/L	Q46538
Acetone	ND	10	<5	µg/L	Q46538
Acrolein	ND	100	<50	µg/L	Q46538
Acrylonitrile	ND	100	<50	µg/L	Q46538
Benzene	ND	1	<0.5	µg/L	Q46538
Bromobenzene	ND	1	<0.5	µg/L	Q46538
Bromochloromethane	ND	1	<0.5	µg/L	Q46538
Bromodichloromethane	ND	1	<0.5	µg/L	Q46538
Bromoform	ND	1	<0.5	µg/L	Q46538

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Level II QC Report

12/17/09

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Attn: Harold Thurston
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Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW

COC Group Number: G1209167
Date/Time Submitted: 12/4/09 15:00

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Bromomethane	ND	3	<1.5	µg/L	Q46538
Carbon disulfide	ND	5	<2.5	µg/L	Q46538
Carbon tetrachloride	ND	2	<1	µg/L	Q46538
Chlorobenzene	ND	1	<0.5	µg/L	Q46538
Chlorodibromomethane	ND	1	<0.5	µg/L	Q46538
Chloroethane	ND	5	<2.5	µg/L	Q46538
Chloroform	ND	1	<0.5	µg/L	Q46538
Chloromethane	ND	2	<1	µg/L	Q46538
cis-1,2-Dichloroethene	ND	1	<0.5	µg/L	Q46538
cis-1,3-Dichloropropene	ND	1	<0.5	µg/L	Q46538
Dibromomethane	ND	1	<0.5	µg/L	Q46538
Dichlorodifluoromethane	ND	2	<1	µg/L	Q46538
Ethylbenzene	ND	1	<0.5	µg/L	Q46538
Hexachlorobutadiene	ND	2	<1	µg/L	Q46538
Isopropyl ether (IPE)	ND	1	<0.5	µg/L	Q46538
Isopropylbenzene	ND	1	<0.5	µg/L	Q46538
m,p-Xylenes	ND	2	<1	µg/L	Q46538
Methyl ethyl ketone (MEK)	ND	5	<2.5	µg/L	Q46538
Methyl t-butyl ether (MTBE)	ND	1	<0.5	µg/L	Q46538
Methylene chloride	ND	2	<1	µg/L	Q46538
n-Butylbenzene	ND	1	<0.5	µg/L	Q46538
n-Propylbenzene	ND	1	<0.5	µg/L	Q46538
Naphthalene	ND	1	<0.5	µg/L	Q46538
o-Xylene	ND	1	<0.5	µg/L	Q46538
p-Isopropyltoluene	ND	1	<0.5	µg/L	Q46538
sec-Butylbenzene	ND	1	<0.5	µg/L	Q46538
Styrene	ND	1	<0.5	µg/L	Q46538
tert-Butylbenzene	ND	1	<0.5	µg/L	Q46538
Tetrachloroethene	ND	1	<0.5	µg/L	Q46538
Toluene	ND	1	<0.5	µg/L	Q46538
trans-1,2-Dichloroethene	ND	2	<1	µg/L	Q46538
trans-1,3-Dichloropropene	ND	1	<0.5	µg/L	Q46538
Trichloroethene	ND	2	<1	µg/L	Q46538
Trichlorofluoromethane	ND	2	<1	µg/L	Q46538
Vinyl acetate	ND	20	<10	µg/L	Q46538
Vinyl chloride	ND	2	<1	µg/L	Q46538

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Morrisville, NC 27560

Project Name: Wakeforest Road
Project ID: Alcatel-Raleigh-GW

COC Group Number: G1209167
Date/Time Submitted: 12/4/09 15:00

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Ranges %	QC Batch ID
1,1-Dichloroethene	48.13	50	µg/L	96	70-154	Q46538
Benzene	54.67	50	µg/L	109	77-128	Q46538
Chlorobenzene	47.78	50	µg/L	96	78-119	Q46538
Toluene	54.11	50	µg/L	108	76-131	Q46538
Trichloroethene	55.68	50	µg/L	111	77-133	Q46538

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Ranges %	QC Batch ID
265377	1,1-Dichloroethene	476.9	500	µg/L	95	70-149	Q46538
	Benzene	527.6	500	µg/L	106	75-130	Q46538
	Chlorobenzene	453.3	500	µg/L	91	76-119	Q46538
	Toluene	524.2	500	µg/L	105	73-134	Q46538
	Trichloroethene	538.5	500	µg/L	108	76-130	Q46538

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Ranges %	RPD %	RPD Range %	QC Batch ID
265377	1,1-Dichloroethene	491	500	µg/L	98	70-149	3	0 - 17	Q46538
	Benzene	549	500	µg/L	110	75-130	4	0 - 15	Q46538
	Chlorobenzene	476.1	500	µg/L	95	76-119	5	0 - 18	Q46538
	Toluene	545	500	µg/L	109	73-134	4	0 - 17	Q46538
	Trichloroethene	558.7	500	µg/L	112	76-130	4	0 - 15	Q46538

#-See Case Narrative

This report should not be reproduced, except in its entirety, without the written consent of Prism Laboratories, Inc.
449 Springbrook Road - P.O. Box 240543 - Charlotte, NC 28224-0543
Phone: 704/529-6364 - Toll Free Number: 1-800/529-6364 - Fax: 704/525-0409

CHAIN OF CUSTODY RECORD

PRISM LABORATORIES, INC. | Full-Service Analytical & Environmental Solutions

449 Springbrook Road • P.O. Box 240543 • Charlotte, NC 28224-0543
Phone: 704/529-6364 • Fax: 704/525-0409

PAGE 1 OF 1 QUOTE # TO ENSURE PROPER BILLING: _____

Project Name: Alcatel- Wake Forest Road

Short Hold Analysis: (Yes) (No) UST Project: (Yes) (No)

*Please ATTACH any project specific reporting (QC LEVEL I II III IV) provisions and/or QC Requirements

Client Company Name: AMEC Earth + Environmental

Report To/Contact Name: Harold Thurston

Reporting Address: 2200 Gateway Centre Blvd Suite 205, Morrisville, NC 27650

Phone: 919-447-2750 Fax (Yes) (No): _____

Email (Yes) (No) Email Address harold.thurston@amec.com

EDD Type: PDF____ Excel____ Other_____

Site Location Name: Alcatel

Site Location Physical Address: Raleigh, NC

Invoice To: Same - Attn: Harld Thurston

Address: _____

Purchase Order No./Billing Reference _____

Requested Due Date ❑ 1 Day ❑ 2 Days ❑ 3 Days ❑ 4 Days ❑ 5 Days
"Working Days" ❑ 6-9 Days ❑ Standard 10 days ❑ Rush Work Must Be Pre-Approved

Samples received after 15:00 will be processed next business day.
Turnaround time is based on business days, excluding weekends and holidays.
(SEE REVERSE FOR TERMS & CONDITIONS REGARDING SERVICES RENDERED BY PRISM LABORATORIES, INC. TO CLIENT)

LAB USE ONLY

	YES	NO	N/A
Samples INTACT upon arrival?	✓		
Received ON WET ICE? Temp 2.8	✓		
PROPER PRESERVATIVES indicated?	✓		
Received WITHIN HOLDING TIMES?	✓		
CUSTODY SEALS INTACT?			✓
VOLATILES rec'd W/OUT HEADSPACE?	✓		
PROPER CONTAINERS used?	✓		

TO BE FILLED IN BY CLIENT/SAMPLING PERSONNEL

Certification: NELAC____ USACE____ FL____ NC____ SC____ OTHER____ N/A____

Water Chlorinated: YES___ NO___

Sample Iced Upon Collection: YES___ NO___

CLIENT SAMPLE DESCRIPTION	DATE COLLECTED	TIME COLLECTED MILITARY HOURS	MATRIX (SOIL, WATER OR SLUDGE)	SAMPLE CONTAINER *TYPE SEE BELOW	NO.	SIZE	PRESERVATIVES	ANALYSES REQUESTED 8260B						REMARKS	PRISM LAB ID NO.
~~Trip Blank~~														DT 12/3/09	
MW-21I	12/03/09	1017	water	VOA	3	40ml	HCl	X							265280
MW-20I	12/03/09	1215	water	VOA	3	40ml	HCl	X							265281
MW-18I	12/03/09	1311	water	VOA	3	40ml	HCl	X							265282
MW-17I	12/03/09	1431	water	VOA	3	40ml	HCl	X							265283
MW-19I	12/03/09	1535	water	VOA	3	40ml	HCl	X							265284
MW-22I	12/03/09	1634	water	VOA	3	40ml	HCl	X							265285

PRESS DOWN FIRMLY - 3 COPIES

Sampler's Signature [signature] Sampled By (Print Name) David Trowdway Affiliation AMEC

Upon relinquishing, this Chain of Custody is your authorization for Prism to proceed with the analyses as requested above. Any changes must be submitted in writing to the Prism Project Manager. There will be charges for any changes after analyses have been initialized.

		Date	Military/Hours
Relinquished By: (Signature) [signature]	Received By: (Signature) [signature]	12/3/09	1745
Relinquished By: (Signature) [signature]	Received By: (Signature) [signature]	12-04-09	1045
Relinquished By: (Signature) [signature]	Received For Prism Laboratories By: [signature]	12/4/09	1230

Method of Shipment: NOTE: ALL SAMPLE COOLERS SHOULD BE TAPED SHUT WITH CUSTODY SEALS FOR TRANSPORTATION TO THE LABORATORY. SAMPLES ARE NOT ACCEPTED AND VERIFIED AGAINST COC UNTIL RECEIVED AT THE LABORATORY.

COC Group No. G1209167

❑ Fed Ex ❑ UPS ❑ Hand-delivered ❑ Prism Field Service ❑ Other _____

Additional Comments: Relinquished by David Morin 12-4-09 1500 Rec'd by: [signature]

PRISM USE ONLY

Site Arrival Time:
Site Departure Time:
Field Tech Fee:
Mileage:

NPDES:	UST:	GROUNDWATER:	DRINKING WATER:	SOLID WASTE:	RCRA:	CERCLA	LANDFILL	OTHER:
❑ NC ❑ SC	❑ NC ❑ SC	❑ NC ❑ SC	❑ NC ❑ SC	❑ NC ❑ SC	❑ NC ❑ SC	❑ NC ❑ SC	❑ NC ❑ SC	❑ NC ❑ SC
❑ _____	❑ _____	❑ _____	❑ _____	❑ _____	❑ _____	❑ _____	❑ _____	❑ _____

*CONTAINER TYPE CODES: A = Amber C = Clear G = Glass P = Plastic; TL = Teflon-Lined Cap VOA = Volatile Organics Analysis (Zero Head Space)

SEE REVERSE FOR TERMS & CONDITIONS

ORIGINAL

APPENDIX C

HISTORICAL ANALYTICAL DATA TABLES AND GRAPHS

AMEC Earth & Environmental, Inc.
2200 Gateway Centre Boulevard, Suite 205
Morrisville, NC 27560
www.amec.com
Tel – (919) 447-2750
Fax – (919) 447-2751

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		**200**	**210,000**	**70**	**7**	**0.38**	**1**	**70**	**70**	**0.7**	**2.8**	**100**	**2.1**	**0.015**	**7**	**NA**	**1000**	**15**
MW-1S	08/21/90	11	BDL	BDL	BDL	BDL	NA	NA	BDL	**2**	BDL	BDL	NA	NA	NA	**13**	**1200**	BDL
	02/08/93	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	667	14
	09/19/93	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL	NA	NA	NA	BDL	**1150**	3
	08/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	877	BDL
	11/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	85	6
	09/13/96	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	331	5
	04/10/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	141	BDL
	10/31/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	428	BDL
	04/28/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	108	BDL
	10/08/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	130	BDL
	04/28/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	0.58	BDL	NA	NA	NA	**0.58**	BDL	BDL
	10/27/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	71	BDL
	10/11/00	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	13	6
	04/25/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/24/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/04/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/29/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	10/21/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NS	BDL	55	BDL
	04/07/05	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NS	BDL	36	BDL
MW-2D	11/30/94	**2800**	BDL	BDL	**1600**	BDL	NA	NA	NA	**540**	BDL	NA	NA	NA	NA	**4940**	BDL	BDL
	09/13/96	**828**	BDL	8.13	**418**	BDL	NA	NA	BDL	**729**	2.18	BDL	NA	NA	NA	**1985.31**	26	BDL
	04/10/97	**1460**	2.31	23	**893**	BDL	NA	NA	1.52	**1090**	**3.32**	BDL	NA	NA	NA	**3473.15**	13	BDL
	10/30/97	**3500**	BDL	**270**	**1400**	BDL	NA	NA	BDL	**6500**	BDL	BDL	NA	NA	NA	**11670**	BDL	BDL
	04/28/98	**2600**	BDL	BDL	**1000**	BDL	NA	NA	BDL	**4300**	BDL	BDL	NA	NA	NA	**7900**	BDL	BDL
	10/08/98	BDL	BDL	**1800**	**440**	BDL	NA	NA	BDL	**3200**	BDL	BDL	NA	NA	NA	**5440**	15	BDL
	04/28/99	**2600**	BDL	20	**560**	BDL	NA	NA	1.3	**2800**	**61**	0.97	NA	NA	NA	**6043.27**	BDL	BDL
	10/28/99	**2580**	3	12.7	**928**	BDL	NA	NA	1.8	**1460**	2.6	2.5	NA	NA	NA	**4990.6**	16	BDL
	10/12/00	**4700**	BDL	BDL	**1300**	BDL	NA	NA	BDL	**1400**	BDL	BDL	NA	NA	NA	**7400**	18	BDL
	04/25/01	**3100**	BDL	BDL	**780**	BDL	NA	NA	BDL	**1200**	BDL	BDL	NA	NA	NA	**5080**	BDL	BDL
	10/24/01	**670**	BDL	BDL	**290**	BDL	NA	NA	BDL	**200**	BDL	BDL	NA	NA	NA	**1160**	BDL	BDL
	04/18/02	160	BDL	9.2	**75**	BDL	NA	NA	BDL	**99**	BDL	1.5	NA	NA	NA	**344.7**	BDL	BDL
	10/01/02	**1600**	BDL	8	**510**	BDL	NA	NA	BDL	**390**	BDL	BDL	NA	NA	NA	**2508**	BDL	BDL
	11/01/02	**560**	BDL	BDL	**400**	BDL	NA	NA	BDL	**190**	BDL	BDL	NA	NA	NA	**1150**	NM	NM
	04/23/03	**2000**	BDL	8.5	**560**	BDL	NA	NA	BDL	**450**	BDL	BDL	NA	NA	NA	**3018.5**	BDL	BDL
	10/29/03	**830**	BDL	5.7	**390**	BDL	NA	NA	BDL	**290**	BDL	BDL	NA	NA	NA	**1515.7**	BDL	BDL
	04/07/04	**1400**	BDL	BDL	**350**	BDL	NA	NA	BDL	**250**	BDL	BDL	NA	NA	NA	**2000**	BDL	BDL
	10/21/04	**260 E**	BDL	2.6	**120 E**	BDL	NA	NA	BDL	BDL	**170 E**	BDL	NA	NA	NA	**552.6**	12	1.4 J
	04/07/05	**1800**	BDL	8.0	**470**	BDL	NA	NA	BDL	**480**	BDL	BDL	NA	NA	**12**	**2758**	16	BDL
	10/12/05	180	BDL	BDL	**89**	BDL	NA	NA	BDL	**280**	BDL	BDL	NA	NA	BDL	**549**	BDL	BDL
	04/12/06	**370**	BDL	BDL	**120**	BDL	NA	NA	BDL	**130**	BDL	BDL	NA	NA	**12**	**620**	7.1J	2.1J
	10/05/06	**550**	BDL	BDL	**240**	BDL	NA	NA	BDL	**190**	BDL	BDL	NA	NA	**17**	**980**	5.8J	BDL
	04/25/07	**340**	BDL	4.0	**180**	BDL	NA	NA	2.5	**200**	0.69	BDL	NA	NA	**9**	**727.19**	61	**50**
	06/13/07	75	BDL	3.1	**17**	BDL	NA	NA	2.1	**63**	1.5	BDL	NA	NA	BDL	**161.7**	35	8.8
	10/23/07	20	BDL	1.4	BDL	BDL	NA	NA	BDL	**6.4**	BDL	BDL	NA	NA	BDL	**27.8**	5.6 J	2.0 J
	04/24/08	12	BDL	BDL	BDL	BDL	NA	NA	BDL	**3.1**	BDL	BDL	NA	NA	BDL	**15.1**	4.6 J	BDL
	10/15/08	26	BDL	2.2	**34**	BDL	NA	NA	0.55	**36**	BDL	BDL	NA	NA	BDL	**98.75**	19	**18**
	04/16/09	12	BDL	1.6	**27**	BDL	NA	NA	BDL	**19**	BDL	BDL	NA	NA	BDL	**59.6**	32	**26**
	10/08/09	26	BDL	1.6	**34**	BDL	**1.0**	BDL	1.3	**43**	BDL	BDL	BDL	BDL	BDL	**105.9**	0.030	0.0048 J

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		**200**	**210,000**	**70**	**7**	**0.38**	**1**	**70**	**70**	**0.7**	**2.8**	**100**	**2.1**	**0.015**	**7**	**NA**	**1000**	**15**
MW-2S	08/21/90	120	1	7	**16**	BDL	NA	NA	BDL	**9**	BDL	BDL	NA	NA	NA	**153**	BDL	BDL
	02/08/93	130	BDL	9	**19**	BDL	NA	NA	BDL	**9**	BDL	BDL	NA	NA	NA	**167**	10.3	6.8
	09/19/93	94	BDL	6.9	BDL	BDL	NA	NA	NA	**8.9**	BDL	BDL	NA	NA	NA	**109.8**	30	5
	08/30/94	140	BDL	BDL	**20**	BDL	NA	NA	NA	**18**	BDL	NA	NA	NA	NA	**178**	BDL	BDL
	11/30/94	43	BDL	BDL	**16**	BDL	NA	NA	NA	**6.4**	BDL	NA	NA	NA	NA	**65.4**	BDL	BDL
	09/13/96	**319**	BDL	15.8	**21.7**	BDL	NA	NA	BDL	**74.3**	BDL	BDL	NA	NA	NA	**430.8**	BDL	BDL
	04/09/97	BDL	BDL	BDL	2.26	BDL	NA	NA	BDL	**1.37**	BDL	BDL	NA	NA	NA	**3.63**	BDL	BDL
	10/30/97	**400**	BDL	44	**490**	BDL	NA	NA	BDL	**71**	BDL	BDL	NA	NA	NA	**1005**	BDL	BDL
	04/28/98	**310**	BDL	54	**290**	BDL	NA	NA	BDL	**59**	BDL	BDL	NA	NA	NA	**713**	BDL	BDL
	10/08/98	**310**	BDL	42	**86**	BDL	NA	NA	BDL	**41**	BDL	BDL	NA	NA	NA	**479**	BDL	BDL
	04/28/99	**290**	BDL	29	**88**	BDL	NA	NA	BDL	**48**	**5**	BDL	NA	NA	NA	**460**	BDL	BDL
	10/28/99	116	0.3	15.8	**70.8**	**16.8**	NA	NA	0.4	BDL	BDL	BDL	NA	NA	NA	**220.1**	BDL	BDL
	10/12/00	100	BDL	11	**69**	**0.91**	NA	NA	BDL	**12**	BDL	BDL	NA	NA	NA	**192.91**	BDL	BDL
	04/25/01	110	BDL	18	**63**	**0.95**	NA	NA	BDL	**15**	BDL	BDL	NA	NA	NA	**206.95**	BDL	BDL
	10/24/01	47	BDL	6.1	**44**	**0.63**	NA	NA	BDL	**5.5**	BDl	BDL	NA	NA	NA	**103.23**	BDL	BDL
	04/18/02	48	BDL	2.3	6.0	**0.95**	NA	NA	BDL	**2.3**	BDL	BDL	NA	NA	NA	**59.55**	BDL	BDL
	10/01/02	19	BDL	2.6	**8.6**	BDL	NA	NA	BDL	**2.5**	BDL	BDL	NA	NA	NA	**32.7**	BDL	BDL
	04/23/03	7.7	BDL	0.85	5.3	BDL	NA	NA	BDL	**1.9**	BDL	BDL	NA	NA	NA	**15.75**	BDL	BDL
	10/29/03	4.2	BDL	0.53	2.6	BDL	NA	NA	BDL	**1.6**	BDL	BDL	NA	NA	NA	**8.93**	BDL	BDL
	04/07/04	2.8	BDL	BDL	1.6	BDL	NA	NA	BDL	**2.2**	BDL	BDL	NA	NA	NA	**6.6**	BDL	BDL
	10/21/04	15	BDL	1.7	3.7	BDL	NA	NA	BDL	**6.9**	BDL	BDL	NA	NA	NA	**27.3**	24	BDL
	04/07/05	33	BDL	4.2	**9.3**	BDL	NA	NA	BDL	**17**	BDL	BDL	NA	NA	BDL	**63.5**	24	BDL
	10/12/05	26	BDL	2.4	5.9	BDL	NA	NA	BDL	**13**	BDL	BDL	NA	NA	BDL	**47.3**	BDL	BDL
	04/12/06	3.3	BDL	0.54	1.0	BDL	NA	NA	BDL	**2.5**	BDL	BDL	NA	NA	BDL	**7.34**	2.9J	1.6J
	10/05/06	4.9	BDL	0.64	1.2	BDL	NA	NA	BDL	**3.1**	BDL	BDL	NA	NA	BDL	**9.84**	2.0J	BDL
	04/25/07	5.5	BDL	0.80	1.4	BDL	NA	NA	BDL	**4.0**	BDL	BDL	NA	NA	BDL	**11.7**	1.2J	BDL
	06/13/07	6.7	BDL	1.1	1.6	BDL	NA	NA	BDL	**4.6**	BDL	BDL	NA	NA	BDL	**14**	1.4J	BDL
	10/23/07	8	BDL	1.6	1.8	BDL	NA	NA	BDL	**4.8**	BDL	BDL	NA	NA	BDL	**16.2**	0.5 J	BDL
	04/24/08	9.6	BDL	1.6	1.7	BDL	NA	NA	BDL	**7.0**	BDL	BDL	NA	NA	BDL	**19.9**	1.0 J	1.9 J
	10/13/08	11.0	BDL	2.2	2.4	BDL	NA	NA	BDL	**7.8**	BDL	BDL	NA	NA	BDL	**23.4**	BDL	BDL
	04/16/09	11.0	BDL	2.1	2.1	BDL	NA	NA	BDL	**8.2**	BDL	BDL	NA	NA	BDL	**23.4**	1.4 J	BDL
	10/08/09	8.0	BDL	1.5	1.2	BDL	BDL	BDL	BDL	**6.6**	BDL	BDL	0.85	BDL	BDL	**18.15**	0.0017 J	0.0019 J
MW-3D	11/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL
	09/13/96	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	2
	04/10/97	**205**	BDL	3.35	**49.9**	BDL	NA	NA	BDL	**5.03**	BDL	BDL	NA	NA	NA	**263.3**	BDL	BDL
	10/30/97	**470**	BDL	29	**120**	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**619**	BDL	BDL
	04/28/98	**220**	BDL	BDL	**32**	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**252**	BDL	BDL
	10/08/98	160	BDL	BDL	6.9	BDL	NA	NA	BDL	**1.1**	BDL	BDL	NA	NA	NA	**168**	BDL	BDL
	04/28/99	66	BDL	BDL	**9.7**	BDL	NA	NA	BDL	**8.3**	**4.8**	BDL	NA	NA	NA	**88.8**	BDL	BDL
	10/27/99	20.3	BDL	BDL	3.9	**1.1**	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**25.3**	BDL	BDL
	10/12/00	2.7	BDL	1.2	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**3.9**	BDL	BDL
	04/25/01	BDL	BDL	1.2	BDL	BDL	NA	NA	0.69	BDL	BDL	BDL	NA	NA	NA	**1.9**	BDL	BDL
	10/24/01	0.61	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**0.6**	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/03/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/29/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/21/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/05	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	10/12/05	2.0	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	**2.0**	BDL	BDL
	04/12/06	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	4.0J	BDL
	10/05/06	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	3.0J	BDL
	04/25/07	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	3.1J	BDL
	06/13/07	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	8.5J	BDL
	10/25/07	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	2.3 J	BDL
	04/25/08	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	10/14/08	1.80	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	**1.8**	1.2 J	BDL
	04/15/09	5.2	BDL	0.80	1.7	BDL	NA	NA	BDL	**0.84**	BDL	BDL	NA	NA	BDL	**8.5**	3.9 J	BDL
	10/08/09	4.5	BDL	1.1	2.3	BDL	BDL	0.78	BDL	**1.8**	BDL	BDL	BDL	BDL	BDL	**10.48**	BDL	BDL

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		**200**	**210,000**	**70**	**7**	**0.38**	**1**	**70**	**70**	**0.7**	**2.8**	**100**	**2.1**	**0.015**	**7**	**NA**	**1000**	**15**
MW-3S	08/21/90	1	BDL	2	2	BDL	NA	NA	BDL	BDL	**5**	BDL	NA	NA	NA	**10**	NM	BDL
	02/08/93	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	**30**
	09/19/93	BDL	BDL	1.2	1.7	BDL	NA	NA	NA	BDL	**9.3**	BDL	NA	NA	NA	**12.2**	BDL	**30**
	08/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	**20**
	11/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	2.7	NA	NA	NA	NA	**2.7**	BDL	BDL
	09/13/96	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	**4.75**	BDL	NA	NA	NA	**4.75**	15	BDL
	04/09/97	BDL	BDL	BDL	1.16	BDL	NA	NA	BDL	BDL	**4.12**	BDL	NA	NA	NA	**5.28**	BDL	BDL
	10/30/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	2	BDL	NA	NA	NA	**2**	BDL	BDL
	04/28/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	**3**	BDL	NA	NA	NA	**3**	BDL	BDL
	10/08/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	1.2	BDL	NA	NA	NA	**1.2**	BDL	BDL
	04/28/99	BDL	BDL	1.1	2.1	BDL	NA	NA	0.71	**2.2**	**8.1**	BDL	NA	NA	NA	**14.21**	BDL	BDL
	10/28/99	BDL	BDL	0.8	0.8	BDL	NA	NA	0.5	0.1	2.6	BDL	NA	NA	NA	**4.8**	BDL	BDL
	10/12/00	18	BDL	BDL	BDL	BDL	NA	NA	0.85	BDL	**4.3**	BDL	NA	NA	NA	**23.15**	BDL	BDL
	04/25/01	18	BDL	BDL	1.4	BDL	NA	NA	BDL	**0.99**	BDL	BDL	NA	NA	NA	**20.39**	BDL	BDL
	10/24/01	BDL	BDL	1.3	1.1	BDL	NA	NA	1.2	BDL	**4.2**	BDL	NA	NA	NA	**7.8**	BDL	BDL
	04/18/02	BDL	BDL	0.85	BDL	BDL	NA	NA	BDL	BDL	1	BDL	NA	NA	NA	**1.85**	BDL	BDL
	10/03/02	BDL	BDL	1.9	1.3	BDL	NA	NA	0.98	BDL	**3.9**	BDL	NA	NA	NA	**8.08**	BDL	BDL
	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	0.94	BDL	NA	NA	NA	**0.94**	BDL	BDL
	10/29/03	BDL	BDL	0.7	1.2	BDL	NA	NA	0.82	BDL	**3.3**	BDL	NA	NA	NA	**6.03**	BDL	BDL
	04/07/04	BDL	BDL	BDL	0.83	BDL	NA	NA	1.1	BDL	**3**	BDL	NA	NA	NA	**4.93**	BDL	BDL
	10/21/04	BDL	BDL	0.87	0.98	BDL	NA	NA	0.76	BDL	2.4	BDL	NA	NA	NA	**5.01**	BDL	BDL
	04/07/05	BDL	BDL	0.74	1.2	BDL	NA	NA	1.4	BDL	**4.1**	BDL	NA	NA	**9**	**7.44**	BDL	BDL
	10/12/05	BDL	BDL	1.3	2.4	BDL	NA	NA	0.74	BDL	**3.7**	BDL	NA	NA	BDL	**8.14**	BDL	BDL
	04/12/06	BDL	BDL	0.94	0.91	BDL	NA	NA	0.67	BDL	**4.0**	BDL	NA	NA	BDL	**6.52**	BDL	BDL
	10/05/06	BDL	BDL	1.1	1.1	BDL	NA	NA	0.70	BDL	**3.6**	BDL	NA	NA	2.8	**6.5**	1.9J	BDL
	04/25/07	BDL	BDL	0.54	BDL	BDL	NA	NA	1.1	**3.10**	BDL	BDL	NA	NA	BDL	**4.74**	2.0J	BDL
	06/13/07	BDL	BDL	0.88	0.73	BDL	NA	NA	0.56	BDL	**3.1**	BDL	NA	NA	3.9	**5.27**	1.7J	BDL
	10/25/07	BDL	BDL	1.1	1.0	BDL	NA	NA	0.55	BDL	**4.2**	BDL	NA	NA	3.4	**6.85**	3.0 J	BDL
	04/25/08	BDL	BDL	0.87	0.94	BDL	NA	NA	BDL	BDL	**3.0**	BDL	NA	NA	3.1	**4.81**	BDL	BDL
	10/14/08	BDL	BDL	1.0	1.3	BDL	NA	NA	0.66	BDL	**3.9**	BDL	NA	NA	3.6	**6.86**	BDL	BDL
	04/15/09	BDL	BDL	0.69	0.69	BDL	NA	NA	BDL	BDL	2.5	BDL	NA	NA	BDL	**3.88**	2.2 J	BDL
	10/08/09	BDL	BDL	0.70	0.66	BDL	BDL	BDL	BDL	BDL	**3.3**	BDL	BDL	BDL	BDL	**4.66**	0.0027 J	BDL
MW-4D	11/30/94	130	BDL	BDL	**230**	BDL	NA	NA	NA	**240**	BDL	NA	NA	NA	NA	**600**	BDL	BDL
	10/27/99	10	BDL	BDL	**55**	BDL	NA	NA	BDL	**295**	BDL	BDL	NA	NA	NA	**360**	BDL	BDL
	10/12/00	**320**	1.2	12	**220**	**3.8**	NA	NA	BDL	**600**	**5.4**	BDL	NA	NA	NA	**1162.4**	BDL	BDL
	04/25/01	150	BDL	5.3	**110**	BDL	NA	NA	BDL	**150**	BDL	BDL	NA	NA	NA	**415.3**	BDL	BDL
	10/24/01	**260**	BDL	11	**180**	**0.64**	NA	NA	BDL	**410**	1.9	0.51	NA	NA	NA	**864.05**	BDL	BDL
	04/18/02	130	BDL	8.2	**70**	**1.0**	NA	NA	BDL	**320**	0.77	BDL	NA	NA	NA	**529.97**	BDL	BDL
	10/02/02	100	BDL	6.9	**74**	BDL	NA	NA	BDL	**310**	BDL	BDL	NA	NA	NA	**490.9**	BDL	BDL
	11/01/02	170	BDL	9.6	**300**	BDL	NA	NA	BDL	**320**	1.6	BDL	NA	NA	NA	**801.2**	NM	NM
	04/23/03	140	BDL	9.5	**100**	BDL	NA	NA	BDL	**380**	1.7	BDL	NA	NA	NA	**631.2**	BDL	BDL
	10/29/03	130	BDL	7.9	**130**	BDL	NA	NA	BDL	**270**	0.8	BDL	NA	NA	NA	**538.7**	BDL	BDL
	04/07/04	69	BDL	5.8	**70**	BDL	NA	NA	BDL	**160**	1.3	BDL	NA	NA	NA	**306.1**	BDL	BDL
	10/21/04	BDL	BDL	9.4	**100**	BDL	NA	NA	BDL	**270**	1.9	BDL	NA	NA	NA	**381.3**	2.3 J	BDL
	04/07/05	100	BDL	11	**190**	**1.5**	NA	NA	0.75	**550**	2.6	BDL	NA	NA	**19**	**855.85**	BDL	BDL
	10/12/05	140	BDL	14	**160**	BDL	NA	NA	1.9	**470**	**4.0**	BDL	NA	NA	**29**	**789.9**	BDL	BDL
	04/12/06	12	BDL	1.1	**20**	BDL	NA	NA	BDL	**110**	1.3	BDL	NA	NA	**13**	**144.4**	5.0J	1.6J
	10/05/06	20	BDL	2.3	**37**	BDL	NA	NA	BDL	**170**	0.81	BDL	NA	NA	**13**	**230.11**	5.6J	BDL
	04/25/07	100	BDL	7.2	**110**	BDL	NA	NA	1.2	**820**	2.5	BDL	NA	NA	**9.7**	**1040.9**	3.6J	BDL
	06/13/07	79	BDL	6.3	**93**	**0.86**	NA	NA	0.79	**510**	2.5	BDL	NA	NA	**15.0**	**692.45**	12.00	BDL
	10/23/07	100	BDL	7.5	**140**	BDL	NA	NA	BDL	**570**	2.5	BDL	NA	NA	**20**	**820**	4.3 J	2.1 J
	04/23/08	190	NA	6.0	**96**	BDL	NA	NA	NA	**1300**	BDL	NA	NA	NA	**16**	**1592**	BDL	1.4 J
	10/14/08	120	BDL	6.9	**130**	BDL	NA	NA	BDL	**980**	BDL	BDL	NA	NA	**11**	**1236.9**	BDL	BDL
	04/16/09	44	BDL	BDL	**63**	BDL	NA	NA	BDL	**530**	BDL	BDL	NA	NA	**13**	**637**	1.8 J	BDL
	10/07/09	57	BDL	BDL	**110**	BDL	BDL	BDL	BDL	**740**	BDL	BDL	BDL	BDL	**6.9**	**907**	BDL	BDL

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		**200**	**210,000**	**70**	**7**	**0.38**	**1**	**70**	**70**	**0.7**	**2.8**	**100**	**2.1**	**0.015**	**7**	**NA**	**1000**	**15**
MW-4DD	10/31/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**1100**	**27**	BDL	NA	NA	NA	**1127**	BDL	BDL
	04/28/98	BDL	BDL	BDL	**75**	BDL	NA	NA	BDL	**740**	**59**	BDL	NA	NA	NA	**874**	BDL	BDL
	10/08/98	BDL	BDL	BDL	**20**	**660**	NA	NA	BDL	BDL	**46**	BDL	NA	NA	NA	**726**	10	BDL
	04/28/99	6.2	BDL	14	**82**	BDL	NA	NA	2.9	**920**	**910**	60	NA	NA	NA	**1995.1**	BDL	BDL
	10/27/99	BDL	BDL	20	**205**	BDL	NA	NA	BDL	**915**	**1300**	**210**	NA	NA	NA	**2650**	13	BDL
	10/12/00	6.5	BDL	24	**67**	BDL	NA	NA	6.7	**550**	**490**	88	NA	NA	NA	**1232.2**	18	BDL
	04/25/01	41	BDL	17	**12**	BDL	NA	NA	3.7	**5500**	**320**	71	NA	NA	NA	**5964.7**	18	BDL
	06/15/01	3.6	BDL	6.6	**48**	BDL	NA	NA	2.0	**1400**	**240**	11	NA	NA	NA	**1711.2**	NM	NM
	10/24/01	14	BDL	8.4	**130**	BDL	NA	NA	BDL	**1300**	**120**	24	NA	NA	NA	**1596.4**	BDL	BDL
	04/18/02	14	BDL	9.3	**22**	BDL	NA	NA	BDL	**710**	**44**	8.5	NA	NA	NA	**807.8**	BDL	BDL
MW-4S	08/21/90	140	BDL	BDL	**23**	BDL	NA	NA	BDL	**210**	BDL	BDL	NA	NA	NA	**373**	BDL	BDL
	02/08/93	36	BDL	BDL	**17**	BDL	NA	NA	BDL	**170**	BDL	BDL	NA	NA	NA	**223**	26.6	**15.4**
	09/19/93	22	BDL	BDL	**10**	BDL	NA	NA	NA	**120**	BDL	BDL	NA	NA	NA	**152**	40	4
	08/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	**39**	BDL	NA	NA	NA	NA	**39**	BDL	BDL
	11/30/94	8.3	BDL	BDL	BDL	BDL	NA	NA	NA	**54**	BDL	NA	NA	NA	NA	**62.3**	N/A	9
	10/21/04	BDL	BDL	BDL	2.3	BDL	NA	NA	BDL	**55**	BDL	BDL	NA	NA	NA	**57.3**	2.4 J	BDL
	04/07/05	3.9	BDL	BDL	1.8	BDL	NA	NA	BDL	**56**	BDL	BDL	NA	NA	**20**	**61.7**	BDL	BDL
	04/12/06	0.63	BDL	BDL	BDL	BDL	NA	NA	BDL	**13**	BDL	BDL	NA	NA	**11**	**13.63**	12	5.3
	10/05/06	2.3	BDL	BDL	0.59	BDL	NA	NA	BDL	**23**	BDL	BDL	NA	NA	3	**25.89**	13	2.1J
	04/25/07	2.5	BDL	BDL	0.70	BDL	NA	NA	BDL	**35**	BDL	BDL	NA	NA	BDL	**38.2**	8.7J	BDL
	06/13/07	1.9	BDL	BDL	0.93	BDL	NA	NA	BDL	**27**	BDL	BDL	NA	NA	BDL	**29.83**	4.2J	BDL
	10/23/07	3.3	BDL	BDL	1.2	BDL	NA	NA	BDL	**30**	BDL	BDL	NA	NA	4.6	**34.5**	300	**60**
	04/23/08	3.3	BDL	BDL	0.81	BDL	NA	NA	BDL	**29**	BDL	BDL	NA	NA	3.1	**33.11**	BDL	BDL
	10/14/08	4.2	BDL	BDL	1.3	BDL	NA	NA	BDL	**31**	BDL	BDL	NA	NA	BDL	**36.5**	BDL	BDL
	04/16/09	6.0	BDL	BDL	1.8	BDL	NA	NA	BDL	**64**	BDL	BDL	NA	NA	BDL	**71.8**	3.5 J	BDL
	10/07/09	5.9	BDL	BDL	1.3	BDL	BDL	BDL	BDL	**72**	BDL	BDL	BDL	BDL	BDL	**79.2**	0.0230	0.0071
MW-5D	08/21/90	1	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**1**	BDL	BDL
	02/08/93	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**7**	BDL	BDL	NA	NA	NA	**7**	66.6	**28.4**
MW-5S	09/19/93	1.8	2	1.8	BDL	BDL	NA	NA	NA	**6.8**	BDL	BDL	NA	NA	NA	**12.4**	BDL	4
	08/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL
	11/30/94	BDL	BDL	3	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**3**	BDL	BDL
	09/13/96	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	3	1
	04/09/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/31/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/28/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/08/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/28/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/27/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	0.2	BDL	BDL	NA	NA	NA	**0.2**	BDL	BDL
	10/11/00	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/25/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	13	BDL
	10/24/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/01/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**1.2**	BDL	BDL	NA	NA	NA	**1.2**	BDL	BDL
	10/29/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/21/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/05	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
MW-6S	10/17/90	1	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**1**	30	BDL
	02/08/93	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	28.3	9
	09/19/93	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL	NA	NA	NA	BDL	NM	NM

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		**200**	**210,000**	**70**	**7**	**0.38**	**1**	**70**	**70**	**0.7**	**2.8**	**100**	**2.1**	**0.015**	**7**	**NA**	**1000**	**15**
MW-7D	11/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL
	09/13/96	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	3	BDL
	04/10/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/31/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/28/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/08/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/28/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**2.5**	0.7	BDL	NA	NA	NA	**3.2**	BDL	BDL
	10/27/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/11/00	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/24/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/01/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/29/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
MW-7S	10/17/90	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	5
	02/08/93	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	221	**25.1**
	09/19/93	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL	NA	NA	NA	BDL	20	3
	08/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL
	11/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL
	09/13/96	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**1.11**	BDL	BDL	NA	NA	NA	**1.11**	10	1
	04/10/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/31/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/28/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/08/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	15	BDL
	04/28/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	0.55	BDL	NA	NA	NA	**0.55**	BDL	BDL
	10/27/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	13	BDL
	10/11/00	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	18	BDL
	04/25/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	18	BDL
	10/24/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/01/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/29/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
MW-8S	10/17/90	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	30	BDL
	02/08/93	BDL	BDL	11	BDL	BDL	NA	NA	BDL	BDL	**3**	BDL	NA	NA	NA	**14**	17.4	6.5
MW-9S	10/18/90	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	40	10
	02/08/93	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	56.5	**15.3**
	09/19/93	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL	NA	NA	NA	BDL	50	**15**
	08/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NM	NA	NA	NA	BDL	BDL	BDL
	11/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	157	**53**
MW-10S	06/27/93	1.9	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	**1.9**	BDL	BDL
	09/19/93	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL	NA	NA	NA	BDL	30	2
	08/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	**15**
	11/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		**200**	**210,000**	**70**	**7**	**0.38**	**1**	**70**	**70**	**0.7**	**2.8**	**100**	**2.1**	**0.015**	**7**	**NA**	**1000**	**15**
MW-11S	06/27/93	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	**270**	BDL	BDL	NA	NA	NA	**270**	BDL	BDL
	09/19/93	4.3	BDL	3.1	BDL	BDL	NA	NA	NA	**230**	BDL	BDL	NA	NA	NA	**237.4**	20	2
	08/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	**130**	BDL	NA	NA	NA	NA	**130**	BDL	**38**
	11/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	**120**	BDL	NA	NA	NA	NA	**120**	BDL	12
	09/13/96	BDL	BDL	BDL	1.13	BDL	NA	NA	BDL	**119**	BDL	BDL	NA	NA	NA	**120.13**	BDL	BDL
	04/10/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**7.78**	BDL	BDL	NA	NA	NA	**7.78**	BDL	BDL
	10/31/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**25**	BDL	BDL	NA	NA	NA	**25**	BDL	BDL
	04/28/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**16**	BDL	BDL	NA	NA	NA	**16**	BDL	BDL
	10/07/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**12**	BDL	BDL	NA	NA	NA	**12**	12	10
	04/27/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**16**	BDL	BDL	NA	NA	NA	**16**	BDL	BDL
	10/27/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**9.6**	BDL	BDL	NA	NA	NA	**9.6**	BDL	BDL
	04/25/01	0.51	BDL	BDL	0.6	BDL	NA	NA	BDL	BDL	**45**	BDL	NA	NA	NA	**46.11**	BDL	BDL
	10/21/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/06/05	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**28**	BDL	BDL	NA	NA	BDL	**28**	3.2	0.76J
	04/12/06	0.69	BDL	BDL	1.2	BDL	NA	NA	BDL	**40**	BDL	BDL	NA	NA	NS	**41.89**	NS	NS
	04/25/07	BDL	BDL	BDL	0.77	BDL	NA	NA	BDL	**21**	BDL	BDL	NA	NA	BDL	**21.77**	11	BDL
MW-12S	09/19/93	BDL	BDL	6.6	**7.3**	BDL	NA	NA	NA	**2**	**3.7**	BDL	NA	NA	NA	**19.6**	40	2.1
	08/30/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL
	11/30/94	3.1	BDL	11	**11**	BDL	NA	NA	NA	**2.6**	BDL	NA	NA	NA	NA	**27.7**	BDL	**18**
	09/13/96	BDL	BDL	1.11	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**1.11**	BDL	BDL
	04/09/97	BDL	BDL	5.82	3.28	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**9.1**	BDL	BDL
	10/30/97	BDL	BDL	2	1	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**3**	BDL	BDL
	04/28/98	BDL	BDL	0.6	1	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**1.6**	BDL	BDL
	10/08/98	0.54	BDL	3.4	0.7	BDL	NA	NA	0.68	**2.1**	0.51	BDL	NA	NA	NA	**7.93**	BDL	BDL
	04/28/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**1.6**	BDL	BDL	NA	NA	NA	**1.6**	BDL	BDL
	10/28/99	BDL	BDL	2.8	1.8	BDL	NA	NA	1.0	0.6	0.2	BDL	NA	NA	NA	**6.4**	BDL	BDL
	10/12/00	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	27	**30**
	04/25/01	BDL	BDL	0.65	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**0.65**	27	**30**
	10/24/01	BDL	BDL	3.5	1.4	BDL	NA	NA	1.6	**0.7**	0.66	BDL	NA	NA	NA	**7.86**	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/01/02	BDL	BDL	4.7	2.6	BDL	NA	NA	1.8	**0.71**	1.10	BDL	NA	NA	NA	**10.91**	BDL	BDL
	04/23/03	BDL	BDL	3.7	1.4	BDL	NA	NA	0.80	**0.77**	0.73	BDL	NA	NA	NA	**7.4**	BDL	BDL
	10/29/03	BDL	BDL	5.8	3.2	BDL	NA	NA	2.10	**0.85**	BDL	BDL	NA	NA	NA	**11.95**	BDL	BDL
	04/07/04	BDL	BDL	4.8	2.6	BDL	NA	NA	2	BDL	1.3	BDL	NA	NA	NA	**10.7**	BDL	BDL
	10/21/04	BDL	BDL	6.5	3.1	BDL	NA	NA	2.9	BDL	1.5	BDL	NA	NA	NA	**14**	1.7 J	1.2 J
	04/07/05	BDL	BDL	5.1	4.3	BDL	NA	NA	2.6	**1.1**	1.6	BDL	NA	NA	**15**	**14.7**	BDL	BDL
	10/12/05	BDL	BDL	5.4	3.4	BDL	NA	NA	1.5	**0.78**	1.8	BDL	NA	NA	**21**	**12.88**	BDL	BDL
	04/12/06	BDL	BDL	6.6	2.2	BDL	NA	NA	1.9	**0.82**	1.8	BDL	NA	NA	**32**	**13.32**	5.7J	7.2
	10/05/06	BDL	BDL	9.8	5.4	BDL	NA	NA	5.2	0.59	0.5	BDL	NA	NA	**37**	**21.49**	6.2J	6.4
	04/25/07	BDL	BDL	9.5	5.5	BDL	NA	NA	4.5	0.57	0.69	BDL	NA	NA	**40**	**20.76**	2.4J	BDL
	10/23/07	BDL	BDL	14	5.9	BDL	NA	NA	7.1	BDL	0.59	BDL	NA	NA	**53**	**27.59**	BDL	1.5 J
	04/25/08	BDL	BDL	11	6.0	BDL	NA	NA	6.5	0.60	0.53	BDL	NA	NA	**59**	**24.63**	BDL	2.3 J
	10/14/08	BDL	BDL	9.1	4.5	BDL	NA	NA	5.4	BDL	0.55	BDL	NA	NA	**36**	**19.55**	BDL	1.5 J
	04/16/09	BDL	BDL	1.1	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	**34**	**1.1**	1.1 J	BDL
	10/08/09	BDL	BDL	3.2	0.94	BDL	BDL	BDL	0.97	BDL	1.1	BDL	BDL	BDL	**96**	**6.21**	0.0026 J	0.0016 J

Table 3
Historic Groundwater Analytical Results
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Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		**200**	**210,000**	**70**	**7**	**0.38**	**1**	**70**	**70**	**0.7**	**2.8**	**100**	**2.1**	**0.015**	**7**	**NA**	**1000**	**15**
MW-13D	10/31/97	**1300**	BDL	42	**460**	BDL	NA	NA	BDL	**100**	BDL	BDL	NA	NA	NA	**1902**	169	BDL
	04/27/98	**2000**	BDL	BDL	**360**	BDL	NA	NA	BDL	**59**	BDL	BDL	NA	NA	NA	**2419**	278	BDL
	10/07/98	**470**	BDL	69	**200**	**2.2**	NA	NA	BDL	**79**	BDL	BDL	NA	NA	NA	**820.2**	93	BDL
	04/27/99	**2000**	BDL	39	**120**	BDL	NA	NA	BDL	**45**	**42**	BDL	NA	NA	NA	**2246**	BDL	BDL
	10/27/99	>50	BDL	32	BDL	**19.5**	NA	NA	0.7	BDL	1.2	0.9	NA	NA	NA	**54.3**	24	BDL
	12/14/99	**1270**	BDL	16.7	**135**	BDL	NA	NA	BDL	**16.7**	BDL	BDL	NA	NA	NA	**1438.4**	240	BDL
	10/11/00	**670**	2.4	30	**120**	**3.3**	NA	NA	BDL	**73**	**3.4**	BDL	NA	NA	NA	**902.1**	710	BDL
	04/25/01	**450**	BDL	11	**93**	BDL	NA	NA	BDL	**6.2**	BDL	BDL	NA	NA	NA	**560.2**	BDL	BDL
	10/24/01	**300**	BDL	15	**92**	**0.75**	NA	NA	BDL	**17**	BDL	BDL	NA	NA	NA	**424.75**	BDL	BDL
	04/18/02	**250**	BDL	16	**200**	**2.5**	NA	NA	BDL	**13**	BDL	BDL	NA	NA	NA	**481.5**	BDL	BDL
	10/02/02	73	BDL	5	**26**	BDL	NA	NA	BDL	**4.6**	BDL	BDL	NA	NA	NA	**108.4**	BDL	BDL
	11/01/02	40	BDL	2.8	**41**	BDL	NA	NA	BDL	**3.3**	BDL	BDL	NA	NA	NA	**87.1**	NM	NM
	04/23/03	58	BDL	6.1	**29**	BDL	NA	NA	BDL	**6.3**	BDL	BDL	NA	NA	NA	**99.4**	BDL	BDL
	10/29/03	58	BDL	10	**41**	BDL	NA	NA	BDL	**6.8**	BDL	BDL	NA	NA	NA	**115.8**	BDL	BDL
	04/07/04	28	BDL	4.9	**19**	BDL	NA	NA	BDL	**4.4**	BDL	BDL	NA	NA	NA	**56.3**	BDL	BDL
	10/21/04	30	BDL	5.2	**20**	BDL	NA	NA	BDL	**3.8**	BDL	BDL	NA	NA	NA	**59**	120	BDL
	04/06/05	**210**	BDL	20	**95**	**1.8**	NA	NA	BDL	**18**	BDL	BDL	NA	NA	**20**	**344.8**	57	0.28J
	10/12/05	11	BDL	1.7	**7.0**	BDL	NA	NA	BDL	**1.9**	BDL	BDL	NA	NA	BDL	**21.6**	48	BDL
	04/12/06	8.3	BDL	2.5	**8.2**	BDL	NA	NA	BDL	**2.4**	BDL	BDL	NA	NA	**21**	**21.4**	76	BDL
	10/05/06	9.8	BDL	3.2	**11**	BDL	NA	NA	BDL	**2.6**	BDL	BDL	NA	NA	**24**	**26.6**	87	BDL
	04/25/07	32	BDL	6.9	**23**	BDL	NA	NA	BDL	**5.7**	BDL	BDL	NA	NA	**9.1**	**67.6**	120	BDL
	06/13/07	11	BDL	1.8	BDL	BDL	NA	NA	BDL	**1.8**	BDL	BDL	NA	NA	5.8	**14.6**	60	BDL
	10/25/07	2.2	BDL	BDL	0.60	BDL	NA	NA	BDL	0.56	BDL	BDL	NA	NA	BDL	**3.36**	39	BDL
	04/24/08	2.8	BDL	0.71	1.3	BDL	NA	NA	BDL	0.60	BDL	BDL	NA	NA	3.3	**5.41**	1.4	BDL
	10/15/08	2.9	BDL	0.74	0.77	BDL	NA	NA	BDL	**0.79**	BDL	BDL	NA	NA	BDL	**5.2**	29.0	BDL
	04/16/09	2.1	BDL	0.62	2.10	BDL	NA	NA	BDL	0.67	BDL	BDL	NA	NA	BDL	**5.49**	1.4 J	BDL
	10/08/09	5.7	BDL	1.4	3.7	BDL	BDL	BDL	BDL	**1.40**	BDL	BDL	BDL	BDL	BDL	**12.20**	0.35	BDL
MW-13S	05/28/95	**390**	BDL	BDL	**2000**	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**2390**	BDL	6.6
	09/13/96	**562**	BDL	182	**2610**	**10.4**	NA	NA	BDL	**242**	**3.35**	BDL	NA	NA	NA	**3609.75**	9	8
	04/10/97	**306**	5.19	233	**2370**	**13.8**	NA	NA	BDL	**403**	**3.61**	BDL	NA	NA	NA	**3334.6**	BDL	BDL
	10/31/97	160	BDL	BDL	**1500**	BDL	NA	NA	BDL	**2500**	BDL	BDL	NA	NA	NA	**4160**	BDL	BDL
	04/27/98	90	BDL	65	**1900**	BDL	NA	NA	BDL	**1700**	BDL	BDL	NA	NA	NA	**3755**	BDL	BDL
	10/07/98	85	BDL	53	**780**	BDL	NA	NA	BDL	**2400**	BDL	BDL	NA	NA	NA	**3318**	13	**17**
	04/27/99	98	BDL	72	**1300**	**8.1**	NA	NA	BDL	**1300**	**3.7**	BDL	NA	NA	NA	**2781.8**	BDL	BDL
	10/27/99	59.5	4.3	56.0	**>50**	**7.0**	NA	NA	1.3	**65.8**	**3.0**	1.6	NA	NA	NA	**198.5**	BDL	BDL
	12/14/99	68	BDL	68	**1740**	BDL	NA	NA	BDL	**957**	BDL	BDL	NA	NA	NA	**2833**	BDL	BDL
	10/11/00	38	BDL	69	**2200**	**6.5**	NA	NA	BDL	**390**	BDL	BDL	NA	NA	NA	**2703.5**	42	BDL
	04/25/01	6.8	BDL	19	**520**	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**545.8**	BDL	BDL
	04/18/02	7.1	BDL	23	**230**	BDL	NA	NA	BDL	**120**	BDL	BDL	NA	NA	NA	**380.1**	BDL	BDL
	04/23/03	9	2.2	45	**440**	**4.7**	NA	NA	BDL	**230**	1.3	BDL	NA	NA	NA	**732.2**	BDL	BDL
	10/29/03	7	2.4	82	**1100**	**9.2**	NA	NA	BDL	**300**	2.0	BDL	NA	NA	NA	**1503**	NM	NM
	10/21/04	4.6	3.5	69	**650**	**8.4**	NA	NA	BDL	**260**	1.4	BDL	NA	NA	NA	**996.9**	BDL	BDL
	04/06/05	3.9	3.2	52	**600**	**7.3**	NA	NA	BDL	**290**	2.3	BDL	NA	NA	**230**	**958.7**	2.6	1.1
	10/12/05	Dry	Dry	Dry	Dry	Dry	NA	NA	Dry	Dry	Dry	Dry	NA	NA	Dry	Dry	Dry	Dry
	04/12/06	Dry	Dry	Dry	Dry	Dry	NA	NA	Dry	Dry	Dry	Dry	NA	NA	Dry	Dry	Dry	Dry
	10/03/06	Dry	Dry	Dry	Dry	Dry	NA	NA	Dry	Dry	Dry	Dry	NA	NA	Dry	Dry	Dry	Dry
	04/25/07	4.9	3.9	66	**570**	**7.1**	NA	NA	0.83	**140**	2.7	BDL	NA	NA	**360**	**795.43**	6.1J	0.9J
	06/13/07	5.0	3.5	**73**	**510**	**6.3**	NA	NA	BDL	**93**	**3.8**	BDL	NA	NA	**720**	**694.6**	1.4J	BDL
	04/16/09	11	3.0	**85**	**460**	**5.6**	NA	NA	BDL	**110**	**2.8**	BDL	NA	NA	**980**	**677.4**	1.4 J	BDL
	10/08/09	14	4.2	**86**	**530**	**8.5**	BDL	12	BDL	**130**	**4.9**	BDL	BDL	BDL	**1000**	**789.6**	0.0032 J	BDL
MW-13Sr	06/13/07	64	1.9	**150**	**370**	**4.7**	NA	NA	BDL	**67**	**4.4**	BDL	NA	NA	**320**	**662**	1.5J	BDL
	10/25/07	61	BDL	110	**490**	BDL	NA	NA	BDL	**67**	BDL	BDL	NA	NA	**710**	**728**	14	2.4 J
	04/24/08	56	BDL	100	**430**	BDL	NA	NA	BDL	**67**	BDL	BDL	NA	NA	**680**	**653**	BDL	BDL
	10/15/08	81	BDL	120	**640**	BDL	NA	NA	BDL	**80**	BDL	BDL	NA	NA	**410**	**921**	BDL	BDL
	04/16/09	35	1.3	**74**	**160**	**2.6**	NA	NA	BDL	**59**	**4.1**	BDL	NA	NA	**440**	**336**	1.1 J	BDL
	10/08/09	49	1.5	**82**	**320**	**3.4**	BDL	1.8	BDL	**71**	**3.9**	BDL	BDL	BDL	**690**	**532.6**	0.0015 J	BDL

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		**200**	**210,000**	**70**	**7**	**0.38**	**1**	**70**	**70**	**0.7**	**2.8**	**100**	**2.1**	**0.015**	**7**	**NA**	**1000**	**15**
MW-14D	10/31/97	**16000**	BDL	BDL	**810**	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**16810**	**272**	BDL
	04/28/98	**9700**	BDL	BDL	**680**	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**10380**	209	BDL
	10/08/98	**8500**	BDL	BDL	**380**	BDL	NA	NA	BDL	**82**	BDL	BDL	NA	NA	NA	**8962**	320	BDL
	04/28/99	**3600**	BDL	3.6	**190**	BDL	NA	NA	BDL	**74**	**5.5**	BDL	NA	NA	NA	**3873.1**	BDL	BDL
	10/27/99	4.0	BDL	BDL	BDL	BDL	NA	NA	1.5	BDL	**3.0**	3.1	NA	NA	NA	**11.6**	62	BDL
	12/14/99	**4420**	BDL	16.4	**237**	BDL	NA	NA	BDL	**22**	BDL	BDL	NA	NA	NA	**4695.4**	620	BDL
	10/11/00	**3400**	BDL	5.2	**550**	BDL	NA	NA	BDL	**93**	0.6	BDL	NA	NA	NA	**4048.8**	250	6
	04/25/01	**410**	BDL	BDL	**28**	BDL	NA	NA	BDL	**2.6**	0.58	BDL	NA	NA	NA	**441.18**	BDL	6
	10/24/01	**1500**	BDL	1.2	**98**	**0.66**	NA	NA	BDL	**18**	0.68	BDL	NA	NA	NA	**1618.54**	BDL	BDL
	04/18/02	**500**	BDL	3.0	**33**	BDL	NA	NA	BDL	**4.7**	BDL	BDL	NA	NA	NA	**540.7**	BDL	BDL
	10/02/02	**600**	BDL	1.8	**85**	BDL	NA	NA	BDL	**12.0**	0.87	BDL	NA	NA	NA	**699.67**	BDL	BDL
	11/01/02	170	BDL	5.9	**56**	**0.76**	NA	NA	BDL	**3.5**	0.87	BDL	NA	NA	NA	**237.03**	NM	NM
	04/23/03	**680**	BDL	1	**63**	BDL	NA	NA	BDL	**12**	BDL	BDL	NA	NA	NA	**756**	BDL	BDL
	10/29/03	**320**	BDL	60	**29**	BDL	NA	NA	BDL	**7**	BDL	BDL	NA	NA	NA	**415.6**	BDL	BDL
	04/07/04	**230**	BDL	BDL	**27**	BDL	NA	NA	BDL	**4.5**	BDL	BDL	NA	NA	NA	**261.5**	BDL	BDL
	10/21/04	**380**	BDL	57	**38**	BDL	NA	NA	BDL	**7.5**	BDL	BDL	NA	NA	NA	**482.5**	54	BDL
	04/07/05	**220**	BDL	2.1	**16**	BDL	NA	NA	BDL	**4.4**	BDL	BDL	NA	NA	BDL	**242.5**	120	BDL
	10/12/05	**370**	BDL	1.3	**43**	BDL	NA	NA	BDL	**8.8**	BDL	BDL	NA	NA	BDL	**423.1**	56	BDL
	04/12/06	62	BDL	1.4	**11**	BDL	NA	NA	BDL	**2.5**	BDL	BDL	NA	NA	BDL	**76.9**	91	3.9J
	10/05/06	170	BDL	28	**29**	BDL	NA	NA	BDL	**4.1**	BDL	BDL	NA	NA	5.8	**231.1**	50	BDL
	04/25/07	**350**	BDL	BDL	**38**	BDL	NA	NA	BDL	**5.1**	BDL	BDL	NA	NA	BDL	**393.1**	89	BDL
	10/24/07	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	260	2.1 J
	04/23/08	180	BDL	BDL	**27**	BDL	NA	NA	BDL	**3.5**	BDL	BDL	NA	NA	BDL	**210.5**	220	BDL
	10/15/08	**280**	BDL	0.55	**34**	BDL	NA	NA	BDL	**3.4**	BDL	BDL	NA	NA	BDL	**317.95**	190	1.4 J
	04/16/09	120	BDL	1.20	**15**	BDL	NA	NA	BDL	**2.5**	BDL	BDL	NA	NA	BDL	**138.7**	190	1.8 J
	10/07/09	160	BDL	BDL	**14**	BDL	BDL	BDL	BDL	**2.3**	BDL	BDL	BDL	BDL	BDL	**176.3**	0.14	0.0019 J
MW-15D	10/08/98	3.9	BDL	1.6	**27**	BDL	NA	NA	BDL	**28**	**17**	BDL	NA	NA	NA	**77.5**	BDL	BDL
	04/28/99	2.4	BDL	BDL	**19**	BDL	NA	NA	0.7	BDL	**18**	1.4	NA	NA	NA	**41.48**	BDL	BDL
	10/27/99	BDL	1	BDL	**39**	**4**	NA	NA	BDL	**15**	**8**	BDL	NA	NA	NA	**67**	10	BDL
	10/12/00	BDL	BDL	0.97	**45**	BDL	NA	NA	BDL	**11**	**11**	BDL	NA	NA	NA	**67.97**	13	BDL
	04/25/01	BDL	BDL	0.97	**34**	BDL	NA	NA	BDL	**13**	**11**	BDL	NA	NA	NA	**58.97**	BDL	BDL
	10/24/01	0.61	BDL	0.9	**35**	BDL	NA	NA	BDL	**8.4**	**8.6**	BDL	NA	NA	NA	**53.51**	BDL	BDL
	04/18/02	BDL	BDL	0.8	3	BDL	NA	NA	BDL	**5.4**	**4.7**	BDL	NA	NA	NA	**14.29**	BDL	BDL
	10/21/04	BDL	BDL	BDL	**13**	BDL	NA	NA	BDL	**5.3**	**4.8**	BDL	NA	NA	NA	**23.1**	3.5 J	BDL
MW-15S	10/08/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	190	**170**
	04/28/99	10	BDL	BDL	2.1	BDL	NA	NA	BDL	**35**	BDL	BDL	NA	NA	NA	**47.1**	BDL	BDL
	10/27/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	37	12
	10/12/00	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	40	BDL
	04/27/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/24/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/21/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
MW-16D	05/31/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/04/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	1.50	BDL	NA	NA	NA	BDL	BDL	BDL
	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/29/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
MW-1IK	12/01/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL
MW-1SK	12/01/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	8
MW-2IK	09/21/94	**300**	BDL	63	**1800**	BDL	NA	NA	BDL	**340**	**41**	BDL	NA	NA	NA	**2544**	BDL	**26**
	12/01/94	**220**	BDL	BDL	**1500**	BDL	NA	NA	NA	**260**	BDL	NA	NA	NA	NA	**1980**	BDL	BDL
MW-2SK	09/21/94	**260**	BDL	47	**1000**	BDL	NA	NA	BDL	**270**	**8**	BDL	NA	NA	NA	**1585**	14	**24**
	12/01/94	BDL	BDL	BDL	**940**	BDL	NA	NA	NA	**240**	BDL	NA	NA	NA	NA	**1180**	BDL	BDL
	09/13/96	56.8	BDL	15.5	**434**	BDL	NA	NA	BDL	**121**	**7.27**	BDL	NA	NA	NA	**634.57**	8	3

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		200	210,000	70	7	0.38	1	70	70	0.7	2.8	100	2.1	0.015	7	NA	1000	15
MW-3DK	10/08/98	2.7	BDL	BDL	BDL	BDL	NA	NA	BDL	54	BDL	BDL	NA	NA	NA	56.7	26	29
	04/28/99	10	BDL	BDL	2.1	BDL	NA	NA	BDL	35	BDL	BDL	NA	NA	NA	47.1	BDL	BDL
	10/27/99	2.8	BDL	BDL	0.9	BDL	NA	NA	BDL	7.4	BDL	BDL	NA	NA	NA	11.1	17	12
	10/12/00	92	BDL	7.6	64	BDL	NA	NA	0.58	81	BDL	BDL	NA	NA	NA	245.18	19	16
	04/25/01	7.5	BDL	BDL	3.2	BDL	NA	NA	BDL	30	BDL	BDL	NA	NA	NA	40.7	19	16
	10/24/01	87	BDL	13	73	0.86	NA	NA	0.66	70	BDL	BDL	NA	NA	NA	244.52	BDL	BDL
	04/18/02	55	BDL	5.8	58	1.4	NA	NA	0.58	100	BDL	BDL	NA	NA	NA	220.78	BDL	BDL
	10/02/02	78	BDL	BDL	87	BDL	NA	NA	BDL	160	BDL	BDL	NA	NA	NA	325	BDL	BDL
	11/01/02	35	BDL	5.7	83	BDL	NA	NA	BDL	86	BDL	BDL	NA	NA	NA	209.7	NM	NM
	04/23/03	64	BDL	8.6	75	BDL	NA	NA	BDL	110	0.95	BDL	NA	NA	NA	258.55	BDL	BDL
	10/29/03	31	BDL	6.8	110	BDL	NA	NA	BDL	90	0.85	BDL	NA	NA	NA	238.65	BDL	BDL
	04/07/04	36	BDL	8.8	78	BDL	NA	NA	BDL	87	0.94	BDL	NA	NA	NA	210.74	BDL	BDL
	10/21/04	29	BDL	2.2	15	BDL	NA	NA	BDL	48	BDL	BDL	NA	NA	NA	94.2	5 J	BDL
	04/07/05	43	BDL	1.8	25	BDL	NA	NA	BDL	330	BDL	BDL	NA	NA	12	399.8	2.3	0.46J
	10/12/05	32	BDL	9.4	69	BDL	NA	NA	BDL	83	BDL	BDL	NA	NA	33	193.4	BDL	BDL
	04/12/06	16	BDL	5.1	43	BDL	NA	NA	BDL	51	1.5	BDL	NA	NA	31	116.6	2.2J	1.5J
	10/05/06	60	BDL	5.5	42	BDL	NA	NA	BDL	160	BDL	BDL	NA	NA	14	267.5	BDL	BDL
	04/25/07	47	BDL	3.7	22	BDL	NA	NA	BDL	99	BDL	BDL	NA	NA	3.2	171.7	2.3J	BDL
	10/23/07	54	BDL	3.8	23	BDL	NA	NA	BDL	120	BDL	BDL	NA	NA	11	200.8	1.3 J	2.2 J
	04/24/08	56	BDL	5.7	11	BDL	NA	NA	BDL	110	BDL	BDL	NA	NA	15	182.7	BDL	1.5 J
	10/14/08	67	BDL	8.8	30	BDL	NA	NA	BDL	140	BDL	BDL	NA	NA	12	245.8	BDL	BDL
	04/15/09	65	BDL	6.5	26	BDL	NA	NA	BDL	160	BDL	BDL	NA	NA	13	257.5	2.0 J	BDL
	10/07/09	47	BDL	5.1	13	BDL	BDL	0.57	BDL	140	BDL	BDL	BDL	BDL	23	205.67	0.0015 J	BDL
MW-3SK	09/21/94	58	BDL	BDL	28	BDL	NA	NA	BDL	360	BDL	BDL	NA	NA	NA	446	1	8
	12/01/94	65	20	BDL	38	BDL	NA	NA	NA	300	BDL	NA	NA	NA	NA	423	55	57
	10/21/04	4.1	BDL	BDL	1.4	BDL	NA	NA	BDL	19	BDL	BDL	NA	NA	NA	24.5	21	14
	04/07/05	2.1	BDL	BDL	1.1	BDL	NA	NA	BDL	19	BDL	BDL	NA	NA	8.2	22.2	1.7J	0.43J
	04/12/06	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	4.1	BDL	BDL	NA	NA	NS	4.1	NS	NS
	10/05/06	4.2	BDL	BDL	1.3	BDL	NA	NA	BDL	22	BDL	BDL	NA	NA	7.1	27.5	3.1J	7.9
	04/24/08	8.7	BDL	BDL	0.62	BDL	NA	NA	BDL	55	BDL	BDL	NA	NA	5.2	64.32	2.1 J	5.6
	10/14/08	12	BDL	BDL	1.5	BDL	NA	NA	BDL	61	BDL	BDL	NA	NA	BDL	74.5	BDL	BDL
	04/15/09	11	BDL	BDL	1.2	BDL	NA	NA	BDL	71	BDL	BDL	NA	NA	BDL	83.2	3.9 J	1.0 J
	10/07/09	13	BDL	BDL	1.8	BDL	BDL	BDL	BDL	100	BDL	BDL	BDL	BDL	BDL	114.8	0.0066 J	0.0059
MW-4SK	09/21/94	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	32	BDL
	12/01/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL
MW-5SK	12/01/94	BDL	BDL	2.5	2.5	BDL	NA	NA	NA	BDL	3.1	NA	NA	NA	NA	8.1	BDL	11
	09/13/96	BDL	BDL	3.67	28.7	BDL	NA	NA	33.4	6.49	83.7	BDL	NA	NA	NA	155.96	2	BDL
	04/09/97	BDL	BDL	2.4	8.22	BDL	NA	NA	1.8	BDL	5.41	BDL	NA	NA	NA	17.83	BDL	BDL
	10/30/97	BDL	BDL	2	1	BDL	NA	NA	6	BDL	0.5	BDL	NA	NA	NA	9.5	BDL	BDL
	04/27/98	BDL	BDL	0.8	2	BDL	NA	NA	BDL	BDL	2	BDL	NA	NA	NA	4.8	BDL	BDL
	10/08/98	BDL	BDL	BDL	0.66	BDL	NA	NA	1.9	BDL	BDL	BDL	NA	NA	NA	2.56	14	8
	04/28/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	1.2	1.3	BDL	NA	NA	NA	2.5	BDL	BDL
	10/27/99	BDL	BDL	0.3	0.6	0.4	NA	NA	1.4	BDL	BDL	BDL	NA	NA	NA	2.7	10	BDL
	10/12/00	BDL	BDL	0.72	BDL	BDL	NA	NA	3.3	BDL	0.66	BDL	NA	NA	NA	4.68	BDL	BDL
	04/25/01	BDL	BDL	1	3.5	BDL	NA	NA	3.1	BDL	4.3	BDL	NA	NA	NA	11.9	BDL	BDL
	10/24/01	BDL	BDL	0.59	0.7	BDL	NA	NA	2.6	BDL	BDL	BDL	NA	NA	NA	3.89	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	1.6	BDL	BDL	BDL	NA	NA	NA	1.6	BDL	BDL
	10/01/02	BDL	BDL	BDL	BDL	BDL	NA	NA	1.8	BDL	BDL	BDL	NA	NA	NA	1.8	BDL	BDL
	04/23/03	BDL	BDL	0.56	BDL	BDL	NA	NA	3.6	BDL	BDL	BDL	NA	NA	NA	4.16	BDL	BDL
	10/29/03	BDL	BDL	0.77	1.3	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	2.07	BDL	BDL
	04/07/04	BDL	BDL	0.57	1.9	BDL	NA	NA	4.6	BDL	BDL	BDL	NA	NA	NA	7.07	BDL	BDL
	10/21/04	BDL	BDL	BDL	1.5	BDL	NA	NA	5.8	BDL	BDL	BDL	NA	NA	NA	7.3	BDL	BDL
	04/07/05	BDL	BDL	0.78	2.1	BDL	NA	NA	7.0	BDL	1.0	BDL	NA	NA	14	10.88	BDL	BDL
	10/12/05	BDL	BDL	1.1	2.9	BDL	NA	NA	6.6	BDL	BDL	BDL	NA	NA	BDL	10.6	BDL	BDL
	04/12/06	BDL	BDL	0.74	1.4	BDL	NA	NA	4.6	BDL	BDL	BDL	NA	NA	16	6.74	BDL	BDL
	10/05/06	BDL	BDL	0.74	1.4	BDL	NA	NA	4.7	BDL	BDL	BDL	NA	NA	5.6	6.84	BDL	BDL
	04/25/07	BDL	BDL	0.84	1.7	BDL	NA	NA	4.9	BDL	0.91	BDL	NA	NA	2.5	8.35	1.4J	BDL
	10/25/07	BDL	BDL	0.56	0.81	BDL	NA	NA	3.6	BDL	BDL	BDL	NA	NA	3.8	4.97	2.0 J	3.8 J
	04/23/08	BDL	BDL	BDL	BDL	BDL	NA	NA	2.3	BDL	BDL	BDL	NA	NA	3.1	2.3	2.6 J	4.8 J
	10/14/08	BDL	BDL	0.52	0.55	BDL	NA	NA	3.0	BDL	BDL	BDL	NA	NA	BDL	4.07	4.3 J	1.2 J
	04/15/09	BDL	BDL	0.70	0.94	BDL	NA	NA	3.4	BDL	1.1	BDL	NA	NA	BDL	6.14	BDL	BDL
	10/07/09	BDL	BDL	BDL	0.63	BDL	BDL	BDL	3.3	BDL	BDL	BDL	BDL	0.57	BDL	4.50	0.0018 J	0.0012 J

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		200	210,000	70	7	0.38	1	70	70	0.7	2.8	100	2.1	0.015	7	NA	1000	15
MW-6IK	12/01/94	2	BDL	BDL	15	BDL	NA	NA	NA	5.8	4.6	NA	NA	NA	NA	27.4	BDL	BDL
MW-6SK	12/01/94	5.4	BDL	6.8	58	BDL	NA	NA	NA	19	34	NA	NA	NA	NA	123.2	BDL	BDL
MW-7IK	12/01/94	230	BDL	BDL	400	BDL	NA	NA	NA	3200	BDL	NA	NA	NA	NA	3830	BDL	BDL
MW-7SK	12/01/94	28	7.1	BDL	79	BDL	NA	NA	NA	110	BDL	NA	NA	NA	NA	224.1	BDL	8
MW-8DK	12/01/94	13	BDL	BDL	32	BDL	NA	NA	NA	76	BDL	NA	NA	NA	NA	121	BDL	BDL
MW-8SK	12/01/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL
MW-9DK	12/01/94	27	BDL	BDL	180	BDL	NA	NA	NA	41	BDL	NA	NA	NA	NA	248	BDL	BDL
	09/13/96	36.6	BDL	7.27	225	BDL	NA	NA	BDL	81	8.58	BDL	NA	NA	NA	358.45	BDL	BDL
	01/14/97	9.43	BDL	BDL	BDL	BDL	NA	NA	BDL	22.3	5.53	BDL	NA	NA	NA	37.26	BDL	BDL
	04/09/97	2.79	BDL	BDL	39.7	BDL	NA	NA	BDL	10.5	5.69	BDL	NA	NA	NA	58.68	BDL	BDL
	10/30/97	BDL	BDL	2	28	BDL	NA	NA	BDL	8	5	BDL	NA	NA	NA	43	BDL	BDL
	04/27/98	0.6	BDL	BDL	19	BDL	NA	NA	BDL	5	3	BDL	NA	NA	NA	27.6	BDL	BDL
	10/08/98	0.65	BDL	0.53	4.2	BDL	NA	NA	BDL	3.7	2.5	BDL	NA	NA	NA	11.58	BDL	BDL
	04/28/99	0.51	BDL	BDL	3.2	BDL	NA	NA	BDL	2.1	1.2	BDL	NA	NA	NA	7.01	BDL	BDL
	10/27/99	BDL	BDL	BDL	3	BDL	NA	NA	BDL	1	1.4	BDL	NA	NA	NA	5.4	20	BDL
	10/12/00	BDL	BDL	BDL	0.65	BDL	NA	NA	BDL	1.2	1.6	BDL	NA	NA	NA	3.45	22	BDL
	04/25/01	BDL	BDL	BDL	3.1	BDL	NA	NA	BDL	1.8	3.4	BDL	NA	NA	NA	8.3	22	BDL
	10/24/01	BDL	BDL	BDL	1.8	BDL	NA	NA	BDL	0.68	1.50	BDL	NA	NA	NA	3.98	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/01/02	BDL	BDL	BDL	2.6	BDL	NA	NA	BDL	1.0	2.0	BDL	NA	NA	NA	5.6	BDL	BDL
	04/23/03	BDL	BDL	BDL	1.5	BDL	NA	NA	BDL	0.88	1.1	BDL	NA	NA	NA	3.48	BDL	BDL
	10/29/03	BDL	BDL	BDL	3.7	BDL	NA	NA	BDL	1.40	0.7	BDL	NA	NA	NA	5.8	BDL	BDL
	04/07/04	BDL	BDL	BDL	4.3	BDL	NA	NA	BDL	1.3	1.7	BDL	NA	NA	NA	7.3	BDL	BDL
	10/21/04	1.8	BDL	BDL	5.9	BDL	NA	NA	BDL	2.9	2.8	BDL	NA	NA	NA	13.4	21 J	BDL
	04/07/05	2.7	BDL	BDL	8.3	BDL	NA	NA	BDL	7.1	3.6	BDL	NA	NA	BDL	21.7	BDL	BDL
	10/12/05	4.2	BDL	0.73	8.8	BDL	NA	NA	BDL	6.3	4.7	BDL	NA	NA	BDL	24.73	BDL	BDL
	04/12/06	0.64	BDL	BDL	3.8	BDL	NA	NA	BDL	2.8	3.3	BDL	NA	NA	BDL	10.54	BDL	2.0J
	10/05/06	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	1.9J	BDL
	04/24/07	BDL	BDL	BDL	2.5	BDL	NA	NA	BDL	1.4	2.1	BDL	NA	NA	BDL	6	2.9J	BDL
	10/23/07	BDL	BDL	BDL	2.9	BDL	NA	NA	BDL	1.8	3.5	BDL	NA	NA	3.3	8.2	1.3 J	1.7 J
	04/23/08	BDL	BDL	BDL	2.9	BDL	NA	NA	BDL	2.7	4.1	BDL	NA	NA	BDL	9.7	8.4 J	BDL
	10/14/08	BDL	BDL	BDL	2.7	BDL	NA	NA	BDL	2.8	4.8	BDL	NA	NA	BDL	10.3	1.0 J	BDL
	04/14/09	BDL	BDL	BDL	3.1	BDL	NA	NA	BDL	2.8	4.9	BDL	NA	NA	BDL	10.8	BDL	BDL
	10/06/09	0.60	BDL	BDL	2.6	BDL	BDL	0.92	BDL	3.1	5.6	BDL	BDL	BDL	BDL	12.82	BDL	BDL
MW-9SK	12/01/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL
	09/13/96	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	3	BDL
	01/14/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	N	NA	NA	NA	BDL	23	BDL
	04/10/97	271	BDL	32.7	181	BDL	NA	NA	BDL	24.1	BDL	BDL	NA	NA	NA	508.8	BDL	BDL
	10/30/97	BDL	BDL	1	2	BDL	NA	NA	BDL	0.8	BDL	BDL	NA	NA	NA	3.8	BDL	BDL
	04/27/98	BDL	BDL	BDL	0.6	BDL	NA	NA	BDL	BDL	0.7	BDL	NA	NA	NA	1.3	BDL	BDL
	10/08/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	1.1	BDL	BDL	NA	NA	NA	1.1	93	22
	04/28/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	1.9	2.2	BDL	NA	NA	NA	4.1	BDL	BDL
	10/27/99	BDL	BDL	BDL	0.6	BDL	NA	NA	BDL	0.4	0.6	BDL	NA	NA	NA	1.6	12	BDL
	10/12/00	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	10	BDL
	04/25/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	10	BDL
	10/24/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/03/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/29/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/21/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/05	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	10/12/05	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	04/12/06	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	10/05/06	BDL	BDL	BDL	3.30	BDL	NA	NA	BDL	2.1	2.6	BDL	NA	NA	BDL	8.0	2.7J	BDL
	04/24/07	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	10/23/07	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	1.2	BDL	2.0 J	1.9 J
	04/23/08	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	1.8 J	3.8 J
	10/13/08	BDL	BDL	BDL	1.4	BDL	NA	NA	BDL	2.5	BDL	BDL	NA	NA	BDL	3.9	BDL	BDL
	04/14/09	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	6.6 J	BDL
	10/06/09	0.76	BDL	BDL	2.2	BDL	BDL	BDL	BDL	8.7	0.87	BDL	BDL	BDL	BDL	12.53	BDL	BDL

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		**200**	**210,000**	**70**	**7**	**0.38**	**1**	**70**	**70**	**0.7**	**2.8**	**100**	**2.1**	**0.015**	**7**	**NA**	**1000**	**15**
MW-12DK	12/01/94	BDL	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	NA	NA	NA	NA	BDL	BDL	BDL
	09/13/96	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	2	2
	04/09/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/31/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/27/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/08/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	20	**27**
	04/28/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	0.56	BDL	NA	NA	NA	**0.56**	BDL	BDL
	10/27/99	BDL	BDL	BDL	BDL	**0.4**	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**0.4**	39	BDL
	10/12/00	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/25/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/24/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/01/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/29/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/21/04	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	6.7 J	BDL
	04/07/05	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	10/12/05	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	04/12/06	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	2.2J	1.9J
	10/05/06	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	2.2J	BDL
	04/25/07	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	1.9J	BDL
	10/25/07	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	3.4 J	0.9 J
	04/25/08	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	10/15/08	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	04/15/09	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	10/07/09	BDL	BDL	BDL	BDL	BDL	BDL	1.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**1.1**	BDL	BDL
EQ-1	04/15/09	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**3.5**	BDL	BDL	NA	NA	BDL	**3.5**	BDL	BDL
	10/08/09	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.0022 J	0.0012 J
RW-1	11/10/94	43	BDL	BDL	BDL	**12**	NA	NA	BDL	**164**	BDL	BDL	NA	NA	NA	**219**	9	BDL
	11/30/94	30	10	BDL	**12**	BDL	NA	NA	NA	**160**	BDL	NA	NA	NA	NA	**212**	BDL	BDL
	10/04/02	64	BDL	2	**20**	**0.56**	NA	NA	BDL	**290**	BDL	BDL	NA	NA	NA	**376.56**	BDL	BDL
RW-2	11/30/94	**200**	BDL	BDL	**500**	BDL	NA	NA	NM	**220**	BDL	NM	NA	NA	NA	**920**	BDL	BDL
RW-5	10/03/02	3.6	BDL	0.69	**8.4**	BDL	NA	NA	BDL	**9.6**	**3.4**	BDL	NA	NA	NA	**25.69**	BDL	BDL
	10/21/04	14	BDL	1.7	**23**	BDL	NA	NA	58	**150**	2.6	BDL	NA	NA	NA	**249.3**	4.1 J	BDL
	04/06/05	14	BDL	2.8	**34**	BDL	NA	NA	0.68	**41**	1.4	BDL	NA	NA	**26**	**93.88**	0.76J	0.45J
	10/12/05	6.5	BDL	1.2	**12**	BDL	NA	NA	0.85	**18**	**3.7**	BDL	NA	NA	**8**	**42.25**	BDL	BDL
	04/12/06	0.63	BDL	BDL	3.2	BDL	NA	NA	BDL	**3.9**	2.7	BDL	NA	NA	BDL	**10.43**	BDL	BDL
	10/05/06	2.0	BDL	BDL	5.2	BDL	NA	NA	0.54	**5.8**	2.3	BDL	NA	NA	1.8	**15.84**	BDL	BDL
	04/25/07	BDL	BDL	BDL	4.0	BDL	NA	NA	1.1	**5.6**	1.8	BDL	NA	NA	BDL	**12.5**	1.0J	BDL
	10/24/07	1.8	BDL	1.2	**13**	BDL	NA	NA	BDL	**23**	1.6	BDL	NA	NA	**8.4**	**40.6**	BDL	BDL
	04/25/08	0.70	BDL	BDL	3.4	BDL	NA	NA	BDL	**3.6**	**5.3**	BDL	NA	NA	BDL	**13**	BDL	BDL
	10/15/08	2.2	BDL	1.8	**21**	BDL	NA	NA	BDL	**47**	2.5	BDL	NA	NA	7.4	**74.5**	BDL	BDL
	04/15/09	1.8	BDL	1.4	**13**	BDL	NA	NA	BDL	**41**	2.1	BDL	NA	NA	**8.7**	**59.3**	BDL	BDL
	10/07/09	0.6	BDL	1.0	**11**	BDL	BDL	1.9	BDL	**32**	**3.1**	BDL	BDL	BDL	BDL	**49.6**	0.0011 J	0.0013 J
RW-7	11/19/04	8.8	BDL	1.6	**18**	BDL	NA	NA	15	**97**	2.7	BDL	NA	NA	NA	**143.1**	NM	NM
	04/06/05	4	BDL	0.81	**9.5**	BDL	NA	NA	0.76	**7.6**	**3.1**	BDL	NA	NA	**16**	**25.77**	1.1J	0.87J
	10/12/05	2.7	BDL	0.85	6.7	BDL	NA	NA	BDL	**6.7**	**4.6**	BDL	NA	NA	BDL	**21.55**	BDL	**68**
	04/12/06	BDL	BDL	BDL	2.8	BDL	NA	NA	BDL	**3.0**	**3.2**	BDL	NA	NA	BDL	**9**	3.3J	1.6J
	10/05/06	1.7	BDL	BDL	3.6	BDL	NA	NA	1.8	**4.5**	**3.2**	BDL	NA	NA	1.7	**14.8**	BDL	BDL
	04/25/07	BDL	BDL	BDL	2.6	BDL	NA	NA	0.93	**2.3**	2.5	BDL	NA	NA	BDL	**8.33**	2.6J	BDL
	10/24/07	1.0	BDL	BDL	4.7	BDL	NA	NA	BDL	**3.5**	**5.3**	BDL	NA	NA	4.2	**14.5**	BDL	BDL
	04/24/08	1.9	BDL	1.5	**17**	BDL	NA	NA	BDL	**43**	2.1	BDL	NA	NA	**11**	**65.5**	BDL	BDL
	10/15/08	0.91	BDL	0.5	4.4	BDL	NA	NA	0.91	**4.7**	**6.6**	BDL	NA	NA	BDL	**18.02**	BDL	0.9 J
RW-9	11/19/04	4.8	BDL	2.4	**16**	BDL	NA	NA	5.8	**34**	**7.5**	BDL	NA	NA	NA	**70.5**	NM	NM

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		**200**	**210,000**	**70**	**7**	**0.38**	**1**	**70**	**70**	**0.7**	**2.8**	**100**	**2.1**	**0.015**	**7**	**NA**	**1000**	**15**
CRW-1	01/14/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	15	14
	04/09/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**2.39**	**10.7**	BDL	NA	NA	NA	**13.09**	BDL	BDL
	10/29/97	BDL	BDL	BDL	4	BDL	NA	NA	BDL	**17**	**52**	BDL	NA	NA	NA	**73**	BDL	BDL
	04/27/98	BDL	BDL	BDL	3	BDL	NA	NA	BDL	**13**	**36**	BDL	NA	NA	NA	**52**	BDL	10.4
	10/07/98	BDL	BDL	BDL	0.72	BDL	NA	NA	14	**3.2**	**6.4**	BDL	NA	NA	NA	**24.32**	22	**20**
	04/27/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**4.1**	**15**	BDL	NA	NA	NA	**19.1**	BDL	BDL
	10/26/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**5.0**	**20.0**	BDL	NA	NA	NA	**25**	60	6
	12/14/99	BDL	BDL	0.5	2.8	BDL	NA	NA	BDL	**7.0**	**9.8**	BDL	NA	NA	NA	**20.1**	60	6.0
	10/23/00	BDL	BDL	BDL	0.74	BDL	NA	NA	BDL	**4.3**	**20**	BDL	NA	NA	NA	**25.04**	16	**15**
	04/25/01	BDL	BDL	BDL	0.7	BDL	NA	NA	BDL	**1.2**	**4.5**	BDL	NA	NA	NA	**6.44**	16	**15**
	10/24/01	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	0.65	**4.3**	BDL	NA	NA	NA	**4.95**	BDL	BDL
	04/18/02	2.50	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**2.5**	BDL	**40**
	10/03/02	BDL	BDL	BDL	1.6	BDL	NA	NA	BDL	**2.5**	**14**	BDL	NA	NA	NA	**18.1**	**1200**	**370**
	04/23/03	BDL	BDL	BDL	0.66	BDL	NA	NA	BDL	**1.5**	**7.0**	BDL	NA	NA	NA	**9.16**	BDL	BDL
	10/29/03	BDL	BDL	BDL	0.99	BDL	NA	NA	BDL	**1.6**	**6.8**	BDL	NA	NA	NA	**9.39**	BDL	BDL
	04/07/04	BDL	BDL	BDL	1.2	BDL	NA	NA	1.3	**1.1**	**4**	BDL	NA	NA	NA	**7.6**	BDL	BDL
	10/21/04	6.8	BDL	BDL	3.5	BDL	NA	NA	0.85	**39**	0.74	BDL	NA	NA	NA	**50.89**	10	3.3 J
	04/07/05	3.0	BDL	BDL	4.3	BDL	NA	NA	1.1	**20**	1.9	BDL	NA	NA	BDL	**30.3**	4.0	0.75J
	10/12/05	4.1	BDL	BDL	3.3	BDL	NA	NA	1.3	**32**	2.4	BDL	NA	NA	BDL	**43.1**	15	BDL
	04/12/06	BDL	BDL	BDL	2.1	BDL	NA	NA	0.57	**2.6**	**12**	BDL	NA	NA	BDL	**17.27**	BDL	BDL
	10/05/06	BDL	BDL	BDL	2.4	BDL	NA	NA	0.59	**2.1**	**15**	BDL	NA	NA	BDL	**20.09**	BDL	3.4J
	04/25/07	BDL	BDL	BDL	2.5	BDL	NA	NA	1.1	**2.1**	**14**	BDL	NA	NA	BDL	**19.7**	3.1J	BDL
	10/25/07	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	8.1 J	1.8 J
	04/24/08	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	1.8	BDL	NA	NA	BDL	**1.8**	BDL	BDL
	10/15/08	BDL	BDL	BDL	3.0	BDL	NA	NA	0.75	**1.1**	**16**	BDL	NA	NA	BDL	**20.85**	1.1 J	BDL
	04/15/09	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	10/07/09	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1.1	BDL	BDL	BDL	BDL	**1.1**	BDL	BDL
CRW-5	01/14/97	11.4	BDL	BDL	**120**	BDL	NA	NA	BDL	**48.3**	**5.92**	BDL	NA	NA	NA	**185.62**	14	**23**
	04/10/97	6.38	BDL	1.89	**81**	BDL	NA	NA	BDL	**26**	**5.39**	BDL	NA	NA	NA	**120.66**	BDL	BDL
	10/29/97	BDL	BDL	BDL	2	BDL	NA	NA	BDL	**5**	2	BDL	NA	NA	NA	**9**	83	BDL
	04/28/98	BDL	BDL	BDL	2	BDL	NA	NA	BDL	**0.9**	1	BDL	NA	NA	NA	**3.9**	52.3	**25.3**
	10/07/98	BDL	BDL	BDL	0.75	BDL	NA	NA	BDL	**1.9**	1.2	BDL	NA	NA	NA	**3.85**	240	**21**
	04/27/99	BDL	BDL	BDL	0.98	BDL	NA	NA	BDL	**2.6**	2.4	BDL	NA	NA	NA	**5.98**	BDL	BDL
	10/26/99	BDL	BDL	BDL	1.3	BDL	NA	NA	BDL	**0.8**	1.2	BDL	NA	NA	NA	**3.3**	48	BDL
	12/14/99	BDL	BDL	BDL	0.5	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	**0.5**	48	BDL
	10/11/00	BDL	BDL	BDL	0.97	BDL	NA	NA	BDL	**2.1**	**3.2**	BDL	NA	NA	NA	**6.27**	74	BDL
	04/25/01	BDL	BDL	BDL	0.86	BDL	NA	NA	BDL	**3.6**	**14**	BDL	NA	NA	NA	**18.46**	BDL	BDL
	10/24/01	BDL	BDL	BDL	0.69	BDL	NA	NA	BDL	**0.79**	**3.5**	BDL	NA	NA	NA	**4.98**	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	0.60	1.9	BDL	NA	NA	NA	**2.5**	BDL	BDL
	10/03/02	4.1	BDL	BDL	4.4	BDL	NA	NA	BDL	**31**	0.65	BDL	NA	NA	NA	**40.15**	BDL	**25**
	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**1.6**	**6.6**	BDL	NA	NA	NA	**8.2**	BDL	BDL
	10/29/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	04/07/04	4.2	BDL	BDL	4.6	BDL	NA	NA	2	**20**	0.85	BDL	NA	NA	NA	**31.65**	BDL	BDL
	10/21/04	7.1	BDL	BDL	3.3	BDL	NA	NA	BDL	**43**	BDL	BDL	NA	NA	NA	**53.4**	68	2.2 J
	04/06/05	1.1	BDL	BDL	2.5	BDL	NA	NA	BDL	**5.4**	0.85	BDL	NA	NA	BDL	**9.85**	5.8	0.83J
	10/12/05	4.2	BDL	BDL	3.1	BDL	NA	NA	BDL	**37**	BDL	BDL	NA	NA	BDL	**44.3**	BDL	BDL
	04/12/06	1.5	BDL	0.52	5.7	BDL	NA	NA	BDL	**9.4**	2.1	BDL	NA	NA	BDL	**19.22**	11	1.3J
	10/05/06	2.6	BDL	0.60	**7.7**	BDL	NA	NA	BDL	**8.9**	1.5	BDL	NA	NA	1.80	**21.3**	2.8J	BDL
	04/25/07	1.5	BDL	0.59	**8.0**	BDL	NA	NA	0.82	**9.9**	1.5	BDL	NA	NA	BDL	**22.31**	2.9J	BDL
	10/24/07	BDL	BDL	BDL	BDL	BDL	NA	NA	0.57	BDL	BDL	BDL	NA	NA	BDL	**0.57**	2.6 J	BDL
	04/24/08	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	10/15/08	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL
	04/15/09	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	2.6 J	BDL
	10/07/09	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.0018 J	BDL

Table 3
Historic Groundwater Analytical Results
Former Alcatel Facility
Raleigh, NC

Monitoring Well	Date Sampled	1,1,1-TCA (ug/l)	1,1,2-TCA (ug/l)	1,1-DCA (ug/l)	1,1-DCE (ug/l)	1,2-DCA (ug/l)	Benzene (ug/l)	Chloroform (ug/l)	cis-1,2-DCE (ug/l)	PCE (ug/l)	TCE (ug/l)	trans-1,2-DCE (ug/l)	Trichloro-fluoro-methane (ug/l)	Vinyl Chloride (ug/l)	1,4-Dioxane (ug/l)	Total Chlorinated VOCs (ug/l)	Copper (mg/l)	Lead (mg/l)
2L Standards		**200**	**210,000**	**70**	**7**	**0.38**	**1**	**70**	**70**	**0.7**	**2.8**	**100**	**2.1**	**0.015**	**7**	**NA**	**1000**	**15**
CRW-9	09/13/96	20	4.11	1.32	**15.7**	BDL	NA	NA	BDL	**97.2**	BDL	BDL	NA	NA	NA	**138.33**	3	BDL
	01/14/97	27.6	BDL	BDL	**28.4**	BDL	NA	NA	BDL	**282**	BDL	BDL	NA	NA	NA	**338**	BDL	**27**
	04/10/97	12	BDL	BDL	**12.5**	BDL	NA	NA	BDL	**108**	BDL	BDL	NA	NA	NA	**132.5**	BDL	13
	10/29/97	4	BDL	BDL	4	BDL	NA	NA	BDL	**61**	BDL	BDL	NA	NA	NA	**69**	BDL	BDL
	04/27/98	2	BDL	BDL	5	BDL	NA	NA	BDL	**40**	BDL	BDL	NA	NA	NA	**47**	BDL	BDL
	10/07/98	1.9	BDL	0.55	2.3	BDL	NA	NA	BDL	**24**	BDL	BDL	NA	NA	NA	**28.75**	97	14
	12/14/99	1.4	BDL	BDL	1.5	BDL	NA	NA	1.2	**11.2**	BDL	BDL	NA	NA	NA	**15.3**	NS	NS
CRW-11	01/14/97	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**19**	BDL	BDL	NA	NA	NA	**19**	61	**66**
	04/27/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**2**	BDL	BDL	NA	NA	NA	**2**	BDL	BDL
	10/07/98	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**6.8**	BDL	BDL	NA	NA	NA	**6.8**	10	BDL
	04/27/99	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**2**	BDL	BDL	NA	NA	NA	**2**	BDL	BDL
	10/26/99	BDL	BDL	BDL	BDL	BDL	NA	NA	5.6	0.2	BDL	BDL	NA	NA	NA	**5.8**	30	BDL
	12/14/99	BDL	BDL	BDL	BDL	BDL	NA	NA	9.3	BDL	BDL	BDL	NA	NA	NA	**9.3**	30	BDL
	10/11/00	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**0.95**	BDL	BDL	NA	NA	NA	**0.95**	12	BDL
	04/25/01	BDL	BDL	BDL	6.5	BDL	NA	NA	6.5	**1.1**	1.2	BDL	NA	NA	NA	**15.3**	12	BDL
	10/24/01	BDL	BDL	BDL	0.69	BDL	NA	NA	BDL	**0.8**	BDL	BDL	NA	NA	NA	**1.48**	BDL	BDL
	04/18/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	BDL	BDL	BDL	NA	NA	NA	BDL	BDL	BDL
	10/03/02	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**1.4**	BDL	BDL	NA	NA	NA	**1.4**	BDL	BDL
	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**3.3**	BDL	BDL	NA	NA	NA	**3.3**	BDL	BDL
	10/29/03	1.30	BDL	BDL	1.50	BDL	NA	NA	BDL	**8.0**	BDL	BDL	NA	NA	NA	**10.8**	BDL	BDL
	04/07/04	0.93	BDL	BDL	BDL	BDL	NA	NA	BDL	**4**	BDL	BDL	NA	NA	NA	**4.93**	BDL	BDL
	10/21/04	4.5	BDL	BDL	1.7	BDL	NA	NA	BDL	**26**	BDL	BDL	NA	NA	NA	**32.2**	3.4 J	BDL
	04/06/05	3.5	BDL	BDL	1.9	BDL	NA	NA	BDL	**22**	BDL	BDL	NA	NA	BDL	**27.4**	0.89J	0.24J
	10/12/05	3.4	BDL	BDL	2.4	BDL	NA	NA	BDL	**13**	BDL	BDL	NA	NA	BDL	**18.8**	BDL	BDL
IW-1	04/23/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**7.5**	BDL	BDL	NA	NA	NA	**7.5**	BDL	BDL
	10/29/03	BDL	BDL	BDL	BDL	BDL	NA	NA	BDL	**8.8**	BDL	BDL	NA	NA	NA	**8.8**	BDL	BDL

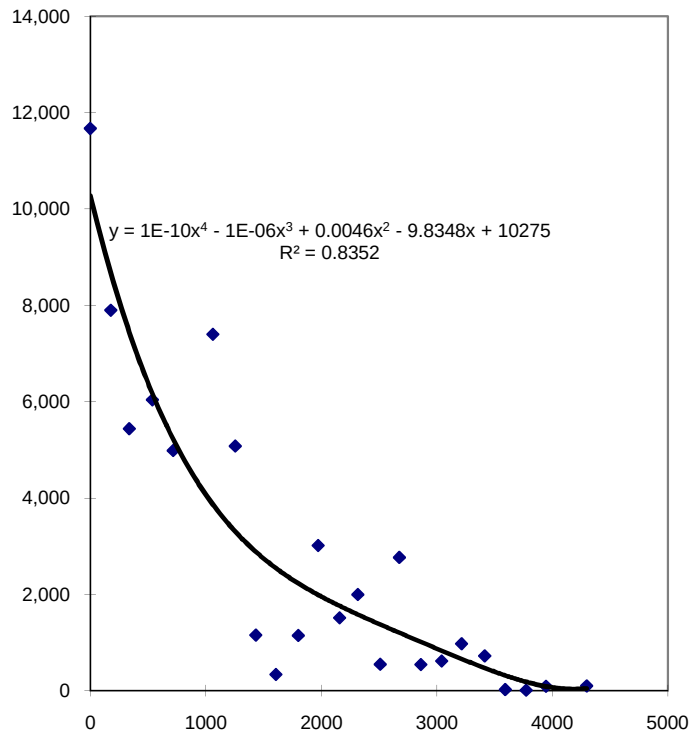
Notes:

ug/l - micrograms per liter
mg/l - milligrams per liter
BDL - Analyte not detected at or above laboratory practical quantitation limit (PQL).
NA - Not analyzed for constituent
NS - Not sampled
E - Estimate value, calib. Range was exceeded
J - Estimated value below laboratory PQL.
1,4-Dioxane not included in VOC total

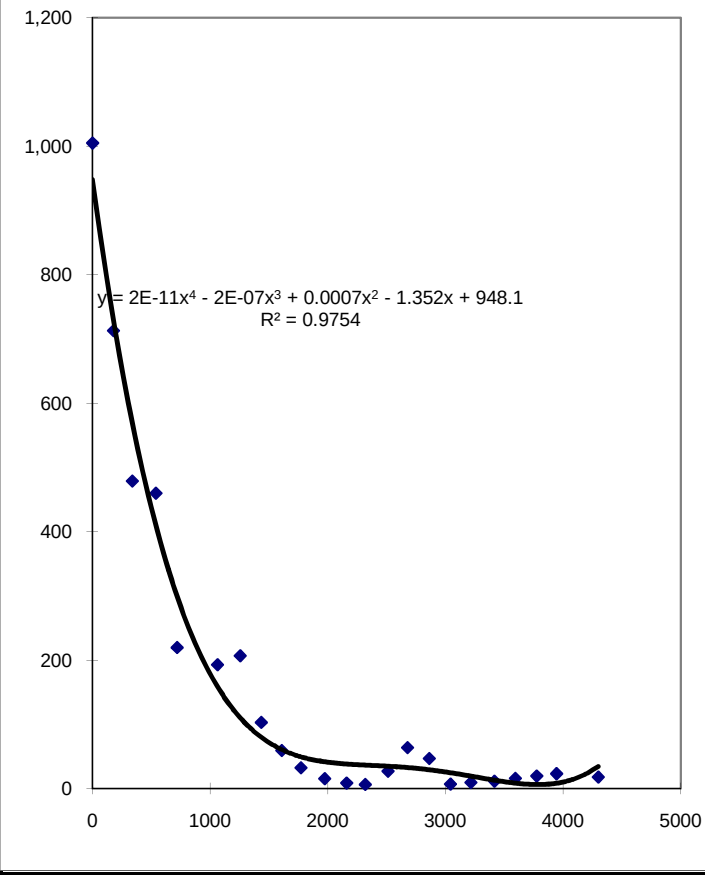
APPENDIX C
Coefficient of Determination Trend Results

Well	Date Sampled	Time (days)	Influent Concentration
MW-2d	11/29/94	0	4940.0
	09/13/96	644	1985.3
	04/10/97	851	3471.6
	10/30/97	0	11670.0
	04/28/98	178	7900.0
	10/08/98	338	5440.0
	04/28/99	538	6041.0
	10/28/99	718	4986.3
	10/12/00	1062	7400
	04/25/01	1255	5080
	10/24/01	1434	1160
	04/18/02	1608	343.2
	11/01/02	1801	1150
	04/23/03	1973	3018.5
	10/29/03	2159	1515.7
	04/07/04	2317	2000
	10/21/04	2511	552.6
	04/06/05	2676	2770
	10/12/05	2862	549
	04/12/06	3042	620
	10/05/06	3215	980
	04/25/07	3415	727.2
	10/23/07	3593	27.8
	04/24/08	3774	15.1
	10/15/2008	3945	98.75
	10/8/2009	4298	105.90

Trend and Coefficient

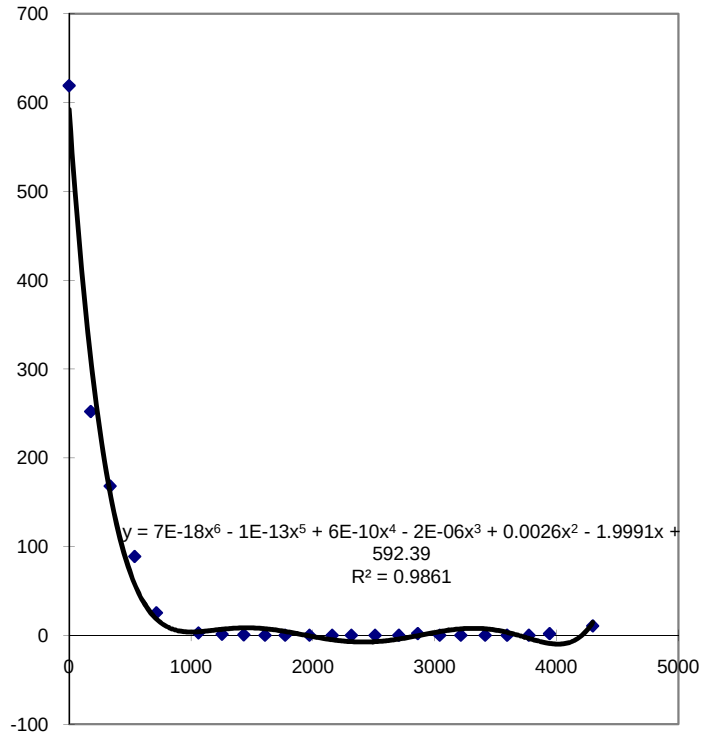


Well	Date Sampled	Time (days)	Influent Concentration
MW-2s	08/21/90	0	153.0
	02/08/93	887	167.0
	09/19/93	1108	109.8
	08/30/94	1449	178.0
	11/30/94	1539	65.4
	09/13/96	2182	430.8
	04/10/97	2389	3.6
	10/30/97	0	1005.0
	04/28/98	178	713.0
	10/08/98	338	479.0
	04/28/99	538	460.0
	10/28/99	718	219.7
	10/12/00	1062	192.91
	04/25/01	1255	207
	10/24/01	1434	103.23
	04/18/02	1608	59.55
	10/01/02	1771	32.7
	04/23/03	1973	15.75
	10/29/03	2159	8.93
	04/07/04	2317	6.6
	10/21/04	2511	27.3
	04/07/05	2677	64
	10/12/05	2862	47
	04/12/06	3042	7.3
	10/05/06	3215	9.8
	04/25/07	3415	11.7
	10/23/07	3593	16.2
	04/24/08	3774	19.9
	10/13/2008	3943	23.4
	10/8/2009	4298	18.15

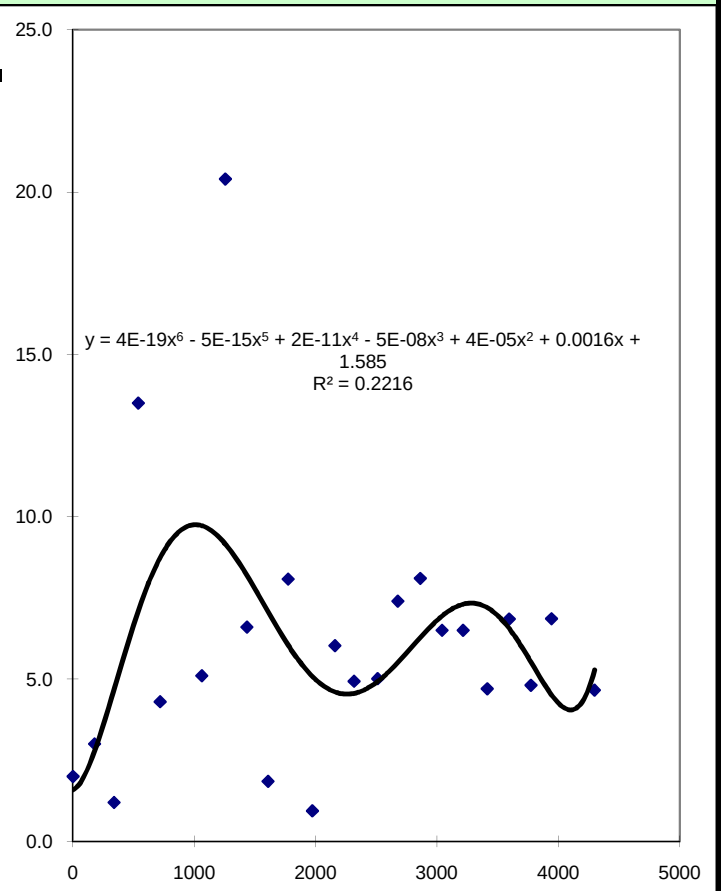


APPENDIX C
Coefficient of Determination Trend Results

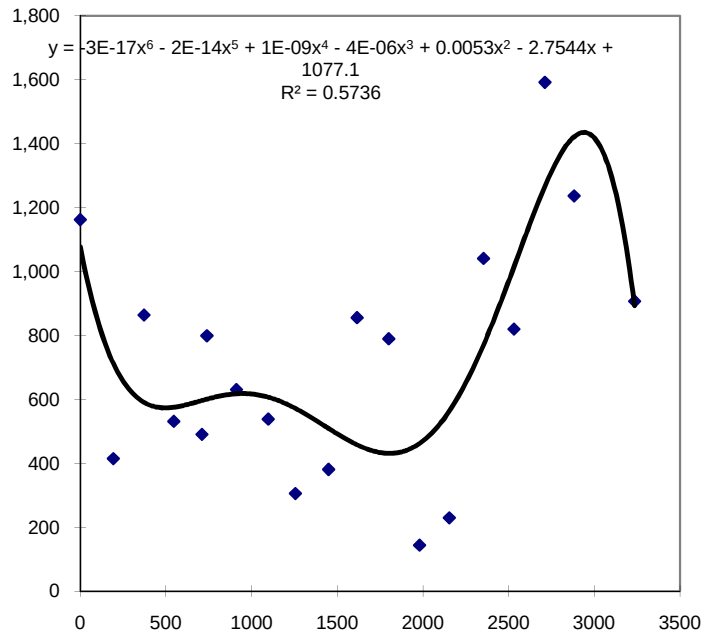
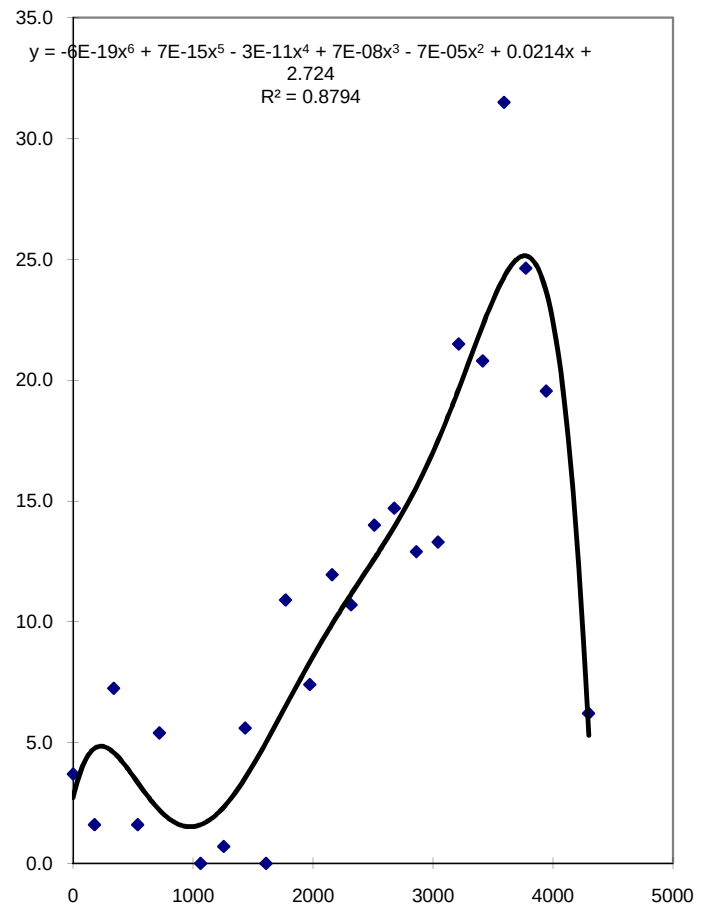
Well	Date Sampled	Time (days)	Influent Concentration	Trend and Coefficient
MW-3d	11/30/94	0	BDL	
	09/13/96	643	BDL	
	04/10/97	850	263.3	
	10/30/97	0	619.0	
	04/28/98	178	252.0	
	10/08/98	338	168.0	
	04/28/99	538	88.8	
	10/27/99	717	25.3	
	10/12/00	1062	2.7	
	04/25/01	1255	1.2	
	10/24/01	1434	0.61	
	04/18/02	1608	BDL	
	10/03/02	1773	BDL	
	04/23/03	1973	BDL	
	10/29/03	2159	BDL	
	04/07/04	2317	BDL	
	10/21/04	2511	BDL	
	05/07/05	2707	BDL	
	10/12/05	2862	2	
	04/12/06	3042	BDL	
	10/05/06	3215	BDL	
	04/25/07	3415	BDL	
	10/25/07	3595	BDL	
	04/24/08	3774	BDL	
	10/14/2008	3944	1.8	
	10/8/2009	4298	10.48	



Well	Date Sampled	Time (days)	Influent Concentration
MW-3s	08/21/90	0	10.0
	02/08/93	887	BDL
	09/19/93	1108	12.2
	08/30/94	1449	BDL
	11/30/94	1539	2.7
	09/13/96	2182	4.8
	04/10/97	2389	5.3
	10/30/97	0	2.0
	04/28/98	178	3.0
	10/08/98	338	1.2
	04/28/99	538	13.5
	10/28/99	718	4.3
	10/12/00	1062	5.1
	04/25/01	1255	20.4
	10/24/01	1434	6.6
	04/18/02	1608	1.85
	10/03/02	1773	8.08
	04/23/03	1973	0.94
	10/29/03	2159	6.03
	04/07/04	2317	4.93
	10/21/04	2511	5.01
	04/07/05	2677	7.4
	10/12/05	2862	8.1
	04/12/06	3042	6.5
	10/05/06	3215	6.5
	04/25/07	3415	4.7
	10/25/07	3595	6.85
	04/24/08	3774	4.81
	10/14/08	3944	6.86
	10/08/09	4298	4.66



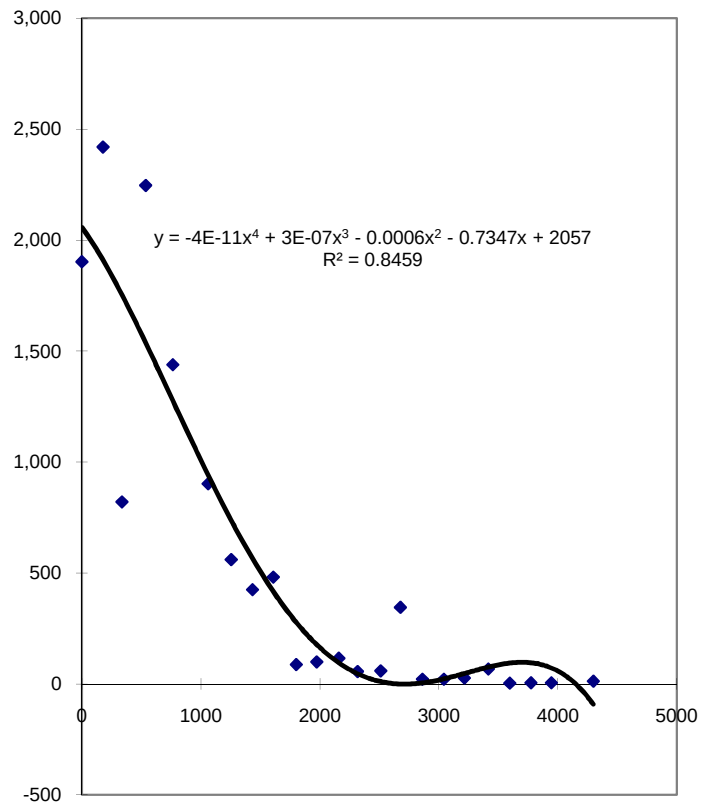
APPENDIX C
Coefficient of Determination Trend Results

Well	Date Sampled	Time (days)	Influent Concentration	Trend and Coefficient
MW-4d	10/12/00	0	1162.4	
	04/25/01	193	415.3	
	10/24/01	372	864.1	
	04/18/02	546	531.5	
	10/02/02	710	490.9	
	11/01/02	739	799.6	
	04/23/03	911	631.2	
	10/29/03	1097	538.7	
	04/07/04	1255	306.1	
	10/21/04	1449	381.3	
	04/07/05	1615	855.9	
	10/12/05	1800	789.9	
	04/12/06	1980	144.4	
	10/05/06	2153	230	
	04/25/07	2353	1040.9	
	10/23/07	2531	820	
	04/23/08	2711	1592	
	10/14/08	2882	1236.9	
	10/07/09	3235	907	
MW-12s	09/19/93	0	19.6	
	08/30/94	341	BDL	
	11/30/94	431	27.7	
	09/13/96	1074	1.1	
	04/10/97	1281	9.1	
	10/30/97	0	3.7	
	04/28/98	178	1.6	
	10/08/98	338	7.3	
	04/28/99	538	1.6	
	10/28/99	718	5.4	
	10/12/00	1062	BDL	
	04/25/01	1255	0.7	
	10/24/01	1434	5.6	
	04/18/02	1608	BDL	
	10/01/02	1771	10.9	
	04/23/03	1973	7.4	
	10/29/03	2159	11.95	
	04/07/04	2317	10.7	
	10/21/04	2511	14.0	
	04/07/05	2677	14.7	
	10/12/05	2862	12.9	
	04/12/06	3042	13.3	
	10/05/06	3215	21.5	
	04/25/07	3415	20.8	
	10/23/07	3593	31.5	
	04/24/08	3774	24.6	
	10/14/08	3944	19.6	
	10/08/09	4298	6.2	

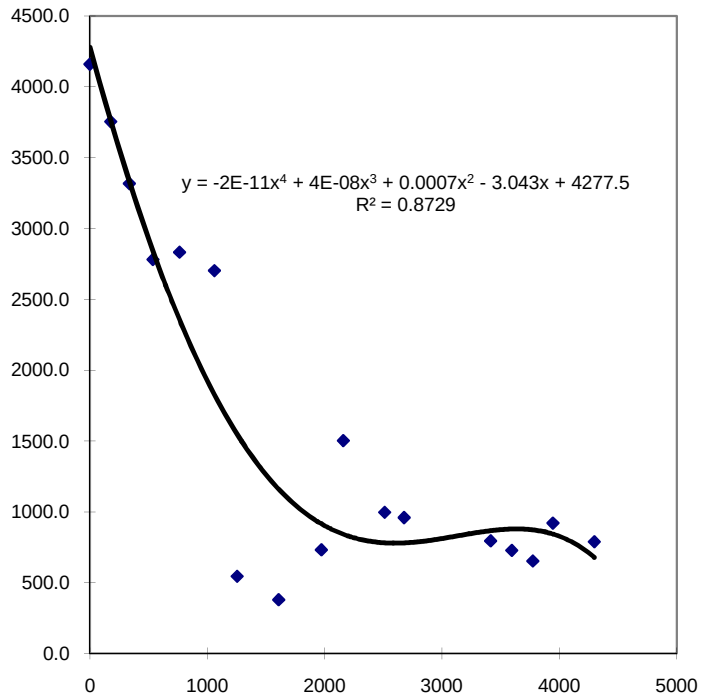
APPENDIX C
Coefficient of Determination Trend Results

Well	Date Sampled	Time (days)	Influent Concentration
MW-13d	10/31/97	0	1902.0
	04/27/98	177	2419.0
	10/07/98	337	820.2
	04/27/99	537	2246.0
	12/14/99	764	1438.4
	10/11/00	1061	902.1
	04/25/01	1255	560.2
	10/24/01	1434	424.75
	04/18/02	1608	481.5
	11/01/02	1801	87.1
	04/23/03	1973	99.4
	10/29/03	2159	115.8
	04/07/04	2317	56.3
	10/21/04	2511	59.0
	04/07/05	2677	344.8
	10/12/05	2862	21.6
	04/12/06	3042	21.4
	10/05/06	3215	26.6
	04/25/07	3415	67.6
	10/25/07	3595	3.4
	04/24/08	3774	5.4
	10/15/08	3945	5.2
	10/08/09	4298	12.2

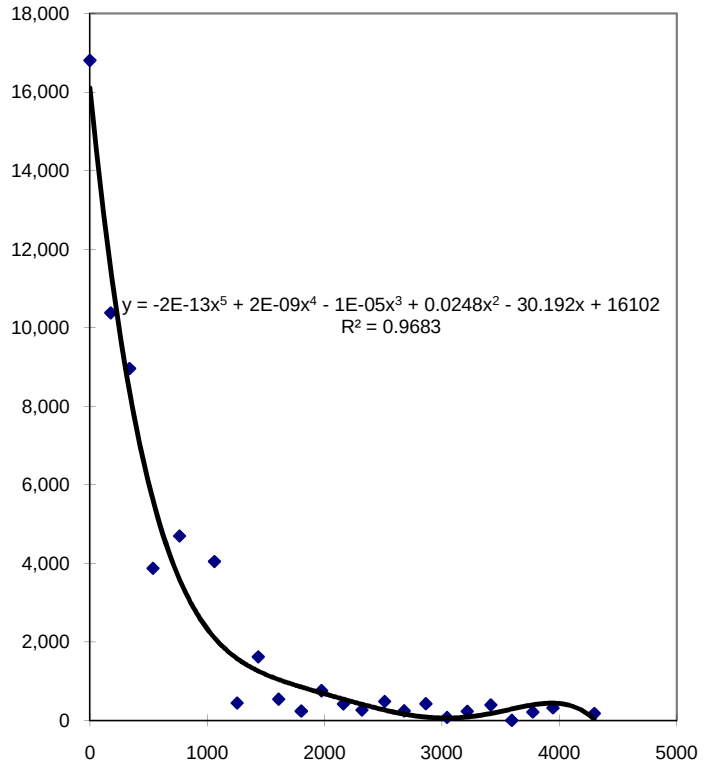
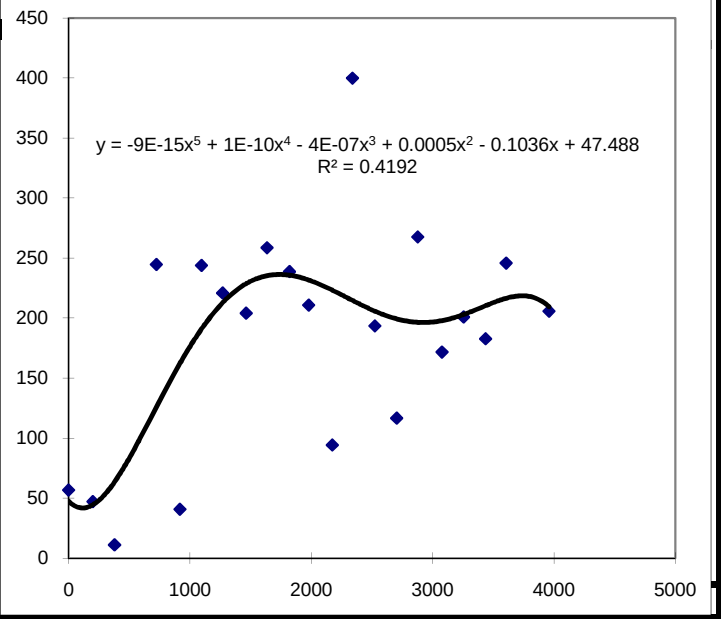
Trend and Coefficient



Well	Date Sampled	Time (days)	Influent Concentration
MW-13s	05/28/95	0	2390.0
	09/13/96	465	3609.8
	04/10/97	672	3334.6
	10/31/97	0	4160.0
	04/27/98	177	3755.0
	10/07/98	337	3318.0
	04/27/99	537	2781.8
	12/14/99	764	2833.0
	10/11/00	1061	2703.5
	04/25/01	1255	545.8
	04/18/02	1608	380.1
	04/23/03	1973	732.2
	10/29/03	2159	1503
	10/21/04	2511	996.9
	04/07/05	2677	960
	04/25/07	3415	795.6
MW-13sr	10/25/07	3595	728
	04/24/08	3774	653.00
	10/15/08	3945	921.00
MW-13s	10/08/09	4298	789.60



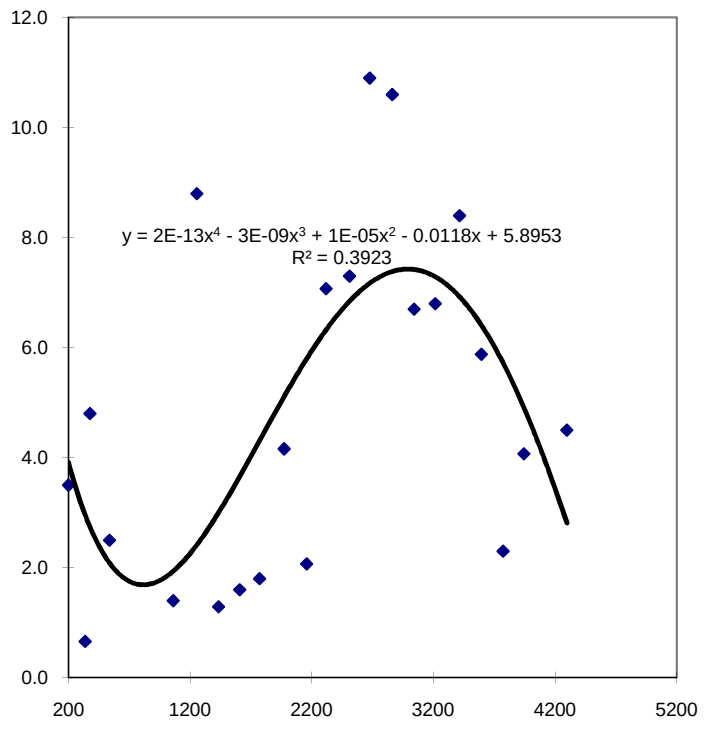
APPENDIX C
Coefficient of Determination Trend Results

Well	Date Sampled	Time (days)	Influent Concentration	Trend and Coefficient
MW-14d	10/31/97	0	16810.0	
	04/28/98	178	10380.0	
	10/08/98	338	8962.0	
	04/28/99	538	3873.1	
	12/14/99	764	4695.7	
	10/11/00	1061	4048.2	
	04/25/01	1255	441.2	
	10/24/01	1434	1618.54	
	04/18/02	1608	540.7	
	11/01/02	1801	236.3	
	04/23/03	1973	756	
	10/29/03	2159	416	
	04/07/04	2317	261.5	
	10/21/04	2511	482.5	
	04/07/05	2677	242.5	
	10/12/05	2862	423.1	
	04/12/06	3042	76.9	
	10/05/06	3215	231.1	
	04/25/07	3415	393.1	
	10/24/07	3594	0.1	
	04/23/08	3773	210.50	
	10/15/08	3945	318.00	
	10/07/09	4297	176.30	
MW-3dk	10/08/98	0	56.7	
	04/28/99	200	47.1	
	10/27/99	379	11.1	
	10/12/00	724	244.6	
	04/25/01	917	40.7	
	10/24/01	1096	243.86	
	04/18/02	1270	220.8	
	11/01/02	1463	204	
	04/23/03	1635	258.55	
	10/29/03	1821	238.65	
	04/07/04	1979	210.74	
	10/21/04	2173	94.2	
	04/07/05	2339	399.8	
	10/12/05	2524	193.4	
	04/12/06	2704	116.6	
	10/05/06	2877	267.5	
	04/25/07	3077	171.7	
	10/23/07	3255	200.8	
	04/24/08	3436	182.7	
	10/14/08	3606	245.8	
	10/07/09	3959	205.67	

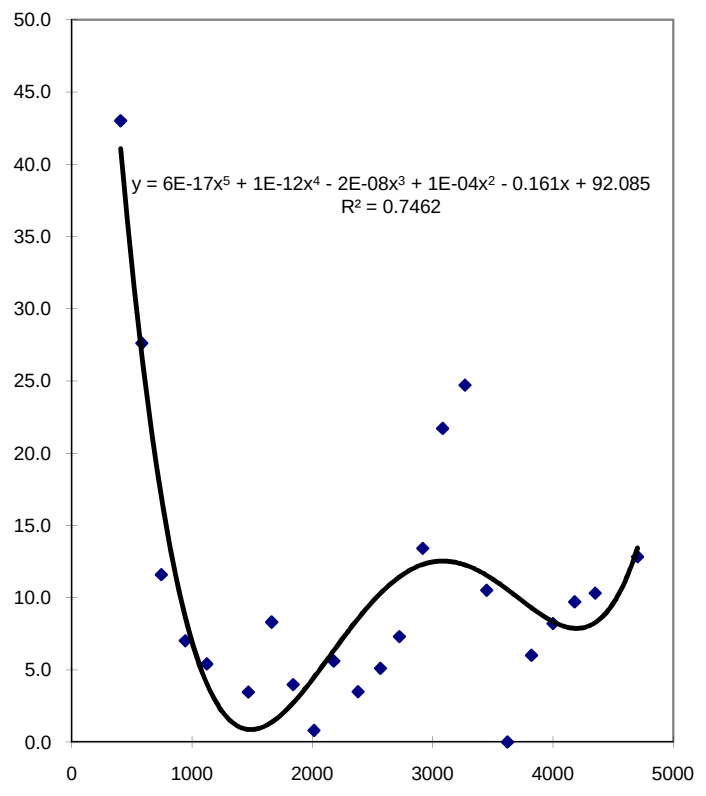
APPENDIX C
Coefficient of Determination Trend Results

Well	Date Sampled	Time (days)	Influent Concentration
MW-5sk	12/01/94	0	8.1
	09/13/96	642	122.6
	04/10/97	0	16.0
	10/30/97	200	3.5
	04/27/98	377	4.8
	10/08/98	338	0.7
	04/28/99	538	2.5
	10/12/00	1062	1.4
	04/25/01	1255	8.8
	10/24/01	1434	1.29
	04/18/02	1608	1.6
	10/01/02	1771	1.8
	04/23/03	1973	4.16
	10/29/03	2159	2.07
	04/07/04	2317	7.07
	10/21/04	2511	7.3
	04/07/05	2677	10.9
	10/12/05	2862	10.6
	04/12/06	3042	6.7
	10/05/06	3215	6.8
	04/25/07	3415	8.4
	10/25/07	3595	5.88
	04/23/08	3773	2.3
	10/14/08	3944	4.07
	10/07/09	4297	4.5

Trend and Coefficient



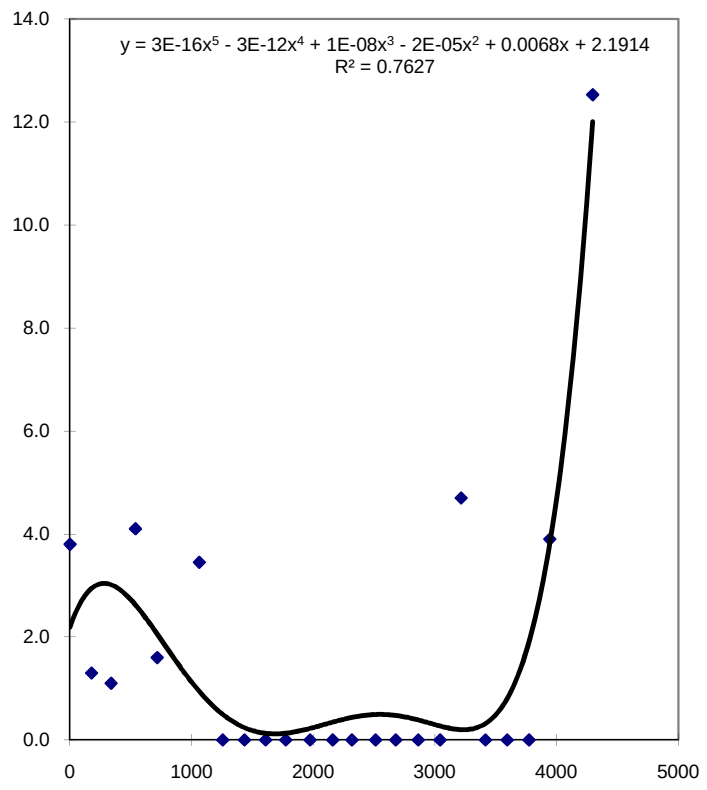
Well	Date Sampled	Time (days)	Influent Concentration
MW-9dk	12/01/94	0	248.0
	09/13/96	0	358.5
	01/14/97	121	37.3
	04/10/97	207	58.7
	10/30/97	407	43.0
	04/27/98	584	27.6
	10/08/98	745	11.6
	04/28/99	945	7.0
	10/27/99	1124	5.4
	10/12/00	1469	3.45
	04/25/01	1662	8.3
	10/24/01	1841	3.98
	04/18/02	2015	0.80
	10/01/02	2178	5.60
	04/23/03	2380	3.48
	10/29/03	2566	5.10
	04/07/04	2724	7.3
	10/21/04	2918	13.4
	04/07/05	3084	21.7
	10/12/05	3269	24.7
	04/12/06	3449	10.5
	10/05/06	3622	BDL
	04/24/07	3821	6.0
	10/23/07	4000	8.2
	04/23/08	4180	9.7
	10/14/08	4351	10.3
	10/06/09	4703	12.8



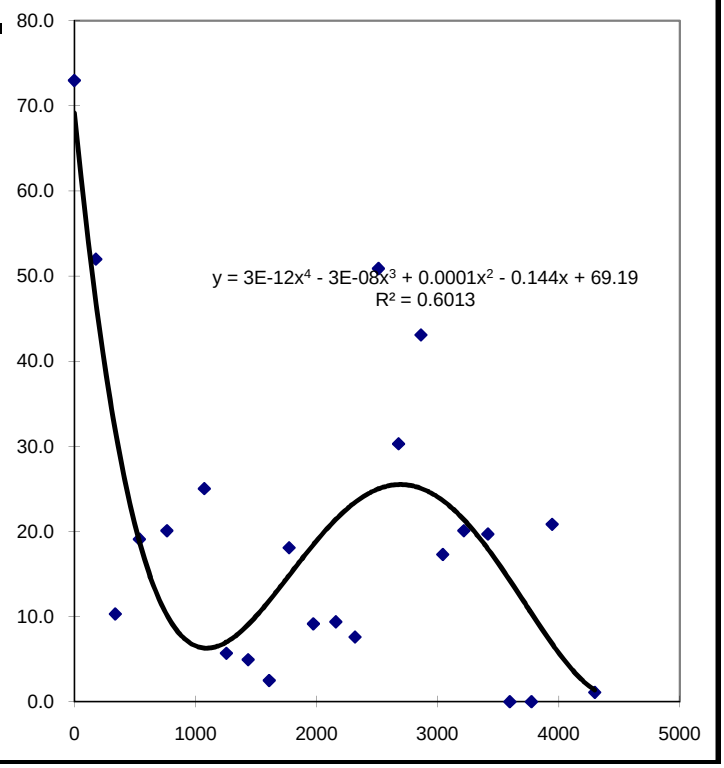
APPENDIX C
Coefficient of Determination Trend Results

Well	Date Sampled	Time (days)	Influent Concentration
MW-9sk	12/01/94	0	BDL
	09/13/96	642	BDL
	01/14/97	763	BDL
	04/10/97	849	508.8
	10/30/97	0	3.8
	04/27/98	177	1.3
	10/08/98	338	1.1
	04/28/99	538	4.1
	10/27/99	717	1.6
	10/12/00	1062	3.45
	04/25/01	1255	0
	10/24/01	1434	0
	04/18/02	1608	0
	10/03/02	1773	0
	04/23/03	1973	0
	10/29/03	2159	0
	04/07/04	2317	0
	10/21/04	2511	0
	04/07/05	2677	0
	10/12/05	2862	0
	04/12/06	3042	0
	10/05/06	3215	4.7
	04/24/07	3414	0
	10/23/07	3593	BDL
	04/23/08	3773	BDL
	10/13/08	3943	3.9
	10/06/09	4296	12.53

Trend and Coefficient

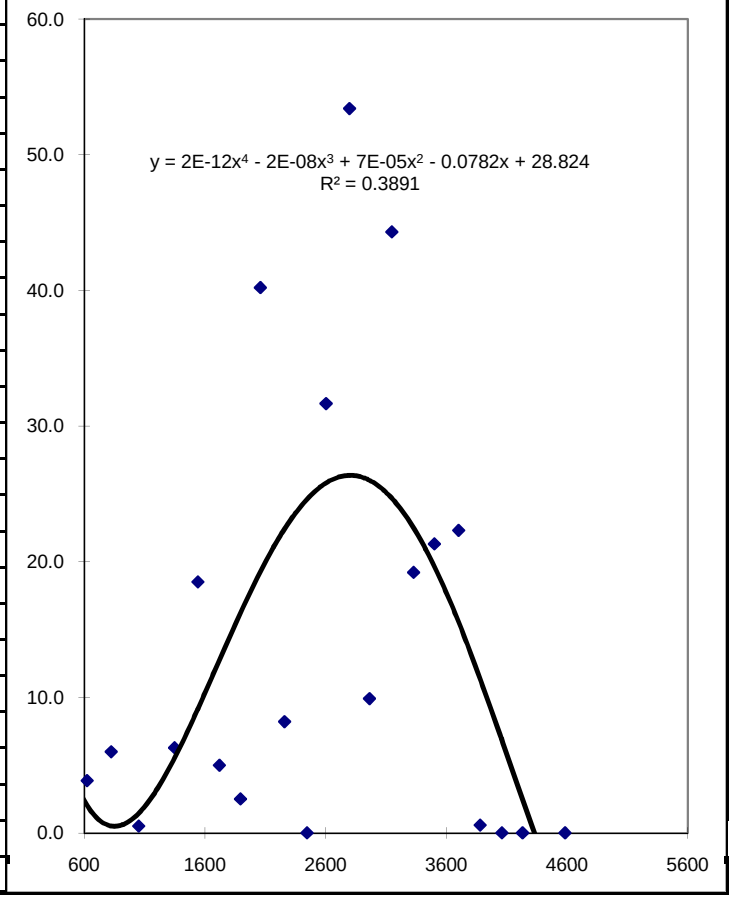


Well	Date Sampled	Time (days)	Influent Concentration
CRW-1	01/14/97	0	BDL
	04/10/97	86	13.1
	10/29/97	0	73.0
	04/27/98	178	52.0
	10/07/98	338	10.3
	04/27/99	538	19.1
	12/14/99	765	20.1
	10/23/00	1074	25.04
	04/25/01	1256	5.7
	10/24/01	1435	4.95
	04/18/02	1609	2.5
	10/03/02	1774	18.1
	04/23/03	1974	9.16
	10/29/03	2160	9.39
	04/07/04	2318	7.6
	10/21/04	2512	50.9
	04/07/05	2678	30.3
	10/12/05	2863	43.1
	04/12/06	3043	17.3
	10/05/06	3216	20.1
	04/25/07	3416	19.7
	10/25/07	3596	BDL
	04/24/08	3775	BDL
	10/15/08	3946	20.85
	10/07/09	4298	1.10



APPENDIX C
Coefficient of Determination Trend Results

Well	Date Sampled	Time (days)	Influent Concentration	Trend and Coefficient
CRW-5	01/14/97	0	185.6	
	04/10/97	86	120.7	
	10/29/97	285	9.0	
	04/28/98	464	3.9	
	10/07/98	623	3.9	
	04/27/99	823	6.0	
	12/14/99	1050	0.5	
	10/11/00	1347	6.3	
	04/25/01	1541	18.5	
	10/24/01	1720	4.98	
	04/18/02	1894	2.5	
	10/03/02	2059	40.2	
	04/23/03	2259	8.2	
	10/29/03	2445	0	
	04/07/04	2603	31.65	
	10/21/04	2797	53.4	
	04/07/05	2963	9.9	
	10/12/05	3148	44.3	
	04/12/06	3328	19.2	
	10/05/06	3501	21.3	
	04/25/07	3701	22.3	
	10/24/07	3880	0.57	
	04/24/08	4060	BDL	
	10/15/08	4231	BDL	
	10/07/09	4583	BDL	



APPENDIX D

BIOCHLOR MODEL INPUT PARAMETERS AND RESULTS

AMEC Earth & Environmental, Inc.
2200 Gateway Centre Boulevard, Suite 205
Morrisville, NC 27560
www.amec.com
Tel – (919) 447-2750
Fax – (919) 447-2751

BIOCHLOR SCREENING MODEL INPUT PARAMETERS
Former Alcatel Facility
2912 Wake Forest Road
Raleigh, North Carolina 27609
NCD 003-185-238

Initial Calibration

Calibrated to current trend of the plume using plume outline for 1,4-Dioxane extending to the southwest within the saprolite unit.

Hydraulic Conductivity	1 x 10-4 cm/sec
Gradient	0.01 ft/ft
Effective Porosity	15%
Dispersion Coefficient(Dx)	500
Soil Bulk Density (rho)	1.7 Kg/L (default value)
Fraction Organic Carbon (f_{oc})	0.003 (default)
Partioning Coefficient (K_{oc})	
TCA	56 L/Kg (default)
DCA	30 L/Kg (default)
Chloroethane	3 L/Kg (default)

Decay – Assumed conservative view of half-life of zero since there are few degradation products, and to account for behavior of 1,4-Dioxane.

Source Concentrations

- Total Chlorinated VOCs 7,000 µg/L
- Calibrated to wells MW-13s (1,300 µg/L) and MW-12s (70 µg/L) along 1,4-Dioxane plume line.
- Calibrated at run for year 14 with anticipated spill and/or movement of COCs to groundwater in approximately 1995. Maximum plume distance 900 feet.

Results

Overall, there was minimal change between the results. The 1,000 µg/L cleanup goal achieves source control and minimizes the overall down gradient movement of the plume over time.

Modeled Cleanup Goal	Resulting Concentration - Distance from Source Area (30 yrs)		
	400 ft	800 ft	1,200 ft
1,000 µg/L	86	12	1
500 µg/L	43	6	0
100 µg/L	9	1	0

Results shown in µg/L

Calibration Run

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Former Alcatel Site
Raleigh, NC
Run Name

Data Input Instructions:

115 → 1. Enter value directly....or
↑ *or* 2. Calculate by filling in gray
0.02 cells. Press Enter, then (c)
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ○ Ethanes ◉

1. ADVECTION

Seepage Velocity*	Vs	6.9	(ft/yr)
or			
Hydraulic Conductivity	K	1.0E-04	(cm/sec)
Hydraulic Gradient	i	0.01	(ft/ft)
Effective Porosity	n	0.15	(-)

2. DISPERSION

Alpha x*	500	(ft)
(Alpha y) / (Alpha x)*	0.1	(-)
(Alpha z) / (Alpha x)*	1.E-99	(-)

Calc. Alpha x

3. ADSORPTION

Retardation Factor* → R

or

	Koc		R	
Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.0E-3	(-)		
Partition Coefficient				
TCA	56	(L/kg)	1.63	(-)
DCA	30	(L/kg)	1.34	(-)
CA	3	(L/kg)	1.04	(-)

Common R (used in model)* = 1.34

4. BIOTRANSFORMATION -1st Order Decay Coefficient*

Zone 1

	λ (1/yr)	half-life (yrs)	Yield
TCA → DCA	0.000		0.74
DCA → CA	0.000		0.65
CA → Ethane	0.000		0.47

Zone 2

	λ (1/yr)	half-life (yrs)
TCA → DCA	0.000	
DCA → CA	0.000	
CA → Ethane	0.000	

λ HELP

5. GENERAL

Simulation Time*	20	(yr)
Modeled Area Width*	700	(ft)
Modeled Area Length*	1000	(ft)
Zone 1 Length*	1000	(ft)
Zone 2 Length*	0	(ft)

L, W

Zone 2= L - Zone 1

6. SOURCE DATA TYPE: Decaying Single Planar

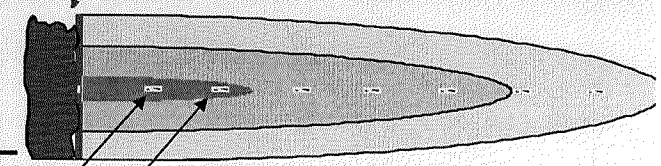
Source Options

Source Thickness in Sat. Zone* 20 (ft)

Width* (ft) Y1 100

Conc. (mg/L)*	C1	k_s* (1/yr)
TCA	5.0	0.001
DCA	.1	0.001
CA	.1	0.001

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

Distance from Source (ft)	0	100	200	300	400	500	600	700	800	900	1000
TCA Conc. (mg/L)		1.3				.07					
DCA Conc. (mg/L)											
CA Conc. (mg/L)											
Date Data Collected	2009										

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore Formulas | RESET | SEE OUTPUT | Paste Example

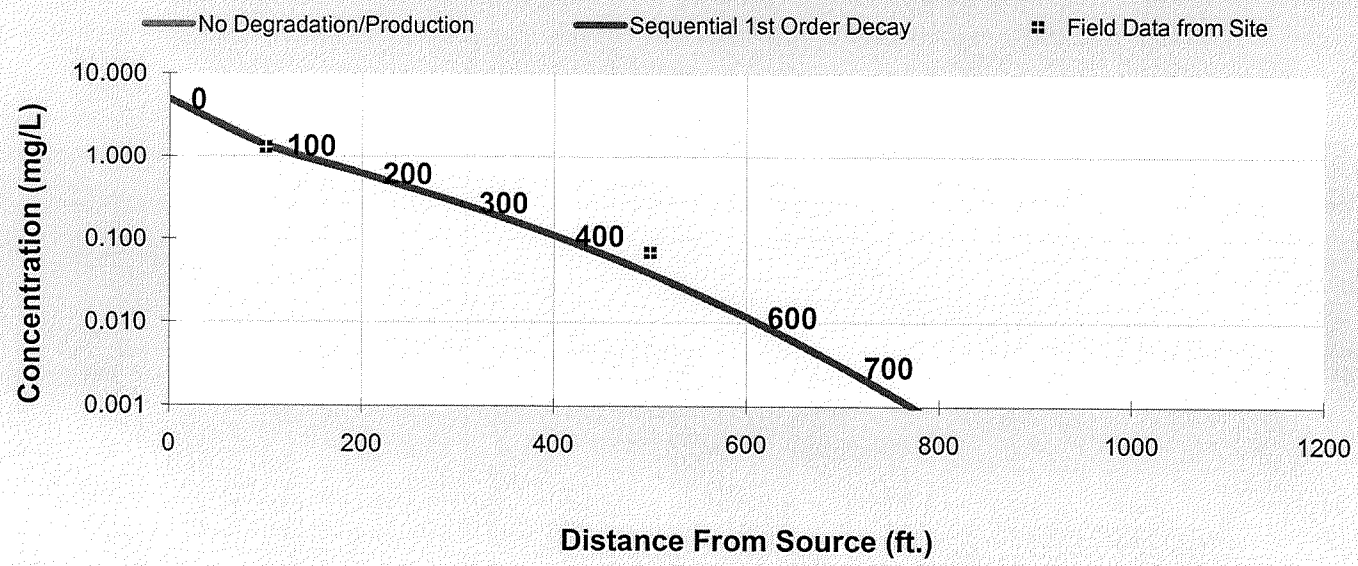
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	100	200	300	400	500	600	700	800	900	1000
No Degradation	4.950	1.375	0.627	0.280	0.112	0.039	0.012	0.003	0.001	0.000	0.000
Biotransformation	4.9502	1.375	0.627	0.280	0.112	0.039	0.012	0.003	0.001	0.000	0.000

Monitoring Well Locations (ft)

	0	100	200	300	400	500	600	700	800	900	1000
Field Data from Site		1.300				0.070					



See TCA

See DCA

See CA

Replay

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

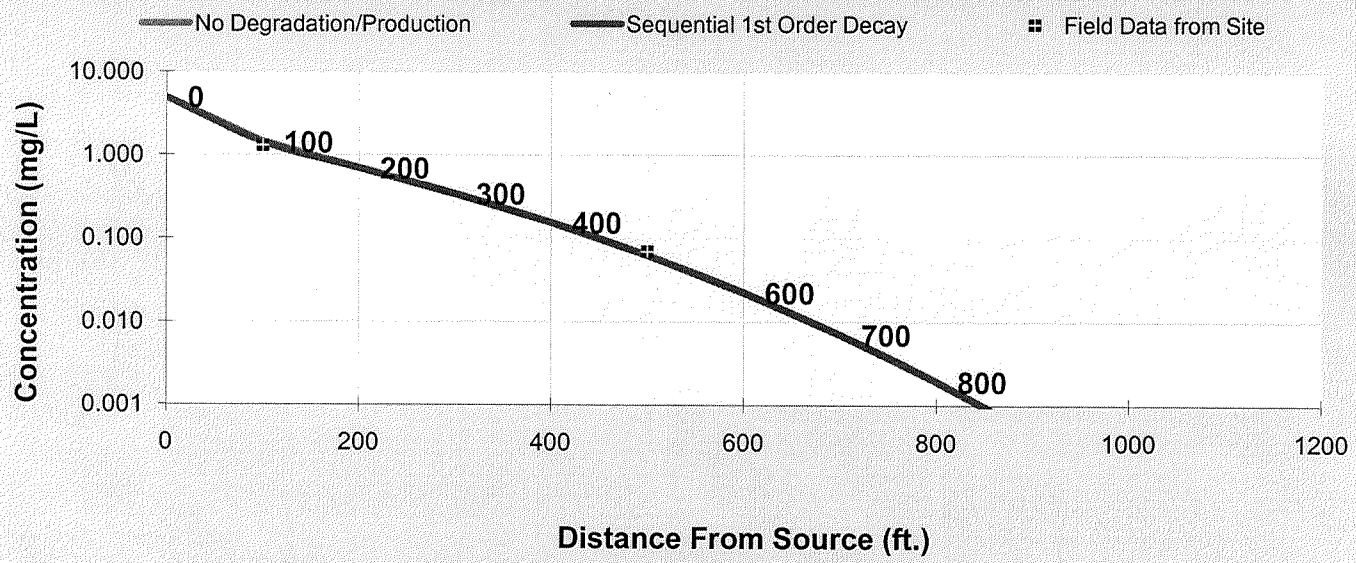
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	100	200	300	400	500	600	700	800	900	1000
No Degradation	4.940	1.430	0.696	0.341	0.154	0.063	0.023	0.007	0.002	0.000	0.000
Biotransformation	4.9404	1.430	0.696	0.341	0.154	0.063	0.023	0.007	0.002	0.000	0.000

Monitoring Well Locations (ft)

	0	100	200	300	400	500	600	700	800	900	1000
Field Data from Site		1.300				0.070					



See TCA

See DCA

See CA

Replay

Time:

12.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

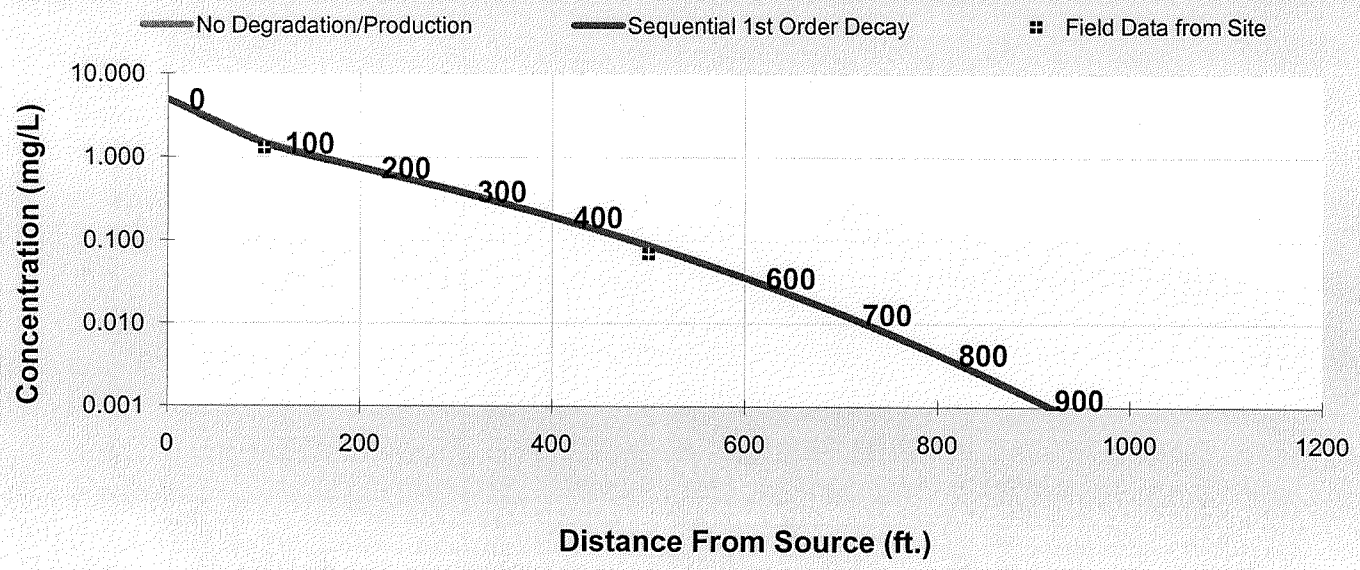
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	100	200	300	400	500	600	700	800	900	1000
No Degradation	4.930	1.472	0.752	0.394	0.195	0.089	0.036	0.013	0.004	0.001	0.000
Biotransformation	4.9305	1.472	0.752	0.394	0.195	0.089	0.036	0.013	0.004	0.001	0.000

Monitoring Well Locations (ft)

	0	100	200	300	400	500	600	700	800	900	1000
Field Data from Site		1.300				0.070					



See TCA

See DCA

See CA

Replay

Time:

14.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

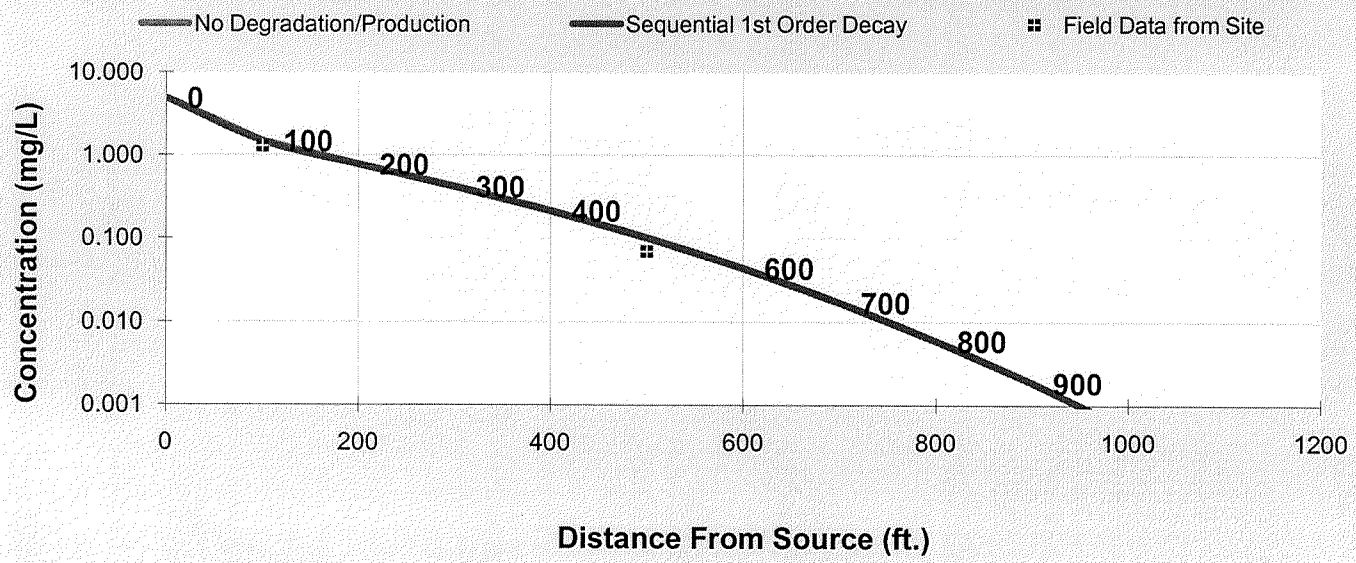
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	100	200	300	400	500	600	700	800	900	1000
No Degradation	4.926	1.490	0.776	0.418	0.214	0.102	0.044	0.017	0.006	0.002	0.001
Biotransformation	4.9256	1.490	0.776	0.418	0.214	0.102	0.044	0.017	0.006	0.002	0.001

Monitoring Well Locations (ft)

	0	100	200	300	400	500	600	700	800	900	1000
Field Data from Site		1.300				0.070					



See TCA

See DCA

See CA

Replay

Time:

15.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

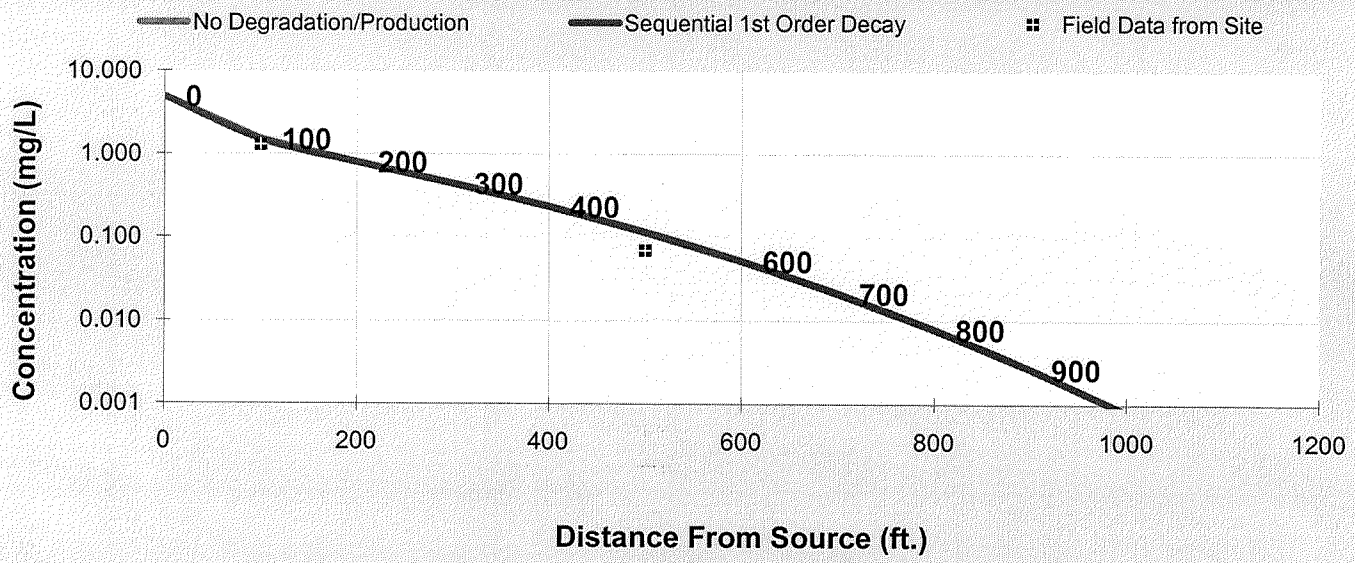
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	100	200	300	400	500	600	700	800	900	1000
No Degradation	4.921	1.506	0.799	0.440	0.233	0.115	0.052	0.021	0.008	0.003	0.001
Biotransformation	4.9206	1.506	0.799	0.440	0.233	0.115	0.052	0.021	0.008	0.003	0.001

Monitoring Well Locations (ft)

	0	100	200	300	400	500	600	700	800	900	1000
Field Data from Site		1.300				0.070					



See TCA

See DCA

See CA

Replay

Time:

16.0 Years

Log ⟷ Linear

Return to Input

To All

To Array

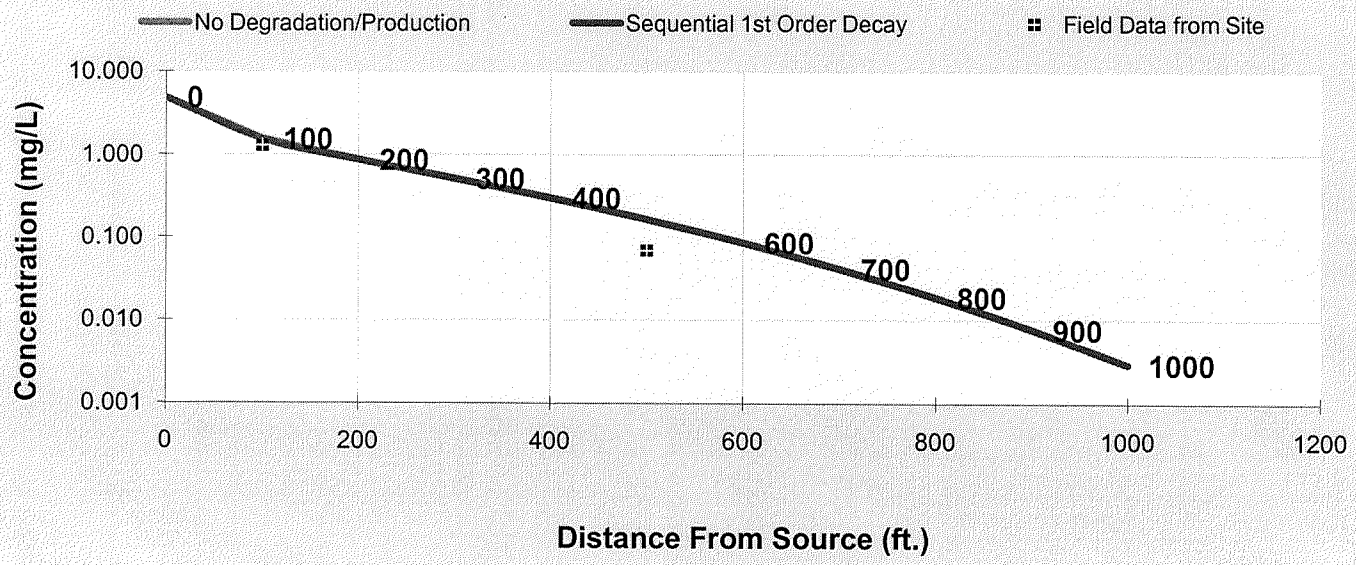
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	100	200	300	400	500	600	700	800	900	1000
No Degradation	4.901	1.556	0.871	0.517	0.301	0.167	0.087	0.042	0.019	0.008	0.003
Biotransformation	4.9010	1.556	0.871	0.517	0.301	0.167	0.087	0.042	0.019	0.008	0.003

Monitoring Well Locations (ft)

	0	100	200	300	400	500	600	700	800	900	1000
Field Data from Site		1.300				0.070					



See TCA

See DCA

See CA

Replay

Time:

20.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

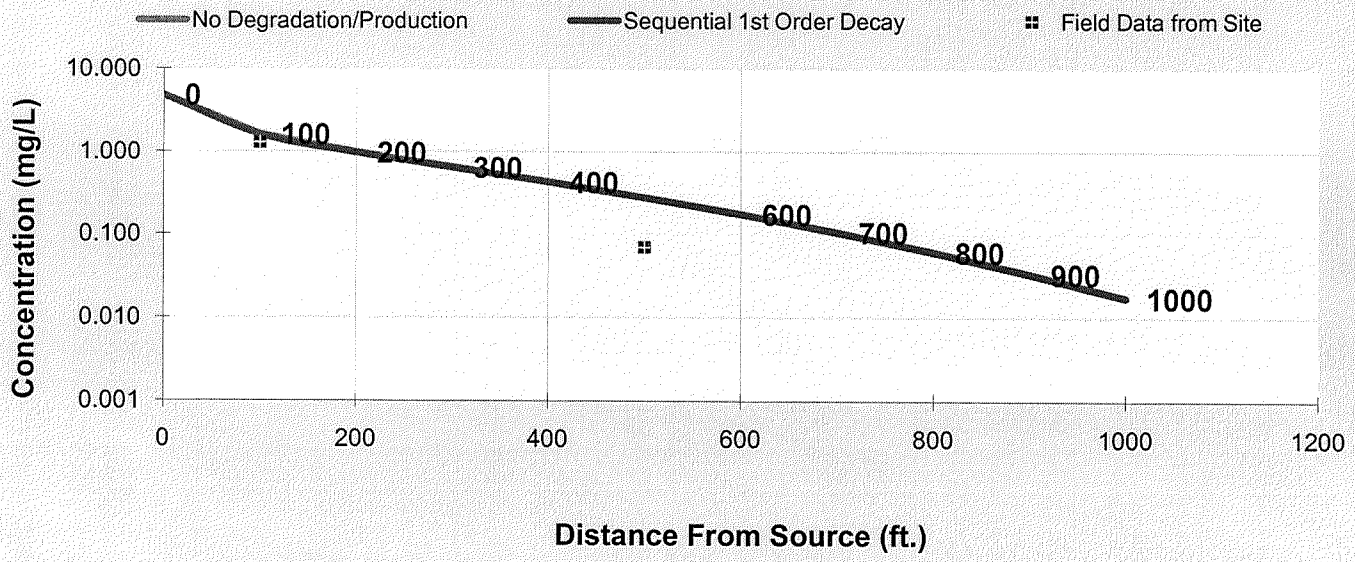
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	100	200	300	400	500	600	700	800	900	1000
No Degradation	4.852	1.627	0.985	0.649	0.430	0.280	0.176	0.106	0.061	0.034	0.017
Biotransformation	4.8522	1.627	0.985	0.649	0.430	0.280	0.176	0.106	0.061	0.034	0.017

Monitoring Well Locations (ft)

	0	100	200	300	400	500	600	700	800	900	1000
Field Data from Site		1.300				0.070					



See TCA

See DCA

See CA

Replay

Time:
30.0 Years
Log ⟺ Linear

Return to Input

To All

To Array

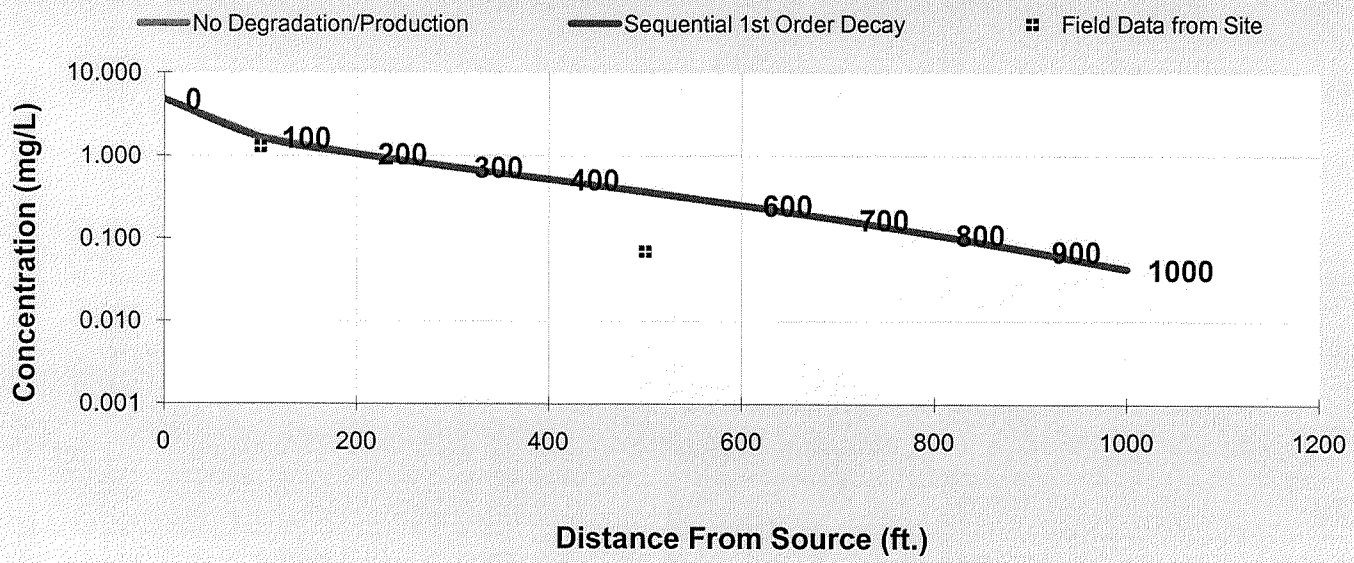
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	100	200	300	400	500	600	700	800	900	1000
No Degradation	4.804	1.662	1.050	0.731	0.519	0.366	0.253	0.171	0.112	0.071	0.043
Biotransformation	4.8039	1.662	1.050	0.731	0.519	0.366	0.253	0.171	0.112	0.071	0.043

Monitoring Well Locations (ft)

	0	100	200	300	400	500	600	700	800	900	1000
Field Data from Site		1.300				0.070					



See TCA

See DCA

See CA

Replay

Time:

40.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

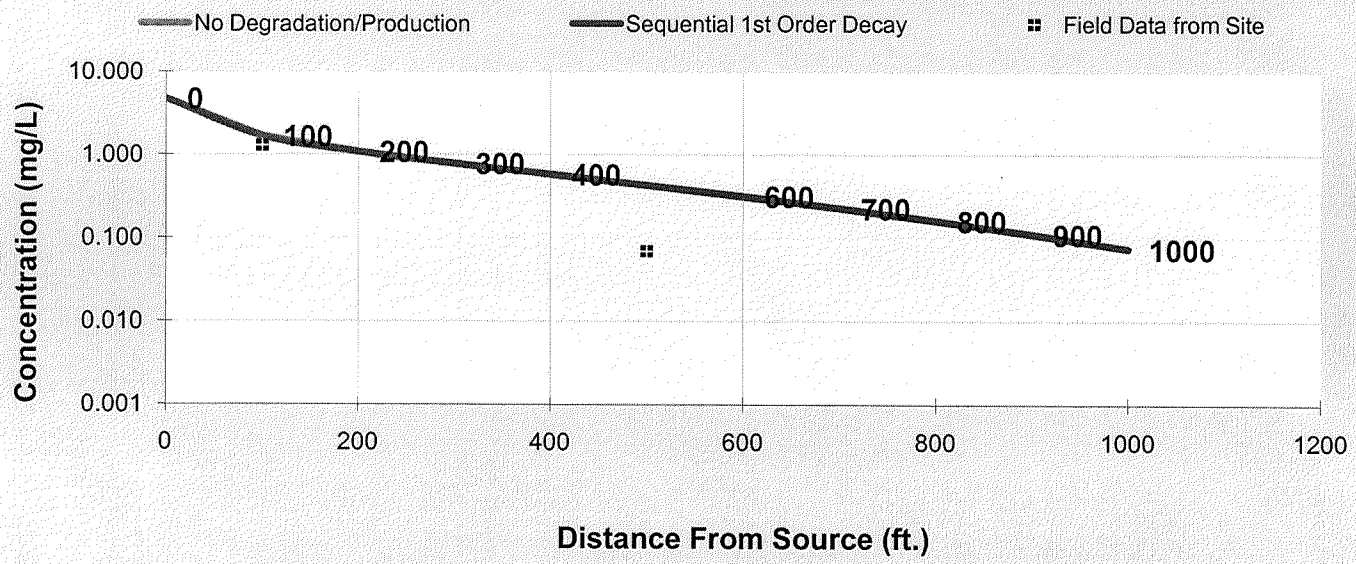
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	100	200	300	400	500	600	700	800	900	1000
No Degradation	4.756	1.679	1.090	0.786	0.582	0.432	0.317	0.229	0.162	0.111	0.075
Biotransformation	4.7561	1.679	1.090	0.786	0.582	0.432	0.317	0.229	0.162	0.111	0.075

Monitoring Well Locations (ft)

	0	100	200	300	400	500	600	700	800	900	1000
Field Data from Site		1.300				0.070					



See TCA

See DCA

See CA

Replay

Time:
50.0 Years
Log ⟺ Linear

Return to Input

To All

To Array

1000ppb Total VOCs Clean-up

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Former Alcatel Site
Raleigh, NC
Run Name

Data Input Instructions:

115 → 1. Enter value directly....or
↑ *or* 2. Calculate by filling in gray
0.02 cells. Press Enter, then (C)
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ○ Ethanes ◉

1. ADVECTION

Seepage Velocity*	Vs	6.9	(ft/yr)
or			
Hydraulic Conductivity	K	1.0E-04	(cm/sec)
Hydraulic Gradient	i	0.01	(ft/ft)
Effective Porosity	n	0.15	(-)

2. DISPERSION

Alpha x*	500	(ft)
(Alpha y) / (Alpha x)*	0.1	(-)
(Alpha z) / (Alpha x)*	1.E-99	(-)

Calc. Alpha x

3. ADSORPTION

Retardation Factor* → R

or

Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.0E-3	(-)		
Partition Coefficient	Koc			
TCA	56	(L/kg)	1.63	(-)
DCA	30	(L/kg)	1.34	(-)
CA	3	(L/kg)	1.04	(-)

Common R (used in model)* = 1.34

4. BIOTRANSFORMATION -1st Order Decay Coefficient*

Zone 1

	λ (1/yr)	half-life (yrs)	Yield
TCA → DCA	0.000		0.74
DCA → CA	0.000		0.65
CA → Ethane	0.000		0.47

Zone 2

	λ (1/yr)	half-life (yrs)
TCA → DCA	0.000	
DCA → CA	0.000	
CA → Ethane	0.000	

λ HELP

5. GENERAL

Simulation Time*	50	(yr)
Modeled Area Width*	700	(ft)
Modeled Area Length*	2000	(ft)
Zone 1 Length*	2000	(ft)
Zone 2 Length*	0	(ft)

L, W

Zone 2= L - Zone 1

6. SOURCE DATA TYPE: Decaying Single Planar

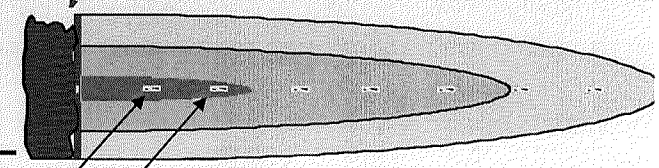
Source Options

Source Thickness in Sat. Zone* 20 (ft)

Width* (ft) Y1 100

Conc. (mg/L)*	C1	k_s* (1/yr)
TCA	1.0	0.001
DCA	.0	0.001
CA	.0	0.001

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

TCA Conc. (mg/L)											
DCA Conc. (mg/L)											
CA Conc. (mg/L)											
Distance from Source (ft)	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Date Data Collected	2009										

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore Formulas | RESET | SEE OUTPUT | Paste Example

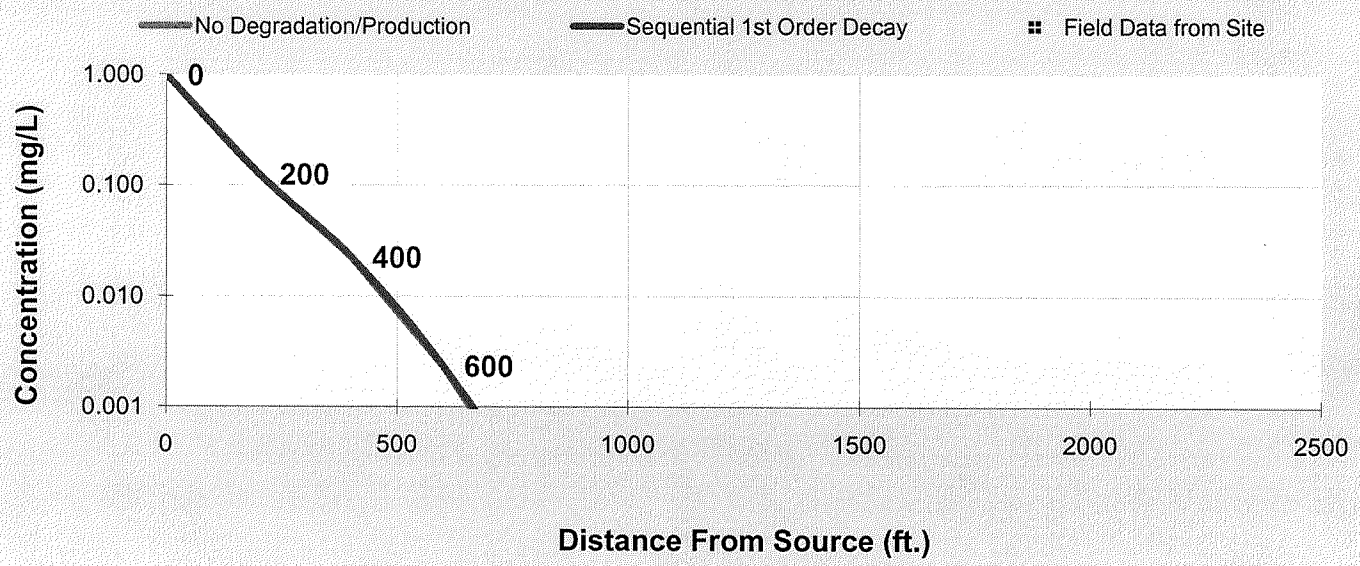
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.990	0.125	0.022	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.9900	0.125	0.022	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

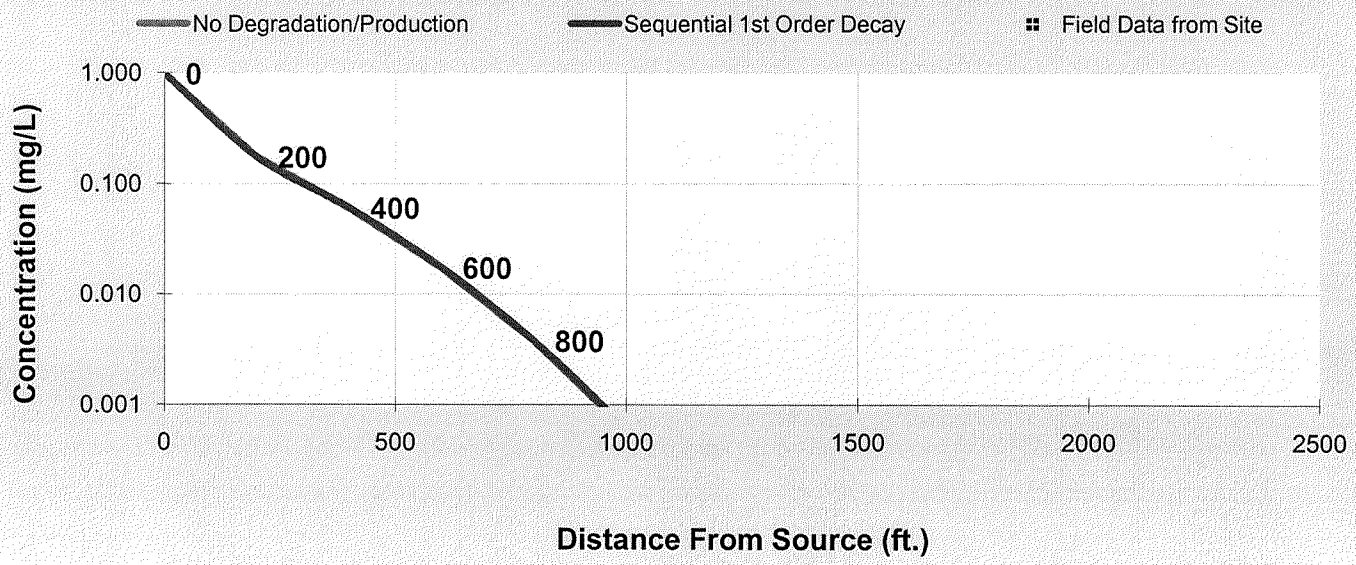
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.980	0.174	0.060	0.017	0.004	0.001	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.9802	0.174	0.060	0.017	0.004	0.001	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

20.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

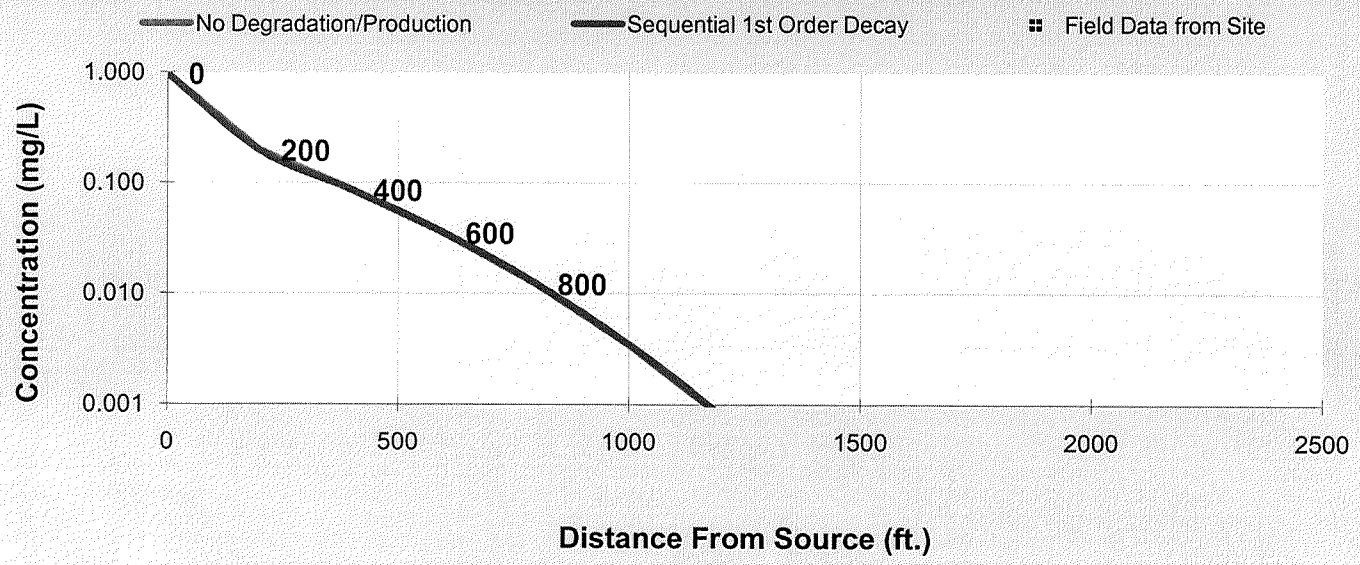
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.970	0.197	0.086	0.035	0.012	0.003	0.001	0.000	0.000	0.000	0.000
Biotransformation	0.9704	0.197	0.086	0.035	0.012	0.003	0.001	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:
30.0 Years
Log ⟺ Linear

Return to Input

To All

To Array

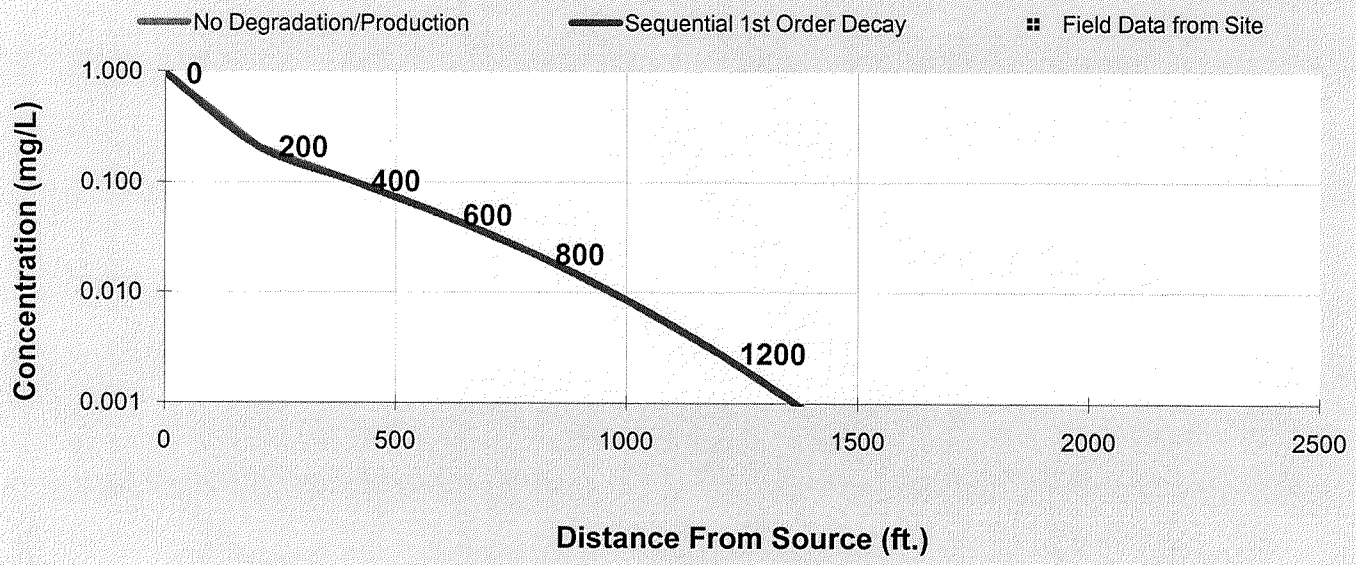
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.961	0.210	0.104	0.051	0.022	0.009	0.003	0.001	0.000	0.000	0.000
Biotransformation	0.9608	0.210	0.104	0.051	0.022	0.009	0.003	0.001	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

40.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

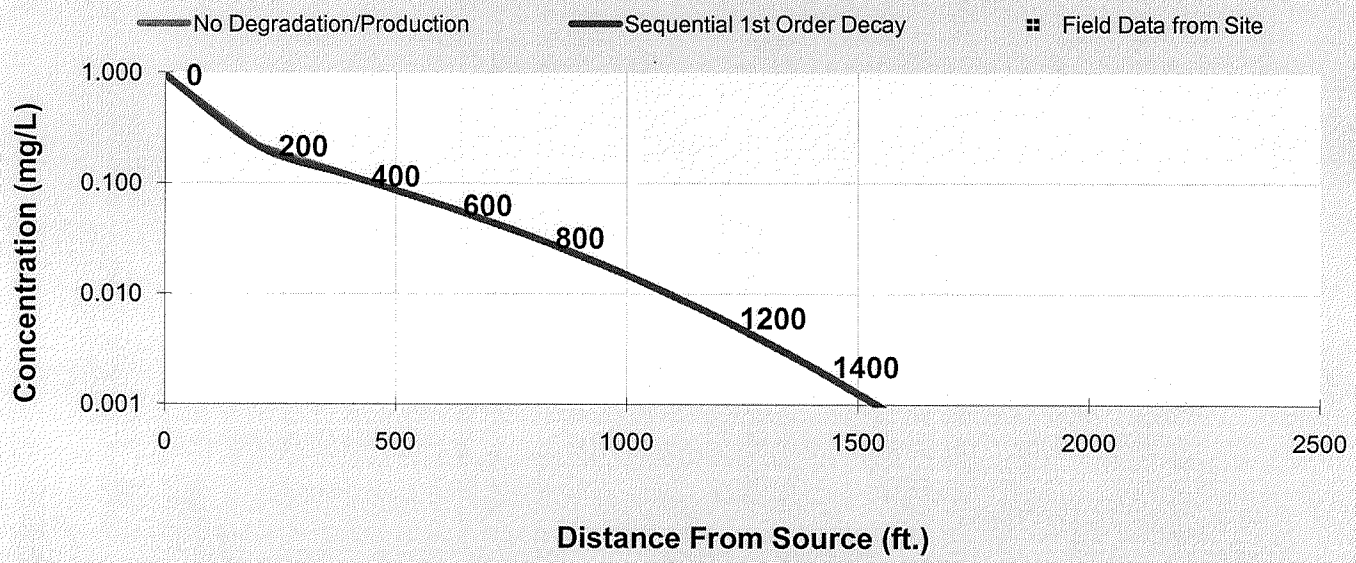
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.951	0.218	0.116	0.063	0.032	0.015	0.006	0.002	0.001	0.000	0.000
Biotransformation	0.9512	0.218	0.116	0.063	0.032	0.015	0.006	0.002	0.001	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

50.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

500ppb Total VOCs Cleanup

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Former Alcatel Site
Raleigh, NC
Run Name

Data Input Instructions:

115 → 1. Enter value directly....or
↑ *or* 2. Calculate by filling in gray
0.02 cells. Press Enter, then ⓒ
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ○ Ethanes ◉

1. ADVECTION

Seepage Velocity*	Vs	6.9	(ft/yr)
or			
Hydraulic Conductivity	K	1.0E-04	(cm/sec)
Hydraulic Gradient	i	0.01	(ft/ft)
Effective Porosity	n	0.15	(-)

2. DISPERSION

Alpha x*	500	(ft)
(Alpha y) / (Alpha x)*	0.1	(-)
(Alpha z) / (Alpha x)*	1.E-99	(-)

Calc. Alpha x

3. ADSORPTION

Retardation Factor* → R

or

Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.0E-3	(-)		
Partition Coefficient	Koc			
TCA	56	(L/kg)	1.63	(-)
DCA	30	(L/kg)	1.34	(-)
CA	3	(L/kg)	1.04	(-)

Common R (used in model)* = 1.34

4. BIOTRANSFORMATION

-1st Order Decay Coefficient*

Zone 1	λ (1/yr)	half-life (yrs)	Yield
TCA → DCA	0.000		0.74
DCA → CA	0.000		0.65
CA → Ethane	0.000		0.47

Zone 2	λ (1/yr)	half-life (yrs)
TCA → DCA	0.000	
DCA → CA	0.000	
CA → Ethane	0.000	

λ HELP

5. GENERAL

Simulation Time*	50	(yr)
Modeled Area Width*	700	(ft)
Modeled Area Length*	2000	(ft)
Zone 1 Length*	2000	(ft)
Zone 2 Length*	0	(ft)

Zone 2= L - Zone 1

6. SOURCE DATA

TYPE: Decaying Single Planar

Source Options

Source Thickness in Sat. Zone* 20 (ft)

	Y1	k_s* (1/yr)
Width* (ft)	100	
Conc. (mg/L)*	C1	
TCA	.5	0.001
DCA	.0	0.001
CA	.0	0.001

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations

View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

Distance from Source (ft)	0	200	400	600	800	1000	1200	1400	1600	1800	2000
TCA Conc. (mg/L)											
DCA Conc. (mg/L)											
CA Conc. (mg/L)											
Date Data Collected	2009										

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore Formulas | RESET | SEE OUTPUT | Paste Example

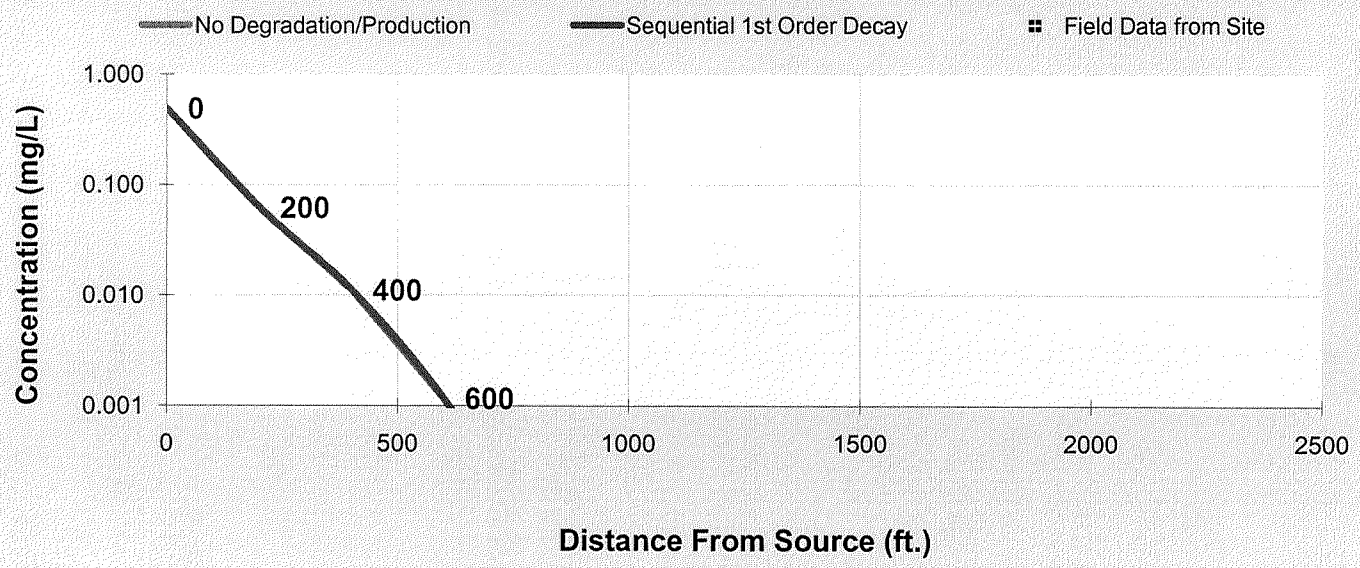
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.495	0.063	0.011	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.4950	0.063	0.011	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

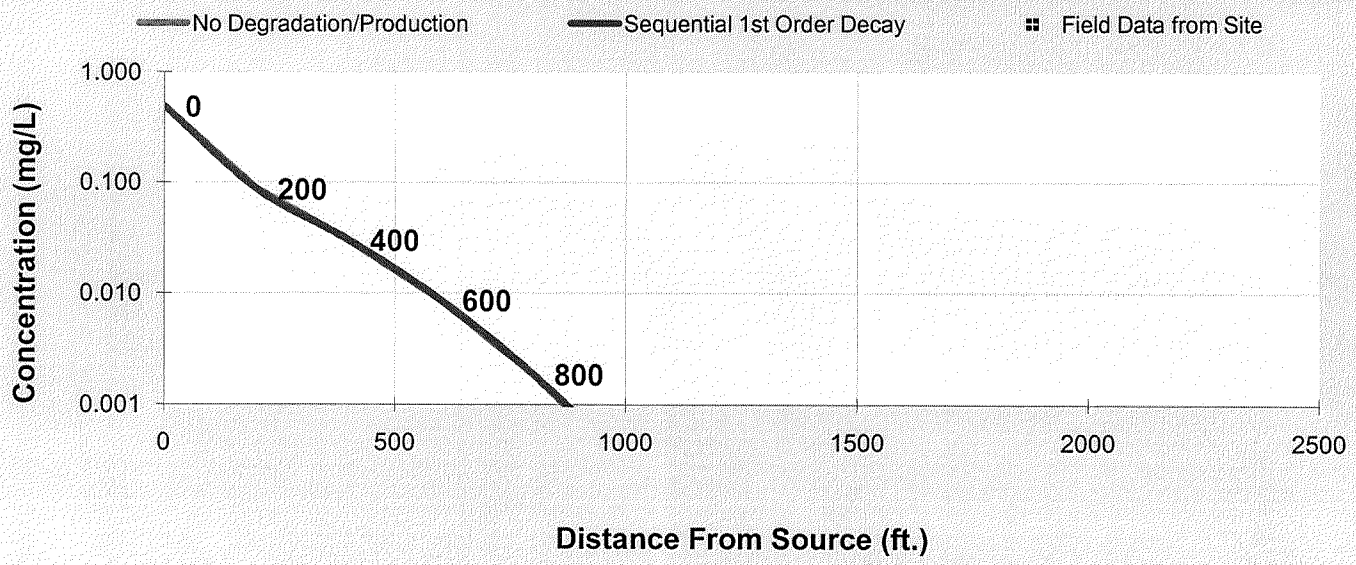
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.490	0.087	0.030	0.009	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.4901	0.087	0.030	0.009	0.002	0.000	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

20.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

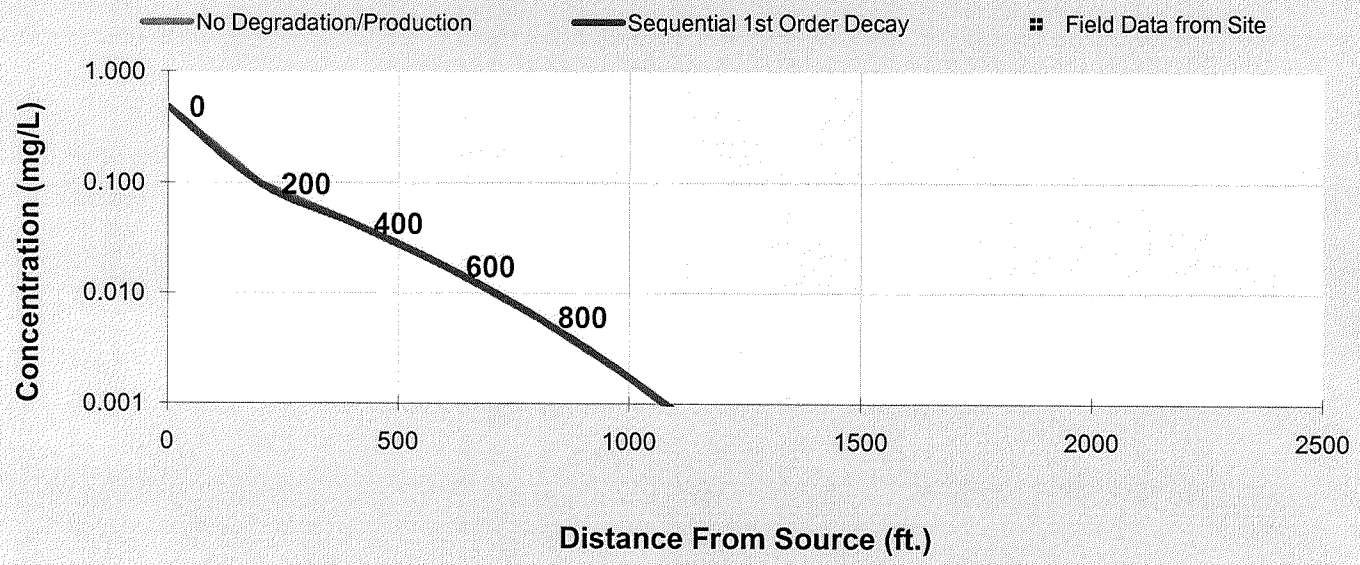
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.485	0.099	0.043	0.018	0.006	0.002	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.4852	0.099	0.043	0.018	0.006	0.002	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

30.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

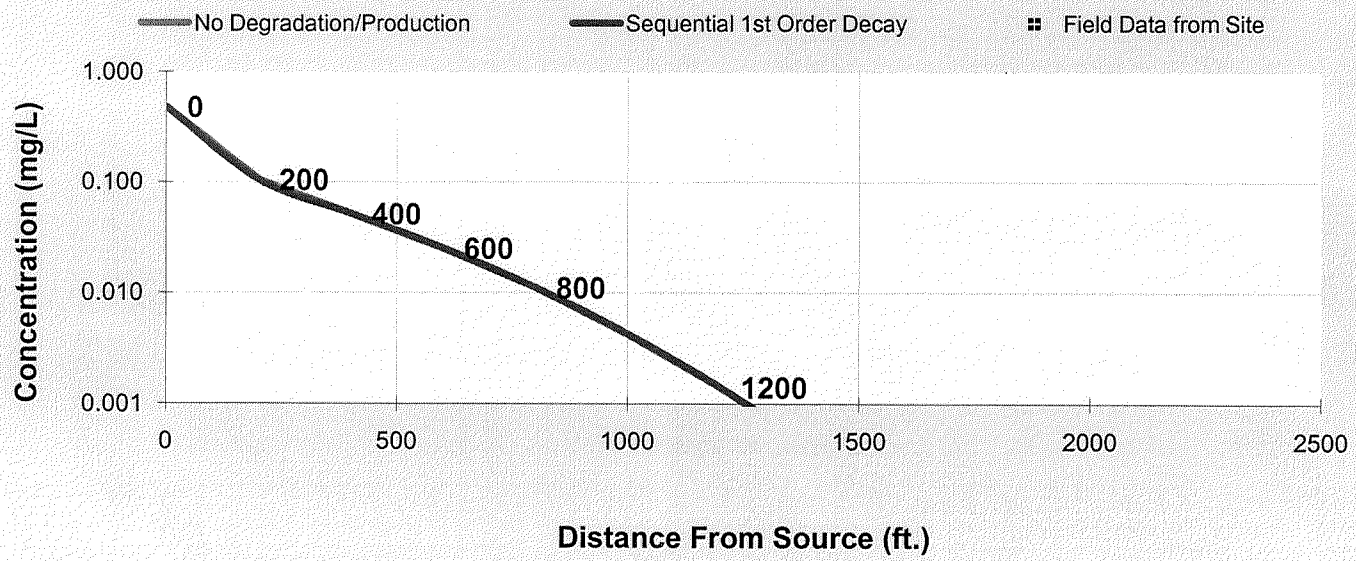
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.480	0.105	0.052	0.025	0.011	0.004	0.001	0.000	0.000	0.000	0.000
Biotransformation	0.4804	0.105	0.052	0.025	0.011	0.004	0.001	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

40.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

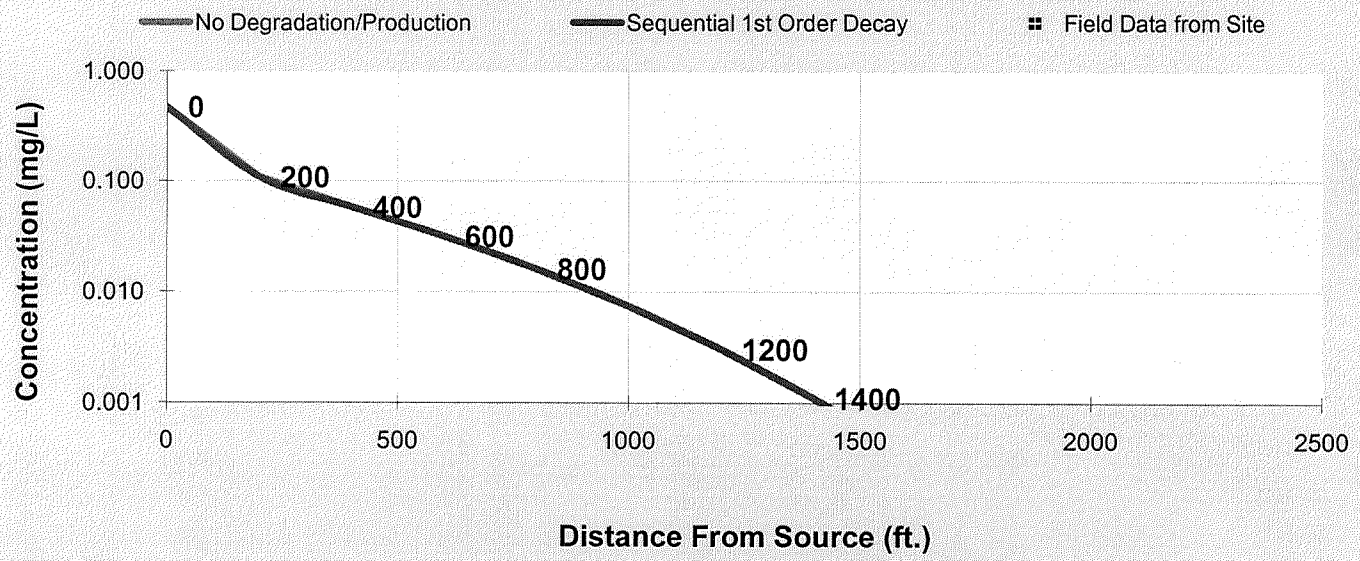
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.476	0.109	0.058	0.032	0.016	0.007	0.003	0.001	0.000	0.000	0.000
Biotransformation	0.4756	0.109	0.058	0.032	0.016	0.007	0.003	0.001	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

50.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

100 ppb Total VOCs Clean-Up

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Former Alcatel Site
Raleigh, NC
Run Name

Data Input Instructions:

115 → 1. Enter value directly....or
↑ or
0.02 ↗ 2. Calculate by filling in gray cells. Press Enter, then ⓒ

(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ○ Ethanes ◉

1. ADVECTION

Seepage Velocity*	Vs	6.9	(ft/yr)
or			
Hydraulic Conductivity	K	1.0E-04	(cm/sec)
Hydraulic Gradient	i	0.01	(ft/ft)
Effective Porosity	n	0.15	(-)

2. DISPERSION

Alpha x*	500	(ft)
(Alpha y) / (Alpha x)*	0.1	(-)
(Alpha z) / (Alpha x)*	1.E-99	(-)

Calc. Alpha x

3. ADSORPTION

Retardation Factor* → R

or

Soil Bulk Density, rho		1.7	(kg/L)	
FractionOrganicCarbon, foc		1.0E-3	(-)	
Partition Coefficient	Koc			
TCA		56	(L/kg)	1.63 (-)
DCA		30	(L/kg)	1.34 (-)
CA		3	(L/kg)	1.04 (-)

Common R (used in model)* = 1.34

4. BIOTRANSFORMATION

-1st Order Decay Coefficient*

Zone 1

	λ (1/yr)	half-life (yrs)	Yield
TCA → DCA	0.000		0.74
DCA → CA	0.000		0.65
CA → Ethane	0.000		0.47

Zone 2

	λ (1/yr)	half-life (yrs)
TCA → DCA	0.000	
DCA → CA	0.000	
CA → Ethane	0.000	

λ HELP

5. GENERAL

Simulation Time*	50	(yr)
Modeled Area Width*	700	(ft)
Modeled Area Length*	2000	(ft)
Zone 1 Length*	2000	(ft)
Zone 2 Length*	0	(ft)

Zone 2= L - Zone 1

6. SOURCE DATA

TYPE: Decaying Single Planar

Source Options

Source Thickness in Sat. Zone* 20 (ft)

	Y1	k_s* (1/yr)
Width* (ft)	100	
Conc. (mg/L)*	C1	
TCA	.1	0.001
DCA	.0	0.001
CA	.0	0.001

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations

View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

TCA Conc. (mg/L)											
DCA Conc. (mg/L)											
CA Conc. (mg/L)											
Distance from Source (ft)	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Date Data Collected	2009										

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore Formulas | RESET | SEE OUTPUT | Paste Example

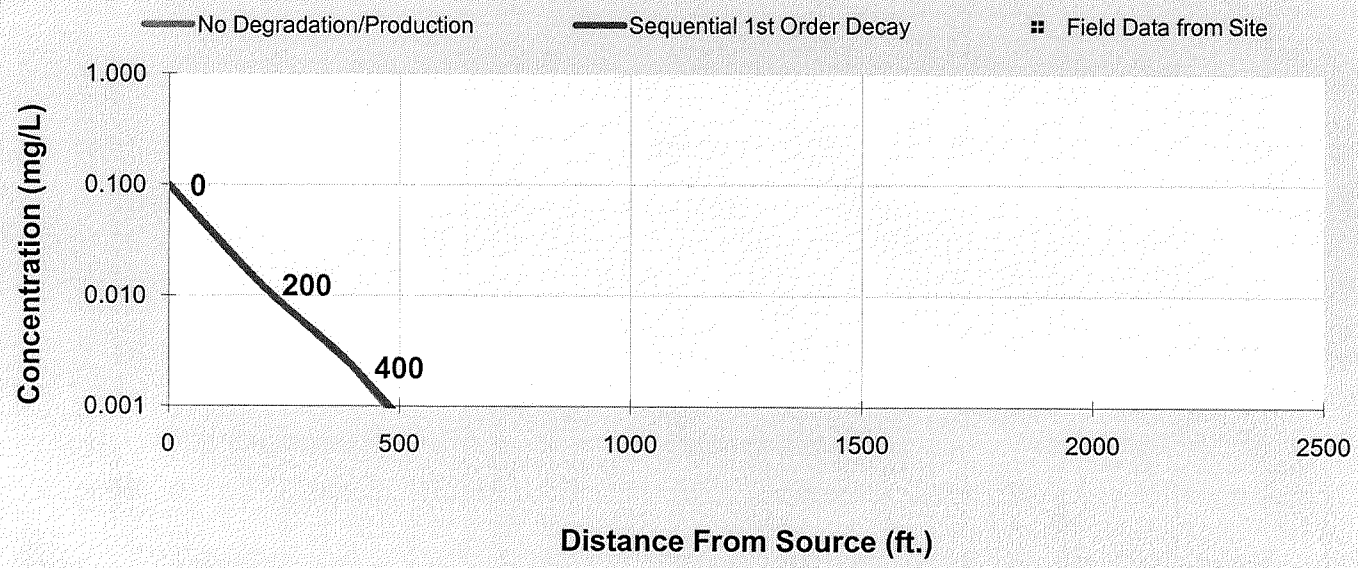
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.099	0.013	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0990	0.013	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

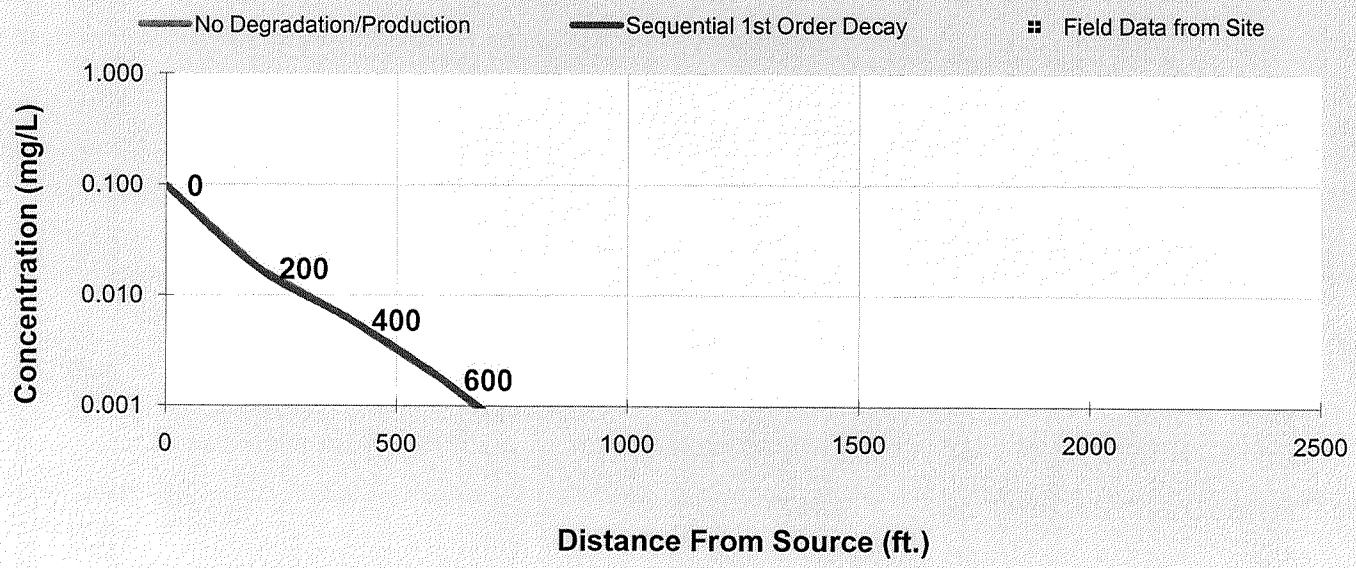
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.098	0.017	0.006	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0980	0.017	0.006	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

20.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

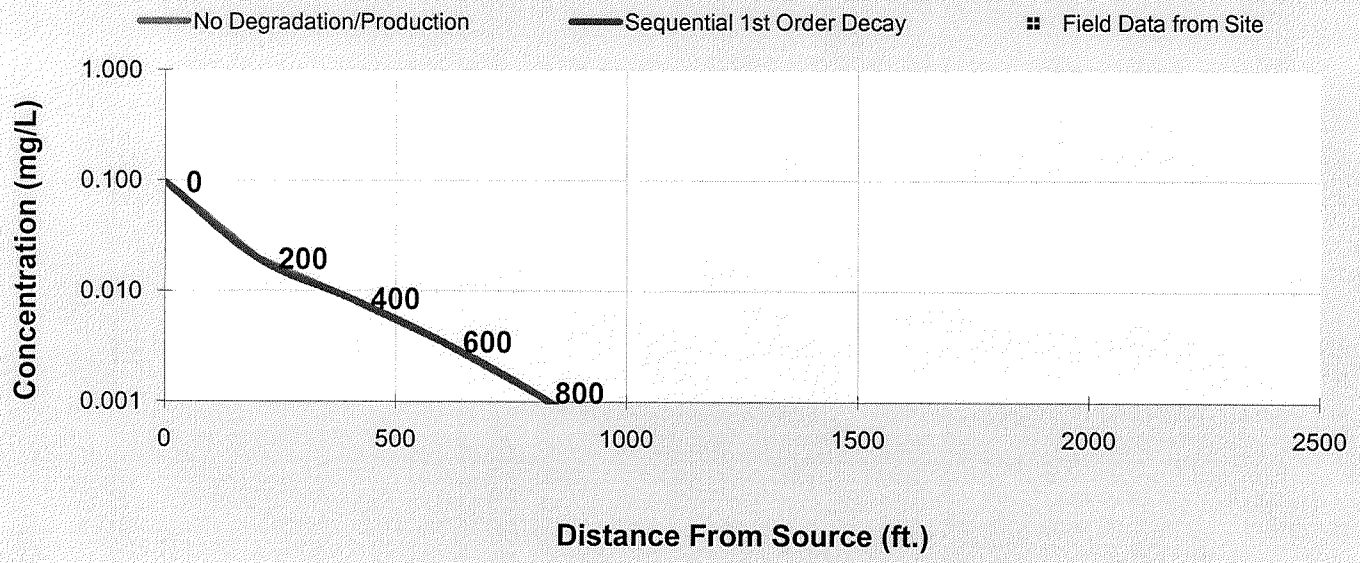
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.097	0.020	0.009	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0970	0.020	0.009	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

30.0 Years

Log ⟷ Linear

Return to Input

To All

To Array

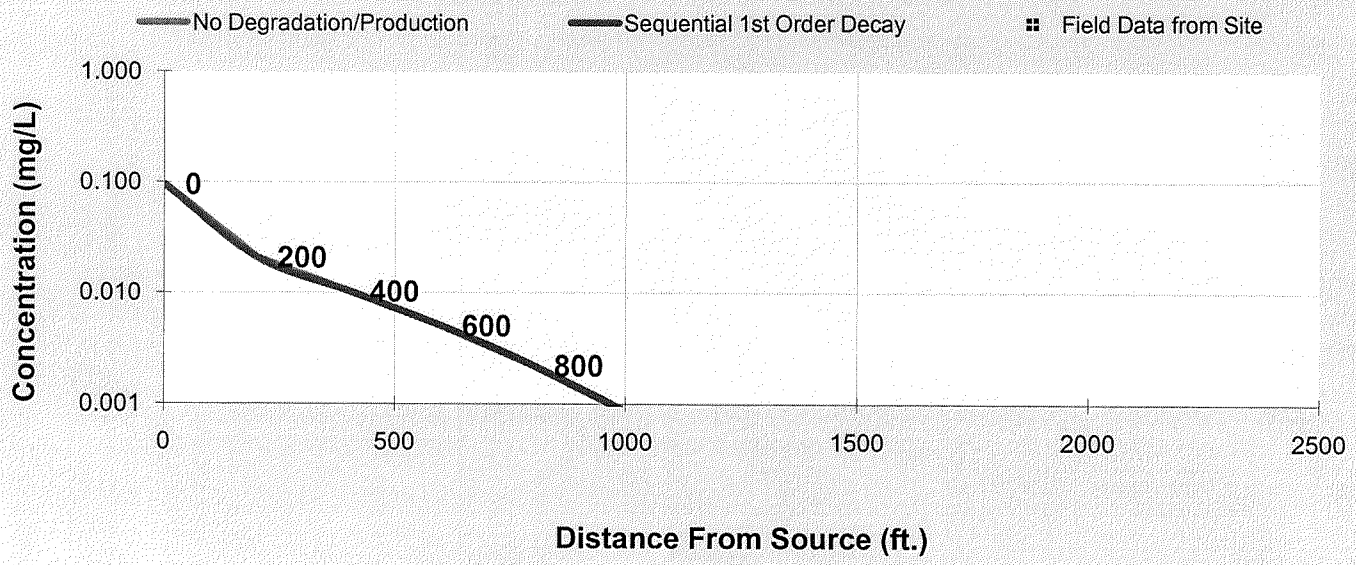
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.096	0.021	0.010	0.005	0.002	0.001	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0961	0.021	0.010	0.005	0.002	0.001	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

40.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

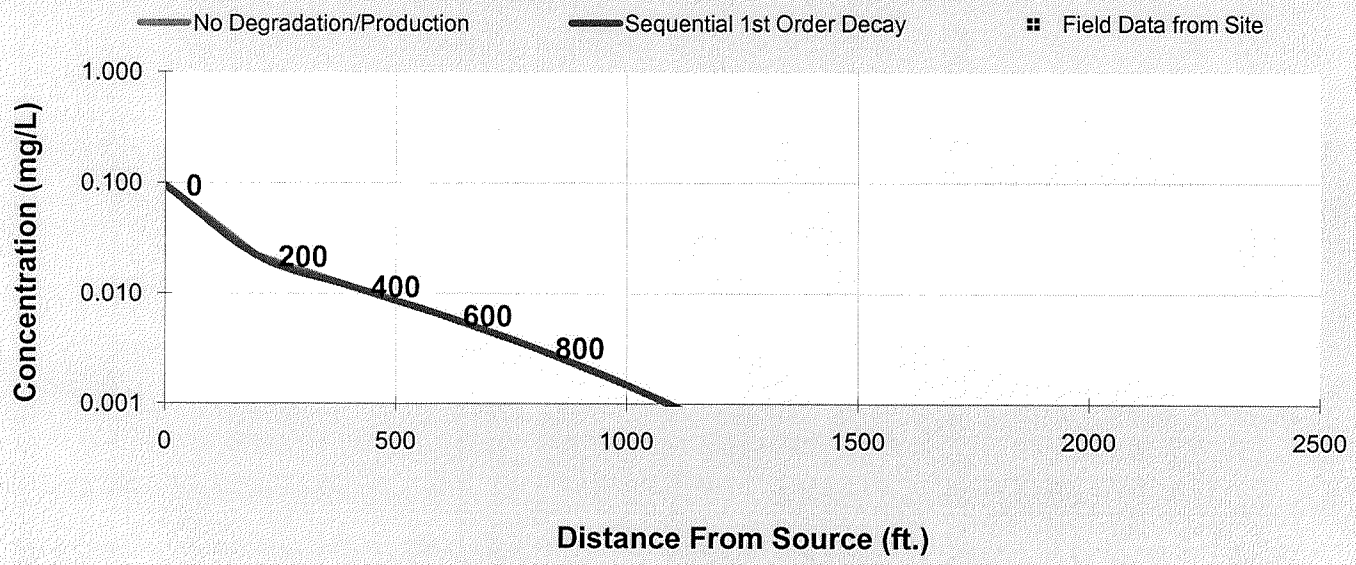
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCA	0	200	400	600	800	1000	1200	1400	1600	1800	2000
No Degradation	0.095	0.022	0.012	0.006	0.003	0.001	0.001	0.000	0.000	0.000	0.000
Biotransformation	0.0951	0.022	0.012	0.006	0.003	0.001	0.001	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Field Data from Site											



See TCA

See DCA

See CA

Replay

Time:

50.0 Years

Log ⟺ Linear

Return to Input

To All

To Array